WORLD CONGRESS ON OSTEOPOROSIS, OSTEOARTHRITIS AND MUSCULOSKELETAL DISEASES



WCO IOF-ESCEO

2026 PRAGUE

April 16-19, 2026

Prague | Czech Republic

O_2 universum Prague

WORLD'S LEADING CLINICAL CONFERENCE ON BONE, JOINT AND MUSCLE HEALTH

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The Abstracts will be also published, at the end of Q3 2025, in a supplement of the Journal Aging Clinical and Experimental Research, the official ESCEO Journal – IF 2023: 3.4

NEW!

APAC AUDIT 2025

THE APCO-IOF ASIA PACIFIC REGIONAL AUDIT

EPIDEMIOLOGY, COSTS AND BURDEN OF OSTEOPOROSIS IN 2025

32 NATIONAL SOCIETIES

6 REGIONAL UNIVERSITIES

22 COUNTRIES/ REGIONS

READ ONLINE

DISCOVER ALL THE FINDINGS THROUGH THE MAIN REPORT, COUNTRY PROFILES AND INTERACTIVE MAP

- **National and regional epidemiological data** for osteoporosis and fragility fractures
- **Review of diagnosis, treatment, guidelines** etc. for each country
- **Describes progress and challenges** at the national and regional level
- **Includes key messages and recommendations** to help tackle the fragility fracture crisis in the region



IOF International Osteoporosis Foundation

APCO ASIA PACIFIC CONSORTIUM ON OSTEOPOROSIS

www.osteoporosis.foundation/asia-pacific-audit-2025

ABOUT ESCEO

The European Society for Clinical and Economic Aspects of Osteoporosis, Osteoarthritis and Musculoskeletal Diseases (ESCEO) is a not-for-profit organization, dedicated to a close interaction between clinical scientists dealing with bone, joint and muscle disorder, pharmaceutical industry developing new compounds in this field, regulators responsible for the registration of such drugs and health policy makers, to integrate the management of Osteoporosis and Osteoarthritis within the comprehensive perspective of health resources utilization.

The objective of ESCEO is to provide practitioners with the latest clinical and economic information, allowing them to organize their daily practice, in an evidence-based medicine perspective, with a cost-conscious perception.

www.esceo.org

ABOUT IOF

The International Osteoporosis Foundation (IOF) is the world's largest nongovernmental organization dedicated to the prevention, diagnosis, and treatment of osteoporosis and related musculoskeletal diseases. Its members — including committees of leading scientific researchers and 349 patient, medical, and research organizations across 152 countries — work together to make fracture prevention and healthy mobility a global healthcare priority.

www.osteoporosis.foundation

Mission

- Increase awareness and understanding of osteoporosis.
- Motivate people to take action to prevent, diagnose and treat osteoporosis.
- Support national osteoporosis societies in order to maximize their effectiveness

DEAR COLLEAGUES,

We are delighted to welcome you to the 2026 IOF-ESCEO World Congress on Osteoporosis, Osteoarthritis and Musculoskeletal Diseases in Prague.

The Congress' scientific programme has been developed by a team comprising members of the Committee of Scientific Advisors of the International Osteoporosis Foundation (IOF) and the Scientific Advisory Board of the European Society for Clinical and Economic Aspects of Osteoporosis, Osteoarthritis and Musculoskeletal Diseases (ESCEO). We would like to thank the respective Scientific Programme Chairs — Professors Nicholas Harvey and René Rizzoli — for taking the lead in shaping a comprehensive programme that brings together the world's leading experts in musculoskeletal health and disease, while fully leveraging the synergies and combined expertise of our two organisations. Additionally, we extend our sincere thanks to the local organising society, the Czech Society of Metabolic Bone Diseases, for their invaluable support and collaboration.

With a shared goal, we come together to acquire new knowledge, skills and tools for preventing and treating osteoporosis, osteoarthritis and sarcopenia, the most common and disabling musculoskeletal conditions affecting older adults. Specific related focus areas of this year's meeting include novel care pathways for structured post-fracture follow-up and secondary prevention, the role of obesity and diabetes in bone and joint health and advances in long-term osteoporosis management, as well as emerging topics such as the musculoskeletal effects of GLP-1 receptor agonists, AI in clinical practice and global challenges in bone health management, among many other cutting edge topics. By presenting innovative strategies and new options for prevention, diagnosis, and treatment, this Congress will advance the field for the benefit of patients worldwide.

The core scientific programme consists of **10** plenary lectures by renowned speakers and **41** oral communications selected from the very best of hundreds of submitted abstracts, and **22** oral presentations of selected posters. In addition, participants can choose among **10** different Meet-The-Expert sessions and **14** special sessions and symposia on issues of clinical importance. We also encourage you to attend the scheduled poster sessions and the industry-sponsored satellite symposia. Be sure to visit the large commercial exhibition, presented by leading companies in the bone field, as well as the 'CNS Village,' where you can meet IOF's member societies from around the world.

We are proud to share that our World Congress, the largest in the field, continues to set new records each year for attendance and abstract submissions. We are especially grateful for your ongoing support and engagement and are committed to making this meeting a memorable and enriching experience for all.



Nicholas C. Harvey
IOF President

Jean-Yves Reginster
ESCEO President

EVENT

WCO-IOF-ESCEO
April 16-19, 2026

World Congress on Osteoporosis, Osteoarthritis and Musculoskeletal Diseases

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Společnost pro metabolická onemocnění skeletu

The Congress is under the auspices of Czech Minister of Health, Mr. Adam Vojtech

The project is implemented with the financial support of the Capital City of Prague

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PRECCO

PRE-COMPETITIVE CONSORTIUM ON OSTEOPOROSIS AND BONE HEALTH

An initiative from ESCEO and IOF to support the five-year partnership signed between ESCEO and the World Health Organization to improve the management of osteoporosis

ESCEO and IOF are very proud to announce the creation of the Pre-Competitive Consortium on Osteoporosis and Bone Health (PRECCO). This Consortium, created to support the five-year partnership signed between ESCEO and the **World Health Organization** to improve the management of osteoporosis, involves a diverse range of stakeholders, who place the osteoporotic patients at the center of their priorities, independently of their immediate strategy, in terms of content and timeline. The stakeholders supporting the PRECCO are listed below.

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15:15 - 16:45 - Auditorium 1
WCO-IOF-ESCEO - OPENING CEREMONY
Chairpersons: Jean-Yves Reginster, Nicholas C. Harvey

15:15 **Best clinical papers published in 2025** René Rizzoli

15:55 **Opening of the Congress** Jean-Yves Reginster, Nicholas C. Harvey

16:05 **Presentation of the IOF achievements** Nicholas C. Harvey

16:10 **Presentation of the ESCEO achievements** Jean-Yves Reginster

16:15 **Welcome Speech of the Czech Minister of Health** Adam Vojtech

16:20 **Current global challenges in academic publishing** Sarah Onuora (Editor-in-Chief Nature Reviews Rheumatology)

16:40 **Presentation of the ESCEO-IOF Pierre Delmas Medal** René Rizzoli

16:45 - 17:55 - Auditorium 1
ESCEO-WHO INNOVATION SESSION
Chairpersons: René Rizzoli, Jotheeswaran Amuthavalli Thiyagarajan (WHO-Geneva)
See details on Page 30

17:55 - 19:00 - Auditorium 1
WCO-IOF-ESCEO - OPENING CEREMONY
Chairpersons: Jean-Yves Reginster, Nicholas C. Harvey

17:55 **Three Years On: Evidence and Insights from the WHO Bone Health Initiative** Jotheeswaran Amuthavalli Thiyagarajan (WHO-Geneva)

18:05 **Presentation of the 2026 IOF CSA Medal of Achievement** Etienne Cavalier

18:10 **Understanding the origin of diseases through population genetics** Kirsten Bos

18:40 **Presentation of the IOF President's Award** Nicholas C. Harvey

18:45 **Presentation of the WHO-ESCEO Innovation Award** Jotheeswaran Amuthavalli Thiyagarajan (WHO-Geneva)

19:00 - 20:00 - Auditorium 1
WELCOME COCKTAIL

08:00 - 09:00 - Auditorium 1
SPONSORED BREAKFAST SYMPOSIUM

See details on the Sponsored Sessions Section (Pages 28-29)

08:00 - 09:00 - Auditorium 2
SPONSORED BREAKFAST SYMPOSIUM

See details on the Sponsored Sessions Section (Pages 28-29)

08:00 - 09:00
NON-SPONSORED SYMPOSIA

MR - D9 **Musculoskeletal Aging: where East meets West**
Chairperson: Elaine Dennison
- Musculoskeletal aging in the oldest old: when East meets West Elaine Dennison
- The ROAD study: an overview Noriko Yoshimura
- The SALSA study: an overview Faidra Laskou
- How does musculoskeletal health and its determinants in East and West differ? Leo Westbury

MR - D8 **Cardiovascular Comorbidities in Osteoporosis: WHO Report**
Chairperson: Joshua Lewis
- Move to Improve: Osteoporosis, Cardiovascular Risk, and the Role of Exercise in Healthy Aging Cassandra Smith
- Bone Appétit: Influence of Cardiovascular Disease on Musculoskeletal Health: A Key Role for Nutrition? Marc Sim
- A Model of Atherosclerotic Calcifications as a Consequence of Osteoporosis Gordon Klein
- Q&A

MR - D3 **The metabolic profile of psoriatic disease. Obesity, musculoskeletal manifestations and management**
Chairperson: Panagiotis Athanassiou
- Psoriatic disease Lambros Athanassiou
- Psoriatic disease and metabolic syndrome Yannis Dionyssiotis
- Psoriatic disease and obesity Yannis Athanassiou, Ifigenia Kostoglou-Athanassiou
- Psoriatic disease and treatment Panagiotis Athanassiou

MR- D4 **Standardizing Periprosthetic DXA in Hip and Knee Arthroplasty: From Variability to Robust Data**
Chairpersons: Jose Francisco Torres-Naranjo, Cristina Ojeda-Thies
- Why Periprosthetic DXA Needs Standardization: Evidence, Variability, and the RAND/UCLA Process Iñigo Etxebarria Foronda
- From Pixels to Protocols: A Practical Framework for High-Quality Periprosthetic DXA Jose Francisco Torres-Naranjo
- Interpreting Perprosthetic BMD: Precision, Longitudinal Change, and Therapy-Aware Flags Roberto Enrique Lopez-Cervantes

MR - D1 **Capture the Fracture - Building High-Quality Fracture Liaison Services: Practical Lessons from Global Experience**
Chairperson: Maria Luisa Brandi
- The FLS history in Italy: A decade of action Maria Luisa Brandi
- Learning from peers and building a strong FLS community – the Japanese experience Atsushi Suzuki
- A set of variables for the assessment of Fragility Fracture patients in an FLS environment in Latin America (Country Specific Datasets) Monica Calo
- Q&A

08:00 - 09:00 - MR - C1
ESCEO MEETS DVO Current highlights in Osteology

Chairpersons: Ralf Schmidmaier, Manju Chandran
- One for all? Scoring of vertebral fractures? Uwe Maus
- Treatment induced osteoporosis in women with breast cancer - the updated position statement Peyman Hadji
- Fracture and Osteoporosis - Riskfactor, Endpoint, Complication,Treatment Andreas Kurth

08:00 - 09:00 - MR - D12
ESCEO SYMPOSIUM

Update of the 2017 recommendations for the use of Hyaluronic Acid injections in patients with knee osteoarthritis: a patient-centered experts' consensus

Chairpersons: François Rannou, Ali Mobasheri
- Efficacy of IAHA in osteoarthritis Olivier Bruyère
- Safety of IAHA in osteoarthritis Emmanuel Maheu
- New perspectives in the use of IAHA for the management of osteoarthritis Nicholas Fuggle
- Discussion leaders Elaine Dennison, Alberto Migliore

09:00 - 10:30 - Auditorium 1
SCIENTIFIC SESSION I

Chairpersons: Charlotte Beaudart, Peter Ebeling

09:00 **Plenary Lecture**
Management of very high fracture risk in the context of a lifelong osteoporosis treatment plan
Michael McClung

09:30 **ORAL COMMUNICATIONS SELECTED FROM ABSTRACTS**

09:30 **OC1** PREDICTIVE VALUE OF BMD FOR HIP AND OTHER FRACTURES A META-ANALYSIS TO UPDATE FRAX
Presenting author: E. McCloskey
Authors: N. C. Harvey, H. Johansson, E. Liu, L. Vandenput, M. Lorentzon, W. D. Leslie, J. A. Kanis, Frax Meta-Analysis Cohort Group

09:40 **OC2** LIFE EXPECTANCY FOLLOWING FIRST DXA - ARE MEN REFERRED TOO LATE? AN ANALYSIS OF THE 1900-1960 BIRTH COHORT
Presenting author: B. Abrahamsen
Authors: B. Bakke Hansen, B. Haddock, N. Rye Jørgensen, P. Vestergaard, U. Kock Wiil, L. Folkestad, S. Möller, B. Langdahl, K. Hass Rubin

09:50 **OC3** EARLY INITIATION OF OSTEOPOROSIS TREATMENT AFTER FRACTURE REDUCES SECONDARY FRACTURES IN ADULTS AGED ≥75 YEARS
Presenting author: M. Tsukamoto
Authors: T. Hamasaki, N. Okimoto, Y. Saito, S. Fujiwara

10:00 **OC4** TIMING OF ANTI-OSTEOPOROTIC TREATMENT INITIATION AFTER VERTEBRAL FRACTURE AND RISK OF NEW FRACTURE IN A FLS MODEL
Presenting author: N. Padron Orozco
Authors: P. Perez Andrés, C. Reyes Diez, M. J. Montesa Cabrera, B. Gonzalez Alvarez

10:10 **OC5** THE NUMBER NEEDED TO TREAT (NNT) ANALYSIS: A CLINICAL CONTEXT FOR THE TREATMENT-RELATED CHANGE IN TOTAL HIP BONE MINERAL DENSITY: THE ASBMR-SABRE PROJECT
Presenting author: T. Vilaca
Authors: L. Lui, M. Schini, S. K. Ewing, A. Thompson, E. Vittinghoff, D. C. Bauer, B. Langdahl, D. Black, M. Bouxsein, R. Eastell

10:20 **OC6** ADHERENCE TO CARDIOVASCULAR RISK MINIMIZATION MEASURES FOR ROMOSOZUMAB INTERIM RESULTS FROM A EUROPEAN MULTI-DATABASE DRUG UTILISATION STUDY
Presenting author: E. H. Tan
Authors: T. Rathod-Mistry, M. T. Sanchez-Santos, C. Reyes, M. Far, J. Reinold, L. Pederson, B. Darvalics, K. Verhamme, A. Brutau Abia, F. Riefolo, P. Beukelaers, S. Lisart, A. Moayerri, D. Prieto-Alhambra

10:30 - 12:15 - Auditorium 1
SCIENTIFIC SESSION II

Chairpersons: Radmila Matijevic, Etienne Cavalier

10:30 **Presentation of the 2026 ESCEO Medal of Excellence** Jean-Yves Reginster

10:40 **Plenary Lecture**
Barriers and facilitators for orthogeriatric success Celia Gregson

11:10 **OC7** REVISED SWEDISH FRAX MODELS AND THE ESTABLISHMENT OF AGE-DEPENDENT INTERVENTION THRESHOLDS
Presenting author: K. Axelsson
Authors: H. Litsne, N. C. Harvey, J. A. Kanis, E. McCloskey, H. Johansson, M. Lorentzon

11:20 **OC8** IMPROVED 10-YEAR FRACTURE RISK PREDICTION WITH THE “;BONE STRAIN INDEX“; BEYOND BONE MINERAL DENSITY AND FRAX IN COMMUNITY-DWELLING OLDER WOMEN
Presenting author: J.-J. Body
Authors: J. M. K. De Filette, A. Bellanger, L. Rinaudo, F. M. Ulivieri, I. Calderone, S. Cuttone, D. Sanchez-Rodriguez, F. Baleanu, A.-S. Hambye, F. Benoit, M. Surquin, L. Iconaru, P. Bergmann

11:30 **OC9** EROSIVE HAND OSTEOARTHRITIS IS ASSOCIATED WITH INCREASED RISK OF INCIDENT OSTEOPOROTIC FRACTURES IN POST-MENOPAUSAL WOMEN (QUALYOR COHORT)
Presenting author: M. Auroux
Authors: A. Mercier-Guery, A. Piot, B. Merle, M. Proriol, E. Fontanges, E. Duvert, E. Lespessailles, R. Chapurlat

11:40 **OC10** MUSCULOSKELETAL HEALTH AND LIFE-SPACE MOBILITY, SOCIAL ISOLATION AND LONELINESS IN THE OLDEST OLD FINDINGS FROM THE HERTFORDSHIRE COHORT STUDY
Presenting author: L. Westbury
Authors: G. Bevilacqua, H. P. Patel, F. Laskou, E. M. Dennison

11:50 **OC11** BONE COMPONENT DISORGANIZATION IN METABOLIC AND GENETIC BONE DISEASES, INCLUDING HYPOPHOSPHATASIA NOVEL INSIGHTS INTO DISEASE PATHOGENESIS AND PATIENT ASSESSMENT
Presenting author: R. Zebaze
Authors: C. Chiang, C. Shore-Lorenti, F. Milat, R. Ebeling

12:00 **OC12** FREQUENCY OF ECTOPIC CALCIFICATIONS AMONG PATIENTS WITH HYPOPHOSPHATASIA IN THE GLOBAL HPP REGISTRY
Presenting author: P. Ebeling
Authors: A. Linglart, K. M. Dahir, P. S. Kishnani, A. Petryk, L. K. Burke, S. Fang, W. Högler, G. A. Martos Moreno, C. Rockman-Greenberg, L. Seefried, K. Ozono

12:15 - 13:45 - Auditorium 1
SPONSORED LUNCH SYMPOSIUM
See details on the Sponsored Sessions Section (Pages 28-29)

12:15 - 13:45 - Auditorium 2
SPONSORED LUNCH SYMPOSIUM
See details on the Sponsored Sessions Section (Pages 28-29)

14:00 - 15:00
MEET-THE-EXPERT SESSION

MR - D9 **PTH, vitamin D and bone turnover markers from the laboratory perspective: more than you can eat!** Etienne Cavalier

MR - D8 **Skeletal microarchitecture and fracture risk** Roland Chapurlat

MR - D1 **FLS: current global challenges** Manju Chandran

MR - D2 **Managing bone health after bariatric surgery** Bernard Cortet

14:00 - 15:00 - MR- D4
EDUCATIONAL LECTURE
Revolution in Osteoporosis Patient Care Necessity, Opportunities, Possibilities and Results. The Czech Paradigm
Chairpersons: Eugene McCloskey, Vladimir Palicka, Richard Pikner

- Osteoporosis Care in the Czech Republic: where we are and where we go Vladimir Palicka
- Czech National Population Programme for Early Detection of Osteoporosis - Methodology, Principles, and 30 Months Results Richard Pikner
- Discussion

14:00 - 15:00 - Podium
ORAL PRESENTATIONS OF SELECTED POSTERS
Chairperson: Elaine Dennison

14:00 **OP1 - P416** FROM WRIST TO HIP CAN EARLY FLS INTERVENTION AFTER A DISTAL RADIUS FRACTURE PREVENT THE NEXT FRAGILITY FRACTURE
Presenting author: C. Singh
Authors: A. E. Elsalamwy, D. C. Charchoglyan, S. Z. Zidan

14:06 **OP2 - P1154** ASSOCIATION BETWEEN THE TREATMENT-RELATED CHANGE IN BONE MINERAL DENSITY AND FRACTURE RISK REDUCTION ACCORDING TO THE PRE-TREATMENT BMD ANALYSIS FROM THE FNIH-ASBMR SABRE PROJECT
Presenting author: M. Schini
Authors: L. Lui, T. Vilaca, S. K. Ewing, A. Thompson, B. L. Langdahl, D. M. Black, M. L. Bouxsein, R. Eastell

14:12 **OP3 - P1770** REAL-WORLD TREATMENT STRATEGIES FOR OSTEOPOROSIS IN OLDER ADULTS WITH CKD-MBD IMPACT OF GERIATRIC SYNDROMES AND TREATMENT COMPLIANCE
Presenting author: S. Z. Şahin Tırnova
Authors: E. Pınar, Z. Fetullahoğlu, D. Seyithanoğlu, H. Arıcı, T. Erdoğan, S. Öztürk, O. Soyluk Selçukbiricik, G. Yenidünya Yalın, N. Gül, A. S. Artan, M. A. Karan, G. Bahat

14:18 **OP4 - P365 -** GLP-1 RECEPTOR AGONISTS AND MUSCULOSKELETAL OUTCOMES A SYSTEMATIC LITERATURE REVIEW AND META-ANALYSIS
Presenting author: C. Beaudart
Authors: Y. Malréchauffé, S. van Heden, D. Sanchez-Rodriguez, A. Scheen, O. Bruyère, A. Mobasheri, G. Duque, R. Rizzoli, J.-Y. Reginster

14:24 **OP5 - P1076** BISPHOSPHONATES OR DENOSUMAB AFTER FRACTURE? REAL-WORLD EVIDENCE FROM A TARGET TRIAL EMULATION IN MULTIMORBID ADULTS
Presenting author: M. Lin
Authors: T. Tran, R. Blank, J. R. Center, D. Bliuc

14:36 **OP6 - P806** HIP BONE COMPARTMENT RESPONSES TO ROMOSOZUMAB VERSUS ALENDRONATE IN PATIENTS WITH DIABETES A SUBGROUP ANALYSIS FROM THE ARCH TRIAL USING 3D-DXA MODELLING
Presenting author: S. Ferrari
Authors: N. Napoli, B. L. Langdahl, K. Luijtens, J. Timoshanko, L. Humbert, M. Bracco

14:42 **OP7 - P261** THE EFFECTIVENESS OF THE INTENSIVE CARE PROGRAM FOR FLS IMPLEMENTATION TO REDUCE MORPHOMETRIC VERTEBRAL FRACTURES IN OSTEOPOROSIS PATIENTS AT VERY HIGH FRACTURE RISK COMPARED TO THE PRIMARY CARE PHYSICIAN-LED STANDARD CARE JOINT-08 TRIAL
Presenting author: A. Suzuki
Authors: H. Hagino, Y. Uemura, J. Iwamoto, S. Tanaka, Y. Takeuchi, S. Tanaka, S. Soen, E. Hamaya, J. Shimauchi, K. M. Javaid

14:48 **OP8 - P1011** BONE HEALTH IN PATIENTS WITH NON-METASTATIC PROSTATE CANCER ON ANDROGEN DEPRIVATION THERAPY INTERNATIONAL OSTEOPOROSIS FOUNDATION – BONE AND CANCER WORKING GROUP – POSITION STATEMENT
Presenting author: M. Chakhtoura
Authors: N. Napoli, D. Kendler, A. Bazzocchi, R. Blank, J.-J. Body, M. L. Brandi, P. Hadji, E. Biver, C. Campusano, J. Cannata-Andía, C. Confavreux, P. Ebeling, C. Glüer, G. Guglielmi, G. Holzer, T. De Villiers, D. Pierroz, R. Rizzoli, G. El Hajj Fuleihan

14:54 **OP9 - P427** OSTEOPOROSIS AND HEARING LOSS NATIONWIDE EVIDENCE FOR AN EXTRA-SKELETAL PROTECTIVE EFFECT OF ZOLEDRONIC ACID AND DENOSUMAB
Presenting author: C.-F. Huang
Authors: C.-F. Huang, S.-H. Hung, W. P. Chan

15:00 **OP10 - P739** TRANSLATING MOLECULAR INSIGHTS INTO CLINICAL PROGRESS RJX-01 FOR MUSCLE RECOVERY AND OSTEOSARCOPENIA THERAPY
Presenting author: J. Aerssens
Authors: A. Ugarte , S. Verheijden , L. Meuleners , E. Mercken, A. Beliën

14:00 - 15:00 - MR - C1
ESCEO SYMPOSIUM
GLP-1 Receptor Agonists and Musculoskeletal Health
Chairpersons: René Rizzoli, Nicholas C. Harvey

- Introduction
  Gulistan Bahat
- GLP1 Receptor Agonists and bone health
  Elizabeth Curtis, Nicholas C. Harvey
- GLP1 Receptor Agonists and joint health
  Ali Mobasheri
- GLP1 Receptor Agonists and muscle health
  Gustavo Duque
- Discussion and conclusion
  René Rizzoli

14:00 - 15:00 - MR - D12
WHO COLLABORATING CENTER ON EPIDEMIOLOGY OF MUSCULOSKELETAL HEALTH SYMPOSIUM
New perspectives on clinical and regulatory aspects of sarcopenia management
Chairpersons: Nicholas Fuggle, Andrea Laslop

- Introduction
  Andrea Laslop
- Sarcopenia: state of the art in disease definition and clinical translation
  Alfonso Cruz Jentoft
- Development of novel muscle-active agents: a regulatory perspective
  Ewa Balkowiec-Iskra
- Discussion
  Nicholas Fuggle

14:00 - 15:00 - MR - D3
SPONSORED SESSION
See details on the Sponsored Sessions Section (Pages 28-29)

15:00 - 16:45 - MR - D12
COMMITTEE OF NATIONAL SOCIETIES SPECIAL PLENARY SESSION: FROM RESEARCH TO CLINICAL PRACTICE: BRIDGING THE GAP IN BONE HEALTH
Chairpersons: Famida Jiwa, Şansın Tüzün

15:10 **OCs1** A BODY SHAPE INDEX AS A SURROGATE MARKER FOR SARCOPENIA RISK IN POSTMENOPAUSAL WOMEN: A CROSS-SECTIONAL ANALYSIS
Presenting author: Z. Beşışık Yılmaz
Authors: S. Durmuş, A. Yılmaz, E. D. Özüdoğru, Y. Yıldız, C. Alkaç, B. Can, A. Tufan

15:18 **OCs2** REIMAGINING ROUTINE HEALTH INFORMATION SYSTEMS TO DETECT FRACTURE RISK AND OSTEOPOROSIS A POLICY BRIEF PREPARED FOR THE WORLD HEALTH ORGANISATION (WHO)
Presenting author: M. Sim
Authors: A. Vassallo, B. Abrahamsen, S. Barteit, C. L. Cheung, M. Diehl, G. Duque, G. E. Fuleihan, N. Fahimfar, C. C. Glüer, C. L. Gregson, N. Hong, M. K. Javaid, F. M. Kiweewa, W. D. Leslie, K. Marenah, L. Micklesfield, K. M. Kim, L. Nedkoff, J. T. Schousboe, A. Spagnoli, K. Ward, L. Wang, J. R. Lewis

15:26 **OCs3** MULTI-CENTER VALIDATION OF A FEDERATED LEARNING-BASED ARTIFICIAL INTELLIGENCE SYSTEM FOR SCREENING LOW BONE MINERAL DENSITY USING CHEST X-RAYS
Presenting author: W. C. Hung
Authors: B.-R. Lin, W.-C. Sun, P.-W. Wu, W.-D. Liu

15:34 **OCs4** GLP-1 RECEPTOR AGONISTS AND MUSCULOSKELETAL OUTCOMES A SYSTEMATIC LITERATURE REVIEW AND META-ANALYSIS
Presenting author: C. Beaudart
Authors: Beaudart, Y. Malréchauffé, S. van Heden, D. Sanchez-Rodriguez, A. Scheen, O. Bruyère, A. Mobasheri, G. Duque, R. Rizzoli, J.-Y. Reginster

15:42 **OCs5 - FRAGILITY RUNS IN THE FAMILY** INTERGENERATIONAL CLUSTERING OF OSTEOPOROSIS IN A RURAL INDIAN COHORT
Presenting author: L. Nagendra
Authors: O. Deshmukh, C. Yajnik, On Behalf Of The Pune Maternal Nutrition Study

15:50 **Presentation of the IOF Committee of National Societies Medal** Famida Jiwa

15:55 **Presentation of the CNS Best Booth Award** Philippe Halbout

16:00 **OCs6** DEVELOPMENT AND VALIDATION OF DIABETES HIP FRACTURE SCORE (D-HFS) IN PATIENTS WITH TYPE 2 DIABETES A POPULATION-BASED COHORT STUDY OF HONG KONG
Presenting author: D. T.-W. Lui
Authors: Y. Zhang, C. H.-Y. Fong, M. Chandran, W.-S. Chow, K. C.-B. Tan, C.-H. Lee, Y.-C. Woo, K. S.-L. Lam

16:08 **OCs7** LIFESTYLE AND CLINICAL FACTORS ASSOCIATED WITH FEMORAL NECK BONE MINERAL DENSITY IN AFRICAN ADULTS FINDINGS FROM THE FRACTURE-E3 STUDY
Presenting author: C. Pearse
Authors: L. S. Gates, A. J. Burton, M. K. Jallow, T. Manyanga, C. Grundy, N. J. Crabtree, E. M. Clark, H. Wilson, A. M. Manyara, T. Madanhire, B. Cassim, R. A. Ferrand, C. L. Gregson, K. A. Ward

16:16 **OCs8** USING RESEARCH TO TRANSFORM HEALTH POLICY FOR PATIENTS WITH FRAGILITY FRACTURE IN BRITISH COLUMBIA, CANADA
Presenting author: S. Singh
Authors: L. Funnell, J. Solarzano, L. Battersby, L. Li, T. Bubela, D. Whitehurst, S. Hejazi, S. Bayat, T. O'Callaghan, A. Godfreyson, I. Matthes, B. Ballantyne, L. Matheson-Jennings, J. Robinson, R. Kherani, A. Tecson, O. Slavutskiy, A. Virk

16:24 **OCs9 - OSTEOSARCOPENIA AND RISK OF ALL- CAUSE MORTALITY FOR COMMUNITY-DWELLING OLDER ADULTS** THE BUSHEHR ELDERLY HEALTH (BEH) PROGRAM
Presenting author: G. Shafiee
Authors: N. Fahimfar, M. Sanjari, K. Khalagi, I. Nabipour, R. Heshmat

16:32 **OCs10 - AI-ASSISTED OPPORTUNISTIC DETECTION OF VERTEBRAL COMPRESSION FRACTURES IN CT SCANS** OCS10 - AI-ASSISTED OPPORTUNISTIC DETECTION OF VERTEBRAL COMPRESSION FRACTURES IN CT SCANS
Presenting author: A. Cheung
Authors: R. Bleakney, A. Kamona, F. Alavi, E. V. Navarro, Y. Zhang, T. Chung, H.-J. Jang, A. M. Cheung

15:00 - 17:00 - Auditorium 1
SCIENTIFIC SESSION III
Chairpersons: Richard Pikner, Patricia Clark

15:00 **Plenary Lecture**
Hyperglycaemia and bone health: disease and therapy Kate Ward

15:30 **ORAL COMMUNICATIONS SELECTED FROM ABSTRACTS**

15:30 **OC13** INCIDENCE OF NEW OSTEOPOROTIC FRACTURES UP TO THREE YEARS OF FOLLOW-UP IN SUBJECTS WITH TYPE 2 DIABETES MELLITUS WHO INITIATE ANY OSTEOPOROSIS MEDICATION COMPARED TO NON-DIABETICS A POPULATION-BASED COHORT STUDY
Presenting author: L. Gomez Rodriguez
Authors: C. Carbonell-Abella, P. Satorra Herbera, C. Reyes, M. A. Pou Gimenez, C. Diaz Torné, D. Martinez-Laguna, C. Tebé-Cordomí

15:40 **OC14** TYPE 2 DIABETES MELLITUS AND FRACTURE RISK AN INTERNATIONAL META-ANALYSIS
Presenting author: N. C. Harvey
Authors: E. M. Curtis, H. Johansson, L. Westbury, E. V. McCloskey, E. Liu, L. Vandenput, D. P. Kiel, M. Lorentzon, W. D. Leslie, J. A. Kanis, Frax Meta-Analysis Cohort Group

15:50 **OC15** LONGITUDINAL EFFECTS OF DENOSUMAB, ROMOSOZUMAB, AND COMBINATION THERAPY ON MUSCLE QUALITY AND METABOLIC PROFILES A RANDOMIZED CONTROLLED TRIAL
Presenting author: H.-K. Yen
Authors: J. Y. Hsu, C. C. Hung, S. H. Fu, C. Y. Wang

16:00 **OC16** PREGNANCY-RELATED CHANGES IN BONE HEALTH A LONGITUDINAL REMS-BASED STUDY
Presenting author: V. A. Degennaro
Authors: S. Casciaro, F. Conversano, F. A. Lombardi, G. Peluso, P. Pisani, T. Ghi

16:10 **OC17** COST-EFFECTIVENESS OF AI-ENHANCED OPPORTUNISTIC OSTEOPOROSIS SCREENING USING CHEST RADIOGRAPHS EVIDENCE FROM SIX INTERNATIONAL ANALYSES
Presenting author: M. Hiligsmann
Authors: M. Alokail, J.-Y. Reginster

16:20 **OC18** CLINICALLY INTERPRETABLE PREDICTORS OF IMMINENT SUBSEQUENT FRACTURES IN A DEEP-LEARNING PREDICTION MODEL
Presenting author: H. Nguyen
Authors: T. Tran, D. Bliuc, R. Blank, C. White, J. Center

16:30 **Plenary Lecture**
Is there a role for sex hormones in the management of musculoskeletal disorders? Tommaso Simonicini

17:00 - 18:30 - Auditorium 1
SPONSORED SATELLITE SYMPOSIUM
See details on the Sponsored Sessions Section (Pages 28-29)

18:30 - 19:30
NON-SPONSORED SYMPOSIA

MR - C1 **Bone Turnover Markers in CKD-Associated Osteoporosis: Translating European Consensus to Practice**
Chairpersons: Maria Fusaro, Etienne Cavalier
- Applying Bone Turnover Markers in Dialysis and Transplantation: Case-Based Insights Thomas Nickolas
- BALP, TRACP-5b and iPINP: New Reference Markers and Diagnostic Cut-offs in CKD Hanne Skou Jørgensen

MR - D9 **Clinical Outcomes of Sarcopenia: A GLIS Symposium**
Chairpersons: Alfonso Cruz Jentoft, Jean-Yves Reginster
- The Global Leadership Initiative on Sarcopenia (GLIS): objectives, structure, and achievements Alfonso Cruz Jentoft
- Health outcomes of sarcopenia: Insights from the GLIS Outcome Working Group and clinical implications Gustavo Duque
- Updated meta-analysis on the health outcomes of sarcopenia Charlotte Beaudart

MR - D12 **Mind Body Exercises: Yoga and its effect on Bone and Muscle Health: Myth, Magic, or Measurable Impact?**
Chairperson: Ambrish Mithal
- Introduction to Yoga and Its Relevance to Musculoskeletal Health Manju Chandran
- Effect of Yoga on bone mineral metabolism Lakshmi Nagendra
- Effect of yoga on muscle strength Paras Bajaj
- Yoga demonstration
- Q&A

MR - D2 **Women's Bone Health and Hormones Therapy Update: Integrating Gynecology Into Multidisciplinary Osteoporosis Care**
Chairpersons: Maria Celeste Osório Wender, Adriana Orcesi Pedro

- Estradiol Therapy in 2025: Optimizing Type, Dose, and Route for Bone Protection Across Menopausal Stages Maria Celeste Osório Wender
- Beyond Endometrial Safety: Do Different Progestogens Change Long-Term Skeletal and Metabolic Risk? Jaime Kulak Junior
- Androgens and the Female Musculoskeletal System: Evidence, Gaps, and the Future of Therapy Adriana Orcesi Pedro
- Q&A

MR - D3 **Osteoporosis in Inflammatory Diseases: Clinical Challenges and Diagnostic Gaps**
Chairperson: Elena Bischoff

- High prevalence of osteoporosis in autoimmune and inflammatory diseases Elena Bischoff
- Clinical Challenges and Diagnostic Gaps: REMS technology Mira Hristova

MR - D4 **Managing Bone Fragility in Older Adults with Diabetes: Pathophysiology, Assessment, and Therapeutic Considerations in Older Adults**
Chairpersons: Gulistan Bahat, Dilek Gogas Yavuz

- Pathophysiology, Risk Assessment Challenges, and Non-Pharmacological Strategies in Diabetic Bone Fragility Tugba Erdogan
- Skeletal Effects of Anti-Diabetic Drugs and Osteoporosis Management in Patients with Diabetes Serdar Ozkok

MR - D1 **Artificial Intelligence in Osteoporosis: What's new and what's next**
Chairperson: Nicholas Fuggle

- The AI Landscape in Bone Health 2026: From Multimodal Models to Clinical Agents Nicholas Fuggle
- Current ML models for predicting fracture risk - Do they meet the clinical need and if not then what are the next steps? Bo Abrahamsen
- Ensuring Safe, Equitable, and Regulated AI in Osteoporosis Care Ankeet Tanna

MR - D7 **Kidney and bone health in hypoparathyroidism**
Chairperson: Maria Luisa Brandi

- Kidney health in hypoparathyroidism Jean-Philippe Bertocchio
- Bone health in hypoparathyroidism Aliya Khan

MR - D8 **Hip Fracture and Osteoporosis**
Chairperson: Christopher Niedhart

- Hip Biomechanics and Fracture Risk: Beyond Bone Density Andreas Kurth
- Management of Hip Fractures – The German Approach Katharina Michalke
- Local Bone Augmentation to Prevent Hip Fractures Uwe Maus

08:00 - 09:00

NON-SPONSORED SYMPOSIA

MR - D9 Update in Musculoskeletal Conditions with Hand Involvement

Chairpersons: Fitnat Dincer, Andreas Winkelmann

- Update in Degenerative joint disease of Hand, Osteoarthritic Hand Fitnat Dincer
- Update in Soft tissue lesions /non articular involvement of Hand Andreas Winkelmann

MR - D8 Music, Rhythm, Music, and Cognition: Implementing Dalcroze Eurhythmics to Preserve Capacity in Care Home Residents

Chairpersons: Yasser El Miedany, Naglaa Gadallah

- The Neurological Symphony: Rhythmic Auditory-Motor Coupling and Dual-Task Training Effects of Eurhythmics on Balance and Executive Function Naglaa Gadallah
- "The Moving Body": Developing a Scalable and Safe Dalcroze Protocol for Older Adults with Varying Cognitive and Physical Limitations in Residential Care Mohamed Hassan Abu Zaid
- Beyond Falls: Assessing the Impact of Dalcroze Eurhythmics on Quality of Life, Social Engagement, and Care Home Service Cost-Effectiveness Yasser El Miedany

MR - D1 Muscle impairment in patients with rheumatic diseases: A pragmatic approach

Chairpersons: Osvaldo Daniel Messina, Jorge Luis Alberto Morales-Torres

- Introduction: the need for pragmatic approaches for patients at risk. Osvaldo Daniel Messina, Jorge Luis Alberto Morales-Torres
- Muscle impairment: the problem with outcomes Gustavo Duque
- Muscle impairment: adapting diagnosis to joint limitations Jorge Luis Alberto Morales-Torres
- Muscle impairment: primary and secondary prevention today Osvaldo Daniel Messina
- Discussion and conclusions

MR - D2 Multimorbidity and Fracture Outcomes

Chairpersons: Jacqueline R. Center, Robert D. Blank

- Multimorbidity contribues to the osteoporosis treatment gap. Dana Bliuc
- Multimorbidity double burden: Elevated fracture risk despite high mortality following fracture. Mike Lin
- Risk stratification for imminent subsequent fractures: A DeepHit approach using administrative health data. Huy Nguyen

MR- D4 Low-dose Radiotherapy in Musculoskeletal Disorders: Emerging Strategies for Pain Management and Inflammatory Modulation

Chairperson: África Fernández Forné

- Low-dose radiotherapy in degenerative musculoskeletal disorders: From radiobiological principles to clinical practice. África Fernández Forné
- Beyond conventional therapies: A rheumatologist's perspective on the management of complex and refractory patients. Nerea Costas Torrijo
- Building clinical evidence: Preliminary results from the FINGERT and TROCANTERT studies José Pardo Masferrer
- Discussion and Q&A

MR - D7 Emphasizing the importance of osteoporotic vertebral fractures: focus on diagnosis and care.

Chairperson: Anabela Barcelos

- Early Detection of Vertebral Fragility Fractures: Bridging the Diagnostic Gap Luís C. Semedo
- Opportunistic diagnosis of vertebral fractures using routine CT-scans: the Portuguese experience and literature review Ana Paula Barbosa
- Assessing Quality of Life After Vertebral Fracture: The Value of the Portuguese-Validated QUALEFFO-41 Over Generic Instruments Sofia Azevedo
- Closing remarks Anabela Barcelos

08:00 - 09:00 - Auditorium 1
SPONSORED SATELLITE SYMPOSIUM
See details on the Sponsored Sessions Section (Pages 28-29)

08:00 - 09:00 - Auditorium 2
SPONSORED BREAKFAST SYMPOSIUM
See details on the Sponsored Sessions Section (Pages 28-29)

08:00 - 09:00 - MR - D12
ESCEO AND IOF MEET WFS
Fracture Prevention in Older Adults
Chairpersons: Tahir Masud, Nicholas C. Harvey

- Pharmacological treatments for osteoporosis in the oldest older persons Nicholas C. Harvey
- The interplay between osteoporosis, dementia and fragility fractures Carmelinda Ruggiero
- Reducing falls and fractures by medication optimisation Lotta Seppala

09:00 - 10:30 - Auditorium 1
SCIENTIFIC SESSION IV
Chairpersons: Fitnat Dincer, Vladimir Palicka

09:00 **Plenary Lecture**
En route to a global sarcopenia consensus
Alfonso Cruz Jentoft

09:30 **ORAL COMMUNICATIONS SELECTED FROM ABSTRACTS**

09:30 **OC19** HIGH MORTALITY IN OLDER MEN WITH LOW MUSCLE MASS AND STRENGTH – THE PROSPECTIVE STRAMBO STUDY
Presenting author: P. Szulc
Authors: R. Chapurlat

09:40 **OC20** LOWER INTRINSIC CAPACITY AND SARCOPENIA DATA FROM THE GEELONG OSTEOPOROSIS STUDY
Presenting author: K. L. Holloway-Kew
Authors: L. Stuart, K. B. Anderson, J. Pasco, E. C. Emma, L. J. Williams

09:50 **OC21** INCREASED DIETARY FIBER INTAKE IS ASSOCIATED WITH BETTER GRIP STRENGTH AND PHYSICAL PERFORMANCE IN COMMUNITY-DWELLING OLDER ADULTS
Presenting author: L. Lapauw
Authors: N. Amini, L. Peeters, M. Derrien, J. Raes, E. Gielen, J. Dupont

10:00 **OC22** EFFECT OF DALCROZE EURHYTHMICS EXERCISE ON MUSCLE, PHYSICAL AND COGNITIVE FUNCTION, AND FALLS IN SARCOPENIC OLDER ADULTS THE SARCARE RANDOMIZED CONTROLLED TRIAL
Presenting author: A. Trombetti
Authors: A. Tahar, F. Herrmann, C. Graf, T. Chevalley, R. Rizzoli, M. Hars

10:10 **OC23** IDENTIFICATION OF FACTORS ASSOCIATED WITH NON-RESPONSE TO A MULTICOMPONENT INTERVENTION IN OLDER ADULTS WITH PHYSICAL FRAILTY AND SARCOPENIA
Presenting author: R. Calvani
Authors: E. Marzetti, A. E. Nuzzi, A. Álvarez-Bustos, H. J. Coelho Júnior, S. Cacciatore, M. Tosato, F. Landi

10:20 **Presentation of the ESCEO-IOF Pierre Meunier Young Scientist Award** René Rizzoli

10:30 - 12:15 - Auditorium 1
SCIENTIFIC SESSION V
Chairpersons: Manju Chandran, Karel Pavelka

10:30 **Presentation of the IOF Olof Johnell Science Award** Nicholas C. Harvey

10:35 **Presentation of the ESCEO-IOF Young Investigator Awards** Jean-Yves Reginster, Nicholas C. Harvey

10:40 **Presentation of the ESCEO-Aging Clinical and Experimental Research Award** Nicola Veronese, Jean-Yves Reginster

10:45 **Plenary Lecture**
Nutritional strategies for optimal muscle health
Bess Dawson-Hughes

11:15 **ORAL COMMUNICATIONS SELECTED FROM ABSTRACTS**

11:15 **OC24** CAN AI-DERIVED BMD FROM ROUTINE RADIOGRAPHS PREDICT FRACTURE RISK? A 6-YEAR FOLLOW-UP STUDY
Presenting author: J.-Y. Hsu
Authors: S.-H. Fu, T.-H. Tseng, C.-C. Hung, P.-C. Tsao, G. H. Chang, C.-Y. Wang

11:25 **OC25** FOREARM BMD IS A FRAX INDEPENDENT PREDICTOR OF FRACTURE RISK
Presenting author: E. McCloskey
Authors: H. Johansson, N. C. Harvey, M. Lorentzon, W. Leslie, J. Kanis

11:35 **OC26** PREDICTION OF INCIDENT FRACTURES USING THE AI-BASED TBS REVEAL BONE FRAGILITY INDEX A BAYESIAN SURVIVAL ANALYSIS
Presenting author: G. Gatineau
Authors: P. Eghbalishamsabadi, M. De Gruttola, K. Hind, M. Davies, A. Walstra, D. Krueger, N. Binkley, O. Suhail Alsaed, S. Alemadi, D. Hans

11:45 **OC27** 3D-SHAPER DIFFERENTIATION OF CORTICAL AND TRABECULAR BONE DESCRIBES FRACTURE STATUS IN PATIENTS WITH KIDNEY DISEASE
Presenting author: T. Nickolas
Authors: H. El-Bilbeisi, T. Kotzur, M. A. Aponte, M. Hussain, M. Balogun, M. Mohseni, L. Humbert, M. Bracco

11:55 **OC28** PERFORMANCE OF NOGG GUIDELINES BASED ON FRAX PRIOR TO DXA VS FRAX CALCULATED USING A FEMORAL NECK ESTIMATE FROM AN OPPORTUNISTIC SCREEN OF LOW BONE DENSITY FROM STANDARD X-RAY
Presenting author: C. Syme
Authors: M. D. Cicero, M. Lopes, A. Bilbily

12:05 **OC29** SUPERIOR FRAGILITY FRACTURE DISCRIMINATION BY CORTICAL ULTRASOUND SPECTROSCOPY COMPARED WITH BONE MINERAL DENSITY IN WOMEN AND MEN
Presenting author: K. Raum
Authors: G. Armbrecht, E. Wiebe

12:15 - 13:45 - Auditorium 1
SPONSORED SATELLITE SYMPOSIUM
See details on the Sponsored Sessions Section (Pages 28-29)

12:15 - 13:45 - Auditorium 2
SPONSORED SATELLITE SYMPOSIUM
See details on the Sponsored Sessions Section (Pages 28-29)

14:00 - 15:00
MEET-THE-EXPERT SESSION

MR - D9 **Screening for high fracture risk** Eugene McCloskey
MR - D8 **Rare bone diseases for the osteoporosis physician** Maria Luisa Brandi
MR - D1 **Meta-analysis: makings sense of umbrella and network approaches** Charlotte Beaudart
MR - D2 **Exercise: what to recommend in osteoporosis** Olivier Bruyère, Daniel Pinto

14:00 - 15:00 - Podium
ORAL PRESENTATIONS OF SELECTED POSTERS
Chairperson: Elaine Dennison

14:00 **OP11 - P1094** WHAT PROPORTION OF WOMEN EXPERIENCE SIGNIFICANT TRANSMENOPAUSAL BONE LOSS?
Presenting author: M. McClung
Author: A. Clark

14:06 **OP12 - P1496** APPLICATION OF MACHINE LEARNING MODELS FOR OSTEOPOROSIS SCREENING BUSHEHR ELDERLY HEALTH (BEH) PROGRAM
Presenting author: A. Razi
Authors: A. Shahsavand, S. Forghani A. Dadras, S. Nayebirad, A. Razi, K. Khalagi, N. Fahimfar, G. Shafiee, M. Sanjari, I. Nabipour, B. Larijani, H. Kavoosi

14:12 **OP13 - P1702** HOW COMMON IS IT? HIGH AND VERY HIGH-RISK FRACTURE RATES AMONG PATIENTS WITH A NON-OSTEOPOROTIC-RANGE BONE MINERAL DENSITY IN A DXA DATABASE FROM A TERTIARY MEDICAL CENTER
Presenting author: Y. Eden-Friedman
Authors: I. Vered, N. Tripto, N. Minsky, Y. Levy-Shraga, P. Rotman-Pikielny, L. Tripto-Shkolnik

14:18 **OP14 - P807** SERUM PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS) AND BONE MINERAL DENSITY IN NORWEGIAN ADOLESCENTS SEX-SPECIFIC ASSOCIATIONS AND MIXTURE EFFECTS
Presenting author: J. Wang
Authors: M. Averina, S. Huber, G. Grimnes, G. Fosse, Å. Bjørnerem, E. Evensen, J. Johansson, R. Joakimsen

14:24 **OP15 - P1370** MATERNAL DIABETES IN PREGNANCY AND FRACTURE RISK IN OFFSPRING A VICTORIA STATE-WIDE DATA LINKAGE STUDY
Presenting author: P. N. Che
Authors: M. Breslin, M. Thompson, M. Dalton, F. Johnston, L. S. Lieke

14:30 **OP16 - P527** SEX- AND DISTRIBUTION-SPECIFIC PROSPECTIVE MUSCLE-FAT-FRACTURE RELATIONSHIPS IN UK BIOBANK
Presenting author: E. Curtis
Authors: S. X. Lin, S. D'Angelo, L. Westbury, R. Moon, C. Cooper, K. A. Ward, N. C. Harvey

14:36 **OP17 - P735** THE LANDSCAPE OF RENAL OSTEODYSTROPHY IN EUROPE A FIRST REPORT FROM THE EUROD BONE BIOPSY DATABASE
Presenting author: I. Ystrøm
Authors: S. Salam, G. Spasovski, A. Ferreira, A. C. Ferreira, S. Keronen, H. Kröger, P. Evenepoel, H. S. Jørgensen

14:42 **OP18 - P1437** LONG-TERM QUALITY OF LIFE TRAJECTORIES IN FIBROUS DYSPLASIA AND MCCUNE-ALBRIGHT SYNDROME
Presenting author: R. Vijjhalwar
Authors: F. Clemeno, M. A. Legrand, R. Pinedo-Villanueva, M. K. Javaid

14:48 **OP19 - P500** IMPAIRED ORAL HEALTH PREDICTS FRACTURES AND FALLS IN OLDER ADULTS A PROSPECTIVE COHORT STUDY
Presenting author: E. Biver
Authors: A. Kada, N. Chebib, M. Papageorgiou, M. Hars, M. Hars, A. Trombetti, S. Ferrari, F. Müller

14:54 **OP20 - P849** THE SINTER STUDY A RECALL-BY-GENOTYPE DESIGN WITH MULTIDIMENSIONAL MUSCULOSKELETAL PHENOTYPING ACROSS INTERNAL-MEDICINE OUTPATIENT CLINICS
Presenting author: K. Huininga
Authors: F. Koromani, S. Li, K. Trajanoska, K. Berk, M. Boon, L. Chaker, P. van Daele, J. Hofland, M. van Hoek, M. Hemmelder, J. Roeters van Lennep, M. Medici, J. Olieman, B. Ozcan, R. Peters, F. Mattace-Raso, E. Mulugeta, E. F. C. van Rossum, J. van Rooij, A. Uitterlinden, W. Visser, E. F. van Velsen, M. C. Zillikens, F. Rivadeneira

15:00 **OP21 - P586** DEVELOPMENT AND EXPERT VALIDATION OF AN INTERNATIONAL POSTMENOPAUSAL OSTEOPOROSIS RISK ASSESSMENT AND LIFESTYLE (IPORL) QUESTIONNAIRE
Presenting author: F. Alradini
Author: A. Alblooshi

15:06 **OP22 - P386** FRACTURES AND BONE MINERAL DENSITY LOSS IN ADULTS LIVING WITH HIV IN LOW- AND MIDDLE-INCOME COUNTRIES A SYSTEMATIC REVIEW AND META-ANALYSIS
Presenting author: C. Gregson
Authors: M. Westby, A. De Wilton, T. Madanhire, J. Savovic, G. Gwaze, M. Vitoria, J. Amuthavalli Thiyagarajan, K. A. Ward

14:00 - 15:00 - MR- D4
EDUCATIONAL LECTURE
CKD-Associated Osteoporosis: The Over-looked Burden of Bone Fragility in CKD
Chairperson: Maria Fusaro, Nicholas C. Harvey
- Denosumab use in advanced CKD patients: yes or no, this is the dilemma Maria Fusaro
- Mendelian randomization role of vitamin D in coronary heart disease Giovanni Tripepi
- Bone quality in CKD: How to assess and why it matters Hanne Skou Jørgensen
- KIDNEY-FRAX: Is it the right time to perform it? Jordi Bover

14:00 - 15:00 - MR - D3
ESCEO MEETS OARSI
Obesity and its implications for pain and structure in osteoarthritis
Chairpersons: Martin Englund, Jean-Yves Reginster
- The role of obesity and adipose tissue dysfunction in osteoarthritis pain Marie Binvignat
- Structural changes with weight loss in knee osteoarthritis Mikael Boesen

14:00 - 15:00 - MR - D12
ESCEO AND IOF MEET EUGMS
Integrating falls and fractures management in the patient-centered care
Chairpersons: Nathalie Van der Velde, Carmelinda Ruggiero, René Rizzoli
- Landscape for integrated falls and fragility fracture pathways across Europe: where do we stand? Nathalie Van der Velde
- Falls and fragility fractures in older adults with neurocognitive disorders: preparing for the impending storm Tahir Masud
- Integrating falls and fragility fractures secondary prevention: the small win of the orthogeriatric care pathway Maria Bonnici

15:00 - 16:45 - MR - D12
COMMITTEE OF SCIENTIFIC ADVISORS SPECIAL SESSION
Chairpersons: Eugene McCloskey, Etienne Cavalier

- Fragile Bone, Fragile Constructs? Bone Health Assessment and Osteoporosis Therapies in Spinal Fusion Manju Chandran
- PTH Analog Therapy in CKD G4-G5D: Current Evidence and Potential Role of Abaloparatide in Adynamic Bone Disease Maria Fusaro
- Crosstalk of bone and muscle in ageing Gustavo Duque

15:00 - 17:10 - Auditorium 1
SCIENTIFIC SESSION VI
Chairpersons: Claudia Campusano, Atsushi Suzuki

15:00 **Plenary Lecture**
State of the art: advances in osteoarthritis imaging Felix Eckstein

15:30 **ORAL COMMUNICATIONS SELECTED FROM ABSTRACTS**

15:30 **OC30** INFRAPATELLAR FAT PAD MORPHOLOGY AND SIGNAL PREDICTS KNEE REPLACEMENT RISK IN OSTEOARTHRITIS AN 8-YEAR MRI CASE-CONTROL STUDY
Presenting author: J.-P. Pelletier
Authors: P. Paiement, M. Dorais, J.-P. Raynauld, J. Martel-Pelletier

15:40 **OC31** QUANTIFYING TREATMENT-RELATED INFLAMMATORY CHANGE IN KNEE OSTEOARTHRITIS USING NORMALIZED MRI INFLAMMATION VOLUME (NORMI)
Presenting author: M. Clark
Authors: O. Kubassova, A. Singareddy, R. Hagoug, D. Skerrett

15:50 **OC32** FROM MODEL TO APPLICATION METABOLOMIC-DRIVEN MACHINE LEARNING FOR PROGNOSIS OF KNEE STRUCTURAL OSTEOARTHRITIS PROGRESSION
Presenting author: J. Martel-Pelletier
Authors: A. Jamshidi, G. Zhai, M. Liu, W. Zhang, G. Jones, F. M. Cicuttini, J.-P. Pelletier

16:00 **OC33 - TOWARDS OA PATIENTS ENDOTYPING** DEVELOPMENT OF AN LC-MS/MS METHOD FOR THE QUANTITATION OF JOINT-RELATED COLLAGENS FRAGMENTS
Presenting author: J. Demeuse
Authors: L. Kalut, A. Mackowiak, M. Piette, E. Grifnée, E. Cavalier

16:10 **OC34** INTRA-ARTICULAR POLYACRYLAMIDE HYDROGEL FOR KNEE OSTEOARTHRITIS 1-YEAR RESULTS FROM THE LUNA OBSERVATIONAL STUDY.
Presenting author: T. Klonschinski
Authors: A. Migliore, E. Fockens, P. Peev, P. Massin, J. Beier, S. Maimen, P. Drees, H. Henning

16:20 **OC35** EXPERT CONSENSUS ON HYALURONIC ACID INJECTIONS FOR KNEE OSTEOARTHRITIS A PATIENT-CENTERED APPROACH
Presenting author: A. Mobasheri
Authors: N. Fuggle, F. Rannou, E. Maheu, A. Migliore, N. Al-Daghri, M. Alokail, P. Ammann, F. Berenbaum, A. Botto-van Bemden, M. L. Brandi, N. Burlet, R. Chapurlat, C. Cooper, E. Dennison, N. C. Harvey, G.-I. Im, A. Kurth, R. Matijevic, D. Messina, J. Monfort Faure, R. P. Radermecker, R. Schmidmaier, S. Silverman, J. Wegrzyn, L. Zakraoui, R. Rizzoli, O. Bruyère, J.-Y. Reginster

16:30 **OC36** IS EFFUSION SYNOVITIS, ASSESSED QUANTITATIVELY BY MORPHOMETRY OR SEMI-QUANTITATIVELY BY EXPERT READING; RELATED TO OSTEOARTHRITIS PROGRESSION
Presenting author: F. Eckstein
Authors: K. Sheikhi Valashani, T. Winkler, J. Collins, F. Roemer, A. Guermazi, D. Hunter, W. Wirth

16:40 **Plenary Lecture**
Novel emerging therapies for osteoarthritis
Ida Haugen

17:10 - 18:10
NON-SPONSORED SYMPOSIA

MR - C1 **Narrowing the "Treatment Gap of Osteoporosis" Using the Optimal Clinical Paradigm**
Chairperson: P. Dean Cummings

- Closing the Care Gap: Defining a Scalable Pathway to Transform Bone Health Evaluation Across Health Systems Rachel Patel
- Integrating Biology, Behavior, Function, and Environment: A 4-Pillar Framework Driving Comprehensive Bone Health Optimization Nikos Koumontzis
- Mapping the Future: Using Structured Assessment to Guide Implementation, Direction, and Impact in Bone Health Care P. Dean Cummings

MR - D9 **Vitamin D Metabolite Ratio (VMR): From LC–MS/MS Technology to Clinical Decision-Making in Bone and Metabolic Health**
Chairpersons: Etienne Cavalier, Nasser M. Al-Daghri
- Analytical Principles and Performance Considerations in LC–MS/MS Profiling of Vitamin D Metabolites Etienne Cavalier
- Vitamin D Metabolite Ratio as a Functional Biomarker Across Health Outcomes Nasser M. Al-Daghri, Shaun Sabico
- Q&A

MR - D8 **Osteoporosis Diagnosis in Intellectual Disability**
Chairperson: Elena Bischoff
- The Importance of Bone Health Monitoring and Fracture Risk Prediction in Intellectual Disability: State of the Art Eilish Burke
- REMS Application in Individuals with Intellectual Disability Federica Saponaro

MR - D1 **Bridging Science and Service: Biomarkers, Translational Models, and Equity in Implementation in the Identification and Management of Sarcopenia and Frailty**
Chairpersons: Nicholas Fuggle, Manju Chandran
- The Global Leadership Initiative on Sarcopenia (GLIS): Defining a Pathway into the Medical Glossary Ben Kirk
- Integrating imaging biomarkers and biochemical markers of sarcopenia into frailty care pathways Ali Mobasheri
- Translating Research into Service: The "Frailty in Community" Program – From Science to Real-World Care Joyce McSwan
- Strengths-based approaches to frailty assessments in partnership with older Aboriginal and Torres Strait Islander adults Jesse Zanker

MR - D2 **From Bone Fragility to Fracture: Perspectives on Diagnosis and Prevention**
Chairperson: Nicola Veronese
- Fragility Fractures in Osteoporosis: Diagnostic Limitations and Early Prevention Strategies Elena Bischoff
- Improving Fracture Prevention Through Advanced Diagnostic Tools Nikola Kirilov
- Fracture Prevention in high-risk Patients: The Clinical Role of REMS Technology Giuseppe Guglielmi

MR - D3 **From Fracture to Function: A Dynamic Physiotherapy Pathway for Vertebral Fracture Recovery**
Chairperson: George Ioannidis
- Physical performance measures for the assessment of functional limitations in older adults with vertebral fractures Alexandra Papaioannou
- Applying and integrating clinical care pathways to guide personalized exercise prescriptions Bonny O'Hare

MR- D4 **Innovative HTA Approaches for Sarcopenia: From Economic Burden to Patient-Centered Value**
Chairperson: Mickael Hiligsmann
- The Economic Burden of Sarcopenia and Its Impact on Societal Costs and Quality of Life Olivier Bruyère
- Economic Evaluation and HTA Approaches to Assess Value in Sarcopenia Mickael Hiligsmann
- Listening the Voice of Participants in Sarcopenia Research Charlotte Beaudart

MR - D12 **Transforming Episode Accountability Model: An Opportunity to Drive Bone Health Optimization and Fracture Liaison Service Uptake in the United States**
Chairperson: Rita Roy
- Transforming Episode Accountability Model (TEAM): Impact on Orthopaedic, Spine, and Bone Health Clinical Practice and Opportunities to Drive Osteoporosis Diagnosis and Treatment Rita Roy
- A Spine Surgeon Perspective on the Need for Spine and Bone Health Optimization and Implementation of Fracture Liaison Service Programs Tom Schuler

08:00 - 09:00

NON-SPONSORED SYMPOSIA

MR - D9 **Nutrition and Physical Exercise: Individual Roles and Synergy in Sarcopenia Management**

Chairperson: Bernardo Abel Cedeño Veloz

- Molecular Mechanisms Underlying Sarcopenia: From Basic Research to Clinical Implications Marta Montes Resano
- Nutritional Strategies for Managing Sarcopenia Bernardo Abel Cedeño Veloz
- Integrating Nutrition and Exercise: A Synergistic Approach Chenhui Chen
- Discussion + Q&A

MR - D8 **Lipoprotein (a): New evidence for Bone-Vascular axis in Osteoporosis and Atherosclerosis**

Chairperson: Sekib Sokolovic

- Lipoprotein (a) and dentin hypersensitivity: A potential link between cardiovascular and osteoporotis risk Blazenka Miskic
- Association between lipoprotein (a), menopause and cardiovascular risk in women Cosic Vesna
- The role of Lipoprotein (a) in Osteoporosis and Atherosclerosis: A shared inflammatory pathway Sekib Sokolovic

MR - D6 **Rewiring Pain and Angiogenesis: Transarterial Embolization as a New Frontier for Pain Management in Osteoarthritis and Musculoskeletal Disorders**

Chairpersons: Alberto Migliore, Francesco Ursini

- Unmet Need: Filling the Gap in Treatment-Refractory Osteoarthritis Alberto Migliore
- Technique and Angiographic Landmarks of TAE Giancarlo Facchini
- Clinical Evidence in Osteoarthritis Jacopo Ciaffi
- Beyond Osteoarthritis: Expanding Horizons Francesco Ursini
- Discussion

MR - D1 **Management of osteoarthritis. Novel and controversial aspects**

Chairperson: Panagiotis Athanassiou

- Osteoarthritis. An old and common disease Panagiotis Athanassiou
- Osteoarthritis. Clinical picture and pathophysiology Lambros Athanassiou
- Management of osteoarthritis Ifigenia Kostoglou-Athanassiou
- Treatment of osteoarthritis Niki Sarianidou
- Physical treatment of osteoarthritis Spyridon Mitsoulis

MR - D2 **Skeletal rare bone diseases: Focus on Mc Cune Albright and Hypophosphatasia**

Chairpersons: Osvaldo Daniel Messina, Kassim Javaid

- From polyostotic fibrous dysplasia to autoimmunity: A unique case of McCune-Albright syndrome with rheumatoid arthritis. Gisela Kluwak
- Hypophosphatasia in 2026: Update and therapeutic opportunities Maritza Vidal

MR- D4 **Thyroid–Parathyroid Disorders: The Neglected Dimension of Bone Health**

Chairpersons: Dilek Gogas Yavuz, Şansın Tüzün

- Skeletal effects of parathyroid disease Aliya Khan
- Thyroid Hormone Deficiency and Long-Term Skeletal Outcomes: Hypothyroidism, Subclinical Hypothyroidism Ayşe Kubat Üzüm
- Endogenous and Iatrogenic Thyroid Hormone Excess: Impact on Bone Health and Fracture Risk Dilek Gogas Yavuz
- Discussion + Q&A

MR - D7 **Fractures-E3 Study: Fractures in sub-Saharan Africa- epidemiology, ethnography and economic impact**

Chairperson: Celia Gregson

- Factors affecting hip fracture service implementation in South Africa Sarah Drew
- Hip fracture care pathways and the delivery of traditional bone setter treatment in The Gambia Kate Ward
- Patient priorities in hip fracture management and health system factors that impact responsive care in Zimbabwe Celia Gregson

08:00 - 09:00 - MR - D3

ESCEO AND IOF MEET SICOT

Fractures around the hip in the elderly – Importance of Co-Geriatric Management

Chairpersons: Veronika Koeppen-Ursic, Marc Hanschen

- Importance of Co-Geriatric Management in the Treatment of Fractures around the Hip Veronika Koeppen-Ursic
- Pertrochanteric Fractures – Innovations and Pitfalls Marc Hanschen
- Femoral Neck Fractures in the Elderly – Therapeutic Options Christian von Rüden
- Sarcopenia and Fractures around the Hip – Newest Data Conrad Ketzer

08:00 - 09:00 - MR - C1
ESCEO MEETS EMAS
Menopause and bone health: From hormonal changes to clinical impact
Chairpersons: Esther Speksnijder, Fitnat Dincer
- Hormonal changes around menopause and bone health Peter Bisschop
- Body composition through menopause and its implications on bone Albrecht Popp
- Effect of cyclic 17-β-estradiol on bone turnover in postmenopausal women Esther Speksnijder

08:00 - 09:00 - MR - D12
ESCEO SYMPOSIUM
Treatment of Osteoporosis: What should the target be? A call for action from The European Society for Clinical and Economic Aspects of Osteoporosis, Osteoarthritis and Musculoskeletal Diseases (ESCEO)
Chairpersons: Nicholas C. Harvey, René Rizzoli
- Introduction René Rizzoli
- IOF-ESCEO stratified fracture risk approach: altering the osteoporosis treatment paradigm Nicholas C. Harvey
- Surrogate measures for osteoporosis treatment evaluation and implementation in the context of absolute fracture probability Eugene McCloskey
- Discussion and conclusions Nicholas C. Harvey

09:00 - 10:00
MEET-THE-EXPERT SESSION
MR - D8 **Management of fracture risk post denosumab** Roland Chapurlat

MR - D9 **Meeting global challenges for osteoporosis patient societies** Famida Jiwa, Craig Jones, Teréza Hough

10:00 - 12:00 - Auditorium 1
SCIENTIFIC SESSION VII
Chairpersons: Nicholas Fuggle, Şansın Tüzün, Cyrus Cooper

10:00 **Plenary Lecture**
Key challenges for global fracture prevention initiatives Nicholas C. Harvey

10:30 **ORAL COMMUNICATIONS SELECTED FROM ABSTRACTS**

10:30 **OC37** BURDEN OF IMMINENT SUBSEQUENT FRACTURES IN POST-MENOPAUSAL WOMEN ACROSS MULTIPLE EUROPEAN PRIMARY CARE DATABASES
Presenting author: E. H. Tan
Authors: X. Chen, T. Rathod-Mistry, G. Fabiano, A. Moayyeri, J. Warden, C. Reyes, K. Verhamme, R. Pinedo-Villanueva

10:40 **OC38** EFFECT OF DENOSUMAB ON IMPLANT SURVIVAL FOLLOWING TOTAL HIP AND KNEE ARTHROPLASTY IN OSTEOARTHRITIS PATIENTS A REGISTRY-BASED DATA LINKAGE STUDY
Presenting author: J. Ciaffi
Authors: B. Bordini, M. Cosentino, A. Di Martino, C. Faldini, G. Mazziotti, R. Caporali, F. Ursini

10:50 **OC39** REDUCING PRE-OPERATIVE DELAY IN NECK OF FEMUR FRACTURE (NOFF) PATIENTS
Presenting author: J. Rosen
Authors: V. P. Suresh, S. B. Begum, V. G. Gupta, L. D. Dalton, L. B. Bellanti, F. E. Eales, L. F. Fraser, S. W. Wooldridge, G. M. Mccloskey, A. B. Baker, M. A. Arastu

11:00 **OC40** LIFESTYLE AND CLINICAL FACTORS ASSOCIATED WITH FEMORAL NECK BONE MINERAL DENSITY IN AFRICAN ADULTS FINDINGS FROM THE FRACTURE-E3 STUDY
Presenting author: C. Pearse
Authors: L. S. Gates, A. J. Burton, M. K. Jallow, T. Manyanga, C. Grundy, N. J. Crabtree, E. M. Clark, H. Wilson, A. M. Manyara, T. Madanhire, B. Cassim, R. A. Ferrand, C. L. Gregson, K. A. Ward

11:10 **OC41** EXPLORING THE RELATIONSHIP BETWEEN BONE FORMATION AND RESORPTION CREATING BONE BALANCE INDEX FORMULAE IN ADULTS USING KIDNEY-INDEPENDENT BONE TURNOVER MARKERS
Presenting author: I. Trifonidi
Authors: D. Smout, A. Bouquegneau, E. Chronopoulos, H. S. Jørgensen, E. Cavalier, P. Everpoel, K. Makris

11:30 **Plenary Lecture**
Imaging-based opportunistic detection for fracture prevention Bo Abrahamsen

12:00 - 13:00
NON-SPONSORED SYMPOSIA

MR - C1 **Importance of differentiated fall risk assessment between outpatients and institutionalized patients: Fall and fracture risk program in nursing homes for elderly people**
Chairperson: Oslei de Matos
- Importance of differentiated fall risk assessment between outpatients and institutionalized patients Oslei de Matos
- Fall risk assessment and prevention program in nursing homes Ana Lucia Coutinho

MR - D9 **Translating Intrinsic Capacity (IC) into Action: Measurement, Risk Stratification, and Implementation of Personalized Care Models**
Chairpersons: Yasser El Miedany, Naglaa Gadallah
- Standardizing the Measure of Moving, Thinking, and Feeling: Validating Assessment Tools for the Five Domains of Intrinsic Capacity Naglaa Gadallah
- The IC Prognosticator: Using Intrinsic Capacity Profiles to Stratify Risk for Frailty, Hospitalization, and Negative Health Outcomes Mohamed Hassan Abu Zaid
- From Concept to Clinic: Implementing Multidomain, Personalized Interventions Based on Intrinsic Capacity in Real-World Primary Care Settings Yasser El Miedany

MR - D8 **Dynapenia or Oral Health Assestment Tool (OHAT) on hip fractured patients?**
Chairperson: Hugo Gutierrez Hermosillo
- Dynapenia (HGS) & fractures Alejandro Navarro
- OHAT, the facts Jorge Luis Alberto Morales-Torres
- Dynapenia (HGS) Vs. OHAT, the Trial Hugo Gutierrez Hermosillo

MR - D12 **Quantitative Bone Ultrasound Techniques - Current Knowledge and Future Directions**
Chairpersons: David Reid, Claus Glüer
- The Role of Quantitative Ultrasound in Bone Health Assessment: A Historical Overview Richard Eastell
- Ultrasound for Fracture Prediction Jean-Gabriel Minonzio
- New Approaches and Measurement Techniques Kay Raum

MR - D1 **Breast cancer and osteoporosis**
Chairperson: Ifigenia Kostoglou-Athanassiou
- Breast cancer and bone metabolism Lambros Athanassiou
- Breast cancer and osteoporosis Yannis Dionyssiotis
- Adjuvant treatment of breast cancer and osteoporosis Panagiotis Athanassiou
- Management of osteoporosis in breast cancer patients Yannis Athanassiou, Ifigenia Kostoglou-Athanassiou

MR - D2 **Burning Bones Across Ages: Igniting Awareness about SAPHO and CRMO**
Chairpersons: Wafa Hamdi, Hanene Ferjani
- Non-Infectious Bone Inflammation Through the Ages: One Disease, Multiple Faces Dorra Ben Nessib
- Chronic Non-bacterial Osteitis and Its Mimics: Imaging the Enigma Lobna Kharrat
- Towards a tailored therapeutic approach to SAPHO/CRMO: what does the future hold? Fatma Majdoub

MR- D4 **Breaking the Burden of Shoulder Pain: Advances in Diagnosis and Treatment**
Chairpersons: Özlen Peker, Ece Cinar
- The Burden of Shoulder Pain Yeşim Gökçe-Kutsal
- Assessment and Diagnostic Approach of Shoulder Pain Selmin Gülbahar
- Treatment Pathways in Shoulder Pain: Pharmacological Management Ayşe A. Küçükdeveci
- Rehabilitation of Shoulder Pain-Related Conditions Özlem El

MR - D7 **Osteosarcopenia and Falls**
Chairpersons: Ifigeneia Kostoglou-Athanassiou, Yannis Dionyssiotis
- Introduction in osteosarcopenia and falls Belgin Erhan
- Exercise and falls: Protocols from world falls guidelines Maria Tsekoura
- Questionnaires as a tool for falls prevention in osteosarcopenia Yannis Dionyssiotis

08:00 - 09:00 - Auditorium 1

AMGEN SPONSORED BREAKFAST SATELLITE SYMPOSIUM: From Risk Stratification to Innovation: Advancing Care for Very High-risk Patients

Chairperson: Nicholas C. Harvey

- Very High-risk Fracture: Why Stratification Must Drive Action Peter Ebeling
- From First Fracture to Re-fracture: Why Systems Fail and the Importance of FLS Bente Langdahl
- Discussion and Q&A

08:00 - 09:00 - Auditorium 2

GEDEON RICHTER SPONSORED BREAKFAST SATELLITE SYMPOSIUM: Opportunities and controversies in osteoporosis management using sequential therapies

Chairpersons: Serge Ferrari, Enrique Casado

- High versus very high risk across guidelines: when is an anabolic-first approach appropriate? Serge Ferrari
- Fracture on therapy: when does it represent treatment failure, and what is the optimal therapeutic sequence? David Kendler

12:15 - 13:45 - Auditorium 1

UCB SPONSORED LUNCH SATELLITE SYMPOSIUM

Protecting her future with romosozumab first

Chairperson: Prof. Kassim Javaid

- Welcome and Introduction Prof. Kassim Javaid
- Case 1: The urgent imperative Prof. Ralf Schmidmaier
- Case 2: Breaking the cycle Prof. Nicola Napoli
- Case 3: Rebuilding foundations in very high fracture risk Prof. Bente Langdahl
- Key takeaways and conclusions Prof. Kassim Javaid
- Faculty Q&A and symposium close

12:15 - 13:45 - Auditorium 2

VIATRIS SPONSORED LUNCH SATELLITE SYMPOSIUM

Transforming Osteoarthritis Care: From Early Intervention to Long-Term Outcomes

Chairperson: Jean-Yves Reginster

- Welcome and Introduction Jean-Yves Reginster
- The OA Treatment Journey: From Early Intervention to Long-Term Mangement Nicholas Fuggle
- Holistic OA Management: How Disease Severity Can Guide NSAID Choice Olivier Bruyère
- Live Q&A and Closing Remarks Jean-Yves Reginster
- Panel theme: Holistic OA Panorama

14:00 - 15:00 - MR - D3

ALEXION SPONSORED MEET-THE-EXPERT SESSION: Beyond vitamin D and calcium: Rethinking bone monitoring in hypoparathyroidism

Chairpersons/Speakers: Aliya Khan, Maria Luisa Brandi

- HypoPT overview and unmet medical need
- Recent RWE publications on HypoPT disease burden across various regions, including bone manifestations
- Guidelines: focus on latest bone monitoring updates - 2025 best practice recommendations (Khan 2025) & 2025 ESE guidelines (Bollerslev 2025)
- Clinical practice – proposed approach: Patient case
- Q&A and close

17:00 - 18:30 - Auditorium 1

ECHOLIGHT SPONSORED SATELLITE SYMPOSIUM

REMS for Addressing Unmet Clinical Needs in Osteoporosis Care

Chairperson: Jean-Yves Reginster

- REMS Technology in Clinical Practice: Applications That Enhance Osteoporosis Diagnosis Radmila Matijevic
- From Innovation to Clinic: REMS as a Breakthrough Tool in Osteoporosis Management Francesco Conversano
- Identifying Fragility Before Fractures Occur: The Added Value of REMS in Osteoporosis Care Nicholas Fuggle

08:00 - 09:00 - Auditorium 1

KYOWA KIRIN SPONSORED EDUCATIONAL LECTURE

Low phosphate and the bone doctor

Prof. Maria Luisa Brandi

- Improving diagnosis through routine phosphate testing and timely action Prof. Maria Luisa Brandi
- Phenotypic variability in hypophosphatemia Prof. Maria Luisa Brandi
- Spotlight on delayed diagnosis: Hereditary and acquired chronic hypophosphatemia in practice Prof. Maria Luisa Brandi
- Shared experiences of the bone doctor: Advancing clinical practice in the diagnosis and management of hypophosphatemic disorders Prof. Maria Luisa Brandi
- Summary and close Prof. Maria Luisa Brandi

08:00 - 09:00 - Auditorium 2

SANDOZ SPONSORED BREAKFAST SATELLITE SYMPOSIUM: Biosimilars in bone health: translating clinical evidence into sustainable outcomes

Chairperson: Prof. Richard Eastell

- Welcome and introduction Prof. Richard Eastell
- The premise and promise of biosimilars Prof. Richard Eastell
- Real-world insights: experience with initiation and transition to biosimilar denosumab in Canada Prof. Richard Eastell, Prof. Aliya Khan, Prof. Bente Langdahl
- Denosumab in clinical practice: strategies for sustained patient outcomes Prof. Richard Eastell, Prof. Aliya Khan, Prof. Bente Langdahl
- Q&A session

12:15 - 13:45 - Auditorium 1

THERAMEX SPONSORED LUNCH SATELLITE SYMPOSIUM

Rebuilding bone, advancing outcomes: Abaloparatide▼evidence across the patient spectrum

Chairperson: Jean-Yves Reginster

- Is it time to rethink bone anabolism? Jean-Yves Reginster
- Why cortical bone matters: sharpening clinical decisions for imminent-risk patients Lothar Seefried
- Optimising bone building after recent fracture: the Abaloparatide experience Giovanni Adami
- The window of opportunity in high-risk postmenopausal women: early intervention with Abaloparatide Friederike Thomasius
- Summarising the Abaloparatide journey: Mechanism, timing and clinical confidence Jean-Yves Reginster
- Q&A from the Audience Jean-Yves Reginster

12:15 - 13:45 - Auditorium 2

ALEXION SPONSORED LUNCH SATELLITE SYMPOSIUM

Advances in the Diagnosis and Management of Patients With Hypophosphatasia (HPP) Across the Disease Continuum

Chairperson: Maria Luisa Brandi

- Welcome and Introductions Maria Luisa Brandi
- HPP Presentation and Diagnosis Across the Disease Continuum Maria Luisa Brandi
- HPP Disease Impact and Management Throughout the Patient Lifespan Florian Barvencik
- Future Directions in HPP Eric T. Rush
- Q&A Session

Disclaimer :

This session has been jointly organized by ESCEO and by the World Health Organization to offer the members of the Pre-Competitive Consortium on Osteoporosis and Bone Health (PRECCO), the opportunity to showcase how their product/device/technology (commercially available or under development) contribute to an innovative management of osteoporosis. PRECCO members are stakeholders who support the five-year partnership signed between ESCEO and WHO to improve the management of osteoporosis worldwide.

Thursday, April 16

16:45 - 17:55 - Auditorium 1

ESCEO-WHO INNOVATION SESSION

Chairpersons: René Rizzoli, Jotheeswaran Amuthavalli Thiyagarajan (WHO-Geneva)

16:45 Helping address the osteoporosis care gap with Rho: Opportunistic screening of low BMD from standard x-rays Catriona Syme

16:52 ALIGNOGRAM1.0: AI-Powered Detection of Bone Tissue Disorganization — A Novel Biomarker for Fracture Risk & Treatment Response in Bone Disease, with a Focus on Rare Disorders
Peter Ebeling, Roger Zebaze

16:59 Dynamika v7 – The Cloud-Native Operating System for Global Bone Health Imaging
Michael Clark

17:06 3D-Shaper for Advanced Bone Health Assessment Ludovic Humbert

17:13 REMS for Healthy Ageing: A Radiation-Free, Accessible Point-of-Care Solution for Osteoporosis and Fragility Fracture Prevention and Management Paola Pisani

17:20 Osteo Signal: AI-powered Opportunistic Screening Using Chest X-rays for Early Osteoporosis Detection and Fracture Prevention Hyun-Jin Bae

17:27 OLYMPUS Program (Osteoporosis Longitudinal multi-Year program to evaluate Postmenopausal women at risk for fractUreS): Advancing AGA2118, a bispecific sclerostin/DKK1antibody
Ricardo Dent-Acosta

17:34 Bindex pulse-echo ultrasonometry (PEUS) for point-of-care supporting prevention of fragility fractures / osteoporosis screening Janne Karjalainen

17:41 The TBS Bone Health Ecosystem
Karen Hind, Didier Hans

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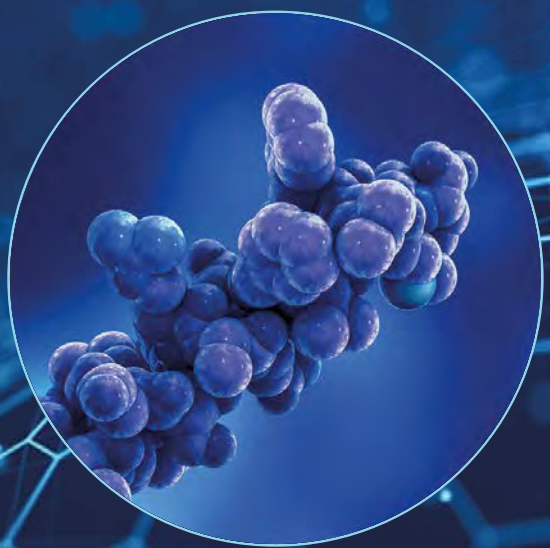
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2026 PRAGUE

WORLD CONGRESS ON OSTEOPOROSIS, OSTEOARTHRITIS AND MUSCULOSKELETAL DISEASES

Abstract Book

Oral Presentations Abstracts



OP1 - P416

FROM WRIST TO HIP: CAN EARLY FLS INTERVENTION AFTER A DISTAL RADIUS FRACTURE PREVENT THE NEXT FRAGILITY FRACTURE

A. E. Elsalamwy[1], D. C. Charchoglyan[2], S. Z. Zidan[3], C. S. Singh[1]

[1]Trauma & Orthopaedic Department, Southend University Hospital, Mid and South Essex NHS Foundation Trust, Southend-on-sea, United Kingdom; [2]Emergency Department, Southend on sea, United Kingdom; [3]Trauma & Orthopaedic Department, North Middlesex University Hospital, Royal Free London NHS Foundation Trust, London, United Kingdom

Background

Distal radius fracture (DRF) is frequently the first clinical manifestation of osteoporosis and a strong predictor of future major fragility fractures, particularly hip fractures. The risk of a subsequent hip fracture is reported to be **1.4–3.5 times higher** following a DRF, with the majority occurring within two years. This "imminent risk" period represents a key opportunity for secondary prevention. Despite NICE and Royal Osteoporosis Society (ROS) guidance, many patients with DRF are not referred for bone health assessment. The Fracture Liaison Service (FLS) model provides a structured approach for identification, investigation, and treatment. We evaluated whether FLS-led management following DRF at Southend University Hospital reduced the risk of subsequent hip and other fragility fractures.

Methods

We retrospectively reviewed all adults aged ≥50 years presenting with an index DRF between January 2018 and December 2024. Patients were stratified into:

(1) **FLS group:** completed FLS pathway (assessment ≤90 days, DXA scan, initiation of anti-osteoporosis therapy, and falls assessment).

(2) **Non-FLS group:** no referral or incomplete pathway.

The primary outcome was hospital admission with a hip fracture within 24 months. Secondary outcomes included any new major osteoporotic fracture and treatment adherence. Kaplan–Meier survival analysis and multivariable Cox regression were used to estimate hazard ratios (HR) adjusted for age, sex, comorbidities, and previous fractures.

Results

Among **612 eligible patients** (mean age 72 ± 10 years; 78% female), **48%** received full FLS follow-up. Over 24 months, **15.6%** of the non-FLS group sustained a second fragility fracture compared with **8.9%** in the FLS group. Hip fractures occurred in **5.1% vs 2.4%**, respectively. FLS management was associated with a **34% lower hazard** of any secondary fracture (adjusted HR 0.66; 95% CI 0.48–0.91; p = 0.01).

Conclusions

Patients presenting with a distal radius fracture face a high imminent risk of subsequent hip or major fragility fractures. Comprehensive post-fracture management through an FLS pathway significantly reduced secondary fracture rates within two years. These findings reinforce the value of universal FLS coverage and early bone-health optimisation to transform the distal radius fracture from a precursor to a preventable event in the fracture-care continuum.

Keywords: distal radius fracture; hip fracture; fragility fracture; FLS; osteoporosis; secondary prevention; UK

OP2 - P1154

ASSOCIATION BETWEEN THE TREATMENT-RELATED CHANGE IN BONE MINERAL DENSITY AND FRACTURE RISK REDUCTION ACCORDING TO THE PRE-TREATMENT BMD: ANALYSIS FROM THE FNIH-ASBMR SABRE PROJECT

M. Schini[1], L. Lui[2], T. Vilaca[3], S. K. Ewing[4], A. Thompson[4], B. L. Langdahl[5], D. M. Black[4], M. L. Bouxsein[6], R. Eastell[1]

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Objective

In December 2025, the FDA has qualified the use of total hip BMD (TH BMD) as a surrogate endpoint for future trials of anti-osteoporosis therapies. This was based on analyses and evidence from the FNIH-ASBMR SABRE (Study to Advance BMD as a Regulatory Endpoint) project. However, if future trials do not have to demonstrate anti-fracture efficacy, they may enrol lower-risk subjects. Thus, it is essential to determine whether baseline BMD levels affect the relationship between changes in TH BMD and fracture risk reduction.

Methods

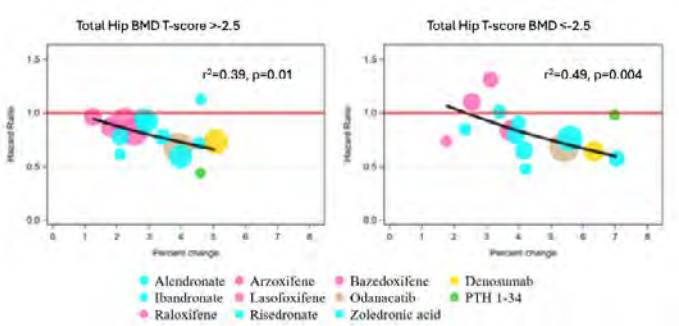
Using the SABRE database, we separated participants into those with a TH BMD T-score ≤ -2.5 and those with a TH BMD T-score> -2.5. We performed trial-level meta-regressions comparing the association between the 24-month between-treatment difference in TH BMD per cent change and clinical fracture risk reduction across baseline TH BMD T-score subgroups. We calculated the r^2 (95% CI) for each group. The clinical fracture category was defined as non-vertebral + clinical vertebral fractures.

Results

Data from 15 trials were included in the meta-regression. There were 20,474 participants in the T-score ≤ -2.5 group and 54,196 in the T-score > -2.5 group. The meta-regression results were similar across groups, with r^2 (95% CI) for the T-score ≤ -2.5 group of 0.49 (0.08 to 0.70), p = 0.004, and for the T-score > -2.5 group, r^2 = 0.39 (0.02 to 0.64), p = 0.01. The p value for the r^2 interaction term was 0.66.

Conclusion

Notably, the range of BMD per cent change was greater in the low-BMD group. This was because the results were expressed as a percentage, however, the absolute changes in BMD were similar. The higher BMD group had more trials from less potent medications. These findings suggest that, in future trials of new osteoporosis treatments where efficacy will be judged by total hip BMD change, participants can be included independently of their baseline total hip T-score, as the association between bone mineral density per cent change and fracture risk reduction is similar.



OP3 - P1770

REAL-WORLD TREATMENT STRATEGIES FOR OSTEOPOROSIS IN OLDER ADULTS WITH CKD-MBD: IMPACT OF GERIATRIC SYNDROMES AND TREATMENT COMPLIANCE

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Aim: Osteoporosis (OP) management in chronic kidney disease (CKD) is complicated by altered bone turnover, mineral metabolism, renal drug clearance, and coexisting geriatric syndromes. Frailty and high fall risk may justify treatment even without low T-scores. This study presents a real-world, multidisciplinary, and individualized approach to managing older adults with OP and CKD–mineral bone disease (MBD), focusing on geriatric syndromes and treatment compliance (access, duration, adverse effects).

Participants and Methods: Twenty older adults with OP and stage 3a–5 CKD were evaluated by a multidisciplinary team. Baseline data (December 2023) included clinical, DXA, biochemical, and comprehensive geriatric assessment(CGA) findings; fracture and treatment history; inappropriate medication use(IMU); and fall-risk-increasing drugs (FRIDs). Patients were categorized as OP-only, OP + adynamic bone disease(ABD), or OP + osteomalacia(OM). Treatment was individualized based on bone turnover, renal function, prior therapy, and CGA. Compliance was reassessed at two years (December 2025).

Results: Median age was 78 years; 45% were male. Frailty was present in 50%, orthostatic hypotension in 50%, falls in 35%, and polypharmacy in 95% (median 9 drugs). IMU was identified in 12(60%) of patients, with 1–3 inappropriate drugs deprescribed per patient, and FRIDs were used by 75%. Malnutrition was present in 25%. Prior fragility fractures were common (65%), yet only two patients were on OP treatment at baseline. Diagnosis, treatment decisions, and compliance are summarized in Table 1. At two years, 50% patients were fully compliant, 30% required treatment modification (reimbursement issues, comorbidities, or switching/interruptions), 10% were lost to follow-up, and 10% were managed conservatively. No severe hypocalcemia, new fragility fractures, or adverse-effect–related discontinuations occurred.

Conclusions: Managing osteoporosis in older adults with CKD requires a nuanced, patient-specific strategy supported by multidisciplinary collaboration, considering bone turnover, renal impairment, and complex geriatric syndromes. Treatment compliance remains crucial; in our cohort, reimbursement delays and comorbidities were the main barriers. Overall, denosumab—combined with structured calcium supplementation and monitoring—appeared to be the most feasible therapeutic option.

Table-4: Diagnosis, Treatment Decisions, Duration and Compliance Outcomes of the Study Patient

Patient Number	Diagnosis	Decision	Treatment Compliance	Treatment Duration (months)
1	CKD-MBD (ABD) + OP	Teriparatide	Lost to follow-up	-
2	CKD-MBD (ABD) + OP	Teriparatide after discontinuation of vit D and calcium	Could not start teriparatide (reimbursement issues); switched to denosumab	18
3	OP-only	Oral bisphosphonate therapy continued	Compliant, no complications	28
4	OP-only	Zoledronate	Compliant, no complications	21

5	CKD-MBD (ABD) + OP	Teriparatide after discontinuation of active vitamin D and phosphate binders	Compliant, no complications	18
6	CKD-MBD (ABD) + OP	Follow-up without treatment (Due to no indication) Cessation of active vitamin D and calcium	Follow-up without treatment	-
7	OP-only	Romosozumab	Compliant, no complications	12 mo romosozumab, followed by denosumab
8	OP-only	Romosozumab	Irregular romosozumab use, later switched to denosumab	10 months irregular romosozumab, then switched to denosumab
9	OP-only	Denosumab + Testosterone replacement	Compliant, no complications	17
10	OP-only	Teriparatide	Could not initiate teriparatide due to recurrent hospitalizations (GI bleeding, ileus); later switched to denosumab	7
11	OP-only	Denosumab	Compliant, no complications	18
12	OP-only	Denosumab	Lost to follow-up	-
13	CKD-MBD (ABD) + OP	Teriparatide	Compliant, no complications	24 months teriparatide, followed by denosumab
14	CKD-MBD (ABD) + OP	Teriparatide	Compliant, no complications	10
15	CKD-MBD (ABD) + OP	Denosumab, after discontinuation of calcium and no evidence of ABD	Compliant, no complications	10
16	CKD-MBD (OM) + OP	Denosumab after calcium and vitamin D supplementation	Interrupted after 2nd denosumab dose (1-year gap), later resumed therapy	19 months (with interruption)
17	OP-only	Follow-up without treatment (Due to low life expectancy and being bedridden)	Follow-up without treatment	-
18	CKD-MBD (OM) + OP	Teriparatide after vitamin D supplementation	Could not start teriparatide (recurrent UTIs/urosepsis) then refused further treatment	-
19	CKD-MBD (OM) + OP	Denosumab after vitamin D supplementation	Delayed denosumab initiation due to cardiac problems; sustained fracture during delay, denosumab later started	3
20	OP-only	Denosumab	Compliant, no complications	3

ABD: Adynamic Bone Disease, CKD-MBD: Chronic Kidney Disease – Mineral and Bone Disorder, OM: Osteomalacia, OP: Osteoporosis, UTI: Urinary Tract Infection, GI: Gastrointestinal

OP4 - P365

GLP-1 RECEPTOR AGONISTS AND MUSCULOSKELETAL OUTCOMES: A SYSTEMATIC LITERATURE REVIEW AND META-ANALYSIS

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Introduction: This systematic review/meta-analysis aims to synthesize clinical data on the effects of Glucagon-like peptide-1 (GLP-1) receptor agonists (RAs) on key relevant bone, muscle, and joint outcomes. The primary objective is to establish whether these agents are safe for the musculoskeletal system; secondarily, the study examines their potential protective role in mitigating age- and disease-related decline and in improving some key relevant outcomes in musculoskeletal health.

Methods: MEDLINE, Cochrane Central Register of Controlled Trials (CENTRAL) (both via Ovid® platform) and Embase were searched in March 2025 to identify relevant randomized controlled trials (RCTs) or real-world evidence (RWE) studies to be included. This bibliographic search was completed with manual search. A random-effect model meta-analysis was performed for any outcome reported in at least 2 studies. Subgroup analyses were performed on the type of GLP-1 RAs, type of comparator used and study design. Sensitivity analyses were performed to test the robustness of the data. This work has been performed in adherence with PRISMA statement. (PROSPERO Record ID: CRD420251024082).

Results: From 1,148 potentially relevant references, 61 articles (47 RCTs, 13 RWE studies and 1 pharmacovigilance study, combining a total of 1,250,778 individuals) met the inclusion criteria. Different GLP1-RAs were represented across the panel of studies i.e., semaglutide, liraglutide, exenatide, dulaglutide, and tirzepatide (dual agonist GIP/GLP-1), as well as others such as albiglutide, lixisenatide, and SAR425899 (bamadutide). No effect on bone outcomes (i.e., bone mineral density (all sites) and fractures (all sites) were observed when models included the most adjusted effect size. Regarding muscle outcomes, a significant decrease of lean body mass/fat-free mass was consistently observed with GLP1-RAs in the global model (k=28, SMD0.52, 95%CI -0.8; -0.23, I^2 88%, p-value for heterogeneity <0.0001), which remained robust in all sensitivity analyses. Subgroup analyses showed that the effect was mainly driven by liraglutide and semaglutide, with a decrease in lean body mass/fat-free mass observed when GLP-1 RAs were compared with placebo. No publication bias was found. Regarding joint outcome, models revealed no significant change in WOMAC pain, physical function and stiffness.

Conclusion: This meta-analysis is the first to investigate the effects of GLP-1 RAs on a large panel of musculoskeletal health outcomes. While no effect on bone outcomes and joint outcomes was found, effects on muscle mass outcomes (i.e., decrease of lean body mass/fat-free mass) were observed, apparently in line with body weight reduction. The clinical relevance of these results needs to be firmly established. Further studies in this field, including those looking at muscle function and using multivariate models considering confounding are needed to better reinforce the models and final findings.

OP5 - P1076

BISPHOSPHONATES OR DENOSUMAB AFTER FRACTURE? REAL-WORLD EVIDENCE FROM A TARGET TRIAL EMULATION IN MULTIMORBID ADULTS

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Objective: Individuals with multimorbidity (MM) are often excluded from randomised trials, limiting evidence on comparative effectiveness of antiresorptive therapies. We implemented target trial emulation (TTE) to compare bisphosphonates (BP) versus denosumab (Dmab) for refracture and all-cause mortality across MM clusters.

Methods: Using whole-population linked administrative data, we identified treatment-naïve adults aged ≥50 years in New South Wales, Australia, who sustained fractures requiring emergency or hospital admission between 2010 and 2018. We excluded individuals with prior osteoporosis treatment, prior fractures, metastatic cancer, or other metabolic bone disorders. A clone-censor-weight approach compared two strategies: initiation of BP (alendronate, risedronate, or zoledronic acid) versus Dmab within

12 months post-fracture (grace period). Time zero was the fracture date, with follow-up of up to 4 years for refracture and mortality. Individuals were cloned, assigned to each strategy, and censored if their observed treatment deviated from the assigned strategy. Inverse probability of censoring weights addressed informative censoring. Latent class analysis (LCA) classified individuals into MM clusters based on comorbidities at time of fracture. Sex-specific weighted pooled logistic regression estimated hazard ratios (HRs) and 4-year risk differences (RDs).

Results: Among 117,031 eligible individuals (mean age 75.7 years; 64% women), 6036 initiated BP and 2611 initiated Dmab within grace period. LCA identified four MM clusters (cardiovascular, cardiometabolic, geriatric, mental health; median comorbidity count: 4-12) and one low MM cluster (median: 0). Compared with Dmab, BP use was associated with lower all-cause mortality in women (HR 0.71, 95% CI 0.67–0.76; RD −26.3%, 95% CI −31.1% to −21.1%) and men (HR 0.79, 95% CI 0.74–0.85; RD −24.4%, 95% CI −30.6% to −17.9%). Mortality reduction was consistent across multimorbidity clusters. Refracture risk was comparable between treatment groups.

Conclusion: In this real-world TTE, initiation of BP after fracture was associated with lower mortality compared to Dmab in both healthy and MM populations, with comparable refracture risk. These findings suggest BP have non-skeletal benefits that warrant further investigation.

OP6 - P806

HIP BONE COMPARTMENT RESPONSES TO ROMOSOZUMAB VERSUS ALENDRONATE IN PATIENTS WITH DIABETES: A SUBGROUP ANALYSIS FROM THE ARCH TRIAL USING 3D-DXA MODELLING

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Objective(s): Type 2 diabetes mellitus (T2DM) is linked to increased fracture risk.[1] The paradox of preserved bone mineral density (BMD) and trabecular bone structure but impaired cortical bone parameters in T2DM underscores the importance of advanced imaging for fracture risk assessment. We sought to evaluate changes in hip bone parameters with romosozumab (Romo) versus alendronate (Aln) in postmenopausal women with osteoporosis (OP) and T2DM.

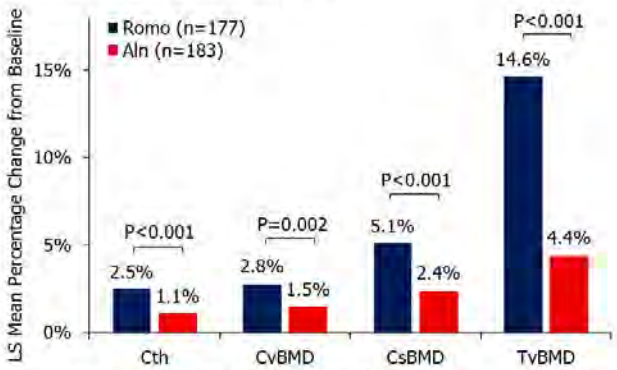
Materials and Methods: In ARCH (NCT01631214)[2], postmenopausal women with OP were randomised to monthly subcutaneous Romo (210 mg) or weekly oral Aln (70 mg) for 12 months (blinded). We analysed a subset of 360 women (Romo: n=177; Aln: n=183) who had T2DM at baseline and total hip Dual-Energy X-ray Absorptiometry (DXA) scans available. Cortical thickness (Cth), cortical volumetric BMD (CvBMD), cortical surface BMD (CsBMD) and trabecular volumetric BMD (TvBMD) estimates were obtained with 3DShaper Research software (v2.14, 3D-Shaper Medical, Barcelona, Spain). Percentage changes from baseline to Month 12 between treatments were assessed using an ANCOVA model adjusted for baseline covariates.

Results: Baseline characteristics, including mean (standard deviation) age (Romo: 75.8 [7.2] vs Aln: 75.5 [6.9] years), prevalence of severe vertebral fracture (66% vs 62%, respectively) and total hip areal BMD (0.659 [0.087] vs 0.651 [0.085] g/cm^2, respectively) were comparable between groups and generally consistent with overall ARCH populations.[2] At Month 12, Romo resulted in greater increases in all hip compartment-specific parameters vs Aln (least squares mean difference in cortical parameters: 1.3–2.7%; TvBMD: 10.2%; **Figure**).

Conclusions: In postmenopausal women with OP and T2DM, Romo demonstrated greater hip structural and density improvements vs Aln. The magnitude and pattern of these responses in the T2DM subgroup were consistent with the overall ARCH population.[3] Thus, T2DM did not attenuate the clinical efficacy of Romo.

References:1. Ferrari S. Osteoporos Int. 2025;36(7):1115–28. **2.** Saag KG. N Engl J Med 2017;377(15):1417–27. **3.** Lewiecki EM. J Bone Miner Res. 2024;39(4):473–83.

Figure. Percentage change from Baseline to Month 12 in cortical and trabecular parameters in women with OP and T2DM in ARCH.



P-values presented are nominal. The ANCOVA model for analysing percent change from baseline to Month 12 was adjusted for treatment, presence of severe vertebral fracture at baseline, baseline scan result, machine type and baseline scan result by machine type interaction. Abbreviations: Aln: alendronate; ANCOVA: analysis of covariance; BMD: bone mineral density; CsBMD: cortical surface BMD; Cth: cortical thickness; CvBMD: cortical volumetric BMD; LS: least squares; OP: osteoporosis; Romo: romosozumab; T2DM: Type 2 diabetes mellitus; TvBMD: trabecular volumetric BMD.

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Disclosure of Conflict of Interest (within past 24 months):
SF: Received consulting and lecture fees from Amgen, UCB Pharma, AgNovos, Gedeon Richter, Fresenius Kabi, Samsung Bioepis and Alexion.
NN: Consulting fees: Sandoz, Theramex and UCB; Speakers fee: Abiogen, Theramex and UCB.

BL: Received fees and honoraria for lectures and advice from

Amgen, Angitia, Gedeon Richter, Samsung Bioepis and UCB and served on the advisory boards for Gedeon Richter, Mereo and UCB.
KL: Employee of UCB.
JT: Employee and shareholder of UCB.
LH: Employee and stockholder of 3D-SHAPER Medical.
MB: Employee of 3D-SHAPER Medical.

OP7 - P261

THE EFFECTIVENESS OF THE INTENSIVE CARE PROGRAM FOR FLS IMPLEMENTATION TO REDUCE MORPHOMETRIC VERTEBRAL FRACTURES IN OSTEOPOROSIS PATIENTS AT VERY HIGH FRACTURE RISK COMPARED TO THE PRIMARY CARE PHYSICIAN-LED STANDARD CARE: JOINT-08 TRIAL

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Objectives:

Recently, initial use of osteoanabolic agents is recommended in goal-directed treatment algorithms for patients at very high fracture risk (VHFR). Although FLS and Osteoporosis Liaison Service (OLS) have been established to improve the osteoporosis management, the effectiveness of these intensive care programs which integrate osteoanabolic therapies has not been established. We designed a clinical trial to investigate the effectiveness of intensive care (FLS-CARE) aligned with the goal-directed osteoporosis treatment compared with usual care in patients at VHFR.

Methods and Analysis:

Japanese Osteoporosis Intervention Trial-08 (JOINT-08), a multi-center, site classification into two groups, on-going intervention study, involves postmenopausal Japanese women at VHFR aged 55 and older, defined by any of: bone mineral density (BMD) T-score < -3.3, two or more prevalent vertebral fractures, at least one semi-quantitative (SQ) grade 3, one or more fragility fractures with BMD T-score < -2.5, or a prevalent hip fragility fracture.

The patients in FLS-CARE group are registered at medical institutions with a Japan Osteoporosis Society-certified physician and OLS manager and receive an intensive care program integrating goal-directed osteoporosis treatment and FLS/OLS support (education on osteoporosis and treatment management). Patients in the control (PCP-CARE) group receive standard care at the discretion of their primary care physician.

The primary endpoint of this study is the incidence of morphometric vertebral fractures by SQ grade at 12 months, and the key secondary endpoint is the incidence of morphometric vertebral fractures at 24 months. The other secondary end points are adherence, persistence, incidence of non-vertebral fractures, incidence of worsening of vertebral fracture by SQ grade, changes in BMD at lumbar spine, femoral neck, and total hip at 12 months as well as descriptive analyses of adverse events.

Conclusion:

JOINT-08 is the first study to investigate the effectiveness of an intensive care program, combining goal-directed osteoporosis treatment and patient management by an OLS manager in postmenopausal osteoporosis at VHFR. The findings will be crucial for advancing treatment strategies to prevent osteoporotic fractures.

OP8 - P1011

BONE HEALTH IN PATIENTS WITH NON-METASTATIC PROSTATE CANCER ON ANDROGEN DEPRIVATION THERAPY INTERNATIONAL OSTEOPOROSIS FOUNDATION – BONE AND CANCER WORKING GROUP – POSITION STATEMENT

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Objective

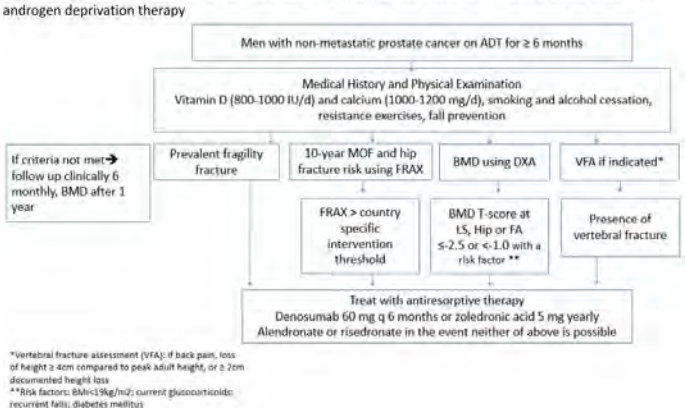
Androgen deprivation therapy (ADT) induces bone loss and significantly increases fracture risk in non-metastatic prostate cancer (nmPCa). Our aim is to provide physicians an evidence-based and practical guidance on the approach to bone health management in patients with nmPCa on ADT.

Material and Methods

The International Osteoporosis Foundation- Bone and Cancer Working Group (BCWG) members agreed on evaluating a set of 7 clinical questions. We addressed each question based on the evidence retrieved from 2 systematic reviews, including original studies and guidelines that aimed to optimize bone health in patients with nmPCa on ADT (CRD42021225502; CRD420251013073). The BCWG members voted anonymously on each question on answer.forms app, using strongly agree (SA), weakly agree (WA), weakly disagree (WD), strongly disagree (SD), not qualified (NQ).

Results

Figure: Suggested approach to bone health management in patients with non-metastatic prostate cancer on androgen deprivation therapy



Patients with nmPCa on ADT should be assessed for a previous fragility fracture (100%SA), and have a bone mineral density (BMD) and a fracture risk assessment upon the initiation of ADT (87%SA, 13%WA). A calcium intake of 1000-1200 mg/d (86%SA; 14%WA) and vitamin D supplementation of 800-2000 IU/d (71%SA; 29%WA) are required. A bone active agent is recommended for a previous fragility fracture (93%SA; 7%WA), a 10-year fracture risk above the country specific intervention threshold (80%SA;20%WA) or a BMD T-score at the lumbar spine, total hip, femoral neck or forearm ≤ -2.5, or ≤ -1 in the presence of one or more risk factors (53%SA; 34%WA; 13% WD). First line treatment options are Denosumab 60mg every 6 months (as it reduces radiologic vertebral fractures by 85% at 1 year, versus placebo) or Zoledronic acid 5mg yearly (as it increases BMD by 6.9% at lumbar spine, versus placebo) (87%SA; 13%WA) (Figure).

Conclusion

ADT increases osteoporosis risk. Bone health in patients with nmPCa should be prioritized. Screening and early intervention following our simple and practical approach allow to reduce fracture and its related morbidity. Strategies to improve guidelines implementation, increase physician and patient awareness, and investigation of the cost effectiveness of our approach are needed to close the bone health care gap.

OP9 - P427

OSTEOPOROSIS AND HEARING LOSS: NATIONWIDE EVIDENCE FOR AN EXTRA-SKELETAL PROTECTIVE EFFECT OF ZOLEDRONIC ACID AND DENOSUMAB

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Objective

To investigate the association between osteoporosis or fragility fractures and the risk of hearing loss, and to evaluate whether long-acting injectable osteoporosis treatments, specifically zoledronic acid and denosumab, are associated with a reduced risk of hearing loss.

Material and Methods

This nationwide retrospective cohort study used data from Taiwan's National Health Insurance Research Database between January 2011 and December 2020. Adults aged ≥50 years with a diagnosis of osteoporosis or fragility fractures were identified and compared with matched controls without these conditions. Propensity score matching was performed using age, sex, and Charlson Comorbidity Index. A second matched cohort compared patients treated with zoledronic acid or denosumab with untreated individuals. Incident hearing loss was the primary outcome. Hazard ratios (HRs) and 95% confidence intervals (CIs) were estimated using Cox proportional hazards models, with subgroup and sensitivity analyses conducted to assess sex differences and treatment duration effects.

Results

Individuals with osteoporosis or fragility fractures had a significantly higher risk of hearing loss compared with matched controls (adjusted HR 1.36, 95% CI 1.33–1.38). Among affected individuals, treatment with zoledronic acid (HR 0.87, 95% CI 0.81–0.93) or denosumab (HR 0.91, 95% CI 0.85–0.97) was associated with a significantly lower risk of hearing loss compared with no treatment. Subgroup analyses demonstrated that zoledronic acid was protective in both sexes, whereas the association for denosumab reached statistical significance only in males. Sensitivity analyses indicated that treatment durations of 2–4 years were associated with the greatest risk reduction.

Conclusion(s)

Osteoporosis and fragility fractures are associated with an increased risk of hearing loss. Long-acting injectable osteoporosis therapies, particularly zoledronic acid, are associated with a reduced risk of hearing loss, suggesting a potential extra-skeletal benefit beyond fracture prevention.

OP10 - P739

TRANSLATING MOLECULAR INSIGHTS INTO CLINICAL PROGRESS: RJX-01 FOR MUSCLE RECOVERY AND OSTEOSARCOPENIA THERAPY

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Objective

A phase 1b trial using an immobilization (casted leg) model showed that 6-week treatment with RJx-01 improved muscle strength and fatigue resistance. The molecular mechanisms behind RJx-01's effects remained largely unexplored and warrant further study. A phase 2 trial evaluating RJx-01 in hospitalization-associated sarcopenia among COPD patients is currently ongoing. Moving forward, we propose a second phase 2 trial targeting osteosarcopenia.

Material and Methods

In a phase 1 sub-study (placebo versus RJx-01-treated healthy males), transcriptomic profiling (RNA-seq) was performed on muscle biopsies from the immobilized leg at baseline, after 2 weeks immobilization, and after 4 weeks recovery.

Results

Transcriptomic analysis revealed significant changes post-immobilization in both groups: reduced expression of genes linked to mitochondrial energy metabolism and increased expression of genes related to inflammation, immune activation, and collagen fibrosis. After 4 weeks recovery, gene set enrichment analysis showed normalization of these disrupted pathways in the RJx-01 group but not in the placebo group. Complementary hematoxylin & eosin staining confirmed sustained inflammation in placebo subjects during recovery, which was reversed in RJx-01-treated subjects.

Osteosarcopenia is characterized by dynamic crosstalk between bone and muscle, mediated by a range of bioactive factors including myokines, osteokines, and adipokines. Recent studies indicate osteosarcopenia increases risk of disability, frailty, falls, fractures, hospitalization, and mortality compared to either condition alone (osteoporosis, sarcopenia). While pharmacological treatments exist for bone loss, there is an unmet need for sarcopenia therapies. Based on our phase 1 findings, we propose a placebo-controlled phase 2 study to evaluate whether a 6-months RJx-01 treatment can preserve muscle strength and function in postmenopausal osteosarcopenia patients. We hypothesize that RJx-01, combined with standard bone-loss therapy, may improve functional outcomes.

Conclusion

RJx-01 enhances muscle strength and recovery, supported by molecular and histological evidence. The proposed phase 2 trial will determine if RJx-01 can address the unmet need for sarcopenia treatment in osteosarcopenia patients, aiming to improve clinical outcomes and reduce disability.

Disclosures: All co-authors were employed or funded by Rejuvenate Biomed nv.

OP11 - P1094

WHAT PROPORTION OF WOMEN EXPERIENCE SIGNIFICANT TRANSMENOPAUSAL BONE LOSS?

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The relatively rapid bone loss that occurs during the menopausal transition is an important determinant of the subsequent development of postmenopausal osteoporosis. The Study of Women Across the Nation (SWAN) followed more than 3000 women across the menopausal transition. Reports from SWAN have described the average changes in bone mineral density (BMD) with average losses from 5 years before the final menstrual period (FMP) until 5 years after FMP of 10.6% in the lumbar spine and 9.1% at the femoral neck. Knowing the proportion and characteristics of women who experience significant bone loss during the menopausal transition would aid the development of appropriate strategies to prevent that bone loss in women at high risk for developing osteoporosis.

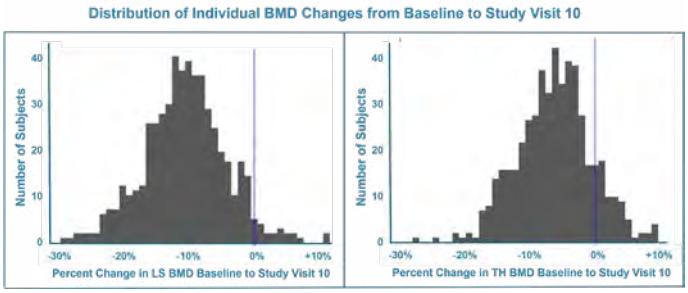
Objective: To evaluate the distributions of lumbar spine and total hip BMD changes in individual women in SWAN from baseline to Visit 10.

Design: A secondary analysis was conducted using the publicly available SWAN dataset, from baseline through 10 years of annual assessments. The analysis was limited to women undergoing natural menopause without exposure to bone-active drugs (estrogens, osteoporosis medications, tamoxifen, and chemotherapy).

All subjects who had BMD results at baseline and 10 years were evaluated. Menopause status at each visit was categorized as pre-, early peri-, late peri- or post menopause. Percentage change in lumbar spine (LS) and total hip (TH) BMD from baseline to 10 years was calculated. Analyses were conducted in RStudio, version 2024.12.1.

Results: 516 women met inclusion criteria. Mean age was 46.2 years; mean years of menopause 4.5; mean BMI 27.6. Average BMD values at baseline corresponded to T-scores of 0.18 at LS and 0.08 at TH. The average % changes in BMD were 10.4% at LS (almost 1 T-score) and 6.1% at TH. Distributions of individual changes in LS BMD are shown in the Figure. 88% and 72% of

women had losses of at least 3% at LS and TH, respectively, while 83% and 57% had losses of 5% or greater. Maximum individual losses exceeded 25% at both the spine and hip.



Conclusion: Almost all women experience significant bone loss during the menopausal transition, and many would benefit from therapy to prevent bone loss and osteoporosis.

Disclosures: None

OP12 - P1496

APPLICATION OF MACHINE LEARNING MODELS FOR OSTEOPOROSIS SCREENING: BUSHEHR ELDERLY HEALTH (BEH) PROGRAM

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Objective: To design and evaluate machine learning approaches for osteoporosis screening.

Material and Methods: Using baseline data from the Bushehr Elderly Health (BEH) program, we developed screening tools defining osteoporosis as bone mineral density T-score ≤ -2.5 (lumbar spine, femoral neck, or total hip) by dual-energy X-ray absorptiometry. Data were partitioned into training (80%) and independent test (20%) sets. Fifteen algorithms were trained using hybrid feature selection (recursive elimination with logistic regression and XGBoost). We addressed class imbalance via SMOTEENN resampling within stratified cross-validation. Decision thresholds were constrained to maximize F2-score. Model performance was evaluated on the test set using AUC, sensitivity, specificity, and F2-score.

Results: Among 4,110 participants (median age: 66 years; 54.2% female; 37.8% osteoporosis prevalence), key predictors included weight, height, age, parity, and fracture cause. The voting ensemble achieved the highest screening performance (AUC 0.82, sensitivity 95.2%, specificity 39.3%, F2-score 0.80). Gradient boosting demonstrated balanced discrimination (AUC 0.82, sensitivity 90.7%, specificity 52.1%, F2-score 0.80), while LightGBM offered higher specificity (AUC 0.82, sensitivity 82.6%, specificity 60.7%, F2-score 0.75) (Table & Figure).

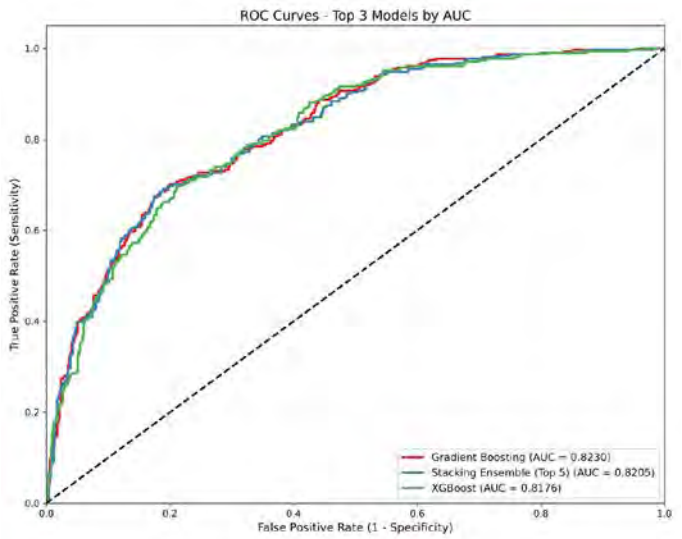
Conclusion: Machine learning enables effective osteoporosis screening; the voting ensemble excels at exclusion, while Gradient boosting optimizes discriminative balance. This allows tool selection based on surveillance goals and resource constraints. An online risk calculator was developed.

https://osteosarcopenia-risk-calculator-u9pvs4ecg7euxryfcec3mc.streamlit.app/

Table: Performance of the top five models for osteoporosis screening using 10 features.

Model	F2-Score	Sensitivity	Specificity	ROC-AUC
Voting Ensemble	0.800	0.952	0.393	0.817
Extra Trees	0.799	0.949	0.398	0.808
Gradient Boosting	0.796	0.907	0.521	0.823
AdaBoost	0.795	0.929	0.443	0.808
Random Forest	0.794	0.913	0.492	0.817
Feature importance: weight, height, age, parity, fracture cause, diabetes, difficulty walking, hormone replacement therapy, smoking status, difficulty climbing stairs.				

Figure: ROC curves of top osteoporosis screening models.



OP13 - P1702

HOW COMMON IS IT? HIGH AND VERY HIGH-RISK FRACTURE RATES AMONG PATIENTS WITH A NON-OSTEOPOROTIC-RANGE BONE MINERAL DENSITY IN A DXA DATABASE FROM A TERTIARY MEDICAL CENTER

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Objective: Fracture risk assessment has become a mainstay of osteoporosis management. Treatment paradigms for patients with a high or, especially, very high fracture risk based on FRAX assessment prioritize first-line anabolic treatment, even when bone mineral density (BMD) is in the non-osteoporotic (NOP) range. However, data regarding the prevalence of high or very high fracture risk among patients with NOP-range BMD are scarce.

Material and Methods: We utilized computerized BMD data from a tertiary medical center between 2024 and 2025. BMD was measured by the Lunar Prodigy Advance densitometer, and country-specific FRAX calculation ± Trabecular Bone Score (TBS) adjustment was performed by the Encore v18 software. Risk factors were reported by a self-administered questionnaire. Patients were classified as osteoporotic according to T-score ≤-2.5 at either the femoral neck, total hip, or at least two lumbar spine vertebrae. High/very high fracture risk was defined as ≥3/4.5% for hip, or ≥20/30% for major osteoporotic fractures (MOF), respectively. Statistical analysis was performed using Python.

Results: Five thousand and fifteen patients aged 40 years or older (40.3% males, age 66.8 ± 8.9 years) performed BMD test during the study period and were included. Overall, 1523 (30.4%) were classified as osteoporotic and 3492 (69.6%) with a NOP BMD. Among those with a NOP BMD, 1054 (30.2%) had high hip fracture risk, while 639 (18.3%) had very high risk. In contrast, regarding MOF, only 199 (5.7%) had high risk, and 52 (1.5%) had very high risk. TBS adjustment did not significantly change these proportions (high/very high hip fracture risk: 28.9%, p=0.248/17.2% p=0.247, high/very high MOF risk 4.7%, p=0.067;/1.0%, p=0.051).

Patients with BMD-defined osteoporosis, compared to patients in the NOP high-risk group, were younger (67.9 vs. 73.8 years, p<0.001), more likely to be female (82.6% vs. 55.6%, p<0.001), and to have lower BMI (25.5 vs. 27.1 kg/m², p<0.001). Among those with NOP-range BMD, the mean lumbar spine1-4/femoral neck/total hip T-score was 0.10±1.58/-1.24±0.86/-0.56±1.07, respectively.

Conclusions: The proportion of patients with high or very high fracture risk categories despite NOP BMD is substantial and driven primarily by hip fracture risk. These data can inform reimbursement policy decisions regarding first-line anabolic treatment.

OP14 - P807

SERUM PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS) AND BONE MINERAL DENSITY IN NORWEGIAN ADOLESCENTS: SEX-SPECIFIC ASSOCIATIONS AND MIXTURE EFFECTS

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Background: Adolescence is the critical period for the development of peak bone mass (PBM). Per- and polyfluoroalkyl substances (PFAS) are widespread endocrine disruptors that may disturb skeletal development, but evidence in Nordic adolescents is limited.

Objectives: To evaluate sex-specific associations between serum PFAS and areal bone mineral density (aBMD) Z-scores among Norwegian adolescents.

Methods: This cross-sectional study utilised data from Fit Futures 1 (2010–2011), a cohort of adolescents in Northern Norway. Eighteen serum PFAS were quantified, and aBMD Z-scores (femoral neck, total hip, total body) were calculated using dual-energy X-ray absorptiometry. We used multivariable linear regression and mixture analyses (quantile g-computation and Bayesian kernel machine regression) to estimate sex-specific associations.

Results: Among 889 participants (421 girls and 468 boys; mean age 16.2 years), eight PFAS had detection rates >70%. The sum of linear and branched perfluorooctane sulfonic acid (ΣPFOS) had the highest median concentration (6.23 ng/ml). Perfluorononanoic acid (PFNA) (β = −0.16 per doubling, 95% CI: −0.26, −0.06) and perfluorodecanoic acid (PFDA) (β = −0.15 per doubling, 95% CI: −0.24, −0.06) showed consistent inverse association with total body aBMD. Mixture analyses suggested modest overall adverse mixture effects, with limited evidence of interaction between PFAS. Sex-specific patterns showed more pronounced inverse associations in boys.

Conclusions: Higher concentrations of several PFAS, most consistently PFNA and PFDA, were associated with lower aBMD Z-scores, with stronger inverse patterns in boys. These findings suggest possible sex-specific vulnerabilities in bone accrual, underscoring the need for longitudinal studies to clarify long-term skeletal impacts.

Keywords: perfluoroalkyl substances, bone mineral density, adolescents, population-based study, mixture effect

OP15 - P1370

MATERNAL DIABETES IN PREGNANCY AND FRACTURE RISK IN OFFSPRING: A VICTORIA STATE-WIDE DATA LINKAGE STUDY

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Objective

Maternal diabetes in pregnancy may influence fetal skeletal development; therefore, this study examined the association between maternal diabetes subtype and hazard of first long-bone fracture in offspring during the first nine years of life.

Materials and Methods

We conducted a population-based cohort study using linked administrative health data for singleton births in Victoria, Australia. Maternal gestational diabetes (GDM), type 1 diabetes (T1DM), or type 2 diabetes (T2DM) status was identified from the Victorian Perinatal Data Collection (2012–2015) using ICD-10-AM codes. Offspring time to first long-bone fracture and censoring was ascertained from emergency department records between 2013 and 2021 and modelled using Cox proportional hazards regression, with maternal diabetes subtype as the exposure. Models were adjusted for offspring sex, index of relative socioeconomic disadvantage, and maternal smoking during pregnancy.

Results

Among 279,067 mother–offspring pairs, 22,153 (8.0%) mothers had GDM, 998 (0.4%) had T1DM, and 885 (0.3%) had T2DM. A total of 15,275 (5.7%) offspring sustained at least one incident long-bone fracture during follow-up. Compared with offspring of mothers without diabetes, fracture hazard ratio was lower among offspring exposed to GDM (hazard ratio [HR] 0.90; 95% confidence interval [CI] 0.84–0.96), higher among those exposed to T1DM (HR 1.28; 95% CI 1.00–1.64), and not significantly different for T2DM (HR 0.92; 95% CI 0.68–1.25).

Conclusion

Offspring fracture hazard differed by maternal diabetes subtype, with higher hazard following T1DM and lower hazard following GDM, the latter likely reflecting behavioural rather than skeletal factors. Early monitoring and targeted injury-prevention strategies may benefit offspring exposed to maternal T1DM.

OP16 - P527

SEX- AND DISTRIBUTION-SPECIFIC PROSPECTIVE MUSCLE-FAT-FRACTURE RELATIONSHIPS IN UK BIOBANK

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Objectives

We aimed to quantify the prospective associations between site-specific MRIderived fat and muscle volumes and incident fracture in the UK Biobank Imaging Study.

Materials and Methods

We analysed data from UK Biobank Imaging Study participants with MRIderived visceral adipose tissue volume (VAT), abdominal subcutaneous adipose tissue volume (ASAT) and thigh muscle volume (TMV) as exposures. The primary outcome was first osteoporotic fracture, ascertained via hospital record linkage. Cox proportional hazards models were used to estimate hazard ratios (HRs) per standard deviation (SD) increase in each exposure, adjusting for age, socioeconomic deprivation, smoking, exercise, diabetes, and prior fracture. Femoral neck bone mineral density (BMD) adjustments were applied in sensitivity analyses. Participants were followed until first osteoporotic fracture, death, loss to followup or 31 March 2023.

Results

The dataset comprised 50,151 participants (mean age: women 63.7 years; men 65.1 years) with MRI data. 806 incident osteoporotic fractures occurred during a total 223,069 person-years follow-

up time. In fully adjusted models, higher ASAT was consistently associated with lower fracture risk in both sexes [women HR/SD(95%CI): 0.67(0.60–0.74); men 0.79(0.67–0.93)], with similar findings for VAT [women 0.67(0.59-0.75); men 0.82(0.71-0.95)]. These associations remained robust after adjustment for BMD, except for VAT in men. Greater TMV was associated with lower fracture risk in women [0.74(0.64-0.86)] but this relationship was substantially attenuated by adjustment for BMD [0.92(0.78-1.08)], and there was no evidence of an association in men [1.03(0.83-1.28)].

Conclusions

Greater fat volume in subcutaneous or visceral compartments was protective against incident osteoporotic fracture in both sexes, as was greater thigh muscle volume in women, but not men. Associations between incident fracture and visceral adipose tissue (men) or thigh muscle (women) volume appeared BMD-dependent. These findings inform fracture risk assessment and biological understanding of body composition in skeletal health. (UK Biobank access application 3593).

OP17 - P735

THE LANDSCAPE OF RENAL OSTEODYSTROPHY IN EUROPE: A FIRST REPORT FROM THE EUROD BONE BIOPSY DATABASE

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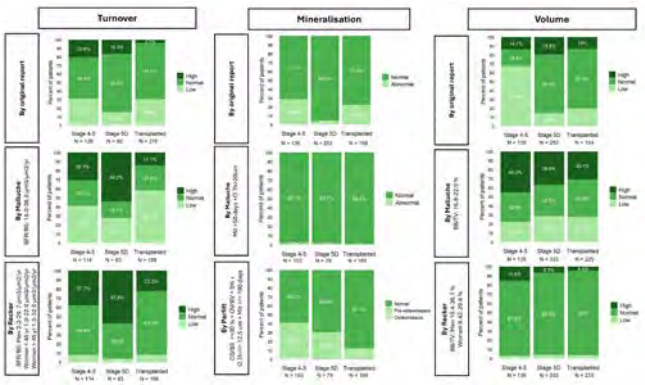
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Objective: Renal osteodystrophy (ROD) is a major complication of chronic kidney disease (CKD), yet its epidemiology is poorly defined due to the declining use of bone biopsy both in clinical practice and research. Earlier studies indicated a shift from high to low turnover bone disease in CKD[1], but the current spectrum of ROD is uncertain. This study reports from a multicenter bone biopsy database to address this knowledge gap.

Methods: Bone biopsies from 5 countries, collected between 1998 and 2025 were included. Biopsies were from patients across the spectrum of kidney dysfunction, including pre-dialysis, on dialysis, and after kidney transplantation. All centers reported the TMV classification for bone turnover (low, normal, high), mineralisation (normal, abnormal), and volume (low, normal, high). In addition, re-classification to common diagnostic definitions were performed using previously published cut-offs[2].

Results: A total of 851 bone biopsies were available. Of these, 155 were excluded (duplicates, incomplete registrations, or performed on clinical indication). The remaining 696 research-indication biopsies were stratified on CKD grade: Predialysis (CKDG4-5; n=135), on dialysis (CKDG5D, n=335), and post-transplant (TX, n=225). Median age at time of biopsy was 57 years, 32% were female, and 19% had diabetes mellitus. Antiosteoporosis medication was rarely used (CKDG4; 0%, CKDG5D: 2%, TX: 6%). TMV-classification showed high variation depending on cutoffs applied (**Fig** 1). By the original report, normal bone turnover was the most common presentation for all patients. For tetracycline-labeled biopsies (N=341) additional diagnostic definitions were applied. By the Malluche definition[1], the majority of patients in CKDG4-5 and CKDG5D had high bone turnover. This was also the case with the Recker definition[3,4], which labeled all patients as either high or normal bone turnover. Bone mineralization defects were reported for a notable proportion of patients in CKDG4-5, as well as TX

Conclusion: The presentation of ROD was mainly normal to high bone turnover in bone biopsies performed in research context over the past two decades in Europe. Contrary to previous reports, low bone turnover was not dominant. Classification was highly variable depending on diagnostic cutoffs applied, and further efforts should be directed at harmonizing diagnostic criteria. The presence of abnormal bone mineralisation in a sizeable number of patients deserves further attention.



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OP18 - P1437

LONG-TERM QUALITY OF LIFE TRAJECTORIES IN FIBROUS DYSPLASIA AND MCCUNE-ALBRIGHT SYNDROME

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Objectives: Fibrous dysplasia and McCune-Albright syndrome (FD/MAS) are associated with substantial morbidity, yet long-term patient-reported outcomes remain poorly characterised. We describe longitudinal health-related quality of life (HRQoL) trajectories in FD/MAS and identify clinically meaningful subgroups at differential risk of deterioration using generic HRQoL (EQ-5D) data.

Material and Methods: We analysed longitudinal EQ-5D-5L data from 74 adults with participant-reported FD/MAS contributing 509 HRQoL observations (median follow-up 6.5 years) from the UK-based RUDY research database (www.rudystudy.org). Linear mixed-effects models estimated annual changes across EQ-5D domains and VAS, adjusting for age, sex, and year of entry. EQ-5D index scores were derived using validated algorithms. Patients with ≥2 measurements underwent unsupervised clustering of baseline-to-follow-up EQ-5D index change. K-means clustering (k=2) was compared with Gaussian mixture modelling (GMM). Baseline associations with cluster membership were tested using Fisher's exact tests.

Results: Population-level analyses showed overall significant annual worsening in mobility, self-care, and anxiety/depression, with declining EQ-5D VAS scores, while pain/discomfort and usual activities remained stable. Clustering identified two distinct trajectories. A high-risk "decliner" group (≈30%) had poor baseline HRQoL (mean EQ-5D index 0.33) with marked deterioration over time (mean change -0.23), while a second majority group remained stable or slightly improved (Figure 1). Baseline EQ-5D index <0.5 was strongly associated with high-risk cluster membership (p=0.0005), whereas age and sex showed no association.

Conclusions: FD/MAS patients demonstrate heterogeneous long-term HRQoL trajectories. A substantial subgroup experiences a severe, progressive decline that may be identified at first assessment using baseline EQ-5D index scores. Early recognition may support targeted monitoring, multidisciplinary intervention, and future trials in this rare disease population.

Declarations: RV, FC, MAL, RPV nothing to declare. MKJ received paid consultancy or sponsorship for external talks from Amgen, UCB, Sanofi, Kyowa Kirin, Nanox-AI, Native Technologies, Thornton Ross and Theramex

OP19 - P500

IMPAIRED ORAL HEALTH PREDICTS FRACTURES AND FALLS IN OLDER ADULTS: A PROSPECTIVE COHORT STUDY

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Objective

The interplay between age-related declines in oral and musculoskeletal health, nutrition, and lifestyle in older adults remains poorly understood. The associations between oral health, fractures, falls, and lifestyle factors were investigated in a prospective cohort of older adults.

Methods

A total of 747 participants from the Geneva Retirees Cohort (mean age 67.9 ± 1.5 years; 80% women) were included with a mean follow up of 5.5 ± 1.8 years. Subjective oral health was assessed using the Geriatric Oral Health Assessment Index (GOHAI), a self-reported questionnaire covering functional, psychosocial, and pain/discomfort dimensions. In addition, number of teeth, presence of dental prostheses and/or implants and xerostomia were documented. Incident low-trauma fractures and non-traumatic falls were recorded. Bone density and body composition were assessed by DXA, bone microarchitecture and estimated bone strength by HR-pQCT with finite element analyses, and dietary intake using a food frequency questionnaire. All analyses were adjusted for age and sex.

Results

A total of 85 incident fractures and 230 individuals with at least one fall were recorded. Oral pain/discomfort and oral function impairment were associated with a higher risk of incident fractures (HR 95% CI per one-point decrease in GOHAI score, 1.18 (1.03, 1.35) and 1.09 (1.01, 1.18), respectively). The association of oral pain/discomfort was independent of hip BMD and FRAX. Teeth loss (<24 remaining teeth) and xerostomia were associated with an increased risk of falls (HR 1.53 (1.08, 2.16) and 1.69 (1.06, 2.7), respectively). Participants with teeth loss had lower trabecular density and reduced bone strength at the tibia. Participants with oral functional impairment and/or teeth loss had lower calcium and/or protein intakes, a higher BMI, lower physical activity levels, and a higher prevalence of smoking, without differences in muscle parameters.

Conclusion

Oral health may reflect musculoskeletal fragility beyond bone density measures and FRAX. Perceived pain and functional limitations were associated with an increased risk of fractures, while teeth loss and xerostomia were associated with falls. These associations appear partly related to nutrition and lifestyle

factors, suggesting that maintaining a healthy lifestyle could improve both oral and musculoskeletal health. Supporting oral health in older adults may also contribute to support nutrition and a better musculoskeletal health.

OP20 - P849

THE SINTER STUDY: A RECALL-BY-GENOTYPE DESIGN WITH MULTIDIMENSIONAL MUSCULOSKELETAL PHENOTYPING ACROSS INTERNAL-MEDICINE OUTPATIENT CLINICS

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Objectives

We describe the design of the EraSmus medIcal CeNTer skEletal fRagility (SINTER) Study, an observational clinical study integrating polygenic risk stratification with advanced musculoskeletal imaging and functional phenotyping to improve characterisation of skeletal fragility in chronic conditions.

Methods and Materials

SINTER is conducted across nine internal medicine outpatient clinics in two stages. First, 5,650 patients undergo genotyping. Second, ~1,500 individuals from the extremes of the polygenic score for bone mineral density (PGSBMD), plus 400 patients with mastocytosis are recalled for musculoskeletal phenotyping. Imaging includes DXA, EOS Edge imaging for three-dimensional spinal alignment and global biomechanics, and peripheral quantitative computed tomography for volumetric density and microarchitectural assessment. Skeletal material and tissue-level properties are assessed using quantitative ultrasound and reference point indentation. Muscle function and physical performance are evaluated using mechanography and handgrip strength. Lifestyle data are extracted from questionnaires, alongside patient-reported outcomes and perceptions related to musculoskeletal health. To validate the RbG design, simulation analyses were performed in the population-based Rotterdam Study, comparing clinical and skeletal characteristics between individuals selected from low and high extremes of the PGSBMD distribution.

Results

Ethical approval has been obtained, and recruitment is ongoing. In the Rotterdam Study, selection based on PGSBMD extremes, results in the expected separation in femoral neck BMD and osteoporotic fracture prevalence, while clinical and lifestyle characteristics remain well balanced, supporting the randomisation properties of the RbG approach (Table).

Conclusions

SINTER establishes a clinically embedded research framework that integrates genetic information with advanced musculoskeletal imaging and functional assessment. Validation in an independent population-based cohort demonstrates that RbG stratification based on polygenic scores achieves randomisation-like balance of clinical characteristics while enriching for skeletal fragility phenotypes, supporting its use for mechanistic musculoskeletal research.

Table. Characteristics of the study population compared between low and high BMD wPGS.

	Low BMD wPGS n=666	High BMD wPGS n=666	P-value
wPGS BMD (SD)	4.67 (0.13)	5.72 (0.14)	<0.001
FN-BMD (SD)	0.83 (0.13)	0.92 (0.14)	<0.001
OPFx (%)	204 (30.6)	160 (24.0)	0.008
Age (SD)	66.6 (8.8)	66.9 (9.2)	0.4
Sex (F) (%)	466 (70.0)	449 (67.4)	0.3
FRAX MOF >10% (%)	173 (26.0)	164 (24.6)	0.6
T2D (%)	87 (13.1)	99 (14.9)	0.3
TSH >3.85 mU/L (%)	90 (13.5)	104 (15.6)	0.3
eGFR <56.5 (%)	90 (13.5)	98 (14.7)	0.5
Falling last month (%)	101 (15.2)	108 (16.2)	0.6
BMI >31 kg/ m2 (%)	92 (13.8)	99 (14.9)	0.6
Cholesterol >7.5 mmol/L (%)	86 (12.9)	98 (14.7)	0.3

wPGS- weighted polygenic score, BMD- bone mineral density OPFx- prevalent osteoporotic fractures, MOF- major osteoporotic fractures, TSH- thyroid stimulating hormone, eGFR- estimated glomerular filtration rate, BMI- body mass index

OP21 - P586

DEVELOPMENT AND EXPERT VALIDATION OF AN INTERNATIONAL POSTMENOPAUSAL OSTEOPOROSIS RISK ASSESSMENT AND LIFESTYLE (IPORL) QUESTIONNAIRE

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Background: Osteoporosis affects over 200 million women globally, contributing to significant morbidity and socioeconomic burden. Despite the availability of standardized tools such as FRAX and OKAT, few instruments comprehensively assess both biomedical and lifestyle risk factors while remaining adaptable for Postmenopausal women internationally.

Objective: To develop and establish the content validity of an internationally adaptable osteoporosis risk and lifestyle questionnaire for postmenopausal women.

Methods: A 60-item questionnaire was constructed from four validated frameworks: The Menopause Rating Scale (MRS), The Osteoporosis Knowledge Assessment Tool (OKAT), WHO FRAX clinical risk factors, and WHO STEPwise (STEPS) approach. Sociodemographic data were incorporated as the first section of the instrument. Twenty-two multidisciplinary experts in endocrinology, gynecology, family medicine, orthopedics, and public health independently rated each item for relevance, clarity, and necessity on a 4-point scale. The Item-level Content Validity Index (I-CVI) for relevance and modified kappa (k*) were calculated as well as comment burden for each item. Qualitative feedback underwent further content analysis. Decisions to retain, revise, or remove items were based on integrated quantitative and qualitative analysis of experts' recommendations.

Results: Quantitative analysis showed relevance I-CVI values ranging from 0.68–1.00 (S-CVI = 0.92); k* values 0.67–1.00, indicating good to excellent agreement. Comment burdens per item were predominantly low, with 36 items (60%) receiving 0–2 comments, 17 items (28%) receiving 3–5 comments, and only 7 items (12%) receiving six or more comments. Therefore, 32 items retained, 27 revised, and 1 removed. Following further qualitative analysis of the experts' comments, 26 were retained, 32 revised, and 2 removed (household income and menstrual irregularity). Overall, 98% of expert-endorsed items were retained or refined, yielding a 58-item final version.

Conclusion: The International Postmenopausal Osteoporosis Risk assessment and Lifestyle Questionnaire (IPORL-Q) comprising 58 items across five sections 1) Sociodemographic, 2) The Menopause Rating Scale (MRS), 3) Osteoporosis Knowledge Assessment Tool (OKAT), 4) WHO FRAX clinical risk factors, and 5) The WHO STEPwise (STEPS) approach. The IPORL-Q demonstrates excellent content validity, linguistic clarity, and adaptability for global use. It provides a robust foundation for psychometric validation and cross-cultural research in postmenopausal osteoporosis assessment and prevention.

OP22 - P386

FRACTURES AND BONE MINERAL DENSITY LOSS IN ADULTS LIVING WITH HIV IN LOW- AND MIDDLE-INCOME COUNTRIES: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Objective

To synthesise low- and middle-income country (LMIC) evidence on fractures and bone mineral density (BMD) loss, including associations with antiretroviral therapy (ART) and pre-exposure prophylaxis (PrEP) and fracture/BMD risk factors, in adult people living with HIV (PLHIV) or using PrEP.

Methods

We searched Embase, Medline, SciElo, WHO Global Index Medicus for evidence on fractures and BMD in PLHIV in LMICs. Analysis included meta-analysis, network meta-analysis (NMA) and component NMA. We examined heterogeneity with subgroup analysis and meta-regression. 38 studies were included. PROSPERO: CRD42024587101

Results

Pooled fracture prevalence was 10% [95%CI 5, 16%] (self-reported/vertebral imaging) (n=20 studies), 19% [11, 30%] in PLHIV for >5 years, and 25% [14, 39%] with vertebral imaging. HIV is associated with prevalent fracture OR 2.1 [1.2, 3.6] (n=2 studies). In longitudinal DXA studies PLHIV have greater BMD loss than HIV-negative adults, varying with type of ART: over 1-year TDF-ART is associated with 3.5% [3.0, 4.1] more BMD loss (4 studies; n=577) than HIV negative groups. In PLHIV, fracture risk factor analyses for traditional risk factors were sparse and imprecise (few fractures). Lower BMI and smoking were most consistently associated with future BMD loss. TDF ART vs non-TDF ART may be associated with prevalent fracture (pooled OR 1.7, [0.72, 4.1]). For PrEP, NMA of 7 RCTs (21,236 people) suggests TDF monotherapy vs placebo may increase fracture risk (RR 1.3 [0.97, 1.7], but GRADE low certainty evidence). However, TDF PrEP (vs placebo) is associated with greater BMD loss, more so in those adhering to PrEP (BMD difference −1.2% [−1.6, −0.81]). In PLHIV, RCT evidence shows lower BMD for TDF vs non-TDF ART. No study investigated fracture prevention. Two small pilot studies showed

possible benefits of exercise on BMD. Two studies concluded FRAX assessment may underestimate fracture risk in PLHIV.

Conclusion

Fractures are frequent in adult PLHIV in LMICs. Exposure to TDF and smoking accelerate bone loss and may increase fracture risk, with TDF-related BMD declines like those seen in menopause. Other risk factors are understudied, and research mainly involves adults <50yrs. Existing risk assessment tools may underestimate fracture risk in adult PLHIV, and significant evidence gaps remain.

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WORLD CONGRESS ON OSTEOPOROSIS, OSTEOARTHRITIS AND MUSCULOSKELETAL DISEASES

Abstract Book

Oral Communications Abstracts



OC1

PREDICTIVE VALUE OF BMD FOR HIP AND OTHER FRACTURES: A META-ANALYSIS TO UPDATE FRAX

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Introduction: This study aimed to quantify the relationship between DXA-measured femoral neck bone mineral density (BMD) and future fracture risk, and to assess the modifying effects of age, sex and time since measurement on fracture risk, with a view to updating FRAX®.

Methods: We analysed data from 307,205 men and women across 53 predominately population-based cohorts with an average follow up of 8.7 years and a total of 2,683,185 person-years. The association between BMD and fracture risk was examined using an extended Poisson model in each cohort separately by sex. Results were expressed as a gradient of risk (GR), defined as the hazard ratio per standard deviation decrease in BMD t score for the outcome fracture. Cohort-specific results were then merged using weighted coefficients.

Results: Femoral neck BMD strongly predicted hip fractures both in men (GR 2.31, 95% CI 2.18-2.46) and women (GR 2.03, 95% CI 1.91-2.16) (Figure). However, the magnitude of association was significantly dependent on age, with a higher gradient of risk at younger ages. For example, at age 50 years, the GR was 3.49 (95% CI: 2.51, 4.84) in men and decreased to 2.14 (95% CI: 1.96, 2.34) at age 80 years. The decline in GR with age was similar in women: 3.23 (95% CI: 2.75, 3.80) and 2.11 (95% CI: 1.99, 2.44), respectively. The GR for major osteoporotic fracture (MOF) remained unchanged with age (p=0.89 for men and p=0.12 for women). A significant decrease in GR for hip fracture was observed with increasing duration of follow up but the magnitude of the effect was modest relative to the effect of age. For other fracture outcomes, including non-hip major osteoporotic fracture, the gradient of risk was lower than for hip fracture.

Conclusions: Femoral neck BMD is an important risk factor for future hip fracture. The slightly lower magnitude of association at older age is consistent with other, non-skeletal factors contributing to hip fracture risk. This international validation supports the use of BMD in case finding strategies. Its use should, however, take account of the variations in predictive value with age, sex and length of follow up.

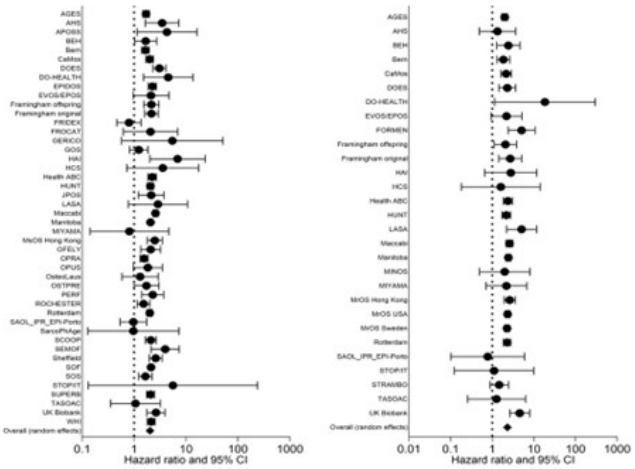


Fig 1 Forest plots of the association between BMD and risk of a subsequent hip fracture for women (left) and for men (right). Effect estimates (hazard ratios/SD) are shown for fracture (circles), adjusted for age, sex and duration of follow-up. The horizontal lines represent 95% confidence intervals.

OC2

LIFE EXPECTANCY FOLLOWING FIRST DXA - ARE MEN REFERRED TOO LATE? AN ANALYSIS OF THE 1900-1960 BIRTH COHORT

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Objective(s)

We assessed whether first DXA scans are performed too late in life to allow for a five-year treatment benefit period.

Material and methods

We identified first routine-care DXA scans (2010–2022) from the NOCTE cohort[1] and matched patients on sex, age, region from the background population. We estimated Mortality Rates (MR), Standardized Mortality Ratios (SMR), as well as 5- and 10-year survival.

Results

We included 72,818 men and 172,622 women with first DXA scans and their matched controls. Median follow-up was 5.5 years (men) and 7.0 years (women). Post-DXA 5-year survival was 73% in men vs. 87% in women (Table 1), with a significantly higher male (+56%) than female (+17%) SMR increase relative to background.

Table 1. Mortality rates and Survival

Group	N	Age at index (Mean, sd)	T-score < -2.5 at index (%)	MOF[a] 1 yr prior index (%)	MR Per 1000 PY (95% CI)	SMR (95% CI)	Survival 5y / 10y
MEN							
Background	386,075	71.8 (8.4)	Unknown	0.6%	41.4 (40.8 ; 41.3)	Ref.	83% / 65%
DXA	72,818	71.8 (8.4)	16.5%	9.7%	64.4 (63.6 ; 65.2)	1.56 (1.53 ; 1.59)	73% / 52%
WOMEN							
Background	932,176	70.3 (9.1)	Unknown	1.4%	28.5 (28.3 ; 28.6)	Ref.	88% / 75%
DXA	172,622	70.3 (9.1)	33.4%	12.4%	33.2 (32.9 ; 33.5)	1.17 (1.16 ; 1.18)	87% / 71%

[a]*MOF: Major Osteoporotic Fracture*

Conclusion

Men have higher excess mortality as reflected in the difference in SMR by sex and worse 5 and 10-year survival, with 73% surviving 5 years and only 52% surviving 10 years post-DXA, compared to 87% and 71% of women. This is despite women presenting more often with T-scores under –2.5 and/or a recent MOF. The amplified discrepancy in survival suggests that current referral patterns still lack sufficient focus on male osteoporosis, hindering opportunities for timely and effective treatment intervention.

References

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Disclosures

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OC3

EARLY INITIATION OF OSTEOPOROSIS TREATMENT AFTER FRACTURE REDUCES SECONDARY FRACTURES IN ADULTS AGED ≥75 YEARS

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Objective

To evaluate whether initiation of osteoporosis medication within 3 months after fracture and continuation for at least 6 months reduces secondary fracture risk in adults aged ≥75 years.

Material and Methods

This study emulated a randomized target trial using Japanese administrative claims data from the DeSC database (2014–2022). Individuals aged ≥75 years with a recent osteoporotic fracture were classified as exposed if osteoporosis medication was initiated within 90 days after fracture, or as controls otherwise. High-dimensional propensity score matching was applied to balance baseline characteristics. Cox proportional hazards models estimated hazard ratios (HRs) and 95% confidence intervals (CIs) for any secondary fracture and site-specific fractures. Treatment effects were evaluated according to treatment duration: initiation regardless of duration, continuation for ≥6 months, and continuation for ≥12 months.

Results

Among 203,534 eligible individuals, 53,436 matched participants (mean age 83.7 years; 77.9% women) were included. Initiation and continuation of osteoporosis medication significantly reduced the risk of any secondary fracture, with HRs of 0.78 (95% CI 0.70–0.84) after ≥6 months and 0.74 (95% CI 0.65–0.83) after ≥12 months of treatment. Hip fracture risk was markedly reduced after ≥6 months in both men (HR 0.56, 95% CI 0.36–0.80) and women (HR 0.60, 95% CI 0.49–0.72). The magnitude of fracture risk reduction was comparable between sexes.

Conclusion

Early initiation and sustained use of osteoporosis medication after fracture substantially reduce the risk of secondary fractures, particularly hip fractures, in adults aged ≥75 years. These findings support prompt pharmacological intervention for secondary fracture prevention in older adults of both sexes.

OC4

TIMING OF ANTI-OSTEOPOROTIC TREATMENT INITIATION AFTER VERTEBRAL FRACTURE AND RISK OF NEW FRACTURE IN A FLS MODEL

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Background: Vertebral fractures are the most common osteoporotic fractures and represent a critical window for secondary fracture prevention. Although early initiation of anti-osteoporotic treatment is recommended, timing in real-world practice remains unclear. Objective: To assess the association between the timing of anti-osteoporotic treatment initiation after a vertebral fracture and the risk of subsequent vertebral fractures. Material and Methods: We conducted a retrospective, single-center observational study that included patients aged ≥50 with a recent fragility vertebral fracture who were followed in a Fracture Liaison Service (FLS) between 2017 and 2023. Treatment initiation was categorized as ≤90, 91–180, or 181–365 days after the index fracture. The primary outcome was incident vertebral fracture. A Cox proportional hazards model with time-dependent exposure was used, adjusting for relevant clinical covariates. Results: A total of 260 patients with a follow-up longer than one year were analyzed. Treatment was initiated within ≤90 days in 27.3% of patients, between 91–180 days in 39.6%, and between 181–365 days in 33.1%. The incidence of new vertebral fractures was 14.1%, 14.6%, and 9.3%, respectively. In the adjusted Cox model, treatment initiation between 91-180 days was associated with a higher hazard of new vertebral fracture compared with the unexposed period (HR 10.62; 95% CI 1.16–97.55; p=0.037), whereas the other groups did not show statistically significant associations.These findings should be interpreted with caution due to confounding by indication and low event rates. Conclusions: The incidence of new vertebral fractures was similar among patients who initiated treatment within the first six months after the index fracture and lower among those with later treatment initiation. The low incidence of new fractures may be related to the early detection in FLS programs, underscoring their importance in secondary fracture prevention.

Variable	≤90 days (n=71)	91–180 days (n=103)	181–365 days (n=86)
Age (years)	73,7 ± 9,3	72,8 ± 9,1	70,5 ± 9,0
Sex, n (%)	F: 59 (83,1) M: 12 (16,9)	F: 85 (82,5) M: 18 (17,5)	F: 72 (83,7) M: 14 (16,3)
BMI (kg/m²)	27,3 ± 4,3	27,9 ± 5,4	27,9 ± 5,3
Premature menopause, n (%)	19 (26,8)	33 (32,0)	32 (37,2)
Charlson Index, n (%)	High: 38,0%	High: 35,9%	High: 20,9%
FRAX without BMD, n (%)	High: 64,8%	High: 60,2%	High: 52,3%
Baseline LS T-score, n (%)	−1,9 ± 1,3	−2,0 ± 1,5	−2,1 ± 1,3
Baseline FN T-score, n (%)	−1,8 ± 1,2	−2,1 ± 1,0	−2,2 ± 1,0
Previous vertebral fracture, n (%)	16 (22,5)	21 (20,4)	23 (26,7)
Smoking, n (%)	Never: 56,3% Former:25,4% Current:18,3%	Never: 60,2% Former: 21,4% Current: 18,4%	Never: 70,9 Former: 18,6% Current: 10,5%
Alcohol, n (%)	No: 80,3% Yes: 19,7%	No: 82,5% Yes: 17,5%	No: 88,4% Yes: 11,6%
Medications, n (%)	15 (21,1)	19 (18,4)	9 (10,5)

Table 1. Baseline characteristics of the study population.

OC5

THE NUMBER NEEDED TO TREAT (NNT) ANALYSIS: A CLINICAL CONTEXT FOR THE TREATMENT-RELATED CHANGE IN TOTAL HIP BONE MINERAL DENSITY: THE ASBMR-SABRE PROJECT

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Objective: The Study to Advance Bone Mineral Density as a Regulatory Endpoint (SABRE) has demonstrated that the treatment-related difference (active–placebo) in total hip bone mineral density percent change at 24 months (Δ%THBMD) is an excellent surrogate for fracture risk reduction. In this analysis, we estimated the clinical significance of Δ%THBMD by calculating the number needed to treat (NNT) to prevent one fracture over a three-year period, providing a direct measure of treatment benefit.

Methods: NNTs were derived from absolute risk reduction, defined as the difference in fracture incidence between treated and placebo groups. We calculated NNTs for vertebral and hip fractures for Δ%THBMD changes of 3% and 5%. Because NNT depends on background fracture incidence, we estimated 3-year fracture rates for each fracture type among placebo participants. We evaluated NNTs across the lowest, first quartile, median, third quartile, and highest incidence categories. Meta-regression curves were used to estimate relative risk as a function of Δ%THBMD change across these incidence levels.

Results: We analysed data from 25 randomised, placebo-controlled trials, comprising 137,717 participants receiving bisphosphonates (n=13 trials), odanacatib (n=1), hormone therapy (n=2), parathyroid hormone receptor agonists (n=3), denosumab (n=1), selective oestrogen receptor modulators (n=4), and romosozumab (n=1).

NNTs decreased with higher fracture incidence and greater Δ%THBMD change. For a 3% increase in Δ%THBMD, NNTs for vertebral fractures ranged from 79 (2.8% incidence) to 7 (30.2% incidence) (panel A) and for hip fractures, from 1,408 (0.3% incidence) to 88 (4.8% incidence). At 5% Δ%THBMD, NNTs for vertebral fractures ranged from 56 to 5 and for hip, 757 to 47 respectively (panel B).

Conclusion: Integrating fracture risk reduction with NNT estimates based on treatment-related total hip BMD changes provides a clinically meaningful framework for quantifying treatment benefit in osteoporosis. This approach supports patient-centred interpretation of trial outcomes and may inform future trial design and regulatory evaluation.

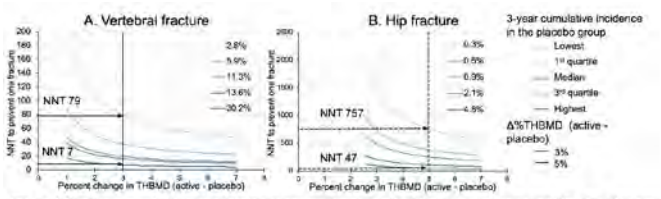


Figure A Numbers-needed-to-treat (NNT) to prevent one vertebral fracture at lowest and highest fracture incidence observed in placebo groups at 3% difference (active - placebo) in 24-month mean increase in total hip bone mineral density (Δ%THBMD). B NNT to prevent one hip fracture at lowest and highest fracture incidence observed in placebo groups at 5% Δ%THBMD.
Δ%THBMD - difference (active - placebo) in 24-month mean increase in total hip bone mineral density

OC6

ADHERENCE TO CARDIOVASCULAR RISK MINIMIZATION MEASURES FOR ROMOSOZUMAB: INTERIM RESULTS FROM A EUROPEAN MULTI-DATABASE DRUG UTILISATION STUDY

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Objective(s): Romosozumab (Romo) is approved for the treatment of severe osteoporosis (OP) in postmenopausal women at high fracture risk but contraindicated in those with prior myocardial infarction (MI) or stroke in Europe. Monitoring of real-world adherence to the risk minimization measures (RMMs) is essential for patient safety. We aim to describe compliance to Romo RMMs as well as utilisation patterns of Romo and other OP medications (including persistence and switching/transition patterns) in Europe.

Materials and Methods: This multi-national, multi-database cohort study was conducted using routinely collected healthcare data from Denmark, Germany, the Netherlands, Spain, and the UK. Adult patients (≥18 years) initiating Romo or other OP medications between 2018–2025 were identified for patient-level analyses. Prevalence and incidence rates of Romo use were calculated, and compliance with RMMs was assessed by evaluating the proportion of Romo users with contraindications (history of MI or stroke) and those meeting the indicated population (women ≥50 years with recent fracture).

Results: A total of 2,501 patients initiated Romo. Across databases, monthly treatment prevalence ranged from 0.04 to 0.44 per 10,000 persons, and monthly incidence from 0.01 to 0.05 per 10,000 person-months. Most Romo users were female (98–99%) and aged ≥50 (98–100%), with 27–90% across databases having a record of fracture within two years before treatment (variation potentially reflecting databases ability to capture fracture history). History of MI was present in 0–1.8% of Romo users (vs 2.4–7.2% for other OP drugs), and history of stroke in 0–3.7% (vs 5.1–9.5%). Median medication possession ratio was high in Germany and Spain (99%), but lower elsewhere due to prescription tracking limitations of databases. Romo switching mainly occurred between 12–18 months (matching the recommended course), most often to antiresorptives (denosumab, bisphosphonates), as per guidelines.

Conclusions: Adherence to RMMs for Romo appears to be generally high in Europe, with most users meeting label criteria and few with contraindications. Final results of this study are expected next year with larger sample size and longer follow-up.

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OC7

REVISED SWEDISH FRAX MODELS AND THE ESTABLISHMENT OF AGE-DEPENDENT INTERVENTION THRESHOLDS

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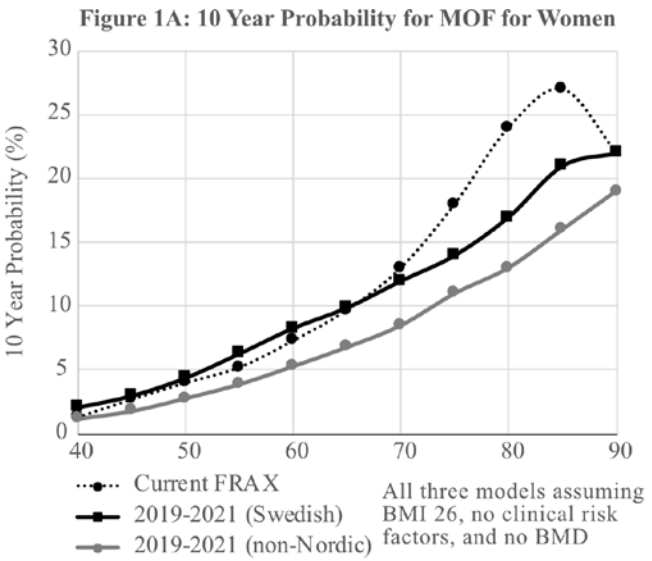
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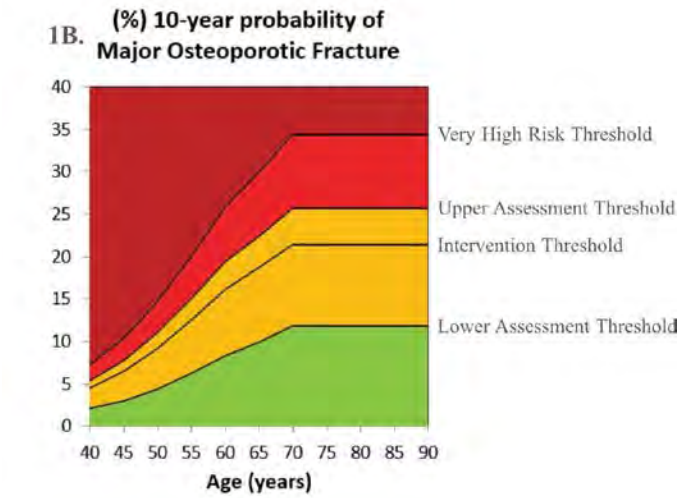
Objective: Since the development of the Swedish FRAX model in 2008, fracture incidence has changed. The primary aim of this study was to develop a revised FRAX model, based on region of birth, and updated incidence for death and fracture, for Sweden. A secondary aim was to define age-dependent intervention thresholds.

Methods: Based on national registries, all persons from the age of 40 years living in Sweden between 2005 and 2021 were included. Yearly age- and sex-standardized incidence of hip fracture and major osteoporotic fracture (MOF) were calculated, and those from 2019-2021 were used to create a revised FRAX model for Sweden. Two models, one for Swedish/Nordic born individuals and one for non-Nordic born, were developed. We compared the revised FRAX models with the original model. In addition, we calculated age-specific intervention thresholds for BMD testing and treatment using the methods of the UK National Osteoporosis Guideline Group. We then compared the number of patients eligible for intervention with the revised FRAX models and age-dependent thresholds with the original FRAX model and fixed threshold by age-group and sex in a simulated Swedish population.

Results: Compared with the previous FRAX model, the revised model yielded lower 10-year probabilities for both hip fracture and MOF in men and women. The non-Nordic models showed substantially lower probabilities across all age groups and sexes (Figure 1A). Intervention thresholds for MOF without BMD ranged from a ten-year probability of 4.5% at age 40 years to 21.5% at age 70 years and older (Figure 1B). Given similarities between the previous and new fixed probability thresholds in men and women 70 years and older, the proportion with probabilities above the thresholds was also similar. However, the proportions of younger women and men with probabilities above the age-dependent thresholds were 3.5 and 7.1 times higher compared to the respective fixed thresholds.

Conclusions: The revised FRAX models update the calibration of the models for current fracture incidences, with lower risk estimates for older people. However, the introduction of age-dependent intervention thresholds increases the eligibility of younger patients for osteoporosis treatment in Sweden.





OC8

IMPROVED 10-YEAR FRACTURE RISK PREDICTION WITH THE "BONE STRAIN INDEX" BEYOND BONE MINERAL DENSITY AND FRAX® IN COMMUNITY-DWELLING OLDER WOMEN

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Objectives: The Bone Strain Index (BSI), derived from finite element analysis of DXA, quantifies mechanical strain within bone. Its predictive value for fragility fractures in older women remains to be established in large prospective studies.

Methods: This prospective cohort study assessed the association between BSI, incident and major osteoporotic fractures (MOF) in 3338 community-dwelling older women (age 64-77 years) during a 5-year and 10-year follow-up. BSI was calculated at the lumbar spine, total hip, and femoral neck using baseline DXA scans. Incident fragility and MOF were radiographically validated. Discriminative performance was assessed using ROC curves, optimal cut-offs (Youden index), and Cox proportional-hazards models adjusted for age, areal bone mineral density (aBMD), or FRAX® score.

Results: During the 10-year follow-up, 803 women (24.1%) sustained at least one fragility fracture, including 525 MOF. Higher BSI values were significantly associated with increased fracture risk at 5 and 10 years, independently of age, aBMD, or FRAX®. Total hip BSI showed the strongest performance among all sites (AUC 0.63 at 5 and 10 years), outperforming lumbar spine BSI (AUC 0.58). Each 1-SD increase in total hip BSI was associated with higher fracture risk (HR 1.42 [1.32–1.53] at 5 years; 1.41 [1.34–1.49] at 10 years), which remained significant after FRAX® adjustment (HR 1.24 [1.14–1.35]).

Conclusions: BSI independently predicted incident fragility fractures and MOF during a 5-year and 10-year follow-up in community-dwelling older women. Total hip BSI showed stronger predictive performance than lumbar spine BSI, and both provided discriminative value beyond aBMD and FRAX®.

OC9

EROSIVE HAND OSTEOARTHRITIS IS ASSOCIATED WITH INCREASED RISK OF INCIDENT OSTEOPOROTIC FRACTURES IN POST-MENOPAUSAL WOMEN (QUALYOR COHORT)

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Purpose :

Erosive hand osteoarthritis (ErHOA) is a severe form of hand osteoarthritis (HOA) associated with greater inflammation and disability. Previous studies exploring the relationship between osteoarthritis and the incidence of osteoporotic fractures have yielded inconsistent results, and data specifically on hand OA are limited. We aimed to investigate the association between ErHOA, bone loss, and the incidence of osteoporotic fractures.

Methods:

We used data from the prospective **QUALYOR** study, which enrolled 1,575 postmenopausal women aged at least 50 years, followed prospectively for 14 years. At baseline (the 6-year visit), HOA was assessed using hand radiographs and the AUSCAN questionnaire. Hand osteoarthritis status was defined as follows:

- **No HOA:** no pain **and** no radiographic sign of HOA
- **Radiographic HOA (RxHOA):** at least two joints graded KL ≥ 2 **and** no symptoms
- **Symptomatic HOA (SHOA):** ACR criteria for HOA (no eroded joints)
- **Erosive HOA (ErHOA):** SHOA with at least one eroded joint

Osteoporotic (OP) status was also evaluated at baseline and each follow-up visit by DXA (Bone Mineral Density [BMD] at the lumbar spine and hip), and incident OP fractures were medically ascertained. OP status was defined as follows:

- **No OP:** all T-scores above −2.5 **and** no history of OP fracture
- **OP DXA:** at least one T-score below −2.5 **and** no history of OP fracture
- **OP fracture:** history of at least one OP fracture (regardless of T-scores)

Associations between baseline HOA status and incident OP fractures were analyzed using Cox proportional hazards models adjusted for age, fracture history, T-scores, obesity, and SPPB score (a surrogate marker of sarcopenia). Kaplan–Meier curves and standardized incidence rates (SIRs, Poisson regression) were obtained. Linear mixed-effects models adjusted for age and BMI assessed annual BMD changes according to HOA status. A mediation analysis evaluated the impact of ErHOA on incident fractures, with mediators selected among major fracture risk factors (age, T-scores, prevalent fracture at baseline, SPPB score).

Results :

The analysis included 1,180 women (mean age 71.7 ± 6.4 years; mean follow-up 4.6 ± 0.9 years): 364 (30.8%) had no HOA, 335 (28.4%) RxHOA, 340 (28.8%) SHOA, and 141 (11.9%) ErHOA. Participants with ErHOA were significantly older, more obese, and more sarcopenic (lower SPPB scores) than controls.

During follow-up, 131 participants (11.1%) experienced 166 incident OP fractures, with a mean time to event of 2.2 ± 1.42 years. Among them, 19.1% had ErHOA compared with 11.1% among those without incident fractures ($p < 0.05$).

The age-standardized incidence rate of OP fractures was **58.5/1,000 patient-years** (95% CI [16.6–155.7]) in ErHOA versus **30.2/1,000 patient-years** (95% CI [10.9–66.6]) in participants without HOA or with non-erosive HOA.

The hazard ratio (HR) for incident fracture in ErHOA compared with no HOA was **1.93** (95% CI [1.12–3.32], $p < 0.05$), whereas HRs were **1.10** (95% CI [0.69–1.77], n.s.) for SHOA and **0.95** (95% CI [0.59–1.57], n.s.) for RxHOA.

Additional stratification by prevalent fracture history at baseline (a major risk factor for subsequent OP fractures) again showed the highest fracture incidence rates in ErHOA patients.This increased fracture risk was not mediated by greater bone loss over time.

Mediation analysis supported a predominant direct effect of ErHOA on fracture risk, outweighing all other mediators (direct effect = 0.379, $p = 0.016$).

Conclusions :

Erosive HOA is a strong predictor of incident osteoporotic fractures in postmenopausal women, independently of classical fracture risk factors.

These findings suggest that ErHOA represents a distinct endotype of HOA (since the association was not significant for other HOA phenotypes), and the mechanisms underlying this association warrant further integrated investigation.

OC10

MUSCULOSKELETAL HEALTH AND LIFE-SPACE MOBILITY, SOCIAL ISOLATION AND LONELINESS IN THE OLDEST OLD: FINDINGS FROM THE HERTFORDSHIRE COHORT STUDY

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Objective

Musculoskeletal conditions, and their related adverse events such as falls and fractures, are prevalent among the oldest old (>80 years) and affect functional ability and quality of life. However, research on how these factors relate to life-space mobility (extent, frequency, and independence with which an individual moves through their environment), social isolation, and loneliness in this age group is limited. We investigated this in community-dwelling older adults from the Hertfordshire Cohort Study.

Materials and Methods

Data were analysed from 169 men and 156 women aged 84–93. Participant information was collected using self-administered questionnaires. Exposures included: fall in previous year; fracture since age 50; osteoarthritis (self-reported diagnosis or history of hip/knee arthroplasty); and high sarcopenia risk (≤52.4 on the Sarcopenia Quality of Life [SarQoL] questionnaire). Outcomes included: University of Alabama Life-Space Assessment (LSA) score, social isolation score (Lubben Social Network Scale), and De Jong Gierveld loneliness scores (emotional, social, overall). Sex-stratified linear and Poisson regression models were implemented. Age, ability to manage financially, nutritional risk score, physical activity, and number of systems medicated were included as adjustments.

Results

Musculoskeletal exposures were common: falls (men 36.1%, women 34.9%); fractures (men 14.2%, women 28.8%); osteoarthritis (men 36.3%, women 61.0%); and high sarcopenia risk (men 21.7%, women 43.0%). Compared to those without the exposure, lower mean LSA scores (95% CI) were observed among men who reported a fall (−9.7 (−18.8, −0.6)) and among participants with high sarcopenia risk (men −26.6 (−35.9, −17.3), women −17.9 (−25.6, −10.2)). Emotional loneliness scores were 2.4 (1.4, 4.2) times higher among women with high sarcopenia risk compared to those without; p>0.05 for other associations.

Conclusion

Musculoskeletal conditions and adverse outcomes were common. High sarcopenia risk was related to greater emotional loneliness among women, and lower LSA scores among both sexes. These findings suggest that individuals at high sarcopenia risk may be at increased risk of poor life-space mobility and loneliness, and could benefit from personalised support and health interventions.

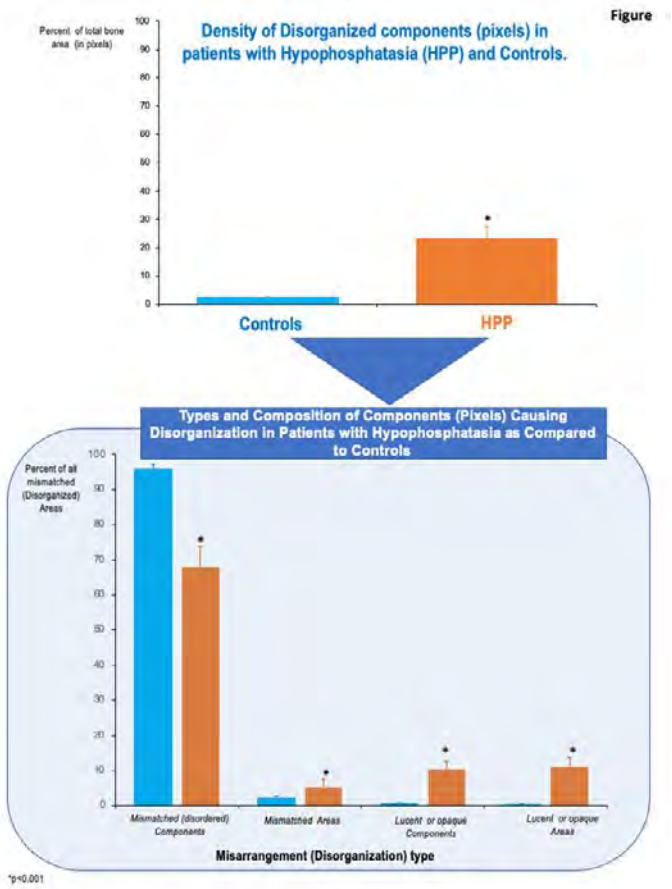
OC11

BONE COMPONENT DISORGANIZATION IN METABOLIC AND GENETIC BONE DISEASES, INCLUDING HYPOPHOSPHATASIA: NOVEL INSIGHTS INTO DISEASE PATHOGENESIS AND PATIENT ASSESSMENT

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Figure



Background: In metabolic and genetic bone diseases, bone cell function may be impaired, or cells may receive incorrect or abnormal matrix components. As a consequence, inappropriate components may be deposited within the bone matrix, or normal components may be deposited in incorrect locations, leading to a misarranged (disorganized) bone matrix—a major clinical and biomechanical abnormality. Disruption of the normal organization of matrix elements impairs load and energy transfer, resulting in structural damage, skeletal abnormalities, and fractures, independently of bone mineral density (BMD).

Hypophosphatasia (HPP) represents a prototypical disorder in which these mechanisms are prominent. In HPP, deficiency or dysfunction

of tissue-nonspecific alkaline phosphatase (TNSALP) leads to the accumulation of abnormal matrix components and consequent bone matrix disorganization. We therefore hypothesized that quantifying the extent of bone matrix misarrangement could provide a robust approach for identifying and assessing patients with HPP in both clinical and research settings.

Methods- We studied 29 patients with adult-onset hypophosphatasia (HPP) and 103 age- and sex-matched controls. The extent of bone matrix disorganization and the characteristics of the most misarranged areas were assessed on femoral X-rays using a novel, validated tool (ALIGNOGRAM).

Findings- In patients with HPP, 235.48 ± 3.97 out of 1,000 matrix components (pixels) were disorganized, compared to 27.85± 0.27 in controls (p<0.0001)—representing an 8.45-fold greater degree of misarrangement.

Remarkably, in all patients with HPP, disorganization was attributable to the presence of lucent (hypodense) or opaque (hyperdense) components—a feature observed in less than 1% of controls. In contrast, among controls, disorganization was predominantly due to mismatched or disorderly arranged components (pixels), which represented the sole abnormality in 95.7% ± 1.26 of them (Figure).

Interpretation: The presence of a disorganized bone matrix characterized by lucent (hypodense) and/or opaque (hyperdense) elements should alert health professionals to an underlying genetic or metabolic bone disease, especially HPP. This imaging biomarker, which can be quantified on standard plain radiographs available worldwide, provides a widely accessible and cost-effective approach for early detection, routine monitoring, and assessment of therapeutic response, particularly in patients with metabolic, genetic, and other rare bone diseases, including HPP.

OC12

FREQUENCY OF ECTOPIC CALCIFICATIONS AMONG PATIENTS WITH HYPOPHOSPHATASIA IN THE GLOBAL HPP REGISTRY

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Objective: To assess frequency of renal and eye ectopic calcifications among patients with hypophosphatasia (HPP) who were either naive to treatment or treated with asfotase alfa enzyme replacement therapy (ERT).

Methods: Patients of all ages enrolled in the Global HPP Registry were included. Frequencies (95% CIs) of nephrocalcinosis and eye ectopic calcifications were assessed by renal ultrasound and ophthalmologic exam, respectively. Assessments were cross-sectional in ERT-naive patients (at any time in untreated patients or before ERT in treated patients) and longitudinal in treated patients. Patients in Japan were excluded from eye analyses owing to differences in data collection. Data cut: June 2025.

Results: A total of 1,155 patients were included (65.9% female, 70.6% White, median age 32.3 y at last ERT-naive visit, 42.3% went on to ERT). Nephrocalcinosis was found in 12.5% (64/513; 95% CI 9.7%, 15.7%) of ERT-naive patients; most (76.7% [33/43]) cases were mild. Nephrocalcinosis was more common in patients who went on to receive ERT (17.3% [39/225]; 95% CI 12.6%, 22.9%) than those who never received ERT (8.7% [25/288]; 95% CI 5.7%, 12.5%). Eye ectopic calcification was found in 4.2% (9/214; 95% CI 1.9%, 7.8%) of ERT-naive patients. Of 488 treated patients, 150 had a renal ultrasound and 66 had an eye exam before and after ERT start. Nephrocalcinosis occurred in 22.7% (95% CI 16.2%, 30.2%) of patients at or before ERT, 27.3% (95% CI 20.4%, 35.2%) at any time after ERT, and 14.7% (95% CI 9.4%, 21.4%) at most recent exam (median [range] follow-up: 4.2 [0.3, 12.9] y); eye ectopic calcification was found in 4.5% (95% CI 0.9%, 12.7%), 16.7% (95% CI 8.6%, 27.9%), and 4.5% (95% CI 0.9%, 12.7%) of patients, respectively (median [range] follow-up: 5.0 [0.5, 12.9] y).

Conclusions: Ectopic calcifications were reported in ERT-naive patients, indicating they are part of HPP's natural history. ERT does not appear to increase ectopic calcification occurrence in longitudinally followed patients.

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OC13

INCIDENCE OF NEW OSTEOPOROTIC FRACTURES UP TO THREE YEARS OF FOLLOW-UP IN SUBJECTS WITH TYPE 2 DIABETES MELLITUS WHO INITIATE ANY OSTEOPOROSIS MEDICATION COMPARED TO NON-DIABETICS: A POPULATION-BASED COHORT STUDY

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Introduction: Patients with type 2 diabetes mellitus (T2DM), despite having higher bone mass than the general population, have an increased risk of osteoporotic fractures (OF). In addition, these patients are underrepresented in clinical trials of different osteoporosis medications (OM).

Objective: To analyze the incidence of OF among patients with T2DM compared to non-diabetics in real-life conditions.

Methods: A population-based cohort study in the primary care setting was conducted. All individuals who initiated an OM between 2012 and 2016 were selected from the SIDIAP database (which contains pseudo-anonymized clinical information on more than 5.5 million patients in Catalonia). Exclusion criteria included prior OM use in the previous 12 months, history of neoplasia, Paget's disease, or HIV infection. Up to three non-diabetic subjects were matched to each T2DM subject by propensity score. To assess effectiveness, incidence rates and incidence rate ratios of hip fracture (HF), vertebral fracture (VF) and OF were calculated for the periods 0-3, 4-12, 13-24 and 25-36 months.

Results: A total of 42,946 subjects who initiated an OM were identified (5,828 with T2DM and 37,118 non-diabetic), predominantly women (82.5% in T2DM and 91.6% in non-diabetics), with a mean age (SD) of 74.1 (8.9) and 68.1 (10.4) years, respectively. The most used OM were oral bisphosphonates (80.4%) and denosumab (9.8%). Incidence rates (×1000 person/year) in subjects with T2DM were 53.7 for OF, 18.7 for HF, and 32.8 for VF, and in non-diabetic subjects 31.5, 8.1 and 22.5, respectively. Compared with the 0–3 months period, incidence rate ratios for all OM were lower in all subsequent periods, both in T2DM and non-diabetic subjects (Table 1).

Conclusions: The effectiveness of different OM, measured as changes in incidence rates, is similar in patients with T2DM and in non-diabetic individuals.

Table 1: Incidence rate ratios (95% CI) for different OM in T2DM and non-diabetic subjects, compared to the 0-3 months period.

		T2DM SUBJECTS			NON-DIABETIC SUBJECTS			p value comparing both cohorts		
		4-12 months	13-24 months	25-36 months	4-12 months	13-24 months	25-36 months	4-12 months	13-24 months	25-36 months
Any OM	OF	0.13 [0.1, 0.16]*	0.1 [0.07, 0.13]*	0.09 [0.07, 0.12]*	0.12 [0.1, 0.15]*	0.09 [0.07, 0.11]*	0.09 [0.07, 0.11]*	0.6969	0.7125	0.8312
	HF	0.17 [0.11, 0.24]*	0.1 [0.06, 0.16]*	0.12 [0.07, 0.19]*	0.21 [0.15, 0.29]*	0.15 [0.11, 0.2]*	0.11 [0.07, 0.17]*	0.4025	0.1612	0.9269
	VF	0.11 [0.08, 0.15]*	0.09 [0.06, 0.13]*	0.09 [0.06, 0.13]*	0.09 [0.06, 0.12]*	0.07 [0.06, 0.1]*	0.08 [0.06, 0.11]*	0.596	0.4128	0.7623
Oral BF	OF	0.11 [0.09, 0.15]*	0.1 [0.07, 0.13]*	0.09 [0.07, 0.12]*	0.11 [0.09, 0.13]*	0.08 [0.07, 0.11]*	0.08 [0.06, 0.1]*	0.6717	0.475	0.3963
	HF	0.15 [0.09, 0.23]*	0.08 [0.05, 0.14]*	0.1 [0.06, 0.18]*	0.19 [0.14, 0.27]*	0.13 [0.09, 0.19]*	0.09 [0.06, 0.15]*	0.3123	0.1963	0.7746
	VF	0.1 [0.07, 0.14]*	0.09 [0.06, 0.14]*	0.1 [0.06, 0.15]*	0.08 [0.07, 0.11]*	0.07 [0.05, 0.09]*	0.07 [0.05, 0.1]*	0.5404	0.2112	0.2367
Denosumab	OF	0.26 [0.13, 0.53]*	0.22 [0.1, 0.47]*	0.24 [0.1, 0.58]*	0.39 [0.25, 0.61]*	0.31 [0.19, 0.51]*	0.41 [0.26, 0.64]*	0.3573	0.4636	0.2959
	HF	0.13 [0.02, 0.64]*	0.36 [0.12, 1.15]	0.35 [0.09, 1.36]	0.66 [0.3, 1.47]	0.6 [0.27, 1.31]	0.62 [0.27, 1.46]	0.0765	0.4937	0.4771
	VF	0.32 [0.14, 0.71]*	0.18 [0.06, 0.49]*	0.11 [0.03, 0.46]*	0.28 [0.15, 0.54]*	0.24 [0.13, 0.47]*	0.41 [0.24, 0.71]*	0.8316	0.5933	0.1063
Teriparatide	OF	0.18 [0.02, 0.37]*	NA	NA	0.11 [0.05, 0.2]*	NA	NA	0.289	NA	NA
	HF	0.4 [0.15, 1.06]*	NA	NA	0.11 [0.04, 0.29]*	NA	NA	0.0513	NA	NA
	VF	0.08 [0.02, 0.26]*	NA	NA	0.11 [0.05, 0.23]*	NA	NA	0.6579	NA	NA

OM = osteoporosis medication, T2DM = type 2 diabetes mellitus, BF = bisphosphonate, OF = osteoporotic fracture, HF = hip fracture, VF = vertebral fracture

* p <0.001 compared to the incidence in the 0-3 months period

OC14

TYPE 2 DIABETES MELLITUS AND FRACTURE RISK: AN INTERNATIONAL META-ANALYSIS

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Objectives

We investigated, using an international individual participant data meta-analysis, prospective associations between type 2 diabetes mellitus and incident fracture in men and women, and any dependence of associations on femoral neck bone mineral density (FNBMD).

Materials and methods

The interim analysis dataset comprised individual records of 951,871 participants (65.0% women) with information on type 2 diabetes status, from 48 cohorts across 31 countries. The total follow-up time was 10.2 million person-years. FNBMD T-score was available in a subset of 134,817 individuals. We investigated associations between the presence/absence of type 2 diabetes mellitus at baseline and risk of major osteoporotic fracture (MOF) or hip fracture using an extended Poisson model in each cohort. Covariates considered were age, sex, duration of follow-up and FNBMD T-score. The results from the different studies were merged by using the inverse-variance weighted β-coefficients in a random effects model.

Results

In a model adjusted for age and time since baseline, type 2 diabetes was associated with a greater risk of incident MOF in both men [hazard ratio (95% CI): 1.20 (1.11, 1.33)] and women [1.11 (1.03, 1.19)]. Comparable associations were demonstrated for hip fracture [men: 1.29 (1.16, 1.44); women: 1.43 (1.23, 1.66)]. Associations were similar in the subset with FNBMD; adjustment for FNBMD T-score tended to modestly increase point estimates. For example, for incident hip fracture: men, 1.71 (1.44, 2.03); women, 1.48 (1.24, 1.78).

Conclusions

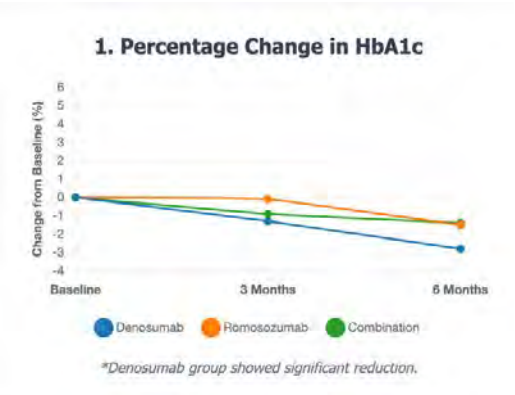
In one of the largest ever individual participant data meta-analyses undertaken to date, type 2 diabetes was associated with increased fracture risk, at least partly independently of femoral neck BMD. These findings will inform the next iteration of the FRAX® calculator.

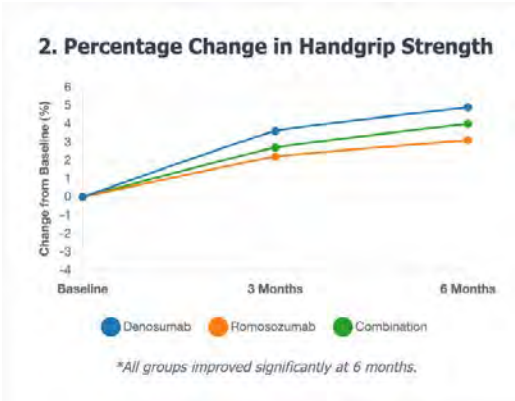
OC15

LONGITUDINAL EFFECTS OF DENOSUMAB, ROMOSOZUMAB, AND COMBINATION THERAPY ON MUSCLE QUALITY AND METABOLIC PROFILES A RANDOMIZED CONTROLLED TRIAL

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OBJECTIVE(S): To compare the efficacy of denosumab, romosozumab, and their combination on musculoskeletal health (handgrip strength, skeletal muscle mass) and metabolic profiles (HbA1c, body composition) in osteoporotic patients.

MATERIAL AND METHODS: A total of 114 patients were randomized into three groups: denosumab (N=38), romosozumab (N=38), and combination therapy (denosumab + romosozumab, N=38). Outcomes included handgrip strength, skeletal muscle mass (SMM), fat mass, BMI, and HbA1c, assessed at baseline, 3, and 6 months. Changes from baseline were analyzed. Statistical methods included Kruskal-Wallis for between-group differences, Friedman test for within-group longitudinal changes, and Generalized Estimating Equations (GEE) for time-by-group interactions.

RESULTS: Baseline characteristics were comparable across groups ($p>0.05$). GEE analysis showed no significant time-by-group interactions for any outcome, indicating parallel improvement trends across treatments. No significant between-group differences were found in percentage changes at 3 or 6 months. However, within-group analyses revealed significant improvements. At 6 months, handgrip strength increased in all groups (denosumab: +4.9%; romosozumab: +3.1%; combination: +4.0%; all $p<0.05$). SMM also significantly increased (denosumab: +1.6%; romosozumab: +1.0%; combination: +1.1%; $p<0.05$). Uniquely, regarding metabolic profiles, only the denosumab group showed a significant reduction in HbA1c (-2.8%, $p=0.015$), whereas other groups showed no significant change.

CONCLUSION(S): All three regimens—denosumab, romosozumab, and combination therapy—effectively improved muscle quality (strength and mass) over 6 months, with no significant difference between strategies. Notably, denosumab monotherapy conferred an additional benefit in glycemic control (HbA1c reduction), suggesting potential metabolic advantages beyond skeletal protection.

OC16

PREGNANCY-RELATED CHANGES IN BONE HEALTH: A LONGITUDINAL REMS-BASED STUDY

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SC, FC, FAL, GP and PP equal contributors in alphabetic order

Objective(s): Pregnancy-related increases in calcium requirements may lead to enhanced bone resorption, resulting in substantial reductions in bone mineral density (BMD), and a higher risk of osteoporosis. Current evidence in literature report that pregnant women can show a BMD reduction up to 9%. As standard densitometric technologies, such as dual-energy X-ray absorptiometry (DXA), involve exposure to ionising radiation, their use is not recommended during pregnancy. Therefore, the present study aimed to investigate pregnancy-related changes in bone density and microarchitecture using the Radiofrequency Echographic Multi-Spectrometry (REMS) technology.

Materials and Methods: Inclusion criteria encompassed Caucasian pregnant women at first trimester who underwent REMS scans of femoral neck. Patients were re-assessed at the third trimester. By automatically combining bone quantity (REMS-T-score) and quality (REMS-FS) parameters, patients were classified into one of the 7 risk classes (named from R1 to R7), each corresponding to an increasing probability of imminent (within 5-year) fragility hip fractures. Changes in bone-related parameters over time were evaluated using paired *t*-tests.

Results: In total, the analysis included 46 pregnant women (aged 26–49 years; BMI 16.59–29.76 kg/m²). Comparison over time revealed a significant deterioration in both bone-related parameters: the mean T-score, in fact, decreased from −1.1 ± 0.7 to −1.3 ± 0.7 ($p < 0.0001$), and the mean FS increased from 41.70 ± 5.68 to 46.39 ± 8.33 ($p = 0.0006$). Furthermore, 55% of the participants shifted from a lower to a higher risk class.

Conclusion(s): Overall, the results demonstrate that pregnancy is associated with a deterioration in bone density and microarchitectural integrity, which together increases the risk of fragility fractures. In this context, REMS technology represents a safe, radiation-free and non-invasive approach that enables early identification of women at higher risk and monitoring over time, thus supporting targeted preventive strategies.

OC17

COST-EFFECTIVENESS OF AI-ENHANCED OPPORTUNISTIC OSTEOPOROSIS SCREENING USING CHEST RADIOGRAPHS: EVIDENCE FROM SIX INTERNATIONAL ANALYSES

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Introduction: AI-enhanced analysis of routinely acquired chest radiographs enables opportunistic osteoporosis screening without additional imaging. While individual studies suggest economic value, evidence comparing results across healthcare systems is limited. This study summarizes findings from six international cost-effectiveness analyses of AI-enhanced opportunistic osteoporosis screening.

Methods: We reviewed six country-specific studies, four published and two recently submitted, comparing AI-enhanced chest radiograph screening with no screening. Models used local data on fracture incidence, costs, follow-up pathways, and treatment patterns. Outcomes included costs, quality-adjusted life years (QALYs), incremental cost-effectiveness ratios (ICERs), and key drivers.

Results: AI-enhanced screening was cost-effective in all six settings (Germany, United States, Japan, Korea, Singapore, Australia). ICERs ranged from dominance (cost-saving with QALY gains) to US$72,085 per QALY gained. Dominance occurred in some settings, largely where fracture incidence or fracture-related costs were higher. Lifetime fractures prevented per 10,000 screened people ranged from 16 (Singapore) to 44 (Germany). One evaluation (Korea) included both sexes and showed cost-effectiveness in men and women. Across countries, results were most sensitive to fracture costs, medication prices, adherence, and follow-up after osteoporosis is suspected.

Discussion: Across diverse healthcare systems, AI-enhanced opportunistic screening consistently produced favorable economic outcomes, though the size of benefit varied. Differences in epidemiology, treatment patterns, and cost structures limit direct generalizability, highlighting the need for local analyses. Overall, these findings support AI-enhanced opportunistic screening as a scalable and efficient strategy to reduce the global burden of osteoporotic fractures.

Acknowledgement: Funded by an unrestricted educational grant from Promedius, Inc.

OC18

CLINICALLY INTERPRETABLE PREDICTORS OF IMMINENT SUBSEQUENT FRACTURES IN A DEEP-LEARNING PREDICTION MODEL

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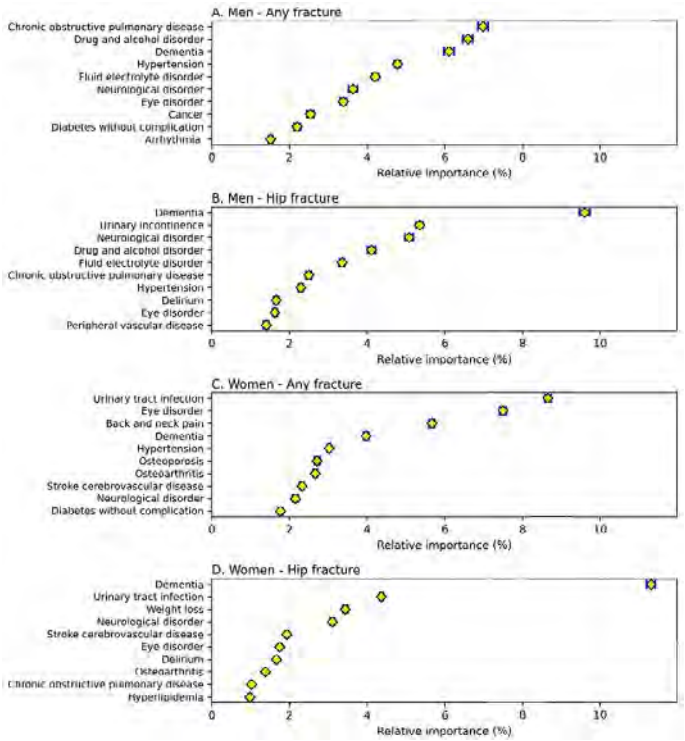
The inherent *"black-box"* nature of machine- and deep-learning models, despite the reported superiority in predictive performance, limits their adoption in clinical practice, as clinicians cannot justify individual predictions necessary for personalised treatment decisions. This study aimed to quantify and characterise the relative importance of predictors in a deep-learning algorithm for imminent subsequent fracture risk, facilitating its clinical interpretability and translational potential.

We developed a *DeepHit* prediction model for subsequent fractures using administrative health data from a statewide population-based cohort of 269,294 adults in New South Wales, Australia, born on or before 01/01/1950, who sustained an incident fracture between 2005 and 2017, with follow-up through 2022. The model accounts for complex non-linear data and competing mortality risks. Predictors included age at index fracture, fracture site, prior fractures and falls, and 1,870 ICD-10 codes representing 65 predefined chronic diseases recorded at the time of the index fracture. We used a SHapley Additive exPlanations (SHAP) to quantify each predictor's contribution across all possible predictor subsets.

The model showed strong discrimination and calibration for 1- and 2-year risks of subsequent fractures, with minimal prediction bias (~ zero), and C-indices of up to 0.81 for hip fractures and 0.75 for any subsequent fractures. Age at index fracture was the dominant predictor, accounting for 20% of the predictive contribution for any subsequent fractures in men and up to 34% for hip fractures in women. Index fracture site was consistently influential, contributing 8-14% of the overall model predictive performance. Among comorbidities, lung disease, dementia, urinary tract infections or incontinence, drug- or alcohol-related disorders, eye and neurological conditions were the strongest contributors to the prediction of imminent subsequent fracture risk (Figure).

This study identifies clinically meaningful predictors of imminent subsequent fractures. It demonstrates that explainable deep-learning models can provide accurate predictive performance while remaining interpretable and transparent, thus supporting targeted secondary fracture prevention.

Figure. The strongest comorbidity predictors to imminent subsequent fracture risk



OC19

HIGH MORTALITY IN OLDER MEN WITH LOW MUSCLE MASS AND STRENGTH – THE PROSPECTIVE STRAMBO STUDY

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Objective: Low muscle mass and strength are associated with high mortality, but the studies were focused on all-cause mortality and did not consistently assess predictive value of both factors. We assessed the association of low muscle mass (estimated by the creatinine to cystatin C ratio [CCR]) and grip strength with the mortality in older men.

Methods: In 806 men aged 60–87 yr, grip strength and CCR were assessed at baseline. Data on the death (date, cause) was confirmed by a health professional. Statistical models were adjusted for age, fat mass, education level, physical activity, co-morbidities, 25OHD, C-reactive protein, eGFR and abdominal aortic calcification.

Results: Over 12 years, 255 men died. Among them, 69 died of cardiovascular (CV) diseases, 88 of cancer and 98 of other reasons (non-CV-non-cancer mortality). CCR and grip strength were correlated ($r=0.22$, $p<0.001$). Low CCR and low grip strength were associated with higher all-cause mortality (HR=1.39 /SD decrease, 95%CI: 1.20–1.62, and HR=1.37 /SD decrease, 95%CI: 1.16–1.61, both $p<0.001$) independently of each other (interaction, $p=0.93$). Mortality was higher in men being in the lowest tertiles of CCR and grip strength vs. those being in the highest tertiles of both variables (HR=5.47, 95%CI: 2.59–11.57, $p<0.001$).

CCR and grip strength were associated with higher CV mortality (HR=1.57 /SD, 95%CI: 1.17–2.11, $p<0.005$ and HR=1.52 /SD, 95%CI: 1.10–2.11,

p<0.05) and higher non-CV-non-cancer mortality (HR=1.59 /SD, 95%CI: 1.22–2.07 and HR=1.64 /SD, 95%CI: 1.25–2.14, both p<0.001). Only CCR was associated with cancer mortality (p<0.005). Each type of mortality was higher in men in the highest tertiles of both variables vs. men in their lowest tertiles (e.g., cancer mortality HR=12.29, 95%CI: 2.64-57.20, p<0.005).

Conclusion: In older men followed prospectively for 12 years, low muscle mass (estimated by CCR) and, to a lesser extent, low grip strength were associated with higher mortality regardless of its cause.

OC20

LOWER INTRINSIC CAPACITY AND SARCOPENIA: DATA FROM THE GEELONG OSTEOPOROSIS STUDY

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Objective: Intrinsic capacity (IC), proposed by the WHO as the overall combination of an individual's physical and mental abilities, has been identified as a key indicator of healthy ageing. While the Integrated Care for Older People (ICOPE) framework focuses on overall IC, it includes aspects of ageing which are also relevant to sarcopenia. The aim of this cross-sectional study was to explore the IC-sarcopenia relationship in older women.

Methods: Composite IC scores were calculated for 191 women (60-90y), with higher scores reflecting greater capacity, based on five domains: vitality (repeated chair stands, perceived energy, weight loss), cognition (Mini-Mental State Examination), psychological wellbeing (Hospital Anxiety and Depression Scale), locomotion (timed Up-&-Go) and sensory abilities (vision, hearing). Scores for each domain ranged from 0 (unhealthy) to 3 (healthy). Low appendicular lean mass (ALM/h^2<5.5kg/m^2) was measured by DXA and low handgrip strength (HGS<16kg) by dynamometry. Education, physical activity (inactive/sedentary/active/very-active), smoking and alcohol use were self-reported. Linear regression modelling was used to determine associations of IC with components of sarcopenia and lifestyle factors.

Results: Median IC score=12 (range 4-14). In separate models, low-HGS (β= -2.178, se 0.547, p<0.001) and low-ALM/h^2 (β= -1.242, se 0.464, p=0.008) were negatively associated with IC scores. In a multivariable model, independent associations with IC included low-HGS (β= -1.379, se 0.463, p=0.003), low-ALM/h^2 (β= -1.180, se 0.373, p=0.002), age (β= -0.074, se 0.017, p<0.001), smoking (β= -1.318, se 0.494, p=0.008) and physical activity: with 'inactive' as reference, sedentary (β=2.305, se 0.434), active (β=2.676, se 0.419) and very-active (β=3.000, se 0.464) groups showed a dose-related association with IC (all p<0.001).

Conclusion: The association between components of sarcopenia and lower IC scores, independent of age and movement, suggest that further research should investigate the ICOPE framework as a screener for functional deterioration, psychological decline and energy imbalance, all of which contribute to sarcopenia.

OC21

INCREASED DIETARY FIBER INTAKE IS ASSOCIATED WITH BETTER GRIP STRENGTH AND PHYSICAL PERFORMANCE IN COMMUNITY-DWELLING OLDER ADULTS

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Objective: Poor habitual diet may contribute to sarcopenia via gut microbiota–mediated inflammation, yet evidence in older adults is scarce. In this study we aimed to investigate associations of habitual dietary fiber and fatty acid intake with sarcopenia-defining parameters and with intestinal and systemic inflammation.

Methods: This retrospective, cross-sectional analysis included data from the Trial in Elderly with Musculoskeletal Problems due Underlying Sarcopenia-Faeces to Unravel the Gut and Inflammation Translationally (TEMPUS-FUGIT, NCT05008770) and Exercise and Nutrition for Healthy AgeiNg (ENHANce, NCT03649698) studies. Dietary intake was assessed through four-day food records in community-dwelling persons aged ≥65 years. Eighty-four participants with probable, confirmed or severe sarcopenia as per European Working Group on Sarcopenia in Older Persons 2 (EWGSOP2) and 100 controls without sarcopenia were included. Muscle mass and function were evaluated using appendicular lean mass (ALM), handgrip strength (HGS), the 5-time Chair Stand Test (CST), Short Physical Performance Battery (SPPB), and gait speed. Assessed inflammatory markers included interleukins (IL)-4, IL-6 and IL-10, Tumor Necrosis Factor (TNF)-α, InterFeroN (IFN)-γ, White Blood Cells (WBC), high sensitivity C reactive protein (hs-CRP), Erythrocyte Sedimentation Rate (ESR), albumin and fecal calprotectin (fCPT). Group comparisons and correlations were multiple-testing adjusted and associations were adjusted for age, body mass index, sex, mean steps, nutritional status and energy intake in linear regression models.

Results: In the entire cohort, HGS associated positively with protein (β=0.264; 95% Confidence Interval (CI) [0.013;0.515]) and total fiber (β=0.236; 95% CI [0.077;0.395]) intake. The total SPPB score associated with total (β=0.113; 95% CI [0.006;0.220]) and soluble fiber (β=0.093; 95% CI [0.013;0.172]) intake. PUFA (β= -0.133; 95% CI [-0.244;-0.022]) and omega-6 (β= -0.115; 95% CI [-0.214;-0.016]) associated negatively with WBC counts. Among persons with any stage of sarcopenia, fCPT correlated inversely with total (ρ= -0.450) and soluble fiber (ρ= -0.436). Protein, DocosaHexanoic Acid (DHA) and soluble fiber declined with increasing sarcopenia severity, whereas omega-6/omega-3 ratio increased. All reported results were significant (p<0.05).

Conclusions: These results point to fiber-rich eating patterns, emphasizing total and soluble fiber sources (highly present in legumes, beans, oats, and fruits), as meaningful for maintaining muscle strength, function, and intestinal inflammatory status for age-related health.

Disclosures: all authors have nothing to disclose.

OC22

EFFECT OF DALCROZE EURHYTHMICS EXERCISE ON MUSCLE, PHYSICAL AND COGNITIVE FUNCTION, AND FALLS IN SARCOPENIC OLDER ADULTS: THE SARCARE RANDOMIZED CONTROLLED TRIAL

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Objectives Given the growing evidence pointing towards the key role of the central nervous system in sarcopenia, it can be hypothesized that specific interventions influencing this system may also exert a significant effect on muscle function in sarcopenic elders. Dalcroze Eurhythmics (DE) exercise has been shown to increase physical performances and reduce falls in older adults at high risk for falls, and to modify CNS activity. The SARCARE trial, a proof-of-concept study, was mainly designed to determine i) the effectiveness of a DE exercise intervention in improving muscle, physical and cognitive function and reducing falls in sarcopenic older adults, and ii) whether exercise-related benefits are associated/mediated with changes at central level.

Material and Methods We conducted a single-centre, single-blind, two-arm, randomized controlled trial, in which 196 community-dwelling adults ≥65 years (mean age, 75.2 years; 89% women) with low lean mass and low physical performance were randomized (1:1) to i) a DE exercise group (2x/week supervised group-based) or ii) a CONtrol group (no exercise) for 12 months, and assessed at baseline, 6- and 12-month. Both groups also received regular educational lectures. The primary outcome was change in Short Physical Performance Battery (SPPB) score at 12 months. Secondary outcomes included, among others, changes in muscle strength and mass (assessed by DXA), cognition, and falls.

Results At 12 months, physical function improved in the DE group compared to the CON group (group*time interaction for SPPB score: 1.16, 95%CI 0.76 to 1.56; p<0.001). Significant improvements were also found in the DE group on muscle strength (5x chair stand time & handgrip strength, p<0.005 for both) compared to the CON group, while no effect was found on muscle mass (ALM/height^2, p=0.947). Also, the DE group improved on a variety of cognitive/executive function outcomes compared to CON group (e.g., Trail Making Test-Part B, p<0.001). The adjusted hazard ratio for falls was 0.56 (95%CI 0.33 to 0.95; p=0.030) in favor of the DE group.

Conclusions A 12-month DE exercise program was effective in improving muscle, physical and cognitive function, and reducing falls in sarcopenic older adults. Further analyses will help clarify the mechanisms underlying the muscular benefits of DE training.

OC23

IDENTIFICATION OF FACTORS ASSOCIATED WITH NON-RESPONSE TO A MULTICOMPONENT INTERVENTION IN OLDER ADULTS WITH PHYSICAL FRAILTY AND SARCOPENIA

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Objective(s) To identify baseline characteristics associated with incident mobility disability among older adults with physical frailty and sarcopenia showing high adherence to a multicomponent intervention.

Materials and Methods This is a secondary analysis of the SPRINTT randomized controlled trial, which evaluated a multicomponent intervention based on physical activity and nutritional counselling to prevent mobility disability in community-dwelling older adults with physical frailty and sarcopenia. The present analysis focused on participants allocated to the intervention arm who showed high adherence to physical activity, defined according to American College of Sports Medicine recommendations as attending ≥2–3 sessions per week. Incident mobility disability was operationalised as inability to complete the 400-m walk test in <15 minutes during follow-up. Logistic regression, Kaplan–Meier and Cox proportional hazards models were used to identify predictors of incident mobility disability. Models were progressively adjusted for potential confounders. Additional analyses explored the association between baseline walking performance and incident mobility disability using different modelling strategies, including alternative operationalisations of walking performance. Sensitivity analyses were conducted to assess the robustness of the findings under different analytical assumptions.

Results Among 352 participants with high adherence (mean age 78.7±5.5 years, 72.7% women), 110 (31.3%) developed incident mobility disability. At baseline, those who developed disability were older and had significantly slower 400-m walk time (569±153 vs 479±119 s, p<0.001). In logistic regression, baseline walk time was independently associated with mobility disability (OR per minute increase: 1.27, 95% CI 1.13–1.42), together with age. Antiepileptic and antithrombotic drug use were also associated with higher risk, but their inclusion did not affect model discrimination. In survival analyses, each additional minute of baseline walk time increased the hazard of disability by 20% (HR 1.20, 95% CI 1.12–1.29). Using a 480-second (or 8-minute) cut-off, participants with slower baseline walk had a more than two-fold higher risk compared with faster walkers (HR 2.47, 95% CI 1.66–3.66). Dose–response analyses across quartiles suggested a near-linear relationship between baseline walk time and disability risk. Results were consistent in sensitivity analyses and across different outcome adjudication strategies.

Conclusion(s) Among older adults with physical frailty and sarcopenia showing high adherence to a multicomponent intervention, baseline 400-m walk time is a strong and independent predictor of non-response. These findings suggest that functional severity at baseline may limit the effectiveness of lifestyle interventions, highlighting the need for personalised or intensified strategies in slower walkers.

OC24

CAN AI-DERIVED BMD FROM ROUTINE RADIOGRAPHS PREDICT FRACTURE RISK? A 6-YEAR FOLLOW-UP STUDY

J.-Y. Hsu[1], S.-H. Fu[2], T.-H. Tseng[3], C.-C. Hung[2], P.-C. Tsao[4], G. H. Chang[1], C.-Y. Wang[5]

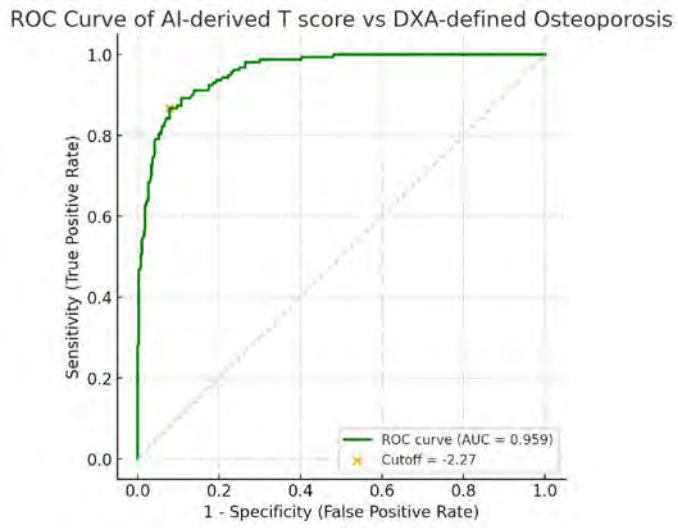
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Objective(s) To determine whether AI-derived bone mineral density (BMD) from routine spine radiographs can predict real-world fracture events, and to validate the accuracy of AI-based BMD estimation and its diagnostic performance for osteoporosis.

Material and Methods Adults aged ≥20 years with paired lumbar DXA and spine radiographs (lumbosacral or kidney-ureter-bladder) within 6 months were retrospectively analyzed from a tertiary medical centre in Taiwan (2014-2024). A commercially cleared AI algorithm (DeepXray Spina) estimated lumbar BMD from radiographs. Agreement between AI- and DXA-derived BMD was assessed using Pearson correlation, intraclass correlation coefficient (ICC), and Bland-Altman analysis. Diagnostic accuracy for osteoporosis (T-score ≤−2.5) was evaluated by ROC analysis and Cohen's κ. Fracture prediction for vertebral, hip, and all-site fractures was assessed using ROC analysis with DeLong's test comparing AI and DXA performance.

Results Among 540 participants (73.9% female; mean age 57.0 years), mean follow-up was 6.4 years. AI- and DXA-derived BMD showed excellent agreement (r=0.943; ICC=0.934). For osteoporosis diagnosis, AI-derived T-scores achieved AUC of 0.959 with κ=0.74 and 90% accuracy. During follow-up, 57 vertebral fractures, 13 hip fractures, and 100 all-site fractures occurred. AI-derived BMD predicted vertebral fractures (AUC 0.704 vs 0.678, p=0.086) and hip fractures (AUC 0.716 vs 0.678, p=0.078) comparably to DXA. For all-site fractures, AI demonstrated significantly better prediction (AUC 0.699 vs 0.677, p=0.042). Lower AI-derived BMD was significantly associated with higher fracture risk (OR 1.74 per 0.1 g/cm² decrease for vertebral fractures).

Conclusion(s) AI-derived BMD from routine radiographs demonstrates excellent agreement with DXA and predicts fracture risk comparably or even superiorly to DXA over long-term follow-up. This approach enables opportunistic identification of high-risk individuals, supporting population-level osteoporosis screening where DXA is unavailable.



OC25

FOREARM BMD IS A FRAX INDEPENDENT PREDICTOR OF FRACTURE RISK

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Objectives: The aim of this study was to quantify the relationship between forearm BMD, FRAX probabilities and fracture risk, and to examine the effect of age, sex, time since measurement and BMD value on fracture risk.

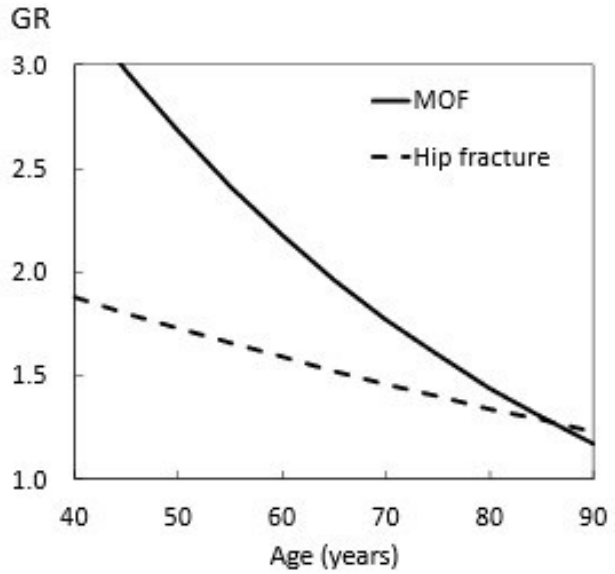
Materials and methods: 35121 men and women from 11 predominately population-based cohorts were followed for an average of 11.1 years and a total of 388,654 person-years. The association between forearm BMD, FRAX probabilities (calculated without femoral neck BMD), and the risk of fracture was examined using an extension of the Poisson regression model in each cohort by sex and expressed as the gradient of risk (GR; hazard ratio per 1 SD decrease in BMD). The different studies were merged using weighted coefficients.

Results: The GR of forearm BMD for major osteoporotic fracture was 1.41 (95% confidence interval [CI] 1.31-1.51) when adjusted for age and time since baseline and was similar in men and women (p> 0.20). GRs decreased significantly with age (Figure). When additionally adjusted for FRAX 10-year probability of major osteoporotic fracture, forearm BMD remained a significant, independent predictor for fracture (GR = 1.34, 95% CI 1.26-1.44). A similar GR was noted for hip fracture (GR=1.48; 95% CI 1.35-1.62) that also persisted after adjustment for FRAX (GR=1.41;

95% CI 1.31-1.51). Adjustments to FRAX probabilities based on forearm BMD varied by age and Z-score.

Conclusion: Forearm BMD is a risk factor for fracture that is independent of FRAX. Its validation on an international basis could enable its use in case finding with FRAX.

Figure. Gradient of risk (GR) of forearm BMD for hip fracture or MOF FRAX probabilities according to age



OC26

PREDICTION OF INCIDENT FRACTURES USING THE AI-BASED TBS REVEAL BONE FRAGILITY INDEX: A BAYESIAN SURVIVAL ANALYSIS

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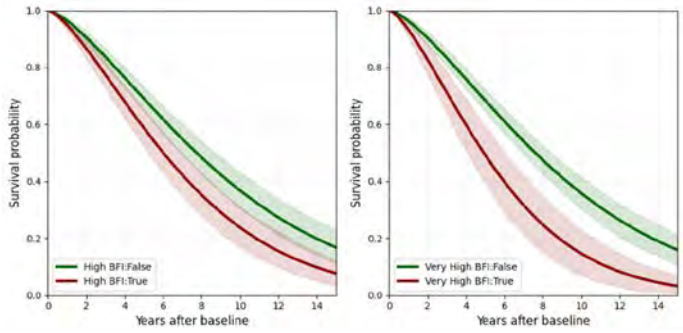
[1]Center of Bone Diseases, Rheumatology Unit, Bone and Joint Department, Lausanne University Hospital & University of Lausanne, Lausanne, Switzerland; [2]Medimaps group SA, Geneva, Switzerland; [3]Faculty of Health & Medicine, Lancaster University, Lancaster, United Kingdom; [4]School of Medicine and Public Health, University of Wisconsin, Madison, United States; [5]Hamad Medical Corporation, Doha, Qatar

Objectives: AI tools for osteoporosis assessment have potential for estimating bone mineral density (BMD) from radiographs; however, typically quantify BMD alone and do not account for microarchitecture. To date, these tools have not demonstrated performance for predicting incident fractures. TBS Reveal™ is an AI-driven solution addressing this gap by deriving a Bone Fragility Index (BFI) from X-ray images through integration of trabecular bone score (TBS) and BMD-related information. This study evaluated the ability of TBS Reveal™ to predict fracture-free survival and the timing of major osteoporotic fractures (MOF).

Materials and Methods: 338 women (mean±SD age 68.3±9.4 years) received baseline spine X-ray imaging with prospective MOF follow-up. TBS Reveal™ was applied to derive the BFI. High BFI was defined as osteoporosis or degraded TBS with osteopenia, and Very High BFI as degraded TBS with osteoporosis. Fracture-free survival was defined from baseline imaging to first MOF. Associations between BFI category and fracture risk were evaluated using a Bayesian Weibull proportional hazards model, comparing High BFI versus all others and Very High BFI versus all others. Five and ten-year fracture probabilities were estimated at the cohort mean age to isolate the effect of bone fragility classification.

Results: 157 participants sustained an incident MOF, with a median time to first fracture of 7.7 years (95%CI: 6.8–8.5). At baseline, 102 participants were classified as High BFI and 44 as Very High BFI. BFI was strongly associated with incident fracture risk, particularly within 5 years. Compared with all other participants, those classified as High BFI had a 10.3% higher 5-year fracture probability (95%CI: 1.2–19.5), increasing to 12.9% at 10 years (95%CI: 1.5–23.6). The Very High BFI group showed a more pronounced effect, with a 19.2% higher 5-year fracture probability (95%CI: 6.3–31.8) and a 21.0% higher probability at 10 years (95%CI: 7.9–31.2). Fracture-free survival curves separated early and remained distinct across BFI categories.

Conclusions: The TBS Reveal™ BFI predicted incident fracture timing, with robust discrimination of short-term fracture risk. By identifying accelerated time-to-fracture profiles from a single X-ray, TBS Reveal™ provides clinically actionable stratification of short and long-term fracture risk, supporting earlier, more targeted fracture prevention strategies.



OC27

3D-SHAPER DIFFERENTIATION OF CORTICAL AND TRABECULAR BONE DESCRIBES FRACTURE STATUS IN PATIENTS WITH KIDNEY DISEASE

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Both cortical and trabecular bone are impaired in patients with chronic kidney disease (CKD) and contribute to increased fracture risk. However, the clinical standard to classify risk, areal bone mineral density (aBMD) by dual energy X-ray absorptiometry (DXA), is a 2-dimensional (D) measure and cannot assess differential contributions of cortical and trabecular bone to fragility. 3D-SHAPER is a novel technological tool applied to DXA imaging that permits 3D analysis of the hip DXA image. 3D models capture femoral geometry, density distribution, cortical and trabecular density. We performed 3D-SHAPER and DXA in 97 patients with (n=31)

and without (n=66) fracture. 3D-SHAPER and DXA data were analyzed as Z-scores to account for age and sex interactions. The total cohort mean age (IQR) was 66.7 (60.0-73.2) years, 53% were females, and 36%, 38% and 27% had CKD Stage 1-3, 4-5 and 5D respectively. CKD duration was 9.2 years. There were no between-group differences in age, gender or CKD stage or duration. Subjects with fracture had lower weight and BMI (74.5 vs 81.3 kg, p<0.05; and 27.6 vs 29.5 kg/m^2, p=0.04, respectively). 3D-SHAPER cortical and trabecular measures were highly and directly correlated with total hip and femoral neck aBMD (r 0.80-0.87, p<0.001) but moderately and directly correlated with spine and forearm aBMD (r 0.41-0.58, p<0.001). In univariate analyses, measures from 3D-SHAPER and DXA discriminated fracture status (table), but trabecular volumetric BMD had highest discrimination. In backward selection multivariate analyses including cortical surface BMD (model 1) and trabecular volumetric BMD (model 2) and aBMD at the forearm and spine, only 3D-SHAPER parameters were selected as the discrimination metric. In conclusion, 3D-SHAPER and DXA measures discriminated fracture status, with superior performance demonstrated by 3D assessment of the individual bone compartments to fragility. Larger and prospective studies are needed to validate these findings.

Z-scores	Fracture (mean±SD)	No fracture (mean±SD)	OR (95%CI)	AUC (95%CI)
3D-SHAPER Measures				
Trabecular volumetric BMD	-0.597 ± 1.286	0.305 ± 1.266	1.83(1.22-2.73)	0.70(0.58-0.81)
Cortical surface BMD	-0.760 ± 1.442	0.184 ± 1.398	1.59(1.14-2.22)	0.66(0.54-0.78)
DXA Measures				
Lumbar Spine	0.311 ± 1.880	1.183 ± 1.810	1.32(1.02-1.75)	0.63(0.51-0.76)
Total Hip	-0.388 ± 1.301	0.224 ± 1.063	1.60(1.08-2.37)	0.65(0.53-0.77)
Femoral Neck	-0.493 ± 1.007	0.020 ± 0.898	1.80(1.11-2.91)	0.64(0.52-0.76)
1/3 Radius	-0.046 ± 1.987	0.888 ± 1.421	1.42(1.07-1.88)	0.63(0.51-0.76)
Ultradistal Radius	-0.569 ± 1.504	0.286 ± 1.249	1.62(1.14-2.30)	0.66(0.54-0.78)

OC28

PERFORMANCE OF NOGG GUIDELINES BASED ON FRAX PRIOR TO DXA VS FRAX CALCULATED USING A FEMORAL NECK ESTIMATE FROM AN OPPORTUNISTIC SCREEN OF LOW BONE DENSITY FROM STANDARD X-RAY

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Objective: To assess the potential of a femoral neck (FN) T-Score estimated from an opportunistic screen of low bone density from standard x-rays (Rho) to improve NOGG risk categorization when used as an input to FRAX.

Material and Methods: In a retrospective dataset of consecutive patients with a Rho-eligible x-ray, DXA and FRAX inputs available, we calculated FRAX MOF score with no T-Score (FRAX-NoT), Rho-estimated FN T (FRAX-Rho), and a DXA FN T (FRAX-DXA). We classified patients in UK NOGG risk categories (low, intermediate, high) and as eligible for pharmacotherapy based on NOGG treatment guidelines (NOGG-RX; i.e., FRAX-DXA > NOGG intervention threshold).

Results: In 1,199 patients (74% female; 50-93 years of age; 56% low bone mass [lowest DXA T-Score > -2.5 and < -1] and 17% osteoporosis), agreement between risk category using FRAX-Rho and FRAX-DXA (Cohen's weighted κ=0.71 [0.68-0.75]) was significantly greater than agreement using FRAX-NoT and FRAX-DXA (0.60 [0.56-0.64]). Had patients been referred for DXA based on FRAX-Rho vs FRAX-NoT exceeding the lower assessment threshold, then 144/746 (19%) vs 140/633 (24%) of referred patients would qualify for NOGG-RX (p=0.22). FRAX-Rho would have referred a net of 113 more patients, but 91 of them would have had elevated fracture risk based on FRAX-DXA. Referral based on FRAX-Rho would not have missed any patients eligible for NOGG-RX while referral based on FRAX-NoT would have missed 4 patients eligible for NOGG-RX. Had patients been assigned high or very high risk, which qualifies for treatment initiation before DXA, based on FRAX-Rho vs FRAX-NoT, 96/113 (85%) vs 76/111 (68%; p=0.006) would truly be eligible for NOGG-RX.

Conclusions: DXA scans often have long waiting lists, and in some cases may not be available. A Rho-estimated FN T-Score has the potential to improve a FRAX-NoT estimate when DXA is not available, as it has significantly greater agreement with FRAX-DXA. It would correctly identify more patients eligible for therapy and would reduce the number of inappropriately treated prior to DXA.

Disclosures: The authors are/were employees of 16 Bit. MC and AB are inventors on a patent for the underlying technology, assigned to 16 Bit.

OC29

SUPERIOR FRAGILITY FRACTURE DISCRIMINATION BY CORTICAL ULTRASOUND SPECTROSCOPY COMPARED WITH BONE MINERAL DENSITY IN WOMEN AND MEN

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Objectives:

Cortical ultrasound spectroscopy (CortBS) is an emerging, non-ionizing imaging modality that quantifies viscoelastic material properties and the distribution of intracortical pore sizes in the antero-medial region of the tibia midshaft. An initial investigation in postmenopausal women with reduced bone mineral density demonstrated superior fracture discrimination of CortBS compared with the current reference standard, dual-energy X-ray absorptiometry (DXA). The present study aims to assess the fracture discrimination performance of CortBS in both male and female patients as well as in young, healthy volunteers, and to directly compare its performance with DXA.

Material and Methods:

This cross-sectional study (DRKS00025849, EA4/068/19) included 144

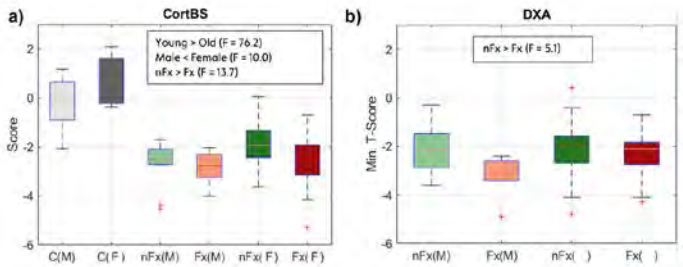
women (among them 55 postmenopausal women from a prior study [1]) and 33 men, with an age range of 30–86 years (DXA performed in participants older than 56 years). DXA measurements were obtained at the lumbar spine and both proximal femora. CortBS assessments were conducted at the anteromedial tibial surface using a SonixTOUCH device equipped with dedicated custom software. Multivariate analysis of variance was applied to examine the effects of sex, age, and anthropometric (AP) parameters (height, weight, body mass index) on both CortBS and DXA outcomes. Discrimination performance for vertebral, non-vertebral, and any fragility fractures was evaluated using partial least squares (PLS) discriminant analysis with cross-validation, with and without inclusion of sex, age, and AP variables.

Results:

DXA T-scores were influenced by body weight and BMI and were significantly lower in individuals with non-vertebral fractures (F = 5.1). The CortBS-derived fracture risk score decreased significantly with age (F = 76.2), was significantly lower male than in female (F = 10.0) and, after adjusting for age and sex, lower in patients with fractures than in those without (F = 13.7). Across all fracture categories, CortBS demonstrated superior discrimination compared with DXA ($0.60 \leq AUC_{DXA} \leq 0.63$; $0.68 \leq AUC_{CortBS} \leq 0.74$).

Conclusions:

CortBS exhibits the age- and gender associated fracture risk and has a superior fracture discrimination performance than DXA.



OC30

INFRAPATELLAR FAT PAD MORPHOLOGY AND SIGNAL PREDICTS KNEE REPLACEMENT RISK IN OSTEOARTHRITIS: AN 8-YEAR MRI CASE-CONTROL STUDY

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Objective. This exploratory nested case-control study investigated whether infrapatellar fat pad (IPFP) morphology and signal intensity in knee osteoarthritis (OA) predict knee replacement (KR), using clinically meaningful thresholds of change.

Methods. Participants were drawn from the Osteoarthritis Initiative (OAI) progression cohort. Cases (KR, n=163) were matched 1:4 to controls (n=643) based on age, gender, body mass index, and follow-up duration. IPFP global, hyperintense, and hypointense signal intensity volumes and areas were quantified by MRI. Associations with KR were analyzed using adjusted conditional logistic regression, accounting for analgesic use, race, WOMAC pain, medial bone marrow lesions (BML), Kellgren-Lawrence grade, and new medial meniscal extrusion at KR index date. Analyses were conducted for values above and below the cohort median and further stratified by gender.

Results. At inclusion, cases and controls were generally balanced, except cases that reported greater pain (WOMAC, $p \leq 0.001$), higher analgesic use ($p \leq 0.001$), narrower joint space width (nJSW), and reduced cartilage volume, larger effusion, and more meniscal extrusion (analyzed by MRI) (all $p \leq 0.002$). Men showed larger IPFP volumes and hyperintense areas ($p \leq 0.001$). Median time to KR was ≈4.5 years. Over follow-up, cases exhibited sharper progression of pain, nJSW, medial cartilage loss, BML, and effusion (all $p \leq 0.03$), alongside increased IPFP hyperintense volume ($p=0.040$). Predictive analyses revealed that smaller (<median) hypointense areas at inclusion increased KR risk (overall OR=2.43, $p=0.049$; women OR=5.07, $p=0.034$). At the index date, larger (≥median) hyperintense IPFP volume and area predicted overall (OR=2.36, $p=0.048$; OR=2.69, $p=0.010$, respectively) and women (OR=2.89, $p=0.046$; OR=1.79, $p=0.039$) KR. Inverse associations were observed, with values ≥median at inclusion or <median at the index date linked to decreased KR risk.

Conclusion. IPFP morphology and hyperintense signal intensity are robust predictors of KR risk in OA, with directionality depending on threshold values. These associations persist after adjustment for conventional confounders.

Acknowledgements. Supported in part by OA Research Unit, CRCHUM, and Chair in OA, University of Montreal, Canada.

OC31

QUANTIFYING TREATMENT-RELATED INFLAMMATORY CHANGE IN KNEE OSTEOARTHRITIS USING NORMALIZED MRI INFLAMMATION VOLUME (NORMI)

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OBJECTIVE

To apply a normalized MRI-based inflammation metric (normalized MRI inflammation volume; NORMI) within a multimodal osteoarthritis imaging framework to quantify joint-level inflammatory burden and to distinguish imaging-defined responders and non-responders in participants with knee osteoarthritis (OA) treated with injectable pentosan polysulfate sodium (iPPS, bene pharmaChem GmBH) or placebo.

METHODS

This exploratory Phase 2, randomized, double-blind, placebo-controlled study (anzctr.org.au identifier: ACTRN12621000136808) enrolled 61 participants with moderate to severe knee OA (Kellgren-Lawrence grade 2–4) and an inadequate response to conservative therapy. Participants randomized 1:1:1 to twice-weekly iPPS, once-weekly iPPS, or placebo for 6 weeks, with follow-up imaging at Day 168.

Post-gadolinium 3D knee MRI scans were analyzed to quantify synovial and bone marrow lesion (BME) volumes using a previously described quantitative computer-aided methods (Boesen et al., 2021). A blinded

radiology reader used DYNAMIKA (Image Analysis Group, London, UK) to place a 1 cm muscle region of interest (ROI) at baseline and Day 168, derive a reference signal, and identify enhancing voxels in synovium and bone marrow exceeding a two-standard deviation threshold. Rough ROIs were then drawn around synovium and BME on all slices, and total synovial inflammation and BME volumes were automatically computed as the number of voxels above this enhancement threshold, yielding continuous measures of inflammatory change (see Figure 1).

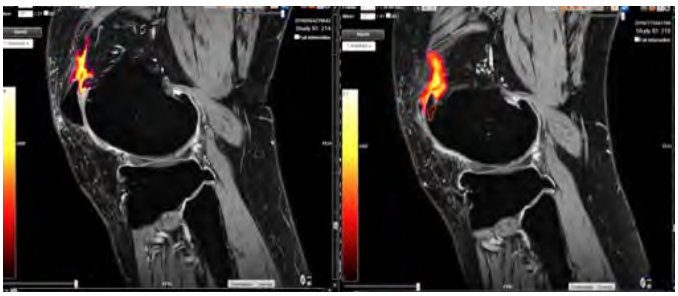


Figure 1. Normalized MRI inflammation volume (NORMI): Baseline and post-treatment knee OA maps showing clear reduction in synovial activity.

RESULTS

MRI analysis was focused on quantification of changes in BME and synovitis. An 18% reduction of overall quantitative volume of BME was observed in the iPPS twice-weekly group, whereas placebo participants saw a 2% overall increase in BME. BME in the femur decreased by 16.1% in the iPPS twice-weekly arm, whereas in the placebo arm and the iPPS once-weekly arm BME increased by 77.0% and 4.1%, respectively. BME in the tibia and patella increased in all three arms. Synovitis, as measured by the volume of gadolinium-enhancing synovial tissue and fluid in the joint, increased in the placebo arm (4.6%) and the iPPS once-weekly arm (30.1%), but decreased slightly (1%) in the iPPS twice-weekly arm.

CONCLUSION

NORMI provides a quantitative, joint-size-independent MRI endpoint within a multimodal imaging framework for knee OA. This approach supports objective assessment of inflammatory disease activity and imaging-based responder stratification, with potential utility for endpoint development in disease-modifying osteoarthritis drug clinical trials.

OC32

FROM MODEL TO APPLICATION: METABOLOMIC-DRIVEN MACHINE LEARNING FOR PROGNOSIS OF KNEE STRUCTURAL OSTEOARTHRITIS PROGRESSION

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Objective. We aimed to develop and validate a metabolomic-driven machine learning (ML) prognostic model for structural progression in knee osteoarthritis (OA).

Methods. Baseline serum metabolomic data from two independent cohorts were analyzed: Tasmanian Older Adult Cohort (n=180) for model development and Licofelone trial (n=137) for validation. Participants were categorized by likelihood of knee structural progression using MRI and X-ray data. Four metabolomic scenarios were assessed: metabolites (104), plus ratios and inverse ratios (each 5,460), and all combined (10,816), alongside age, sex, and BMI. Profiling used high-throughput omics, with batch effects corrected. Feature selection combined variable clustering with elastic net regularization. Top features of each scenario were trained with five ML/DL models, and performance assessed by AUC, accuracy, sensitivity, and specificity, with 95% confidence intervals. Feature contributions were analyzed via SHapley Additive exPlanations (SHAP).

Results. The metabolomic-only scenario, including sex and age, yielded the best performance. After clustering, the top 10 features were used. An Artificial Neural Network with a domain-adversarial component outperformed other algorithms under domain shift. The final model, including six metabolites (SM (OH) C22:2, proline, citrulline, LysoPC a C18:0, glutamate, and C12-DC), plus sex and age, demonstrated excellent predictive performance (test: AUC 0.98[0.95,1.00], accuracy 0.89[0.84,0.94]; validation: AUC 0.89[0.83,0.95], accuracy 0.85[0.79,0.91]). SHAP ranked SM (OH) C22:2 highest, followed by proline, citrulline, sex, age, LysoPC a C18:0, glutamate, and C12-DC. SM (OH) C22:2 and glutamate were positively associated with progression, while others showed nonlinear effects, with intermediate values influencing predictions differently than extremes. Females had a slightly higher risk.

Conclusion. This validated, public GitHub-hosted metabolomic-driven DL framework introduces a novel approach for predicting knee OA structural progression. This framework advances precision OA management, enabling earlier interventions and effective therapeutic development.

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OC33

TOWARDS OA PATIENTS ENDOTYPING : DEVELOPMENT OF AN LC-MS/MS METHOD FOR THE QUANTITATION OF JOINT-RELATED COLLAGENS FRAGMENTS

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Objectives: This study aimed to develop a targeted LC–MS/MS method for the quantitation of a broad panel of plasma-derived fragments originating from joint-related collagens (types I, II, and III). The optimised method will subsequently be used to stratify osteoarthritis (OA) patients according to molecular endotypes using a clustering-based statistical

workflow, with the long-term goal of supporting personalised medicine approaches in OA.

Materials and methods: In silico multi-enzymatic digestions of collagens type I–III were performed, and MRM transitions were designed using Skyline. The transition list was implemented on a triple quadrupole mass spectrometer (TQ6500, Sciex) coupled to a UPLC system (Shimadzu). To validate the transitions, bone, cartilage, and synovial membrane tissues were digested using trypsin, chymotrypsin, and Glu-C, followed by purification and size exclusion chromatography fractionation. Samples were analysed by LC–MS/MS to confirm the detectability of collagen-derived peptides.

Results: Bone tissue analysis enabled the detection of 132 peptides from the α1 and α2 chains of type I collagen, corresponding to nearly 50% sequence coverage. Cartilage tissue analysis yielded 74 peptides from type II collagen, with a coverage of 48%, while synovial membrane analysis resulted in the detection of 55 peptides from type III collagen, corresponding to a coverage of 40%. Regions with lower coverage mainly corresponded to telopeptides, likely due to cross-linking and post-translational modifications.

Conclusion: The developed LC–MS/MS method enabled the detection of 261 peptides derived from joint-related collagens. From an initial set of 14,350 theoretical transitions, 950, 293, and 232 transitions were retained for collagens type I, II, and III, respectively. This validated transition panel provides a robust analytical foundation for adaptation to plasma samples and for the molecular stratification of OA patients, supporting future personalised medicine strategies.

OC34

INTRA-ARTICULAR POLYACRYLAMIDE HYDROGEL FOR KNEE OSTEOARTHRITIS: 1-YEAR RESULTS FROM THE LUNA OBSERVATIONAL STUDY

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Objectives 2.5% injectable polyacrylamide hydrogel (iPAAG) is a CE-marked synovial implant for symptomatic knee osteoarthritis (OA). The LUNA study (NCT05057559) evaluates the safety, tolerability, and efficacy of a single intra-articular (IA) injection of 2.5% PAAG in participants with moderate-to-severe knee OA in a prospective, observational, open-label study.

Materials & Methods This multicentre European study enrolled patients with clinically diagnosed knee OA according to the European instructions for use for 2.5% iPAAG. Participants received a single 6 mL IA injection of 2.5% PAAG and are being followed for 5 years. This abstract reports the 1-year interim results.

The primary endpoint was the incidence and nature of adverse events (AEs). Secondary endpoints included changes from baseline in WOMAC pain, stiffness, and physical function, as well as Patient Global Assessment (PGA). Outcomes were analysed using a mixed model for repeated measures (MMRM) with restricted maximum likelihood (REML) estimation.

Results A total of 199 participants (106 women; mean age 62.8 years) were enrolled, of whom 189 completed the 1-year follow-up.

Most AEs were mild and transient. The most frequently reported device-related AEs were injection site pain (n=9; events=10) and arthralgia (n=5; events=6). 6 serious AEs were reported (hip joint abscess, urinary tract infection, intussusception, post procedural discharge, laparotomy, haematoma in psoas muscle); none were assessed as related to 2.5% PAAG IA injection.

Clinically relevant and statistically significant improvements in WOMAC pain were observed at 1 year compared with baseline (−17.0; 95% CI −19.6 to −14.4). WOMAC stiffness, WOMAC physical function, and PGA showed similar clinically relevant and statistically significant improvements.

Conclusion The 1-year interim results demonstrate that a single IA injection of 2.5% PAAG is well tolerated in participants with knee OA, with no device-related serious AEs. Sustained improvements in pain and function over 12 months support its role as a well-tolerated, non-surgical treatment option for knee OA.

OC35

EXPERT CONSENSUS ON HYALURONIC ACID INJECTIONS FOR KNEE OSTEOARTHRITIS: A PATIENT-CENTERED APPROACH

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Hyaluronic acid (HA) is a linear polysaccharide which occurs naturally as a constituent of synovial fluid. The HA concentration in the joint decreases inexorably during the progression of knee osteoarthritis (OA) and so, for nearly five decades, HA has been trialled and used in the treatment of knee OA. International and domestic guidelines vary in the degree to which they recommend the use of intra-articular hyaluronic acid (IAHA) with some supporting and others discouraging its usage. There are strong data from clinical trials, meta-analyses and umbrella reviews to support the use of IAHA in the treatment of patients with knee OA, though not in patients with acute, active osteoarthritis experiencing a flare. The majority of the literature suggests that IAHA has a positive safety profile despite a few meta-analyses suggesting an increased risk of serious adverse effects. Further qualitative analysis is required in order to further explore these findings. IAHA has been combined with a number of additional agents, including mannitol, sorbitol, chondroitin sulphate, tranexamic acid, polynucleotides and hybrid IAHA formulations. These show variable performance beyond the baseline effect of their constituents. It is, of course, crucial to consider the patient preference when considering treatments for knee osteoarthritis. Specific to HA, considerations regarding needle gauge, volume of injection, number of injections and duration of action are paramount.

OC36

IS EFFUSION SYNOVITIS, ASSESSED QUANTITATIVELY BY MORPHOMETRY OR SEMI-QUANTITATIVELY BY EXPERT READING; RELATED TO OSTEOARTHRITIS PROGRESSION

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Objectives: To develop fully automated, MRI-based quantitative volumetry for effusion synovitis (qESV), and to assess its utility for predicting OA progression compared with expert semi-quantitative (sq) MOAKS ES readings. In the absence of contrast enhancement (CE), ES severity is considered a sensitive, albeit not specific, surrogate of joint inflammation.

Methods: Automated segmentation of peripatellar ES was performed by a convolutional neural networks (CNN) AI algorithm, trained on >100 semi-automated segmentations with visual inspection. This was based on axial reformatted DESS MRIs from the FNIH Biomarker Study of the Osteoarthritis Initiative: 194 displayed combined radiographic and pain progression (2-4 years); 200 showed neither type of progression. Cohen's d (d) served as a measure of effect size (progressors vs. non-progressors). For validation purposes, q measures were converted into ordinal (sq) CNN-ES scores; the resulting sqORs for progressor status were compared with expert sq ES MOAKS readings. We assumed a monotonic ordering of categories, and the sqORs to represent a one-category increase.

Results: The qESV displayed a *d* of 0.24 (progressor status) and a qOR of 1.24 (95% CI 1.01, 1.51). The sqORs were 1.45 (95% CI 1.08, 1.94) for CNN-derived ES vs. 1.11 (95% CI 0.86, 1.43) for expert MOAKS grades. Most progressor/non-progressor comparisons were statistically significant.

Conclusions: We here evaluate the prognostic performance of ES volumetry with respect to OA progression status. The study relied on fully automated segmentation of ES using CNNs using DESS MRI. qESV morphometry revealed that, after conversion to ordinal scores, the difference between progressors and non-progressors was at least as high as that observed with expert MOAKS sq readings. The results suggest that a CNN-based automated pipeline can provide a scalable, q biomarker of inflammation as a potential surrogate endpoint in clinical studies.

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OC37

BURDEN OF IMMINENT SUBSEQUENT FRACTURES IN POST-MENOPAUSAL WOMEN ACROSS MULTIPLE EUROPEAN PRIMARY CARE DATABASES

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Objective: This study leveraged a federated network of standardised primary care databases across six European countries with the aim of quantifying the incidence and cumulative risk of imminent subsequent fractures (SF) within two years of an initial fracture.

Material and methods: Using the Observational Medical Outcomes Partnership Common Data Model, we collected electronic medical records data from primary care databases in the UK (CPRD), France (LPD), Germany (IQVIA DA), Italy (LPD), the Netherlands (IPCI), and Spain (SIDIAP). The cohort study included women aged ≥50 years with an index fracture between April 2010 and March 2018 and were followed up to two years after each fracture. Incidence rates of new imminent SF and two-year cumulative incidence, accounting for death as a competing risk using the Fine and Gray model were calculated.

Results: Patient counts for each dataset were: Spain: 143,992; Germany: 101,586; UK: 43,553; Italy: 24,406; the Netherlands: 16,423; and France: 14,919; Incidence rates per 1,000 person-years of SF were highest in Italy at 320.8 (95% CI: 314.6-327.1) and lowest in the UK at 118.0 (115.5-120.6). Rates in remaining countries ranged from: 142.0 (140.6-143.4) in Spain to 202.2 (196.1-208.5) in France. A trend of increasing incidence rates based on the number of previous fractures was seen across countries (Table 1) except for Italy, which did have the highest mean age of 75 years. The cumulative incidence of patients experiencing 1st SF in the UK was 19%, Among these, 23% experienced a 2nd SF within the following 2 years. Comparable patterns were observed across countries as follows: Spain (23% and 34%), the Netherlands (25% and 35%), Germany (30% and 38%), and France (30% and 46%). Notably, only Italy showed a decrease but remained high with 45% and 40%.

Conclusions: Imminent SF imposes a significant and growing burden on healthcare systems across Europe. Each additional fracture compounds risk and resource utilisation, emphasizing the need for early intervention after the first fracture. Coordinated strategies to prevent recurrence are critical to reduce this escalating cycle of fragility fractures and their associated impact.

Table 1: Incidence rate of subsequent fractures by the number of subsequent fractures in 6 European countries

	Incidence rate per 1000 person-years (95% CI)
Italy	
1st SF	321.2 (315.0, 327.5)
2nd SF	282.7 (229.0, 345.2)
France	
1st SF	201.8 (195.7, 208.1)
2nd SF	345.1 (204.5, 545.4)
Germany	
1st SF	189.7 (187.4, 192.0)
2nd SF	255.6 (244.1, 267.5)
3rd SF	319.4 (252.5, 398.7)
Netherlands	
1st SF	162.2 (157.0, 167.5)
2nd SF	250.4 (209.1, 297.6)
Spain	
1st SF	131.8 (130.4, 133.3)
2nd SF	212.8 (207.7, 218.0)
3rd SF	244.3 (223.9, 266.0)
UK	
1st SF	116.7 (114.1, 119.3)
2nd SF	144.5 (131.9, 158.0)

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OC38

EFFECT OF DENOSUMAB ON IMPLANT SURVIVAL FOLLOWING TOTAL HIP AND KNEE ARTHROPLASTY IN OSTEOARTHRITIS PATIENTS: A REGISTRY-BASED DATA LINKAGE STUDY

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Objectives: Total hip arthroplasty (THA) and total knee arthroplasty (TKA) are now performed in millions of patients annually, yet over 60% of candidates have osteoporosis or osteopenia. Poor bone quality predisposes patients to periprosthetic fractures, implant migration, and aseptic loosening. Bisphosphonates provide a long-lasting antiresorptive effect, whereas denosumab suppresses osteoclast activity more rapidly but reversibly. It remains unclear whether these drugs differentially affect implant survival. The objective of our study is to compare the impact of perioperative denosumab versus alendronate treatment on implant survival following THA and TKA for OA, using real-world data.

Material and Methods: This retrospective cohort study used data from the Emilia-Romagna Registry of Orthopaedic Prosthetic Implants (RIPO). Patients undergoing primary TKA or THA for osteoarthritis between 2011 and 2023 were eligible. Perioperative exposure was defined as at least one dispensing of denosumab or alendronate in the 180 days before or after surgery. Follow-up continued until revision, death, emigration, or discontinuation of therapy. The outcome was first revision for any cause; analyses were stratified by joint and drug.

Results: The THA cohort comprised 129 denosumab and 933 alendronate users. Revision occurred in 4 denosumab (3.1%) and 21 alendronate patients (2.3%); Kaplan–Meier curves overlapped (Fig. 1), and the log-rank test was non-significant (p =0.608). In the TKA

cohort, 117 denosumab and 940 alendronate users were analysed. Here, 8 denosumab patients (6.8%) and 18 alendronate patients (1.9%) required revision, with a significant divergence in survival curves (Fig. 2; p <0.001). Revisions in denosumab users were mainly due to aseptic loosening of the tibial component, whereas only one case overall, in the TKA cohort, was related to infection, supporting a reassuring infective safety profile for denosumab. In both THA and TKA cohorts, denosumab and alendronate groups were comparable in terms of age, duration of drug exposure, and surgical characteristics.

Figure 1. Total hip arthroplasty cohort

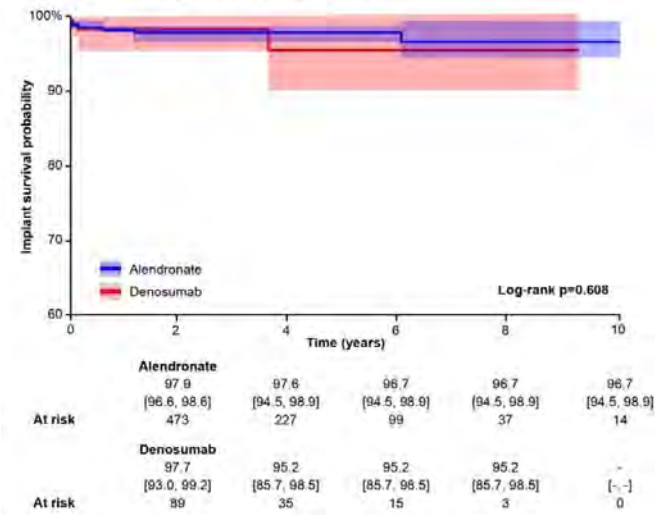
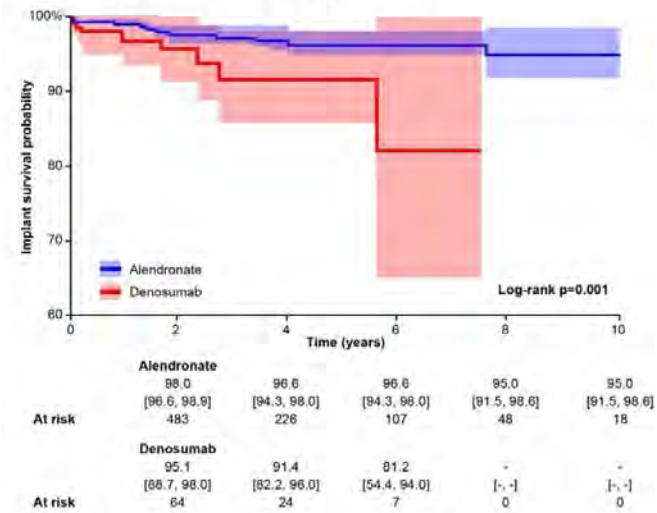


Figure 2. Total knee arthroplasty cohort



Conclusions: Perioperative denosumab exposure does not reduce implant survival after THA compared with alendronate but appears associated with a higher risk of revision after TKA. In the knee, the combination of systemic antiresorptive therapy and the biomechanical demands of the tibial component may compromise stability. Residual confounding by indication cannot be excluded, and further prospective studies are needed to confirm these findings and elucidate underlying mechanisms.

OC39

REDUCING PRE-OPERATIVE DELAY IN NECK OF FEMUR FRACTURE (NOFF) PATIENTS

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Introduction Neck of femur fractures are time-sensitive surgical emergencies. National Hip Fracture Database (NHFD) standards require surgery within 36 hours[1]. Mortality increases by 1.8% for every hour of delay beyond 36 hours[2]. To identify causes of pre-operative delay and track improvements from 2018–2025 using local data from a Major Trauma Hospital.

Methods & Materials Retrospective analysis of 3339 NOFF cases from a prospectively maintained database (2018-2025). Operative delay is defined as time to surgery >36 hours from arrival in an emergency department. Each delay was categorised as space, medical, imaging and unwell or unfit for surgery. Data collection was conducted using the NHFD and Microsoft Excel was used for data extraction.

Results Our unit has seen a 30% increase in NOFFs post covid compared to pre-pandemic levels. Yet the capacity to cater for such increase hasn't changed. 2024 saw a 55% increase in the annual average time to theatre for patients compared to pre-pandemic with the months May to December seeing an average time to theatre of 43 hours with the highest averages coming in June (49.92) followed by July and August which were 46 hours. We also found that the most common reason for patient delay to theatre was space which over the 5 years accounted for almost 80% of delays. Additionally, over the 5 years analysed 56 pts had periprosthetic fractures with an average delay of 68.8 hours.

Conclusion Real progress has been made in reducing clinically driven delays especially through anticoagulation protocols and earlier involvement from orthogeriatrics and anaesthetics. Despite this, overall compliance with the 36-hour target has declined. Theatre capacity has not kept pace with rising trauma demand, and delays are now often due to list overruns, resource constraints, or prioritisation of more complex cases.

Further Steps

- Early senior medical escalation at admission.
- Cultivating a work culture that prioritises NOFF care, ensuring theatre coordination and escalation mechanisms consistently support timely surgery.
- Incorporating Comprehensive Geriatric Assessment (CGA).

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OC40

LIFESTYLE AND CLINICAL FACTORS ASSOCIATED WITH FEMORAL NECK BONE MINERAL DENSITY IN AFRICAN ADULTS: FINDINGS FROM THE FRACTURE-E3 STUDY

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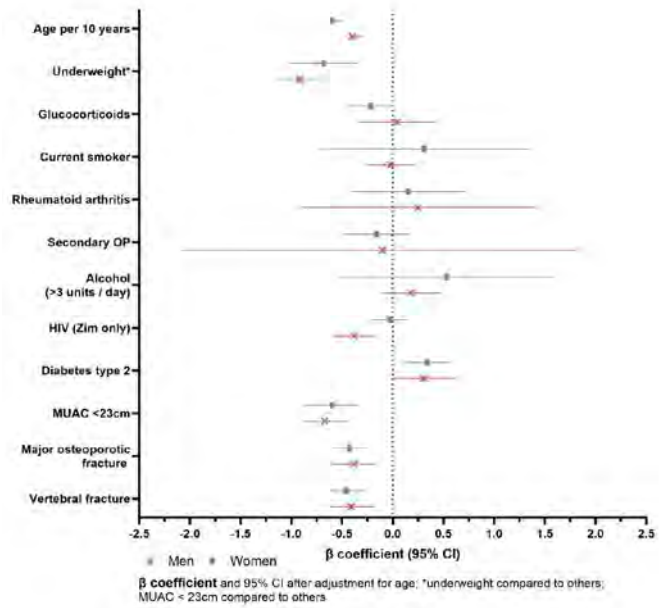
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Objective: To identify clinical, nutritional and lifestyle factors associated with femoral neck bone mineral density (FN-BMD) in women and men in Africa.

Methods: A population-based sample of adults aged ≥40 years, stratified by sex and age bands, were recruited in The Gambia and Zimbabwe. FN-BMD was measured using DXA, with vertebral fractures (VF) identified using Genant semiquantitative methods. Linear regression explored associations between demographic, nutritional, lifestyle and clinical risk factors and femoral neck T-scores, stratified by sex and adjusted for age (age-adjusted results shown in the figure). Factors assessed included underweight (BMI <18.5 kg/m²), low mid-upper arm circumference (MUAC <23 cm), HIV (Zimbabwe only), diabetes, glucocorticoid use, fracture history, rheumatoid arthritis (RA), secondary osteoporosis, smoking and alcohol intake.

Results: The study included 2181 participants (53% women), mean age 61.4 years; 5.8% were underweight and 6% had MUAC < 23 cm. After adjustment for age, markers of undernutrition, low BMI and low MUAC, were associated with lower FN-BMD in both sexes (women (w): β = −0.7 and β = −0.6; men (m): β = −0.9 and β = −0.7, respectively). Previous fractures were also associated with lower FN-BMD (w: VF β = −0.5, MOF β = −0.4; m: VF β = −0.4, MOF β = −0.4). HIV infection was independently associated with lower BMD in men only (β = −0.4), while type 2 diabetes was associated with lower BMD in women only (β = −0.3). Associations for smoking, alcohol intake and secondary osteoporosis seen in unadjusted models were attenuated after age adjustment. Several traditional osteoporosis risk factors, including glucocorticoid use and RA, showed no significant associations, potentially due to low prevalence (4.4% and 0.6%, respectively).

Conclusion: Undernutrition indicators (low BMI and MUAC <23 cm) and prior fractures (MOF and VF) were the strongest correlates of lower FN-BMD, with additional sex-specific associations for HIV (men) and diabetes (women). The absence of associations with several conventional risk factors suggests that in African settings, nutritional status and fracture history may be more informative. Given the limited access to DXA in many African countries, integrating simple anthropometric measures with fracture history may offer a more practical approach to identifying adults at increased fracture risk. Figure. Sex-specific associations between potential risk factors and FN-BMD, after adjustment for age



OC41

EXPLORING THE RELATIONSHIP BETWEEN BONE FORMATION AND RESORPTION CREATING BONE BALANCE INDEX FORMULAE IN ADULTS USING KIDNEY-INDEPENDENT BONE TURNOVER MARKERS

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Objective: Individual bone turnover markers inform on current whole-skeletal remodeling, but not the balance between bone formation and bone resorption. A calculated bone balance index (BBI) has been suggested to bridge this gap. To establish a BBI based on the relationship between non-kidney cleared biomarkers of bone formation (bone-specific alkaline phosphatase [BALP], intact pro-collagen type I N-terminal pro-peptide, [iPINP])) and bone resorption (tartrate resistant acid phosphatase isoform-5b [TRACP5b]) in a cohort of healthy individuals, and to utilize this BBI to explore net bone resorption relative to bone formation in an independent test cohort.

Materials and Methods: BBI was constructed leveraging data from 235 healthy volunteers (147 premenopausal women and 88 age-comparable men with BMD T-score >-1.0), presumed to be in a state of neutral bone remodeling. Equations were built using either iP1NP or BALP as the bone formation marker and TRACP5b and β-Crosslaps (β-CTX-I) as the bone resorption marker. We used linear regression to quantify the relationship between pairs of bone formation and resorption markers. BBI=0 indicates a neutral state, positive BBI-values indicate higher net formation relative to resorption, while negative indicate higher net resorption.

Results: The relationship between bone formation and bone resorption was sex-dependent for several biomarker-pairs. For BALP/TRACP5b, pair slopes differed between men (TRACP5b=1.967+0.042*BALP) and women (TRACP5b=1.081+0.104*BALP), supporting sex-specific equations. For iPINP/TRACP5b, (TRACP5b=1.259+0.020×iPINP) regression lines were statistically indistinguishable, suggesting that a single equation is acceptable for both sexes. For iPINP/β-CTX-I (men: β-CTX-I=116.749+4.921*iPINP, women: β-CTX-I=63.738+5.255*iPINP) and BALP/β-CTX-I (men: β-CTX-I=251.999+11.173*BALP, women: β-CTX-I=97.988+21.300*BALP) slopes were similar, but intercepts differed, favoring sex-specific equations. Once calculated by sex-appropriate equations, BBI was more positive in men compared to women across age-groups in all biomarker combinations. BBI was significantly higher in subjects with normal BMD compared to subjects with osteopenia or osteoporosis, when utilizing biomarker pairs consisting of TRACP5b as the resorption marker.

Conclusions: We provide a calculated BBI based on bone formation and resorption markers that are not affected by kidney function that could be utilized in the setting of kidney dysfunction. Future studies should explore the value of the BBI in predicting clinically relevant outcomes such as ongoing bone loss.

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PL1

MANAGEMENT OF VERY HIGH FRACTURE RISK IN THE CONTEXT OF A LIFE-LONG OSTEOPOROSIS TREATMENT PLAN

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Osteoporosis is a chronic condition that requires long-term, often lifelong, management. Treatment needs vary depending on the stage of disease progression and a patient's fracture risk. Women at high risk for developing osteoporosis, as well as some individuals with low bone mass, may benefit from therapies that prevent further bone loss. Most patients whose bone mineral density (BMD) meets diagnostic criteria for osteoporosis are candidates for anti-remodeling medications such as bisphosphonates or denosumab.

A subset of patients, however, face very high or imminent fracture risk. This group includes those with recent or multiple fractures, very low BMD (T-score < −3.0), or several compounding risk factors. They require treatments that rapidly increase bone mass and strength and quickly reduce fracture risk. Evidence shows that osteoanabolic agents produce faster, larger gains in BMD and greater fracture-risk reduction than anti-remodeling drugs, making them the preferred initial therapy for these high-risk patients.

Because the anabolic effects of these agents diminish over time, patients typically transition to a bisphosphonate, denosumab, or occasionally another osteoanabolic drug to maintain the benefits achieved. A planned second course of osteoanabolic therapy is another possible strategy. This presentation will review these management options for patients at very high fracture risk following an initial course of osteoanabolic treatment.

PL2

BARRIERS AND FACILITATORS TO ORTHOGERIATRIC SERVICES

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Orthogeriatric services are specialised models of care that integrate the principles of geriatric medicine into the orthopaedic management of older adults with fragility fractures, most services have evolved principally from the care of patients with hip fractures. These services are designed to address the complexity of older patients who often present with multiple comorbidities, frailty and high future falls and fracture risks. Services, usually led by orthogeriatricians, provide holistic, multidisciplinary care to address these needs and improve patient outcomes. Greater orthogeriatric input is generally associated with improved patient survival.

Multiple studies have considered barriers to orthogeriatric services, the principal barrier stems from lack of prioritisation of services within senior hospital management, and hence inadequate financial investment. Lack of senior clinical leadership, as well as understaffing or insufficient staffing skill mix within the multidisciplinary team pose further barriers.

Facilitators include having dedicated orthogeriatric wards, with skilled staff, who work well within a multidisciplinary team, supported by clinical governance structures, with a culture of transparent audit and data sharing within the whole team. Dedicated theatre lists for hip fractures, performed by senior anaesthetists, giving short anaesthetics, improve patient outcomes. Morbidity and mortality meetings held with surgeons, anaesthetists, orthogeriatricians and nurses offer multidisciplinary learning towards service improvement. National clinical audits in some countries have markedly improved orthogeriatric services, allowing an individual hospital to benchmark its performance against its neighbours. Good orthogeriatric services integrate with local fracture liaison services, and fall services, to ensure streamlined osteoporosis and fall risk management. A key to the delivery of complex care is effective communication and coordination within large multidisciplinary teams. Trauma coordinators can often assist in this endeavour. Standardised clinical documentation improves care delivered by diverse teams.

The REDUCE study in the UK has developed a wide range of service improvements tools, designed for use by hospital doctors and managers, to combat many of these barriers and improve orthogeriatric services.

PL3

HYPERGLYCAEMIA AND BONE HEALTH: DISEASE AND THERAPY

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Both type 1 and type 2 diabetes mellitus have implications for skeletal health, both in terms of bone mineral density and fracture risk. Such associations are increasingly understood to be complex and involve both direct and indirect mechanisms. With the relentless increase in prevalence of overweight/obesity worldwide, type 2 diabetes presents an increasing healthcare burden globally. In this Plenary Presentation, the relationship between chronic hyperglycaemia and bone health will be explored across both type 1 and type 2 diabetes mellitus, comparing and contrasting mechanisms and associations across both diseases. The opposing relationships with bone mineral density will be highlighted, together with the apparent time-dependent nature of fracture risk with the onset of type 2 diabetes mellitus, and implications relating to altered material properties of bone in the context of hyperglycaemia. Appropriate terminology will be addressed, highlighting the distinction between such altered material properties and classical osteoporosis. Finally routes to appropriate clinical assessment will be appraised, such that skeletal health can be optimally assessed and managed in these superficially similar, but in reality often contrasting, chronic conditions.

PL4

IS THERE A ROLE FOR SEX HORMONES IN THE MANAGEMENT OF MUSCULOSKELETAL DISORDERS?

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Musculoskeletal disorders (MSDs) represent a substantial burden for postmenopausal women, contributing significantly to morbidity and reduced quality of life on a global scale. The menopausal transition is marked by a dramatic decline in sex hormones, principally estrogen, which plays a critical role in maintaining bone density, cartilage integrity, and musculoskeletal function. The resultant hormonal deficiency accelerates bone loss, heightens the risk of osteoporosis and fragility fractures, and predisposes to osteoarthritis and sarcopenia. This abstract explores the clinical relevance of hormonal therapies in the prevention and management of MSDs in menopausal women, with a focus on evidence-based strategies.

The presentation will review the mechanisms by which estrogen deficiency disrupts bone remodeling and connective tissue homeostasis, leading to increased susceptibility to musculoskeletal pathology. Hormone replacement therapy (HRT) remains the gold standard for preserving bone mineral density and reducing fracture risk in this population. Clinical trials consistently demonstrate the efficacy of HRT in mitigating bone loss and providing symptomatic relief for joint pain and muscle weakness. Additionally, selective estrogen receptor modulators (SERMs) and novel endocrine agents offer promising alternatives for women with contraindications to traditional HRT, expanding the therapeutic landscape.

The benefits and potential risks of menopausal hormone therapy are discussed, emphasizing the importance of individualized treatment plans based on patient risk profiles and preferences. Integrating hormonal interventions with lifestyle modifications forms a comprehensive approach to musculoskeletal health. Ultimately, the presentation will highlight the pivotal role of menopausal hormone therapies in the prevention and treatment of MSDs, advocating for their considered use within a multidisciplinary framework to optimize outcomes for postmenopausal women.

PL5

EN ROUTE TO A GLOBAL SARCOPENIA CONSENSUS

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Around 2010, consensus meetings held on different continents published updated definitions of sarcopenia. Despite slight variations, these definitions agreed on including muscle function (typically defined as low muscle strength and/or low body physical performance) within the concept of sarcopenia, rather than using the term as a synonym for low muscle mass. Consequently, sarcopenia was conceptualised as an organ insufficiency (muscle failure) characterised by reduced muscle mass, low muscle strength, and reduced physical performance, with different frameworks and cut-off points being used. This functional redefinition swiftly demonstrated clinical significance, propelling research that established the predictive capacity of sarcopenia for critical outcomes such as mortality, disability and falls. These new findings were incorporated into a second wave of key sarcopenia definitions that emphasised the pivotal role of muscle strength in this condition.

However, disparities in definitions among continents are hindering research and the universal integration of sarcopenia detection and management into routine clinical practice. Additionally, incorporating new disciplines into sarcopenia research, where body composition assessments (typically via CT scans) are available but functional measures are lacking, has led to the erroneous attribution of the term 'sarcopenia' to describe reduced muscle mass. This is incorrect, as low muscle mass is also a defining feature of malnutrition and cachexia.

Encouragingly, major consensus groups have come together as part of an initiative called the Global Leadership Initiative in Sarcopenia (GLIS). This collaborative effort has produced an updated conceptual definition of sarcopenia that can be applied globally. An operational definition based on the results of three working groups aiming to define how to measure muscle mass, muscle strength and sarcopenia outcomes is currently being finalised. These advancements, together with expected future developments, will be presented at the conference.

PL6

NUTRITIONAL STRATEGIES FOR OPTIMAL MUSCLE HEALTH

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Many nutrients influence muscle performance, but I shall focus on two for which optimal intake remains controversial despite extensive study, protein and vitamin D. These nutrients are often viewed in the context of the well-recognized relationship between intake and physiological function. In this model, both inadequate and excess intake of the nutrient have adverse physiologic consequences and the plateau range between these extremes is optimal. Identifying that plateau region is the challenge.

Scientific literature addressing the extent to which protein intake influences muscle function, despite being widely studied, is challenging to synthesize and interpret. This is due to many factors, including the age and physical activity level of the participants studied, the type of protein ingested, the timing of protein ingestion, the fact that most studies are small, and other factors. I will give examples of these determinants but will focus on protein intake in the general older population. The multifaceted link between protein intake and function makes observational studies particularly challenging and exposed to residual confounding. The recently published US Dietary guidelines for 2025-2030 changed the previous recommendation of 0.8 gm/kg/d to 1.2 – 1.6 g/kg/d for the general population. This has caused quite a stir among well-respected scientists, in part because it may encourage an excess intake of saturated fat in those who choose meat as their main protein source.

Vitamin D deficiency has been linked to muscle since 1922, when E. V. McCollum ultimately identified the causal substance that cured rickets

and named it vitamin D. Here too, multiple observational studies report a positive association between the circulating 25(OH)D level and muscle performance. However, clinical trials have not confirmed the findings of observational studies. As with protein studies, the outcome of clinical trials depends heavily upon the baseline vitamin D status of individuals, on the vitamin D dose, the dose schedule, and other factors. While deficiency is clearly disadvantageous to muscle, there is increasing evidence that excess vitamin D stimulates FGF23, an osteokine that sets in motion a counterregulatory sequence that ultimately diminishes $1,25(OH)_2D$ levels and activity. FGF23 increases the circulating levels of parathyroid hormone and lowers the circulating level of phosphate, both of which contribute to muscle weakness. A current challenge is to identify the optimal 25(OH)D range for muscle function more precisely, so that deficiency and excess can be agreed upon and avoided.

PL7
STATE OF THE ART: ADVANCES IN OSTEOARTHRITIS IMAGING

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Objectives
Osteoarthritis (OA) is a debilitating disease affecting > 500 million patients worldwide, yet no therapies are currently available that modify joint structural pathology. This presentation summarizes recent advances in clinical OA imaging, with a focus on quantitative methodologies and on emerging fully automated analysis technologies based on artificial intelligence (AI). Such automated pipelines have the potential to provide scalable, quantitative biomarkers and endpoints for large clinical trials of putative disease-modifying OA drugs (DMOADs) and other interventions, as well as for large-scale epidemiological studies, including those using federated learning approaches. Once effective disease-modifying therapies become available, these biomarkers may also find application in clinical management, supporting diagnosis, prognosis, longitudinal monitoring of treatment efficacy, and identification of responders and non-responders.

Methods
We focus on quantitative imaging biomarkers in OA, specifically cartilage morphology (thickness, volume, surface areas), cartilage composition (MRI transverse relaxation time, T2), and inflammation, including quantitative assessment of Hoffa synovitis using radiomics and effusion-synovitis using morphometry. Imaging of the meniscus, bone, muscle, and adipose tissue is also briefly addressed. Beyond technical validation, we emphasize clinical validation by applying these techniques in studies demonstrating clinically relevant effect sizes, and by comparing established gold-standard methods with novel fully automated approaches.

Results
Imaging biomarkers, such as cartilage morphology, cartilage composition (T2), or synovitis are amenable to fully automated analysis by convolutional neural network (CNN)-based AI algorithms. These approaches demonstrate fair to good agreement with semi-quantitative reading or expert manual segmentation, including quality control. Illustrative applications of these biomarkers will including how they predict and monitor (radiographic/symptomatic) OA progression vs. non-progression, how they differentiate patients with subsequent knee replacement from those without, and other clinically relevant use cases.

Conclusions
Quantitative imaging biomarkers are expected to assume an increasingly important role in OA diagnosis, prognosis, and longitudinal disease monitoring. Given that clinical outcomes require prohibitively large sample sizes for regulatory approval of putative DMOADs, scalable quantitative imaging endpoints offer a realistic pathway toward surrogate endpoint acceptance by regulatory agencies. Such acceptance could substantially accelerate DMOAD development via expedited approval pathways for this serious disease, analogous to the recent (12/2025) acceptance of DXA-based endpoints for osteoporosis drug approval.

PL8
NOVEL EMERGING THERAPIES FOR OSTEOARTHRITIS

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There are no approved disease-modifying drugs for osteoarthritis, and there are limited treatment options for this painful and disabling disease. Recently, successful trials on both hand and knee osteoarthritis have been performed, showing benefits of methotrexate, which is currently used for treatment of a variety of other rheumatic diseases. Novel drugs for weight loss, i.e. GLP1-receptor agonists, have demonstrated tremendous pain reduction in knee osteoarthritis patients with overweight/obesity with effect sizes larger than any approved non-surgical therapy for osteoarthritis. Several ongoing Phase 3 trials provide hope for the approval of disease-modifying therapies for osteoarthritis.

PL9
KEY CHALLENGES FOR GLOBAL FRACTURE PREVENTION INITIATIVES

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Most guidelines for the management of osteoporosis and bone health in older age focus on treatment of individuals who experience a fragility fracture and case finding for risk assessment based on the presence of clinical risk factors. However, in many settings the majority of individuals at high fracture risk do not experience appropriate assessment and treatment. This is the case in most high-income countries. Across many low and middle-income countries, heterogeneity in care may be even more stark, potentially being undertaken without access to bone density scanning or even oral bisphosphonates in some settings. Traditional approaches to fracture care which do not incorporate prevention of future fractures may also complicate the picture. In this presentation, I will review the magnitude of, and heterogeneity within, the osteoporosis care gap worldwide, investigating barriers to achieving equitable access to bone health management globally. I will then set out possible solutions to achieving this goal, as published in a recent IOF Position Paper, endorsed by 89 societies around the world.

PL10

IMAGING-BASED OPPORTUNISTIC DETECTION FOR FRACTURE PREVENTION

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Identification of prevalent and incident fractures is critical to identify patients at very high risk of subsequent, preventable fractures. This is the concept we know as tertiary prevention in osteoporosis and which is addressed by fracture liaison services (FLS) as well as by opportunistic fracture detection and by mining text records. While hip, forearm and humerus fractures are not often missed, only 1/3 of vertebral fractures(VF) are identified. My talk will therefore focus primarily on vertebral and pelvic fractures as this is where the barrier to identification and tertiary prevention is greater. Opportunistic detection may also involve detecting low BMD, typically on CTs or chest x-rays requested on other indications.

Both non-AI and AI based approaches play a role. A familiar example of the former is the addition of VFA to DXA exam in order to screen for vertebral fractures – this requires acquisition of an additional image, taking on the role more of targeted screening (the image is done specifically to find fractures). While CT scans of the thorax and abdomen can and should be reviewed for bone lesions including spine fractures, in practice this is often not done or reported inconsistently. A number of ML tools are now commercially available or in various phases of development. While these tools demonstrate high accuracy[1] and may hold CE (cf https://healthairegister.com/radiology/products) and FDA clearance, some methodological concerns remain and validation of performance in different populations can be limited so that implementation may disappoint. Intended use statements (IUSs) are mandatory for AI based medical devices in the European Union yet often lack important information[2]. Given the low VF identification rate in most services, considerable improvement could be gained even with ML tools that are not perfect in all aspects. However, a clear understanding of the strengths and limitations of such tools is needed for successful implementation in care paths.

1. Namireddy Scientific Reports 2024; 14:30560

2. Van Leeuwen Insights into Imaging 2024; 15:51

Disclosures: *BA contributed to the clinical development of the Bonebot/ Flamingo tool for vertebral fractures and has in the past held research grants and consulting from UCB, Novartis, Amgen, Pharmacosmos and Kyowa-Kirin. No patents or royalties.*

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EL1

OSTEOPOROSIS CARE IN THE CZECH REUBLIC. WHERE WE ARE AND WHERE TO GO

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Where We Were and Are:

- There were no precise data on the prevalence of osteoporosis in the country. Approximate data from 2019 (WHO) estimate 572,000 cases among the population of over 10 million.
- The economic burden of osteoporosis fractures is very high (21st place among EU27+2 countries).
- A high number of deaths are associated with fracture events (159 per100.000 individuals aged 50 years or older).
- There is a very large diagnostic gap.
- There is a very large treatment gap (79 %).
- Expenditure on osteoporosis care is very low, even though the entire care pathway is covered by health insurance companies.
- There was no official system of care, management was fragmented and provided mainly by endocrinologists, rheumatologists and a small number of orthopaedic surgeons.

What We Did:

- A scientific society dedicated specifically to osteoporosis and other metabolic bone diseases was established (the Czech Society for Metabolic Bone Diseases); it now has more than 200 members.
- A new medical specialisation, **Clinical Osteology,** was created and officially established, accepted and certified by the Ministry of Health and health insurance companies.
- Specialists in Clinical Osteology are authorised to use all diagnostic methods and all types of treatment, which are almost fully covered by health insurance.

What We Have Now:

- A nationwide consensus agreement with the Society of Gynaecologists, the Society of General Practitioners, and all health insurance companies on the "**Population Programme for the Early Detection of Osteoporosis**".
- The screening programme, including treatment, is fully covered by health insurance.
- Screening commenced on 1 April 2023, more than 400.000 individuals have been assessed using FRAX and/or DXA.
- The number of DXA machines covered by health insurance increased from 66 to 214.
- More than 50 % of general practitioners and over two-thirds of gynaecologists are actively involved, using DXA techniques and providing treatment.
- Prescription of bisphosphonates is open to all physicians, denosumab and romosozumab are also available for prescription by gynaecologists.

Where To Go:

- Continue to support prevention, screening programmes, and therapy, including osteoanabolic treatment.
- Place strong emphasis on the development and expansion of the Fracture Liaison Service (FLS) programme.

EL2

CZECH NATIONAL POPULATION PROGRAM FOR EARLY DETECTION OF OSTEOPOROSIS - METHODOLOGY, PRINCIPLES, AND 30 MONTHS RESULTS

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Objective: The Czech Republic SCOPE scores, published in 2021, resulted in 6th place regarding disease burden and 26th place in combined healthcare provision. Therefore, major professional societies together with major health care payers have prepared and launched the Czech National Population-based Program for Early Detection of Osteoporosis (Program). The Program has started from 1st April 2023. The main aim was to improve osteoporosis detection and care delivery in the country. We present data from the first 30 months of the program.

Methods: National algorithm for DXA indication and monitoring has been proposed. 5 specific reimbursement codes, divided by T-score category (T-score ≥-1.0; -1.1 to -2.0; -2.1 to -2.4; -2.5 to-3.4 and ≥ -3.5), have been created. The code represents lowest T-score reached at L-spine, total Hip and Hip neck from both limbs. 20 DXA per million, 1-2 per district was set as target in 2030. GP´s and gynaecologists have been allowed to perform DXA scans based on mandatory training and have got access to anti-osteoporosis medication. Women at 60 and older, men at 70 and older are indicated for DXA assessment. Furthermore, postmenopausal women up to age 59 and men aged 65-69, if their FRAX exceeds the lower assessment threshold.

Results: We observed 189% increase in DXA devices from January 2023 (118 DXA´s) to 223 to September 2025 (223 DXA´s) in Czechia. This is 20.49 DXA units per million. Regional accessibility has also improved significantly from in 42 of 76 districts (56%) in January 2023 to in 74 districts (97%) in September 2025. Within the period from April 2023 to September 2025 DXA scans were performed in 360 509 women (90%), 76.6 % were older 60 years and in 36 159 men (10%), 90.5 were % older 70 years. We identified 20.99 % women and 11.9% men with T-score equal and below -2.5. We observed expected gradual increase in by T-score defined osteoporosis in women (16.8 % in 60-64 y.; 24.9% 70 y., 37.6 % in

80-84 y). Similar gradient was observed in men.

Conclusion: The Program improved availability of diagnostic care and provide population data. The program is a powerful systematic tool for osteoporosis in Czechia. The program provides important static data to prepare more precise financial plans for osteoporosis care. But it also brings increased demands on continuous education of all healthcare providers.

EL3

DENOSUMAB USE IN ADVANCED CKD PATIENTS: YES OR NO, THIS IS THE DILEMMA

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Denosumab, a monoclonal antibody widely used to treat osteoporosis, acts by blocking RANKL and thereby suppressing osteoclast formation. It is not cleared through the kidneys; so, its pharmacokinetics are unaffected by renal impairment, and dose adjustments are not required to maintain safety or tolerability. The relevance of denosumab in patients with age-related renal dysfunction has been examined in several analyses. A post-hoc assessment of the FREEDOM trial evaluated the drug's performance in women with varying degrees of kidney function—73 participants with creatinine clearance between 15–29 mL/min and 2817 with values between 30–59 mL/min, calculated via the Cockcroft–Gault equation. The study found no evidence that kidney function modified the treatment response. Rates of adverse events were comparable across renal function strata, while significant gains in spinal and hip BMD were observed. Moreover, among individuals with an eGFR of 30–59 mL/min, denosumab was associated with a 68% reduction in the odds of vertebral fractures. Further support comes from a retrospective investigation by Iseri and colleagues involving 124 dialysis-dependent CKD patients. Using DXA 3D assessments, they highlighted substantial improvements in BMD, cortical thickness, and biomechanical strength at the hip during the first 3.5 years of therapy. These benefits plateaued thereafter, a pattern that differs from that seen in the general population with osteoporosis, where bone parameters typically continue to rise for up to eight years. As expected, discontinuing denosumab resulted in a gradual decline of the accrued skeletal gains—an effect that makes treatment interruption particularly problematic in the CKD population due to the heightened fracture risk. Consequently, long-term therapy should be considered by physicians before starting denosumab in advanced CKD. Hypocalcemia, ranging from mild to life-threatening, remains the major safety concern when denosumab is used in patients with impaired renal function. Nonetheless, clinical experiences shown in various studies are conflicting; it's fair to state that the drug can be administered safely in advanced CKD-associated osteoporosis provided that patients receive active vitamin D supplementation, maintain sufficient calcium intake, and have dialysate calcium concentrations adjusted appropriately.

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EL4

MENDELIAN RANDOMIZATION ROLE OF VITAMIN D IN CORONARY HEART DISEASE

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Coronary heart disease (CHD) remains a leading cause of morbidity and mortality worldwide, and identifying modifiable risk factors is critical for prevention. Observational studies have suggested an association between low vitamin D levels and increased CHD risk; however, causality remains uncertain due to confounding and reverse causation. Mendelian randomization (MR) leverages genetic variants as instrumental variables to assess causal relationships, minimizing these biases. This lecture will re-examine the role of vitamin D in CHD through a MR study investigating the link between vitamin D–related genetic variants and cardiovascular outcomes in the general population.

EL5

BONE QUALITY IN CKD: HOW TO ASSESS AND WHY IT MATTERS

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Patients with chronic kidney disease (CKD) suffer from osteoporosis with high risk of fracture. In addition to traditional risk factors, several CKD-specific conditions contribute to bone fragility in this patient population. The bone phenotype in CKD differs from that of post-menopausal or age-related osteoporosis. Several studies have demonstrated disturbed bone microarchitecture in patients with CKD, particularly in the cortical bone department, providing information which goes beyond what is detectable by a regular DXA scan. Further, bone histomorphometry may reveal diverse disturbances in skeletal remodeling, with either very high or very low bone turnover and variable degrees of bone mineralisation

defects. Together, these disturbances contribute to reduced bone quality in CKD. In this lecture we will investigate current options for evaluation of bone quality in CKD, including novel imaging modalities and minimally invasive techniques such as bone microidentation, and the current level of evidence for implementing these in the clinical evaluation of patients with CKD-associated osteoporosis.

EL6

KIDNEY-FRAX®: IS IT THE RIGHT TIME TO PERFORM IT?

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Bone fragility is a major concern in chronic kidney disease (CKD) because it significantly increases morbidity, mortality, and healthcare costs, and this occurs even before dialysis is initiated. The complex interplay between renal osteodystrophy (ROD), disturbances in mineral metabolism, and changes in both bone quantity and quality lead to increased skeletal fragility and makes clinical assessment of fracture risk in this population particularly challenging.

Importantly, two major developments have "recently" occurred. First, the 2017 revised KDIGO CKD-mineral and bone disorder (MBD) 3.2.1 guideline *suggested* that bone mineral density (BMD) testing may be used to assess fracture risk if results will impact treatment decisions in patients with CKD G3a–G5D with evidence of CKD-MBD and/or risk factors for osteoporosis (evidence level 2B). Second, in 2025, the outcomes of a Controversies Conference on CKD-MBD: "Progress and Knowledge Gaps Toward Personalizing Care" introduced the concept of CKD-associated osteoporosis and emphasized the importance of the heightened fracture risk in patients with CKD.

In this presentation, we will briefly review the ability of FRAX® to identify CKD patients at increased fracture risk and discuss whether FRAX® can truly serve as a practical tool in routine clinical practice. Alternatives such as adjusting FRAX by classifying CKD as a cause of secondary osteoporosis and FRAXplus® will be mentioned. In any case, in order to avoid *renalism*, therapeutic *nihilism* and/or limitation of resources (e.g., densitometry-DXA), FRAX® may be considered a particularly valuable tool in a population in which both fracture risk and the need for treatment are frequently underestimated.

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ESCEO Symposia Abstracts



ESCEO1

EFFICACY OF INTRA-ARTICULAR HYALURONIC ACID IN OSTEOARTHRITIS

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Intra-articular hyaluronic acid (IAHA) injections are widely used for the symptomatic management of knee osteoarthritis, yet their clinical efficacy has long been debated due to inconsistent conclusions across systematic reviews and meta-analyses. Clarifying the true magnitude and relevance of IAHA effects is essential to support evidence-based clinical decision-making. Recent high-level evidence, including an umbrella review of systematic reviews and meta-analyses of randomized placebo-controlled trials, indicates that IAHA provides statistically significant improvements in pain and physical function in patients with knee osteoarthritis. Importantly, all systematic reviews of high or moderate methodological quality reported beneficial effects of IAHA compared with placebo. Discrepancies in published conclusions largely stem from differences in methodological quality, restrictive inclusion criteria (e.g. selection of large trials only), and varying interpretations of clinical relevance rather than from an absence of treatment effect. Effect sizes observed across randomized trials are generally small to moderate, but consistent with those of other commonly used osteoarthritis treatments. Evidence suggests that treatment response may be influenced by disease stage, hyaluronic acid formulation, dosing regimen, and timing of outcome assessment, highlighting the importance of appropriate patient selection.

ESCEO2

EXPERT CONSENSUS ON HYALURONIC ACID INJECTIONS FOR KNEE OSTEOARTHRITIS: A PATIENT-CENTERED APPROACH. SAFETY OF IAHA INJECTIONS: CLINICAL OVERVIEW

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Background: Knee osteoarthritis (OA) is a most prevalent degenerative joint disease associated with pain, functional impairment, and reduced quality of life. Hyaluronic acid (HA) is a linear polysaccharide natural component of synovial fluid. Intra-articular (IA) hyaluronic acid injections have been widely used as a symptomatic treatment aimed, since the years 1970's. Their efficacy has been extensively studied. Safety remains a key factor influencing clinical use.

Objective: To evaluate the safety profile of IAHA injections in patients with knee OA.

Methods: Clinical data and published literature were reviewed, focusing on IAHA safety in knee OA, i.e. adverse events associated with HA injections, including local and systemic reactions, incidence rates, severity, and discontinuation due to intolerance.

Results: Most of the literature suggests that IAHA have a positive safety profile despite a few meta-analyses suggesting an increased risk of serious adverse effects.

Hyaluronic acid injections demonstrated a favorable tolerability profile overall. The most reported adverse events (AEs) were mild to moderate post-injections local reactions, including pain at the injection site, transient swelling and redness. Reviews found no major systemic risks with IAHA, reporting only a local AE rate of **~8% (1)** and rare post-injection arthritis. These events were self-limiting and resolved without intervention in most cases. They are common and observed whatever the IA treatment used (including placebo). Severe adverse events, such as acute inflammatory reactions or pseudo-septic arthritis, were rare. Systemic side effects were infrequent. Treatment discontinuation due to intolerance occurred in a small number of patients. No significant safety differences were observed between the different HA formulations. Some metaanalyses outlined that there might be more post-injections inflammatory arthritis with a high molecular weight cross-linked HA preparation (Hylan G-F20), but this was not further confirmed despite the numerous cross-linked preparations launched worldwide since these papers were published.

Few metaanalyses, all from the same team emphasized an unfavourable benefit-risk balance of IAHA, due to a supposed higher rate of severe adverse events compared to placebo (2). Their reporting of safety outcomes appeared to lack consistency and transparency. Notably, they did not assess AEs clinical relevance or causality, a key-issue in a robust safety evaluation. Instead, they referred to their previous meta-analyses, which did not either classify AEs by treatment relationship, leading to potentially misleading conclusions (a motorcycle incident appears in their list). **In contrast,** other reviews found no major systemic risks with IAHA, and sticked to a local AE rate of 8-10%.

Conclusion: IAHA injections are overall well tolerated in patients with knee osteoarthritis, with predominantly mild and transient local adverse effects, underlining their good risk/benefit profile and supporting their use as a therapeutic option in knee OA.

Keywords: knee osteoarthritis, hyaluronic acid, intra-articular injection, IAHA, safety

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ESCEO3

NEW PERSPECTIVES IN THE USE OF IAHA FOR THE MANAGEMENT OF OSTEOARTHRITIS

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Intra-articular hyaluronic acid (IAHA) has been used in the management of osteoarthritis (OA) for more than four decades, yet its role in contemporary clinical practice remains debated. Recent advances in trial methodology, large-scale evidence synthesis and a growing emphasis on patient-centred care have prompted renewed evaluation of where, when, and for whom IAHA may offer meaningful benefit. Particular focus on the

well-established concept of a "window of opportunity" in early disease is warranted, where IAHA may contribute to symptom control and functional preservation before irreversible structural damage occurs.

New perspectives are also provided on the expanding landscape of IAHA formulations including combinations with polyols, chondroitin sulphate, corticosteroids, polynucleotides and hybrid molecular-weight preparations. Emerging data suggest that some combination approaches may enhance or prolong clinical benefit beyond IAHA alone, although high-quality comparative trials are a key stepping-stone on research journey.

With new perspectives, as well as with established approaches, it is vital to emphasises the importance of shared decision-making, recognising patient preferences for minimally invasive, non-steroidal therapies with established safety profiles and sustained symptom relief.

Overall, IAHA is a targeted component to be used in the context of multimodal osteoarthritis management.

ESCEO4

GLP-1 RECEPTOR AGONISTS AND MUSCULOSKELETAL HEALTH-INTRODUCTION

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Glucagon-like peptide-1 receptor agonists (GLP-1RAs) are incretin-based therapies that reproduce the physiological actions of endogenous GLP-1, including glucose-dependent insulin secretion, suppression of glucagon release, delayed gastric emptying, and central appetite regulation. Initially developed for the management of type 2 diabetes mellitus, these agents demonstrated consistent metabolic effects and cardiovascular benefit, leading to their widespread clinical adoption.

Subsequent trials demonstrating substantial and sustained weight loss expanded the use of GLP-1RAs to obesity treatment, resulting in a rapid and ongoing increase in their global use. With this expanding utilization, important questions have emerged regarding their potential impact on the musculoskeletal system. Weight loss—particularly when rapid—has raised concerns about possible adverse effects on bone density and skeletal muscle mass. Conversely, experimental and clinical data suggest that GLP-1RAs may exert anti-inflammatory, anti-apoptotic, and tissue-modulating effects that could be beneficial for bone remodeling, muscle quality, and joint health. These apparently divergent mechanisms have generated uncertainty regarding the net musculoskeletal impact of GLP-1RA therapy and highlighted the need for an integrated and evidence-based evaluation, an issue that may be particularly relevant in the context of ageing, vulnerability, and frailty while remaining important across the broader adult population.

In response to these unresolved issues, the European Society for Clinical and Economic Aspects of Osteoporosis, Osteoarthritis and Musculoskeletal Diseases (ESCEO) has established a dedicated working group to critically assess available mechanistic and clinical data on GLP-1 receptor agonists and musculoskeletal health. This symposium presents the findings of this initiative, providing a structured overview of current evidence on bone, muscle, and joint outcomes associated with GLP-1RA therapy.

ESCEO5

GLP1 RECEPTOR AGONISTS AND BONE HEALTH

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The prevalence of overweight and obesity is rising across most populations. This is associated with increasing risks of chronic diseases such as hypertension and type 2 diabetes. Excess fat mass has complex relationships with bone health through biomechanical and hormonal pathways, together with effects via chronic inflammation and indirectly through muscle health. GLP1 receptor agonists, originally used in the management of type 2 diabetes, now offer effective routes to improved weight management. Whilst these medications lead to substantial loss of weight, which is predominantly a reduction in fat mass, there appears to be a concomitant reduction in lean mass. Effects on bone health remain inconclusive, but may entail both direct positive effects of these medications on bone cells, and negative effects through the reduced skeletal loading associated with marked weight loss and possible reduction in lean mass. This presentation will review relationships between fat mass and bone health, accounting for muscle, and in particular the direct and indirect implications of GLP1 receptor agonist use for bone density and fracture outcomes.

ESCEO6

GLP1 RECEPTOR AGONISTS AND JOINT HEALTH

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Objectives: The aim of this presentation is to summarise the current state of knowledge regarding the effects of glucagon-like peptide-1 receptor agonists (GLP-1 RAs) on the musculoskeletal (MSK) system and evaluate their potential relevance for the prevention and treatment of osteoarthritis (OA), osteoporosis (OP), sarcopenia, intervertebral disc (IVD) degeneration and low back pain (LBP).

Material and Methods: This presentation will begin by focusing on the functional aspects of GLP-1 RAs, starting from molecular and cellular mechanisms and then discuss data from preclinical models and clinical studies. There will be a special emphasis on GLP-1 RA effects on joint metabolism, bone turnover, muscle function and spinal health.

Results: GLP-1 receptors are expressed in joint and spine tissues. Agonist activation reduces inflammatory signalling, oxidative stress and catabolic enzyme production in chondrocytes. In OA models, GLP-1 RAs attenuate cartilage degradation and improve subchondral bone architecture. Clinically, weight reduction associated with GLP-1 RAs correlates with decreased knee pain and improved joint function,

although direct structure-modifying effects remain unknown due to the lack of studies integrating imaging and biochemical markers (1). In bone, GLP-1 signalling inhibits osteoclast formation and enhances osteoblast activity, supporting potential protection of bone mineral density during weight loss (2). *In vitro* and preclinical data indicate favourable effects on bone quality and possible fracture risk reduction. In skeletal muscle, lean mass reduction parallels total weight loss, but there is also evidence to suggest that GLP-1 RAs may improve mitochondrial function, insulin sensitivity and intramuscular lipid content, potentially mitigating sarcopenic decline (3). In the spine, GLP-1 RAs exhibit anti-inflammatory and anti-fibrotic actions in preclinical IVD models, suggesting potential benefits for disc degeneration. Clinical observations point to improvement in LBP severity, likely mediated by reduced adiposity, systemic inflammation and mechanical load (4).

Conclusions: GLP-1 RAs demonstrate anti-inflammatory, cartilage and bone-protective effects relevant to OA, OP, sarcopenia and IVD degeneration. However, clinical data remains limited in some MSK diseases. Modern obesity pharmacotherapy is rapidly shifting from single-pathway GLP-1 RAs (e.g., semaglutide) to multi-hormone agonists that stimulate two or three metabolic pathways simultaneously, including other incretin hormones such as glucose-dependent insulinotropic polypeptide 1 (GIP-1). These co-agonists and tri-agonists aim for greater weight loss, improved metabolic health, and reduced plateauing compared with GLP-1 monotherapy. Well-designed, randomised, double-blind, placebo-controlled clinical trials of emerging double and triple agents are needed to confirm musculoskeletal efficacy and clarify long-term safety and efficacy in joint, bone, muscle and spine health. Trials with imaging and biomarker endpoints are required to determine whether GLP-1 RAs, co-agonists and tri-agonists can exhibit true disease-modifying potential and alter disease progression in OA.

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ESCEO7

GLP1 RECEPTOR AGONISTS AND MUSCLE HEALTH

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Glucagon-like peptide-1 receptor agonists (GLP-1RAs) are increasingly prescribed for the management of type 2 diabetes and obesity, with growing use among older adults. Although their metabolic and cardiovascular benefits are well established, concerns have emerged about their effects on skeletal muscle, particularly in populations already at risk of sarcopenia and frailty. This session will critically examine current evidence on the impact of GLP-1RAs on muscle mass, muscle quality, and physical function.

We will review data from clinical trials, real-world studies, and preclinical models assessing changes in lean mass during GLP-1RA therapy, distinguishing quantitative losses from qualitative adaptations in muscle tissue. Emerging evidence suggests that, despite reductions in absolute muscle mass accompanying weight loss, GLP-1RAs may be associated with preserved or improved muscle quality, including enhanced mitochondrial function, improved insulin sensitivity, favorable shifts in muscle fiber composition, and improved muscle perfusion. Potential mechanisms linking GLP-1 signaling to muscle metabolism, inflammation, and neuromuscular function will be discussed.

Finally, the presentation will address clinical implications for older adults, highlighting strategies to mitigate muscle loss, including resistance exercise, nutritional optimization, and individualized prescribing. By integrating mechanistic insights with clinical perspectives, this session aims to provide clinicians and researchers with a clear understanding of the benefits and risks of GLP-1RA therapy for muscle health across the aging spectrum.

ESCEO8

SARCOPENIA: STATE OF THE ART IN DISEASE DEFINITION AND CLINICAL TRANSLATION

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Sarcopenia is a progressive, generalised disease of the skeletal muscles, characterised by accelerated muscle mass and function loss. As such, it impairs both muscle morphology and function. Distinctive features include low muscle mass, changes in fibre type composition and increased fat infiltration. It also compromises essential muscle functions such as strength, power and endurance. Like other diseases, it may present both as an acute and chronic condition.

Like other geriatric syndromes, the pathophysiology of sarcopenia is complex. Multiple pathophysiological pathways converge to result in organ failure (in this case, muscle failure). Skeletal muscle plays a multifaceted role that extends beyond movement to include functions such as regulating protein levels, maintaining hormonal balance,

regulating body composition and metabolic processes, facilitating tissue healing, and mediating interactions with adipose tissue and bone. This systemic involvement highlights the wide-ranging clinical implications of sarcopenia.

From an epidemiological perspective, sarcopenia exhibits age-related prevalence and incidence patterns, although it is not exclusive to older populations. An important feature is its potential for spontaneous or treatment-induced reversal. Low muscle mass is also characteristic of other conditions such as malnutrition and cachexia, but sarcopenia is specifically characterised by its functional aspects. Clinical diagnosis relies on specific muscle parameters, particularly measures of muscle strength and morphology, which form the basis of all current definitions. The GLIS initiative aims to standardise these parameters in a global operational definition.

The clinical consequences of sarcopenia are substantial. It significantly impairs physical performance and can lead to further adverse health outcomes, including an increased risk of falls, progressive disability, and an elevated mortality rate. Sarcopenia has a profound impact on quality of life, affecting independence and functional capacity across multiple domains. Recognising sarcopenia as a treatable condition emphasises the importance of early identification and intervention. Healthcare professionals managing older adults and patients at risk of sarcopenia must understand its multisystem effects, diagnostic criteria and clinical consequences in order to implement appropriate preventive and therapeutic strategies.

ESCEO9

DEVELOPMENT OF NOVEL MUSCLE-ACTIVE AGENTS: A REGULATORY PERSPECTIVE

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Sarcopenia is a severe and debilitating disease, affecting muscles, bones as well as other organs and systems. The condition is age related, and in elderly people it is a common cause of disability, including pain, falls and limitations of activities and participation. Since there is no treatment for sarcopenia approved, an unmet medical need is undisputed. Therefore, there is an urgent necessity for extensive discussions among different stakeholders regarding recommended design of clinical studies aimed to evaluate efficacy and safety of medicinal products for the treatment of sarcopenia. These discussions should take into account heterogeneity of sarcopenia symptoms and be focused on methodological aspects regarding both exploratory and confirmatory clinical studies (including but not limited to selection of a study population, proposed dose, primary and secondary objectives, sample size, optimal duration of both double-blind and open-label study periods).

ESCEO10

IOF-ESCEO STRATIFIED FRACTURE RISK APPROACH: ALTERING THE OSTEOPOROSIS TREATMENT PARADIGM

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Osteoporosis and bone health management have advanced substantially in recent decades. We now have an established WHO disease definition, effective mechanisms for fracture risk assessment, and a range of effective treatments. Until recent years, our clinical guidelines have focused on identification of individuals at high fracture risk for anti-osteoporosis treatment. With the advent of anabolic therapies, which have been shown to reduce fracture risk more quickly, and to a greater degree, than oral antiresorptive medications, but generally at greater unit cost, there is a need to most effectively target the most appropriate therapeutic approach to each patient assessed. In this presentation, I will discuss the approach espoused by IOF-ESCEO to targeting treatment choices based on fracture probability calculated using FRAX. Thus, for those individuals at low fracture risk, reassurance, attention to nutrition and physical activity, and potentially menopausal hormone therapy in postmenopausal women, may well be appropriate. For those at high fracture risk, oral or parenteral antiresorptives may additionally be indicated. For those at very high fracture risk, then initial treatment with an anabolic therapy, followed by maintenance with an antiresorptive, is usually the optimal approach. I will present the derivation of this approach and its clinical application, concluding with practical lessons for the clinic.

ESCEO11

SURROGATE MEASURES FOR OSTEOPOROSIS TREATMENT EVALUATION AND IMPLEMENTATION IN THE CONTEXT OF ABSOLUTE FRACTURE PROBABILITY

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In osteoporosis, the meaningful outcome of effective treatment, for patients, clinicians and regulators, is fracture reduction. However, due to the relatively infrequent nature of osteoporotic fractures and difficulties arising from the fracture risk profile of participants in placebo-controlled or comparator studies, the requirement of such studies for regulatory approval is time-consuming and expensive. For this reason, in many other disease areas, drug development is facilitated by the use of surrogate measures which are deemed capable of evaluating the treatment response.

Increasingly in clinical practice, absolute fracture probability assessed by the FRAX tool provides a framework for who to treat and, more recently, allows stratification within those at increased risk to inform treatment choice. A question is often asked if a tool such as FRAX could also be used to assess treatment response and efficacy; however, to attain the status of a treatment goal, it would need to be highly responsive to osteoporosis

treatment-mediated changes in risk factors. There are obvious limitations to such an approach; for example, age will continue to increase and thus FRAX probability will tend to increase. Furthermore, while an incident fracture can increase fracture probability, there is currently no mechanism by which a prolonged fracture-free interval, mediated by the treatment under investigation, can reduce the estimated probability. Of the FRAX risk factors, bone mineral density (BMD), as a direct skeletal measure, is the most responsive to bone-targeted treatments, and recent meta-regression and individual-patient-data analyses have led to approval by the US FDA of 24-month change in total hip BMD alone as a surrogate endpoint for osteoporosis drug development. However, when combined with important BMD-independent risk factors for fracture, the impact of changes in BMD on FRAX is necessarily diminished. This was demonstrated in a study of 11,049 women from the Manitoba cohort. Over 4 years of follow-up, median FRAX scores showed an increase of 1.1% for major fractures and 0.3% for hip fractures. The authors concluded that FRAX probabilities slowly increased over time, and this increase was attenuated but not completely prevented by treatment.

In summary, few patients have meaningful reductions in FRAX-assessed fracture risk during osteoporosis treatment and FRAX should not be used to monitor treatment response; it can, however, be used to re-evaluate current fracture probability when a change in management is being reconsidered.

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ESCEO-DVO1

ONE FOR ALL? SCORING OF VERTEBRAL FRACTURES?

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Osteoporosis is characterised by an increased risk of fragility fractures and fractures following inadequate trauma. The typical osteoporosis-associated fractures are fractures of the proximal humerus, the distal forearm and the hip. Other typical fractures include vertebral fractures. Vertebral fractures are unique in that the risk of subsequent fractures is influenced by the number and severity of the fractures. Therefore, scoring vertebral fractures is very important in order to correctly assess the risk of subsequent fractures. The most commonly used Genant classification divides fractures into different degrees of severity and allows the risk of subsequent fractures to be assessed based on the result. However, the classification is not suitable for weighing up conservative or surgical treatment options. The AO classification for vertebral fractures in general and the OF classification have become established in Germany. The OF classification was developed specifically for osteoporotic vertebral fractures by a working group of the German Society for Orthopaedics and Trauma Surgery and is recommended in the guidelines for the treatment of osteoporotic vertebral fractures. It distinguishes between different types of vertebral fractures and derives appropriate treatment recommendations from this scoring system. Conservative treatment is recommended for minor vertebral fractures, while surgery is recommended for more severe fractures. For more severe fractures, surgical treatment is recommended, with treatment recommendations ranging from vertebral augmentation to spinal instrumentation. In addition, a dedicated evaluation system supports decision-making.

The AO classification also serves to differentiate between fractures and assist in treatment decisions, but it refers primarily to traumatic fractures rather than osteoporotic fractures. In summary, it can be said that there is currently no scoring system available that allows treatment decisions to be made for vertebral fractures and, at the same time, enables the risk of subsequent fractures to be assessed.

ESCEO-DVO2

TREATMENT INDUCED OSTEOPOROSIS IN WOMEN WITH BREAST CANCER - THE UPDATED POSITION STATEMENT

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Introduction: Osteoporosis is one of the most frequent diseases in postmenopausal women leading to an increased fracture risk due to the physiologic loss of the bone protective effects of estrogen. Hereby, several risk factors for fracture such as prevalent fracture, low BMD, age, family history, use of glucocorticoid use etc. have been identified.

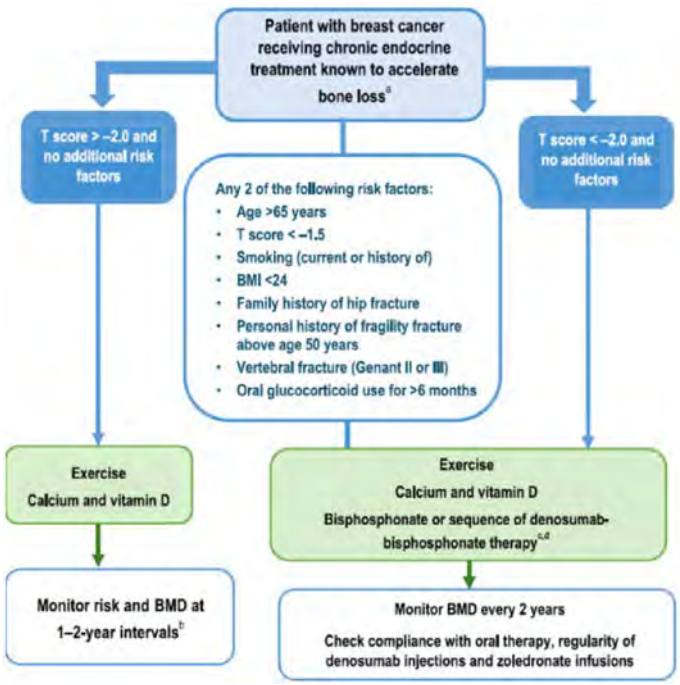
Background: Women with hormone-responsive breast cancer who receive adjuvant endocrine treatment with aromatase inhibitors (AI) are known to be at higher fracture risk due to a marked increase in bone resorption. In 2017, several interdisciplinary cancer and bone societies involved in the management of women with AI-associated bone loss (AIBL) published a joint position statement comprising evidence-based recommendations and a practical management algorithm for the assessment of fracture risk and optimal treatment of this patient population.

Patients and methods: In order to provide updated recommendations that reflect recent advances in the assessment and management of AIBL since publication of the 2017 joint position statement, a systematic literature review was undertaken to identify relevant studies for analysis, including systematic reviews and meta-analyses. Individual trials identified were assessed for their level of evidence based on design, size, follow-up, and evaluation of safety, as well as the impact of bone directed treatments on breast cancer outcomes.

Results: New evidence was combined with the existing recommendations to provide an updated joint position statement regarding fracture risk assessment and implementation of bone-directed therapy.

Conclusion: Current published literature, including recent clinical trial reports, systematic reviews and meta-analyses, continue to affirm the high risk of fractures in women with breast cancer who are receiving adjuvant AI treatment, a risk which has been observed to increase with the commonly used approach of extended duration AI therapy (>5 years). Risk factors for fracture and risk assessment in this patient population as well as the most suitable treatment modalities have been updated. Finally, the influence of bone protective treatments on breast cancer outcomes such as incidence of bone metastasis and breast cancer related overall survival have been included (figure 1).

Figure 1. Recommended algorithm for managing bone health in women receiving aromatase inhibitor therapy for breast cancer. Adapted from Hadji et al, 2017 and Coleman et al, 2020.



[a] Includes AIs and ovarian suppression therapy/oophorectomy.

[b] If patients experience an annual decrease in BMD of ≥10% at any site (or ≥4–5% in patients who were osteopenic at baseline) using the same DXA absorptiometry machine, secondary causes of bone loss such as vitamin D deficiency should be evaluated and antiresorptive therapy initiated.

Use the lowest T-score from spine or hip.

[c] Either denosumab (60 mg every 6 months) or six-monthly intravenous zoledronate (4 mg) as first-line treatment (for the duration of endocrine treatment/together typically for up to 5 years). Discontinuation of denosumab should be followed up by an appropriate antiresorptive.

[d] Weekly oral alendronate (70 mg) or risedronate (35mg) or monthly oral ibandronate (150 mg) for the duration of endocrine treatment/typically for up to 5 years.

Abbreviations: AI, aromatase inhibitor; BMD, bone mineral density; BMI, body mass index.

ESCEO-DVO3

FRACTURE AND OSTEOPOROSIS - RISKFACTOR, ENDPOINT, COMPLICATION, TREATMENT

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Osteoporosis is a systemic skeletal disorder characterized by impaired bone quality resulting in reduced bone strength and an **increased risk of fracture**. **Fragility fractures**, defined as **fractures** resulting from low-energy trauma such as a fall from standing height are central in the understanding of osteoporosis. They represent the clinically significant endpoint of osteoporosis, indicate an increased risk, initiate a number of different trreatment strtategies including surgery, pharamcological treatmen, which might impaire **fracture** healing and post surgery care is mandatory.

This presentation focuses on strategies for identifying, evaluating, and treating adults with **fragility fractures** in order to prevent subsequent **fracture** events and improve functionality of patients..

Clinical relevant endpoint of osteoporosis: A **prior fracture** approximately doubles the relative risk of **future fractures**, with the highest risk observed after hip (femur) and vertebral **fractures**. Risk further increases with the number and severity of previous **fractures,** and additional sites—including the humerus, radius, ankle, and ribs bear a risk of **subsequent fractures.**

Treatment Effects on Fracture: Pharmacologic therapies play a central role in **fracture prevention**. Bisphosphonates reduce hip fracture risk over 36–48 months, while denosumab demonstrates similar benefits over 36 months. Meta-analyses support protective effects for bisphosphonates, denosumab, teriparatide, abaloparartide, and romosozumab. However, prolonged antiresorptive treatment has been associated with **atypical femoral fractures**, likely due to suppressed bone turnover and impaired microdamage repair.

Surgical Considerations: Osteoporotic fractures often require specialized surgical approaches because of compromised bone quality, particularly in elderly patients with multiple comorbidities. Arthroplasty—either total or partial—may be advantageous in cases of femur fractures; hemiarthroplasty, for example, can offer benefits over osteosynthesis in intertrochanteric femur fractures. Minimally invasive procedures such as vertebroplasty and kyphoplasty provide rapid pain relief and structural bone support, although vertebroplasty carries risks of cement leakage and adjacent fractures, while kyphoplasty may reduce leakage risk and improve vertebral height restoration.

Fracture Healing: Fracture healing is a critical determinant of functional recovery. Evidence regarding the negative impact of osteoporosis on fracture healing is derived largely from animal models, with inconclusive clinical data due to confounding factors such as advanced age and comorbidities. Current evidence does not support delaying antiresorptive therapy after acute fragility fractures and surgery or discontinuing ongoing osteoporosis treatment. Teriparatide may shorten healing time at certain anatomical sites, such as the distal radius, but does not appear to affect union rates. Although romosozumab has demonstrated positive effects on fracture healing in animal studies, these findings have not been replicated in humans.

Post-Fracture Care: Despite established diagnostic and therapeutic guidelines, post-fracture care remains suboptimal worldwide. The **Fracture Liaison Service (FLS**) is a multidisciplinary, coordinated model designed to close this care gap by systematically identifying, assessing, and managing patients after fragility fractures. Evidence indicates that FLS programs reduce re-fracture rates, improve treatment adherence and quality of life, and generate significant economic benefits.

Conclusion: Fracture in osteoporosis is a key element in understanding the disease and the treatment. Fragility fractures are a major clinical consequence of osteoporosis and a strong predictor of subsequent fractures. Comprehensive management—including risk assessment, appropriate surgical intervention, pharmacologic therapy and structured post-fracture care—is essential to reduce recurrence and improve patient outcome.

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EUGMS-IOF-ESCEO1

LANDSCAPE FOR INTEGRATED FALLS AND FRAGILITY FRACTURE PATHWAYS ACROSS EUROPE: WHERE DO WE STAND?

N. van der Velde[1]

[1]Academic Director EuGMS, Amsterdam, Netherlands

Fragility fractures constitute a major global health burden and are closely linked to falls, both epidemiologically and clinically. While evidence-based strategies for falls prevention and fracture management are well established, their implementation across healthcare systems and community services remains fragmented. A continuum-of-care approach—linking primary falls prevention, acute fracture management, rehabilitation, and secondary prevention in high-risk populations—is therefore essential to reduce fracture incidence and improve outcomes in older adults.

This presentation will discuss the updated joint position paper from EuGMS, FFN, WFPS, IAGG, and ESCEO–IOF, which builds on the 2016 EuGMS Fracture Prevention Statement and places integrated falls and fracture prevention at its core. Current clinical guidelines will be reviewed, with particular attention to strengthening multidisciplinary care pathways that connect primary care, hospital services, rehabilitation, and community-based falls and fracture prevention programs. Practical strategies will be highlighted for incorporating fracture risk assessment into falls prevention services and for embedding systematic falls assessment within Fracture Liaison Services (FLS), thereby enhancing bidirectional integration between these traditionally separate domains of care.

Beyond clinical practice, the presentation will address the importance of knowledge dissemination and education, emphasizing the need for training programs that prepare healthcare professionals to work across disciplinary boundaries rather than in silos. From a policy point of view, Integrated falls and fracture prevention should be recognized as a public health priority and incorporated into national strategies for healthy ageing, supported by sustainable resource allocation, including in low-resource settings. Finally, key research priorities will be outlined, focusing on the evaluation of effectiveness and cost-effectiveness of integrated care models, as well as on identifying barriers and facilitators to their implementation across diverse healthcare systems and populations.

By aligning clinical practice, education, policy, and research, integrated falls and fracture prevention offers a pragmatic and scalable approach to reducing the burden of fragility fractures and promoting healthy ageing.

EUGMS-IOF-ESCEO2

FALLS AND FRAGILITY FRACTURES IN OLDER ADULTS WITH NEUROCOGNITIVE DISORDERS: PREPARING FOR THE IMPENDING STORM

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Sixty to eighty percent of people with dementia fall at least once over the course of a year, and forty percent of hip fractures occur in those with dementia. Falls and fractures are also common in other neurodegenerative conditions including Parkinson's disease. The number of persons aged 80 years or older is expected to triple between 2020 and 2050 to reach 426 million worldwide. The societal burden from falls and fractures in the cognitively impaired is therefore going to increase substantially given that the percentage of population with dementia increases from less than 5% in the 70s age range to around 20% in the late 80s and around 30% in the 90s. There is a tri-directional association between dementia, falls and fractures. This talk will explore biological mechanisms that underpin this relationship and will the review the evidence for interventions that reduce falls and fracture risk in this population, and discuss guidelines such as the World Falls Guidelines that can aid clinical management. The multifactorial approach to falls and fracture prevention will be discussed including modification of intrinsic and extrinsic risk factors such as exercise guidelines in this group, deprescribing, medical interventions and environmental modification. The emerging field of the gut-brain axis also opens up new possibilities for future advances. The important role of fracture liaison services and appropriate osteoporosis prevention and treatment in the cognitively impaired will also be discussed.

EUGMS-IOF-ESCEO3

INTEGRATING FALLS AND FRAGILITY FRACTURES SECONDARY PREVENTION: THE SMALL WIN OF THE ORTHOGERIATRIC CARE PATHWAY

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Falls and fragility fractures represent interrelated manifestations of frailty, osteoporosis, and multimorbidity in older adults, yet they continue to be addressed through parallel and often fragmented care pathways. While strong evidence supports orthogeriatric (OG) care in improving health-related outcomes after hip fracture, and fracture liaison services (FLS) in reducing subsequent fracture risk, to date limited research evaluated the integration of these models within a single, coordinated pathway.

This presentation reports on the OG pathway as a pragmatic, patient-centred framework for integrating falls and fracture secondary prevention into routine clinical practice. OG care, underpinned by comprehensive geriatric assessment and interdisciplinary collaboration, enables early identification of shared drivers of falls and fractures, including frailty, osteosarcopenia, multimorbidity, polypharmacy, and social and environmental factors.

OG acute management represents a time-critical opportunity to enhance patient awareness and initiate falls and fracture prevention interventions before patients are lost to follow-up.

The presentation highlights how coordinated, patient-centred actions delivered at key transition points can lead to meaningful improvements in clinical and functional outcomes, even in the absence of large, integrated trials. Implementation challenges, existing knowledge gaps, and priorities for future research in integrated orthogeriatric–FLS pathways are discussed, positioning integration as a necessary next step toward truly patient-centred falls and fracture care.

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ESCEO-EMAS1

HORMONAL CHANGES AROUND MENOPAUSE AND BONE HEALTH

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Menopause marks the end of a woman's reproductive phase and is defined by the final menstrual period. As the follicular reserve declines more rapidly approaching menopause, estradiol levels fall and FSH levels rise. This reduction in estrogen leads to accelerated bone loss, beginning in the late menopausal transition and continuing into early postmenopause. Women with premature ovarian insufficiency (<40 years) or early menopause (<45 years) face a higher fracture risk and require menopausal hormone therapy to mitigate this risk. Even among women reaching menopause at the average age, greater perimenopausal bone loss at the lumbar spine is linked to increased fracture risk. A key challenge is identifying those most susceptible to pronounced perimenopausal bone loss and providing timely hormonal or non-hormonal interventions to prevent excessive bone loss and reduce fracture risk.

ESCEO-EMAS2

BODY COMPOSITION THROUGH MENOPAUSE AND ITS IMPLICATIONS ON BONE

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Background: The profound endocrine changes caused by menopause alter body composition and accelerate bone loss in particular. Dual-energy X-ray absorptiometry (DXA) enables concurrent assessment of bone mineral density (BMD) and fat and lean mass, offering insights into musculoskeletal health across this transition.

Objectives: To summarize current evidence on DXA-derived body composition changes through menopause and to describe their implications on bone health.

Methods: A focused synthesis of clinical and epidemiologic evidence using DXA to quantify cross-sectional and longitudinal changes in bone, fat, and lean mass across the climacteric.

Results: During menopause transition lean mass loss and fat mass gain were associated differentially with BMD, both were independently related to more fractures. Consistent with the findings from large cohort studies, that loss of lean mass is related with a greater fracture risk in later life. Longitudinally, increases in appendicular lean mass during early menopause were associated with favorable changes in BMD.

Conclusions: DXA accurately captures changes in bone, fat, and lean mass during menopause. This information allows targeted intervention strategies at the individual level. Consensus is needed on the clinical application of body composition assessment by DXA to establish indications and thresholds for interventions.

ESCEO-EMAS3

EFFECT OF CYCLIC 17-B-ESTRADIOL ON BONE TURNOVER IN POSTMENOPAUSAL WOMEN

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Background: Hormone therapy containing 17- β-estradiol is an effective treatment for the prevention of bone loss in postmenopausal women. We investigated whether restoring a monthly cycle in 17-β-estradiol concentrations is beneficial for bone formation, compared to continuous estradiol administration.

Methods: Healthy postmenopausal women, aged 45-60 years, were randomized to transdermal cyclic, continuous low-dose, or continuous standard-dose transdermal 17-β-estradiol for 16 weeks. The endpoints of the study were the change over time in serum procollagen type 1 N propeptide (P1NP; marker for bone formation) and serum C-terminal telopeptide type 1 collagen (CTX; marker for bone resorption), measured every two weeks.

Results: In the 48 participants, P1NP increased in all groups between baseline and week 4, followed by a decrease between week 4 and week 16. The median decrease in P1NP was less pronounced in the cyclic (-12.6 µg/L (IQR -20.4 – -0.7), p = 0.03) and low-dose group (-12.0 µg/L (IQR -18.4 – 1.8), p < 0.01) compared to the standard-dose group (-15.2 µg/L (IQR -29.1 – -8.7)). CTX decreased between baseline and week 16 in all three groups. The median decrease in CTX from baseline until week 16 was similar in the cyclic group (-143.0 ng/L (IQR -221.3 – -71.2), p = 0.45) compared to the standard-dose group (-157.9 ng/L (IQR -218.9 – -123.2)). However, CTX values remained higher in the low-dose group (-112.2 ng/L (IQR -192.6 – -67.9), p = 0.04) compared to the standard-dose group.

Conclusion: Cyclic 17-β-estradiol administration resulted in higher bone formation over time compared to continuous standard-dose administration, while bone resorption did not differ between the cyclic and continuous standard-dose group. Thus, cyclic 17-β-estradiol may improve bone health compared to continuous administration.

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ESCEO-OARSI1

THE ROLE OF OBESITY AND ADIPOSE TISSUE DYSFUNCTION IN OSTEOARTHRITIS PAIN

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Obesity is a major, modifiable risk factor for pain in osteoarthritis (OA), with effects that extend beyond mechanical loading or body mass index (BMI). Increasing evidence suggests that obesity exacerbates OA-related pain through a complex interplay of metabolic, inflammatory, and neurobiological pathways, many of which overlap with other modifiable pain-related risk factors. Central to this process is adipose tissue dysfunction, which drives local and systemic inflammation, immune dysregulation, and elevated production of pro-inflammatory cytokines and adipokines, amplifying pain signaling independently of BMI. Among adipokines, leptin has emerged as a potential mediator of OA pain, with serum and synovial fluid levels closely correlating with pain severity after BMI adjustment, whereas the role of adiponectin remains less consistent.

Adipose tissue dysfunction is strongly associated with metabolic syndrome, which contributes to OA pain beyond the effects of excess body weight. The interplay among obesity, metabolic syndrome, and adipose tissue dysfunction modulates multiple pain pathways, including nociceptive, neuropathic-like, and nociplastic mechanisms, through neuromodulators as well as peripheral and central sensitization. These mechanisms likely underlie both the heightened pain burden, and the heterogeneity of pain phenotypes observed in individuals with OA and obesity.

Reflecting this mechanistic complexity, obesity is linked to reduced responsiveness to standard pharmacologic and non-pharmacologic pain management strategies. Interventions that target obesity and metabolic dysfunction therefore represent a promising, yet underexplored, approach to improving pain outcomes in OA. Therapies commonly used for obesity and metabolic syndrome, such as glucagon-like peptide-1 receptor agonists, may provide new opportunities for mechanism-based pain modulation. Elucidating the interconnections among obesity, metabolic syndrome, and OA pain could enable more precise pain phenotyping and inform the development of targeted, individualized therapeutic strategies.

ESCEO-OARSI2

STRUCTURAL CHANGES WITH WEIGHT LOSS IN KNEE OSTEOARTHRITIS

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Obesity is a primary risk factor for knee osteoarthritis (OA), and weight loss is widely recommended as a first-line management strategy to reduce pain and improve function. However, it is still debated if weight loss can significantly modify various joint structure and slow disease progression in the knee measured by imaging.

The presentation will defined the approved imaging structural outcomes and give a brief overview of the literature from the last two decades where Radiographic and MRI derived measurements have evaluated the structural effects of weight loss on knee OA. It will further be discussed if never adjunctive therapies, such as glucagon-like peptide-1 receptor agonists (GLP-1RA) or Bracing as well as new AI derived imaging analysis method might enhance the chance of showing improvement or halting the progression of the structural outcomes.

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SICOT-ESCEO-IOF1

IMPORTANCE OF CO-GERIATRIC MANAGEMENT IN THE TREATMENT OF FRACTURES AROUND THE HIP- IMPACT OF REGULATORY FRAMEWORKS ON CLINICAL OUTCOMES AND SECONDARY PREVENTION

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Objectives: Orthogeriatric co-management (OGC) is an integral component of state-ofthe-art patient care in the treatment of proximal femur fractures in geriatric patients. Manycountries have national guidelines or regulations to standardize care pathways, but thestrictness of their enforcement varies substantially. This literature review analyzes howthese distinct regulatory frameworks affect acute care quality, patient outcomes, andsecondary fracture prevention.Methods: A comparative literature review was performed focusing on differencesbetween Germany's legally binding regulatory framework (Federal Joint Committee, GBA) and the United Kingdom's guideline-based model (NICE).Results: OGC lowers mortality and reduces complication rates. The German G-BA modelis enforced through mandatory certification and external audits, with clinics that do notcomply facing regulatory and financial penalties, up to exclusion from selective carecontracts. Since implementation of the rigorous G-BA model, adherence to surgery within24 hours and early postoperative mobilization is among the highest reportedinternationally.In contrast to Germany's high-quality acute care standards, the country scores lowregarding secondary fracture prevention, with anti-osteoporotic drug prescription rates ofapproximately 11.5%. The UK, on the other hand, reports anti-osteoporotic drugprescription rates of around 50.3%. Although the UK's NICE recommendations are notlegal mandates, adherence to proximal femur fracture guidelines is monitored throughthe mandatory National Hip Fracture Database. To further encourage guidelineadherence, the UK applies a financial incentive via the Best Practice Tariff, a schemelinked to outcome measures in hip fracture care.Conclusions: OGC should be regarded as the clinical standard for optimizing survivaland functional recovery after hip fractures. Nevertheless, a "regulatory mismatch" existswithin the German system: mandatory G-BA requirements excel at standardizing thesurgical phase but do not adequately address the post-fracture osteoporosis treatmentgap. To achieve forward-looking patient care, structured longitudinal pathways forsecondary prevention must be enforced with the same assertiveness as acute carestandards.

Disclosures: Speaker's fee: Medi, Hexal. Advisory activities: UCB

SICOT-ESCEO-IOF2

PERTROCHANTERIC FRACTURES – INNOVATIONS AND PITFALLS

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Pertrochanteric fractures represent a significant clinical challenge, particularly in the context of an aging population and increasing fracture incidence worldwide. Over the past two decades, advances in implant design, surgical techniques, and perioperative management have substantially improved outcomes. Intramedullary fixation systems, minimally invasive approaches, and enhanced imaging guidance have become central to modern treatment strategies, enabling earlier mobilization and reduced complication rates. Furthermore, innovations in nail geometry, cephalomedullary fixation, and augmented fixation techniques have expanded the indications for surgical stabilization, even in complex and unstable fracture patterns.

Despite these advances, pertrochanteric fracture management remains associated with notable pitfalls. Implant-related complications such as cut-out, cut-through, malreduction, and peri-implant fractures continue to pose challenges, often related to inadequate fracture reduction, suboptimal implant positioning, or poor bone quality. The increasing use of novel technologies, including cement augmentation and navigation-assisted surgery, introduces new learning curves and potential risks if not applied judiciously. Additionally, patient-related factors such as osteoporosis, frailty, and comorbidities significantly influence outcomes and require a multidisciplinary approach.

SICOT-ESCEO-IOF3

FEMORAL NECK FRACTURES IN THE ELDERLY - THERAPEUTIC OPTIONS

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Femoral neck fractures represent a frequent and clinically relevant injury in the elderly population, often associated with osteoporosis, comorbidities, and an increased risk of morbidity and mortality. The primary therapeutic goal is rapid mobilization while minimizing complications and preserving function. Treatment strategies can broadly be divided into joint-preserving and joint-replacing options, with the choice depending on fracture pattern, displacement, biological age, functional demands, and overall health status of the patient. Joint-preserving procedures, such as internal fixation using screws or dynamic hip systems, are mainly considered for non-displaced or minimally displaced fractures. These approaches aim to maintain the native hip joint and are associated with shorter operative times and less surgical trauma. However, they carry a risk of complications such as nonunion or avascular necrosis, particularly in displaced fractures. Joint-replacing procedures, including hemiarthroplasty and total hip arthroplasty, are commonly recommended for displaced femoral neck fractures in elderly patients. These techniques allow for immediate full weight-bearing and reduce the likelihood of revision surgery due to fixation failure.

Total hip arthroplasty may offer superior functional outcomes in active patients, whereas hemiarthroplasty is often favored in frail individuals. In conclusion, the management of femoral neck fractures in the elderly requires an individualized approach that balances surgical risks, functional expectations, and long-term outcomes to achieve optimal patient care.

SICOT-ESCEO-IOF4

SARCOPENIA AND FRACTURES AROUND THE HIP – NEWEST DATA

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Background

Over recent years, the understanding of hip-related fragility fractures has evolved from a purely bone-centered condition toward an integrated muscle–bone disease model. Accumulating evidence indicates that sarcopenia is highly prevalent in this population, frequently persists after fracture treatment, and substantially contributes to impaired recovery, complications, and mortality. These insights have driven the emergence of concepts such as osteosarcopenia and muscle–bone–oriented care pathways.

Objective

This abstract critically appraises current evidence on the role of sarcopenia in hip-related fragility fractures and discusses its implications for contemporary treatment strategies and clinical decision-making.

Current evidence

Recent registry- and population-based studies report a substantial increase in hip-related fragility fractures in very old patients, with a shift toward more severe and unstable fracture patterns and persistently poor functional outcomes. Longitudinal cohorts further demonstrate that sarcopenia frequently persists after hip fractures and is independently associated with impaired mobility, higher complication rates, and increased mortality, even in the context of modern surgical and orthogeriatric care.

Conclusion

These findings highlight that, despite growing evidence and emerging concepts, multimodal muscle–bone–oriented strategies are not yet systematically implemented in hip fracture care. In addition to standardized assessment of sarcopenia and structured integration of nutritional, rehabilitative, and orthogeriatric interventions, thorough knowledge of contemporary surgical techniques and appropriate indication setting remains essential to optimize outcomes in this vulnerable patient population.

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WFS-IOF-ESCEO1

PHARMACOLOGICAL TREATMENTS FOR OSTEOPOROSIS IN THE OLDEST OLD PERSONS

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Age is a major determinant of fracture risk and all other things being equal, fracture risk will rise with increasing longevity. Osteoporosis and high fracture risk are therefore lifelong considerations. Our ability to optimally manage bone health in the oldest old is impacted by several considerations. Firstly, there is limited direct evidence for the efficacy of medications in this age group - sadly lack of evidence is sometimes interpreted as evidence of a lack of effect; secondly, despite advances in clinical care and policy, and the enormous efforts of bodies such as the IOF, fractures may still be viewed as an inevitable part of ageing; thirdly, the body's ability to metabolise and handle medications may change with age, leading to the potential for greater risk of interactions, particularly given the frequency with which older individuals receive multiple medications; fourthly, comorbidities such as renal impairment and gastrointestinal dysfunction become more common with increasing age, such that choosing an appropriate medication is less straightforward than at younger ages. In this session I will consider in detail the considerations pertaining to the clinical assessment and management of osteoporosis and high fracture risk in the oldest old. I will address resulting clinical approaches in the context of guidelines and issues of long-term efficacy and safety. The ultimate focus will be on achieving a pragmatic approach to do the best for these vulnerable patients at high fracture risk in older age.

WFS-IOF-ESCEO2

THE INTERPLAY BETWEEN OSTEOPOROSIS, DEMENTIA AND FRAGILITY FRACTURES

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As populations age worldwide, clinicians increasingly face patients who suffer simultaneously from neurocognitive diseases, particularly dementia and Alzheimer's disease, and musculoskeletal disorders, including osteoporosis, sarcopenia, and fragility fractures. These conditions do not simply coexist, but reinforce one another through overlapping shared risk factors, some biological pathways related to frailty, malnutrition, vitamin D deficiency, sensory deficits, impaired gait, inappropriate polypharmacy, etc, and vicious circles among homeostatic efforts leading to multisystem failure. Despite the clinical significance of the intersection, the intersection between osteoporosis and dementia remains poor attractive in the research and the clinical scenarios.

People with dementia experience 4-5 fold more falls than cognitively intact older adults, and when they fall, they are 3-fold more likely to sustain fragility fractures, most critically a hip fracture. These fractures are not isolated injuries, they trigger cascades of complications leading to permanent disability, which overcomes premature mortality, poor quality of life and enormous strain on healthcare systems, families, and caregivers. The ethical and logistical challenges of surgical management in this population add further complexity.

However, only 5% of people affected by dementia receive adequate assessment and preventive falls and fractures interventions, reflecting a systemic failure to address a well-documented, high-risk group.

Another dimension to be considered is the bone-brain axis suggesting that bone mineral density (BMD) loss and neurodegeneration share common pathological mechanisms. Then, low BMD may serve as an early biological signal of cognitive deterioration, a finding with significant implications for screening strategies. Incorporating osteoporosis assessment and fall risk evaluation into the earliest stages of cognitive impairment workups could enable earlier multimodal interventions, including supervised exercise, vitamin D supplementation, nutritional support, home safety adaptations, polypharmacy rationalization, mobility aids, etc, which may reduce progression and complication risks. Anti-fracture pharmacotherapy, particularly annual intravenous bisphosphonates, offers a safe, evidence-based, and adherence-friendly option well suited to patients with cognitive limitations. There is an urgency for integration: the risks of falls, fractures, and cognitive decline are intertwined and must be addressed together, not in silos across separate specialties.

WFS-IOF-ESCEO3

REDUCING FALLS AND FRACTURES BY MEDICATION OPTIMIZATION

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Falls are among the most common and serious geriatric syndromes and constitute a major pathway to fragility fractures, disability, and loss of independence. They arise from complex interactions between multimorbidity, age-related physiological vulnerability, functional decline, and pharmacotherapy. A substantial proportion of falls and related fractures are medication-related, particularly associated with fall-risk-increasing drugs (FRIDs). Nevertheless, falls remain under-recognised as adverse drug events, and fall and fracture risk are still insufficiently integrated into routine (de)prescribing practices.

This presentation will focus on medication optimisation as a core strategy for reducing both falls and fractures in older adults. Drawing on recent evidence from deprescribing trials, observational studies, and the World Guidelines for Falls Prevention and Management, it will highlight how history of falls and fractures should systematically inform both prescribing and deprescribing decisions. Key recommendations include assessing fall history and fall risk before initiating FRIDs, using validated tools such as STOPP-START and STOPPFall during structured medication reviews, and embedding medication optimisation within integrated falls and fracture prevention interventions across care settings.

In addition, emerging evidence linking medication groups to falls and fracture risk will be discussed, highlighting both fall-related and non-fall-related mechanisms, including effects on bone metabolism, orthostatic hypotension, sedation, gait instability, and impaired balance. Particular attention will be given to cardiovascular, psychotropic, and centrally acting medications, as well as the cumulative impact of polypharmacy.

Finally, common clinical challenges in deprescribing will be addressed, including risk–benefit trade-offs, symptom recurrence, and patient and caregiver concerns. Practical guidance will be provided on shared decision-making, outcome monitoring, and the use of falls and fractures as clinically meaningful endpoints of pharmacotherapy. By reframing falls and fractures as both determinants and outcomes of prescribing, medication optimisation can support safer, more person-centred care for older populations.

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MTE1

PTH, VITAMIN D AND BONE TURNOVER MARKERS FROM THE LABORATORY PERSPECTIVE: MORE THAN YOU CAN EAT!

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Parathyroid hormone (PTH), vitamin D metabolites and bone turnover markers (BTMs) are cornerstone biomarkers in mineral and bone disorders. This session will illustrate how recent analytical advances and improved standardization can refine clinical interpretation beyond a single-result approach. For vitamin D, robust immunoassays remain appropriate for large-scale screening, while LC-MS/MS offers higher molecular specificity for 25(OH)D2 and 25(OH)D3 and enables targeted metabolic profiling when clinically relevant, including 24,25(OH)2D, 1,25(OH)2D and emerging metabolites such as 1,24,25(OH)3D. Combined readouts (e.g., the vitamin D metabolite ratio, VMR) can provide insight into altered catabolism and support interpretation in kidney disease or atypical phenotypes, provided traceability, commutability and pre-analytical control are ensured. For PTH, method-dependent results largely reflect epitope specificity and fragment detection, which is particularly relevant in chronic kidney disease. Targeted LC-MS/MS workflows without immuno-enrichment can deliver peptide-level specificity and may contribute to reference frameworks, with clear definition of the measurand, peptide targets and calibration hierarchy. For BTMs, clinical added value increases when complementary biology is captured: intact PINP and β-CTX as core formation/resorption markers, together with TRAP5b (osteoclast number/activity) and bone-specific alkaline phosphatase (BALP) for mineralization. Practical take-home messages will focus on assay selection, harmonized reporting (reference intervals, reference change values), and concise interpretative comments to support consistent patient management across platforms and settings.

MTE2

SKELETAL MICROARCHITECTURE AND FRACTURE RISK

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Prediction of fracture risk in individuals older than 50 is challenging because the sensitivity of BMD alone or BMD combined with other risk factors is often low. Non invasive evaluation of microarchitecture using high resolution peripheral quantitative tomography (HRpQCT) has been developed to improve the prediction for fracture, especially in those postmenopausal women who have moderately decreased BMD but who represent the bulk of fragility fractures.

Several prospective cohort studies have measured microarchitecture at the distal radius and tibia in men and women using HRpQCT. Their results indicated that several parameters provided improvement of prediction over BMD alone or FRAX, especially when considering micro finite element analyses results. When all these cohorts data were combined in a large pooled analysis with a large sample of more than 6000 participants (BoMic consortium), these observations were confirmed. The prediction added to traditional risk factors, however, was not substantial. Several studies have attempted to identify subsets of patients who would benefit more from this type of technique. Thus, several phenotypes of bone fragility have been described, based on density and bone size. Also, machine learning techniques can model efficiently the risk of fracture. HRpQCT may also be of interest to improve fracture risk prediction in special populations like diabetics and patients with chronic kidney disease.

The HRpQCT technique is expensive and not widely available, but it might reach specialized clinical practice if machines were produced in larger quantities to decrease costs and if image analyses and fracture risk modeling were easily accessible through artificial intelligence.

MTE3

FLS: CURRENT GLOBAL CHALLENGES

M. Chandran[1]

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Fragility fractures represent a pivotal inflection point in the "osteoporotic career," yet globally, secondary fracture prevention remains fragmented, inconsistent, and frequently ineffective. It has been well established for over four decades that approximately half of patients sustaining a hip fracture have experienced a prior fragility fracture, often months or years earlier, representing missed opportunities for intervention. Fracture Liaison Services (FLS) were developed to address this persistent care gap through a systematic, coordinated approach to post-fracture assessment and treatment.

FLS models, particularly those based on a clinician champion supported by a dedicated coordinator, have demonstrated improvements in fracture risk assessment, osteoporosis treatment initiation, and reductions in re-fracture rates. International frameworks such as the IOF Capture the Fracture® Best Practice Framework (BPF) have provided standardized benchmarks across 13 domains, enabling global mapping, benchmarking, and recognition of FLS performance. To date, over 1250 FLS programs across more than 62 countries have been mapped, underscoring widespread adoption. However, implementation alone does not guarantee long-term success.

This session examines the global challenges that threaten FLS sustainability, drawing on real-world experience and international data. System-level barriers include incomplete fracture identification (particularly vertebral fractures), fragmented care pathways, workforce limitations, insufficient integration with primary care, and lack of long-term funding models. Patient-level challenges, such as poor adherence to therapy and follow-up further erode program effectiveness. Overly complex care pathways risk disengagement, particularly in non-specialist settings.

Sustainable FLS programs require continuous quality improvement, routine auditing, and realistic, measurable key performance indicators rather than aspirational targets. Frameworks such as Plan–Do–Study–Act (PDSA) cycles, process mapping, and performance benchmarking are essential tools to identify care gaps, implement targeted interventions, and reassess outcomes. Importantly, FLS evaluation must extend beyond organizational metrics to include patient-level engagement and outcomes.

In conclusion, breaking the fragility fracture cycle is a global challenge that demands more than awareness or guidelines. Sustainable FLS models must be locally adaptable, minimally disruptive, patient-centred, and embedded within health systems that prioritize long-term fracture prevention. Implementation is only half the battle; sustainability determines impact.

MTE4
MANAGING BONE HEALTH AFTER BARIATRIC SURGERY

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It has been increasingly acknowledged that bariatric surgery adversely affects skeletal health. After bariatric surgery, the extent of high-turnover bone loss is much greater than what would be expected in the absence of a severe skeletal insult.

Patients also experience a significant deterioration in bone microarchitecture and strength. There is now a growing body of evidence that suggests an association between bariatric surgery and higher fracture risk. Although the mechanisms underlying the high-turnover bone loss and increase in fracture risk after bariatric surgery are not fully understood, many factors seem to be involved. The usual suspects are nutritional factors and mechanical unloading, and the roles of gut hormones, adipokines, and bone marrow adiposity should be investigated further. Roux-en-Y gastric bypass (RYGB) was once the most commonly

performed bariatric procedure worldwide, but sleeve gastrectomy (SG) has now become the predominant bariatric procedure.

Accumulating evidence suggests that RYGB is associated with a greater reduction in BMD, a greater increase in markers of bone turnover, and a higher risk of fracture than SG. These findings should be taken into consideration in determining the most appropriate bariatric procedure for patients, especially those at higher fracture risk. Before and after all bariatric procedures, sufficient calcium, vitamin D and protein intake, and adequate physical activity, are needed to counteract negative loss after bariatric surgery.

Several guidelines have been published over the world indicating who should be treated by antiosteoporosis medications after bariatric surgery. These guidelines emphasize the need of treating patients with a past history of fragility fractures. Also, the guidelines recommend to treat patients with higher T-scores compared to patients with bone fragility but without history of bariatric surgery (i.e., T-score ≤-2) Due to the mechanisms of bone loss after bariatric surgery with a huge increase of bone resorption after such a surgery, bisphosphonates represented the first option. Due to the poor absorption of oral bisphosphonates for these patients, zoledronic acid is recommended as a first line option and few data indicated that zoledronic acid can prevent bonne loss particularly at the lumbar spine. However, the effect seems to be less marked at the total hip.

Denosumab seems also to be a relevant option. One study indicated that this option is effective for preventing bone loss at all the sites. The prevention of the rebound effect when the treatment is stopped should also be taken into consideration.

At the stage further studies are needed to precise the best option and the optimal duration of antiosteoporosis treatment in this population.

MTE5
SCREENING FOR HIGH FRACTURE RISK

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Systematic approaches to improving the management and treatment of patients with osteoporotic fractures are increasingly advocated in many countries, reflected in the continuing and rapid expansion in Fracture Liaison Services under the IOF Capture the Fracture initiative. Nonetheless, many patients with past fractures remain unidentified and so untreated, and contribute to a large pool of patients in the general community at high risk of fragility fracture. Here, in primary care, the biggest barrier to effective reduction in fracture rates remains the low awareness of high fracture risk amongst primary care physicians leading to marked under-identification and low treatment rates. This large and persistent treatment gap raises the question if it is now time to consider systematic approaches for the identification of high fracture risk in the wider primary care setting, including the establishment of population screening or enhanced case-finding programs. This MTE session will discuss the possible solutions and examine the barriers to implementation.

MTE6
RARE BONE DISEASES FOR THE OSTEOPOROSIS PHYSICIAN

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A decade ago rare bone disorders were managed mainly by pediatricians, who were in charge for the severe conditions expressed prenatally, at birth or in childhood. The osteoporosis doctors, also named *bone doctors*, were not interested in skeletal rare disorders, simply because the recognition of these diseases in adults can be a specific and also because the use of genetic tests in the adult patient population was not routinely used.

The International Osteoporosis Foundation (IOF) initiated more than a decade ago a worldwide program of education on these disorders among *bone doctors* with dedicated courses, symposia, lectures, webinars, and publications, mainly dedicated to less severe forms of the disease that should be recognized later in life because of bone fragility. This action continues and today we can witness not only the growth of interest towards these disorders by our doctors, but also their increasing interest to know about the management of patients that are diagnosed in the adult age.

With the increase of clinical studies dedicated to these disorders, the *bone doctor* becomes central in the recruitment of adult patients. This contributes immensely to increase his/her knowledge in the field.

In this presentation, the diagnosis and management of disorders that the *bone doctor* can encounter in his/her clinical activity will be reviewed and discussed in depth

MTE7

META-ANALYSIS: MAKINGS SENSE OF UMBRELLA AND NETWORK APPROACHES

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Meta-analyses play a central role in evidence-based medicine by synthesizing data from multiple studies to inform clinical and policy decisions. Beyond traditional pairwise meta-analyses, advanced approaches such as umbrella reviews and network meta-analyses have gained increasing prominence, offering broader and more nuanced perspectives on complex bodies of evidence. This meet-the-expert session aims to provide participants with a comprehensive and practical understanding of these advanced meta-analytical frameworks and their place within the broader meta-synthesis landscape.

The session will first situate umbrella and network meta-analyses within the hierarchy of evidence, highlighting their respective objectives, methodological foundations, and relevance for geriatric and clinical research. Key statistical and methodological concepts—including effect size interpretation, heterogeneity, indirect and mixed comparisons, ranking of interventions, and assessment of bias—will be discussed to facilitate critical appraisal and appropriate application of these methods. Particular attention will be paid to the strengths, limitations, and potential pitfalls inherent in complex evidence synthesis, as well as strategies to enhance robustness, transparency, and interpretability.

Drawing on extensive experience in conducting, reviewing, and editing high-quality systematic reviews and meta-analyses, this session will also provide practical recommendations to improve methodological rigor and increase the likelihood of publication in high-impact journals. By integrating conceptual, methodological, and applied perspectives, this meet-the-expert session aims to equip researchers and clinicians with the tools needed to make sense of umbrella and network meta-analyses and to use them effectively in informed healthcare decision-making.

MTE8

EXERCISE: WHAT TO RECOMMEND IN OSTEOPOROSIS

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Exercise is a key component of osteoporosis management, with benefits extending beyond bone mineral density (BMD) to fracture prevention, physical function, and fall risk reduction. Evidence supports physical activity as a safe and effective non-pharmacological intervention across the lifespan, including in older adults with established osteoporosis. Weight-bearing and resistance exercises are associated with maintenance or modest improvements in BMD at the hip and spine, while moderate-to-vigorous and impact-loading activities appear particularly osteogenic. Importantly, emerging data show that reducing sedentary behavior and replacing it with even light-intensity physical activity can provide meaningful benefits for bone health, especially in older or frail individuals. Fall prevention is central to fracture risk reduction, as most osteoporotic fractures result from falls. Exercise programs combining balance, functional training, and lower-limb strengthening reduce fall incidence and help counteract fear of falling, which often leads to inactivity and further deconditioning. This Meet-the-Expert session will provide practical, evidence-based guidance on exercise prescription in osteoporosis, including appropriate modalities, intensity, frequency, and progression. Recommendations will emphasize the integration of bone-targeted exercises, fall-prevention strategies, and reduction of sedentary time within an individualized, patient-centred approach to osteoporosis care.

MTE9

MANAGEMENT OF FRACTURE RISK POST-DENOSUMAB

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Over the years, the number of patients with osteoporosis is gradually growing. As consequence, the number of patients treated for 3 to 5 years with anti-osteoporotic drugs, according to the length of the pivotal phase III-trials, is growing. So, a common question is what to do after initial treatment. Studies with continuing drug treatment, with the same drug or a new drug are scarce. Stopping anti-osteoporotic drugs or a drug holiday is another option. The effects of stopping oral and intravenous bisphosphonates, SERMS, hormonal replacement therapy, anabolics and denosumab will be discussed.

Since the effects of stopping denosumab are alarming, we will zoom in on the pathogenesis of bone loss in patients stopping with denosumab, and discuss which patients have the largest risk of vertebral fractures after stopping denosumab. Finally, we will discuss the necessity of adequate timing of starting of follow-up therapy after denosumab, including the importance of adequate information of patients, and the effects of follow-up medication on bone markers, BMD and vertebral- and nonvertebral fracture rate.

MTE10

MEETING GLOBAL CHALLENGES FOR OSTEOPOROSIS PATIENT SOCIETIES: OSTEOPOROSIS CANADA'S EXPERIENCE SUPPORTING SPREAD OF FRACTURE LIAISON SERVICES ACROSS CANADA

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Objectives: Osteoporosis Canada is the only organization in Canada serving people affected by osteoporosis. The organization works to educate, empower and support individuals and communities on bone and muscle health and on fracture risk-reduction with a strong focus on the spread of the Fracture Liaison Services (FLS) model of secondary fracture prevention. This presentation provides an overview of FLS development and spread across Canada, the successes and continuing challenges, and specific facilitators and barriers that have been identified.

Material and Methods: Information to shape this presentation included: 1) data from Osteoporosis Canada's FLS registry, audit reports and key performance indicator development 2) a summary report of key informant interviews with Canadian FLS leads and 3) historical data on the development and progression of FLS in Canada since 2012.

Results: Significant expansion of FLS programs across Canada has taken place since 2012 with the number of FLS increasing from 30 FLSs in 2 provinces in 2012, to 55 FLSs in 8 provinces in 2026. Facilitating this spread was the Brookfield Chair in Fracture Prevention (2020-2025) that provided start-up funding for new FLSs and the establishment of a national FLS medical lead to develop and sustain structured FLS processes, registry, audit and toolkits. The context of the Canadian healthcare system poses a significant challenge to rapid and integrated FLS spread as oversight of health is regulated by each of the 13 provinces and territories. The 2023 Osteoporosis Canada FLS National audit demonstrated high enrolment of hip fracture patients into FLS programs (median 75%) and high persistence of pharmacologic treatment (median 81%) in fragility fracture patients who are at high risk for re-fracture. Common challenges encountered by FLS programs include: 1) reluctance of patients to initiate anti-osteoporosis medication due to concerns about side effects 2) lack of adequate administrative support for FLS operations, and 3) limited access to bone density testing and specialist support in rural and remote areas of the country.

Conclusions: Osteoporosis Canada has seen tremendous progress in improving access to FLS for Canadian fragility fracture patients. Global collaboration and networking can help support Canada to overcome challenges and to achieve a vision where all fragility fracture patients receive appropriate secondary fracture prevention interventions so that no patients are "left behind".

MTE11

MEETING GLOBAL CHALLENGES FOR OSTEOPOROSIS PATIENT SOCIETIES: THE UK EXPERIENCE IN USING PUBLIC CAMPAIGNING TO SUPPORT THE SPREAD OF FRACTURE LIAISON SERVICES (FLS) AND MAKE OSTEOPOROSIS A HEALTH POLICY PRIORITY FOR GOVERNMENT

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Objectives: The Royal Osteoporosis Society (ROS) is the UK's largest bone health charity. Since 2023, the organisation has campaigned in the four Parliaments of the UK and in the national media for nationwide action to foster Fracture Liaison Service (FLS) set-up and quality improvement. This session will share lessons learned about how to influence national policy to the benefit of osteoporosis patients. Highlights will include the messaging that worked most effectively with political leaders, the campaign tactics that generated the most traction, and the subsequent challenges encountered in holding Ministers to account for promises made to the electorate on osteoporosis care.

Material and Methods: Information to shape this presentation included: 1) data from the FLS Database, the national audit of clinics and their performance; 2) media cuttings from the Sunday Express and Mail on Sunday press campaigns for universal FLS; 3) Quotes and commentary from national politicians which demonstrate that bone health has been mainstreamed as a public health priority, with national plans in place in three of the four nations of the UK.

Results: Between 2020-3, the Royal Osteoporosis Society built the evidence base for the role of FLS in effective fracture prevention through two Parliamentary Inquiries held by its All Party Parliamentary Group on Osteoporosis and Bone Health. A number of Ministerial meetings were held, with good conversations which ultimately changed little to nothing for patients. In 2023, the charity stepped up its public campaigning to hold policy-makers to account for the lack of action to close the treatment gap which left two-thirds of osteoporosis patients without medication. The charity secured the support of the Sunday Express newspaper to launch the "Better Bones" campaign, which has since run for 87 editions and become the longest-running press campaign on record in the UK. ROS also won the support of a rival newspaper, the Mail on Sunday, to launch a parallel campaign for FLS. Together, this media campaign gathered the endorsements of 279 Parliamentarians, as well as business leaders, trade unions, Royal Medical Colleges and patient charities. Results included a commitment in England to roll-out FLS to every part of the country by 2030, as well as a £4.5m investment in new DEXA scanners. In Wales, the First Minister made it a priority to set up FLS in every area and made a ground-breaking public commitment to meet the "80%/50%/80%" clinical standards for FLS by 2030. In Scotland, Ministers agreed to audit their FLS and report publicly on the results. Work in Northern Ireland to replicate these gains is now beginning.

Conclusions: Through highly visible public campaigning, ROS popularised bone health and created a coalition of interests which made the call for universal FLS impossible to ignore. To do this, the charity publicised bone health through the lens of feminism, social justice and fairness, using a new vocabulary to make the cause relevant and relatable for the public at large. Political promises did not immediately translate into action, so further public action to hold government to account was required to ensure good intentions translated into real change. These lessons are likely to translate well to other countries.

MTE12

MEETING GLOBAL CHALLENGES FOR OSTEOPOROSIS SOCIETIES: A SOUTH AFRICAN PERSPECTIVE

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South Africa is an ageing society. Only 16% of its 60 million people are over the age of 50, and that number is expected to grow substantially over the next 20-30 years. The incidence of osteoporosis and related fractures will therefore increase dramatically. With ageing and urbanization come diet and lifestyle changes, many of which contribute to reduced bone mass.

Nearly half of all South Africans aged 81 and above have osteoporosis.

Meeting global challenges involves a multifaceted approach to improve fracture prevention and post fracture care, improving primary care, promoting health education, ensuring access to diagnostic tools and medication. This requires collaboration between governments, organizations (WHO, UN), healthcare professionals (physicians, nurses, pharmacists), and communities.

Key challenges include our fragile health system, lack of funding, myths

surrounding osteoporosis, and a general lack of awareness that persist in the general population, health care providers, policy makers, and funders.

Key Strategies and Focus areas

- Health Cover for all
- Disease prevention and control
- Access to diagnostic tools and medication
- Development of Health Workforce in bone health programs
- Advancing education and awareness programs
- Addressing health impactors (e.g. urbanisation, lifestyle changes, co-morbidities e.g HIV, obesity, diabetes, malnutrition)

Stakeholders and initiatives

- World Health Organization (WHO)
- United Nations (UN)
- Pharmaceutical Companies
- Private Healthcare
- Dept of Health
- NPO's and NGO's
- Policymakers, healthcare providers and funders

Challenges

- Myths surrounding prevalence of osteoporosis and fractures
- Health inequalities in a 3rd World Country
- Different cultural attitudes toward ageing
- Fragile Health system
- General lack of awareness
- Underutilization of diagnostic tools e.g. FRAX

Addressing these issues remains an ongoing task. Collaboration with other Societies (e.g. Orthopaedics, Gynaecology, Arthritis) is a key-focus, but in a Country where everyone is vying for funding, this is also proving difficult.

NOFSA relies heavily on the success of Awareness Campaigns to educate the public, healthcare professionals, funders and policymakers. These Campaigns are often funded by the few Pharmaceutical Companies left in South Africa.

The situation in South Africa is not unique, but we do have a unique and diverse population which brings about its own challenges.

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CSA-OC1

FRAGILE BONE, FRAGILE CONSTRUCTS? BONE HEALTH ASSESSMENT AND OSTEOPOROSIS THERAPIES IN SPINAL FUSION

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Osteoporosis is traditionally viewed through the lens of fragility fractures; however, its impact extends beyond fracture risk to the structural integrity of bone–implant constructs. In spinal fusion, where mechanical stability and biological fusion must coexist, compromised bone quality can critically influence construct durability. This talk reframes spinal fusion outcomes within a construct-level paradigm, introducing *implant fixation failure* as a unifying endpoint encompassing screw loosening, cage subsidence, pseudarthrosis, and junctional failure. Mechanistically, osteoporosis alters load distribution, reduces cortical thickness, disrupts trabecular architecture, and diminishes material strength, thereby lowering the mechanical margin of safety at the bone–implant interface. Conventional assessment using areal BMD is insufficient to capture these multidimensional deficits. Emerging approaches, including opportunistic CT-derived Hounsfield units, volumetric imaging, and biomechanical modeling offer improved characterization of bone quality relevant to fixation strength. Therapeutically, both antiresorptive and anabolic agents influence construct outcomes, albeit through distinct pathways. Antiresorptives stabilize peri-implant bone and may enhance long-term construct survival, while anabolic therapies demonstrate more consistent benefits in improving fusion mass and accelerating union. However, much of the current evidence relies on surrogate imaging or biomechanical endpoints rather than definitive construct-failure outcomes.

A systematic peri-operative approach to bone health assessment and optimization represents a critical, yet underutilized, opportunity to improve surgical outcomes. Integrating osteoporosis management into spinal reconstruction pathways requires close collaboration between spine surgeons and bone specialists. Future research must prioritize outcome-driven trials to establish definitive links between bone-directed therapies and construct longevity.

CSA-OC2

PTH ANALOG THERAPY IN CKD G4-G5D: CURRENT EVIDENCE AND POTENTIAL ROLE OF ABALOPARATIDE IN ADYNAMIC BONE DISEASE

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Patients with advanced chronic kidney disease (CKD stages G4–G5D) face a disproportionately high risk of osteoporosis and fragility fractures, with hip fracture rates up to nine times higher than the general population due to damage prevalent in cortical bone in these patients.

These complications lead to severe functional decline, association with vascular calcifications, cardiovascular disease, and increased mortality, especially in the case of the presence of vertebral fractures. Despite this, a significant therapeutic gap persists due to the historical exclusion of CKD patients from major clinical trials.

Recent data indicate that Adynamic Bone Disease (ABD) has emerged as the primary Renal Osteodystrophy (ROD) subtype, affecting up to 60% of hemodialysis patients. This rising prevalence is largely driven by aggressive management of secondary hyperparathyroidism. In this context of suppressed bone remodeling, bone-forming agents are a compelling therapeutic strategy; by directly stimulating osteoblastic activity, they can effectively mitigate the skeletal fragility inherent to low-turnover states.

While PTH analogs like teriparatide and abaloparatide are established anabolic treatments, their use in stage G4–G5D remains off-label. Abaloparatide, a selective PTH1 receptor agonist, offers a compelling alternative due to its potent bone-building effects and lower risk of hypercalcemia than teriparatide. Abaloparatide has shown the same safety and efficacy in mild CKD patients.

We need further perspective studies.

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CSA-OC3

CROSSTALK OF BONE AND MUSCLE IN AGEING

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Population aging is accompanied by a progressive decline in bone and muscle mass and function, leading to osteoporosis, sarcopenia, and the increasingly recognized entity of osteosarcopenia. This presentation explores the emerging concept of bone–muscle crosstalk as a central mechanism underlying these interconnected conditions. Rather than functioning as isolated tissues, bone and skeletal muscle communicate through mechanical loading, shared mesenchymal progenitors, inflammatory mediators, and endocrine signals, including myokines and osteokines. With aging, mitochondrial dysfunction, cellular senescence, chronic low-grade inflammation, and impaired anabolic signaling disrupt this bidirectional communication, accelerating functional decline and increasing the risk of falls, fractures, and frailty. Translational evidence from preclinical models and clinical studies highlights common biological pathways that simultaneously regulate bone strength and muscle performance. Targeting these shared mechanisms through physical activity, nutritional optimization, and novel pharmacological interventions offers an integrated strategy to prevent and treat osteosarcopenia. Understanding bone–muscle interactions through a geroscience lens provides new opportunities to preserve intrinsic capacity and extend healthspan in older adults.

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OCs1

A BODY SHAPE INDEX AS A SURROGATE MARKER FOR SARCOPENIA RISK IN POSTMENOPAUSAL WOMEN: A CROSS-SECTIONAL ANALYSIS

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Background: Hormonal changes and increased central adiposity in postmenopausal women contribute to a disproportionately higher rate of sarcopenia, a condition characterized by the progressive loss of skeletal muscle mass (SMM) and function. Primary care requires simpler screening methods, despite the availability of standard diagnostic tools like imaging and functional testing. A Body Shape Index (ABSI), which uses waist, height, and body mass index (BMI), might reflect central fat accumulation and mortality risk, but its role in sarcopenia prediction remains unclear. To analyze the connection between ABSI and sarcopenia in postmenopausal women, using demographic, metabolic, and body composition data categorized by ABSI quartiles.

Methods: A total of 296 postmenopausal women participated in this cross-sectional study. Sarcopenia was defined according to the EWGSOP2 definition. ABSI was calculated and analyzed in quartiles. Logistic regression identified predictors of high ABSI.

Results: The prevalence of sarcopenia was 43.9% among participants. Participants in the highest ABSI quartile showed significantly older, slower gait speed, and higher rates of osteoporosis and sarcopenia (all $p<0.05$). In the total sample, older age, lower SMMI and slower gait speed were associated with the probability of being Q4 ABSI group ($p<0.05$). In addition, lower SMMI and slower gait speed were independent predictors of higher ABSI in women over 65.

Conclusion: Postmenopausal women with high ABSI show a significant association with poor musculoskeletal and metabolic health. In clinical and community settings, ABSI may offer a cost-effective and simple anthropometric marker for early sarcopenia risk assessment.

OCs2

REIMAGINING ROUTINE HEALTH INFORMATION SYSTEMS TO DETECT FRACTURE RISK AND OSTEOPOROSIS: A POLICY BRIEF PREPARED FOR THE WORLD HEALTH ORGANISATION (WHO)

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Introduction: Fragility fractures impose major economic and social burdens, yet wide global variation in health data systems limits the translation of data into actionable insights and a global fracture risk registry. This policy brief was commissioned and prepared for WHO to advise Ministries of Health on leveraging health data to improve osteoporosis screening, monitoring, diagnosis and prevention, to reduce fracture-related morbidity and mortality.

Methods: Twenty-five global experts were identified with 21 invitations from 16 countries accepted. A total of 11 x one-hour virtual interviews were conducted in October-November 2025. A thematic analysis was conducted, beginning with 15 initial codes derived from the WHO Building Blocks and the PRISM framework, with four additional codes added as new themes emerged. Findings were synthesised into barriers and mutually reinforcing policy opportunities.

Results: Five key barriers consistently identified included (1) low public awareness and competing health priorities, gaps in (2) diagnosis and clinical care, and (3) workforce capability, (4) fragmented and low-quality data, and (5) implementation complexity and sustainability constraints. To address these barriers and challenges, four mutually reinforcing policy opportunities were presented to increase the profile of osteoporosis and fragility fractures (Figure). Experts provided recommendations around (1) importance of local osteoporosis management guidelines, (2) minimum dataset and principles needed for local fracture risk registries, and (3) facilitation and integration of resources including digital solutions (e.g., AI, risk prediction algorithms) to bridge workforce and health equity gaps, including opportunistic case finding.

Conclusion: Findings provide practical, feasible, equitable and scalable recommendations to strengthen data systems, workforce capability and governance for Ministries of Health and stakeholders. Emphasising local context-appropriate guidelines, registries and digital solutions appear key to improving awareness of bone health to prevent fragility fractures.



Figure. Four mutually reinforcing policy opportunities to improve data generation, quality and use for the prevention and earlier detection of osteoporosis and fragility fractures, as well as patient risk assessment. These recommendations are designed to collectively work towards increasing the global profile of osteoporosis and fragility fracture, which is ultimately required for sustainable improvements in patient outcomes.

OCs3

MULTI-CENTER VALIDATION OF A FEDERATED LEARNING-BASED ARTIFICIAL INTELLIGENCE SYSTEM FOR SCREENING LOW BONE MINERAL DENSITY USING CHEST X-RAYS

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Objective

To evaluate the diagnostic performance and generalizability of a novel artificial intelligence (AI) system trained via federated learning for opportunistic screening of low bone mineral density (T-score ≤ -2.5) using routine chest X-rays (CXRs) across two independent medical centers.

Material and Methods

We developed a deep learning model (OsteoPredict) utilizing a federated learning architecture to preserve patient data privacy, trained on 5,943 images. The system was validated retrospectively using an independent external cohort of 3,007 adult patients from two distinct tertiary medical centers who underwent same-day CXR and dual-energy X-ray absorptiometry (DXA). The ground truth was operationally defined as a lumbar spine DXA T-score of ≤ -2.5 for the entire cohort to ensure label consistency for model training. The primary endpoint was the Area Under the Receiver Operating Characteristic curve (AUROC), with sensitivity and specificity as secondary endpoints.

Results

Among 3,007 validation cases, 200 (6.7%) were identified with a T-score ≤ -2.5. The AI system demonstrated excellent discrimination with an overall AUROC of 0.942 (95% CI, 0.923-0.962), a sensitivity of 91.0%, and a specificity of 82.7%. Subgroup analyses revealed robust performance across the two different study sites (AUROC 0.947 and 0.936, respectively) and genders. Crucially, the system maintained high sensitivity in the high-risk elderly population (≥60 years), effectively minimizing false negatives in the group with the higher disease prevalence.

Conclusion

This federated learning-based AI system achieves high accuracy for detecting low bone mineral density (T-score ≤ -2.5) from standard CXRs and demonstrates robust generalization across multiple institutions. By leveraging widely available imaging data, it offers a scalable solution for opportunistic screening, effectively identifying at-risk individuals who may require further definitive DXA assessment.

Acknowledgement

We thank Kaohsiung Veterans General Hospital for providing the validation data. Supported by Taiwan Medical Imaging Co., Ltd. under the A+ Industrial Innovation R&D Program, MOEA, Taiwan.

OCs4

GLP-1 RECEPTOR AGONISTS AND MUSCULOSKELETAL OUTCOMES: A SYSTEMATIC LITERATURE REVIEW AND META-ANALYSIS

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Introduction: This systematic review/meta-analysis aims to synthesize clinical data on the effects of Glucagon-like peptide-1 (GLP-1) receptor agonists (RAs) on key relevant bone, muscle, and joint outcomes. The primary objective is to establish whether these agents are safe for the musculoskeletal system; secondarily, the study examines their potential protective role in mitigating age- and disease-related decline and in improving some key relevant outcomes in musculoskeletal health.

Methods: MEDLINE, Cochrane Central Register of Controlled Trials (CENTRAL) (both via Ovid® platform) and Embase were searched in March 2025 to identify relevant randomized controlled trials (RCTs) or real-world evidence (RWE) studies to be included. This bibliographic search was completed with manual search. A random-effect model meta-analysis was performed for any outcome reported in at least 2 studies. Subgroup analyses were performed on the type of GLP-1 RAs, type of comparator used and study design. Sensitivity analyses were performed to test the robustness of the data. This work has been performed in adherence with PRISMA statement. (PROSPERO Record ID: CRD420251024082).

Results: From 1,148 potentially relevant references, 61 articles (47 RCTs, 13 RWE studies and 1 pharmacovigilance study, combining a total of 1,250,778 individuals) met the inclusion criteria. Different GLP1-RAs were represented across the panel of studies i.e., semaglutide, liraglutide, exenatide, dulaglutide, and tirzepatide (dual agonist GIP/GLP-

1), as well as others such as albiglutide, lixisenatide, and SAR425899 (bamadutide). No effect on bone outcomes (i.e., bone mineral density (all sites) and fractures (all sites) were observed when models included the most adjusted effect size. Regarding muscle outcomes, a significant decrease of lean body mass/fat-free mass was consistently observed with GLP1-RAs in the global model (k=28, SMD0.52, 95%CI -0.8; -0.23, I^2 88%, p-value for heterogeneity <0.0001), which remained robust in all sensitivity analyses. Subgroup analyses showed that the effect was mainly driven by liraglutide and semaglutide, with a decrease in lean body mass/fat-free mass observed when GLP-1 RAs were compared with placebo. No publication bias was found. Regarding joint outcome, models revealed no significant change in WOMAC pain, physical function and stiffness.

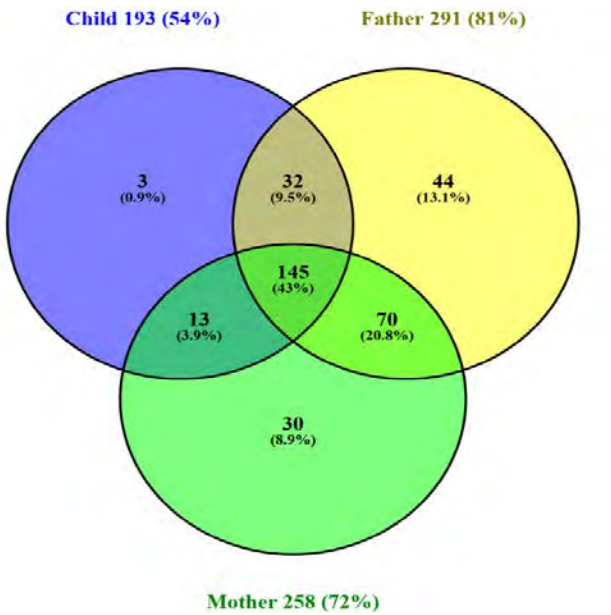
Conclusion: This meta-analysis is the first to investigate the effects of GLP-1 RAs on a large panel of musculoskeletal health outcomes. While no effect on bone outcomes and joint outcomes was found, effects on muscle mass outcomes (i.e., decrease of lean body mass/fat-free mass) were observed, apparently in line with body weight reduction. The clinical relevance of these results needs to be firmly established. Further studies in this field, including those looking at muscle function and using multivariate models considering confounding are needed to better reinforce the models and final findings.

OCs5

FRAGILITY RUNS IN THE FAMILY: INTERGENERATIONAL CLUSTERING OF OSTEOPOROSIS IN A RURAL INDIAN COHORT

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Objectives

To study the prevalence of osteopenia and osteoporosis across two generations and to examine the extent and pattern of familial clustering of low bone mass in a well-characterised rural Indian birth cohort.

Material and Methods

The Pune Maternal Nutrition Study (PMNS) is a prospective intergenerational cohort established in 1993 in rural western India. Dual-energy X-ray absorptiometry (DXA) measurements of the lumbar spine and femoral neck were obtained in 558 adult offspring (F1 generation), 392 fathers and 502 mothers (F0 generation). Familial clustering was evaluated among 358 complete parent-offspring trios using Venn-diagram-based visualisation.

Results

In the F1 generation, mean age of males was 26 years and of females was 23 years. Mean age of fathers was 53 years, and of mothers was 46 years. In the F1 generation (children), the prevalence of osteoporosis was 5.3% in males and 3.9% in females while osteopenia was prevalent in 49.8% and 50.3% respectively. In the F0 generation (parents), the prevalence of osteoporosis was 32.6% in fathers and 25.1% in mothers while osteopenia was prevalent in 48.7% of fathers and 48.6% of mothers. There was a strong association between BMD of children and parents, both at AP spine and neck of femur.

Among 358 parent-offspring trios, osteoporosis or osteopenia was present in 81% of fathers and 72% of mothers, with 54% of children affected. Notably, 43% of trios showed clustering of compromised skeletal health in all three family members, indicating strong familial aggregation. In 177 (52%), families there was father-child concordance and in 158 (46%) families, there was mother-child concordance, showing no significant parent-of-origin effect (Figure 1)

Conclusion

Familial clustering of compromised skeletal health in this cohort shows that osteoporosis is a life-course trait shaped by inheritance and shared family environments. Beyond genetics, intergenerational factors such as maternal nutrition, fetal growth, and early-life living conditions appear to program skeletal risk. This makes family-centred, early-life intervention a rational and potentially transformative strategy in prevention of fractures.

OCs6

DEVELOPMENT AND VALIDATION OF DIABETES HIP FRACTURE SCORE (D-HFS) IN PATIENTS WITH TYPE 2 DIABETES: A POPULATION-BASED COHORT STUDY OF HONG KONG

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Objective: Type 2 diabetes (T2D) is associated with increased risk of hip fracture and post-fracture morbidity. We developed and validated a Diabetes Hip Fracture Score (D-HFS) using population-based electronic health record (EHR) with well-characterised patients with T2D.

Material and Methods: We identified Chinese T2D patients aged ≥40 years who underwent comprehensive diabetes complication assessment during 2008 – 2012 (defined as the index date) in Hong Kong from population-based EHR. Hip fractures were identified by validated ICD-9

code 820. Patients were followed from index date till hip fractures, death, or end of 2023. The cohort was randomly divided 7:3 into development and validation cohorts. D-HFS was build using Fine and Gray model incorporating variables with univariate significance, considering death as competing risk, with model selection based on lowest AIC. Performance of D-HFS was evaluated in validation cohort, and compared with FRAX and other published diabetes-specific hip fracture prediction tools (derived from FDS-I and SIDIAP) using DeLong test.

Results: In total, 254,791 T2D patients were included (age 63.8±11.0 years, 49.1% men, BMI 25.7±3.8 kg/m^2). Upon median follow-up of 12.7 years (IQR: 11.1 – 14.3), 11,368 patients had hip fractures (incidence: 3.8 per 1000 person-years). D-HFS consisted of 11 variables: age, sex, BMI, smoking, history of major osteoporotic fractures, history of fall, diabetes duration, HbA1c, eGFR, statin and anti-diabetic medication use. D-HFS performed well in the validation cohort (5-year prediction at optimal threshold 1.51%: AUC 0.838 [95% CI 0.835–0.841], sensitivity 76.5%, specificity 76.4%, PPV 4.0%, NPV 99.6%; 10-year prediction at optimal threshold 3.63%: AUC was 0.822 [95% CI 0.820–0.824], sensitivity 75.2%, specificity 75.2%, PPV 9.0%, NPV 98.9%). Brier score was 0.012 for 5-year and 0.028 for 10-year prediction, suggesting good calibration. D-HFS performed better than FRAX (AUC 0.79), FDS-1 (0.77) and SIDIAP (0.78) hip fracture risk prediction tools (all p<0.001 vs D-HFS).

Conclusion: We developed and validated D-HFS from the largest database of Chinese T2D patients, applicable to electronic clinical management system to facilitate timely fracture risk stratification and preventive strategies to optimize bone health in T2D.

OCs7

LIFESTYLE AND CLINICAL FACTORS ASSOCIATED WITH FEMORAL NECK BONE MINERAL DENSITY IN AFRICAN ADULTS: FINDINGS FROM THE FRACTURE-E3 STUDY

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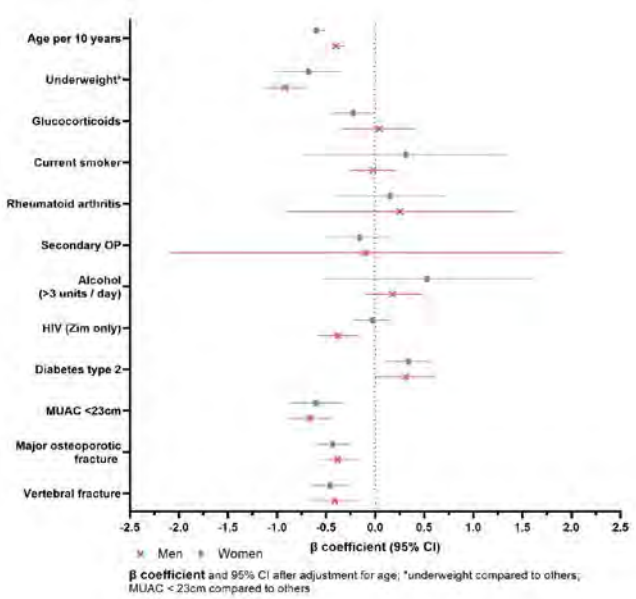
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Objective: To identify clinical, nutritional and lifestyle factors associated with femoral neck bone mineral density (FN-BMD) in women and men in Africa.

Methods: A population-based sample of adults aged ≥40 years, stratified by sex and age bands, were recruited in The Gambia and Zimbabwe. FN-BMD was measured using DXA, with vertebral fractures (VF) identified using Genant semiquantitative methods. Linear regression explored associations between demographic, nutritional, lifestyle and clinical risk factors and femoral neck T-scores, stratified by sex and adjusted for age (age-adjusted results shown in the figure). Factors assessed included underweight (BMI <18.5 kg/m^2), low mid-upper arm circumference (MUAC <23 cm), HIV (Zimbabwe only), diabetes, glucocorticoid use, fracture history, rheumatoid arthritis (RA), secondary osteoporosis, smoking and alcohol intake.

Results: The study included 2181 participants (53% women), mean age 61.4 years; 5.8% were underweight and 6% had MUAC < 23 cm. After adjustment for age, markers of undernutrition, low BMI and low MUAC, were associated with lower FN-BMD in both sexes (women (w): β = −0.7 and β = −0.6; men (m): β = −0.9 and β = −0.7, respectively). Previous fractures were also associated with lower FN-BMD (w: VF β = −0.5, MOF β = −0.4; m: VF β = −0.4, MOF β = −0.4). HIV infection was independently associated with lower BMD in men only (β = −0.4), while type 2 diabetes was associated with lower BMD in women only (β = −0.3). Associations for smoking, alcohol intake and secondary osteoporosis seen in unadjusted models were attenuated after age adjustment. Several traditional osteoporosis risk factors, including glucocorticoid use and RA, showed no significant associations, potentially due to low prevalence (4.4% and 0.6%, respectively).

Conclusion: Undernutrition indicators (low BMI and MUAC <23 cm) and prior fractures (MOF and VF) were the strongest correlates of lower FN-BMD, with additional sex-specific associations for HIV (men) and diabetes (women). The absence of associations with several conventional risk factors suggests that in African settings, nutritional status and fracture history may be more informative. Given the limited access to DXA in many African countries, integrating simple anthropometric measures with fracture history may offer a more practical approach to identifying adults at increased fracture risk. Figure. Sex-specific associations between potential risk factors and FN-BMD, after adjustment for age



OCs8

USING RESEARCH TO TRANSFORM HEALTH POLICY FOR PATIENTS WITH FRAGILITY FRACTURE IN BRITISH COLUMBIA, CANADA

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Objective: Fracture Liaison Service (FLS) is an effective post-fracture care model to reduce repeat fragility fractures and improve quality of life for older adults. An implementation science research team successfully implemented the first FLS in British Columbia (BC), Canada and spread FLS to three additional hospitals. The team is now using research methods to integrate FLS into routine orthopedic care in BC.

Material and Methods: The team – health providers, people with lived experience, academics, health sector decision makers and policy makers – brought together expertise in fracture prevention, research methods, patient experience, knowledge translation and health policy. Research methods included: a series of rapid literature reviews relevant to FLS scale-up and spread, a costing analysis of the impact of FLS spread in BC, a comparative policy review case study of FLS in other Canadian jurisdictions and a deliberative dialogue workshop with diverse stakeholders across Canada to provide input to shape the final BC FLS policy options.

Results: Literature reviews and costing analysis confirm that FLS is effective in preventing repeat fractures and associated health care costs. Patient-related factors important for FLS effectiveness include knowledge of osteoporosis, perceived treatment benefits, and trust with health providers. Successful FLS implementation strategies include primary care provider engagement, patient-centred approaches, adapting to local context, adopting team-based approaches, use of virtual technology and a stepwise approach to FLS spread. Barriers to implementation include lack of dedicated funding, shortage of primary care providers and limited experience reaching rural communities and specific populations (e.g., Indigenous peoples). Outputs from our research include 1) a policy brief (Canadian Institutes of Health Research website), 2) a detailed FLS spread business case and implementation plan for BC and 3) integration of FLS spread into the BC Ministry of Health's *Age Forward Strategy* (2024), a prevention-focused health strategy and action plan supporting older adults' needs.

Conclusion: A multi-disciplinary team, that included policy makers, successfully used research methods to transform the health system to benefit patients with fragility fractures.

OCs9

OSTEOSARCOPENIA AND RISK OF ALL-CAUSE MORTALITY FOR COMMUNITY-DWELLING OLDER ADULTS: THE BUSHEHR ELDERLY HEALTH (BEH) PROGRAM

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Background: Osteosarcopenia is an increasingly recognized geriatric syndrome with a considerable prevalence which increases morbidity and mortality. This study assessed osteosarcopenia as risk factors for all-cause mortality during 7-year follow-up.

Methods: The Bushehr Elderly Health (BEH) Program is a prospective population-based cohort study, which aims to investigate the incidence of non-communicable diseases and their risk factors among people over 60 years old in Bushehr, Iran. Osteopenia/ osteoporosis was defined as a T-score ≤ -1.0 standard deviation below the mean values of a young healthy adult. We defined sarcopenia as reduced skeletal muscle mass index plus low muscle strength and/or low physical performance. Osteosarcopenia was considered as the presence of both osteopenia/osteoporosis and sarcopenia. Participants were categorized in three groups: reference group with no sarcopenia and no osteopenia, sarcopenia or osteopenia group and osteosarcopenia (sarcopenia + osteopenia) group. Hazards ratios (HR) for mortality were calculated with Cox proportional hazards models.

Results: Among 2426 participants, 532 (22.2%) had osteosarcopenia. Over a median follow-up of 7.4 years, 558 (23%) died. Individuals with osteosarcopenia had a significantly higher mortality rate of 52.8 per 100 person-years (95% CI: 45.7-61.0) compared to those without osteosarcopenia, who had a mortality rate of 17.8 per 100 person-years (95% CI: 12.8-24.7). The risk of all- cause mortality among older adults based on osteosarcopenia status, with hazard ratios (HRs) presented across three models. In Model 1 (crude), older adults with osteopenia/ sarcopenia had a significantly increased mortality risk (HR: 1.63, 95% CI: 1.15–2.30), while those with osteosarcopenia exhibited the highest risk (HR: 3.07, 95% CI: 2.15–4.39). After adjusting for age and sex in Model 2, the mortality risk remained elevated in osteopenia/sarcopenia and also osteosarcopenia groups. In Model 3, adjusted for age, sex, body mass index, physical activity, current smoking, protein intake and high fat mass; the highest mortality risk remained in individuals with osteosarcopenia (HR: 1.94, 95% CI: 1.29–2.93), followed by those with osteopenia/sarcopenia group (HR: 1.74, 95% CI: 1.20–2.53).

Conclusion: While sarcopenia or osteopenia increase mortality risk, their combination as osteosarcopenia, is a significant predictor of all-cause mortality among older adults. Therefore, it is important to diagnose and treatment of osteosarcopenia to reduce mortality rate among community-dwelling older adults.

OCs10

AI-ASSISTED OPPORTUNISTIC DETECTION OF VERTEBRAL COMPRESSION FRACTURES IN CT SCANS

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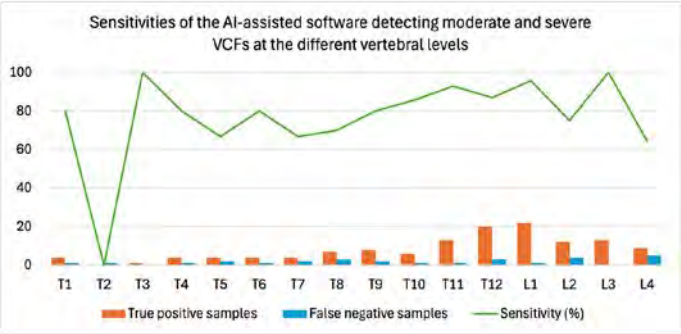
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BACKGROUND: Vertebral compression fractures (VCFs), a hallmark of osteoporosis, are often asymptomatic. In this study, we evaluated the diagnostic utility of an artificial intelligence (AI) software for the opportunistic detection of VCFs in computed tomography (CT) scans.

METHODS: This dual-center retrospective study was conducted at the University Health Network, Toronto, Canada. Consecutive thoracic, abdominal and spine CT scans, from January 1–10, 2023 and June 1–10, 2024, were analyzed using Nanox.AI software HealthOST V1.1 1.0.2, if the following criteria were met: age 50 years and above, sagittal scans with at least 4 vertebrae between T1-L4, and availability of a radiology report. All eligible scans were also reviewed by two expert musculoskeletal radiologists. The Genant semiquantitative technique was used, with moderate and severe VCFs corresponding to height reductions of 25%-40%, and greater than 40%, respectively. A scan was flagged as positive if at least one moderate or severe VCF was identified. The results from software and the original reports were compared to those of the expert radiologists (gold standard). If both software and experts flagged it as positive, regardless of the vertebral level(s), the sample was considered true positive for overall diagnostic performance.

RESULTS: Of the 638 consecutive CT scans, 504 satisfied the inclusion criteria and were successfully analyzed. AI software identified 113 scans as positive, and 391 scans as negative for moderate or severe VCFs. Radiologists excluded 11 scans, and validated 493 scans (17 spine, 164 chest, 188 abdomen/pelvis and 124 chest/abdomen/pelvis). The mean age was 69.9 years (SD 11.2), with 47.9% females. The prevalence was 18% by our expert radiologists. The overall sensitivities and specificities of the software were 90% (95%CI: 82%-95%) and 93% (95%CI: 90%-95%) [PPV of 74% (95%CI: 67%-81%) and NPV of 98% (95%CI: 96%-99%)], while those of the original reports were 49% (95%CI 38%-60%) and 99% (95%CI: 97%-100%), respectively. The sensitivities of the AI software at vertebral levels are shown below.

CONCLUSIONS: AI software can enhance the sensitivity of opportunistic detection of moderate and severe VCFs in thoracic, abdominal and spine CT scans, potentially helping radiologists improve reporting accuracy.



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Abstract Book

Non-Sponsored Symposia Abstracts



NSS1

MUSCULOSKELETAL AGING IN THE OLDEST OLD: WHEN EAST MEETS WEST

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Musculoskeletal disorders of aging carry a heavy public health burden globally as osteoporosis and sarcopenia are strongly associated with an increased risk of fragility fractures and falls respectively, and severe osteoarthritis often requires replacement of the affected joint.

Previous work spanning several decades has suggested differences in the prevalence of these conditions in UK and Japanese populations, although common determinants of musculoskeletal aging have been highlighted. Hence in original work that compared cohort members in the seventh decade of life, peak bone mass appeared lower but bone loss rate slower in Japanese populations [1]. In the same population, severe lumbar spine osteoarthritic degenerative change was more common in UK than Japanese populations [2]. Finally, the prevalence of low grip strength was more common in Japanese adults [3]. Demographic changes worldwide have led to change in life expectancy such that life expectancy in the UK is now 83.5 and 79.3 years for women and men respectively while Japanese life expectancy is now 88 and 82 years for women and men respectively.

This symposium therefore revisits this topic to compare muscle, bone and joint aging in oldest old populations in Southampton, UK and Japan, in a cohort of adults mean age > 80 years.

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NSS2

THE ROAD STUDY – AN OVERVIEW

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Over the past 60 years, life expectancy in Japan has increased by approximately 30 years, making Japan the country with the longest life expectancy in the world. At the same time, however, this remarkable longevity has brought increased attention to the problem of long-term care dependency. We initiated the ROAD (Research on Osteoarthritis / Osteoporosis Against Disability) study in 2005. The primary objectives of this large-scale, population-based cohort study are to clarify basic epidemiological indices of musculoskeletal disorders and to identify their risk factors. The cumulative number of participants in the ROAD study reached 15,693 (5,164 men and 10,529 women) by the sixth survey, placing it among large-scale population-based cohorts of musculoskeletal disorders.

The ROAD study was conducted in three regions with distinct characteristics—an urban area, a mountainous rural area, and a coastal fishing village. Residents were informed about the health examination (baseline survey) through local newsletters and circular notices and were invited to participate. The baseline survey was conducted between 2005 and 2007, with a total of 3,040 participants (1,350 from the urban area, 864 from the mountainous area, and 826 from the fishing village). The mean age was 70.3 years, and 65% of participants were women. Baseline assessments included a detailed questionnaire consisting of approximately 400 items, a dietary survey, grip strength measurement, gait speed assessment, and comprehensive physical measurements (height, weight, grip strength, arm span, blood pressure, pulse rate, ankle–brachial index, one-leg standing test, chair stand test, gait speed, quadriceps muscle strength, and balance function). Bone mineral density was measured using dual-energy X-ray absorptiometry (DXA). In addition, radiographic examinations of the spine, hip joints, and knee joints were conducted, followed by clinical evaluations by orthopedic surgeons. Follow-up surveys of baseline participants have been conducted at 3, 7, 10, 13, and 17 years after enrollment. Measurement of muscle mass was introduced from the second survey onwards. Screening for hand osteoarthritis began in the third survey.

NSS3

THE SALSA STUDY – AN OVERVIEW

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The Southampton Longitudinal Study of Ageing (SaLSA) was established to investigate musculoskeletal health, nutrition, physical activity, and functional decline in community-dwelling older adults.

During the first phase of SaLSA, conducted between August 2020 and September 2021 we recruited 516 adults aged ≥75 years from a large primary care practice in Southampton, UK. Postal questionnaires captured sociodemographic characteristics, comorbidities, physical activity, diet, measures of physical frailty and physical activity as well as sarcopenia risk (SARC-F). The second phase of SaLSA was conducted between November 2023 and July 2025. Two hundred and twenty two participants of the original cohort participated in the phase 2 study; of these 193 participants completed a research visit while 29 completed a postal questionnaire only. Research visits included detailed musculoskeletal phenotyping through physical performance measures, grip strength dynamometry, DXA scanning, high-resolution peripheral quantitative computed tomography (HRpQCT), and clinical examination for osteoarthritis.

Participants had a median age of 79.4 years at baseline and high levels of multimorbidity, with over 70% reporting ≥2 chronic conditions. The cohort was primarily Caucasian (99%), The number of participants with frailty (3 or more frailty components) was 7% among males and 14% among females.

NSS4

HOW DOES MUSCULOSKELETAL HEALTH AND ITS DETERMINANTS IN EAST AND WEST DIFFER?

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Objective Musculoskeletal conditions are common among older people and result in considerable individual and societal costs. However, research comparing the prevalence and correlates of these conditions in Eastern and Western populations is limited. We investigated this among community-dwelling older people from a UK and Japanese cohort.

Materials and Methods Participants were from the Research on Osteoarthritis/Osteoporosis Against Disability (ROAD) Study and the Southampton Longitudinal Study of Ageing (SaLSA); the age range in ROAD was restricted to match that of SaLSA. Questionnaires were used to ascertain the following: health behaviours (smoking history, alcohol intake, Physical Activity Scale for the Elderly); number of comorbidities; and musculoskeletal health (osteoarthritis (ever diagnosed), osteoporosis (ever diagnosed); fall in previous year; and fracture since age 45. A poor musculoskeletal health score was derived from the number of the following: osteoarthritis, osteoporosis, and fall in the previous year. Correlates of the musculoskeletal outcomes and the poor musculoskeletal score were examined using logistic and Poisson regression, respectively.

Results Mean (SD) age was 79.7 (4.7) and 81.1 (4.9) years in ROAD and SaLSA, respectively. Prevalence was higher in ROAD compared to SaLSA regarding osteoarthritis (men 52.1% vs 15.9%, women 65.9% vs 31.4%) and osteoporosis (men 8.4% vs 3.0%, women 34.9% vs 19.4%). Fall prevalence in ROAD (men 23.7%, women 23.9%) and SaLSA (men 21.4%, women 28.5%) was similar; fracture prevalence was similar among women (ROAD 38.4%, SaLSA 37.8%) and higher in ROAD among men (28.4% vs 16.7%). In SaLSA, among women, higher BMI and lower physical activity were associated with falls and osteoarthritis, and a worse musculoskeletal score; among men, ever smoking was associated with osteoarthritis and a worse musculoskeletal score. Among both sexes in ROAD, higher BMI was related to osteoarthritis but reduced risk of osteoporosis; lower physical activity was associated with osteoarthritis among women in ROAD.

Conclusion Prevalence and correlates of the musculoskeletal conditions considered differed between the two cohorts. These findings underscore the need for tailored prevention strategies that consider population-specific risk profiles in the development of interventions to reduce the burden of musculoskeletal disorders.

NSS5

MOVE TO IMPROVE: OSTEOPOROSIS, CARDIOVASCULAR RISK, AND THE ROLE OF EXERCISE IN HEALTHY AGING

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Introduction: Osteoporosis and cardiovascular disease (CVD) are common in older adults. Historically viewed as distinct diseases, with CVD thought to primarily affect men and osteoporosis a disease affecting women. Mounting evidence now links the two through shared risk factors and complex biological mechanisms. Individuals with CVD have a higher prevalence of osteoporosis and fragility fracture risk, while people with osteoporosis have increased risk of cardiovascular events.

Objective: The talk will briefly review the prevalence of CVD in individuals with low BMD or osteoporosis and summarise findings from a systematic review of prospective studies on the prognostic importance of low BMD or osteoporosis for incident CVD. Drawing on 15 years' experience as an Accredited Exercise Physiologist, the presentation will emphasise the importance of exercise for bone and cardiovascular health.

Results: Clinical CVD commonly co-exists with low BMD or osteoporosis, with higher prevalence in individuals with osteoporosis compared to normal or low BMD. Prospective studies indicate that low BMD and/or osteoporosis independently predict incident CVD in older adults, with some showing graded increases in CVD risk across decreasing BMD categories. Exercise provides broad health benefits and is recommended for all, including those with osteoporosis and CVD; however, bone health benefits require specific principles such as weight-bearing, progressive, impact-based exercise. Exercise is also central to falls prevention, reducing falls and fracture risk. While exercise recommendations exist for osteoporosis or CVD individually, targeted evidence-based programs for co-existing CVD and osteoporosis are lacking.

Conclusion: The talk will conclude with practical take-home messages for clinicians to optimise lifestyle approaches. It will summarise evidence on available exercise programs and guidelines for bone and cardiovascular health, emphasising safe implementation in patients with co-existing osteoporosis and CVD. Community perspectives and lived experience will be incorporated to ensure approaches are effective and relevant.

NSS6

BONE-APPÉTIT: INFLUENCE OF CARDIOVASCULAR DISEASE ON MUSCULOSKELETAL HEALTH: A KEY ROLE FOR NUTRITION?

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Introduction: Cardiovascular disease (CVD) and osteoporosis are leading contributors to morbidity, disability, and premature mortality globally. Previously, considered distinct conditions of ageing, growing epidemiological and mechanistic evidence indicates that CVD and poor

musculoskeletal health frequently coexist and interact, increasing the risk of falls and fragility fractures. Both diseases also share numerous lifestyle risk factors, including poor nutrition, which represents a potentially modifiable pathway linking vascular and musculoskeletal health.

Objective: This session will consider evidence from systematic reviews, large population-based cohorts, clinical registries, guideline audits and mechanistic studies to examine CVD (including subclinical CVD) as a comorbidity for a range of musculoskeletal outcomes; low bone mineral density, poor muscle strength, as well as falls and fracture. These will be covered in the context of shared biological mechanisms that can be positively influenced by nutrition.

Results: Subclinical and clinical CVD are common in people with low BMD and osteoporosis, with consistent evidence demonstrating higher fall and fracture risk in individuals with CVD, independent of traditional risk factors. There is also strong evidence for subclinical CVD, specifically abdominal aortic calcification which can be captured on vertebral fracture assessment images, as a key risk factor for incident falls and fractures. Nutrient-dense dietary patterns, particularly those rich in vegetables, adequate protein, calcium and vitamin K, are associated with favourable cardiovascular and musculoskeletal outcomes. However, there appears to be some conflicting data in the context of plant-based and vegan diets for cardiovascular and musculoskeletal health.

Conclusion: This presentation will provide an overview for clinical and subclinical CVD as an under-recognised but important comorbidity of osteoporosis that contributes to falls and fractures. It will highlight how nutrition plays a central, yet underrecognised, role in addressing shared risk pathways. Integrating cardiovascular risk assessment as part of routine musculoskeletal screening could be a promising opportunity to reduce the global burden of falls, fractures and cardiovascular events.

NSS7

A MODEL OF PATHOGENESIS OF ATHEROSCLEROTIC CALCIFICATIONS AS A CONSEQUENCE OF OSTEOPOROSIS

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To address the question of whether atherosclerotic vascular calcifications may be pathologically related to osteoporosis, we undertook a scoping review scanning 6344 manuscripts from 4 databases, identifying 64 that could assist with constructing a conceptual model of pathophysiology determined by the conditions of osteoporosis but ultimately resulting in the development of atherosclerotic calcifications and the reverse. We describe how estrogen deficiency leads to hyperlipidemia with inverse effects on osteoclasts and osteoblasts, consequent inflammation with oxidative stress, liberation of calcium and phosphate from resorbing bone with trapping of both minerals in the circulation as parathyroid secretion of PTH is no longer inhibited by one or two possible mechanisms and Klotho production decreases with inflammation and aging. Calcium and phosphate in the circulation are pro-inflammatory and promote dedifferentiation of vascular smooth muscle cells and replacement by osteogenic precursors. As well, no existing laboratory tests can determine how much circulating calcium and phosphate precipitate in blood vessels as serum determinations only tell us the current concentration of each mineral in solution. Finally, hypercalcemia will inhibit cholesterol catabolism perpetuating the accumulation of total and LDL cholesterol in the circulation. Atherosclerotic cardiovascular disease diminishes bone blood flow leading to further loss of bone. This model provides a basis for understanding how osteoporosis sets in motion pathologic processes resulting in atherosclerotic calcifications or the reverse. Future directions may include screening for abdominal aortic calcifications and fasting hyperlipidemia in osteoporosis patients, or obtaining bone densities in patients with cardiovascular disease. Earlier introduction of anti-resorptives may help prevent vascular calcifications in patients with osteoporosis or osteopenia.

NSS8

PSORIATIC DISEASE

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Psoriatic disease is a systemic autoinflammatory disease which affects both male and female patients. The disease affects both the musculoskeletal system causing psoriatic arthritis and the skin causing psoriasis. Psoriatic arthritis is a systemic autoinflammatory arthritis which affects the enthesis, i.e. the area where the tendons are attached to the bone. The disease mainly affects the spine and the central skeleton, however it may also cause peripheral arthritis. Psoriasis is an autoinflammatory and autoimmune disease which affects the skin causing multiple forms of skin lesions. Patients may display evidence of psoriasis first followed by involvement of the musculoskeletal system with the development of psoriatic arthritis. Some patients develop psoriatic arthritis whereas others may not develop psoriatic arthritis. In some cases psoriatic disease may develop first followed by the development of psoriasis. Psoriasis may take different forms and may also affect the nails causing nail psoriasis. In conclusion, psoriatic disease is a systemic autoinflammatory disease affecting both the musculoskeletal system and the skin.

NSS9

PSORIATIC DISEASE AND METABOLIC SYNDROME

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Psoriatic disease may be accompanied by metabolic syndrome. Metabolic syndrome in the context of psoriatic disease is characterized by central or abdominal obesity, diabetes mellitus type 2, hyperlipidemia and arterial hypertension. The presence of metabolic syndrome is accompanied by an inflammatory phenotype as inflammatory cytokines are secreted which may be implicated in the systemic inflammation observed in psoriatic disease. The presence of metabolic syndrome needs specific treatment involving all metabolic manifestations. In particular, obesity should be prevented and treated. Diabetes mellitus type 2 should be treated. Hyperlipidemia should be effectively treated. Arterial hypertension should also be treated. The presence of metabolic

syndrome may be related with a severe and active profile of psoriatic arthritis. The presence of metabolic syndrome may be related to severe and active forms of psoriasis. In conclusion, metabolic syndrome may accompany psoriatic disease and may be related to active and severe forms of the disease.

NSS10
PSORIATIC DISEASE AND OBESITY

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Obesity may be present in patients with psoriatic disease in the context of metabolic syndrome. Obesity is related to severe and active disease in patients with psoriatic arthritis. Obesity is related to severe and active disease in patients with psoriasis. Therefore obesity needs active and effective management in patients with psoriatic disease. The application of GLP-1 receptor agonists may be applied successfully for the treatment of obesity. GLP-1 receptor agonists may induce weight loss and may improve the inflammatory phenotype of obesity and the inflammatory phenotype of psoriatic disease and improve the activity of the disease. All patients should be offered additional advice to lose weight by diet and physical activity.

NSS11
PSORIATIC DISEASE AND TREATMENT

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Psoriatic disease which includes psoriasis and psoriatic arthritis is an autoinflammatory disease. Nowadays many drugs are available for the treatment of both psoriasis and psoriatic arthritis. Conventional disease modifying antirheumatic drugs, biologic agents, biosimilars, Janus kinase inhibitors, interleukin-23 inhibitors and small molecules are available for the management of psoriatic disease. It is important to take into account the presenting features of the patients when choosing treatment. The presence of peripheral arthritis, axial disease, enthesitis, dactylitis, skin and nail disease should be considered when choosing medication for every patient. The presence of inflammatory bowel disease and uveitis should also be considered, as these manifestations are part of the spondyloarthritis spectrum. The metabolic manifestations of psoriatic disease should also be adequately managed.

NSS12
WHY PERIPROSTHETIC DXA NEEDS STANDARDIZATION: EVIDENCE, VARIABILITY, AND THE RAND/UCLA PROCESS

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This opening session will frame the clinical and methodological problem that motivated the multisociety consensus. It will review evidence on periprosthetic bone mineral density (pBMD) changes after hip and knee arthroplasty, emphasizing that heterogeneous pDXA protocols—differences in positioning, scan coverage, acquisition modes, ROI definitions, and artifact handling—produce substantial measurement error and impede the development of robust, outcome-oriented datasets.

The session will then outline how this framework relates to the prior evidence-based joint position on perioperative bone optimization, which identified periprosthetic bone health as a modifiable factor but did not prescribe a detailed pDXA workflow.

The composition of the expert panel, governance procedures, and key steps of the RAND/UCLA Appropriateness Method—statement drafting, independent rating, discussion of disagreement, and second-round voting—will be described to make the consensus process transparent and open to scrutiny. Attendees will gain a clear understanding of what the framework does (standardizes measurement conditions and reporting) and what it deliberately does not do (propose outcome-validated diagnostic or therapeutic thresholds), thereby setting the stage for the subsequent technical and clinical sessions.

NSS13
FROM PIXELS TO PROTOCOLS: A PRACTICAL FRAMEWORK FOR HIGH-QUALITY PERIPROSTHETIC DXA

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This session will translate the consensus document into a step-by-step "how-to" for performing periprosthetic DXA in hip and knee arthroplasty. It will cover: (1) quality assurance and site-specific precision assessment for periprosthetic ROIs; (2) joint-specific patient positioning and field-of-view rules; (3) the use of metal-removal or artifact-reduction modes and the importance of maintaining a continuous soft-tissue margin around the cortical bone to stabilize dual-energy decomposition; and (4) standardized, implant-anchored ROI templates for the hip (Gruen-adapted femoral zones and DeLee–Charnley acetabular zones) and knee (medial/lateral and metaphyseal/diaphyseal ROIs in PA and lateral projections). Special attention will be given to handling cement mantles, screws, plates, and revision constructs, where attempts at selective pixel-level exclusion often increase variability more than they reduce bias. The session will also explain the Minimum Dataset for Reporting (MDR), which captures key acquisition parameters, ROI schema, precision data, and technical limitations, ensuring that pDXA studies are auditable and comparable across time and centers.

Practical examples and annotated images will illustrate common pitfalls—such as geometric drift of ROIs, misclassification at the bone–implant interface, and truncation of soft-tissue margins—and show how the framework proposes to prevent and document them.

NSS14

INTERPRETING PERIPROSTHETIC BMD: PRECISION, LONGITUDINAL CHANGE, AND THERAPY-AWARE FLAGS

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Once acquisition and segmentation are standardized, the primary value of pDXA lies in quantifying temporal changes in periprosthetic BMD. This session will present the framework's recommendations for longitudinal analysis: establishing site-specific precision and the least significant change (LSC) for periprosthetic ROIs; defining realistic follow-up schedules (baseline within three months, 6 and 12 months, then annually); and replicating geometry and ROI templates across serial scans to avoid artifactual loss or gain.

The speakers will then discuss a therapy-aware interpretive model: how to interpret pBMD trajectories in untreated versus antiresorptive- or anabolic-treated patients; how to integrate central DXA, fracture history, and comorbidities; and how to use a consensus-based Green–Amber–Red flagging scheme that relies on ROI-specific LSC and spatial/temporal patterns rather than unvalidated cut-offs.

The limitations of pBMD as a surrogate biomarker and the absence of validated prognostic thresholds for aseptic loosening, periprosthetic fracture, or revision will be explicitly addressed. The session will conclude with practical examples showing how pDXA can support—not replace—clinical and radiographic assessment in perioperative bone-optimization pathways.

NSS15

THE FLS HISTORY IN ITALY – A DECADE OF ACTION

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Fragility fractures represent a major public health challenge in Italy, with 570'00 fractures in 2019, putting a severe burden on the healthcare system, as fragility fractures' costs are estimated at almost 10 billion euros annually[1].

To tackle the post-fracture care gap, Fracture Liaison Services have been introduced across the country over the past decade.

Since the first Fracture Liaison Service joined Capture the Fracture® in 2013, and following the establishment of the Fragility Fracture Observatory, the launch of the Fragility Fractures Guidelines and the national fracture registry, Professor Brandi will provide an overview of ten years of efforts related to the implementation of Fracture Liaison Services in Italy. In this review, she will highlight key milestones, outcomes, and future directions aimed at enhancing post-fracture care in the country.

Through the Italian experience, participants will get actionable insights and transferable lessons that can support effective and sustainable FLS development in their own settings.

[1] International Osteoporosis Foundation. Solutions for Fracture Prevention in Italy. 2022. Available at https://www.osteoporosis.foundation/sites/iofbonehealth/files/2023-01/2022_country_profile_it.pdf. (Accessed January 2026).

NSS16

LEARNING FROM PEERS AND BUILDING A STRONG FLS COMMUNITY – THE JAPANESE EXPERIENCE

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In April 2022, the Japanese Ministry of Health, Labour and Welfare introduced a new reimbursement model, incentivising early surgery within 48 hours of injury and mandating comprehensive secondary fracture prevention[1]. This progressive policy has catalysed a transformation in fragility fracture care across Japan, accelerating the nationwide implementation of Fracture Liaison Services (FLS) and strengthening long-term osteoporosis management and patient outcomes.

In October 2024, Capture the Fracture® welcomed the 100th FLS from Japan into its global network. This milestone reflects Japan's strong national commitment to fracture prevention and osteoporosis care, supported by increased public recognition of FLS/OLS, a structured nationwide mentorship programme, and sustained engagement from multiple stakeholders. In close collaboration with national societies, including the Japan Osteoporosis Society, and with the active involvement of Capture the Fracture® mentors, the Japanese FLS/OLS community has been built around a shared focus on quality improvement and harmonisation of care across the country.

This peer-learning approach reached a further milestone in December 2025 with the organisation of the Capture the Fracture® Workshop. The highly collaborative atmosphere and strong engagement demonstrated the growing momentum to share best practices, align standards, and drive continuous improvement in FLS/OLS delivery nationwide.

Through the Japanese experience, participants will get more insights on how to build a strong collaborative community, working together to build sustainable and quality FLS/OLS.

[1] The APCO-IOF Asia Pacific Regional Audit: Epidemiology, Costs and Burden of osteoporosis in 2025, International Osteoporosis Foundation (2025), https://www.osteoporosis.foundation/asia-pacific-audit-2025

NSS17

A SET OF VARIABLES FOR THE ASSESSMENT OF FRAGILITY FRACTURE PATIENTS IN AN FLS ENVIRONMENT IN LATIN AMERICA (COUNTRY SPECIFIC DATASETS)

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Objective: To develop a questionnaire for the standardization of clinical, laboratory, and imaging data from patients with fractures treated at FLS (Fracture Liaison Services), with the aim of generating a homogeneous and comprehensive database. The resulting data will enable collaborative work and measuring individual and comparative effectiveness of secondary fracture prevention programmes among FLS included on the Map of Best Practices of the Capture the Fracture® (CTF) program by the International Osteoporosis Foundation (IOF) in Latin America.

Material and Methods: Two task forces were established, one in Argentina and one in Brazil, which worked independently to create a dataset with the most relevant and country-specific variables. To this purpose, experts considered national fracture registry and guidelines, epidemiological information on populations with fragility fractures, and effectiveness KPIs for secondary fracture prevention programs.

Results: The national datasets were defined considering relevant parameters for the performance of FLS at the different stages of identification, evaluation, treatment indication and follow up. Clinical, epidemiological, and demographic variables were included in the data collection, aiming at meeting CTF Best Practice Framework standards as well as feeding key performance indicators for measuring the effectiveness of FLS, while also driving quality improvement plans.

Conclusion: A country-specific database, which records relevant and comparable clinical data from FLS, is a tool that enables the analysis of key variables for the evaluation and improvement of the performance and sustainability of each service to the care of patients with osteoporosis and fragility fractures.

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NSS18

APPLYING BONE TURNOVER MARKERS IN DIALYSIS AND TRANSPLANTATION: CASE-BASED INSIGHTS

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The Kidney-Disease: Improving Global Outcomes (KDIGO) Controversies Conference in 2023 introduced the term chronic kidney disease associated osteoporosis (CKD-OP) to describe bone fragility in CKD. CKD-OP is a complex disorder of bone metabolism that is characterized by alterations in bone turnover and mineralization layered on top of impaired bone density and microarchitecture. Management of CKD-OP is based on the underlying turnover of bone, with agents that suppress turnover for high turnover bone and agents that enhance turnover for low turnover bone. While bone biopsy is the gold standard to assess turnover, its widespread use has significant limitations. The 2023 KDIGO Conference highlighted the role of circulating bone turnover markers to inform and guide management of CKD-OP with bone-targeting pharmacologic agents. In the clinic, circulating markers of bone turnover that are not cleared by the kidney, such as bone-specific alkaline phosphatase (BALP) and tartrate resistant acid phosphatase isoform 5b (TRACP5b) have reasonable accuracy for turnover abnormalities. We will use illustrative cases to demonstrate how turnover markers can be operationalized in the clinic to inform and guide management of CKD-OP.

NSS19

BALP, TRACP-5B AND IPINP: NEW REFERENCE MARKERS AND DIAGNOSTIC CUT-OFFS IN CKD

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Bone turnover abnormalities are common in chronic kidney disease (CKD) and contribute to the high fracture risk in this patient population. The Kidney-Disease: Improving Global Outcomes (KDIGO) Controversies Conference in 2023 introduced the term CKD-associated osteoporosis to describe bone fragility in CKD and highlighted the role of biochemical markers of bone turnover in the clinical evaluation and management of this condition. The bone turnover markers recommended for use in post-menopausal osteoporosis (C-terminal telopeptides of type I collagen, β-CTX-I, and pro-collagen type I N-terminal propeptide, PINP) accumulate with kidney dysfunction and are difficult to interpret in the context of CKD. Consequently, a position paper by ESCEO, IOF, and IFCC recommended bone-specific alkaline phosphatase (BALP) and tartrate resistant acid phosphatase isoform 5b (TRACP5b) as reference biomarkers in CKD-associated osteoporosis. These non-kidney cleared biomarkers show good diagnostic accuracy for skeletal remodeling disturbances, as diagnosed by bone biopsy, in patients with CKD. Higher levels of biomarkers also associate with greater risk of bone loss and fractures, though their value for individual fracture risk prediction remains unclear.

A recent European consensus paper provides specific cutoffs of BALP, TRACP-5b and the intact form of PINP (iPINP) for identifying bone turnover abnormalities in CKD and suggests that these biomarkers may be instrumental in supporting clinical decision-making in CKD-associated osteoporosis. Future research should focus on the integration of these bone turnover markers with other diagnostic tools and the establishment of evidence-based treatment targets and protocols.

NSS20

THE GLOBAL LEADERSHIP INITIATIVE ON SARCOPENIA (GLIS): OBJECTIVES, STRUCTURE, AND ACHIEVEMENTS

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Over the past two decades, many international groups have developed definitions of sarcopenia that include reduced muscle function and low muscle mass. These definitions have advanced the field rapidly. However, the absence of a global consensus among the most widely used definitions impedes progress in the field, affecting both research and the integration of sarcopenia into routine clinical practice.

This lecture will explain how the Global Leadership Initiative in Sarcopenia (GLIS) was formed through the collaboration of the main former definition consensus groups. The initiative aims to create a comprehensive practical definition of sarcopenia that is widely accepted and adopted. The objectives of GLIS, the structure and composition of the groups involved in the initiative, and its main milestones, as well as the current activities and future projections will be described.

NSS21

HEALTH OUTCOMES OF SARCOPENIA: INSIGHTS FROM THE GLIS OUTCOME WORKING GROUP AND CLINICAL IMPLICATIONS

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The Global Leadership Initiative in Sarcopenia (GLIS) was established to harmonize the definition and diagnostic criteria for sarcopenia into a single, internationally accepted classification. A central component of this effort is the Working Group (WG) on sarcopenia outcomes, which aims to identify clinically meaningful health outcomes that should be assessed once sarcopenia is diagnosed, as well as the optimal tools and cutoffs for their measurement. This abstract summarizes the key discussions, evidence base, and conclusions of the GLIS WG on outcomes, as previously reported.

The WG comprised 13 international experts representing multiple continents and disciplines. Its recommendations were informed by systematic reviews, meta-analyses, and high-quality cohort studies evaluating the association between sarcopenia and adverse health outcomes. The evidence demonstrates, with a high level of certainty, that sarcopenia is strongly associated with reduced quality of life, increased risk of falls and fractures, and higher all-cause mortality. Moderate-quality evidence also supports an association between sarcopenia and declines in instrumental activities of daily living (IADL), reflecting early functional impairment relevant to clinical practice.

In contrast, the available evidence was inconclusive regarding associations between sarcopenia and hospitalization, nursing home admission, mobility impairment, and reductions in basic activities of daily living (ADL). These gaps primarily reflect the limited number of longitudinal studies and heterogeneity in outcome definitions and assessment methods across existing research.

Overall, the GLIS WG highlights the urgent need for standardized outcome measures and well-designed longitudinal studies to better characterize the trajectory and clinical consequences of sarcopenia. These efforts are essential to support implementation of a unified sarcopenia definition and to improve risk stratification, clinical decision-making, and intervention development worldwide.

NSS22

UPDATED META-ANALYSIS ON THE HEALTH OUTCOMES OF SARCOPENIA

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In 2017, a landmark systematic review and meta-analysis provided the first comprehensive quantification of the association between sarcopenia and major health outcomes. Since then, the field has evolved considerably, with a rapid increase in high-quality longitudinal studies, broader geographic representation, longer follow-up periods, and the adoption of updated consensus definitions incorporating both muscle quantity and function. These developments warrant a timely and comprehensive update of the existing evidence.

This lecture will present results of the updated version of this systematic review and meta-analysis on the short-, middle-, and long-term clinical outcomes of sarcopenia in older adults, conducted using the same rigorous methodology as the original work, while integrating newly published studies and contemporary diagnostic criteria. The updated synthesis will examine a broad range of clinically relevant outcomes, including all-cause mortality, hospitalisation, falls, functional decline (activities of daily living and instrumental activities of daily living), cognitive decline, depressive symptoms, fractures, and institutionalisation.

By reassessing the strength and consistency of associations between sarcopenia and key health outcomes, this updated synthesis—aligned with the work of the GLIS Outcome Working Group—aims to refine the understanding of the clinical burden of sarcopenia and to support informed clinical decision-making as well as the development of effective prevention and management strategies.

NSS23

PRESENTATION 1: INTRODUCTION TO YOGA AND ITS RELEVANCE TO MUSCULOSKELETAL HEALTH

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This presentation will offer a concise introduction to yoga, its origins, and its relevance to musculoskeletal health. Rooted in ancient Indian philosophy, yoga has evolved into a globally practised mind–body discipline that integrates postures (asanas), breathwork (pranayama), meditation, and mindfulness. Importantly, yoga is not a uniform intervention; its many styles, ranging from alignment-focused Iyengar yoga to dynamic Vinyasa flow, structured Ashtanga, traditional Hatha, and heat-based Bikram vary widely in intensity, biomechanical loading, and neuromuscular challenge. These differences have direct implications for outcomes such as balance, muscle strength, bone loading, and overall functional capacity, and must be considered when interpreting research on yoga's health effects.

The presentation will also briefly address the safety profile of yoga. While it is generally safe when practised with proper instruction, minor musculoskeletal discomforts are the most commonly reported adverse events. Rare incidents often related to loss of balance, excessive range of motion, or incorrect technique underscore the importance of supervision, especially for older adults or individuals with pre-existing conditions. Overall, this presentation will set the stage for the symposium by clarifying what yoga is, how its diverse forms interact with the musculoskeletal system, and what practitioners and clinicians should consider when integrating yoga into health-focused programmes.

NSS24

EFFECT OF YOGA ON BONE MINERAL METABOLISM

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This presentation will provide a concise synthesis of current evidence examining how yoga influences two key determinants of musculoskeletal health: **bone mineral density (BMD)** and **balance**. Yoga incorporates weight-bearing postures, controlled transitions, axial loading, and proprioceptive challenge, all elements with plausible biomechanical relevance to bone strength and postural stability. However, published studies vary widely in yoga style, intensity, duration, and population studied, resulting in a heterogeneous evidence base. This session will review studies evaluating the impact of yoga on BMD across axial and appendicular sites, outline where findings converge or diverge, and identify the methodological factors that shape interpretation.

In parallel, the presentation will explore yoga's effect on balance, an equally important contributor to fracture risk. Drawing on studies that used standardized tools such as the Berg Balance Scale, Tinetti Assessment, single-leg stance, and dynamic posturography, the session will summarise the evidence for improvements in static and dynamic balance, fall risk, and neuromuscular control. Together, these discussions will provide an evidence-informed, balanced perspective on what yoga can realistically achieve for skeletal health and stability, highlight gaps in current research, and set the stage for future directions in studying mind–body interventions for osteoporosis prevention.

NSS25

EFFECT OF YOGA ON MUSCLE STRENGTH

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This presentation will summarise current evidence on yoga's impact on **muscle strength**, a key determinant of bone health, functional capacity, and fall risk. Yoga incorporates a wide range of postures including seated, standing, weight-bearing, and isometric positions that engage major upper- and lower-limb muscle groups. While its benefits for balance and mobility have been increasingly explored, its effects on muscle strength have only recently been evaluated systematically. This session will draw on randomized controlled trials comparing yoga to both no-intervention controls and active comparators such as Pilates, Tai Chi, and core-strengthening programmes, providing an overview of how different yoga styles influence hand grip strength and lower-limb strength across diverse populations.

The presentation will also highlight methodological considerations such as variability in intervention duration, posture selection, intensity, and assessment techniques, all of which shape the interpretation of strength outcomes. Taken together, the available evidence suggests that yoga can serve as an effective mind body approach to improving muscle strength, with potential relevance for fall prevention and musculoskeletal resilience. This session will outline what is currently known, where evidence remains limited, and future priorities for defining yoga's role within strength- and stability-focused health programmes.

NSS26

ESTRADIOL THERAPY IN 2025: OPTIMIZING TYPE, DOSE, AND ROUTE FOR BONE PROTECTION ACROSS MENOPAUSAL STAGES

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Background: Menopausal hormone therapy (MHT) prevents bone loss and reduces vertebral, non-vertebral, and hip fractures, with benefit modulated by timing since menopause, dose, regimen, and route of administration. Early postmenopause is the phase of maximal estrogen-deficiency bone loss, making regimen selection critical.

Methods: Narrative synthesis of randomized trials, large cohorts, and guideline statements evaluating estrogen alone or with progestogen,

transdermal vs oral routes, and dose-response across peri-, early-, and late-postmenopause, focusing on bone mineral density (BMD), fractures, and safety.

Results: MHT lowers fracture risk during use (odds ratio [OR] ~0.75–0.76 for current users) with attenuation after discontinuation; risk may transiently rebound before converging below never-users beyond 10 years off-therapy. Anti-fracture efficacy is robust even in women unselected for low BMD, greatest when initiated before age 60 or within 10 years since menopause. Dose: estrogen effects are dose-dependent; low and ultra-low doses still preserve or increase BMD, particularly in women with very low endogenous estradiol. Route: transdermal and oral routes yield similar BMD gains, but oral therapy confers higher venous thromboembolism (VTE) risk; transdermal minimizes hepatic effects. Conventional-dose combined estrogen-progestogen lowers spine and hip fractures; low-dose effects on fractures may be weaker, though BMD is maintained. Early menopause/POI: MHT is first-line for skeletal preservation; earlier age at menopause independently heightens fracture risk, underscoring timely initiation. After stopping MHT, sequential antiresorptive (e.g., alendronate, raloxifene) can sustain or augment BMD.

Conclusions: For bone protection, initiate MHT in symptomatic women <60 years or within 10 years of menopause, using the lowest effective estrogen dose; prefer the transdermal route when VTE/metabolic risk is a concern, and ensure appropriate progestogen if uterus intact. Plan exit strategies with DXA reassessment and timely transition to antiresorptive drugs to mitigate post-cessation bone loss and fracture rebound.

NSS27

BEYOND ENDOMETRIAL SAFETY: DO DIFFERENT PROGESTOGENS CHANGE LONG-TERM SKELETAL AND METABOLIC RISK?

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Background: In menopausal hormone therapy (MHT), progestogens are essential for endometrial protection, but their skeletal and metabolic effects may differ by molecule and androgenic/glucocorticoid activity, route, and dose. Micronized progesterone and dydrogesterone appear metabolically neutral compared with several synthetic progestins, yet long-term outcomes remain incompletely defined.

Methods: Narrative synthesis of randomized trials, observational cohorts, and systematic reviews evaluating bone mineral density (BMD), fractures, lipids, insulin resistance, and venous thromboembolism (VTE) across progestogens used with estrogen, plus data from progestin-only contraceptives informing class effects.

Results: Progestin identity matters. Medroxyprogesterone acetate (MPA) can blunt estrogen's favorable lipid effects and lower HDL cholesterol, whereas micronized progesterone shows smaller attenuation and neutral cardiometabolic impact in short-term trials. With transdermal estrogen, micronized progesterone and norpregnanes (e.g., dydrogesterone) are linked to lower VTE risk than some synthetic progestins. Bone: In MHT, norethisterone (NET) combined with estrogen increased distal radius BMD by 2.3% over 2 years and reduced nonvertebral fractures (RR 0.14, 95% CI 0.02–0.93), outperforming estrogen+MPA (BMD +1.6%; nonsignificant fracture reduction) in one trial, suggesting differences tied to glucocorticoid activity. Progestin-only depot MPA (DMPA) decreases BMD during use, with partial to full recovery after discontinuation; fracture risk signals are inconsistent but may rise with prolonged exposure (OR up to 3.04 in heavy users <30 years). Combined oralcontraceptives generally show neutral BMD effects although fracture data are limited.

Conclusions: Beyond endometrial safety, progestogens differ in skeletal and metabolic profiles. Micronized progesterone/dydrogesterone are generally cardiometabolically neutral with transdermal estrogen and may minimize VTE risk, while MPA and more androgenic agents variably attenuate lipid benefits and lower HDL. For bone, choice may influence BMD and fractures when combined with estrogen, and progestin-only DMPA warrants caution in prolonged use. Long-term fracture and cardiometabolic outcome trials omparing progestogens are a key unmet need.

NSS28

ANDROGENS AND THE FEMALE MUSCULOSKELETAL SYSTEM: EVIDENCE, GAPS, AND THE FUTURE OF THERAPY

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Background: The role of androgens in female musculoskeletal health remains controversial. Androgens act on bone and muscle in women via androgen receptors and through aromatization to estrogens, influencing osteoblast differentiation, bone remodeling, and muscle mass, yet clinical applications remain limited and heterogeneous Over the past decade, increasing attention has been given to testosterone therapy in postmenopausal women; however, its efficacy for bone and muscle outcomes is uncertain, particularly when compared with established therapies such as menopausal hormone therapy (MHT).

Objective: To critically review current evidence regarding the effects of testosterone and other androgens on bone mineral density (BMD), muscle strength, and fracture risk in postmenopausal women, highlighting knowledge gaps and implications for future therapeutic strategies.

Methods: Narrative synthesis of systematic reviews, meta-analyses, randomized controlled trials (RCTs), observational cohort studies, Mendelian randomization analyses, and international clinical guidelines published over the last 10 years.

Results: High-quality evidence consistently demonstrates that systemic testosterone administered at physiological doses to postmenopausal

womendoes not confer reliable benefits on bone mineral density (BMD), muscle mass, muscle strength, or fracture prevention. Meta-analyses and global consensus statements report no significant effects on lumbar spine, total hip, or femoral neck BMD over 12 months, nor on lean mass or physical performance, while mild androgenic adverse effects are more frequent. Consequently, the only evidence-based indication for testosterone therapy in women remains hypoactive sexual desire disorder (HSDD). In contrast, MHT with estrogen, with or without progestogen, has robust evidence supporting increases in BMD and significant reductions in total, hip, and major osteoporotic fractures while in use. Observational and genetic studies suggest that endogenous androgen balance may influence skeletal health: higher sex hormone–binding globulin (SHBG) levels are consistently associated with increased fracture risk, whereas higher bioavailable testosterone and DHEAS appear to correlate with higher BMD and lower peripheral fracture risk. However, these associations do not establish causality or justify androgen supplementation for skeletal indications. Resistance and high-impact exercise remain an effective non-pharmacological intervention for improving muscle strength and modestly increasing BMD. Key gaps include optimal dosing, patient selection, fracture outcomes, and comparative safety versus estrogen-based therapy. Future directions include targeted trials of physiologic androgen replacement and biomarker-driven personalization to clarify benefit–risk and improve musculoskeletal health in women.

Conclusion: Current evidence does not support the use of systemic testosterone for musculoskeletal benefits in postmenopausal women. Adequately powered RCTs demonstrating fracture or BMD benefit are lacking. MHT, targeted anti-osteoporotic therapies, and structured exercise programs remain the cornerstone strategies for bone and muscle health in this population. Testosterone therapy should be restricted to HSDD, using transdermal formulations at physiological doses, with careful monitoring and acknowledgment of long-term safety uncertainties.

NSS29

HIGH PREVALENCE OF OSTEOPOROSIS IN AUTOIMMUNE AND INFLAMMATORY DISEASES

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Background Osteoporosis is a frequent yet often under-recognized comorbidity in autoimmune and inflammatory diseases. Chronic systemic inflammation, immune-mediated bone resorption, prolonged exposure to glucocorticoids, reduced physical activity and disease-related disability all contribute to impaired bone strength and increased fracture risk. Despite this, osteoporosis screening and fracture prevention strategies remain inconsistently implemented in routine care.

Aim To highlight the prevalence, pathophysiological mechanisms and clinical relevance of osteoporosis in autoimmune and inflammatory diseases, emphasising the need for systematic bone health assessment in these populations.

Methods A narrative review of epidemiological studies, pathophysiological research and international guidelines addressing bone loss and fracture risk in inflammatory and autoimmune conditions.

Results Evidence consistently shows increased rates of low bone mass and fractures in autoimmune and inflammatory diseases. Chronic inflammation stimulates osteoclast activity and suppresses osteoblast function through cytokines such as TNF-α and IL-6, leading to microarchitectural deterioration. Long-term corticosteroid therapy further increases fracture risk even when BMD is not severely reduced. In ankylosing spondylitis (AS), spinal BMD can be falsely elevated on DXA due to ossification. REMS, a non-ionizing ultrasound-based technique, demonstrates excellent precision, allowing detection of smaller BMD changes over shorter intervals and offering potential advantages, particularly in patients with artifacts such as degenerative changes or spinal alterations in AS. Furthermore, REMS-derived Fragility Score may better predict incident osteoporotic fractures than T-scores from either REMS or DXA.

Conclusion Osteoporosis is highly prevalent in autoimmune and inflammatory diseases because of the combined effects of chronic inflammation and corticosteroid therapy, yet current diagnostic approaches frequently fail to detect early deterioration in bone quality. REMS may help bridge this diagnostic gap and support earlier intervention, although further prospective studies are required.

Key words: osteoporosis, prevalence, autoimmune, inflammatory disases

NSS30

CLINICAL CHALLENGES AND DIAGNOSTIC GAPS IN OSTEOPOROSIS ASSESSMENT: THE ROLE OF REMS TECHNOLOGY

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Background Conventional osteoporosis diagnostics, particularly dual-energy X-ray absorptiometry (DXA), may be limited in patients with inflammatory diseases and in special clinical settings such as pregnancy. Positioning difficulties, skeletal deformities, artefacts, cumulative radiation exposure and safety concerns can compromise diagnostic accuracy and feasibility, leading to underdiagnosis of bone fragility.

Aim To discuss current diagnostic gaps in osteoporosis assessment in inflammatory diseases and pregnancy and to explore the potential role of Radiofrequency Echographic Multi-Spectrometry (REMS) as an alternative imaging approach.

Methods Review of clinical studies evaluating feasibility, diagnostic performance and clinical applicability of REMS technology compared with standard densitometry in inflammatory diseases and pregnancy.

Results Evidence suggests that REMS, a non-ionising ultrasound-based technique, allows axial skeletal assessment without radiation exposure and with fewer positioning constraints. Preliminary data indicate good agreement with DXA and improved feasibility in patients with spinal damage, disability or during pregnancy, where ionising techniques are

restricted. REMS may therefore address important diagnostic gaps in challenging clinical scenarios. REMS especially attractive in clinical situations where ionising techniques are restricted or contraindicated, such as during pregnancy or in patients requiring repeated assessments. By improving accessibility and safety while maintaining diagnostic performance, REMS has the potential to address key diagnostic gaps and facilitate earlier, more inclusive bone health evaluation in complex and vulnerable patient populations.

Conclusion Diagnostic limitations contribute significantly to the under-recognition of osteoporosis in inflammatory diseases and pregnancy. REMS technology represents a promising, patient-centred tool that may enhance accessibility, safety and accuracy of bone health assessment, although further validation and long-term outcome data are required.

Key words: bone assessment, clinical challenges, diagnostic gaps

NSS31

PATHOPHYSIOLOGY, RISK ASSESSMENT CHALLENGES, AND NON-PHARMACOLOGICAL STRATEGIES IN DIABETIC BONE FRAGILITY

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Background: Older adults with both type 1 (T1D) and type 2 diabetes (T2D) have a substantially increased risk of fragility fractures, contributing significantly to morbidity and mortality. Importantly, the mechanisms underlying skeletal fragility differ between diabetes types.

Objectives: To summarize the distinct pathophysiological mechanisms of diabetic bone fragility, highlight limitations of current fracture risk assessment tools, and discuss evidence-based non-pharmacological management strategies in older adults with diabetes.

Content: In T1D, insulin deficiency leads to impaired osteoblast function and reduced bone mineral density (BMD), primarily affecting bone quantity. In contrast, T2D is characterized by the "diabetic bone paradox," where BMD is often normal or elevated, yet fracture risk is increased due to compromised bone quality. This impairment results from altered microarchitecture, accumulation of advanced glycation end products, low bone turnover, chronic inflammation, and oxidative stress. Standard fracture risk assessment tools, including DXA-derived BMD and FRAX, frequently underestimate fracture risk in diabetes—particularly in T2D—because they inadequately capture bone quality and fall risk. Incorporation of diabetes-specific factors (disease duration, glycemic control, microvascular complications), alongside assessment tools such as trabecular bone score and FRAX-based adjustments, is essential. Non-pharmacological strategies are fundamental and include optimization of nutrition (adequate calcium, vitamin D, and protein intake), individualized exercise programs combining resistance and balance training, and comprehensive fall prevention. Fall risk is especially high in older adults with diabetes due to hypoglycemia, neuropathy, visual impairment, sarcopenia, and polypharmacy.

Conclusions: Diabetic bone fragility represents a complex, multifactorial condition requiring a tailored approach beyond conventional osteoporosis paradigms. Improved risk stratification and robust non-pharmacological interventions are central to effective fracture prevention in older adults with diabetes.

NSS32

SKELETAL EFFECTS OF ANTI-DIABETIC DRUGS AND OSTEOPOROSIS MANAGEMENT IN PATIENTS WITH DIABETES

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Background: Management of bone fragility in diabetes requires balancing optimal glycemic control with preservation of skeletal health and minimization of fall risk.

Objectives: To review the skeletal effects of commonly used anti-diabetic medications and outline evidence-based osteoporosis treatment strategies in older adults with diabetes.

Content: Individualized glycemic targets are critical in older adults, particularly those who are frail, where relaxed HbA1c goals (approximately 8.0–8.5%) may reduce hypoglycemia-related falls without substantially increasing hyperglycemia-associated bone damage. Anti-diabetic drug selection should prioritize agents with neutral or potentially beneficial skeletal profiles and low hypoglycemia risk, including metformin, DPP-4 inhibitors, GLP-1 receptor agonists, and SGLT2 inhibitors. Thiazolidinediones should be avoided due to their well-established association with bone loss and fractures through diversion of mesenchymal stem cell differentiation toward adipogenesis. Insulin use is consistently associated with increased fracture risk, largely driven by hypoglycemia and disease severity rather than direct skeletal toxicity. When osteoporosis pharmacotherapy is indicated, available evidence—largely from post-hoc and observational analyses—suggests that antiresorptive agents such as bisphosphonates and denosumab are effective in patients with diabetes. Renal function, risk of hypocalcemia, and rebound fractures after denosumab discontinuation must be carefully considered. Anabolic therapies (teriparatide and abaloparatide) are particularly attractive in T2D due to its low bone turnover state. Romosozumab provides potent gains in bone mineral density but requires cautious use in patients with high cardiovascular risk.

Conclusions: Optimal management of diabetic bone fragility demands integrated, goal-directed therapy that accounts for glycemic safety, skeletal effects of glucose-lowering drugs, comorbidities, and overall fracture risk. Individualized treatment selection is essential to improve outcomes in this high-risk population.

NSS33

THE AI LANDSCAPE IN BONE HEALTH 2026: FROM MULTIMODAL MODELS TO CLINICAL AGENTS

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Artificial intelligence (AI) is increasingly embedded within clinical practice and advances in computer vision and large language models have moved the field of clinical AI from experimental exploration toward tools that are beginning to demonstrate real-world clinical utility. In bone health and osteoporosis care, these developments offer the prospect of robust opportunistic screening, and potential support for complex clinical decision-making.

Despite this promise, the translation of AI into routine osteoporosis practice presents challenges. This presentation examines the methodology behind current deployment of AI in osteoporosis including ambient voice technology, computer vision tools and clinical decision-support systems. We will highlighting the key issues of generalisability, bias, explainability, clinical validation and where they sit in clinical workflows.

Attendees will gain a balanced understanding of how these technologies can be responsibly evaluated and adopted, with an emphasis on safety, transparency, and alignment with clinical priorities.

It will not be long before the majority of consultations incorporate the use of AI in some form. It is vital that we, as clinicians and academics, understand these tools and the way they influence the care of our patients.

Disclosures: *NF consults for DocHQ, an AI Physio company.*

NSS34

CURRENT ML MODELS FOR PREDICTING FRACTURE RISK – DO THEY MEET THE CLINICAL NEED AND IF NOT THEN WHAT ARE THE NEXT STEPS?

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This talk will discuss machine learning models for fracture prediction, synthesising evidence on model performance, calibration, transparency, and clinical readiness. We will place these models in context relative to established tools and will highlight methodological challenges that must be addressed in the view of the clinician before widespread deployment:

The last decade has seen publication of a number of ML models for prediction of fracture risk, including models with AUCs of 0.8 to 0.9 for osteoporotic fractures or hip fracture specifically.: Most studies aimed at covering the whole population over a certain age, while others focus on specific groups or circumstances. The time perspective for outcomes varies with some models being focused on imminent risk and others on longer term risk. For most models, extensive validation in other countries or ethnic groups is available only to a small extent or not at all. Hence, performance as presented reflects a best-case scenario. Accurate calibration to other populations is essential and clinicians will likely find models easier to interpret and implement if at least the main features can be inspected. Data imbalance is a technical challenge where severe class imbalance can bias models towards the majority class i.e. person who do not sustain a fracture and this has been approached by different mitigation steps in the models.

As clinicians, we may have failed to accurately stipulate acceptable sensitivity and specificity goals. Moreover, these will vary depending on the organisation of the clinical path, e.g. directing patients to DXA or directing patients directly to treatment without DXA. Directions for future research to best meet the clinical need will be discussed.

Disclosures*: BA contributed to the clinical development of the Bonebot/ Flamingo tool for automated detection of vertebral fractures and has in the past held research grants and consulting from UCB, Novartis, Amgen, Pharmacosmos and Kyowa-Kirin. He does not receive royalties and has no patents*

NSS35

ENSURING SAFE, EQUITABLE, AND REGULATED AI IN OSTEOPOROSIS CARE

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Artificial intelligence (AI) has the potential to transform osteoporosis care by improving early identification of at-risk patients, streamlining clinical pathways, and enhancing the efficiency of healthcare delivery, with possible downstream cost benefits. However, these benefits can only be realised if AI tools deployed in clinical practice are safe, effective, and cybersecure.

Regulation plays a critical role in ensuring that AI-based systems meet these requirements. This presentation will provide an overview of the core regulatory frameworks that apply to medical devices, including software and AI-enabled technologies. It will explain how these frameworks are designed to assure safety, performance, and ultimately deliver clinical benefit. We will touch on core components of the regulatory process including clinical evaluation, risk management, and post-market surveillance. In parallel, the talk will outline what healthcare providers and purchasers should consider when procuring AI tools for osteoporosis care.

Finally, we will also address AI-specific challenges that have particular regulatory relevance, including model retraining, risks of bias, and performance drift following deployment. To conclude, we will examine how regulatory frameworks are evolving to better accommodate AI-based medical devices, highlighting areas of ongoing development as well as unresolved grey-areas that continue to present challenges for developers, regulators, and adopters.

NSS36

KIDNEY HEALTH IN HYPOPARATHYROIDISM

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Parathyroid hormone (PTH) is a key regulator of kidney function and the lack of the hormone, typical in hypoparathyroid conditions, causes excessive secretion of calcium in the urines.

Kidney complications are frequent in hypoparathyroidism (HypoPT) with 36-40% of patients experiencing hypercalciuria and 10-31% experiencing nephrocalcinosis or nephrolithiasis. The risk of chronic kidney disease (CKD) is generally reported to be 2-3 times greater than controls in patients with surgical HypoPT. These problems can be the consequence of PTH deficiency combined with high-dose calcium and active vitamin D treatment.

The treatment with PTH peptides has the potential to solve the problem. In controlled clinical trials neither PTH 1-34 nor PTH 1-84 appeared to be active in achieving an effective decrease in calciuria levels, but the long-acting Palopegteriparatide showed a powerful effect in controlling urinary calcium levels both in normocalciuric and hypercalciuric patients. Potential mechanisms playing a role in the effects are both calcium reabsorption at the tubular level and the increased glomerular filtration rate through an effective renal plasma flow.

Also the calcium sensing receptor antagonists Encaleret appears to be active in reducing urinary calcium levels in hypercalciuric patients affected by the congenital autosomal dominant hypoparathyroidism type 1 (ADH1). Similarly the PTH receptor selective agonist Eneboparatide appears effective in the control of calciuria in hypoparathyroid patients.

Normalization of kidney function is one of the main chronic complications of HypoPT, representing a major target in the future development of drugs for hypoparathyroidism. In this presentation the physiopathology of PTH regulation of kidney function will be presented and discussed in depth, with a critical discussion on how the new pharmacological agents developed for hypoparathyroidism will contribute to the solution of the problem.

NSS37

BONE HEALTH IN HYPOPARATHYROIDISM

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Parathyroid hormone (PTH) is a key regulator of bone remodeling and the insufficient or lack of secretion of the hormone is accompanied by a reduced bone turnover.

Decreased biomarkers of both bone formation and resorption have been reported in hypoparathyroidism (HypoPT), with variable values of bone mineral density (BMD) depending on sex and age. Abnormalities in bone microarchitecture have also been described in hypoparathyroid patients. The bone tissue is supposed to exhibit a high stifness and a reduced elasticity with increased microcracks and fractures. An increased fracture risk, mainly at the vertebral level, has been reported in hypoparathyroid patients.

Chronic treatment with PTH peptides appears to improve the bone structure in HypoPT, while increasing bone turnover. The question still pending is regarding the long-term effects of these therapies on bone turnover and fracture risk, mostly in hypoparathyroid patients with osteopenia and osteoporosis.

The recent controlled clinical trials with different active molecules appear to do not negatively affect bone health in hypoparathyroid patients. However, long-term studies are missing and prospective evaluation of the treated populations are certainly needed.

In this presentation the physiopathological role of PTH in bone remodeling will be presented and the results obtained with PTH peptides, Encaleret and Eneboparatide in controlled clinical studies in hypoparathyroid patients will be critically discussed with a particular attention to the need of collecting clinical data in the future real life analyses.

NSS38

HIP BIOMECHANICS AND FRACTURE RISK: BEYOND BONE DENSITY

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Osteoporotic hip fractures are a leading cause of morbidity and mortality in older adults, with fracture risk determined not only by bone mineral density but also by the biomechanical characteristics of the hip. Hip biomechanics play a critical role in load transmission, energy absorption, and structural resistance to fracture during daily activities and falls. Geometric parameters of the proximal femur, including femoral neck length, neck–shaft angle, cortical thickness, and hip axis length, influence stress distribution and bending moments acting on osteoporotic bone. Alterations in these parameters, often exacerbated by age-related bone loss and changes in gait and muscle function, increase susceptibility to fracture under low-energy trauma. In addition, fall mechanics, impact direction, and the ability of surrounding soft tissues to dissipate energy further modulate fracture risk. Emerging biomechanical models and finite element analyses demonstrate that local stress concentrations in the femoral neck and intertrochanteric region may better predict fracture risk than bone mineral density alone. Understanding the biomechanical determinants of hip fragility provides a more comprehensive framework for fracture risk assessment, personalized surgical planning, implant design, and local bone-strengthening interventions.

NSS39

MANAGEMENT OF HIP FRACTURES – THE GERMAN APPROACH

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Proximal femoral fractures caused by osteoporosis represent a major clinical and socioeconomic challenge in aging populations. Optimal management requires timely surgical intervention, as **„Time to Surgery** is considered a sensitive quality indicator of the treatment process, reflecting patient-related factors, organizational structures, and interdisciplinary coordination within healthcare systems. Delays to surgery are associated with increased morbidity, mortality, and reduced

functional outcomes. A wait time of 24 hours may represent a threshold defining higher risk. In response to these concerns, a special need for action was identified by the German Gemeinsamer Bundesausschuss (G-BA), emphasizing the importance of standardized care pathways and quality assurance measures for hip fracture management. Due to legal requirements, sugery of hip fracture has be performed within 24 hours after the fracture occured. Evidence-based surgical treatment options for proximal osteoporotic femoral fractures include internal fixation techniques, such as intramedullary nailing and screw-based systems, as well as joint replacement procedures, particularly hemiarthroplasty and total hip arthroplasty, depending on fracture pattern, bone quality, and patient characteristics. Current evidence supports procedure selection tailored to fracture stability, biological age, and functional demands, with early surgery as a central determinant of outcome quality. Implementing guideline-conform surgical strategies combined with optimized perioperative logistics is essential to improve patient outcomes and meet established quality indicators in the care of osteoporotic proximal femoral fractures.

NSS40

LOCAL BONE AUGMENTATION TO PREVENT HIP FRACTURES

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Osteoporotic fragility fractures have emerged as a significant and unresolved burden on healthcare systems worldwide. While pharmacological therapies are known to lower the risk of such fractures, important gaps persist in clinical management, particularly for individuals facing an immediate risk of hip fracture, due to the delayed onset of therapeutic benefit after treatment initiation. This limitation highlights the need for alternative strategies, including localized hip interventions capable of providing rapid mechanical reinforcement. The presentation aims to outline a procedure that improves the biomechanical strength of the proximal femur and stimulates new bone formation. The local osteo-enhancement procedure (LOEP) is a minimally invasive surgical technique designed to treat bone voids in the proximal femur, arising from osteoporotic changes of the bone. Following preparation of voids within the femoral neck and intertrochanteric areas, a resorbable, triphasic, calcium-based implant material, is introduced into the target site. Clinical investigations have shown predictable resorption of the implant, simultaneous replacement with native bone, and a significant and sustained increase in areal bone mineral density (aBMD). Overall, completed clinical studies indicate that the procedure has an acceptable safety profile and may contribute to a reduced risk of hip fragility fractures.

NSS41

UPDATE IN DEGENERATIVE JOINT DISEASE OF HAND, OSTEOARTHRITIC HAND

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Introduction

Hand osteoarthritis (HOA) is a prevalent degenerative musculoskeletal condition that primarily affects the small joints of the hands and wrists, leading to pain, stiffness, decreased grip strength, functional limitations in daily activities, and reduced quality of life. HOA is more common with advancing age and disproportionately affects women in older age groups, with radiographic changes seen in many individuals but symptomatic disease in a smaller proportion of the population.

Objective

This presentation aims to synthesize recent evidence from systematic literature on updates in non-pharmacological and pharmacological approaches to the management of HOA, incorporating new guidelines, systematic reviews, and clinical trials published over the last years. Emphasis is placed on integrating evidence-based recommendations with patient-centric perspectives.

Methods

We conducted a structured literature search primarily in the PubMed database and online repositories of clinical guidelines, focusing on English-language publications from the last years that provide updated recommendations or clinical evaluations in HOA care. Core sources included updated management guidelines such as the 2019 ACR/Arthritis Foundation recommendations and the 2022 ESCEO expert working group report, which align US evidence-based practice with a European approach that emphasizes patient preferences.

Earlier foundational guidelines, including the EULAR recommendations for HOA management and EULAR diagnostic criteria (2009), were referenced where current updates did not alter the original evidence base or recommendations. The aim was to integrate these sources to provide comprehensive, evidence-based guidance on optimal HOA management strategies.

Results (Updated with New Literature)

Available guidelines and consensus recommendations on Hand OA recommend exercises as part of current best practice for Hand OA management. Also, the combination of splints for thumb base OA, orthoses and exercise regimens reduce pain and improve functionality in the short and long term and prevent/correct lateral angulation and flexion deformity. There is strong evidence to support the recommendation of strengthening, stretching, and joint mobility exercises for the management of hand OA. These recommended exercises, however, lacked specific details regarding the type and dosage (frequency, intensity and time) for optimal uptake, which therefore need further establishment through research.

Additional recent evidence further clarifies treatment effects:

- A recent 2024 systematic review on the efficacy and safety of

non-pharmacological, pharmacological and surgical treatments confirms that hand exercises and thumb orthoses have moderate- to low-certainty evidence for improving pain and function, while assistive devices contribute to moderate long-term functional improvement. It also highlights a continuing lack of strong evidence for interventions that significantly improve grip strength and emphasizes the need for better-powered trials and OA subtyping.

• A qualitative study on task-shifting between rheumatologists and occupational therapists shows that interprofessional care models are evolving, with occupational therapists taking on expanded roles in clinical assessment and functional management of hand OA, reflecting changes in care delivery and potential impacts on rehabilitation pathways.

• A 2025 systematic review of the prognosis of pain and function in individuals with hand and thumb base OA reveals that, over a 10-year period, hand function and grip strength tend to deteriorate moderately, while average pain changes are smaller; baseline pain severity and comorbidities such as diabetes may influence symptomatic trajectories.

• The narrative perspective "A firm grip on hand OA: 20 years of progress and prospects" underscores how the field has matured over the past two decades, recognizing phenotypic heterogeneity, standardized outcome measures, and sustained challenges in developing truly disease-modifying therapies despite progress in understanding inflammatory and mechanical contributors to pathology.

• A comprehensive review of molecular mechanisms, randomized controlled trials, and future targeted treatment strategies highlights emerging biological insights—such as joint-specific inflammatory pathways, genetic and epigenetic factors, and the gut–joint axis—and notes that while several targeted pharmacologic agents (e.g., TNF/IL-6 inhibitors) show limited clinical success, this work provides a framework for future precision therapeutics.

Hand exercise recommendations for Hand OA management (updated):

1. Exercises to improve hand function and muscle strength, and to reduce hand pain—such as strengthening, stretching, and joint mobility exercises—should be considered for every patient with hand OA. These exercises can be prescribed as home-based or supervised weekly exercises over several weeks. Grade of recommendation (A) — Strength of recommendation (Strong)

2. Hand strengthening exercises should be considered for hand OA management due to their clinically beneficial effect on hand pain and grip force. Grade of recommendation (B) — Strength of recommendation (Strong)

3. Exercise in combination with orthosis improves hand pain and functionality in both the short and long term. Grade of recommendation (B) — Strength of recommendation (Strong)

4. Education regarding an exercise regimen including muscle strengthening and range-of-motion exercises, in combination with joint protection techniques, should be recommended for all patients with HOA. Grade of recommendation (GCP / Good Clinical Practice based on expert opinion) — Strength of recommendation (Weak)

5. Advise people with hand OA to exercise as a core treatment irrespective of age, comorbidity, pain severity, or disability. Exercise should include local muscle strengthening and general aerobic fitness. Grade of recommendation (GCP / Good Clinical Practice based on expert opinion) — Strength of recommendation (Weak)

In pharmacological treatment of Hand OA, chondroitin sulfate among SYSADOAs has demonstrated efficacy for pain and function in some studies. Topical NSAIDs remain the first topical pharmacological choice due to safety reasons and moderate short-term functional effect; oral NSAIDs may be considered for limited use for pain relief. Corticosteroid injections show promise in acute phases, but overall require further evidence. Biologic agents to date have shown limited or no significant benefit. Conventional or biological disease-modifying antirheumatic drugs are generally not recommended, although isolated studies suggest methotrexate may have a modest long-term effect on pain in synovitis-positive subsets. PubMed

Conclusion: As a result of this literature survey, it is concluded that optimal management of Hand OA requires a combination of non-pharmacological and pharmacological treatment modalities individualized to the patient's needs. Exercise to improve function and muscle strength, alongside pain reduction strategies, should be considered for every patient. Education and training in ergonomic principles, activity pacing, and use of assistive devices should be offered to every patient. Orthoses and other supportive devices are strongly recommended components of comprehensive hand OA care.

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NSS42

UPDATE IN MUSCULOSKELETAL CONDITIONS WITH HAND INVOLVEMENT: 2-SOFT TISSUE LESIONS /NON ARTICULAR INVOLVEMENT OF HAND

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Introduction

Soft tissue musculoskeletal disorders (MSDs)/ lesions refer to regional and generalized pain conditions and describe a broad spectrum of health problems, most of them poorly defined according to diagnostic criteria and case definitions (1). Here we want to focus at regional arm/wrist/hand conditions with non-articular involvement of hand.

Purpose:

The aim is

- to present biopsychosocial risk factors, risk groups and trends, preventive/ conservative therapeutic/ rehabilitative strategies for functional health in the case of regional soft tissue lesions, and non-articular wrist/hand involvements.
- to point out the need of research to improve evidence for diagnostic, preventive, therapeutic and rehabilitative strategies for functional health in the case of regional soft tissue lesions/ complaints, and non-articular wrist-/ hand involvements.

Methods:

A systematic literature search was performed to identify all randomized controlled trials, systematic reviews, addressing risk factors and groups, prevention, conservative therapy and rehabilitation of musculoskeletal and non-articular soft tissue involvement, lesions and disorders of the hand. Using the MEDLINE, Embase, the Cochrane Library, PEDro and UptoDate.

Results:

Regional pain and disorders, nonarticular involvement of hand region, may reflect soft tissue conditions within the hand or as referred pain from a proximal region

Soft tissue lesions within the hand can be classified into benign and malignant entities. Common benign lesions/ pain conditions include tenosynovitis/ trigger finger, ganglion cysts, fasciitis/ Dupuytren´s palmar contracture, Carpal tunnel syndrome, lipomas, infections, and fibromas, while malignant tumors, such as sarcomas, are less frequent but can lead to significant morbidity (1, 2). Ganglion cysts, in particular, are prevalent among athletes and individuals engaged in repetitive hand activities (e.g. musicians), highlighting the role of occupational exposure as a bio-risk factor. Lipomas, often asymptomatic, can occur in various populations, while neuromas are frequently seen in patients with a history of nerve injuries or surgeries (3).

Common disorders with referred pain to hand from a proximal region are myofascial pain, epicondylitis, tendinopathy/ tendinitis/ tenosynovitis, enthesitis, bursitis or structural lesions/ disorders (such as hyperlaxity), neurovascular entrapmet disorders (carpal tunnel syndrome). (1, 2)

Many physical, psychosocial and work-related factors play a role in etiology and prognosis. There is a lack of evidence for the management of most soft tissue disorders with therapeutic and rehabilitative strategies. Also good prevention policy does not exist for most conditions, due to the lack of knowledge on risk factors, risk groups and trends.(1) The work-related characteristics such as vibration, repetitiveness, work posture and force can play a role as risk factors for arm/wrist/hand conditions. In forearm pain, high levels of distress and adverse psychosocial factors are associated with the onset of symptoms.(1)

Diagnostic classification of symptoms and functional capacity as well as psychosocial risk factors is crucial as the basis for selecting appropriate therapy and rehabilitation strategies:

- Medical history (questions about trauma, repetitive movements, type/location/modality of symptoms (e.g., stabbing, burning, pulling, etc.), psychosocial history)
- Physical examination (including inspection for possible injuries/ signs of synovial fluid, assessment of active/passive range of motion, ligament stability, nerve function, and palpation of space-occupying lesions, comparing both sides), and
- Imaging (ultrasound (US) for superficial space-occupying lesions (e.g., lipomas), and, if red flags are present, MRI for detailed visualization of soft tissue and nerves; X-ray for bone findings (less helpful for purely soft tissue lesions)) are essential for differential diagnosis.

There is low-level evidence on preventing work-related musculoskeletal disorders (MSDs) for participants using computers with supplementary breaks.(3) Risk groups for upper limb MSDs/ overuse are characterized by beeing overweight due to stress over functional capacity.(4) Elite musicians, in particular, appear to be at risk for overuse injuries similar to elite athletes (point prevalence for musicians of playing-related musculoskeletal disorders up to 47%, with the hand and wrist being among the most frequently affected areas, and lifetime prevalences up to 89%). (5, 6) Strategies to adapt individually suitable instrument positions seem to minimize strenuous and potentially unhealthy compensation movements of the left upper extremity in violin playing musicians (7).

While initial indications of helpful strategies from small clinical studies exist, but evidence is still lacking, particularly for the frequently occurring overuse syndromes, the following points should be investigated in randomized controlled trials in at-risk groups such as adolescent and adult elite athletes and elite musicians:

- Preventive strategies (e.g., warm-up, cool-down, ergonomic exercise/ training, and breaks) and
- Therapies (e.g., manual therapies, device-assisted therapies, laser therapy, shockwave therapy, psychotherapeutic techniques, and newer therapeutic strategies including augmented reality training).

Conclusion:

Work-related physical and psychosocial factors can play a role as risk factors for soft-tissue arm/wrist/hand conditions. There is low-level evidence for supplementary breaks to prevent work-related MSDs. Because the study results only relate to specific professions, they cannot be representative for the general population.

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NSS43

THE NEUROLOGICAL SYMPHONY: RHYTHMIC AUDITORY-MOTOR COUPLING AND DUAL-TASK TRAINING EFFECTS OF EURHYTHMICS ON BALANCE AND EXECUTIVE FUNCTION

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Geriatric population requires physical exercises and various interventions that help to improve their balance, coordination, range of motion, strength, endurance and gait function.

Dalcroze Eurhythmics is a music education method that teaches musical understanding through body movement, rhythm, and physical expression. Neurologic music therapy, a crucial complementary therapy, is currently used in the rehabilitation of movement, speech, and cognition and is accepted in the medical field.

Various biofeedback modalities, including auditory, visual, tactile, and vibrotactile feedback, have been used to optimize motor learning. Among these, rhythmic auditory stimulation (RAS) is widely applied because regular rhythmic cues can synchronize motor and sensory regions. RAS uses an external rhythm (music) to facilitate internally generated rhythmic movements, such as walking. Its effectiveness is supported by strong neuroanatomical connectivity between auditory and motor areas and by the auditory system's faster stimulus processing compared to visual or tactile inputs.

Dual task training can be defined as performing two activities simultaneously together with coordination. Dual-task training with RAS—which combines rhythmic movement with cognitive tasks—has been shown to improve balance, gait, and executive function in older adults, while also reducing fall risk. It enhances both physical stability and cognitive flexibility by engaging motor and cognitive systems simultaneously.

NSS44

THE MOVING BODY: DEVELOPING A SCALABLE AND SAFE DALCROZE PROTOCOL FOR OLDER ADULTS WITH VARYING COGNITIVE AND PHYSICAL LIMITATIONS IN RESIDENTIAL CARE

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As the global population of older adults in residential care increases, there is an urgent need for non-pharmacological interventions that address the "whole person, "integrating physical, cognitive, and social well-being. While traditional exercise programs often struggle with high heterogeneity in resident ability, **Dalcroze Eurythmics (DE)** offers a uniquely adaptable solution by integrating music and movement to stimulate the perception-action loop. This presentation introduces a specialized, scalable Dalcroze protocol designed to bridge the gap between clinical effectiveness and the practical constraints of long-term care environments.

The proposed DE protocol focuses on three core pillars:

- **Safety & Accessibility:** Utilizing seated or supported movement sequences that accommodate residents with restricted mobility, such as those with musculoskeletal conditions or high fall risk.
- **Cognitive Enrichment:** Incorporating rhythmic "reflection-in-action" tasks that support executive function, dual-task performance, and procedural memory, which are critical for residents with mild-to-moderate dementia.
- **Scalability in Care Settings:** Designing sessions that can be delivered in group circles to maximize social connection while requiring minimal specialized equipment, allowing for seamless integration into existing institutional routines.

Evidence from clinical collaborations indicates that regular DE practice can reduce fall rates by more than **50%** and induce positive structural changes in the brain. By emphasizing improvisation and joy over rigid physical output, this protocol transforms therapeutic intervention into a meaningful social experience. Attendees will gain practical insights into implementing a "Buy One, Get One Free" approach that intercepts physical decline while simultaneously fostering cognitive resilience and emotional flourishing in older adults.

NSS45

BEYOND FALLS: ASSESSING THE IMPACT OF DALCROZE EURHYTHMICS ON QUALITY OF LIFE, SOCIAL ENGAGEMENT, AND CARE HOME SERVICE COST-EFFECTIVENESS

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Background: Cognitive and functional decline in care home residents often leads to social isolation, decreased Quality of Life (QoL), and rising institutional costs. While exercise programs are traditionally implemented for fall prevention, the holistic benefits of rhythmic, music-based interventions are frequently undervalued. Dalcroze Eurhythmics—a method integrating music, rhythm, and physical movement—offers a multidomain approach to preserving **Intrinsic Capacity (IC)** by simultaneously engaging the locomotor, cognitive, and psychological domains.

This presentation will discuss the implementation of a structured Dalcroze Eurhythmics program within residential care settings. Moving beyond traditional gait and balance metrics, the research utilized a mixed-methods approach to assess: (1) **Psychosocial Impact:** changes in social engagement and loneliness scales; (2) **Functional QoL:** patient-reported outcomes regarding independence and mood; and (3) **Economic Viability:** a cost-effectiveness analysis of service delivery versus long-term care requirements (e.g., reduced medication for agitation and lower injury-related hospitalizations).

The preliminary data suggest that Dalcroze Eurhythmics significantly enhances social cohesion among residents, creating a shared rhythmic "language" that mitigates isolation. Participants demonstrated improved executive function and "purposeful movement," which translated to higher QoL scores compared to sedentary control groups. Most notably, the intervention proved cost-effective; the initial investment in trained practitioners was offset by a measurable reduction in the utilization of "as-needed" (PRN) psychotropic medications and a decrease in the intensity of caregiver assistance required for daily mobility.

Regarding the cost effectiveness: the technique has helped to:

Reduce "Agitation" Costs: Linking rhythmic engagement to lower levels of sundowning and restlessness, which reduces staff "one-to-one" time.

Functional Longevity: Every month a resident maintains their ability to transfer or walk independently saves the facility significant costs in mechanical lift usage and skin integrity management.

In summary, endorsing the "Music-Brain-Body" link, Dalcroze Eurhythmics represents a potent, multidomain intervention that transcends basic fall prevention. By integrating music and rhythm into clinical care, facilities can preserve the intrinsic capacity of residents while improving the social fabric of the care home environment. It also highlights the role of group rhythm in reducing the "silent epidemic" of loneliness in care homes, endorsing the social capital gains.This evidence-based approach advocates for the inclusion of rhythmic interventions as a standard, cost-effective component of holistic geriatric care.

NSS46

INTRODUCTION: THE NEED FOR PRAGMATIC APPROACHES FOR PATIENTS AT RISK

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The onset of sarcopenia with advancing age results in a decline in strength and function and contributes to clinically important outcomes, including disability, an increased risk of falling and higher mortality1. The prevalence of sarcopenia estimated from 10 to 16% of elderly population worldwide2, has been reported in higher frequency in several rheumatic diseases, and depends on definition used3. Definition, in terms of developing evidence-based diagnostic limits of lean mass and/or muscle strength capable of identifying persons at risk for mobility disability and related endpoints is an ongoing effort from relevant groups of professionals. The Global Leadership Initiative in Sarcopenia (GLIS), has proposed a conceptual definition for sarcopenia, including muscle mass, muscle strength and muscle-specific strength as “components” of sarcopenia, leaving impaired physical performance as an “outcome”, more than a component1. Operational definition will require establishing cut points for lean mass and strength assessments for different populations4.

Therapeutic approaches for prevention and treatment of sarcopenia are currently limited to nutrition and exercise modalities. Markers of a higher risk for muscle impairment in rheumatic diseases include inflammation and joint pain, physical limitations and glucocorticoids, among others3. Although some of these patients may not fulfill the current definition of sarcopenia, it would be advisable to include nutrition and exercise interventions to limit the adverse outcomes1,3.

The purpose of this Symposium is to explore the current concepts of muscular affection in patients with rheumatic diseases; to describe prevention, early detection and diagnostic approaches in patients with specific joint limitations as well as to propose pragmatic approaches for patients at risk.

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NSS47

MUSCLE IMPAIRMENT: THE PROBLEM WITH OUTCOMES

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Muscle loss and dysfunction are highly prevalent complications of rheumatic diseases, including rheumatoid arthritis, spondyloarthritis, systemic lupus erythematosus, and inflammatory myopathies. Driven by chronic inflammation, physical inactivity, pain, glucocorticoid exposure, and metabolic dysregulation, muscle impairment in these conditions substantially contributes to fatigue, disability, falls, fracture risk, and reduced quality of life. Despite its clinical relevance, the assessment of muscle outcomes in rheumatology research remains fragmented and inconsistent.

Studies of muscle loss in rheumatic diseases employ a wide range of outcomes, including lean mass, muscle cross-sectional area, strength measures, physical performance tests, and patient-reported function. These outcomes are often used interchangeably, with limited consideration of their construct validity, sensitivity to change, or relationship to clinically meaningful endpoints. Inflammatory disease activity further complicates interpretation, as fluctuations in inflammation and treatment response may differentially affect muscle mass and function. As a result, improvements in surrogate measures such as lean mass do not consistently translate into gains in strength, mobility, or patient-relevant outcomes.

This presentation will examine the specific challenges of outcome selection for muscle impairment in rheumatic diseases, highlighting sources of heterogeneity across disease states, treatments, and study designs. We will discuss the limitations of current approaches, including the overreliance on mass-based measures and the underrepresentation of functional and patient-centered outcomes. Emerging strategies to harmonize outcome reporting—such as core outcome sets, disease-agnostic functional endpoints, and integrated models linking inflammation, muscle function, and clinical events—will be reviewed.

NSS48

MUSCLE IMPAIRMENT: ADAPTING DIAGNOSIS TO JOINT LIMITATIONS

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Handgrip strength (HGS) measured with a hand-held dynamometer, is widely used. Simple and inexpensive, it is a biomarker for overall health, muscle function, and an indicator of future health risks. Results should be interpreted by comparing an individual's measured grip strength to cut-off reference values. These are influenced by ethnic origin, age, sex, level of education and type of activities performed1. In patients with rheumatoid arthritis HGS is a useful tool to evaluate hand disability2, an indicator of the risk of frailty3 and an instrument to evaluate muscle function4, but interpretation may be difficult for this last purpose, in patients with severe inflammation or articular damage2-4. Evaluation of muscle health in these patients beyond HGS, may include the use of SARC-F questionnaire; muscle mass measured by any available technique and probably gait speed or other functional evaluation1-4.

Rheumatic inflammatory conditions frequently cause muscle dysfunction. It tends to be worse in older patients and in those with more inflammation, joint damage and immobility. Glucocorticoids, Vitamin D deficiency and co-morbidities worsen that impact5. These factors should alert clinicians to deepen the diagnostic process and to consider nutritional and exercise modalities for a broader range of patients to limit the impact of muscle impairment.

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NSS49

MUSCLE IMPAIRMENT IN RHEUMATIC DISEASES: PRIMARY AND SECONDARY PREVENTION TODAY

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Muscle loss is linked to multiple adverse outcomes in chronic rheumatic diseases including higher mortality. Sarcopenia in rheumatic diseases is more frequent than in the general population leading to falls and fractures.

Measures to improve it are as follows:

1 Control the underlying disease as soon as possible to induce clinical remission.

2 Maintain mobility and physical activity.

3 Maintain adequate nutrition including proteins and calcium in the diet.

4 Maintain levels of Vitamin D higher than 40 ng /ml in serum, prescribing Vitamin D supplements .

5 Follow a physical activity program including active exercises and muscle strength exercises.

All these concepts may apply to patients with rheumatoid arthritis, Systemic Lupus Erythematosus and psoriatic arthritis as well as other rheumatic diseases. It is also very important to reach adequate body weight in those patients with sarcopenic obesity .

Future investigations in this field are clearly warranted .

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NSS50

MULTIMORBIDITY CONTRIBUTES TO THE OSTEOPOROSIS TREATMENT GAP

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Objective: Fractures are associated with increased risks of subsequent fracture and premature mortality. Most real-world fracture patients have multimorbidity, yet secondary fracture prevention evidence largely derives from RCTs enrolling relatively healthy individuals (2). We examined the burden of multimorbidity among fracture patients and its association with fracture prevention management and post-fracture outcomes (1,3).

Materials and Methods: Study population comprised participants from 45 and Up Study (n=267,153), a prospective cohort in New South Wales, Australia, with questionnaire data linked to hospital admissions, emergency presentations, pharmaceutical dispensing, and medical services (2005–2017). Incident fractures were identified from hospital and emergency records. Multimorbidity was assessed using the Charlson Comorbidity Index (CCI) and self-rated health. In a high-risk fracture subgroup (10-year fracture risk ≥20%), associations between multimorbidity and post-fracture osteoporosis investigation (DXA) and treatment initiation were examined using adjusted logistic regression. In the broader fracture cohort, associations with subsequent fracture and mortality were examined using Cox models (3).

Results: Over 40% of high-risk fracture patients had CCI ≥2. Despite high fracture risk, management was suboptimal: only 17% of females and 7% of males received DXA investigation, and 22% of females and 14% of males initiated treatment following fracture. Increasing multimorbidity was independently associated with lower likelihood of investigation and treatment. Compared with CCI <1, those with CCI ≥4 had markedly reduced odds of DXA referral (OR range 0.43–0.52) and treatment initiation (OR range 0.37–0.78). In the broader fracture cohort, higher multimorbidity was associated with increased risks of subsequent fracture (~30–40% higher) and all-cause mortality (~50–70% higher) (3).

Conclusion: Multimorbidity is common among fracture patients and is associated with under-investigation, under-treatment, and substantially worse post-fracture outcomes. These findings highlight the need for incorporating multimorbidity into fracture prevention guidelines.

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NSS51

MULTIMORBIDITY DOUBLE BURDEN: ELEVATED REFRACTURE RISK DESPITE HIGH MORTALITY FOLLOWING FRACTURES

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Objective: Multimorbidity (MM), defined as presence of ≥ 2 chronic conditions, affects more than half of individuals with fractures and is associated with excess mortality. However, its impact on refracture risk is unclear. This study aimed to quantify refracture risk across MM clusters and fracture sites to identify high-risk groups.

Methods: Whole-population data linkage cohort study of 2,308,583 adults aged ≥ 50 years living in New South Wales (NSW), Australia, with at least one hospital or emergency admission between 1 Jan 2005 and 30 June 2022. Among them, individuals with fractures between 1 Jan 2005 and 30 June 2021 were followed until 30 June 2022 for refracture and mortality outcomes. Fractures and 60 predefined comorbidities associated with fracture risk, falls, musculoskeletal disease or mortality were identified using ICD-10 and SNOMED-CT

codes. Latent class analysis (LCA) was used to identify MM clusters within the fracture cohort. Sex-specific Fine-Gray subdistribution and Cox proportional hazards models estimated refracture and mortality risk, stratified by fracture site (hip, vertebral, proximal, distal).

Results: Among 335,308 individuals with fractures, 31.2% were men (mean [SD] age, 76.3 [10.7] years) and 68.8% were women (77.4 [10.7] years). LCA identified six clusters in both sexes: five MM clusters (cardiovascular, cardiometabolic, geriatric, cancer, mental health; median comorbidity count: 4-13) and one low MM cluster (median count: 0). When compared to the general NSW populaton risk of incident fracture and death, all clusters were associated with increased refracture risk (HR range: 2.04-2.84 in men, 1.44-2.05 in women) despite substantial competing mortality (HR range: 1.47-4.51 in men, 1.07-3.07 in women). The mental health cluster had the highest refracture risk, while distal fractures were associated with higher refracture risk due to lower mortality.

Conclusion: Multimorbid individuals with fractures remain at substantial risk of refractures despite elevated mortality, particularly those with mental health conditions and distal fractures. These findings highlight the need for targeted secondary fracture prevention in MM populations, especially for non-hip non-vertebral sites that are not traditionally considered.

NSS52

RISK STRATIFICATION FOR IMMINENT SUBSEQUENT FRACTURES: A DEEPHIT APPROACH USING ADMINISTRATIVE HEALTH DATA

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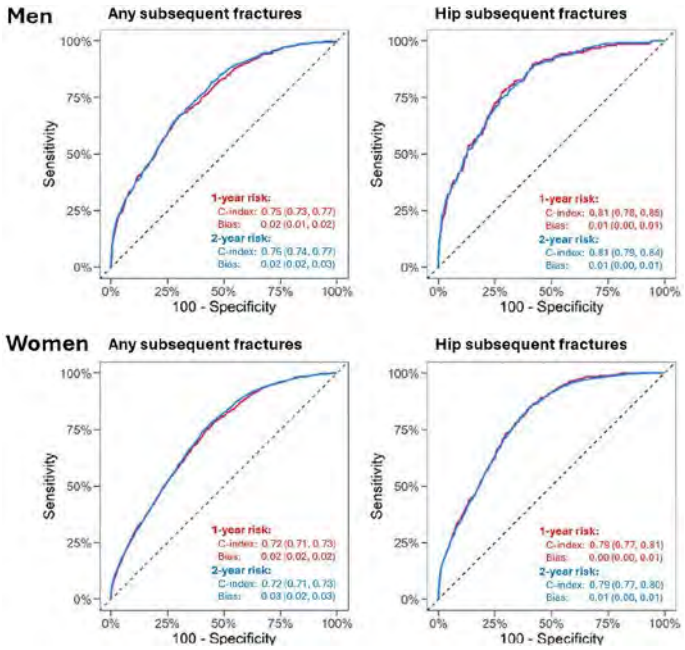
Early identification of patients at risk of subsequent fractures is crucial for optimising post-fracture care, particularly given the emerging evidence on imminent fracture risk. . We developed and validated a deep learning model to predict the 1- and 2-year risks of subsequent hospitalised fractures using routinely collected administrative health data.

This statewide population-based cohort study included 269,294 adults in New South Wales, Australia, born on or before 01 January 1950, who sustained an incident fracture between 2005 and 2017 and were followed through 2022. Fractures and 65 predefined chronic diseases related to fractures and mortality were identified using the ICD-10 codes recorded within 5 years of the index fracture. We used *DeepHit* approach to predict the risk of imminent subsequent fracture, accounting for complex non-linear data and competing mortality risks. Model performance was assessed using discriminative and calibration analyses.

Over a median follow-up of 5 years (IQR: 1.5-8.6), 13,358 men and 46,222 women were admitted for a subsequent fracture, yielding the incidence of 31.2 (95% CI: 30.6-31.7) and 42.9 (42.5-43.3) per 1,000 person-years, respectively. Subsequent hip fracture incidence was 5.3 (5.1-5.4) and 8.0 (7.9-8.1)/1,000 person-years in men and women, respectively. Predictors included age, index fracture site, prior fractures or falls, and 1,870 ICD-10 codes of the predefined chronic diseases. Neither BMD nor weight was included. The model showed strong discrimination and calibration for predicting subsequent fractures at any site and hip (Figure). For 1-year risk of subsequent hip fractures, the C-indices were 0.81 (95% CI: 0.78-0.85) in men and 0.79 (0.77-0.81) in women; and bias was 0.01 (0.00-0.01) in both sexes. For 1-year risk of any subsequent fractures, the C-indices were 0.75 (0.73-0.77) and 0.72 (0.71-0.73) in men and women with biases of 0.02 (0.01, 0.02) and 0.02 (0.02, 0.02), respectively.

Our model accurately identified individuals at imminent risk of subsequent fractures using routinely collected administrative health data, highlighting its potential for automated risk stratification within the healthcare system.

Figure 1. Performance of the *DeepHit* Model for Predicting Imminent Risk of Subsequent Fractures using Routinely Collected Administrative Health Data



NSS53

LOW-DOSE RADIOTHERAPY IN DEGENERATIVE MUSCULOSKELETAL DISORDERS: FROM RADIOBIOLOGICAL PRINCIPLES TO CLINICAL PRACTICE

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Objective:

Low-dose radiotherapy (LDRT) is increasingly recognized as a therapeutic option for patients with certain degenerative musculoskeletal disorders, particularly those that do not respond to conventional treatments. This presentation aims to review the radiobiological and pathophysiological mechanisms underlying LDRT's anti-inflammatory and immunomodulatory effects and to translate this knowledge into clinical practice.

Material and Methods:

This presentation is based on a narrative review of the available radiobiological and clinical evidence supporting the use of LDRT in degenerative and inflammatory musculoskeletal conditions, following the European treatment protocols and its indications. A review of the

mechanisms by which LDRT modulates inflammatory pathways, immune cell activity and microvascular processes at the joint and periarticular level has been conducted, along with the practical aspects of treatment delivery, including dose, fractionation schedules and modern radiotherapy techniques.

Results:

LDRT, typically 3-6 Gy in 0.5-1.0 Gy fractions, demonstrates anti-inflammatory and immunomodulatory effects that translate into pain relief and functional improvement in selected patients. Current clinical indications include osteoarthritis, periarticular soft tissue disorders, enthesopathies, tendinopathies, trochanteric pain syndrome, plantar fasciitis and degenerative disorders of the hand. Modern treatment planning and delivery techniques allow accurate targeting of the affected structures while minimizing exposure to surrounding tissues. The incidence of acute and late adverse effects is minimum, and the theoretical risk of radiation-induced malignancies is considered extremely low with the doses currently used.

Conclusions:

LDRT is a safe and effective therapeutic option with a favorable risk-benefit profile for carefully selected patients with degenerative musculoskeletal disorders that should be considered as part of a multidisciplinary therapeutic approach.

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NSS54

BEYOND CONVENTIONAL THERAPIES: A RHEUMATOLOGIST'S PERSPECTIVE ON THE MANAGEMENT OF COMPLEX AND REFRACTORY PATIENTS

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Objective:

To review the inflammatory pathophysiology of osteoarthritis and degenerative processes and establish rigorous selection criteria for identifying patients who may benefit from low-dose radiotherapy (LDRT) based on imaging tests findings and biomarker analyses.

Material and Methods:

Narrative review of current evidence on the role of inflammation in osteoarthritis, including inflammatory mediators (IL-1β, IL-6, TNF-α), serum and synovial biomarkers and imaging studies identifying active inflammation process. Clinical and preclinical studies on LDRT in osteoarthritis were analyzed, evaluating its efficacy during the inflammatory phase. A practical framework was established to identify refractory patients based on clinical, radiographic, and laboratory criteria.

Results:

Osteoarthritis is characterized by chronic low-grade inflammation mediated primarily by the innate immune system, with involvement of proinflammatory cytokines, chemokines, and growth factors that establish an imbalance between anabolic and catabolic processes. LDRT (typically 3-6 Gy in 0.5-1.0 Gy fractions) exerts anti-inflammatory effects through macrophage polarization, reduction of proinflammatory cytokines (IL-17, IL-4), and systemic modulation of immune cells. Recent studies demonstrate significant pain reduction with sustained benefit at 8-10 weeks, with 72-80% of patients showing clinical improvement. Imaging modalities, particularly contrast-enhanced MRI and ultrasound, can identify active synovitis and guide patient selection. Refractory patients typically present with moderate-to-severe persistent pain after >6 months of conservative therapies (exercise, NSAIDs, intra-articular injections), radiographic evidence of structural changes and signs of active inflammation on imaging studies.

Conclusions:

LDRT represents a noninvasive and effective therapeutic option for patients with refractory osteoarthritis, particularly during the active inflammatory phase. Rigorous patient selection through clinical criteria, imaging studies demonstrating synovitis, and emerging inflammatory biomarkers is fundamental to optimize outcomes. This evidence- based multidisciplinary approach allows identification of ideal candidates who have failed to conventional therapies but are not surgical candidates or prefer noninvasive options, especially in elderly populations where the safety profile of LDRT is favorable.

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NSS55

BUILDING CLINICAL EVIDENCE: PRELIMINARY RESULTS FROM THE FINGERT AND TROCANTERT STUDIES

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Objective:

To present preliminary results from two prospective observational studies evaluating the efficacy and safety of low-dose radiotherapy (LDRT) for hand and finger joint pain (FINGERT) and greater trochanteric pain syndrome (TROCANTERT) in patients treated at Hospital Universitari General de Catalunya.

Material and Methods:

Two prospective observational studies were conducted. In the FINGERT study, patients with painful hand and finger osteoarthritis refractory to conventional therapy were enrolled. In the TROCANTERT study, patients with greater trochanteric pain syndrome (trochanteritis) were included. The radiotherapy protocol consisted of 3Gy delivered in 6 fractions of 0.5Gy on alternate days. Reassessment was performed at 2 months; partial responders or non-responders received a second course of 6Gy in 6 fractions of 1Gy on alternate days. Pain and functional outcomes were evaluated using the Visual Analogue Scale (VAS) and the Von Pannewitz scale, a validated 4-point scale measuring patient- assessed improvement (complete pain relief, marked improvement, slight improvement, no change).

Results:

With a median follow-up of 8 months, the FINGERT study included 92 hands. Overall response rate was 86%, with 50.8% achieving complete response. These results are consistent with published literature reporting 70% improvement rates in finger osteoarthritis treated with LDRT, with 0.5Gy fractions showing superior outcomes. The TROCANTERT study included 182 joints, demonstrating an overall response rate of 74.5%, with 43% achieving complete response. These findings align with previous studies reporting 59-64% response rates for greater trochanteric pain syndrome treated with LDRT. Mobility and pain improvements were observed in both cohorts. No significant adverse effects were recorded.

Conclusions:

These preliminary results from the FINGERT and TROCANTERT studies support the efficacy and safety of LDRT in selected degenerative musculoskeletal disorders. The response rates observed are comparable or superior to those reported in the literature, particularly for hand osteoarthritis. The two-course protocol with dose escalation for non-responders appears to optimize outcomes. These prospective data contribute to building clinical evidence for LDRT as a noninvasive therapeutic option in patients refractory to conventional treatments, supporting its integration into multidisciplinary management pathways for benign painful musculoskeletal conditions.

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NSS56

EARLY DETECTION OF VERTEBRAL FRAGILITY FRACTURES: BRIDGING THE DIAGNOSTIC GAP

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Vertebral fragility fractures are common yet frequently underdiagnosed, often identified incidentally on imaging studies performed for unrelated indications. Despite their strong association with future fracture risk and adverse clinical outcomes, many of these fractures remain unrecognized, leading to missed opportunities for timely intervention.

This educational session aims to highlight practical strategies to improve case finding and early detection of vertebral fragility fractures using imaging, bone densitometry, and emerging artificial intelligence (AI) tools. The complementary roles of opportunistic assessment on routine radiographs, CT, and MRI, as well as vertebral fracture assessment (VFA) by densitometry, will be discussed. In addition, the potential of AI-based algorithms to support automated fracture detection, risk stratification, and workflow integration will be explored.

By fostering closer integration between imaging findings and clinical decision-making, this session seeks to support clinicians in recognizing vertebral fragility fractures and promoting timely assessment and management of osteoporosis.

NSS57

OPPORTUNISTIC DIAGNOSIS OF VERTEBRAL FRACTURES USING ROUTINE CT SCANS: THE PORTUGUESE EXPERIENCE AND LITERATURE REVIEW

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Vertebral fractures (VF) are among the most common fractures in osteoporotic patients (about 50%) and consequently they are approximately five times more likely to develop an additional VF and are twice as likely to suffer a hip fracture with resulting morbidity and mortality. The mid-thoracic region and thoracolumbar junction are the most commonly affected areas and often lead to spinal kyphotic deformities which predisposes to loss of balance, muscle fatigue, degenerative changes of intervertebral joints, restrictive lung disease and further sedentarism/immobilization.

Most radiologists frequently miss or do not report VFs when imaging is requested for an alternative clinical indication and so, that is a missed opportunity to improve the burden of osteoporotic fractures.

The imaging modalities to identify VF are plain films (anteroposterior and lateral projections), CT, MRI (STIR sequence) and bone scintigraphy.

During one year, in a tertiary hospital with an already implemented Fracture Liaison Service (FLS) programme, 2 imagiologists prospectively analysed 430 thoracic, abdominal and pelvic CT scans performed for other diagnostic purposes, in order to identify VF. Two hundred and six patients (48%) were identified with VF, 74 patients (36%) were eligible for osteoporosis management and 68 patients (33%) died during the data collection; these were significantly older (84 vs. 75 years, $p < 0.01$) and more frequently had ≥2 VF (47% vs. 28%, $p = 0.02$). Twelve patients (16%) had a previously known fragility fracture and had never been on anti- osteoporotic drugs.

The Portuguese work has shown that within one year of opportunistic CT-scan evaluation, a vulnerable population could be identified for osteoporosis management and fracture risk reduction intervention measures. It also helped to understand that untreated and undiagnosed VFs can significantly impact on a patients quality of life and life expectancy. Inappropriate terminology in the CT reports may be confusing and non-diagnostic, so basic education programmes delivered to radiologists could help to improve diagnosis leading to early detection and treatment of VF.

More recently, VF detection algorithms are being developed to work in a real-life setting and show promising good sensitivity and specificity; this AI technology can help to improve the efficiency of the FLS.

NSS58

ASSESSING QUALITY OF LIFE AFTER VERTEBRAL FRACTURE: THE VALUE OF THE PORTUGUESE-VALIDATED QUALEFFO-41 OVER GENERIC INSTRUMENTS

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Osteoporotic vertebral fractures are common, frequently under-recognized, and associated with a substantial and persistent burden that extends beyond pain alone. They can lead to impaired mobility, reduced physical function, sleep disturbance, fatigue, loss of independence, and emotional distress, with significant impact on patients' daily activities and social participation - dimensions that are not always captured by generic health status tools. This session will highlight how vertebral fracture–specific assessment can refine the evaluation of health-related quality of life (HRQoL) and strengthen clinical decision-making in routine practice and research. Using QUALEFFO-41 as a central example of a specific measure of HRQoL, we will discuss not only the importance of addressing HRQoL, but how a disease-specific approach can improve baseline and follow-up patient evaluation, by better characterizing symptom burden and functional impact. Finally, we will briefly review other available vertebral-fracture specific assessment tools and their applicability. The overarching objective is to provide clinicians with a more precise, patient-centered framework for monitoring outcomes and optimizing individualized management in patients with osteoporotic vertebral fractures.

NSS59

CLOSING THE CARE GAP: DEFINING A SCALABLE PATHWAY TO TRANSFORM BONE HEALTH EVALUATION ACROSS HEALTH SYSTEMS

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Osteoporosis remains a major public health concern worldwide, yet significant treatment care gaps persist, contributing to preventable fractures, morbidity, and healthcare costs. A central driver of this gap is the lack of standardization in osteoporosis evaluation and assessment across clinical settings. Variability in screening practices, diagnostic criteria, fracture risk assessment tools, and thresholds for treatment initiation leads to inconsistent identification of at-risk individuals and delayed or missed interventions. Differences in laboratory evaluations for secondary causes and follow-up protocols further compound disparities in care. As a result, many patients who meet criteria for therapy remain untreated, while others receive suboptimal, or fragmented care. Inconsistent assessment frameworks undermine the continuity of care and limit the effectiveness of osteoporosis prevention strategies.

NSS60

INTEGRATING BIOLOGY, BEHAVIOR, FUNCTION, AND ENVIRONMENT: A 4-PILLAR FRAMEWORK DRIVING COMPREHENSIVE BONE HEALTH OPTIMIZATION

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A successful clinical process needs to be based upon inherent assessment and treatment algorithms. Our process, the Optimal Clinical Paradigm, consists of methods that are consistent, comprehensive, and reproducible. It begins with our 4-Pillar Assessment that engages the biological, behavioral, functional, and environmental factors that affect every patient and their bone health. Our 4-Pillar Assessment is an integrated data collection and assessment process that exists to evaluate all aspects of being human, as well as the environment in which we live. The biological pillar focuses on identifying and treating the physiological drivers of compromised bone health. Elements of this pillar include a risk factor analysis, physical assessment, appropriate laboratory and radiographic testing, and consultations with specialists, when indicated. The behavioral pillar serves as a comprehensive lifestyle and behavioral evaluation that is fundamental in identifying additional factors that promote decreased bone health and identifying blocks to patients' adherence to defined treatment care plans. This pillar is fundamental in supporting sustainable lifestyle changes that will improve overall success to selected treatment methodologies. The functional pillar evaluates a patients' functional movement, balance, and strength. A consultation with a physical therapist is scheduled to address any deficiencies. Therapists use our tailored protocol to work on muscle strengthening through weight bearing or resistance training, posture, balance, and gait training. Fall risk is evaluated and fall risk reduction techniques are utilized to educate patients regarding safe movement strategies and ergonomics, empowering them to stay active and independent while minimizing their risk of injury. The final pillar, environmental, focuses on creating a safe and supportive living environment that promotes mobility and reduces the risk of fall hazards. Perception of home safety by patients has proven to be different than their actual real living environment. We address this disparity in collaboration with occupational therapists and in-home assessments. Home modifications may be recommended, such as improved lighting, installation of grab bars, and non-slip flooring to ensure safety. Emergency contact devices may be recommended when indicated.

NSS61

MAPPING THE FUTURE: USING STRUCTURED ASSESSMENT TO GUIDE IMPLEMENTATION, DIRECTION, AND IMPACT IN BONE HEALTH CARE

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This exhaustive evaluation process translates into a Multi-disciplinary Assessment Profile or "MAP", which is used to develop a patient's Integrated Care Plan (ICP). While each plan is tailored to the individual needs of the patient, this methodology is consistent, comprehensive, and reproducible. Service lines for our program include men's bone health, women's bone health, peri-operative bone health optimization, post-fracture care, children and adolescents bone health, and athletic bone health. Despite the service line, all patients undergo the same initial evaluation, while patients perceived to be at a higher risk of fracture undergo a comprehensive multidisciplinary assessment, while patients at a low risk of fracture undergo an abbreviated multidisciplinary assessment. Incorporating comprehensive assessments and treatment modalities addresses the specific complexities of each individual patient and showcases the potential for improvement in how we care for patients throughout all facets of their lives. We believe our optimal clinical paradigm can narrow the existing treatment gap and improve patient outcomes.

NSS62

ANALYTICAL PRINCIPLES AND PERFORMANCE CONSIDERATIONS IN LC–MS/MS PROFILING OF VITAMIN D METABOLITES

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More than 50 vitamin D metabolites have been described, and growing evidence suggests that the catabolic arm of the pathway is not merely an "inactivation" route but a clinically informative and potentially biologically active axis. Beyond total 25(OH)D, quantifying 24,25(OH)₂D allows calculation of the vitamin D metabolite ratio (VMR = 24,25(OH)₂D/25(OH)D X100), which appears to better identify vitamin D deficiency and to improve clinical discrimination compared with 25(OH)D alone, including risk stratification for bone outcomes. 24,25(OH)₂D itself is increasingly viewed as biologically active, with data supporting roles in cartilage protection, fracture repair, and a protective association in bone stress injury. Clinically, 24,25(OH)₂D and VMR have become central for diagnosing idiopathic infantile hypercalcemia and, more broadly, for recognizing CYP24A1-related phenotypes, including heterozygous mutations presenting with PTH-suppressed hypercalcemia, elevated 25(OH)D and 1,25(OH)₂D even without supplementation, and an increased risk of nephrolithiasis. Metabolite profiling also offers mechanistic insight into the long-standing "vitamin D paradox" in African Americans, helping explain stronger skeletal outcomes despite lower total 25(OH)D by capturing differences in vitamin D catabolism (VMR) rather than relying on a single total 25(OH)D cut-off. Finally, earlier pharmacologic studies suggest that administering 24,25(OH)₂D may enhance calcium balance without increasing calcemia, raising questions about therapeutic applications and motivating a shift from single-analyte testing to targeted vitamin D metabolite profiling using specific methods like LC–MS/MS.

NSS63

VITAMIN D METABOLITE RATIO AS A FUNCTIONAL BIOMARKER ACROSS HEALTH OUTCOMES

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Growing evidence suggests that conventional serum 25-hydroxyvitamin D [25(OH)D] may not fully reflect functional vitamin D status. Across several complementary studies spanning older adults and adolescents, we evaluated the vitamin D metabolite ratio (VMR; 24,25(OH)D/25(OH)D) as an integrative biomarker of bone health, metabolic risk, and clinical outcomes. Using LC-MS/MS–based profiling, VMR consistently demonstrated stronger physiological relevance than individual vitamin D metabolites. In older adults, VMR showed a significant inverse association with parathyroid hormone and identified individuals at highest risk of all-cause mortality. In adolescents, while vitamin D deficiency was highly prevalent, VMR provided additional functional insight, showing sex-specific associations with biochemical osteomalacia, calcium status, and dietary calcium intake. Notably, VMR was linked to insulin sensitivity and metabolic syndrome in boys, independent of traditional markers, while no comparable associations were observed in girls, highlighting sexual dimorphism in vitamin D metabolism. Collectively, these findings position VMR as a functional, context-dependent biomarker that integrates vitamin D metabolism with endocrine, skeletal, and cardiometabolic health. Incorporating VMR into clinical and population research may improve risk stratification beyond 25(OH)D alone and inform more precise, sex-specific approaches to vitamin D–related health outcomes.

NSS64

THE IMPORTANCE OF BONE HEALTH MONITORING AND FRACTURE RISK PREDICTION IN INTELLECTUAL DISABILITY: STATE OF THE ART

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Background

Osteoporosis is common among adults with intellectual disability and often underdiagnosed due to inequities in access to screening. Despite multiple risk factors including medication use, mobility difficulties, and comorbidities often times standard diagnostic pathways, such as dual-energy X-ray absorptiometry (DXA) are not always feasible leaving individuals susceptible to increased risk of fracture and deleterious consequences impacting on their mobility and independence.

Methods

This longitudinal study analysed data across the Intellectual Disability Supplement to the Irish Longitudinal Study on Ageing (IDS-TILDA). Data included participants across 15 years (N=753 2007 {wave 1) to N=762, 2023 (wave 5)]. Outcomes examined doctor-diagnosed osteoporosis, objectively measured bone quality, DXA attendance, fracture history, and factors influencing screening access.

Findings

Doctor-diagnosed osteoporosis increased from 8.1% in wave 1 to 19% in wave 5. However, over 32% were identified with osteoporosis with a further 29.4% within the osteopenic category. Over 60% of participants reported they did not access bone health assessment (DXA) despite multiple risks. Inequity of access and lack of reasonable adjustments were among the main reasons for lack of access to DXA.

Discussion

The discordance between those with a doctor's diagnosis and those objectively identified indicates a high prevalence of missed diagnosis. Overall, these levels of poor bone quality imply compromised bone integrity and an increased risk of fracture. Lack of accessible alternative bone screening increases the overall risk of fracture and subsequent quality of life issues emphasising the importance of ensure bone health screening to avoid these consequences.

NSS65

REMS APPLICATION IN INDIVIDUALS WITH INTELLECTUAL DISABILITY

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Background

Osteoporosis remains a critical health concern within populations with intellectual disabilities, particularly due to their increased susceptibility to fragility fractures, which negatively impact quality of life and elevate healthcare burdens. Traditional methods for bone mineral density (BMD) measurement, such as dual-energy X-ray absorptiometry (DXA), face significant limitations in access and applicability, especially in residential care settings. The emergence of radiofrequency echographic multi-spectrometry (REMS) presents an opportunity to provide effective BMD assessment without the constraints of transportation or cognitive barriers associated with DXA.

REMS has already shown significant utility in adult populations, particularly those with severe motor and intellectual disabilities (SMID) residing in long-term care facilities. A recent study involving 65 adults with SMID demonstrated that REMS successfully evaluated BMD in patients unable to undergo traditional assessments. The findings revealed low BMD across participants, with mean T-scores indicative of osteoporosis, underscoring the importance of REMS in identifying high fracture risk in this vulnerable demographic. This experience emphasizes REMS's potential in enhancing osteoporosis management among individuals with disabilities.

Methods

In our project, we focused on evaluating bone and muscle health in 50 children with cerebral palsy (CP). Building on previous insights from adult populations, we utilized REMS for BMD analysis for additional assessment, ensuring a comprehensive and safe evaluation process for this pediatric group. We measured critical parameters, including serum biomarkers of mineral metabolism, muscle sarcopenia markers such as

Irisin, and indicators of neuronal damage and inflammation.

Results

Our findings revealed significant concerns regarding bone density and muscle function within the CP group, who exhibited a higher prevalence of low BMD and an increased risk of fragility fractures. Additionally, correlations between our data and physical activity metrics from wearable sensors highlighted disparities in energy expenditure and movement patterns commonly observed in children with CP.

Conclusion

Overall, this project underscores the effectiveness of REMS in assessing BMD in children with CP, illustrating its feasibility in addressing the unique challenges faced by this population. Our results emphasize the urgent need for targeted interventions to improve bone and muscle health, ultimately aiming to enhance the quality of life and minimize fracture risk in children with cerebral palsy.

NSS66

THE GLOBAL LEADERSHIP INITIATIVE IN SARCOPENIA (GLIS): A UNIFIED DEFINITION AND DIAGNOSIS OF SARCOPENIA

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Background: Age-related and disease-related muscle loss and weakness (Sarcopenia) results in poor health outcomes and monumental healthcare costs; i.e., an estimated £2.5 billion annually in UK. Since sarcopenia was defined in 1989, several different definitions have emerged that are continent specific. There has been no unified definition of sarcopenia until now. The Global Leadership Initiative in Sarcopenia (GLIS) was formed to address this issue.

Objective: This presentation will outline the background and progress of GLIS to date.

Methods: A steering committee was formed of representatives from musculoskeletal and sarcopenia societies and groups globally (Kirk et al., 2024). The full committee consisted of inviting experts from these societies and groups once approval was sought. A series of Modified Delphi studies were used to establish the conceptual and operational definitions of sarcopenia; and designated working groups were formed to establish consensus on how to identify components and outcomes of sarcopenia (e.g., tools/cutpoints for low muscle mass or tools for low quality of life).

Results: The conceptual definition of sarcopenia was published in March 2024 (Kirk et al., 2024). Key findings from 'general aspects' included that sarcopenia is a disease; from 'components' were that muscle mass, muscle strength and muscle-specific strength should be part of the definition, and that impaired physical performance is a key 'outcome'. As of January 2026, the operational definition of sarcopenia is underway by Delphi (preliminary results will be presented at the Congress). Preliminary results will also be shared from the designated working groups on muscle mass, muscle strength and health outcomes of sarcopenia (Beaudart et al 2025).

Conclusion: The GLIS represents the first of many steps to define and diagnose sarcopenia globally. GLIS will support uptake into the medical glossary and implementation into healthcare systems. In turn, GLIS will help identify sarcopenia and reduce the debilitating socioeconomic consequences of poor muscle health globally.

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Acknowledgments

The full list of GLIS members including steering committee members can be viewed here: https://www.esceo.org/glis. The society and organisation associated with GLIS members is also shown.

Disclosures

Before starting the GLIS initiative, Ben Kirk submitted a Declaration of Interest (DOI) form. This can be viewed here: https://www.eugms.org/fileadmin/images/news/2022/GLIS_Steering_Committee_Rev3.pdf.

Not listed in DOI above: Ben Kirk is an external advisor for Entelo Bio as of 2025.

NSS67

INTEGRATING IMAGING BIOMARKERS AND BIOCHEMICAL MARKERS OF SARCOPENIA INTO FRAILTY CARE PATHWAYS

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Background: Sarcopenia is characterized by the progressive loss of

muscle mass and function and is a primary driver of frailty and increased healthcare utilization globally (1). There is a critical need for objective biochemical and imaging markers to identify at-risk individuals before functional decline becomes irreversible (2). Current diagnostic pathways often rely on physical performance, yet molecular and imaging changes frequently precede clinical symptoms (3).

Objective: This presentation will provide an updated overview of current and emerging imaging and biochemical markers of sarcopenia. The presentation will also include clinical recommendations from the International Conference on Frailty and Sarcopenia Research (ICFSR) (4). Examining how these biomarker tools can be integrated into frailty care pathways can enhance early detection, enable risk stratification, and the improve monitoring of disease progression (5).

Methods: Through a review of recent basic, translational and clinical research, this presentation will evaluate the sensitivity and specificity of various modalities, including imaging techniques like DXA, MRI, and ultrasound, alongside serum-derived biochemical markers reflecting muscle protein turnover, neuromuscular junction integrity, and systemic inflammation.

Results: Recent data suggest that combining imaging biomarkers of muscle quality with specific biochemical signatures and molecular endotypes improves predictive accuracy for frailty-related outcomes compared to functional assessments alone (6). Advances in automated MRI and ultrasound protocols may allow for more precise monitoring of muscle mass in clinical settings, providing a foundation for biomarker-guided interventions that allow for more personalized, patient-centered care in community-dwelling older adults (7). Conclusion: Integrating biochemical and imaging markers into sarcopenia and frailty research is a vital step toward bridging the gap between laboratory science and clinical care. By establishing biomarkers in care pathways, healthcare systems can better operationalize frailty research, promoting improved quality of life for vulnerable elderly populations.

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NSS68

TRANSLATING RESEARCH INTO SERVICE: THE "FRAILTY IN COMMUNITY" PROGRAM – FROM SCIENCE TO REAL-WORLD CARE

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Background: Frailty affects around one in five Australians over the age of 65 years, and is associated with reduced quality of life, resilience to acute illness and survival.[1,2] Yet is often missed as, screening is not routinely captured, with the exception of assessment for aged care services.[3,4] Internationally, pilot community-based integrated models of care show promise for managing frailty, yet evidence from the Australian primary care settings remains limited.[5,6]

Objective: This presentation demonstrates how translational science informed the development of Australia's first integrated primary care program for frail and at-risk older adults, improving function and quality of life through early identification and a structured, multidisciplinary, patient-centred approach in the community.

Methods: A prospective cohort study of elderly patients referred by their GP for pre-frailty risk enrolled in a 16–24-week multidisciplinary program. Participants received coordinated psychology, physiotherapy, exercise prescription, dietary counselling, and pharmacy services delivered via home and/or clinic settings. Frailty risk, physical function, mobility, energy levels, and quality-of-life domains (physical, social, emotional, pain) were assessed at baseline and post-intervention.

Results: There were 71 patients (58% female, mean age 80 years, range 65 to 92 years) recruited into the study. Most (61%) were engaged in the home setting, the remainder in the clinic. At baseline, the mean Edmonton score was 6.3 ± 2.8. Almost a third, 31% (22/70) of participants were pre-frail and 23% were frail (16/70) based on their Edmonton scores. A majority had below-average scores for physical functioning (66%), physical limits (65%) and energy (51%). Post-intervention, 59% demonstrated improved frailty risk scores, 19% declined, and 23% remained stable. Improvements were observed across all quality-of-life domains, including physical, social, emotional well-being and pain for a majority of participants.

Conclusion: This pilot is the first to demonstrate implementation of integrated community-based care may be able to effectively reverses functional decline and maintain independence in frail older adults. Further studies examining patient selection and intervention may help optimise and expand multidisciplinary primary care models to prevent hospitalisation and optimise health outcomes in vulnerable populations.

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NSS69

STRENGTHS-BASED APPROACHES TO FRAILTY IN OLDER ABORIGINAL AND TORRES STRAIT ISLANDER ADULTS IN TWO AUSTRALIA-WIDE STUDIES

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Background: Strengths-based approaches are holistic and draw on the strengths of people, community and culture to provide a framework for growth and thriving (Fogarty *et al* 2018). Strengths-based approaches can be applied to health challenges such as frailty, which occurs at high rates and young onset in Aboriginal and Torres Strait Islander adults (Lewis *et al* 2023). The association of strengths and frailty with important social and emotional well-being (SEWB) outcomes in older Aboriginal and Torres Strait Islander peoples has not been studied, which is a critical step to inform culturally-grounded frailty care.

Objectives: This presentation provides evidence from two National Aboriginal and Torres Strait Islander Health Surveys (NATSIHS 2018-19 and 2023-23) of adults aged 45 years and older. The findings demonstrate i) the robustness of a Frailty Index (FI) and a Strengths Index (SI) across two time points; ii) the associations of FI and SI with SEWB outcomes, and; iii) that strengths moderate the association of frailty with SEWB.

Methods:

Guided by Aboriginal and Torres Strait Islander Elders (Community knowledge holders), a 56-item FI and 48-item SI were developed. The SI comprised factors considered to enhance quality of life and social and emotional well-being (e.g. secure housing, connection to Country, etc.). A composite Strengths-Frailty Index (SFI) was derived. Descriptive statistics determined associations between demographic characteristics and FI/SI. Generalised linear models and receiver operating characteristic (ROC) curves examined associations between indices and four SEWB outcomes (vitality, low distress, positive- and emotional well-being).

Results

Data for 4,697 Aboriginal and Torres Strait Islander adults (mean ± SD 58.4 ± 9.0 years, 56% women) found both FI and SI were robust across NATSIHS studies. Strengths and frailty increased with age and women had higher levels of both than men (p<.001). High Frailty/High Strengths had stronger associations with SEWB than High Frailty/Low Strengths (OR range 1.5 to 4.1, p<.001). The SFI improved area under the curve for all SEWB outcomes compared with SI or FI alone (p<.001).

Conclusion

These studies present a novel methodology to measure strengths and build on calls from Community leaders to centre strengths in efforts toward health equity.

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NSS70

FRAGILITY FRACTURES IN OSTEOPOROSIS: DIAGNOSTIC LIMITATIONS AND EARLY PREVENTION STRATEGIES

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Background

Fragility fractures are a major complication of osteoporosis, often occurring in the vertebrae, hip, humerus and radius. Despite their clinical significance, many fractures occur in patients with osteopenia, highlighting the limitations of current imaging methods in predicting fracture risk. This study aims to discuss the typical fracture patterns in osteoporosis, the limitations of current imaging techniques for fracture risk prediction and the importance of early detection and preventive strategies to reduce fracture incidence.

Material and Methods

We conducted a comprehensive review of 50 recent publications, focusing on common fracture sites in osteoporosis, the predictive performance of imaging techniques such as DXA and approaches for early identification of patients at high fracture risk.

Results

Vertebral, hip and distal forearm fractures are the most common osteoporotic fragility fractures. The standard method DXA, primarily assesses bone mineral density but often fails to identify patients at risk for fractures with osteopenia. Microarchitectural deterioration, bone quality changes and clinical risk factors contribute to fracture susceptibility, but they are not fully captured by conventional imaging. Early detection of high-risk individuals through combined assessment of clinical risk factors, imaging and emerging techniques can enable timely preventive interventions, including lifestyle modification, pharmacologic therapy and fall-prevention strategies.

Conclusion

Fragility fractures often occur even without a diagnosis of osteoporosis, highlighting the limitations of conventional imaging. Integrating early detection strategies with clinical risk assessment, fracture risk

assessment scores and preventive measures is essential to reduce fracture incidence and improve outcomes in osteoporosis.

Key words: fragility fractures, diagnostic, limitations, prevention strategies

NSS71

IMPROVING FRACTURE PREVENTION THROUGH ADVANCED DIAGNOSTIC TOOLS

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Objective

Fragility fractures are a major health concern in osteoporosis, often leading to morbidity, reduced quality of life and surgical interventions. Dual-energy X-ray absorptiometry (DXA), assesses bone mineral density (BMD), but fail to capture early microarchitectural deterioration and qualitative changes in bone, which limits their ability to identify patients at high fracture risk. This review aims to explore how advanced diagnostic tools can improve fracture risk prediction and contribute to early preventive strategies, potentially reducing the need for surgical interventions.

Material and Methods

A narrative review of 65 recent studies was conducted, focusing on three main areas: the limitations of conventional imaging modalities such as DXA in accurately predicting fracture risk, the clinical performance and potential advantages of emerging techniques including REMS in assessing both bone mineral density and bone quality, and strategies for early identification of patients at high risk for fragility fractures, including assessment of clinical risk factors.

Results

Evidence shows that fragility fractures frequently occur in patients with osteopenia as assessed by DXA, highlighting the need for more sensitive assessment of bone quality. REMS, a non-ionizing, portable and operator-independent technique evaluates both BMD and bone quality through fragility score with excellent precision (RMS-CV <0.5%), enabling detection of smaller changes over shorter intervals. Early identification of high-risk patients using REMS allows timely interventions, including pharmacologic therapy and fall prevention, which can reduce severe fracturesand potentially decrease the need for surgical management. While QCT also assesses trabecular bone and avoids superficial artifacts, it involves radiation, higher cost and limited portability, whereas REMS is radiation-free and suitable for bedside use.

Conclusion(s)

Advanced diagnostic tools like REMS can overcome the limitations of conventional imaging by detecting early bone deterioration, supporting targeted preventive strategies and potentially reducing fracture incidence and surgical interventions in osteoporosis. Integration of such technologies into clinical practice may enhance fracture prevention and optimize patient care.

Key words: fracture prevention, improvement, diagnostic tools

NSS72

FRACTURE PREVENTION IN HIGH-RISK PATIENTS: THE CLINICAL ROLE OF REMS TECHNOLOGY

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Background

Patients with chronic kidney disease (CKD) commonly develop mineral and bone disorders (CKD-MBD), resulting in impaired bone quality and increased fracture risk. Standard diagnostic tools such as dual-energy X-ray absorptiometry (DXA) offer limited information on bone microarchitecture and can be confounded by aortic calcifications and degenerative changes, which are frequent in older and nephrology patients. Radiofrequency Echographic Multi-Spectrometry (REMS) is a radiation-free technique that assesses bone status through direct analysis of raw ultrasound signals and is gaining interest for bone fragility evaluation in nephrology settings.

Materials and Methods

Recent clinical evidence on REMS performance in osteoporosis and CKD/CKD-MBD-related bone disorders was reviewed. Comparative data versus DXA were considered, focusing on diagnostic accuracy, precision, and feasibility in complex patient groups. Practical case examples were used to illustrate how REMS may support individualized monitoring and treatment decision-making.

Results

Available data indicate that REMS may mitigate several limitations of DXA, particularly in the presence of vascular calcifications and degenerative spine disease. REMS-derived parameters show strong associations with fracture risk and may provide clinically relevant information in CKD patients, including individuals receiving dialysis.

Conclusion

REMS is a promising tool to improve bone fragility assessment not only in primary osteoporosis but also in nephrology populations that are challenging to evaluate with conventional imaging. Integrating REMS into multidisciplinary pathways (geriatrics, endocrinology, orthopedics, and nephrology) may support earlier identification, better risk stratification, and more personalized prevention strategies.

Keywords: CKD, Bone Fragility, REMS

NSS73

PHYSICAL PERFORMANCE MEASURES FOR THE ASSESSMENT OF FUNCTIONAL LIMITATIONS IN OLDER ADULTS WITH VERTEBRAL FRACTURES

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This presentation will identify key Physical Performance Measures appropriate for assessing functional limitations in older adults with osteoporotic vertebral fractures, including when and why each measure should be selected.

NSS74

APPLYING AND INTEGRATING CLINICAL CARE PATHWAYS TO GUIDE PERSONALIZED EXERCISE PRESCRIPTIONS

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This presentation will apply a Clinical Care Pathway to stratify patients and guide individualized exercise prescription, using Physical Performance Measure outcomes to inform decision-making and progression, and integrate reassessment, feedback, and adherence strategies into rehabilitation planning to improve functional outcomes and quality of life postvertebral fracture.

NSS75

THE ECONOMIC BURDEN OF SARCOPENIA AND ITS IMPACT ON SOCIETAL COSTS AND QUALITY OF LIFE

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Sarcopenia is an age-related muscle disease increasingly recognized as a major public health challenge due to its strong association with disability, loss of independence, and adverse health outcomes in older adults. Beyond its clinical consequences, sarcopenia generates a substantial economic burden for healthcare systems and society, which remains insufficiently documented and often underestimated in decision-making processes. This presentation will provide an overview of the current evidence on the economic burden of sarcopenia, with a particular focus on societal costs and health-related quality-of-life impacts. Direct medical costs associated with sarcopenia, including hospitalizations, rehabilitation, long-term care, and outpatient management, will be discussed alongside indirect costs related to informal caregiving, productivity losses, and social support. The importance of adopting a societal perspective to capture the full economic impact of sarcopenia will be emphasized. In addition to economic costs, sarcopenia significantly impairs quality of life through functional decline, increased risk of falls and fractures, and reduced participation in daily and social activities. The presentation will highlight how quality-of-life outcomes can be quantified and integrated into economic frameworks. By identifying key methodological challenges and evidence gaps, this talk will underline the need for robust and standardized approaches to better estimate the burden of sarcopenia and support investment in prevention and management strategies.

NSS76

ECONOMIC EVALUATION AND HTA APPROACHES TO ASSESS VALUE IN SARCOPENIA

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While clinical efficacy and safety remain central to healthcare decision-making, cost-effectiveness analyses and Health Technology Assessment (HTA) methodologies are increasingly essential to inform sustainable access to innovation. This lecture will explore how economic evaluation complements clinical evidence by assessing the value of interventions in relation to their costs, supporting transparent and consistent resource allocation in healthcare systems.

The presentation will provide an overview of key HTA concepts and economic evaluation methods, including cost-effectiveness, and budget impact analyses, highlighting their role across the lifecycle of health technologies. Particular emphasis will be placed on early HTA and early economic modeling, which can be applied during the research and development phase to anticipate value, identify evidence gaps, and inform research priorities before definitive clinical data are available.

Sarcopenia represents a relevant and timely case study for this discussion. Despite its high and growing burden in ageing populations, through increased risk of falls, disability, hospitalization, and loss of independence, economic evidence in sarcopenia remains limited, largely due to the lack of approved pharmacological treatments and standardized care pathways. The lecture will discuss how early economic evaluation can help characterize the potential value of emerging interventions, guide trial design, and support future reimbursement and access decisions.

NSS77

LISTENING THE VOICE OF PARTICIPANTS IN SARCOPENIA RESEARCH

C. Beaudart[1]

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As sarcopenia research moves from disease characterization toward prevention and treatment, integrating the patient perspective has become essential to ensure that emerging interventions generate meaningful and sustainable value. This evolution reflects a broader shift in research and clinical practice toward patient-centered approaches, increasingly promoted by regulators, health technology assessment (HTA) agencies, and guideline developers. While traditional research has focused primarily on biological and functional outcomes, accumulating evidence indicates that these measures alone do not fully capture what matters most to people living with sarcopenia. Research exploring patient preferences—whether in terms of outcomes or treatment characteristics—has therefore become critical to better align interventional research with patients' expectations and real-world needs.

Within this evolving landscape, the development of a Core Outcome Set (COS) for sarcopenia represents an important methodological initiative currently underway. This work aims to systematically integrate the patient voice alongside clinical and research perspectives in order to define a minimum set of outcomes that should be consistently measured in sarcopenia studies. By ensuring that selected outcomes are both scientifically robust and meaningful to patients, the COS is expected to improve comparability across studies and strengthen the relevance of evidence generated for clinical decision-making and HTA.

This lecture will present current evidence on patient preferences in sarcopenia, highlight remaining gaps in the field, and illustrate how patient perspectives are being actively incorporated into ongoing research efforts—such as the development of the sarcopenia COS—to reinforce the quality, relevance, and value of future evidence generation.

NSS78

TRANSFORMING EPISODE ACCOUNTABILITY MODEL (TEAM): IMPACT ON ORTHOPAEDIC, SPINE, AND BONE HEALTH CLINICAL PRACTICE AND OPPORTUNITIES TO DRIVE OSTEOPOROSIS DIAGNOSIS AND TREATMENT

R. Roy[1]

[1]Chief Executive Officer, Spine Health Foundation, Reston, United States

Dr. Roy will cover the following key topics:

- The core components of the TEAM model
- Discuss its financial and clinical implications
- Provide an overview on the educational activities of SHF to help health care professionals and patients understand the need to diagnose and treat patients for underlying osteoporosis before any spine or orthopaedic surgery
- Key gaps in health care professional and patient education as highlighted in the surveys conducted by SHF
- Need to coordinate care across spine, orthopaedic, and bone health disciplines

NSS79

A SPINE SURGEON PERSPECTIVE ON THE NEED FOR SPINE AND BONE HEALTH OPTIMIZATION AND IMPLEMENTATION OF FRACTURE LIAISON SERVICE PROGRAMS

P. Anderson[1]

[1]University of Wisconsin School of Medicine; Co-Chair, Spine Health Foundation Spine & Bone Health Task Force, Madison, United States

Dr. Anderson will cover the following key topics:

- Gaps in spine surgeon awareness of the need to conduct perioperative spine health optimization before surgery as a crucial step for improving patient outcomes and reducing complications (which includes a thorough bone health assessment) given the high prevalence of osteoporosis in patients undergoing spine surgery
- Why spine surgeons should establish care pathways to systematically identify and diagnose osteoporosis in their practices (which may include the establishment of a Fracture Liaison Service program or other means to ensure patients are assessed before surgery)
- The need for vertebral compression fractures to be treated as equally aggressively as hip fractures, with medications including anabolics
- Opportunities for spine/orthopaedic surgeons to work more effectively with bone health specialists and primary care to maximize patient care and improve outcomes
- The urgent need for mandatory TEAM sites to develop robust care coordination, bone health optimization protocols, Fracture Liaison Service programs, and how to best coordinate patient care with general practitioners/primary care
- Economic and personal impact of hip and femur fractures
- Impact of using AI to more efficiently identify, diagnose, and treat patients
- Need for bone health optimization and Fracture Liaison Service programs to diagnose and treat underlying osteoporosis

NSS80

MOLECULAR MECHANISMS UNDERLYING NUTRITION AND SARCOPENIA: FROM BASIC RESEARCH TO CLINICAL IMPLICATIONS

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Sarcopenia represents a critical geriatric syndrome driven by a progressive failure of skeletal muscle homeostasis, transcending simple atrophy to involve profound alterations in tissue plasticity and regenerative capacity. This lecture will provide a comprehensive review of the emerging molecular evidence underpinning muscle decline, specifically examining the cellular senescence as convergent drivers of skeletal muscle aging. We will first dissect the etiology of age-related proteostatic stress, highlighting the pivotal loss of post-transcriptional control that characterizes the aging myocyte. Particular emphasis will be placed on the dysregulation of RNA-Binding Proteins (RBPs) and aberrant alternative splicing events, which collectively impair the accurate synthesis of contractile proteins and compromise the cellular stress response. Concurrently, we will address the deleterious impact of senescent cell accumulation within the muscle niche. The lecture will elucidate how these cells, through the hyperactive Senescence-Associated Secretory Phenotype (SASP), release a chronic cascade of pro-inflammatory cytokines, chemokines, and matrix-remodeling enzymes. This paracrine signaling not only fosters a catabolic, "inflammaging" microenvironment but also induces bystander dysfunction in neighboring healthy myofibers and severely inhibits the myogenic potential of satellite cells, thereby locking skeletal muscle in a state of degenerative arrest. Bridging these fundamental discoveries with clinical application, we will discuss how a granular understanding of these pathways is reshaping risk stratification and therapeutic intervention. We will explore the potential of novel circulating biomarkers, such as specific microRNAs and SASP components, to detect pre-clinical trajectories of frailty before phenotypic onset. Furthermore, the talk will evaluate next-generation strategies that extend beyond traditional macronutrient supplementation, highlighting the role of molecular nutrition and senotherapeutics—agents capable of modulating RNA stability or attenuating senescent burden—as targeted adjuvants to exercise. Finally, we will outline a roadmap for precision medicine in gerontology, proposing that targeting these specific molecular hallmarks of aging offers the most promising avenue for personalizing prevention strategies and preserving functional independence in older adults.

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NSS81

NUTRITIONAL STRATEGIES FOR MANAGING SARCOPENIA

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Nutritional intervention constitutes the primary therapeutic cornerstone for counteracting sarcopenia; however, clinical efficacy is frequently compromised by suboptimal implementation and the complex pathophysiology of age-related anabolic resistance. This lecture will synthesize the current evidence base aimed at overcoming the blunted muscle protein synthetic response characteristic of aging, translating mechanistic principles into rigorous clinical protocols. We will critically examine the imperative for elevated protein intake thresholds, focusing not merely on total daily volume (>1.2–1.5 g/kg/day), but on the specific amino acid quality and kinetics required to stimulate the mTORC1 pathway. Special emphasis will be placed on the "leucine trigger" hypothesis and the necessity of achieving a per-meal protein threshold (25–30g) through pulsatile dietary distribution to maximize postprandial anabolism. Beyond proteostasis, the presentation will dissect the role of the nutritional matrix in modulating the muscle microenvironment. We will evaluate the pleiotropic effects of Vitamin D on intramyocellular Vitamin D Receptor (VDR) signaling and the utility of Omega-3 polyunsaturated fatty acids (PUFAs) in mitigating low-grade systemic inflammation and improving mitochondrial membrane fluidity. Integrating these factors, the talk will provide a structured framework for precision nutrition, moving from generic advice to phenotype-specific prescriptions. We will discuss practical algorithms for the screening of malnutrition (using GLIM criteria) and the implementation of targeted oral nutritional supplementation (ONS) within a multimodal care pathway, ensuring that dietary strategies effectively synergize with physical activity to restore functional independence in the geriatric population.

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NSS82

INTEGRATING NUTRITION AND EXERCISE: A SYNERGISTIC APPROACH

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While isolated nutritional or physical interventions offer demonstrable benefits, the effective management of sarcopenia necessitates a combinatorial approach to maximize the therapeutic window and overcome homeostatic dysregulation. This lecture will examine the physiological underpinnings of the synergistic relationship between mechanical loading and nutrient availability, moving beyond the additive model to explore the potentiating effects of multimodal therapy. We will discuss how resistance training (RT) acts as a potent "anabolic sensitizer," effectively reversing age-related anabolic resistance by priming the skeletal muscle machinery to respond to hyperaminoacidemia. The presentation will dissect the molecular crosstalk between mechanotransduction pathways and nutrient-sensing signaling—specifically the convergence on mTORC1—demonstrating how the strategic timing of protein ingestion (peri-exercise nutrition) augments amino acid uptake via exercise-induced hyperemia and transporter upregulation. Furthermore, we will address the complementary role of aerobic exercise in enhancing mitochondrial biogenesis and endothelial function, thereby improving capillary density and substrate delivery to the myocyte. Drawing from recent randomized controlled trials and meta-analyses, the lecture will quantify the superior efficacy of integrated interventions on key endpoints such as appendicular lean mass, specific force, and physical performance (e.g., SPPB scores) compared to monotherapies. Finally, we will bridge physiology with clinical pragmatism, outlining evidence-based frameworks for operationalizing these complex interventions. This includes tailoring periodized training variables and nutritional support to the severity of frailty, addressing barriers to adherence, and establishing a multimodal care pathway that ensures sustainable functional preservation in older adults

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NSS83

LIPOPROTEIN(A) AND DENTIN HYPERSENSITIVITY: A POTENTIAL LINK BETWEEN CARDIOVASCULAR AND OSTEOPOROTIC RISK

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Background: Lipoprotein(a) [Lp(a)] is a genetically determined lipoprotein particle and an established independent cardiovascular risk factor. Increasing evidence suggests that Lp(a) may influence bone metabolism through low-grade inflammation, oxidative stress, and microvascular dysfunction. These pathophysiological pathways are relevant to both cardiovascular disease and osteoporosis. Mineralized tissues, including bone and dentin, share common mechanisms of mineralization and remodeling. Dentin hypersensitivity, characterized by short, sharp pain in response to thermal, chemical, or mechanical stimuli, is typically regarded as a local dental condition. However, due to its high tubular permeability and neural responsiveness, dentin may be particularly sensitive to systemic disturbances in mineral homeostasis and microcirculation, potentially reflecting combined cardiovascular and skeletal risk.

Objective: To investigate the association between serum lipoprotein(a) levels, bone mineral density (BMD), and graded dentin hypersensitivity, and to explore dentin hypersensitivity as a potential clinical indicator linking cardiovascular and osteoporotic risk.

Methods: This cross-sectional, hypothesis-generating study included approximately 120 adult participants, predominantly postmenopausal women, recruited from an outpatient osteoporosis clinic. Serum Lp(a) concentrations were measured and categorized as low (<30 mg/dL), moderate (30–50 mg/dL), or high (>50 mg/dL). Bone mineral density of the lumbar spine and femoral neck was assessed using dual-energy X-ray absorptiometry (DXA). Dentin hypersensitivity was evaluated using standardized air and tactile stimuli and graded according to severity: Grade 0 (no sensitivity), Grade 1 (mild, stimulus-dependent sensitivity), Grade 2 (moderate, frequent discomfort), and Grade 3 (severe daily pain). Data on age, body mass index, menopausal status, smoking, and relevant oral risk factors were collected. Statistic:Multivariate analyses were performed to assess independent associations. **Results**: A progressive decline in femoral neck BMD was observed across increasing Lp(a) categories. Participants with elevated Lp(a) levels exhibited lower BMD ranges compared with those with low Lp(a). Dentin hypersensitivity severity demonstrated a clear graded association with Lp(a). Approximately 65% of individuals with low Lp(a) reported no or mild sensitivity, whereas nearly 70% of participants with high Lp(a) experienced moderate to severe dentin hypersensitivity. Importantly, elevated Lp(a) remained independently associated with higher dentin hypersensitivity grades after adjustment for BMD and other confounding variables.

Conclusion: Elevated lipoprotein(a) levels are associated with lower bone mineral density and increased severity of dentin hypersensitivity.

These findings suggest that dentin hypersensitivity may represent a clinically observable marker reflecting shared pathophysiological mechanisms underlying cardiovascular and osteoporotic risk. The results are hypothesis-generating, and longitudinal studies are required to clarify causality and clinical relevance.

NSS84

ASSOCIATION BETWEEN LIPOPROTEIN(A), MENOPAUSE, AND CARDIOVASCULAR RISK IN WOMEN

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Background: Lipoprotein(a) [Lp(a)] is an established independent cardiovascular risk factor. Menopause is associated with an increase in cardiovascular risk, but its relationship with Lp(a) levels has not been fully clarified.

Objective: To investigate the association between menopausal status and serum lipoprotein(a) levels, and to evaluate their relationship with estimated cardiovascular risk in women.

Methods: This cross-sectional, hypothesis-generating study included 148 women, with a mean age of 56.8 ± 7.4 years. Of these, 113 (76%) were postmenopausal and 35 (24%) premenopausal or perimenopausal. Age at natural menopause was recorded in postmenopausal participants. Serum Lp(a) concentrations were measured using standardized laboratory assays and analyzed as categories: <30 mg/dL, 30–50 mg/dL, and >50 mg/dL. Cardiovascular risk was estimated using the SCORE2 or SCORE2-OP algorithm, incorporating age, smoking status, systolic blood pressure, and non-HDL cholesterol. Additional variables included body mass index and the presence of cardiometabolic comorbidities. Multivariate analyses were performed to assess independent associations.

Results: The overall median Lp(a) concentration was 32 mg/dL (IQR 17–58). Postmenopausal women had higher median Lp(a) levels compared with premenopausal women (35 mg/dL vs. 24 mg/dL). Lp(a) concentrations >50 mg/dL were observed in 29% of postmenopausal and 14% of premenopausal women. Median SCORE2-estimated 10-year cardiovascular risk was 5.4% (IQR 2.9–8.7). High or very-high SCORE2 risk categories were more frequent among women with Lp(a) >50 mg/dL (approximately 38%) compared with those with Lp(a) <30 mg/dL (approximately 21%). The association between elevated Lp(a) and higher cardiovascular risk remained significant after adjustment for age and traditional risk factors.

Conclusion: Postmenopausal status is associated with higher lipoprotein(a) levels and an unfavorable cardiovascular risk profile. Elevated Lp(a) clusters with increased SCORE2-estimated cardiovascular risk, suggesting that a subset of postmenopausal women may be at greater long-term cardiometabolic and skeletal risk than estimated by traditional factors alone. Assessment of lipoprotein(a) during the menopausal transition may improve cardiovascular risk stratification. These findings are hypothesis-generating and warrant confirmation in longitudinal studies.

NSS85

THE ROLE OF LIPOPROTEIN (A) IN OSTEOPOROSIS AND ATHEROSCLEROSIS: A SHARED INFLAMMATORY PATHWAY

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Introduction: Lipoprotein(a) is a cholesterol-rich lipoprotein particle similar to LDL with an additional apolipoprotein (a) attached to apoB-100. It is mainly genetically determined with pro-atherogenic, pro-inflammatory and pro-calcific properties.

Lp(a) trigger and contribute to the chronic low grade inflammation. Elevated Lp(a) levels are a well-established risk factor for cardiovascular diseases, particularly atherosclerosis contribute to the increased risk for myocardial infarction, stroke and aortic stenosis. Lp(a) levels are regulated by estrogen and postmenopausal women have higher Lp(a). So, increased Lp(a) levels often coexists with vascular calcification, atherosclerosis and osteoporosis forming a vascular-bone axis. The recent evidence suggests a potential link between high Lp(a) levels and inflammatory pathways leading to the development of osteoporosis and accelarated atherosclerosis.

This goal of this study is to explore the clinical correlation between elevated Lp(a) levels, atherosclerosis, and osteoporosis in a cohort of patients.

Methods: A retrospective case series was conducted, examining 18 patients (12 female, 6 male) aged 47-74 years in a 2-year period. All patients had clinically diagnosed atherosclerosis (coronary artery disease, carotid artery stenosis, or peripheral vascular disease) and osteoporosis (diagnosed via dual-energy X-ray absorptiometry [DXA]). Serum Lp(a) levels, hsCRP were measured in all patients. Coronary angiography and DXA scans, were reviewed to assess the extent of atherosclerotic plaques and bone density.

Results: All patients had significantly elevated Lp(a) levels, ranging from 50 to 160 mg/dL (normal range <50 mg/dL). 14 patients (77.7%) presented with advanced atherosclerotic plaques in at least 2 vascular territories, while 4 patients (22,3%) had a history of myocardial infarction or stroke. 16 patients (88.8%) showed moderate to severe osteoporosis on DXA, with 2 patients (11.2%) had prior fragility fractures. A significant association was found between higher Lp(a) levels and both atherosclerosis and osteoporosis ($p<0.05$). The hsCRP level was mildly increased 14 patients with a average range of 2,3mg/L.

Discussion: Our case series demonstrates a elevated Lp(a) and hsCRP in the progression of atherosclerosis, and the severity of osteoporosis. The shared inflammatory pathways triggered by elevated Lp(a) may contribute to endothelial damage and bone resorption.

Conclusion: Elevated Lp(a) levels may play a significant role in the development of shared inflammatory pathways in both atherosclerosis and osteoporosis. The potential dual exist in atherosclerosis and osteoporosis in patients with high Lp(a) levels Early screening and targeted interventions could help mitigate the long-term consequences of both conditions.

NSS86

UNMET NEED: FILLING THE GAP IN TREATMENT-REFRACTORY OSTEOARTHRITIS

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Objectives To define the clinical and therapeutic unmet needs of patients with osteoarthritis (OA) who remain symptomatic despite guideline-recommended conservative and intra-articular treatments, and who are not suitable candidates for joint replacement surgery.

Material and Methods This presentation is based on evidence from international guidelines, consensus statements, and observational studies addressing real-world management of OA. Particular attention is given to treatment response to non-pharmacological strategies, pharmacological therapies, and intra-articular interventions, as well as factors influencing surgical eligibility and patient preference.

Results OA remains a leading cause of chronic pain and disability worldwide, and a substantial proportion of patients do not achieve satisfactory symptom control despite multimodal conservative management, including exercise, weight management, rehabilitation, pharmacological treatments, and intra-articular injections. In clinical practice, a relevant subgroup of patients can be defined as treatment-refractory, as they remain symptomatic despite appropriate and guideline-concordant care. For these patients, joint replacement surgery represents the definitive option for end-stage disease; however, many are not optimal surgical candidates due to young age, comorbidities, contraindications, or personal reluctance to undergo arthroplasty. As a result, these individuals often remain trapped in a prolonged therapeutic limbo, characterized by persistent pain, functional impairment, and repeated use of symptomatic treatments with limited long-term benefit.

Conclusions A clear therapeutic gap exists in OA management between conservative strategies and surgery, particularly for patients with refractory symptoms who are unable or unwilling to undergo joint replacement. Addressing this unmet need requires the identification of alternative, minimally invasive treatment options that can be integrated into patient-centred, multidisciplinary care pathways. Defining this gap is a necessary step toward the rational adoption of innovative approaches targeting pain mechanisms beyond conventional therapies.

NSS87

TECHNIQUE AND ANGIOGRAPHIC LANDMARKS OF TAE

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Objectives To describe the technical principles of transarterial embolization (TAE) for osteoarthritis (OA)-related pain, with a focus on angiographic anatomy and procedural landmarks essential for accurate targeting and procedural safety.

Material and Methods This abstract summarizes technical and anatomical evidence from recent angiographic studies and clinical series on TAE for knee OA. Key procedural steps, vascular access strategies, angiographic projections, and identification of pathological hypervascularization are described, together with measures aimed at minimizing non-target embolization.

Results TAE is performed through selective catheterization of periarticular arteries supplying the symptomatic joint compartment. After femoral arterial access, digital subtraction angiography is used to map the genicular arterial anatomy and to identify abnormal neovascularization, typically visualized as a focal blush corresponding to pain localization. Recognition of angiographic landmarks is essential, as genicular artery origins and branching patterns show relevant interindividual variability. The descending genicular artery, superior and inferior genicular branches, and their anastomotic networks represent key targets. Oblique angiographic projections facilitate identification of vessel origins, while selective microcatheterization allows distal positioning beyond major cutaneous branches. Cone-beam computed tomography may support confirmation of target perfusion territories. Embolization is performed using microspheres delivered under fluoroscopic control. Additional safety strategies include recognition of cutaneous branches, temporary flow reduction techniques, and avoidance of embolization in vessels supplying the skin or nerves.

Conclusions Successful TAE relies on detailed knowledge of vascular anatomy and on systematic angiographic mapping to identify pathological hypervascularization while preserving non-target tissues. Standardized recognition of angiographic landmarks and meticulous embolization technique are crucial to optimize procedural safety and reproducibility, supporting the integration of TAE as a minimally invasive option within multidisciplinary OA management pathways.

NSS88

CLINICAL EVIDENCE IN OSTEOARTHRITIS

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Objectives To summarize the current clinical evidence on the efficacy and safety of transarterial embolization (TAE) for the management of knee osteoarthritis (OA)-related pain.

Material and Methods Available prospective and retrospective clinical studies, including randomized and sham-controlled trials, evaluating TAE in patients with symptomatic knee OA were reviewed. Clinical outcomes were assessed using validated pain and function measures, including visual analogue scale, Western Ontario and McMaster Universities Osteoarthritis Index, and Knee injury and Osteoarthritis Outcome Score. Safety outcomes were also examined.

Results Across published studies, TAE has demonstrated high technical success rates and consistent short- to mid-term improvements in pain and function among patients with mild to moderate knee OA. Clinically meaningful reductions in pain scores and improvements in functional outcomes are typically observed within weeks after the procedure and may persist for several months. Evidence from randomized and sham-controlled trials suggests a greater magnitude of symptom improvement in treated patients compared with controls, supporting a treatment-specific effect beyond placebo. Patients with advanced structural disease appear to derive less benefit, highlighting the importance of appropriate patient selection. Adverse events are uncommon and generally mild, most frequently consisting of transient skin discoloration or local discomfort, with serious complications rarely reported.

However, substantial heterogeneity exists across studies, limiting direct comparisons and pooled analyses.

Conclusions Current clinical evidence supports TAE as a promising minimally invasive option for selected patients with symptomatic knee OA who remain refractory to conservative and intra-articular therapies and are not optimal candidates for surgery. While available data indicate favorable short- and mid-term efficacy with an acceptable safety profile, the overall level of evidence remains limited by small sample sizes and methodological variability. Larger, well-designed multicenter trials with longer follow-up are needed to better define the durability of clinical benefit, optimize patient selection, and clarify the role of TAE within OA treatment algorithms.

NSS89
BEYOND OSTEOARTHRITIS: EXPANDING HORIZONS

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Objectives To explore the potential role of transarterial embolization (TAE) in selected inflammatory knee conditions with persistent, localized disease activity refractory to standard treatments.

Material and Methods Clinical evidence from case reports, clinical images, and focused reviews describing the use of TAE in inflammatory knee disorders was examined. Attention was given to conditions characterized by focal synovial or perientheseal hypervascularization despite adequate systemic or local therapy.

Results Inflammatory knee conditions such as chronic synovitis, enthesitis, and crystal-induced arthritis may persist despite optimized medical management and intra-articular treatments. In these settings, inflammation is often spatially confined and associated with pathological neoangiogenesis, suggesting a potential target for embolization-based approaches. Emerging clinical experience indicates that selective genicular artery embolization may provide meaningful pain relief and functional improvement in carefully selected patients with refractory inflammatory knee involvement, including cases of residual monoarticular synovitis and focal enthesitis. Early reports in chronic tophaceous gout affecting the knee further support a precision, lesion-targeted strategy. Across available studies, TAE has shown a favorable short-term safety profile, with adverse events being uncommon and generally mild. Preliminary experience from other anatomical sites, such as ankle synovitis and refractory tendinopathies, suggests that this therapeutic concept may extend beyond the knee in selected scenarios.

Conclusions TAE represents a promising minimally invasive adjunct for patients with inflammatory knee disorders who remain symptomatic despite conventional therapies and for whom escalation of systemic treatment or surgery is not appropriate. Although current evidence is limited and exploratory, these findings support further prospective studies to define the role of TAE in inflammatory knee disease.

NSS90
OSTEOARTHRITIS. AN OLD AND COMMON DISEASE

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Osteoarthritis is the most common type of joint disease, affecting many million of individuals all over the world. It is the leading cause of chronic disability in older adults with a great cost for every economy. It maybe considered as a degenerative disorder with inflammatory components. Inflammatory components may arise from the breakdown of articular carilage in the synovial joints. Osteoarthritis is thought to involve the entire joint organ and includes the subchondral bone and the synovium. The disease causes pain of varying intensity, may cause disability and may greatly affect quality of life.

NSS91
OSTEOARTHRITIS. CLINICAL PICTURE AND PATHOPHYSIOLOGY

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Symptoms of osteoarthritis include deep, achy joint pain exacerbated by extensive use. This joint pain is considered a primary symptom of the disease. Reduced range of motion and crepitus may be present. Stiffness during rest may also be observed which may give rise to morning stiffness of short duration. Joint edema is also observed.

Osteoarthritis is classified as a noninflammatory arthritis characterized by the formation of new bone. However, increasing evidence has shown that inflammation occurs as cytokines and metalloproteinases are released into the joint. These agents are involved in the excessive matrix degradation that characterizes cartilage degeneration in osteoarthritis. Levels of interleukin-17 (IL-17), a proinflammatory cytokine, have been found increased in the synovium of osteoarthritis joints. Other inflammatory molecules which have been associated with osteoarthritis include 15-hydroxyeicosatetraenoic acid, prostaglandin E2, IL-1β, TNF alpha, IL-1 receptor antagonist, and uric acid. Erosion of the damaged cartilage in an osteoarthritic joint progresses until the underlying bone is exposed. Bone denuded of its protective cartilage continues to articulate with the opposing surface. Eventually, the increasing stresses exceed the biomechanical strength of the bone.

NSS92

MANAGEMENT OF OSTEOPOROSIS IN BREAST CANCER PATIENTS

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Breast cancer continues to be the most diagnosed cancer in women from the ancient years till today. Despite improvement in survival, it is still a major cause of cancer related death. Adjuvant treatment of breast cancer is generally advocated and increases survival. Aromatase inhibitor treatment increases disease free survival and reduces recurrence. Patients should be actively screened for bone health on treatment initiation with aromatase inhibitors. Calcium and vitamin D should be used in all patients. Selective estrogen receptor modulators may be used for the management of osteoporosis in breast cancer patients. Additionally, oral bisphosphonates, denosumab or zoledronic acid should be used concurrently with aromatase inhibitors to improve bone health and reduce fractures for the whole length of aromatase inhibitor treatment in women with osteoporosis or at increased risk for the development of the disease. Alendronate may be applied successfully as it improves bone mineral density, decreases fracture risk and has been shown to increase overall survival and decrease the risk of metastatic disease in breast cancer patients.

NSS93

TREATMENT OF OSTEOARTHRITIS

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Treatment of osteoarthritis is multimodal. It involves the use of pain relieving agents as well as non-steroidal-anti-inflammatory agents. The use of intra-articular injections may be used. Recently, the application of disease modifying agents such as hydroxychloroquine has been tried. Other disease modifying agents are also tested in the treatment of osteoarthritis.

NSS94

PHYSICAL TREATMENT OF OSTEOARTHRITIS

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Lifestyle modification, particularly exercise and weight reduction, are core components in the management of osteoarthritis. Home based exercise programs may be used successfully. Weight reduction relieves stress in the affected joints and is effective in the treatment of osteoarthritis. Local measures may also be applied therapeutically in the affected joints. Long-term walking and resistance-training programs have been shown to slow the functional decline seen in many patients with osteoarthritis, including older patients.

NSS95

FROM POLYOSTOTIC FIBROUS DYSPLASIA TO AUTOIMMUNITY: A UNIQUE CASE OF MCCUNE-ALBRIGHT SYNDROME WITH RHEUMATOID ARTHRITIS

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McCune–Albright syndrome (MAS) is a rare sporadic disorder[1], with an estimated incidence of approximately 1 in 100,000 to 1,000,000 individuals[2,3], classically defined by the triad of fibrous dysplasia, café-au-lait skin pigmentation, and endocrine hyperfunction[3]. Skeletal manifestations may progress throughout life, leading to fractures[4], deformities, pain, and significant morbidity in adulthood[5]. While endocrine abnormalities are well recognized in MAS, its association with autoimmune diseases has been rarely reported.

We present a unique case of a 44-year-old woman with long-standing MAS who subsequently developed seropositive rheumatoid arthritis. This case highlights the clinical complexity of adult MAS and raises awareness of the potential coexistence of inflammatory autoimmune disease in patients with rare skeletal disorders, underscoring the importance of a multidisciplinary approach and long-term follow-up.

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NSS96

HYPOPHOSPHATASIA IN 2026: UPDATE AND THERAPEUTIC OPPORTUNITIES

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Hypophosphatasia (HPP) is a rare inherited metabolic bone disease caused by pathogenic variants in the *ALPL* gene, leading to reduced activity of tissue-nonspecific alkaline phosphatase (TNSALP) and defective mineralization of bone and teeth.[1,2] Accumulation of alkaline phosphatase (ALP) substrates, particularly pyridoxal-5-phosphate (PLP), interferes with normal skeletal mineralization.[1,3] The disease shows marked clinical heterogeneity, with autosomal dominant or recessive inheritance and presentations ranging from severe pediatric to mild adult-onset forms. Persistently low serum ALP with elevated substrates, together with compatible clinical and radiological findings, supports the diagnosis. Although identification of a pathogenic ALPL variant facilitates diagnostic confirmation, its absence does not exclude HPP.[4,5] Early recognition is essential to prevent fractures and dental complications. In addition to established enzyme replacement therapy with asfotase alfa, next-generation recombinant alkaline phosphatase therapies, including efzimfotase alfa and ilofotase alfa, are under clinical development and may further expand therapeutic options for HPP.[1,6-11]

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NSS97

SKELETAL EFFECTS OF PARATHYROID DISEASE - IMPACT OF PRIMARY HYPERPARATHYROIDISM AND HYPOPARATHYROIDISM ON BONE HEALTH

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Both PHPT and HypoPT have significant effects on skeletal health impacting bone density, microarchitecture, bone quality and bone strength. This presentation will review the effects of PHPT and HypoPT on the skeleton and also review what is known about effects on fracture risk and possible treatment strategies to improve bone quality and bone strength.

NSS98

THYROID HORMONE DEFICIENCY AND LONG TERM SKELETAL OUTCOMES: IMPACT ON BONE HEALTH AND FRACTURE RISK

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Chondrocytes and osteoblasts are directly responsive to thyroid hormone. Thyroid hormone may affect bone metabolism in different ways: direct action on osteoclasts or by acting on osteoblasts, which in turn mediate osteoclastic bone resorption. Also thyroid-stimulating hormone (TSH) may directly effect bone metabolism by acting on TSH receptors which are located on osteoblast and osteoclast precursors. The effects of thyroid hormone on osteocyte function are unknown.

Hypothyroidism in childhood and adolescence can have more serious consequences for bone development. Thyroid hormone deficiency can lead to delayed bone age, short stature, and delayed skeletal maturation.

Early histomorphometry analysis showed that hypothyroidism results in low bone turnover with decreased osteoblastic bone formation and reduced osteoclastic activity. The prolonged bone remodeling cycle includes a longer period of secondary mineralization resulting in a net increase in bone mineralization and bone mass without a change in bone volume. These changes are very slow.

Clinical data demonstrating the skeletal outcomes of hypothyroidism in adults and long-term prospective studies demonstrating changes in bone mineral density (BMD) in untreated hypothyroid patients are very limited. Also the effects of Hashimoto thyroiditis on bone microarchitecture are studied and no difference was found in women with hypothyroid Hashimoto thyroiditis in comparison with healthy subjects. Hypothyroidism in premenopausal women was reported to have no effect on BMD.

The effect of subclinical hypothyroidism on bone mineralization and fracture susceptibility has not been studied extensively, there is no consensus on its role in osteoporosis. A meta-analysis found no association between subclinical hypothyroidism and fracture risk. However, some researchers noticed that subclinical hypothyroidism is associated with decrease in serum calcium level and low BMD. Postmenopausal women with subclinical hypothyroidism tended to have a higher risk for low-trauma hip fracture.

Although levothyroxine treatment has been associated with an increase in fractures in some studies, there have been no long-term prospective follow-up studies of patients with untreated hypothyroidism. A systematic review and meta-analysis demonstrated that there is a slight adverse effect of LT4 replacement therapy on bone and mineral metabolism in patients with overt hypothyroidism, on the other hand no effect in subclinical hypothyroid patients. It is difficult to demonstrate a significant correlation between hypothyroidism and BMD or fractures because of the small number of studies and conflicting results of clinical studies. Therefore, the bone health of patients with hypothyroidism should be evaluated and managed as the current guideline recommendations

NSS99

ENDOGENOUS AND IATROGENIC THYROID HORMONE EXCESS—IMPACT ON BONE HEALTH AND FRACTURE RISK

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Thyroid hormone excess is a clinically important and potentially preventable contributor to secondary osteoporosis and fractures. In overt hyperthyroidism, accelerated bone turnover—driven mainly by increased resorption—leads to loss of bone mineral density (BMD) and higher fracture risk. Following restoration of euthyroid state, bone turnover markers usually decline and BMD may partially recover; however, fracture risk can remain elevated in high-risk individuals.

Iatrogenic thyroid hormone exposure also requires careful attention. When levothyroxine (LT4) is used as physiologic replacement and TSH is maintained within the reference range, long-term skeletal effects are inconsistent across studies, with variable findings for bone turnover markers and site-specific BMD. In contrast, LT4 suppressive therapy—most commonly used in differentiated thyroid cancer—is a recognized setting in which chronic TSH suppression may adversely affect bone, particularly in vulnerable groups such as postmenopausal women and patients with additional risk factors. In thyroid cancer survivors, the clinical priority is to balance oncologic benefit with skeletal safety by individualizing the intensity and duration of TSH suppression according to recurrence risk and response to therapy, while proactively preventing and treating osteoporosis when indicated.

Subclinical hyperthyroidism, whether endogenous or iatrogenic, is also associated with clinically meaningful skeletal consequences, especially in postmenopausal women. Bone loss is often more evident at cortical-rich sites, and fracture risk appears to increase in proportion to the degree and duration of TSH suppression. Management should focus on correcting the underlying cause when feasible and applying a structured fracture-risk assessment, particularly in older adults, those using glucocorticoids, individuals with low baseline BMD, or patients with prior fragility fractures.

A practical approach includes evaluating baseline fracture risk (history, clinical factors, and DXA when appropriate), ensuring adequate calcium and vitamin D intake, addressing falls risk, and initiating osteoporosis pharmacotherapy promptly in those at high fracture risk.

NSS100

FACTORS AFFECTING HIP FRACTURE SERVICE IMPLEMENTATION IN SOUTH AFRICA

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Implementing hip fracture services in low- and middle-income countries like South Africa is challenging. Reasons include the limited availability of staff and resources. These challenges necessitate the development of feasible, context-specific implementation strategies that leverage existing resources and infrastructure. To develop such strategies, there is a need to understand factors that help or hinder the implementation of care pathways. In this study, we explored factors influencing hip fracture service implementation in South Africa using ethnographic methods, including clinical observations and interviews with 40 healthcare professionals across six hospitals in Gauteng Province. In this talk, I will share key factors that impacted implementation from the perspective of healthcare professionals. I will discuss models of multidisciplinary teamwork, communication strategies and the challenges of balancing competing surgical priorities such as trauma from road traffic accidents. I will also examine the complex dynamics between professional groups with differing priorities, how teams worked around resource constraints to deliver care and suggestions forimproving monitoring and evaluation processes. These findings present practical opportunities to improve service delivery and develop context-specific models of care.

NSS101

HIP FRACTURE CARE PATHWAYS AND THE DELIVERY OF TRADITIONAL BONE SETTER TREATMENT IN THE GAMBIA

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Globally, surgical fixation is the global gold standard of care for hip fractures, yet in The Gambia, traditional bone setters remain the preferred pathway of care despite concerns about complications. The World Health Organization's Traditional Medicine Strategy promotes integrating safe and effective traditional practices into health systems. Achieving this in the context of hip fracture care in The Gambia requires insights into patient decision-making about treatment and the relationship between traditional bone setter practices and biomedical care. In this study, we

identified factors influencing hip fracture patients' decisions to choose traditional care or biomedical services. Additionally, we described traditional bone setter treatment and explored how these practices intersect with formal orthopaedic care. We conducted ethnographic case studies to map patient care pathways, including interviews with 38 patients and their caregivers and observations of care. Additional in-depth interviews and observations of practice were carried out with 16 traditional bone setters and 38 healthcare professionals involved in hip fracture management.

In this talk, I will outline how patients navigated between biomedical care and traditional bone setter treatment, highlighting key factors that influenced decision-making such as the interpretation of injury, financial considerations and tradition. I will describe traditional bone setter techniques—including methods to identify fractures, palpation and massaging of the injury, splinting and patient immobilisation—and discuss informal referral pathways.

Finally, I will share perspectives from traditional bone setters and healthcare professionals on strategies for future collaboration. Findings highlight the potential to develop interventions to strengthen collaboration between the two sectors, helping patients better navigate complex care pathways and improving hip fracture outcomes.

NSS102

PATIENT PRIORITIES IN HIP FRACTURE MANAGEMENT AND HEALTH SYSTEM FACTORS THAT IMPACT RESPONSIVE CARE IN ZIMBABWE

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Health system responsiveness refers to how well a health system meets patients' non-clinical needs and expectations—such as dignity, confidentiality, and choice of provider. Understanding what responsive care means to hip fracture patients and how healthcare professionals can meet these needs provides information that can be used strengthen services and improve patient engagement and trust. This study aimed to identify the priorities and expectations of hip fracture patients in Zimbabwe and to explore health system factors that shaped the ability of healthcare professionals to respond to these needs. Using ethnographic methods, in this study, we conducted interviews and observations with 40 hip fracture patients in Zimbabwe to examine their needs and priorities. Interviews with 42 healthcare professionals further identified the health system factors impacting responsive hip fracture care. In this talk, I will describe patients' careexperiences which highlight their need for timely access to surgery and pain relief medication, dignified continence management, appropriate communication on diagnosis and treatment and, particularly for rural-dwelling patient, access to social support. I will then outline how resources constraints, understaffing issues, and changes in Zimbabwe's pain management process impacted healthcare professionals' ability to respond to patients'needs. Finally, I will share the actions healthcare professionals' employed to circumvent health system constraints and respond to patient priorities. These insights are vital for informing the development of practical, context-specific initiatives for improving responsive hip fracture care in Zimbabwe.

Conclusion

In conclusion we will together reflect on the similarities and differences in hip fracture care across these three diverse African contexts, and consider potential policy and practice implications.

NSS103

IMPORTANCE OF DIFFERENTIATED FALL RISK ASSESSMENT BETWEEN OUTPATIENTS AND INSTITUTIONALIZED PATIENTS

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Osteoporosis is an external manifestation of frailty in the elderly, characterized as an aging syndrome followed by the progressive loss of muscle mass and strength. The decrease in neuromuscular function increases the risk of falls and subsequent fractures, which are exacerbated in people with osteoporosis. These problems result in physical disabilities, reducing the quality of life of the older people.

A short multicomponent protocol was developed for outpatients to assess the risk of falls and fractures in frail or pre-frail elderly people through body composition, bone densitometry, muscle quality, physical performance, sleep quality and nutritional profile.

The approach to the main elements analyzed by this protocol will be the focus of this lecture, and it will highlight the comparative difference with the approach proposed for institutionalized patients.

TOPICS:

- Aging process
- Falls and fractures in older people
- Risk assessment tools
- Multidimensional assessment of the risk of falls and fractures in the older people: a follow-up study in healthcare units
- Sleep disorders assessment and diagnosis

NSS104

FALL RISK ASSESSMENT AND PREVENTION PROGRAM IN NURSING HOMES

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In institutionalized residents, falls are associated with increased morbidity and mortality rates, a greater degree of functional dependence, and frequent use of health services. Several factors have been identified as determinants of falls, including cognitive and motor impairment, decreased muscle strength, and changes in postural balance.

This presentation aims to analyze the main differences in the methodology for assessing the risk of falls in institutionalized elderly individuals with greater cognitive and motor frailty.

Therefore, with the approach of methodology applied to outpatients, the discussion will allow for a broad view of the topic and a more detailed

analysis of the complexity of applying protocols in different populations.

TOPICS:

- Characteristics of institutionalized older adults
- Differences between institutionalized and community-dwelling older adults
- Cognitive and motor balance assessment tools
- Frailty, cognition and dual-task performance
- Main findings
- Multitask exercise program

NSS105

STANDARDIZING THE MEASURE OF MOVING, THINKING, AND FEELING: VALIDATING ASSESSMENT TOOLS FOR THE FIVE DOMAINS OF INTRINSIC CAPACITY

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The World Health Organization has proposed a model of healthy aging built around the concept of functional ability, comprising an individual's intrinsic capacity (IC), the physical and social environment they occupy, and interactions between the two.

The foundational challenges of measuring IC lie in the validity, feasibility, and standardization of tools across the five domains (locomotor, cognitive, sensory, psychological, vitality). Key issues include heterogeneity of populations, lack of universally accepted measures, cultural/contextual differences, and balancing clinical practicality with scientific rigor.

Recent studies validating assessment tools for the five domains of IC show promising progress but highlight ongoing challenges in standardization. One is related to the overlap between domains, for example cognitive decline may affect locomotor performance, while sensory loss can influence psychological well-being, complicating domain-specific measurement.

Another one is how to align the proposed construct with related theories and approaches, notably frailty, biological age, and geroscience. Other challenges include lack of consensus on scoring methods, the need for cross-cultural validation and more integration into clinical practice.

NSS106

THE INTRINSIC CAPACITY PROGNOSTICATOR: USING INTRINSIC CAPACITY PROFILES TO STRATIFY RISK FOR FRAILTY, HOSPITALIZATION, AND NEGATIVE HEALTH OUTCOMES

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In an era of rapid population aging, shifting from a disease-centric to a function-centric model of care is essential for promoting healthy longevity. Intrinsic Capacity (IC), defined by the World Health Organization as the composite of all physical and mental capacities an individual can draw upon, emerges as a powerful multidimensional biomarker for healthy aging. This presentation introduces the **Intrinsic Capacity Prognosticator**, a validated framework designed to move beyond simple diagnosis toward robust risk stratification for adverse clinical events.

The prognosticator utilizes comprehensive IC profiles across five core domains:

- **Locomotor & Sensory:** Assessing gait speed and sensory health as primary predictors of mobility loss and falls.
- **Cognitive & Psychological:** Identifying subclinical impairments in memory and mood that serve as early warnings for frailty and social withdrawal.
- **Vitality:** Monitoring nutritional and metabolic markers that reflect the body's physiological reserves.

By integrating these domains into a unified risk score, the IC Prognosticator demonstrates superior predictive power compared to traditional chronological age or single-disease markers. Large-scale longitudinal data indicate that individuals with low-capacity profiles are at a significantly higher risk for hospitalization, incident frailty, and long-term disability.

This data-driven approach allows healthcare providers to implement personalized risk stratification, moving from "reactive" treatment to "proactive" prevention. By identifying high-risk profiles before catastrophic health events occur, the IC Prognosticator enables clinicians to tailor multidisciplinary interventions—ranging from targeted physical therapy to nutritional support—effectively intercepting the transition from robust aging to dependency.

NSS107

FROM CONCEPT TO CLINIC: IMPLEMENTING MULTIDOMAIN, PERSONALIZED INTERVENTIONS BASED ON INTRINSIC CAPACITY IN REAL-WORLD PRIMARY CARE SETTINGS

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Background: As global populations age, the clinical focus is shifting from a purely disease-centric model to a functional approach centered on Intrinsic Capacity (IC). While the WHO Integrated Care for Older People (ICOPE) framework establishes IC as a composite of physical and mental reserves, practical implementation within the constraints of real-world primary care remains a challenge. This presentation explores the transition from theoretical IC conceptualization to the delivery of purposeful, multidomain interventions.

This presentation will report the systematic implementation strategy designed to integrate IC screening and personalized care planning into primary care workflows. The framework utilizes a multi-phase approach: (1) baseline IC screening across five key domains (locomotor, sensory, cognitive, psychological, and vitality); (2) the use of digital decision aids to manage treatment trade-offs (e.g., comorbidities, management of sarcopenia and increased falls risk); and (3) the co-design of "Purposeful Shared Decision-Making" tools with patients and caregivers.

Preliminary findings indicate that shifting to an IC-based model enhances the detection of subclinical functional decline that traditional disease-specific metrics often overlook. By framing clinical decisions—such as bone health management or exercise program—within the context of a patient's "functional reserve," higher rates of patient engagement and adherence were achieved. Furthermore, the implementation of standardized IC navigators reduced "fragmented care" by providing a holistic functional map used by multidisciplinary teams.

In summary, the "Function over Disease" Shift, emphasize that IC is the best predictor of healthy aging. Implementing IC in standard care is feasible and provides a more accurate reflection of an older adult's health status than comorbidity counts alone. Moving "from concept to clinic" requires the adoption of personalized navigators that translate functional data into actionable clinical decisions. This shift empowers clinicians to protect a patient's intrinsic capacity, ultimately promoting healthy aging and maintaining independence in the community.

NSS108

DYNAPENIA AND FRACTURES

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Osteoporosis related fractures are an important medical condition worldwide, particularly in the elderly, and the incidence of hip fractures is expected to increase particularly in those low- and middle-income countries (1).

Osteoporosis is a condition of low bone mass and micro-architectural deterioration of bone, on thew other hand, sarcopenia is the loss of muscle mass, strength and function, and it is related to adverse outcomes, including risk of falls and fractures. Osteosarcopenia describes the existence of osteoporosis and sarcopenia associated with ageing (2). Some have stated that when evaluating fracture risk hand grip strength (HGS) should be evaluated altogether with bone mineral density (BMD). They found that low HGS is related to mortality on a 19 year follow up even after adjusting for age, gender, smoking, education, and physical activity (3)

HGS has been described to be an easy, accessible, cheap and helpful tool to identify those patients with osteoporosis an it´s consequences (4). There is growing evidence that HGS measurement i is related to BMD as well as fractures, including secondary fractures (5)

There is also strong evidence that low HGS in those with hip fracture is related to several complications, including pressure ulcers incidence (6), and increased mortality within the next year after the fracture occurred, in both genders, but being this more predictive among male (7).

Therefore, we conclude that HGS should be used on every clinic where osteoporosis patients are treated, unfortunately in many places they do not have access to the equipment to have this measurement done, pushing to seek for easier, yet. predictive tools in those patients.

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NSS109

OHAT: THE FACTS

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Oral health problems such as untreated dental caries, periodontal disease, anodontia and others, affect half of the world's population1. World Health Organization´s (WHO) Global Report on oral health, insists on their coincidences with non-communicable pathologies, pointing out the negligent attitude of health policy makers, who leave oral health out of the umbrella of universal health care1. A NICE guideline describes the need to improve collaboration of the Primary Care Physician (PCP) with Dentists2, as the average physician feels limited to identify oral problems3. Expert voices call on PCP to develop skills for detection and referral of problems like periodontitis, known for its associations with various chronic-degenerative diseases4.

The Oral Health Assessment Tool (OHAT) is a simple and reliable instrument in the detection of dental problems in a wide variety of subjects5. It could be a strong instrument for clinicians to identify and refer for proper treatment, patients with oral and dental problems. This may have a positive impact on diverse health outcomes. This presentation will examine the potential and the challenges of a deeper involvement of health professionals with oral health.

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NSS110

DYNAPENIA (HGS) VS. OHAT, THE TRIAL

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Osteoporosis related fractures are a global concern due to the high burden of morbidity and mortality, and the number is increasing worldwide; hip fractures are associated to high mortality during the first year, with one third of those never recovering their functional status previous to the fracture [1,2].

There is growing evidence that oral frailty has been linked to physical frailty but as stated by Sakurai R. et al, this could be a risk factor, but could also be a consequence of physical frailty[3], or even more, from our perspective it could be a vicious circle where it is difficult to identify which came first. Oral Health Assestment Tool (OHAT) has shown to be an effective instrument identifying oral problems[4]. We have previously shown that the hand grip strength (HGS) is an easy, valuable tool identifying those patients at high risk for mortality and other complications after hip fracture[5,6], being the association more pronounced in men than in women[7].

We therefore hypothesized that those with high OHAT score could also be related to adverse events after hip fracture, thus we are carrying out a prospective cohort study, where the primary objective is to compare the effectiveness of OHAT vs HGS to identify complications after hip fracture patients. We identify patients at emergency room arrival, and previous informed consent (either provided by the patient or, in case of dementia, the caregiver) , those patients with hip fracture confirmed by the orthopedic surgeon, are included in the study, besides of the regular approach they have, HGS was measured with a hydraulic Jamar dynamometer, and OHAT is applied to each patient, all laboratory results prior surgery are recorded, they will be followed up at 1 and 12 months after surgery and compare the effectiveness of OHAV vs. HGS to predict complications including mortality, here we present preliminary results.

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NSS111

THE ROLE OF QUANTITATIVE ULTRASOUND IN BONE HEALTH ASSESSMENT: A HISTORICAL OVERVIEW

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Background: For decades, dual-energy x-ray absorptiometry (DXA) has served as the gold standard for diagnosing osteoporosis. However, the search for radiation-free, portable, and cost-effective alternatives led to the development of quantitative ultrasound (QUS). Unlike DXA, which measures mineral density, QUS was conceptualised to capture "bone quality," offering insights into microarchitecture and biomechanical properties such as elasticity.

Methodological Evolution: The foundation of QUS lies in two primary parameters: broadband ultrasound attenuation (BUA) and speed of sound (SOS). The clinical journey began in 1984 when Langton[1] et al. introduced the first application of BUA at the calcaneus. The heel was selected due to its high trabecular content and easy accessibility. This breakthrough paved the way for commercial devices in the 1990s, including the Lunar Achilles and Hologic Sahara, shifting QUS from an experimental tool to a more widely-used clinical modality. Subsequent innovations expanded the technology to peripheral sites, including the radius (UltraScan 650), fingers, and multi-site assessment (Omnisense 7000S).

Evidence and Clinical Utility: Major prospective studies, such as the EPIDOS[2] and SOF studies[3], provided crucial validation, demonstrating that QUS can predict hip fracture risk independently of bone mineral density (BMD). The OPUS study[4] further evaluated a range of devices (e.g., UBIS 5000, DBM Sonic 1200, DTU-one, QUS-2, Achilles+) and confirmed the technology's efficacy. However, the "Black Box" problem—whereby different manufacturers utilised proprietary algorithms—created challenges in standardising results across devices.

Critical Perspective: Despite its advantages in portability and the absence of ionising radiation, QUS faced hurdles in achieving dominance over DXA. The lack of standardised T-score thresholds, limited utility in monitoring treatment response, and device-specific variability hindered its integration into formal diagnostic guidelines. Consequently, DXA remained the primary tool for treatment monitoring and standardised diagnosis.

Conclusion: QUS remains a vital complementary tool rather than a direct replacement for DXA. It excels in low-resource settings, community screening, and large population studies where portability is paramount. By providing a relatively-inexpensive, radiation-free assessment of bone quality, QUS continues to offer "the right tool for the right context."

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NSS112

ULTRASOUND FOR FRACTURE PREDICTION

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Since the 1980's, Quantitative UltraSound (QUS) techniques have presented a significant interest for fragility fracture prediction, due to their non-ionizing nature, their sensitivity to structural and mechanical properties and their portability. Even though the initially introduced for clinical measurements, i.e., Broadband Ultrasonic Attenuation (BUA) and Speed of Sound (SOS) measured at the heel, and the velocity of the first arriving signal (VFAS), measured at the forearm or leg, showed strong evidence and performance comparable to the gold standard DXA, QUS was not yet widely accepted and recognized as standard-of-care in clinical guidelines, partly due to limited clinical evidence, but also because early QUS technologies have been considered to be poorly standardized, user-dependent, and difficult to interpret. This talk reviews the recognition of existing QUS technologies by well-acknowledged international clinical society, summarizes evidence of classical QUS technologies for fracture risk prediction and introduces the physical foundations of emerging techniques, i.e. pulse echo ultrasound (PEUS) [1], Radiofrequency Echographic Multi Spectrometry (REMS) [2], BiDirectional Axial Transmission with Guided Wave Dispersion Analysis (BDAT-GWDA) [3], and Cortical BackScattering (CortBS) [4]. While the two first techniques mainly propose DXA surrogates from ultrasound data measures at leg (PEUS), hip and spine (REMS), the two others (BDAT-GWDA, CortBS) are based on physical modelling and provide interpretable micro-and macrostructural bone properties, such as intracortical pore size distribution, pore density, porosity and cortical thickness. All these techniques have shown fracture discrimination performances comparable to DXA in clinical studies. Part of the future success of the implementation of these approaches will depend on the transparency of utilized algorithms, standardization, comparability between devices and the indisputable additional value to age and anthropometric data in the fracture risk evaluation, to be demonstrated in prospective clinical trials.

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NSS113

NEW APPROACHES AND MEASUREMENT TECHNIQUES

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Dual-energy X-ray absorptiometry (DXA) is the clinical gold standard for assessing fracture risk through the measurement of areal bone mineral density (*aBMD*) at central sites (spine, proximal femur). However, DXA underrepresents cortical bone loss and microstructural deterioration that accounts for most bone loss in older adults. For example, cortical thinning and increased intracortical porosity in long bones are major determinants of bone fragility (1, 2), which are poorly captured by DXA. Tissue remodeling is a key feature of bone tissue to maintain skeletal integrity, occurs at the microscopic length scale and cannot be analyzed by conventional imaging technologies. A new generation of Quantitative Ultrasound Imaging of Bone (QUSIB) technologies has been established during the past years to overcome limitations of first-generation bone QUS with the aim of directly quantifying multiple cortical bone biomarkers associated with skeletal health (3). QUSIB employs sophisticated 2D or 3D high-resolution ultrasound imaging guidance, refraction corrected image reconstruction and model-based spectral analysis of signals backscattered from intracortical pores (CortBS) to estimate cortical microstructure and viscoelastic material properties, resolving pore sizes down to approximately 20 µm.

The talk will compare the physical principles, measurement regions, and parameters measured by established QUS and novel QUSIB technologies, will summarize hopes and promises, fracture-discrimination performance compared with DXA (4, 5) and HR-pQCT, and highlight strengths, clinical findings, limitations, and clinical translation considerations (6).

In summary novel QUSIB methods represent promising, non-ionizing approaches to quantify cortical microstructure and material properties at an accessible site, with potential to improve fracture prediction beyond aBMD. Transparency with respect to measurement and analysis algorithms, reference data, as well as clinical validation in independent prospective studies using incident fractures as endpoints and broader validation across populations are required for clinical adoption.

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NSS114

BREAST CANCER AND BONE METABOLISM

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Breast cancer is one of the most common forms of cancer which affects female patients. The disease is currently treated multimodally and survival rates increase. In modern times the disease may be cured if detected on time and treated accordingly. Breast cancer is treated via surgery, i.e. the cancer is removed surgically with or without excision of the adjacent lymph nodes. Pre-operative chemoradiotherapy may also be applied, if considered necessary. Sequentially, radiotherapy may be applied in order to treat any remaining cancer cells locally. If the patient is premenopausal menopause may be induced. Chemotherapy may also be applied. Following this type of sequential initial treatment the administration of estrogen receptor antagonists such as tamoxifen or aromatase inhibitors such as letrozole may also be used. The multimodal treatment of breast cancer may affect bone metabolism via multiple ways and may induce osteoporosis.

NSS115

BREAST CANCER AND OSTEOPOROSIS

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Breast cancer may be accompanied by osteoporosis. Osteoporosis in the context of breast cancer may be associated with treatment, as breast cancer may be managed by aggressive chemotherapy and radiotherapy which can adversely affect bone metabolism or induce premature menopause. In postmenopausal female patients, breast cancer and osteoporosis are common incidents which affect quality of life. Breast cancer and osteoporosis are both dependent on estrogens. Estrogens reduce fracture risk but they increase the risk of breast cancer. Estrogen treatment is therefore contraindicated in patients with a history of breast cancer. Selective estrogen receptor modifiers (SERMs) hold a great potential in the treatment of both breast cancer and osteoporosis, as they appear to decrease both fracture risk as they have an estrogen agonist effect on bone and breast cancer risk as they have an estrogen antagonist effect on breast tissue. Bisphosphonates may also be applied in the treatment of osteoporosis in breast cancer patients. Alendronate has been shown to decrease overall survival in breast cancer patients.

NSS116

ADJUVANT TREATMENT OF BREAST CANCER AND OSTEOPOROSIS

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Adjuvant treatment of breast cancer with the administration of estrogen receptor antagonists or aromatase inhibitors has been proved effective in the long-term management of the disease. Estrogen receptor antagonists such as tamoxifen have been applied successfully in the treatment of breast cancer. Various reports have shown that the application tamoxifen in the treatment of breast cancer may prevent osteoporosis or it may induce stabilization of bone mineral density. Aromatase inhibitors are effective as adjuvant therapy for breast cancer. They are used as adjuvant treatment for postmenopausal women with estrogen-receptor-positive breast cancer. Aromatase inhibitors reduce endogenous estrogens and induce osteoporosis and arthralgias. An increased risk of bone fractures has been reported in patient with breast cancer on treatment with aromatase inhibitors. Patients on treatment with aromatase inhibitors who develop osteoporosis are at increased risk for musculoskeletal symptoms and bone fractures. The use of calcium supplementation and bisphosphonates reduces the risk of osteoporosis and musculoskeletal symptoms. Monitoring of bone mineral density is essential in the management of patients with breast cancer who receive adjuvant treatment.

NSS117

MANAGEMENT OF OSTEOARTHRITIS

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Treatment should start with acetaminophen for mild or moderate osteoarthritic pain without apparent inflammation. If the clinical response to acetaminophen is not satisfactory or if the clinical presentation of osteoarthritis is inflammatory, consider using a nonsteroidal anti-inflammatory drug. Topical non-steroidal anti-inflammatory drug preparations, particularly diclofenac, are available and may be useful.

In patients with highly resistant pain, consider the analgesic tramadol.

Hydroxychloroquine, which is approved for use in rheumatoid arthritis, has been used off-label in patients with hand osteoarthritis, on the supposition that it might help by relieving synovitis. Duloxetine, a selective serotonin-norepinephrine reuptake inhibitor may also be used to treat osteoarthritis pain. Intra-articular injections with corticosteroid or hyaluronic acid may be used.

NSS118

NON-INFECTIOUS BONE INFLAMMATION THROUGH THE AGES: ONE DISEASE, MULTIPLE FACES

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Sterile bone inflammation encompasses a heterogeneous spectrum of rare autoinflammatory conditions characterized by chronic non-infectious osteitis. This spectrum includes chronic nonbacterial osteomyelitis (CNO), chronic recurrent multifocal osteomyelitis (CRMO), and SAPHO syndrome (synovitis, acne, pustulosis, hyperostosis, and osteitis). The coexistence of multiple terms reflects the complexity of these recently recognized entities, whose underlying mechanisms remain only partially elucidated. Despite growing awareness, misdiagnosis and diagnostic delay remain common, often leading to unnecessary diagnostic procedures, radiation exposure, or prolonged antibiotic therapies.

The pathogenesis of non-infectious bone inflammation is incompletely understood but is increasingly recognized as fundamentally autoinflammatory. A pronounced imbalance in pro- and anti-inflammatory cytokine pathways has been demonstrated (1). Neutrophil-predominant inflammatory responses, overexpression of proinflammatory cytokines such as interleukin-1β, tumor necrosis factor-α, and the IL-17 axis, as well as dysregulation of innate immune pathways, including NLRP3 inflammasome activation, have been reported (2). This inflammasome activation has further been associated with dysregulated expression of immunoregulatory cytokines (IL-10, IL-19) and with possible mutations in genes such as *FBLIM1* and *P2RX7* (1). In addition, an infectious or post-infectious etiology associated with *Propionibacterium Acnes* has been extensively debated and remains debated, notwithstanding pathogen identification in several cases (3).

As for the proposed overlap between SAPHO/CNO and spondyloarthropathies, it remains controversial, even in the presence of some shared clinical features such as psoriasis and inflammatory bowel disease.

Despite complex nomenclature and an incompletely elucidated pathogenesis, recent efforts have resulted in published diagnostic criteria for both adult and pediatric forms (4,5). CNO is commonly used as an umbrella term encompassing all forms of sterile osteitis, whereas CRMO denotes its multifocal, recurrent and severe presentation (4). SAPHO refers to bone inflammation associated with characteristic cutaneous manifestations. Although some authors reserve the term CRMO for pediatric patients and SAPHO for adults, this age-based distinction is increasingly debated. Pediatric cases fulfilling SAPHO criteria have been reported, and several studies describe a pediatric form of SAPHO syndrome, supporting the relevance of defining SAPHO based on the presence of associated skin manifestations rather than age.

Clinical presentation varies with age, although substantial overlap exists. Pediatric patients often present with insidious bone pain involving long bones or the clavicle, whereas adults more frequently exhibit anterior chest wall, spinal, or sacroiliac involvement (6).

The differential diagnosis remains challenging and includes infectious osteomyelitis, malignant bone disease, and systemic disorders such as Langerhans cell histiocytosis.

Monogenetic systemic autoinflammatory disorders with bone

involvement, including Majeed syndrome, deficiency of the interleukin-1 receptor antagonist (DIRA), and pyogenic arthritis, pyoderma gangrenosum and acne (PAPA) syndrome, should be considered in early-onset, severe, or atypical cases (7).

A better understanding of shared mechanisms, nomenclature, and age-related manifestations within the SAPHO/CNO/CRMO spectrum is essential to improve diagnosis, classification, and therapeutic strategies.

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NSS119

CHRONIC NON-BACTERIAL OSTEITIS AND ITS MIMICS: IMAGING THE ENIGMA

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Chronic Non-bacterial Osteitis (CNO) is an uncommon bone disease whose diagnosis relies on the combination of clinical presentation and radiological findings. Imaging plays a key role in the management of CNO, enabling early detection of bone lesions, the exclusion of infectious and neoplastic mimics, and monitoring of disease activity and treatment response.

Conventional radiographs are the first line imaging tool. They are useful in the exclusion of fractures and may identify typical CNO lesions such as osteolysis, sclerosis, hyperostosis, and periosteal reaction. The most frequently affected sites include distal metaphysis, particularly of the lower limb long bones, followed by vertebras (especially thoracic), pelvic bones, chest wall bones, and the medial part of the clavicle, with the latter being considered as very suggestive of CNO [1,2]. However, radiographs have limited sensitivity and could be normal in the early stages of the disease.

Whole-body magnetic resonance imaging (MRI) is considered the gold standard for both diagnosis and the monitoring of CNO. MRI is highly sensitive and contributive in the early inflammatory changes demonstrating T2 STIR-weighted signal changes (bone marrow edema and in some cases soft tissue edema). It also allows the identification of multifocal bone lesions, a key feature of Chronic Recurrent Multifocal Osteitis (CRMO) [1]. T1-weighted sequences are particularly crucial in children and adolescents as they help the differentiation between physiological hematopoietic bone marrow (intermediate T1-weighted signal) and true inflammatory lesions (low T1-weighted signal). **T2 Dixon sequences** are increasingly used in musculoskeletal MRI, offering comparable sensitivity to T2-weighted STIR while enabling better tissue characterization and reduced acquisition time. Diffusion-weighted imaging may be indicated, mainly to exclude malignancy [3]. Although one-third of the patients present with unifocal involvement, the discovery of asymptomatic lesions is common, especially when whole-body MRI is performed [1].

Computed tomography (CT) and whole skeleton technetium-99 m bone scintigraphy are not recommended as first imaging modalities in CNO/CRMO diagnosis, particularly in pediatric population, due to radiation exposure. Nevertheless, Single-Photon Emission Computed Tomography-CT (SPECT-CT) and Positron-Emission Tomography-CT (PET/CT) with a bone-seeking radiotracer may represent reasonable alternatives in adult CNO when MRI is unavailable, inconclusive or not feasible [4,5].

Bone biopsy should be considered in litigious and challenging cases, notably in the case of unusual clinical presentation (fever, acute and rapidly progressive symptoms, weight loss of unique), markedly elevated inflammatory biomarkers or LDH levels, and atypical imaging findings (unifocal lesion, diaphysis or epiphyseal localization, purely lytic lesions without sclerosis, cortical erupting, aggressive periosteal reaction, presence of abscess, marrow replacement, or soft tissues extension). Histology typically shows non-specific inflammatory infiltrate in CNO [1].

CNO remains a diagnosis of exclusion and several potential differential diagnoses must be carefully ruled out. These include infectious osteomyelitis, notably tuberculosis and cat scratch disease (*Bartonella henselae*), malignant bone tumors (leukemia, lymphoma, osteosarcoma), and benign tumors such as osteoid osteoma. Langerhans cell histiocytosis and non-Langerhans histiocytosis may also closely mimic CNO and CRMO on imaging. Langerhans cell histiocytosis is characterized with punched-out lytic lesion without associated sclerosis, most commonly involving the skull, spine and pelvis [1]. Non-Langerhans cell histiocytosis skeletal involvement typically presents as **sclerotic or both lytic and sclerotic bone lesions,** involving the **long bones (especially diaphyseal regions), pelvis, spine, and skull [6].** Moreover, several monogenic autoinflammatory disorders can manifest with osteitis, including deficiency of the interleukin-1 receptor antagonist (DIRA) syndrome—characterized by pustular dermatosis, enlarged ribs, extensive bone involvement with multifocal osteolytic lesions, and marked periostitis, particularly of the proximal femur—Majeed syndrome, which presents with neutrophilic dermatosis and anemia, and the PAPA syndrome (pyogenic arthritis, pyoderma gangrenosum, and acne), associated with cystic acne, psoriasis, and arthritis.

In these conditions, the clinical context (skin lesions and joint involvement) along with genetic testing are useful in establishing the final diagnosis [1,2].

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NSS120

TOWARDS A TAILORED THERAPEUTIC APPROACH TO SAPHO/CRMO: WHAT DOES THE FUTURE HOLD?

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The syndromes synovitis, acne, pustulosis, hyperostosis, and osteitis (SAPHO) and chronic recurrent multifocal osteomyelitis (CRMO) are two rare, distinct, and closely related entities within the spectrum of auto-inflammatory bone disorders. Currently, there are no standardized diagnostic or treatment protocols for SAPHO/CRMO. The existing protocols are largely empirical and based solely on case series and expert opinion. The wide disparity in clinical presentation, coupled with the absence of validated outcome measurement sets to assess disease areas and therapeutic responses, makes treatment even more challenging.

A tailored therapeutic approach to SAPHO/CRMO is currently being implemented. It involves a deeper understanding of auto-inflammatory bone disorders, focusing on molecular pathomechanisms, signaling pathways, and genetic factors, as well as specific clinical symptoms [1,2]. Consequently, the treatment landscape is continuously changing from established drugs to newly introduced ones.

Therapeutic agents are used off-label to treat SAPHO/CRMO, based on treatment approaches for conditions such as psoriasis, severe acne, palmoplantar pustulosis, juvenile/adult psoriatic arthritis and spondyloarthritis. Members of the Childhood Arthritis and Rheumatology Research Alliance (CARRA) have developed consensus treatment plans for CRMO [3], and expert consensus recommendations have been recently put forward for a well-defined management strategy for adult CNO [4].

Treatment strategy and goals include: control of pain and swelling using NSAIDs -as first-line treatment- and Corticosteroids; eradicate focal infections with the use of antibiotics -as infectious factors are incriminated-; manage disease progression with csDMARDS (Methotrexate, Sulfasalazine and less frequently Leflunomide), anti-cytokine biologics and Janus kinase inhibitors as second and third-line treatments; promoting respectively Treg cell differentiation, correcting the imbalance in IL-23/IL-17 axis, JAK/STAT pathways and suppressing the inflammatory response induced by IL-1β, IL-6 and TNFα.

There are no head-to-head comparisons among these treatments, despite current data suggesting higher remission rates in CRMO/SAPHO patients treated with TNFi than those treated with csDMARDs. However, TNFi may be associated with side effects, such as the development of psoriatic dermatoses or the recurrence of palmar pustulosis.

IL-17 inhibitors and IL-23/IL-17 inhibitors should therefore be considered when csDMARDs and TNFα prove ineffective in managing skin symptoms. JAKi has also been shown to significantly improve nail lesions and palmar pustulosis. However, the absence of published evidence regarding the use of JAK inhibitors and IL-17 inhibitors in children with CRMO precludes their current recommendation.

The favourable effects of IL-1 in alleviating joint and osteitis symptoms in SAPHO syndrome, as well as joint and skin symptoms in CRMO, are encouraging. However, the risk-benefit balance must be considered given their potential side effects [2,5].

Serum levels of IL-6 are significantly elevated in patients with SAPHO/CRMO, but current data demonstrate that Tocilizumab efficacy remain limited, although some patients' pain symptoms improved and MRI results showed relief of muscle high signal areas [2,5].

The third area of treatment goals includes bone remodeling therapy with Bisphosphonates (BP) to prevent abnormal bone metabolism resorption and reduce pro-inflammatory cytokines, addressing pain and skeletal dysfunction. Pamidronate was the most commonly used BP and appeared particularly promising, yielding rapid and durable remissions, especially in cases with spinal or mandibular involvement. Rapid response to treatment with Zoledronic acid in combination with the TNFi was also observed. Because of potential side effects and the long biological half-life of BP, their use in CRMO children is limited to refractory cases or vertebral involvement and structural damage.

Despite some reported clinical resolutions in anterior chest wall and axial skeleton involvement in SAPHO, Denosumab efficacy needs to be further elucidated [6].

Biologic and antiresorptive treatments selectively target specific immunological pathways and clinical disease phenotypes, justifying their use in combination therapy when adverse effects and patient condition, particularly among children, are taken into account.

A potential future treatment target may be based on genetic mutations, protein kinase inhibition, mast cell inhibitors, and induced alterations to the microbiome, given their involvement in bone inflammation and microbiome-related disorders such as acne and inflammatory bowel disease [7].

SAPHO/CRMO treatment has not yet been standardized, but a "treat-to-target" therapeutic strategy based on clinical and imaging features has been shown to be effective in disease management with disease control or remission in most patients.

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NSS121

THE BURDEN OF SHOULDER PAIN

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Shoulder pain represents a major and growing global musculoskeletal health challenge, ranking as the third most common musculoskeletal complaint in primary care after low back and knee pain. Its high prevalence, tendency toward chronicity, and substantial functional and socioeconomic consequences position shoulder pain as a critical public health issue across diverse populations and healthcare systems.

Epidemiological evidence demonstrates that shoulder pain is both common and persistent. Although individual prognosis varies widely, approximately 50% of patients presenting with shoulder pain in primary care continue to report symptoms six months later, underscoring its frequent transition to chronicity. Beyond pain, affected individuals often experience significant functional limitations that interfere with work productivity, leisure activities, and social participation, frequently accompanied by psychological distress and reduced quality of life. These consequences translate into a considerable economic burden. A cost-estimation study reported a mean cost of €4,139 per patient, with indirect costs—predominantly related to sick leave—accounting for more than 80% of total expenditures.

Global population-based data confirm the widespread nature of shoulder pain but reveal substantial heterogeneity in reported prevalence and incidence. A comprehensive systematic review synthesizing data from 61 observational studies across high-, middle-, and low-income countries found that community prevalence estimates varied markedly, with a median prevalence of 16% and a wide range (0.67%–55.2%). Longer reference periods were consistently associated with higher prevalence estimates. In contrast, primary care prevalence was lower, ranging from 1.01% to 4.84%. Incidence rates varied from 7.7 to 62 cases per 1,000 person-years, with a median of 37.8 per 1,000 person-years. Shoulder pain was consistently more prevalent among women and more frequently reported in high-income countries. Importantly, variability across studies was not adequately explained by risk of bias—most studies were rated as low risk—but rather reflected differences in case definitions, reference periods, study methodologies, and population characteristics. Notably, data from low-income regions remain scarce, limiting accurate estimation of the true global burden.

From an etiological perspective, most cases of shoulder pain arise from disorders of the periarticular soft tissues or the glenohumeral and acromioclavicular joints. The most common causes include rotator cuff–related disorders (tendinopathy and tears), shoulder impingement, adhesive capsulitis, glenohumeral or acromioclavicular osteoarthritis, instability syndromes, calcific tendinitis, and bursitis. Traumatic etiologies—such as fractures and dislocations—are less frequent but clinically critical. In addition, shoulder pain may originate from cervical spine pathology, brachial plexus involvement, or referred pain from visceral conditions, including cardiopulmonary or intra-abdominal disease. This broad differential diagnosis necessitates a systematic and clinically vigilant approach.

Initial clinical evaluation should integrate a detailed history and focused physical examination, with particular attention to identifying red flags that may indicate serious underlying pathology. These include a history of significant trauma, suspected fracture or dislocation, signs of systemic infection, previous or current malignancy, unexplained weight loss, severe or progressive night pain, and evolving neurological deficits. The presence of fever, chills, night sweats, joint warmth, erythema, or acute swelling should raise suspicion for septic arthritis or osteomyelitis, particularly in immunocompromised individuals or following recent surgery or injection. Constant, non-mechanical pain unrelieved by rest—especially in patients with a history of cancer—should prompt evaluation for metastatic disease. Progressive weakness, sensory loss, or signs of cervical myelopathy warrant urgent assessment for neurological compromise. Finally, shoulder pain associated with chest pain, dyspnea, or abdominal symptoms should alert clinicians to possible referred visceral pathology.

In conclusion, shoulder pain constitutes a highly prevalent, heterogeneous, and disabling condition with profound individual and societal consequences worldwide. Addressing its global burden requires not only improved prevention and management strategies but also greater methodological standardization in epidemiological research and increased representation of low-income regions. A structured clinical approach, grounded in early recognition of red flags, remains essential to optimize outcomes and reduce the long-term impact of this common yet complex disorder.

NSS122

ASSESSMENT AND DIAGNOSTIC APPROACH OF SHOULDER PAIN

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Shoulder pain is a common musculoskeletal complaint that may be due either to intrinsic disorders of the shoulder or referred pain. The intrinsic disorders include injuries and acute or chronic degeneration or inflammation of the shoulder joint, tendons, surrounding ligaments, or periarticular structures. Therefore, the assessment and diagnostic approach for shoulder pain require a meticulous systematic integration of clinical history, physical examination, and selective imaging to differentiate between intrinsic shoulder pathology and extrinsic sources of pain.

Obtaining a detailed clinical history is essential for determining the etiology of pain and identifying "red flags" that require urgent investigation, such as malignancy, infection, or acute trauma with suspected fracture. In demographics patients' age, occupation and recreational activities and sports are very important. Age is a primary predictor for diagnosis; younger patients more frequently present with acute injuries and instability, while those older than 40 are at higher risk for rotator cuff (RC) tears, adhesive capsulitis, and osteoarthritis. Occupation and sports may also cause and exacerbate the symptoms. A standard pain history (ie, onset, duration, palliation/provocation, character, severity, location, radiation and coexisting symptoms) helps to identify diagnosis. The traumatic onset may indicate fractures or acute tears, while insidious onset repetitive motions and overuse often suggest impingement or degenerative tendinopathy. Severe pain with sudden onset may imply calcific tendinitis. The location and the character of pain are also important. While pain at the lateral deltoid is typically related to rotator cuff pathology, the anterior-superior pain often localizes to the acromioclavicular (AC) joint. Night pain is a hallmark of RC tears and adhesive capsulitis. Coexisting symptoms, such as active and passive range of motion limitation, weakness, numbness, swelling, crepitation and instability must be investigated. Comorbid conditions such as diabetes and thyroid disease have a strong association with adhesive capsulitis.

Physical examination with a structured sequence: inspection, palpation, range of motion (ROM), strength, and provocative tests must be done carefully. Clinicians should begin with inspection of skin, scars, swelling, symmetry, scapula and size. Any size alterations such as muscle atrophy (e.g., supraspinatus/infraspinatus) suggests chronic tears. And proceed with careful palpation for localized tenderness, such as over the AC joint, subacromial space or bicipital groove. A novel, simplified algorithm triages patients based on the presence or loss of ROM. Loss of active but preserved passive ROM often indicates rotator cuff pathology or tears. Loss of both active and passive ROM suggests adhesive capsulitis or glenohumeral joint osteoarthritis or dislocations. Some patients may have preserved ROM; the diagnosis is made by using specific special tests. The use of special provocative tests and their combinations to confirm or to rule out a diagnosis of tendinopathy or of full-thickness rotator cuff tears is essential. The Hawkins and Neer tests assess for subacromial impingement; the Empty Can (Jobe) test evaluates the supraspinatus; and the External Rotation Resistance test assesses the infraspinatus. Speed's and Yergason's tests are sensitive for biceps tendinopathy. The crossbody adduction (scarf) test is highly sensitive for AC joint pathology. Apprehension and relocation tests evaluate for glenohumeral instability.

Diagnostic imaging should be utilized when the diagnosis remains unclear, or the outcome would alter management. Plain radiography is the initial diagnostic modality recommended for both acute and chronic pain to delineate bony anatomy, fractures, and degenerative changes like joint space narrowing or osteophytes. Ultrasound (US) is a cost-effective tool with accuracy comparable to MRI for identifying full-thickness RC tears. It allows for dynamic assessment and is useful for detecting bursitis and calcific tendinosis. Magnetic Resonance Imaging (MRI/MRA) is indicated for complex cases, suspected labral pathology, or massive RC tears. MR arthrography is considered the gold standard for intra-articular pathology like SLAP tears. Computed Tomography (CT) is preferred for detailed evaluation of fracture patterns, glenoid bone stock in recurrent instability, and preoperative planning for joint replacement.

Clinicians must distinguish shoulder-related pain from extrinsic sources for differential diagnosis. A distinguishing characteristic of referred pain, in contrast with intrinsic shoulder problems, is that shoulder movement is normal and does not alter the character of the pain. A careful history can often distinguish between the causes of referred shoulder pain especially from visceral organs. Cervical spine pathology can mimic shoulder pain but typically radiates below the elbow and is elicited by neck movements. Other potential causes include thoracic outlet syndrome (presenting with neurovascular symptoms) and brachial neuritis (characterized by sudden, severe pain followed by weakness).

NSS123

TREATMENT PATHWAYS IN SHOULDER PAIN: PHARMACOLOGICAL MANAGEMENT

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Common causes of shoulder pain, after ruling out the red flags, include rotator cuff tendinopathy or tear, adhesive capsulitis, glenohumeral or acromioclavicular osteoarthritis, glenohumeral instability, and calcific tendinitis. Goals in the management of shoulder pain is to control pain and inflammation, improve and/or preserve joint mobility, restore trunk muscle posture and scapula-humeral rhythm, increase muscular strength and endurance, and restore functioning in daily activities and social participation. The first-line therapeutic approaches generally include pharmacological treatments and physical and rehabilitation interventions. Pharmacological therapies are usually administered to reduce inflammation and pain, thereby enabling movement and rehabilitation. They must be tailored to the specific shoulder disorder and its severity as well as the age and comorbidities of the patient. They are always combined with patient education for rest and activity modification, and exercises.

Commonly prescribed and suggested first-line medical treatments in most shoulder pathologies are systemic paracetamol and non-steroidal anti-inflammatory drugs (NSAIDs). Topical NSAIDs and capsaicin can be used for superficial lesions in patients who have contra-indication for systemic NSAIDs. Short-course opioids and muscle relaxants can be prescribed for patients who have severe pain and/or sleep disturbance unresponsive to first-line medications. Subacromial corticosteroid injections are recommended for rotator cuff disease, although multiple injections are not suggested in full rotator cuff tears. Intra-articular corticosteroids are indicated for adhesive capsulitis (with or without hyrodilatation) as well as glenohumeral and acromioclavicular osteoarthritis. Subacromial corticosteroid injections and needling, as well as ultrasound-guided needle lavage, may be helpful in calcific tendinitis.

Other local medications commonly used in painful shoulder disorders are hyaluronic acid and platelet-rich plasma (PRP) injections, although there is controversy about their use in various guidelines. Some guidelines are in favor of hyaluronic acid injections in rotator cuff disease and glenohumeral osteoarthritis, whereas PRP injections are usually not

recommended. However, recent systematic reviews and meta-analyses have shown the positive effects of both hyaluronic acid and PRP injections as well as prolotherapy in rotator cuff disease. Intra-articular hyaluronic acid injections showed consistent and modest benefits on pain and function in shoulder osteoarthritis. The beneficial effects of PRP injections on pain and function in adhesive capsulitis have also been documented by recent meta-analyses.

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NSS124

REHABILITATION OF SHOULDER PAIN-RELATED CONDITIONS

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Shoulder pain is a highly prevalent musculoskeletal condition for which clinical practice guidelines universally recommend conservative rehabilitation, particularly active exercise therapy and patient education, as the primary first-line treatment strategy prior to considering surgical interventions. There is strong consensus across clinical practice guidelines that active rehabilitation is the primary intervention for rotator cuff (RC) tendinopathy. Prescribing an exercise program is universally recommended. Recommended exercise components include range of motion (ROM), strengthening, and motor control exercises. Moderate-quality evidence indicates that both supervised and home-based exercise programs are effective in improving pain and function in the short and longterm. Patient education focusing on relative rest and activity modification is considered an essential component of rehabilitation. Manual therapy is widely supported but is generally recommended as an adjunct to exercise rather than as a standalone intervention. Evidence for physical agents and passive modalities is mixed, and several guidelines recommend against their routine use due to a lack of robust benefit compared with active therapy. There is moderate evidence supporting the effectiveness of high-energy extracorporeal shock wave therapy for calcific rotator cuff tendinitis; however, for non-calcific tendinopathy, the evidence is inconclusive or unfavorable.

Conservative rehabilitation is also a primary treatment option for most rotator cuff tears, especially degenerative tears, with outcomes often comparable to surgery in the short to medium term. Exercise prescription is universally recommended for the management of full-thickness RC tears, with programs typically including ROM and strengthening exercises. Physical therapy protocols centered on exercise have been shown to be effective for improving function. However, one high-quality study reported that although physical therapy is effective, surgical tendon repair may result in superior outcomes at long-term follow-up (approximately five years). Manual therapy is generally supported as an adjunct to exercise rather than a definitive treatment. Low- to moderate-quality evidence suggests that manipulation and mobilization may be effective for RC disorders, either alone or in combination with other therapies. Accordingly, guidelines classify manual therapy as "recommended" or "may be recommended" for full-thickness tears. Evidence supporting physical agents and passive modalities remains mixed. Although rehabilitation is the first-line approach for many patients, guidelines specify indications for surgical referral. Referral is recommended for acute traumatic full-thickness tears, especially in younger patients with significant functional impairment. Surgery is also indicated when there is no meaningful improvement after a defined period of conservative care, typically 6 to 12 weeks in some guidelines or 3 to 6 months in others.

Adhesive capsulitis is a common musculoskeletal disorder characterized by pain and progressive restriction of shoulder mobility, leading to substantial functional impairment. In primary (idiopathic) adhesive capsulitis, no underlying etiology can be identified, whereas in secondary adhesive capsulitis, an associated condition or cause is present. Rehabilitation is a core component of management, although the strength of evidence varies across interventions. Manual therapy, particularly ROM exercises, is conditionally recommended to improve shoulder mobility and upper limb function. Mobilization with movement techniques have demonstrated superiority over passive stretching for short-term pain reduction and functional improvement. Self-stretching exercises are supported by expert consensus as an adjunctive strategy, provided that patients adhere to proper technique. High-quality trials have shown that supervised physical therapy combined with a home exercise program may be similarly effective to a home exercise program alone. There is low-to moderate-quality evidence supporting the use of low-level laser therapy for pain relief and functional improvement, either as a standalone intervention or in combination with exercise, and some guidelines strongly recommend it for pain management. Transcutaneous electrical nerve stimulation may also be considered for pain relief. Evidence for deep heat therapy is insufficient or inconclusive, although some guidelines suggest it may be recommended. Injections are frequently used to facilitate rehabilitation by reducing pain and inflammation. Intra-articular corticosteroid injection is considered a cornerstone treatment and is strongly recommended to improve pain and function. Combining

corticosteroid injections with physical therapy provides greater clinical benefit than physical therapy alone. Hydrodilatation, particularly when combined with intra-articular corticosteroids, is recommended, and intensive mobilization immediately following hydrodilatation is considered a promising adjunct. Suprascapular nerve block may be considered for pain relief and has demonstrated superior pain reduction compared with physical therapy alone in some studies. Hyaluronic acid injections are generally viewed as a second-line option when corticosteroids are contraindicated or not feasible. Although frozen shoulder is often described as a self-limiting condition, not all patients experience complete spontaneous recovery, and some may develop long-term disability. This underscores the importance of active and effective management rather than a passive "wait-and-see" approach. Current guidelines indicate insufficient evidence to support manipulation under anesthesia over other treatment options. Given the associated risks, including fractures and rotator cuff tears, intra-articular corticosteroid injections should be considered before manipulation. Hydrodilatation is often preferred over manipulation due to lower cost and a reduced risk of complications. Surgical capsular release is typically reserved for patients who fail to respond to comprehensive conservative management.

NSS125

INTRODUCTION IN OSTEOSARCOPENIA AND FALLS

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The term osteosarcopenia has recently been used to denote a clinical syndrome that integrates the biochemical, physiological, and clinical characteristics of osteoporosis and sarcopenia. This syndrome illustrates the intricate interconnection between bone and muscle health, wherein simultaneous deterioration of bone density and muscle mass, strength, and function results in a compounded escalation of frailty and physical susceptibility. Consequently, osteosarcopenia has become a significant factor in falls, fractures, disability, and the loss of independence in older adults. Although osteosarcopenia is increasingly acknowledged as a critical geriatric illness, data for its optimum management, especially regarding structured exercise programs, remains scarce. This disparity is significant, as exercise is universally acknowledged as fundamental to fall prevention and is recognized for its advantageous effects on bone and muscle via mechanical loading, neuromuscular adaptation, and enhancements in balance and functional performance. The recent release of the World Falls Guidelines signifies a significant advancement in evidence-based fall prevention; nonetheless, the application and execution of their proposed exercise routines for individuals with osteosarcopenia remain ambiguous. Most current exercise guidelines focus on osteoporosis or sarcopenia separately, rather than the concurrent disease that defines osteosarcopenia. Therefore, there is an urgent need for research that assesses specialized, integrated exercise programs designed for this demographic, to enhance clinical practice and refine fall prevention measures in older persons with concurrent bone and muscle deficiencies.

NSS126

EXERCISE AND FALLS: PROTOCOLS FROM WORLD FALLS GUIDELINES

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In persons with osteosarcopenia, exercise regimens for fall prevention must be expressly linked with the World Falls Guidelines, considering the concurrent muscle and bone pathology inherent to this illness. In osteosarcopenia, fall prevention exercises can be implemented by combining the Otago Exercise Program with the World Falls Guidelines. Otago provides a gradual balance and lower limb strengthening program that adheres to guideline specifications for personalized, appropriately calibrated therapies. Balance training is fundamental, resistance exercise addresses sarcopenic weakness and facilitates bone loading, while walking serves as an adjuvant once balance is enhanced. This integrated framework tackles simultaneous muscle and bone deficiencies, even in the lack of condition-specific guidelines. Balance-challenging exercises are the key intervention and should be administered at an adequate frequency (≥3 hours per week), incorporating gradual lowering of the base of support, dynamic weight shifting, and functional perturbations, as balance deficits are a principal contributor to falls in this demographic. Resistance and power training focused on the lower extremities are crucial to combat sarcopenic weakness and delayed force generation, and must be combined with safe, gradual mechanical loading to promote bone adaptation while minimizing fracture risk. Task-specific exercises, such as transfers, turning, and stair negotiation, are essential for improving the application of training effects to daily tasks, where falls predominantly happen. Walking independently is inadequate and may elevate the danger of falls unless accompanied by enhancements in balancing ability. Mind–body exercises like Tai Chi may be suitable for persons with mild impairment but necessitate modification for those with advanced osteosarcopenia. Exercise regimens must be tailored, progressive, and sustained, with meticulous oversight throughout initial stages to guarantee safety and compliance. The World Falls Guidelines, while not specific to osteosarcopenia, offer a systematic approach for comprehensive fall prevention strategies addressing the combined deficiencies of muscle and bone. This highlights the critical necessity for condition-specific trials to optimize dosage, progression, and safety parameters in this high-risk demographic.

NSS127

QUESTIONNAIRES AS A TOOL FOR FALLS PREVENTION IN OSTEOSARCOPENIA

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A variety of questionnaires have been created to detect older adults at risk of falling; however, none has been explicitly validated for individuals with osteosarcopenia. This signifies a significant limitation, as osteosarcopenia amalgamates the functional repercussions of both sarcopenia and osteoporosis, potentially modifying fall processes and risk profiles in comparison to either condition independently. The SARC-F questionnaire is a validated and often utilized screening

instrument for sarcopenia, incorporating a component pertaining to falls; yet its principal aim is to detect sarcopenia rather than evaluate fall risk. Thus, SARC-F is deficient in sensitivity and breadth necessary to serve as a specialized fall risk screening tool for older people with osteosarcopenia. Consequently, there is a distinct necessity to discover or modify surveys with falls as the key endpoint for this demographic. Accurate fall risk assessment is crucial for risk stratification, directing personalized rehabilitation strategies, and enhancing the selection and intensity of fall prevention measures. This part will examine current falls surveys that may effectively identify older people with osteosarcopenia at heightened risk of falling.

NSS128

DOUBLE BURDEN, SINGLE PATIENT: BARRIERS TO PHYSICAL ACTIVITY IN OLDER ADULTS WITH KNEE OSTEOARTHRITIS AND TYPE 2 DIABETES

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Objective(s): To identify key behavioural and contextual barriers to self-management in older adults living with coexisting knee osteoarthritis (OA) and type 2 diabetes mellitus (T2DM), and to determine how these barriers shape engagement in physical activity and symptom management.

Material and Methods: This qualitative study involved 16 community-dwelling adults aged ≥60 years with clinically diagnosed knee OA and T2DM, recruited from community centres and primary care clinics in Kuala Lumpur and Selangor, Malaysia. Semi-structured interviews explored experiences related to pain, fatigue, physical activity, and daily management. Interviews were audio-recorded, transcribed verbatim, and analysed thematically using the Theoretical Domains Framework (TDF) to systematically identify behavioural, psychosocial, and environmental determinants.

Results: Participants (mean age 69.6 ± 5.0 years) described barriers across ten TDF domains. Central barriers included low perceived capability and motivation driven by pain, ageing, fatigue, obesity, and diabetes-related concerns, alongside limited optimism regarding exercise benefits. Structural constraints such as financial cost, transport limitations, and competing self-management demands restricted physical activity. Social influences, including lack of companionship and family discouragement, further reduced adherence. Fear of pain exacerbation or falls, emotional distress, reduced physical capacity, and low digital literacy compounded difficulties in sustaining active behaviours.

Conclusions: In older adults, the coexistence of knee OA and T2DM creates a compounded barrier profile that directly undermines physical activity and functional recovery. These findings demonstrate that standard knee OA management approaches are insufficient for individuals with diabetes. Integrated, behaviour-informed, and diabetes-sensitive musculoskeletal care models are urgently needed to address obesity, physical inactivity, and social support gaps, with clear implications for clinical practice and service design in ageing populations.

NSS129

MANAGEMENT OF KNEE OSTEOARTHRITIS IN OLDER ADULTS WITH DIABETES MELLITUS IN LOW RESOURCE SETTING: A QUALITATIVE STUDY AMONG MALAYSIAN HEALTHCARE PROVIDERS

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Objective: To explore the barriers and enablers influencing healthcare providers' (HCPs) assessment and management of knee osteoarthritis (KOA) among adults with type 2 diabetes mellitus (T2DM) in Malaysia, guided by the Theoretical Domains Framework (TDF).

Material and Methods: Twelve semi-structured video interviews were conducted with family medicine specialists, endocrinologists, geriatricians, general practitioners, rheumatologists, and orthopedic surgeons who manage patients with KOA and T2DM across diverse Malaysian healthcare settings. Interviews lasted 30–45 minutes, were transcribed verbatim, and analyzed deductively using the TDF. Thematic analysis within each domain identified belief statements and behavioral determinants shaping clinical practice.

Results: Six major TDF domains emerged. (1) Knowledge: Participants reported limited understanding of dual-condition management and highlighted the need for structured clinical guidelines. (2) Skills: HCPs emphasized holistic, multidisciplinary care but cited difficulties coordinating between specialties. (3) Intentions: Empowering patients through shared decision-making and education was prioritized. (4) Professional Role and Identity: Primary-care physicians viewed themselves as coordinators but experienced ambiguity in inter-professional responsibilities. (5) Environmental Context and Resources: Time constraints, workforce shortages, and financial barriers hindered comprehensive care. (6) Social Influences: Patient pain, low motivation, socioeconomic challenges, and cultural norms affected adherence to treatment and lifestyle recommendations. Despite these challenges, participants endorsed the need for integrated, patient-centred management that concurrently addresses joint and metabolic health.

Conclusion: This study identifies multi-level behavioral and systemic factors affecting the management of KOA and T2DM in Malaysia. Addressing knowledge gaps, establishing clear multidisciplinary pathways, and improving resource allocation are critical to enable effective, person-centred multimorbidity care. Findings provide evidence to inform the development of integrated interventions within the i-MOAD framework.

NSS130

DEVELOPMENT OF COMPLEX INTERVENTION FOR OLDER MALAYSIANS LIVING WITH OSTEOARTHRITIS WITH DIABETES MELLITUS (I-MOAD) STUDY

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Objective: This study aimed to design a comprehensive, theory-based intervention to assist primary healthcare providers (HCPs) in delivering integrated, patient-centred care for older adults living with knee osteoarthritis (KOA) and type 2 diabetes mellitus (T2DM) in Malaysia.

Materials and Methods: Intervention development followed the UK Medical Research Council (MRC) framework and was informed by the Theoretical Domains Framework (TDF). The process comprised four sequential phases. Initially, priority behaviours and relevant professional groups were identified through a scoping review and stakeholder engagement. Next, semi-structured interviews were undertaken with 16 adults with KOA and T2DM, 12 healthcare providers, and 12 physiotherapists to identify perceived barriers and facilitators to integrated KOA–T2DM care. Subsequently, identified behavioural determinants were systematically linked to appropriate Behaviour Change Techniques (BCTs) to inform potential intervention components. In the final phase, stakeholders assessed the proposed intervention for feasibility and acceptability using the APEASE criteria, resulting in the development of a programme theory to support implementation.

Results: Major barriers to effective care included insufficient knowledge, reduced self-efficacy, avoidance of physical activity due to pain, and contextual and environmental limitations. A total of fifteen BCTs were selected, forming a multidimensional intervention addressing KOA–T2DM management, dietary practices, and physical activity. The intervention was designed to be delivered through self-management booklets, exercise monitoring logs, and optional digital support. Stakeholder feedback indicated that the intervention was culturally appropriate, feasible to implement, and acceptable within the primary care setting.

Conclusion: The i-MOAD intervention represents a structured, theory-informed, and stakeholder-driven strategy for the integrated management of KOA and T2DM. It has the potential to enhance self-management behaviours, functional outcomes, and coordination of care within primary healthcare.

Disclosures:The authors declare no conflicts of interest.

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Abstract Book

Posters Abstracts



P101

EFFECTIVENESS OF PLATELET-RICH PLASMA, HYALURONIC ACID, AND COMBINED THERAPY IN THE TREATMENT OF KNEE OSTEOARTHRITIS AS ASSESSED BY THE VISUAL ANALOGUE SCALE

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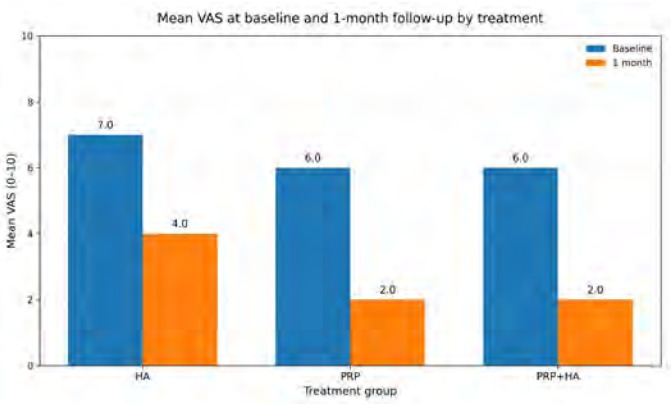
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Guatemalan therapeutic management of osteoarthritis (OA) patients includes analgesics and anti-inflammatories, as well as non-pharmacological interventions, such as physiotherapy and, in advanced stages, resorting to surgical procedures. The limited availability of cutting-edge therapies, such as ortho-biologics, represent a challenge in the national context.

Objective To evaluate the effectiveness of platelet-rich plasma (PRP), hyaluronic acid (HA) and their combined therapy in the treatment of knee OA, measured using the Visual Analogue Scale (VAS).

Material and Methods A cohort study was conducted including 135 patients with Kellgren–Lawrence grade I–III knee OA, selected from a population of 207 patients, calculated with a 95% confidence level. Patients were assigned into three groups: PRP (n=45), HA (n=45) and PRP+HA (n=45). Pain intensity was measured using the VAS at baseline and at days 5, 10, 15 and one month after treatment. Data from 2022–2025 were analyzed using one-way ANOVA and Tukey HSD tests.

Results At 1 month, VAS pain scores decreased in all groups and were significantly lower with PRP and PRP+HA than with HA (one-way ANOVA $p<0.001$; Tukey $p<0.001$), with no difference between PRP and PRP+HA ($p=0.350$).



Conclusions PRP and PRP+HA provided greater pain reduction than HA alone at one month of follow-up according to VAS scores. These findings are consistent with the analgesic and anti-inflammatory effects attributed to PRP, while HA provides viscosupplementation by improving synovial lubrication and viscoelasticity. Although the combined therapy showed slightly greater clinical improvement, it was not statistically superior to PRP alone. The results support the use of PRP-based therapies when early pain relief is the primary therapeutic objective in symptomatic knee OA.

P102

WOMAC SCALE FUNCTION-FOCUSED: OUTCOMES OF PLATELET-RICH PLASMA, HYALURONIC ACID AND THEIR COMBINED THERAPY IN KNEE OSTEOARTHRITIS

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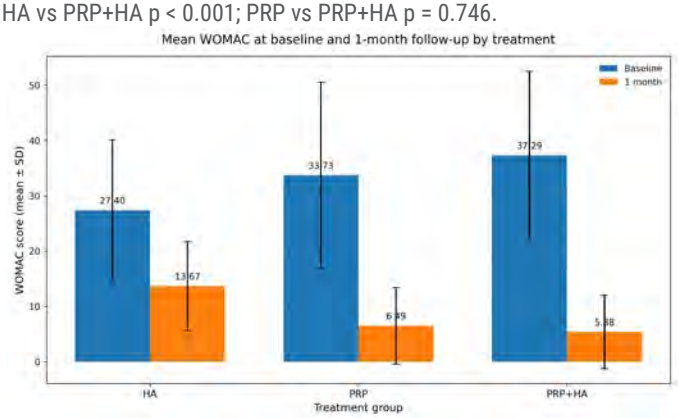
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Knee osteoarthritis (OA) is a common degenerative condition and a major cause of pain and disability. Due to the variable response to conventional treatments, intra-articular therapies such as platelet-rich plasma (PRP) and hyaluronic acid (HA) have gained relevance for their potential to modulate inflammation, improve synovial viscosity, and enhance joint function. Although both treatments have demonstrated clinical benefits, comparative evidence remains limited.

Objective: To compare the effectiveness of PRP, HA, and their combined therapy in the treatment of knee osteoarthritis using the WOMAC scale.

Material and Methods: A cohort study was conducted including 135 patients selected from a population of N=207 with knee OA grades I–III (Kellgren–Lawrence). Participants were allocated into three groups: PRP (n=45), HA (n=45), and PRP+HA (n=45). Treatments followed standardized protocols. WOMAC scores were recorded at baseline and one month after treatment. Data collected from 2022–2025 were analyzed using one-way analysis of variance (ANOVA) and Tukey HSD post-hoc testing.

Results: Mean WOMAC decreased from 27.40 ± 12.72 to 13.67 ± 8.03 (HA), 33.73 ± 16.81 to 6.49 ± 6.89 (PRP), and 37.29 ± 15.24 to 5.38 ± 6.65 (PRP+HA) at 1 month (Figure); ANOVA $p < 0.001$, Tukey: HA vs PRP and HA vs PRP+HA $p < 0.001$; PRP vs PRP+HA $p = 0.746$.



Conclusions:
All treatments produced meaningful improvements in WOMAC scores at

1 month. Mean WOMAC at 1 month was lowest in the PRP+HA group (5.38 ± 6.65), followed by PRP (6.49 ± 6.89), while HA showed the highest residual score (13.67 ± 8.03). HA resulted in significantly higher WOMAC scores than PRP and PRP+HA (both $p < 0.001$), indicating less short-term symptom and function improvement. No significant difference was observed between PRP and PRP+HA ($p = 0.746$), suggesting comparable short-term outcomes with PRP-based regimens. Longer follow-up studies are needed to evaluate durability of benefit and whether combination therapy provides added value over PRP alone over time.

P103

HIGH BURDEN OF OVERWEIGHT AND OBESITY IN KNEE OSTEOARTHRITIS: A RETROSPECTIVE STUDY FROM QUETZALTENANGO, GUATEMALA

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Introduction

Knee osteoarthritis (OA) is a major driver of pain and disability. Excess body weight is a modifiable determinant of knee OA mainly due to mechanical overload. On the other hand systemic low-grade inflammation is consistently linked to worse symptomatic burden. Guatemala-specific clinical data describing BMI profiles among patients with knee OA are limited, constraining locally tailored weight-management strategies aimed at reducing knee pain and improving function.

Objective

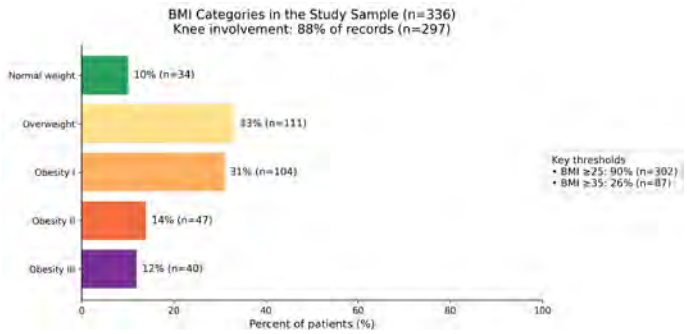
To describe the distribution of body mass index (BMI) among patients with knee osteoarthritis treated at a musculoskeletal research center in Quetzaltenango, Guatemala.

Methods

We conducted a retrospective descriptive study of medical records from 2017–2025. From a source population of 762 patients, 336 records were selected using a 95% confidence level for sample size estimation (Z=1.96; p=0.5; q=0.5; E=0.05). For the present report, we focused on patients with knee involvement (n=297). Radiographic OA was classified using Kellgren–Lawrence grades I–III. BMI was categorized as normal weight, overweight, and obesity grades I–III. Descriptive analyses were performed using IBM SPSS.

Results

Among 336 patients with radiographic osteoarthritis (Kellgren–Lawrence I–III), knee involvement was documented in 297 records (88%). The cohort was predominantly female (75%), with a median age of 56 years (range 15–79). BMI distribution revealed a marked excess-weight burden: normal weight 10% (n=34), overweight 33% (n=111), obesity grade I 31% (n=104), obesity grade II 14% (n=47), and obesity grade III 12% (n=40). Overall, 90% of patients had BMI ≥25 kg/m² (n=302) and 26% had BMI ≥35 kg/m² (n=87) (Figure 1).



Conclusion

In this Quetzaltenango clinical cohort with predominantly knee OA, overweight and obesity were highly prevalent, including a substantial proportion with severe obesity. These findings support integrating structured weight-management pathways into knee OA care in Guatemala and highlight the need for prospective local studies linking BMI to standardized knee pain and functional outcomes.

P104

COMPARATIVE RESPONSIVENESS OF THE VISUAL ANALOGUE SCALE AND WOMAC PAIN SUBSCALE IN KNEE OSTEOARTHRITIS

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Introduction

Knee OA is a major cause of chronic pain and disability worldwide, making accurate assessment of pain and its response to treatment essential for both clinical practice and research. Patient-reported outcome measures such as the VAS and the pain subscale of the WOMAC are widely used to quantify pain in knee OA. While the VAS provides a simple global measure of pain intensity, the WOMAC pain subscale evaluates pain across specific functional activities, potentially offering greater sensitivity to treatment-related changes. In resource-limited settings such as Guatemala, understanding the comparative responsiveness of these instruments can help optimize follow-up and guide clinical decision-making.

Objective

To evaluate and compare the responsiveness of VAS and WOMAC pain subscale in detecting changes in pain intensity before and after treatment in patients with knee osteoarthritis.

Materials and Methods

A comparative study was conducted on a sample of 135 patients diagnosed with knee OA. Pain intensity was assessed using two instruments: the WOMAC pain subscale (original range 0–20) and the VAS (original range 0–10 points). To ensure metric comparability, VAS scores were mathematically normalized to a 0–20 scale prior to data processing. Statistical analysis was performed using SPSS software, applying descriptive statistics (mean and standard deviation) and the independent samples Student's t-test to determine significant differences

between the mean scores of the instruments.

Results

The comparative analysis revealed statistically significant differences between the instruments (p = 0.019). The WOMAC subscale reported a higher mean score (6.58 ± 3.66) compared to the normalized VAS mean (5.60 ± 3.12). The Student's t-test confirmed this discrepancy, indicating that the WOMAC scale records a higher pain intensity.

Conclusions

The results indicate that the WOMAC pain subscale demonstrates greater sensitivity for detecting pain symptoms compared to the VAS (p = 0.019). While the VAS tends to underestimate pain (mean: 5.60), the multidimensional structure of the WOMAC produced significantly higher scores (mean: 6.58). It is concluded that WOMAC is the most suitable instrument for identifying residual functional pain that the global VAS measurement overlooks, and its use is recommended when a comprehensive assessment of therapeutic efficacy is required.

P105

CONSERVATIVE TREATMENT USING PLATELET-RICH PLASMA ON A PARTIAL TEAR OF THE ANTERIOR CRUCIATE LIGAMENT (ACL): A GUATEMALAN CASE REPORT

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Introduction: Partial anterior cruciate ligament (ACL) injuries represent a diagnostic and therapeutic challenge due to clinical, functional heterogeneity and the risk of progression to complex rupture, especially in young active patients. In adolescents, management requires additional caution to not harm the growth plates and to avoid complications. Conservative management with orthobiologics such as platelet-rich plasma (PRP) has gained interest, but in Guatemala these therapies remain incipient, with limited standardization and specialized centers for management and rehabilitation due to limited health care access.

Objective: To describe the clinical and functional evolution of a partial ACL tear treated conservatively with intra-articular PRP in a young patient.

Case Report: A 15-year-old male patient in Western Guatemala presented with left knee pain and functional limitation of 13 weeks after a soccer injury. Physical examination shows a positive Lachman test, decreased diameter of the left quadriceps femoris, a 10/10 on the Visual Analogue Scale (VAS) and a 26 points on the WOMAC scale. MRI confirmed the presence of a partial ACL injury.

Results: Intra-articular PRP was performed on the left knee (PRP volume per injection 9 mL), with a physiotherapy program focused on strengthening the quadriceps and hamstrings. At one month follow-up, the patient presented partial clinical improvement, with a 5/10 VAS and a 10 WOMAC score; therefore, a second PRP treatment was indicated at eight weeks. At the three month evaluation patient showed pain free (VAS 0/10), significant functional improvement (WOMAC 2 points), and a negative Lachman test.

Conclusion The use of PRP as treatment of partial ACL injuries shows a significant pain reduction, functional and knee stability improvement. This case shows that PRP, combined with a structured rehab program, can be a therapeutic alternative to preserve ligamentous integrity and avoid surgical interventions at an early age.

P106

THE FREQUENCY OF OSTEOSARCOPENIA IN AXIAL SPONDYLOARTHRITIS AND ITS RELATIONSHIP WITH CLINICAL PARAMETERS

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Objectives: Osteoporosis is a clinical manifestation of Axial Spondyloarthritis (AxSpA) due to inflammation and immobilization. Similarly, sarcopenia may also develop in AxSpA. Osteosarcopenia may be a significant cause of morbidity and mortality in AxSpA. This study aimed to determine the frequency of osteosarcopenia in patients with AxSpA and investigate its relationship with clinical parameters.

Material and Methods: A total of 97 AxSpA patients (mean age 45, 56% male) and 97 age- and sex-matched healthy controls were included. Osteoporosis was diagnosed using dual-energy X-ray absorptiometry (DXA). Sarcopenia was determined using the European Working Group on Sarcopenia in Older People-2 (EWGSOP2) algorithm, which included measurements of grip strength, muscle mass (measured via DXA and bioelectrical impedance analysis), and physical performance (4-meter walking speed test). The frequency of participants with osteoporosis, as well as probable, definite, and severe sarcopenia were investigated. Osteosarcopenia was defined as the co-existence of osteoporosis and sarcopenia. The relationship of osteoporosis, sarcopenia, and osteosarcopenia with clinical parameters, including age, disease duration, medication use, disease activity, spinal mobility, radiographic involvement, functional status, and physical activity were investigated in AxSpA.

Results: The frequency of osteoporosis was 2.1% and 4.1% in the patient and control groups, respectively. Probable, definite, and severe sarcopenia was identified in 9.3%, 4.1%, and 1% of patients, whereas in controls it was identified in 4.1%, 2.1%, and 1%. Osteosarcopenia was identified only in one patient (1%). No significant differences were found between the groups regarding the frequency of osteoporosis, sarcopenia, or osteosarcopenia ($p>0.05$). Within the AxSpA group, probable sarcopenia was significantly associated with older age ($p=0.001$), limited spinal mobility ($p<0.05$), and worse functional status ($p<0.05$), while definite sarcopenia and osteoporosis were associated only with older age ($p<0.05$). As osteosarcopenia was detected only in one patient, its relation with clinical parameters could not be analyzed.

Conclusion: Frequency of osteoporosis, sarcopenia, and osteosarcopenia in AxSpA was similar to that in healthy controls. Previous studies reported higher frequency rates of osteoporosis and sarcopenia compared to our results. However, in those studies, the average age and disease duration of patients were generally higher, and the rates of anti-TNF drug use were lower compared with the present study.

P107

EFFECT OF A COMBINED PROPRIOCEPTIVE AND MUSCLE STRENGTHENING PROGRAM ON RECURRENT ANKLE SPRAINS

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Objectives:
To evaluate the effectiveness of a structured rehabilitation programme combining proprioceptive training and muscle strengthening in reducing recurrent ankle sprains and improving ankle function.
Material and Methods:
A prospective pilot study including 40 patients with a history of at least one severe ankle sprain occurring more than six months before inclusion. Participants followed a supervised 6-week rehabilitation programme, three sessions per week, including balance exercises, peroneal and tibialis muscle strengthening, and core stability training. Functional outcomes were assessed using the Foot and Ankle Ability Measure (FAAM), pain intensity using a numerical rating scale, ankle range of motion, and recurrence of ankle sprain over a 3-month follow-up.
Results:
After the 6-week rehabilitation programme, the FAAM score significantly improved from 62.4 ± 9.8 to 82.1 ± 8.6 ($p < 0.001$). Pain intensity decreased from 5.6 ± 1.4 to 2.3 ± 1.2 ($p < 0.001$). Ankle dorsiflexion range of motion increased from 12.1 ± 3.5° to 17.8 ± 3.2° ($p = 0.002$). During the 3-month follow-up, the recurrence rate of ankle sprain decreased from 37.5% to 12.5%. Improvements in balance performance were moderately associated with FAAM score changes ($r = 0.48$, $p = 0.01$).
Conclusions:
A combined proprioceptive and strengthening rehabilitation programme appears effective in reducing recurrence and improving functional recovery after ankle sprain. This approach could be recommended as a preventive strategy in patients at risk of chronic ankle instability.
Disclosures:
The authors declare no conflict of interest.

P108

PLANTAR LOAD DISTRIBUTION AND GAIT BIOMECHANICS IN PATIENTS WITH TALOCRURAL OSTEOARTHRITIS

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Objectives:
To analyse plantar load distribution and gait biomechanics in patients with talocrural osteoarthritis and to explore their relationship with pain and functional limitation.
Material and Methods:
A comparative cross-sectional study including 25 patients with symptomatic talocrural osteoarthritis and 25 age-matched healthy controls. Plantar pressure distribution was assessed using a force platform, and gait parameters were analysed with inertial sensors. Outcome measures included peak plantar pressure, centre of pressure displacement, gait speed, step length and pain intensity.
Results:
Patients with talocrural osteoarthritis exhibited significantly higher peak plantar pressure in the forefoot (412 ± 85 kPa) than controls (286 ± 64 kPa, $p < 0.001$). Gait speed was reduced (0.86 ± 0.18 m/s vs 1.21 ± 0.22 m/s, $p < 0.001$), and step length was shorter (0.52 ± 0.09 m vs 0.68 ± 0.11 m, $p = 0.002$). Plantar pressure asymmetry was significantly associated with pain intensity ($r = 0.56$, $p = 0.004$) and functional limitation.
Conclusions:
Talocrural osteoarthritis is associated with significant biomechanical alterations during gait. Objective assessment of plantar load distribution may help guide personalised rehabilitation strategies aimed at reducing pain and improving function.
Disclosures:
The authors declare no conflict of interest.

P109

PREVALENCE AND ASSOCIATED FACTORS OF ANKLE PAIN AND INSTABILITY IN WORKERS WITH PROLONGED STANDING

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Objectives:
To determine the prevalence of ankle pain and instability in workers exposed to prolonged standing and to identify associated risk factors.
Material and Methods:
A cross-sectional study including 150 professionals exposed to prolonged standing. Data were collected using a structured questionnaire assessing ankle pain, history of ankle sprain and occupational exposure. Clinical evaluation included ankle range of motion and stability testing. Associations between ankle disorders and demographic, occupational and clinical factors were analysed.
Results:
Patients with talocrural osteoarthritis exhibited significantly higher peak plantar pressure in the forefoot (412 ± 85 kPa) than controls (286 ± 64 kPa, $p < 0.001$). Gait speed was reduced (0.86 ± 0.18 m/s vs 1.21 ± 0.22 m/s, $p < 0.001$), and step length was shorter (0.52 ± 0.09 m vs 0.68 ± 0.11 m, $p = 0.002$). Plantar pressure asymmetry was significantly correlated with pain intensity ($r = 0.56$, $p = 0.004$) and functional limitation.
Conclusions:
Ankle disorders are common in workers exposed to prolonged standing. Identification of modifiable risk factors supports the implementation of targeted preventive and rehabilitation programmes in occupational settings.
Disclosures:
The authors declare no conflict of interest.

P110

PREVALENCE OF ANKLE MOBILITY LIMITATION IN PATIENTS REFERRED FOR MUSCULOSKELETAL REHABILITATION

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Objectives:
To determine the prevalence of ankle mobility limitation in patients referred for musculoskeletal rehabilitation and to analyse its association with pain and functional impairment.
Material and Methods:
A descriptive cross-sectional study including 200 consecutive patients referred to a physical and rehabilitation medicine department for musculoskeletal disorders. Ankle dorsiflexion range of motion was assessed clinically using a goniometer. Ankle mobility limitation was defined as dorsiflexion <10°. Pain intensity was assessed using a numerical rating scale, and walking ability was evaluated clinically. Associations between ankle mobility limitation and clinical characteristics were analysed.
Results:
Ankle dorsiflexion limitation was observed in 84 patients (42.0%). Patients with limited ankle mobility presented significantly higher pain intensity compared with those without limitation (5.8 ± 1.6 vs 4.1 ± 1.5, p < 0.001). Walking difficulties were more frequent in patients with reduced ankle dorsiflexion (61.9% vs 34.5%, p < 0.001).
Ankle mobility limitation was more prevalent in patients referred for knee disorders (48.6%) and low back pain (44.2%) compared with upper limb conditions (27.3%, p = 0.02). Reduced ankle dorsiflexion was significantly associated with decreased walking speed and the need for walking aids (p < 0.05).
Conclusions:
Ankle mobility limitation is frequent among patients referred for musculoskeletal rehabilitation and is significantly associated with pain and functional impairment. Systematic assessment of ankle mobility should be considered in routine rehabilitation practice to optimise functional outcomes.
Disclosures:
The authors declare no conflict of interest.

P111

ANKLE FUNCTION AND FALL RISK IN OLDER ADULTS WITH MUSCULOSKELETAL DISORDERS

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Objectives: To explore the relationship between ankle mobility, strength, and risk of falls in older adults.

Material and Methods: A cross-sectional study including 120 adults aged ≥65 years referred for musculoskeletal disorders. Ankle range of motion, muscle strength and balance performance were assessed. Fall history during the previous year was recorded.

Results: Among the 120 participants, 46 (38.3%) reported at least one fall during the previous year. Fallers presented significantly reduced ankle dorsiflexion compared with non-fallers (10.2 ± 3.4° vs 15.6 ± 4.1°, p < 0.001). Ankle muscle strength was also lower in fallers (3.1 ± 0.6 vs 3.8 ± 0.7, p = 0.002). Balance performance was significantly impaired in fallers, with longer postural sway duration (p = 0.01). Reduced ankle dorsiflexion was independently associated with increased fall risk (OR = 2.1; 95% CI 1.2–3.8), even after adjustment for age and body mass index.

Conclusions: Ankle function plays a key role in balance and fall prevention. Targeted ankle rehabilitation may represent a modifiable factor to reduce fall risk in older adults.
Disclosures: The authors declare no conflict of interest.

P112

IMPACT OF AN EARLY FUNCTIONAL REHABILITATION PROGRAM AFTER ANKLE FRACTURE

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Objectives: To evaluate the impact of an early functional rehabilitation programme on pain, mobility and functional recovery after ankle fracture.

Material and Methods: A prospective observational study including 45 patients after surgical or conservative treatment of ankle fracture. Patients followed an early rehabilitation programme starting within three weeks, focusing on range of motion, progressive weight-bearing and muscle strengthening. Pain intensity, ankle mobility and functional status were assessed at baseline and at three months.

Results: At three months, patients showed a significant reduction in pain intensity, decreasing from 6.1 ± 1.5 at baseline to 2.8 ± 1.3 (p < 0.001). Ankle dorsiflexion range of motion improved from 9.8±3.1° to 16.5±3.6° (p<0.001), while plantarflexion increased from 28.4 ± 6.2° to 38.9 ± 7.1° (p = 0.003). Functional assessment showed a significant improvement, with 72% of patients able to walk independently without assistive devices at three months compared with 31% at baseline (p < 0.001). Earlier initiation of rehabilitation was associated with better functional recovery and greater ankle mobility (p < 0.05).

Conclusions: Early functional rehabilitation after ankle fracture is associated with improved recovery and reduced pain, supporting its systematic integration into post-fracture management.

Disclosures: The authors declare no conflict of interest.

P113

EVALUTION OF THE EFFECTIVENESS OF ANTI OSTEOPOROTIC TREATMENTS IN REDUCING FRACTURE RISK

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Background
Osteoporosis is among the most prevalent metabolic bone disorders worldwide and one of the main causes of skeletal fragility and disability in the elderly population. The progressive loss of bone mass and microarchitectural deterioration significantly increase the risk of fragility fractures, leading to considerable clinical and socioeconomic impact. Traditional antiresorptive agents such as bisphosphonates are effective but often limited by poor long-term adherence and tolerability. In recent years, novel biological therapies have expanded the treatment landscape. Denosumab (Prolia®), a fully human monoclonal antibody targeting the RANKL pathway, inhibits osteoclast differentiation and function, thereby reducing bone turnover and improving bone strength.

Objectives
This study aimed to evaluate the clinical and densitometric efficacy of Denosumab in improving lumbar and femoral T-scores, preventing new fragility fractures, and assessing its safety and tolerability in patients with primary osteoporosis. Secondary objectives included evaluating its effect in patients previously unresponsive to bisphosphonates and analyzing adherence over a 36-month follow-up.

Design and Methods
A single-center observational study was conducted on 29 patients (male and female) with primary osteoporosis. Each subject received Denosumab 60 mg subcutaneously every six months. Clinical and densitometric follow-up extended to 36 months, with DEXA scans at the lumbar spine and femoral neck at baseline and at 12, 24, and 36 months. Laboratory parameters (serum calcium, vitamin D, PTH, CTX) and adverse events were recorded. A subgroup of 7 patients had a history of bisphosphonate treatment without significant benefit.

Results
Mean lumbar T-score increased by +0.38 after the first year and by +0.62 in patients treated for at least 36 months. Mean femoral T-score improved by +0.3 to +0.5 in responders. During follow-up, no new fragility fractures were reported despite the high baseline fracture risk. Biochemical analyses showed a consistent reduction in bone resorption markers (CTX), consistent with Denosumab's antiresorptive mechanism. The treatment demonstrated an excellent safety profile, with no clinically significant hypocalcemia or severe adverse events. The 7 patients previously unresponsive to bisphosphonates exhibited meaningful densitometric recovery comparable to or exceeding the study average. Treatment adherence remained high owing to the twice-yearly dosing regimen, which enhanced compliance and reduced discontinuation rates.

Conclusion
Denosumab proved to be a safe, effective, and well-tolerated therapy for primary osteoporosis, producing significant improvements in lumbar and femoral bone density and preventing new fractures in high-risk patients. Its twice-yearly administration supports adherence and long-term management, representing a strategic tool for fracture prevention and healthcare sustainability. In the context of an aging population, Denosumab offers a valuable therapeutic alternative for patients who are intolerant or refractory to bisphosphonates. Large-scale multicenter studies with extended follow-up are warranted to further define its optimal role in the integrated management of osteoporosis.

P114

POST-EXTRACTION MANDIBULAR ANGLE FRACTURE UNMASKING COL1A2 P.ASP1120ASN HIGH-BMD OSTEOGENESIS IMPERFECTA

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Background
Osteogenesis imperfecta (OI) is typically manifest with bone mineral density (BMD) and recurrent fractures. A rare counterphenotype arises when missense variants alter the carboxyterminal propeptide cleavage of type I procollagen (COL1A1/2), impairing extracellular processing , and yielding paradoxically high BMD with brittle bone that radiographically mimic osteopetrosis. Craniofacial involvement heightens dental risk and introduces fixation challenges. We report highBMD OI due to COL1A2 p.Asp1120Asn, highlighting the diagnostic trap of "densebutweak" bone and the practical implications for oral and maxillofacial surgery.
Case presentation
A 32yearold man with lifelong lowtrauma fractures and a residual left forearm deformity. Presented with malocclusion and pain following lower third molar extraction, 3D CT demonstrated a right mandibular angle fracture. Despite mini-plate fixation, hardware failure occurred with recurrent displacement and malunion. A skeletal survey showed generalized osteosclerosis with thickened calvaria, raising an initial differential of osteopetrosis. Biochemistry was unremarkable, including calcium, phosphate, parathyroid hormone, alkaline phosphatase and renal function; vitamin D was sufficient. Dualenergy Xray absorptiometry showed paradoxically high Zscores (hip +1.9; lumbar spine +5.1). Family history was positive in two sons with childhood fractures, consistent with autosomal dominant inheritance. A nextgeneration sequencing panel (Centogene) identified heterozygous COL1A2 c.3358G>A (p.Asp1120Asn), classified as likely pathogenic. The genotype, radiographic pattern and clinical course established the diagnosis of highBMD OI. The maxillofacial team recommended treating future mandibular injuries as pathologic fractures using loadbearing locking reconstruction plates and prolonged intermaxillary guidance. Our endocrine service-initiated family genetic counseling, fracturerisk education, and surveillance planning.
Conclusions
This case underscores that High BMD does not exclude brittle bone disease. Recognizing the COL1A2 Cpropeptidecleavage phenotype prevents misdiagnosis as osteopetrosis, explains fixation failure after dental procedures, and guides tailored management. Adults who fracture despite high Zscores—particularly with craniofacial involvement—should undergo genetic testing, receive preventive dental precautions, and be managed within a multidisciplinary team. Early identification facilitates counseling, improves outcomes, and enables cascade genetic testing for atrisk relatives.

P115

CATCH ME IF YOU CAN: THE ROLE OF MUSCULOSKELETAL ULTRASOUND IN DETECTING SUBCLINICAL ENTHESITIS IN ANKYLOSING SPONDYLITIS

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Objectives: To Assess the role of Musculoskeletal ultrasound (MSK US) in detection of subclinical enthesitis in a group of Ankylosing Spondylitis patient and crossing it with clinical and laboratory parameters (acute phase reactant and disease activity).

Methods: We conducted a case-control study at a tertiary hospital from June 2024 till June 2025. We included 50 Ankylosing spondylitis (AS) patients and 50 control included in the study. All subjects included were classified according to Modified New York criteria for ankylosing spondylitis. Complete Blood Count (CBC), erythrocyte sedimentation rate (ESR), C-reactive protein (CRP) and BASDAI were calculated to represent disease activity. Ultrasound assessment (fig 1) using Madrid Sonographic Enthesitis Index (MASEI) was applied to measure subclinical enthesitis at 6 pairs of entheses sites. Statistical Analysis was conducted using SPSS.

Results: In the cases group disease duration mean (SD) was 7.14 ± 4.9 years, all participants were asymptomatic, the BASDAI score mean (SD) was 3.4 ± 2.14. Subclinical enthesitis was detected at 34.8% of cases with significant correlation (P<0.001) to ESR (21.98 ± 20.59 mm/h) and CRP (5.87 ± 7.13). The most affected enthesis was Right (Dominant) triceps tendon enthesis (13.8%) and the least affected enthesis was Left Proximal Patellar Ligament enthesis (2.9%).

Conclusions: MSK US is beneficial for detection of subclinical enthesitis and early diagnosis of AS with a strong correlation to laboratory parameters and disease activity. The role of MSK US opens the door for early diagnosis and treatment of AS patients. Bigger longitudinal studies are needed to more accurately detect the validity of MSK US in AS detection.

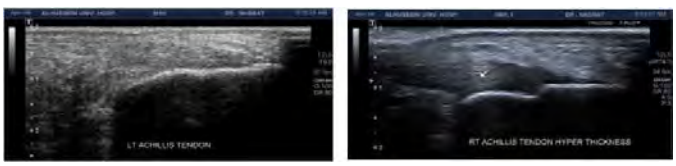


Figure 1: Normal Achilles tendon enthesis. Vs Subclinical enthesitis of the Achilles enthesis.

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MUSCULOSKELETAL FRAILTY IN PATIENTS UNDERGOING SPINAL SURGERY DUE TO DEGENERATIVE PATHOLOGIES: PRELIMINARY INSIGHTS FROM THE ORTHOSPINE FITNESS STUDY

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Objective: Musculoskeletal fitness in patients undergoing spinal surgery is still insufficiently addressed. The objective of this work is to outline the prevalence of osteosarcopenia in adults undergoing surgery due to degenerative disease of the thoraco-lumbo-sacral spine.
Material and Methods: The described cohort is part of a large ongoing prospective study aimed at investigating the relationship between frailty and complications of spinal surgery. At baseline, patients are scanned with dual-energy X-ray absorptiometry (DXA) at lumbar spine, hip, and total body. High-resolution peripheral quantitative computed tomography (HR-pQCT) is performed at distal radius and tibia.
Results: This analysis (approximately mid-project) includes 59 operated patients with mean age of 60.7±8.5 years (F:M=2.28:1) and mean T-score at femoral neck of -1.7±1.0 SD. Based on hip T-score, 28 patients (47.5%) were in the osteopenic range and 17 patients (28.8%) in the osteoporotic range. Lumbar spine DXA could only be acquired in 36 subjects: the overall mean T-score was -0.7±2.5 SD with two outliers. After their exclusion, based on T-score, osteopenia could be identified in 12 patients (35.3%) and osteoporosis in 7 patients (20.6%). Total body DXA was performed in 45 individuals with mean fat mass index (FMI) of 9.6±0.3 kg/m2 and 8.4±1.5 kg/m2, lean mass index (LMI) of 15.5±0.2 kg/m2 and 18.5±1.6 kg/m2, and appendicular skeletal mass index (ASMI) of 6.3±1.1 kg/m2 and 8.0±0.9 kg/m2 in females (n=33) and males (n=11/12), respectively. Relying on cut-offs by EWGSOP2, sarcopenia could be detected in 6 women (18.2%; ASMI<5.5 kg/m2) and 2 men (16.7%; ASMI<7 kg/m2). HR-pQCT revealed variable bone phenotypes.
Conclusion: The prevalence of osteopenia/osteoporosis and sarcopenia in patients who require spinal surgery for degenerative pathologies is substantial. Further research is warranted to clarify their influence on post-operative complications.
Acknowledgements: This work relates to the study: PNRR-MCNT2-2023-12378098 - Orthospine Fitness: which markers of musculoskeletal health can explain complications in spine surgery? CUP: D33C24000420006. Funded by the European Union - Next Generation EU - NRRP M6C2 - Investment 2.1 Enhancement and strengthening of biomedical research in the NHS.
Disclosures: No conflict of interest.

P117

INTEGRATION OF IMAGES WITH RADIOLOGICAL REPORTS IN THE CONTEXT OF RARE SKELETAL DISEASES CAUSING BONE FRAGILITY: PRELIMINARY RESULTS OF A SURVEY CONDUCTED WITHIN THE BETTER PROJECT

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Objective: Several skeletal dysplasias are associated with alterations in bone metabolism that determine an increase in fracture risk. Radiology plays a crucial role in their diagnosis and monitoring but images and reports are not necessarily accessible in practice. The purpose of this work is to evaluate the usefulness of integrating selected images into structured radiological reports with the ultimate aim of optimizing the management of rare bone diseases.
Materials and Methods: In the context of the BETTER project, a structured questionnaire was developed and presented anonymously to radiologists, general practitioners, residents, and researchers using the REDCap platform (Italian + English version). The survey comprised multiple-choice and open-ended questions as well as rating scales and was designed to investigate routine access to diagnostic images, diffusion of structured radiological reports, and perceived impact of their availability on patient care.
Results: Preliminary results indicate that the inclusion of selected images could enhance the value of radiological reports at the time of diagnosis and follow-up in patients with increased fracture risk. Respondents reported that the availability of representative images was either highly or quite relevant for their understanding of altered bone structure, facilitating longitudinal monitoring and expediting clinical assessment. However, difficulties in the simultaneous access to images and reports emerged as a relevant operational limitation in daily workflows; in addition, the adoption of structured reporting remained heterogeneous.
Conclusions: Our work suggests that the integration of images with structured reports could represent a valuable tool to improve the clinical management of patients with rare skeletal diseases, enabling easier identification of individuals at increased fracture risk and supporting therapeutic decisions. Further efforts should be devoted to the design of institutional policies aimed at supporting this approach.
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Disclosures: No conflict of interest.

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BONY INCREASED OFFSET REVERSE SHOULDER ARTHROPLASTY IN PATIENTS WITH RHEUMATOID ARTHRITIS AND OSTEOPOROSIS

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Background. Reverse shoulder arthroplasty (RSA) in patients with rheumatoid arthritis (RA) is associated with compromised bone quality, chronic inflammation, and an increased risk of complications. The use of bony increased offset reverse shoulder arthroplasty (BIO-RSA) in this population remains controversial, particularly in the presence of osteoporosis.
Purpose. To evaluate graft integration and clinical outcomes of BIO-RSA in patients with rheumatoid arthritis and osteoporosis.
Methods. A retrospective analysis included 50 patients who underwent reverse shoulder arthroplasty with BIO-RSA. Thirty-two patients were diagnosed with rheumatoid arthritis, and eighteen patients had primary osteoarthritis. All patients demonstrated radiological signs of osteoporosis. In the RA group, BIO-RSA with glenoid bone grafting was performed in 19 patients. All patients received preoperative subacromial glucocorticosteroid injections. Radiographic assessment focused on graft integration, while clinical follow-up included postoperative complications.
Results. Complete graft integration was observed in all patients, regardless of underlying pathology or bone quality. No cases of graft resorption or non-union were detected. In the RA group, one postoperative dislocation occurred, while two periprosthetic humeral fractures were recorded. Functional outcomes demonstrated satisfactory shoulder mobility, consistent with previously reported benefits of BIO-RSA.
Conclusion. BIO-RSA can be safely performed in patients with rheumatoid arthritis and osteoporosis, providing reliable graft integration and acceptable complication rates. These findings suggest that osteoporosis and inflammatory joint disease should not be considered absolute contraindications to BIO-RSA.

P119

CLINICAL PREDICTORS OF RITUXIMAB NON-RESPONSE IN RA PATIENTS AFTER BDMARD OR JAKI SWITCHING

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Objective:
To identify predictors of rituximab (RTX) ineffectiveness in patients with rheumatoid arthritis (RA) after switching from biologic disease-modifying antirheumatic drugs (bDMARDs) or Janus kinase inhibitors (JAKi).
Methods:
Eighty patients with RA treated with RTX were included. At 6 months, patients were classified as responders (n=39), defined as achieving remission or low disease activity (DAS28-CRP<3.2), and non-responders (n=41), defined as having persistent moderate or high disease activity (DAS28-CRP≥3.2). Mean age was 47.3±13.7 years; 68 patients (85%)

were female. All patients were rheumatoid factor–positive, and 95% were anti–cyclic citrullinated peptide antibody–positive. Baseline ESR and CRP were 34 [14–60] mm/h and 9.8 [2.3–32.0] mg/L, respectively. Median morning stiffness duration was 120 [40–200] minutes; swollen joint count (SJC) was 5 [3–9] and tender joint count (TJC) was 10 [6–15]. Disease activity was assessed using DAS28-ESR (5.6±1.0), DAS28-CRP (5.2±0.9), SDAI (29.8 [24.0–40.5]) and CDAI (29 [21–37]). Pain, fatigue, functional disability, fibromyalgia features, anxiety and depression were evaluated using validated questionnaires (BPI, FSS, HAQ, FiRST and HADS). Social status and concomitant pharmacotherapy were also analyzed.

Results:

Non-responders more frequently had unemployed status (75.6% vs 48.7%, p=0.014) and later RA onset (41.9±11.6 vs 35.5±15.0 years, p=0.036). They exhibited more pronounced joint involvement (TJC 15 [12–19] vs 11 [7–14.5], p<0.001; SJC 9 [5–14] vs 6 [4–9.5], p=0.016) and longer morning stiffness (180 [60–300] vs 90 [30–190] minutes, p=0.025). Baseline disease activity was significantly higher across all indices in non-responders (all p<0.001).

In addition, non-responders demonstrated greater functional disability (HAQ 1.88 [1.63–2.38] vs 1.75 [1.0–2.0], p=0.006), higher levels of depressive symptoms and fatigue (HADS-D 8.0 [5–11] vs 6.0 [4–8.5], p=0.037; FSS 52.0 [42–57] vs 45.0 [33–54.5], p=0.038), as well as higher pain intensity and greater pain-related sleep interference according to BPI (p<0.05). Anxiety symptoms (HADS-A) were more prevalent among non-responders (26.8% vs 7.7%, p=0.038). Immunological profiles did not differ significantly between groups. NSAID use during the 3 months prior to inclusion was more frequent in non-responders (92.7% vs 76.9%, p=0.048).

Conclusion:

RTX ineffectiveness after switching from bDMARDs or JAK inhibitors is associated with high baseline disease activity, pronounced joint involvement, functional disability, high pain burden and psychoemotional disturbances. These clinical and psychosocial factors may serve as potential predictors of RTX treatment ineffectiveness.

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GENETIC PREDICTORS OF RITUXIMAB RESPONSE IN RA PATIENTS AFTER SWITCHING FROM BDMARDS OR JAK INHIBITORS

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Objective

To assess the association of gene polymorphisms with clinical response to rituximab (RTX) in rheumatoid arthritis (RA) patients after switching from other biologic DMARDs or JAK inhibitors.

Materials and Methods

Seventy-four RA patients with prior inadequate response to bDMARDs/JAK inhibitors were treated with RTX. After 6 months, patients were classified as responders (DAS28-CRP<3.2) or non-responders (DAS28-CRP≥3.2). Mean age was 46.3±12.7 years; 63 patients (85.1%) were female. Baseline ESR and CRP were 32 [14–57] mm/h and 9.7 [2.3–31.8] mg/L, respectively; morning stiffness 120 [40–200] min; tender joint count (TJC) 11 [6–16]; swollen joint count (SJC) 6 [4–9]. Disease activity indices: DAS28-ESR 5.6±1.0, DAS28-CRP 5.2±0.9, SDAI 29.8 [24.0–40.5], CDAI 29 [21–37].

Genotyping included IL-6R (rs2228145), TNFAIP3 (rs10499194, rs6920220), TNFA (rs1800629), CTLA-4 (rs231775), COMT (rs4633), IL-10 (rs1800872), STAT4 (rs7574865), KCNS1 (rs734784), and TNFSF13B/BAFF (rs9514828). Associations with clinical response were analyzed under dominant, recessive, and overdominant genetic models.

Results

C allele carriers of IL-6R (rs2228145) had increased risk of non-response to RTX (AC+CC vs AA: 65.8% vs 34.2%; OR=2.69; 95%CI 1.05–6.90; p=0.037).

Carriers of at least one minor G allele of KCNS1 (rs734784) showed reduced risk of non-response (OR=0.37; 95%CI 0.14–0.99; p=0.046).

No significant associations were observed for TNFSF13B/BAFF (rs9514828) or other polymorphisms.

Conclusion

In RA patients with prior inadequate response to bDMARDs/JAK inhibitors, IL-6R (rs2228145) C allele is associated with increased risk of non-response to RTX, whereas KCNS1 (rs734784) minor G allele is associated with reduced risk. These findings support the potential utility of genetic markers as predictors of treatment response when switching biologic therapy.

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BASELINE SERUM CHEMOKINES PREDICT CLINICAL RESPONSE TO RITUXIMAB IN RA PATIENTS AFTER BDMARD/JAKI FAILURE

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Objective

To identify predictors of rituximab (RTX) inefficacy in rheumatoid arthritis (RA) patients after switching from biologic DMARDs (bDMARDs) and/or Janus kinase inhibitors (JAKi) based on baseline serum chemokine and cytokine levels.

Materials and Methods

Thirty-five RA patients with inadequate response to prior bDMARDs and/or JAKi received RTX. Mean age was 45.7±11.7 years; 28 patients (80%) were female. Seropositivity: RF 97.1%, anti-CCP 94.3%. Baseline disease activity: DAS28-ESR 5.6±1.0, DAS28-CRP 5.2±0.9. Clinical response at 6 months was defined by DAS28-CRP: remission or low disease activity (<3.2) as responders, moderate/high disease activity (≥3.2) as non-responders.

Serum chemokine and cytokine levels were quantified using multiplex xMAP technology (Bio-Plex 40-Plex Panel, Bio-Rad, USA), including CCL7, CXCL13, CCL26, IL-1β, CCL22, CCL23, and additional markers.

Results

Comparison between responders (n=18) and non-responders (n=17) revealed significant baseline differences:

- **CXCL13**: 26.7 [10.3–42.8] vs 45.8 [29.9–104.1] pg/mL; p=0.011
- **CCL7**: 308.3 [114.0–424.4] vs 117.8 [65.2–117.8] pg/mL; p=0.014
- **CCL26**: 55.1 [46.9–68.1] vs 36.6 [31.9–62.6] pg/mL; p=0.032
- **IL-1β**: 1.4 [0.9–1.6] vs 0.8 [0.5–1.2] pg/mL; p=0.007
- **CCL22**: 383.2 [196.6–543.2] vs 226.2 [159.2–370.5] pg/mL; p=0.045
- **CCL23**: 191.8 [95.3–323.6] vs 274.2 [228.7–418.5] pg/mL; p=0.035

Conclusion
Baseline serum chemokine levels are associated with clinical response to RTX in RA patients previously failing bDMARDs/JAKi. **Elevated CXCL13 and CCL23 in non-responders reflect B-cell-mediated (CXCL13) and macrophage-associated chemotactic (CCL23) pathways, potentially contributing to persistent inflammation and reduced RTX efficacy**. Higher baseline CCL7, CCL26, CCL22, and IL-1β levels were associated with favorable response. These findings support the potential of serum chemokines as predictive biomarkers and justify further investigation in the context of personalized RA therapy.

P122
"MENOPAUSE WITHOUT RISK" – OSTEOPOROSIS SCREENING CAMPAIGN IN BULGARIAN COMMUNITY PHARMACIES

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Objective: The objective of this study was to implement an osteoporosis screening campaign in community pharmacies and to assess osteoporosis-related risk factors among women in the Bulgarian population.
Material and Methods: A pharmacy-based osteoporosis screening campaign was conducted in October 2025, in connection with World Osteoporosis Day, at two community pharmacies in Plovdiv, Bulgaria's second-largest city. Screening included heel ultrasound osteodensitometry and assessment of osteoporosis risk factors using the IOF Osteoporosis Risk Check questionnaire. Following screening, community pharmacists provided individualised education and counselling regarding osteoporosis risk factors and lifestyle recommendations and referred individuals identified as being at high risk for further medical evaluation. Premenopausal, menopausal, and postmenopausal women without a prior diagnosis of osteoporosis were eligible for participation. Descriptive statistics were applied to summarise participant characteristics and risk factors. A General Linear Model Univariate analysis was performed, with T-score treated as a continuous dependent variable.
Results: A total of 287 women participated in the study (mean age 59.7 ± 11.3 years). Of these, 163 (56.8%) women were classified as being at moderate risk (T-score between −1.0 and −2.5), while 86 (30.0%) women were identified as being at high risk (T-score ≤ −2.5). Osteoporosis screening was performed for the first time in 192 participants. Early menopause (before the age of 45 years) emerged as the strongest independent predictor of lower T-scores, showing a statistically significant association ($p < 0.001$). Body mass index category and consumption of three or more servings of dairy products per day were also independently associated with T-score variability, demonstrating smaller but statistically significant effects ($p < 0.05$). All women identified as being at high risk were referred to a general practitioner and an endocrinologist for further assessment.
Conclusion: Community pharmacy–based osteoporosis screening combined with education and counselling was effective in identifying women at increased risk of osteoporosis and was perceived as highly beneficial by participants, highlighting the important role of community pharmacies in osteoporosis prevention and early detection.

P123
IMPACT OF ODONTOMAXILLARY ALTERATIONS ON ORAL HEALTH–RELATED QUALITY OF LIFE IN PATIENTS WITH X-LINKED HYPOPHOSPHATEMIC RICKETS

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Introduction
X-linked hypophosphatemia (XLH) is a dominant disorder caused by mutations in the *PHEX* gene that affects bone and dental tissues. It is characterized by skeletal abnormalities and significant oral manifestations, including delayed dental development, malocclusions, structural defects of enamel and dentin, periodontal disease, and premature tooth loss. These alterations predispose patients to spontaneous periapical infections and compromise oral function. Oral health–related quality of life (OHRQoL) reflects the biopsychosocial impact of these conditions and can be assessed using the OHIP-14 questionnaire, which evaluates the effect of oral health problems on daily life across multiple functional and psychosocial domains.
Objective
To describe the findings observed on panoramic dental radiographs (orthopantomography) in a cohort of patients with X-linked hypophosphatemic rickets and to evaluate the relationship between odontological and maxillary alterations and oral health–related quality of life, as measured by the OHIP-14 scale.
Methods
A descriptive, retrospective study was conducted including 14 adult patients with a confirmed diagnosis of XLH. All patients underwent panoramic dental radiography, and oral health–related quality of life was assessed using the OHIP-14 questionnaire
Results:
The study sample consisted of 3 males and 11 females, with ages ranging from 22 to 54 years.

Regarding treatment, four patients were not receiving specific therapy, six were undergoing treatment with burosumab, of whom only two were treated on a continuous basis, while the remaining patients received phosphate salts and calcitriol.

	Age	Gender	Treatment XLH	ID	AR	PA	RT	Caries	Cysts	DM	PT	BTA	MSO	Treatment	OHIP
AC	33	F	NO	Y	Y	Y	no	Y	Y	Y	Y	Y	Y	Y	26
AN	54	F	NO	Y	Y	no	no	No	No	No	Y	Y	Y	No	34
CS	39	F	CT	Y	Y	Y	No	Y	Y	Y	Y	Y	Y	Y	17
GB	33	F	BURO	Y	Y	no	No	No	No	No	no	Y	No	Y	24
MJ	38	M	BURO	Y	Y	no	Y	No	No	No	No	No	Y	Y	19
MS	36	F	BURO	Y	Y	Y	No	Y	No	No	Y	Y	Y	Y	30
OM	48	F	NO	Y	Y	Y	Y	Y	Y	Y	Y	No	Y	Y	27
RJ	26	M	BURO	Y	Y	Y	Y	Y	No	Y	Y	No	Y	No	24
SB	32	M	CT	Y	Y	Y	Y	No	no	No	No	No	No	No	30
SL	37	F	CT	Y	Y	Y	Y	Y	Y	Y	Y	No	Y	No	19
SN	29	F	NO	Y	Y	no	no	No	Y	No	No	No	No	No	4
SS	22	F	BURO	no	Y	no	Y	Y	Y	Y	Y	No	No	Y	2
IN	40	F	BURO	no	Y	no	Y	No	Y	no	Y	No	No	Y	13
QV	50	F	CT	Y	Y	Y	Y	no	No	Y	No	no	No	no	14

ID: Incomplete dentition, AR: Alveolar resorption, PA: Periapical alteration, RT: retained teeth, TMJ disorder: Temporomandibular joint alteration, DM: Dental malposition, PT: Periodontal thickening, BTA: Bone trabecular alteration, MSO: Maxillary sinus opacification, CT: Conventional Treatment, Y: Yes

Orthopantomographic Findings

- **Incomplete dentition (ID):** 12 patients
- **Alveolar resorption (AR):** 14 patients
- **Periapical alteration (PA):** 8 patients
- **Retention of dental elements (RDE):** 8 patients
- **Dental caries:** 7 patients
- **Cysts:** 7 patients
- **Dental malposition (DM):** 7 patients
- **Periodontal thickening (PT):** 9 patients
- **Bone trabecular alteration (BTA):** 5 patients
- **Maxillary sinus opacification (MSO):** 8 patients
- **Previous dental treatment:** 8 patients

Regarding the OHIP score, a wide dispersion of results was observed, with a mean value of 22.5 and a range from 2 to 34.

Discussion

This study describes odontomaxillary alterations observed on orthopantomography in adults with X-linked hypophosphatemic rickets (XLH) and their association with oral health–related quality of life assessed by the OHIP-14. Structural dental and maxillary abnormalities were highly prevalent and were associated with a negative impact on oral health perception. These alterations, related to defects in mineralized tissues, predispose patients to periodontal disease, periapical infections, and early tooth loss, with consequent functional and psychosocial effects reflected in elevated OHIP-14 scores. The perceived impact varied among patients and appeared to be influenced by factors such as prior dental treatment, access to specialized care, and systemic therapy. Although burosumab represents a major therapeutic advance, its impact on oral health could not be adequately assessed due to limited continuous use in this cohort. Study limitations include the retrospective design, small sample size, and heterogeneity of treatments.

Conclusions

The results underscore the need for a systematic, early, and interdisciplinary dental approach in patients with XLH, as well as comprehensive therapeutic strategies that address not only structural and functional aspects but also patient´s subjective perceptions and quality of life.

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COMBINING TERIPARATIDE TO ESTABLISHED DENOSUMAB THERAPY: IMPACT ON BONE MINERAL DENSITY IN A CLINICAL CASE SERIES

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Objectives.

Combination therapy with denosumab and teriparatide results in greater gains in bone mineral density (BMD) than either therapy alone. However, data on the impact of adding teriparatide to established denosumab therapy is limited with only one small study (n=11) to date. We report on changes in BMD and Collagen Type I C-Telopeptide (CTX) after adding teriparatide to established denosumab therapy in a clinical case series.

Materials and Methods:

We retrospectively identified patients at our osteoporosis clinic who had teriparatide (20 mcg daily) added to established denosumab therapy (at least 12 months). All patients had densitometric (DXA) measured areal BMD at the hip and spine within 6 months before adding TPD and after 18-24 months of combined therapy. We examined for changes in BMD and CTX on treatment.

Results

There were 9 patients, median age 72.0 years (IQR 67.5-78.0). Five had one or more previous vertebral fractures and median duration of denosumab treatment was 7.2 years (IQR 3.8 – 8.3). Median baseline T score at the lumbar spine was -3.9 (IQR -3.4 to 4.1) and -2.2 at total hip (IQR -2.0 to -3.3). Lumbar spine BMD increased in all patients (median +9.2%, IQR 6.6- 19.5%, P=0.004). Six patients were assessed for hip BMD change (two excluded due to technical factors and data missing for one). Change of total hip BMD was inconsistent and insignificant (median 1.42% , p=0.430). CTX increased over the first 6 months (+0.213 ng/ml, p=0.008) and then fell over the next 6 months (−0.194 ng/ml, p=0.008). BMD response was not associated with duration of prior denosumab therapy (p=0.179) or baseline CTX (p=0.258).

Discussion:

Our results show that the addition of teriparatide to established denosumab therapy is associated with a significant increase in lumbar spine (median 9.2%) but not total hip BMD. The findings are similar to the only other comparable study by Kumar et al (n=11) where the mean BMD increase at the spine BMD was 9.8% with no change identified at the hip. The modest increase in CTX at 6 months suggests the possibility of teriparatide induced bone remodelling. More studies are needed to further explore this strategy.

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COMPARATIVE STUDY OF TWO FOCAL EXTRACORPOREAL SHOCK WAVE THERAPY PROTOCOLS FOR CHRONIC PLANTAR FASCIITIS: A RANDOMIZED CONTROLLED TRIAL

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Objective(s):to compare the clinical and functional effectiveness of two different focal extracorporeal shock wave therapy (ESWT) protocols for treating chronic plantar fasciitis.
Material and Methods: a randomized controlled trial with 60 patients suffering from chronic plantar fasciitis (>3 months) and an ultrasound-measured fascia thickness exceeding 4 mm.Two groups: the control group (n=30) three sessions of 2,000 pulses every 14 days; study group (n=30) two sessions of 3,000 pulses with the same frequency. Both WITH Intensity of 0.30–0.35 mj/mm2. The primary outcome was the Foot Function Index (FFI) at baseline and 3 months post-treatment. Secondary variables: visual analogue scale (VAS), Euroqol-5d, Roles and Maudsley scale, and ultrasound fascia thickness.
Results: No significant baseline differences were found between groups regarding clinical characteristics or initial FFI (p = 0.1507). Following intervention, both groups showed significant improvements in pain and disability (p < 0.001). Comparison of FFI variation revealed no significant difference between protocols (p = 0.2712). Biomechanical gait analysis showed significant functional activity improvement in the study group (p = 0.0004) which was not statistically significant in the control group (p = 0.215). No significant correlation was observed between ultrasound fascia thickness and clinical variables at baseline or post-treatment. (Figure)
Conclusion(s):Plantar fasciitis represents 11–15% of foot-related consultations. Both ESWT protocols are effective and safe. The two-session protocol is a valid alternative that optimizes healthcare resources and patient treatment time without compromising clinical outcomes.

Otucome Variable	Control Group	Study Group	Post-treatment P-value
Foot Functional Index (FFI) Total	121 ± 42 (Baseline) to 84 ± 64 (Post)	137 ± 44 (Baseline) to 84 ± 63 (Post)	< 0.001
FFI Pain	62 (54, 71) (Baseline) to 41 ± 28 (Post)	71 (56, 81) (Baseline) to 42 ± 29 (Post)	0.008 (Control) / < 0.001 (Study)
FFI Disabilty	47 ± 18 (Baseline) to 25 (5, 62) (Post)	53 ± 24 (Baseline) to 31 (4, 49) (Post)	0.019 (Control) / < 0.001 (Study)
FFI Activity	9 (5, 18) (Baseline) to 5 (1, 19) (Post)	19 (5, 27) (Baseline) to 2 (0, 20) (Post)	0.215 (Control) / 0.0004 (Study)
VAS Pain	6.86 ± 2.05 (Baseline) to 4.31 ± 3.07 (Post)	7.19 ± 1.88 (Baseline) to 4.27 ± 3.05 (Post)	< 0.001

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OSCARE: THE OSTEOPOROSIS SELF-CARE QUESTIONNAIRE – DEVELOPMENT AND INITIAL VALIDATION

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Objective: To develop and conduct initial validation of the Osteoporosis Self-Care (OSCare) Questionnaire, a new instrument to measure self-care in patients with osteoporosis.
Material and Methods: The OSCare questionnaire was developed in three phases: (1) Item generation through literature review; (2) Content validity assessment by a multidisciplinary expert panel and cognitive interviews (n=8); (3) Construct validity assessment using exploratory factor analysis (EFA; n=302), and reliability using internal consistency (Cronbach's alpha) and test–retest at baseline and two weeks (n=81).The final questionnaire comprised 15 items. Data were derived from a larger cross-sectional osteoporosis survey conducted in Sweden between 2024-2025 that included the OSCare questionnaire. For this survey, a total of 681 patients aged ≥50 years who had received osteoporosis medication within the past year were identified through electronic health records and invited to participate. Of these, 441 responded and were included in the final sample, with 302 respondents completing all OSCare items and thus included in the present analysis.
Results: EFA supported a five-factor structure comprising osteoporosis knowledge (5 items), physical activity (3 items), diet and lifestyle (3 items), treatment adherence (2 items), fall prevention and ergonomics (2 items). Sampling adequacy was good (KMO=0.813), and Bartlett's test of sphericity significant (p<0.001). Internal consistency was good for the osteoporosis knowledge items (α = 0.85) and acceptable for the physical activity items (α = 0.71) and for all items (α = 0.78); other item groups demonstrated low internal consistency, likely due to few items per factor (2-3). Test–retest analysis indicated moderate to very good agreement across most items (κ: 0.43–0.85), with one item indicating fair agreement (κ:0.29).
Conclusion: The OSCare questionnaire demonstrated promising preliminary psychometric properties including content validity and construct validity supported by its factor structure and acceptable overall reliability. However, further refinement is warranted to enhance reliability, and future studies should apply confirmatory factor analysis (CFA) to verify the proposed factor structure.

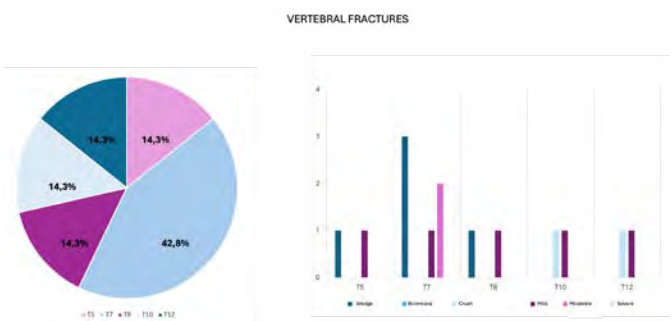
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ASSESSMENT VERTEBRAL FRACTURES AND VASCULAR CALCIFICATIONS IN PERITONEAL DIALYSIS PATIENTS (VERITA-PD STUDY): A PILOT STUDY

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Background: Vertebral fractures (VF) and vascular calcifications (VC) are frequent complications of Chronic Kidney Disease (CKD) and major contributors to morbidity and mortality. Evidence specifically focusing on peritoneal dialysis (PD) patients remains limited.
Aim: To assess the prevalence of VF, abdominal aortic calcification (AAC), and iliac artery calcifications in PD patients using quantitative vertebral morphometry (QVM) and standardized radiographic scoring.
Methods: In this multicenter, observational pilot study, 15 adult PD patients were evaluated at baseline. Clinical history, PD modality, biochemical parameters, CKD-MBD therapy, and radiographic assessments of VF and VC were collected. VF were analyzed by QVM with SpineAnalizer® and classified according to Genant's method; VC were quantified using the Kauppila score through Calcify2D®.
Results: Among the 15 PD patients (mean age 71.6 ± 18.9 years; 66.7% male; 93.3% APD), six (40%) had ≥1 VF, mainly wedge-shaped and located in the thoracic spine (most frequently T7). Hyperphosphatemia was common (80%), while PTH and calcium levels were mostly within range. AAC was detected in 86.6% of patients (mean Kauppila score 10.9 ± 6.7), and iliac artery calcifications in 66.6%. Comparison with the VIKI study in hemodialysis (HD) patients showed similar demographic and biochemical profiles. VF prevalence was slightly lower in our cohort (40% vs 55.3%, p=0.33), with comparable AAC patterns. Differences in medication use, lipid levels, and alcohol intake likely reflected distinct therapeutic approaches rather than intrinsic biological risk.
Conclusions: PD patients exhibit a high burden of VF and VC, with prevalence comparable to HD cohorts despite different dialysis modalities. To our knowledge, this is the first report describing VF prevalence assessed by QVM exclusively in PD patients and the first to evaluate iliac artery calcifications in this group. These preliminary data support the need for larger studies to refine risk stratification and improve bone and vascular health management in PD.



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PSORIATIC ARTHRITIS PRECEDING PSORIASIS: CLINICAL CHARACTERISTICS AND INCIDENCE OF SUBSEQUENT PSORIASIS IN ALGERIAN POPULATION

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Introduction/Objectives: Psoriatic arthritis (PsA) is a chronic inflammatory disease affecting the skin and multiple musculoskeletal structures. Although cutaneous psoriasis typically precedes the onset of arthritis, an estimated 7–15% of patients develop PsA before any skin involvement. This subgroup remains insufficiently characterized. The aim of this study was to describe the baseline features of patients in whom PsA precedes psoriasis, to determine the incidence of psoriasis after PsA diagnosis, and to identify factors associated with its subsequent development.

Methods: This retrospective analysis was based on prospectively collected data from the PURE4 cohort dedicated to the early diagnosis of PsA. A total of 69 patients fulfilling the CASPAR classification criteria were included. Among them, 15 patients had a confirmed diagnosis of PsA without known psoriasis at baseline. Comprehensive review of medical records was performed to identify the later onset of psoriasis. Baseline clinical and radiographic features of these patients were compared with those of individuals who presented with psoriasis before or concurrently with arthritis. A multivariable Cox regression model was used to assess factors associated with incident psoriasis.

Results: Of the 69 included patients, 15 had PsA without psoriasis at cohort entry. The cumulative incidence of psoriasis after PsA diagnosis was 8.1 cases per 100 person-years, with a declining trend over time. Compared with patients in whom psoriasis preceded arthritis, those whose arthritis occurred first were significantly younger at diagnosis (35.7 vs. 35.9 years, p ≤ 0.015), had less frequent nail involvement (35.0% vs. 55.7%, p ≤ 0.002), but exhibited more erosive lesions (66.3% vs. 33.24%, p = 0.001) and higher Steinbrocker radiographic scores at presentation (4.1 vs. 2.7, p ≤ 0.001).Tab1 Multivariable analysis showed that treatment with biologic DMARDs (bDMARDs) was associated with a significantly lower risk of subsequent psoriasis (HR 0.32; 95% CI [0.22–0.46], p ≤ 0.001), as was NSAID use (HR 0.44; 95% CI [0.25–0.85], p = 0.02). Conversely, male sex was associated with an increased risk of developing psoriasis (HR 1.27; 95% CI [0.97–2.22], p = 0.001).Tab2

Conclusion: Patients presenting with PsA in the absence of initial psoriasis tend to be younger and display more severe articular damage, possibly reflecting diagnostic delay due to the lack of cutaneous signs. Treatment with bDMARDs and NSAIDs appears to reduce the risk of later psoriasis onset, unlike conventional DMARDs. These findings underscore the importance of early recognition and tailored management of PsA even in the absence of skin involvement.

Table 1.Baseline Characteristics of Patients With PsA Preceding Psoriasis vs. PsA With Prior/Concurrent Psoriasis

Variable	PsA before psoriasis (n=15)	Psoriasis before/ with PsA (n=54)	p-value
Age at diagnosis (years), mean	**35.7**	35.9	≤ 0.015
Nail involvement (%)	**35.0%**	55.7%	≤ 0.002
Erosive lesions (%)	**66.3%**	33.24%	= 0.001
Steinbrocker radiographic score, mean	**4.1**	2.7	≤ 0.001
Sex (male %)	Higher proportion	–	NS
Peripheral arthritis (%)	Similar	–	NS

Table 2. Factors Associated With Incident Psoriasis (Cox Multivariable Model)

Predictor	Hazard Ratio (HR)	95% CI	p-value	Interpretation
bDMARD therapy	**0.32**	0.22–0.46	≤ 0.001	**Significant reduction of psoriasis risk**
NSAID use	**0.44**	0.25–0.85	= 0.02	**Protective effect**
Male sex	**1.27**	0.97–2.22	= 0.001	**Higher risk of psoriasis onset**
cDMARD therapy	No significant association	–	–	–

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STRUCTURAL SPINAL PROGRESSION IN EARLY AXIAL SPONDYLOARTHRITIS: PROSPECTIVE ANALYSIS OF 25 CASES FROM ALGERIA DURING 24 MONTHS

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Introduction/Objectives The aim of this prospective study was to assess the rate of structural spinal progression over two years and to identify predictors of radiographic progression in patients with early axial spondyloarthritis (axSpA).

Materials and Methods A total of 25 patients with early axSpA were included in this single-center study based on the availability of baseline and 24-month follow-up spinal radiographs. Cervical and thoracolumbar spine radiographs were evaluated by two trained, blinded independent readers using the modified Stoke Ankylosing Spondylitis Spine Score (mSASSS). Radiographic progression was defined as a mean increase of at least 2 mSASSS points over the follow-up period.

Results In this small cohort of 25 patients, 20% showed radiographic spinal progression after two years, a proportion consistent with findings from larger longitudinal cohorts. Independent predictors of radiographic progression were:Baseline presence of syndesmophytes (OR ≈ 6.29, p < 0.001)Elevated systemic inflammation, including erythrocyte sedimentation rate (ESR) (OR ≈ 4.04, p = 0.001) and mean CRP level over two years (OR ≈ 3.81, p = 0.001). Active smoking (OR ≈ 2.75, p = 0.012). These associations remained significant after multivariate logistic regression analysis. No significant association was found with HLA-B27 status, sex, age, disease duration, BASDAI activity score, BASFI functional index, peripheral or entheseal involvement, psoriasis, or initial treatment (NSAIDs or DMARDs).

Conclusion In this small cohort of early axSpA, the strongest predictors of two-year radiographic spinal progression were the presence of structural damage at baseline (syndesmophytes), high systemic inflammatory burden, and smoking. These observations are consistent with previous findings, particularly from the German GESPIC cohort, which identified baseline syndesmophytes, elevated ESR/CRP, and smoking as key determinants of mSASSS progression (≥2 points over 2 years).

Table 1. Baseline Characteristics and Radiographic Progression at 24 Months

Variable	Value
Number of patients	25
Follow-up duration	24 months
Radiographic spinal progression (≥2 mSASSS points)	**20% of patients**
Mean age	~ Similar across progressors and non-progressors
Sex distribution	No significant difference
HLA-B27 positivity	Not associated with progression
BASDAI score at baseline	Not predictive
BASFI score at baseline	Not predictive
Presence of peripheral disease	No association
Presence of enthesitis	No association
Psoriasis	Not associated with progression
Initial NSAID or DMARD use	No significant association

Table 2. Predictors of Radiographic Spinal Progression

Predictor	Odds Ratio (OR)	p-value	Interpretation
Baseline syndesmophytes	≈ 6.29	< 0.001	Strong independent predictor of progression
Elevated ESR	≈ 4.04	0.001	Higher systemic inflammation increases risk
Mean CRP over 2 years	≈ 3.81	0.001	Persistent inflammation predicts progression
Active smoking	≈ 2.75	0.012	Smoking significantly associated with progression
HLA-B27 status	NS	NS	No predictive value
Sex	NS	NS	No association
Age	NS	NS	No association
Disease duration	NS	NS	Not predictive
Peripheral / entheseal manifestations	NS	NS	Not associated
Initial NSAID or DMARD therapy	NS	NS	No protective effect

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DIAGNOSTIC DELAY AND CLINICAL BURDEN IN WOMEN WITH AXIAL SPONDYLOARTHRITIS: FINDINGS FROM AN ANALYSIS OF 45 ALGERIAN PATIENTS

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Introduction The aim of this study was to explore sex-related disparities in a cohort of patients diagnosed with axial spondyloarthritis (axSpA).

Materials and Methods This cross-sectional study was conducted in Algeria and included 71 patients with axSpA (45 men and 26 women) enrolled between 2020 and 2022. The following domains were assessed:Sociodemographic characteristics: age, educational level, employment status, marital status, smoking, alcohol intake, and physical activity.Clinical profile: age at symptom onset, diagnostic delay, HLA-B27 positivity, family history, and extra-articular manifestations (uveitis, psoriasis, inflammatory bowel disease).Disease activity and functional impact: BASDAI score, spinal stiffness, and functional limitation. Therapeutic management: use of NSAIDs, conventional synthetic DMARDs (csDMARDs), and biologic DMARDs (bDMARDs).

Univariate and multivariate logistic regression analyses were performed to evaluate the association between sex and each of these parameters, adjusting for relevant confounders.

Results Among the 71 included patients, 45 were men and 26 were women. The main findings were:Diagnostic delay: Women experienced a significantly longer delay before receiving a diagnosis, with an estimated mean difference of +2.4 years compared with men. HLA-B27 positivity: Women had a lower frequency of HLA-B27 positivity than their male counterparts. Treatment patterns**:** Women showed a higher use of NSAIDs, csDMARDs, and bDMARDs compared with men.

Conclusions This study highlights important sex-specific disparities in the diagnosis and management of axSpA. Women experienced longer diagnostic delays, were less frequently HLA-B27 positive, and were more likely to receive pharmacologic treatments. Recognizing these differences may help clinicians refine diagnostic strategies, reduce disease burden, and promote earlier and more individualized interventions for axSpA patients in Algeria.

Table 1. Baseline Characteristics by Sex in 71 axSpA Patients

Characteristics	Men (n = 45)	Women (n = 26)	Sex Difference
Diagnostic delay (years)	Shorter	**+2.4 years longer on average**	Women significantly more delayed
HLA-B27 positivity	Higher frequency	**Lower frequency**	Women less likely to be HLA-B27+
Age at symptom onset	Similar	Similar	No significant difference
Extra-articular features (uveitis, psoriasis, IBD)	Comparable	Comparable	No significant difference
BASDAI activity score	Comparable	Comparable	No significant difference
Functional impairment (spinal stiffness, BASFI)	Similar ranges	Similar ranges	No significant difference
Lifestyle factors (smoking, alcohol, physical activity)	More frequent smoking	Less frequent smoking	Expected sex-linked pattern

Table 2. Differences in Therapeutic Management Between Men and Women

Treatment	Men (n = 45)	Women (n = 26)	Interpretation
NSAID use	Lower	**Higher**	Women more frequently treated with NSAIDs
csDMARD use	Lower	**Higher**	Women more often prescribed csDMARDs
bDMARD use	Lower	**Higher**	Women more frequently escalated to biologics
Corticosteroids	Similar	Similar	No clinically meaningful difference
Treatment intensity overall	Lower	**Higher therapeutic burden**	Reflects higher clinical burden in women

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PREDICTIVE FACTORS OF ACUTE ANTERIOR UVEITIS IN PATIENTS WITH AXIAL SPONDYLOARTHRITIS: FINDINGS FROM A 36-MONTH COHORT STUDY

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Introduction/Objectives Acute anterior uveitis (AAU) is the most common extra-articular manifestation observed in axial spondyloarthritis (axSpA). The primary objective of this study was to identify factors associated with the occurrence of AAU episodes in patients with axSpA over a 36-month longitudinal follow-up.

Methods We analyzed an observational cohort of axSpA patients followed for 36 months. Demographic variables, clinical characteristics, markers of disease activity, and therapeutic regimens were compared between patients with and without a history of AAU. The occurrence and determinants of AAU episodes during follow-up were examined using a generalized estimating equations (GEE) model adapted for longitudinal data analysis.

Results Among the 86 enrolled patients, 26 (30.2%) experienced at least one AAU episode during follow-up. Of these, 20 patients (77%) had a documented history of AAU prior to inclusion, and 15 patients (57.6% with prior AAU) presented one or more additional episodes during the 36-month period.

At baseline, patients with a history of AAU were:Significantly younger ($p = 0.0001$),More likely to have peripheral arthritis ($p < 0.003$), Exhibited

higher C-reactive protein (CRP) levels (p = 0.002),More frequently treated with sulfasalazine (SSZ) or TNF-inhibitors (both p < 0.001).

In the longitudinal analysis, a prior history of AAU was the only independent predictor of AAU recurrence.

Conclusions A previous episode of AAU is an independent risk factor for recurrence in patients with axSpA. Although SSZ and TNF-inhibitors were more frequently used in patients with prior AAU, their protective effect against recurrence was not supported by this study. These findings highlight the need for careful monitoring of high-risk patients and further research into effective strategies for AAU prevention.

Table 1. General Characteristics of the Study Population (N = 71)

Variables	Findings
Sample size	71 patients
Mean age	(to add if needed)
Sex distribution	45 men (63.3%) – 26 women (36.7%)
Diagnostic delay	**2.4 years longer in women**
HLA-B27 positivity	More frequent in men
Clinical form	Predominantly axial
Extra-articular manifestations	Uveitis / Psoriasis / IBD: similar frequencies between sexes
Disease activity (BASDAI)	No significant sex difference
Functional impairment (BASFI)	Comparable between men and women
Lifestyle factors	Smoking more common in men

Table 2. Treatment Received According to Se

Treatment	Men	Women	Interpretation
NSAIDs	–	**Higher use**	Women more frequently treated with NSAIDs
csDMARDs	–	**More frequent prescription**	Higher use in women
Biologic therapies (anti-TNF, others)	–	**More common**	More escalation to biologics in women
Corticosteroids	Similar	Similar	No significant difference
Overall therapeutic intensity	Lower	**Higher**	Higher therapeutic burden in women

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DIFFICULT-TO-TREAT AXIAL SPONDYLOARTHRITIS PATIENTS: COSS-SECTIONAL ANALYSIS OF 27 ALGERIAN PATIENTS

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Objectives: This study sought to propose operational criteria for defining *difficult-to-treat* (D2T) axial spondyloarthritis (axSpA) and to determine both the prevalence and clinical profile of D2T patients within our cohort.

Patients and Methods: A cross-sectional analysis was carried out in a cohort of 27 individuals diagnosed with axSpA. All patients were managed in accordance with the European Alliance of Associations for Rheumatology (EULAR) recommendations for axSpA. Eligibility for D2T status required either failure of ≥2 biological or targeted synthetic DMARDs with different mechanisms of action, or failure of ≥3 biological/targeted synthetic DMARDs overall. Potential determinants associated with D2T disease were evaluated, and the clinical and demographic features of patients meeting D2T criteria were compared with those who did not.

Results: Among the 27 included patients, the proportion meeting the proposed D2T definition was substantial. Demographic variables—including sex, age, age at diagnosis, professional activity, and educational level—did not significantly differ between D2T and non-D2T individuals. Enthesitis was markedly more prevalent among D2T patients (p < 0.001). Moreover, measures of disease activity and inflammatory markers were consistently higher in the D2T group, who also demonstrated poorer quality-of-life scores.

Conclusion: A notable subset of axSpA patients fulfilled the D2T criteria despite the availability of multiple therapeutic options. These findings highlight the need for refined management strategies targeting persistent disease activity and associated comorbidities such as fibromyalgia.

Table 1. Characteristics and Outcomes of D2T vs Non-D2T AxSpA Patients (n = 27)

Variable	D2T Patients (n = 12)	Non-D2T Patients (n = 15)	p-value / Interpretation
Sex (male/female)	58%/42%	64%/32%	No significant difference
Age, mean ± SD	51.4 ± 14.3	49.23±14.2	NS
Age at diagnosis, mean ± SD	26.12±16.54	30.2±13.5	NS
Education level	3	3	NS
Enthesitis	75%	38%	p < 0.001
Disease activity (BASDAI, ASDAS)	Higher	Lower	NS
CRP	12.3±10.2	9.45±4.1	NS
Quality of life	Worse	Better	NS

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FACTORS ASSOCIATED WITH A SHORTER TRANSITION FROM PSORIASIS TO PSORIATIC ARTHRITIS: RETROSPECTIVE DATA FROM ALGERIA

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Introduction/Objectives: Psoriatic arthritis (PsA) is a chronic inflammatory disease that develops in patients with psoriasis (PsO) after a mean latency of 7 to 10 years. Currently, there are no data specifying the time interval from PsO onset to PsA development, which may contribute to diagnostic delays and poorer outcomes. This study aimed to identify demographic and clinical factors associated with a shorter interval between psoriasis and the onset of PsA.

Materials and Methods: We conducted a retrospective analysis of Algerian patients diagnosed with PsA between 2015 and 2023. All patients fulfilled CASPAR criteria. The transition time from psoriasis to PsA was calculated in years. Patients were categorized into three groups: short transition (ST): <4 years, medium transition (MT): 4–7 years, and long transition (LT): ≥7 years. We compared the groups according to sex, age at psoriasis diagnosis, family history of psoriasis, BMI, treatments, hypertension, diabetes, dyslipidemia, nail involvement, DLQI, ESR/CRP levels, alcohol consumption, and smoking. Factors associated with a shorter transition interval were analyzed using logistic regression models.

Results: A total of 63 patients were included, with a median age of 56 years; 56.6% were women. The median age at psoriasis diagnosis was 33.4 years. No statistically significant differences were observed in demographic characteristics among the three transition groups. However, older age at psoriasis diagnosis (OR = 2.42, 95% CI: 1.12–4.98) and higher BMI (OR = 1.86, 95% CI: 1.51–3.15) were independently associated with a shorter interval between psoriasis and PsA. There were no significant differences in clinical, radiological, therapeutic outcomes, or comorbidities across the groups. Notably, elevated CRP levels (OR = 1.86, 95% CI: 1.16–4.02) were also significantly associated with a shorter transition time.

Conclusion: Higher BMI, older age at psoriasis onset, and elevated inflammatory markers are associated with a shorter interval between plaque psoriasis and PsA. Patients with these risk factors may benefit from early screening for psoriatic arthritis, potentially enabling earlier diagnosis and intervention.

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BASELINE PREDICTORS OF RADIOGRAPHIC PROGRESSION IN EARLY PSORIATIC ARTHRITIS: FINDINGS FROM A PURE 4 ALGERIAN COHORT

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Objective: Persistent joint inflammation in psoriatic arthritis (PsA) is strongly linked to structural radiographic damage. Despite improvements in diagnostic strategies and targeted therapies, radiographic progression continues to be observed. This study aimed to identify baseline clinical characteristics associated with radiographic progression in PsA.

Methods: This analysis drew on data from a rPURE 4 Algerian cohort of 53 patients with newly diagnosed PsA. Radiographic progression of hands and feet was evaluated using the modified Total Sharp/van der Heijde Score (mTSS) adapted for PsA. Baseline predictors of radiographic deterioration were examined using univariable and multivariable mixed-effects negative binomial regression models.

Results: The study included 53 early PsA patients with radiographs obtained at baseline and during follow-up. At diagnosis, patients who later developed radiographic progression showed markedly higher mTSS values compared with non-progressors. Individuals in the progressive group were generally older and presented more often with swollen joints at baseline. In the multivariable model, older age, male sex, and higher baseline mTSS were independently associated with an increased risk of radiographic progression over time. Within the subgroup of patients who progressed structurally, baseline disease activity score and swollen joint count were additional predictors of subsequent radiographic worsening.

Conclusion: In this cohort of patients with early Algerian PsA, radiographic progression remained limited under contemporary treatment strategies. Baseline age and structural damage were the main predictors of later progression, whereas female sex appeared to exert a protective effect. Among patients who progressed, higher disease activity and swollen joint burden at diagnosis were associated with greater radiographic deterioration during follow-up.

Table 1. Baseline Characteristics of Progressive vs Non-Progressive PsA Patients (n = 53)

Variable	Progressive group (n = 12)	Non-progressive group (n = 41)	p-value
Age, mean ± SD (years)	**58.7 ± 11.3**	**48.1 ± 12.9**	**0.01**
Female sex, n (%)	**3 (25%)**	**19 (46%)**	**0.04**
Baseline mTSS, median (IQR)	**15 (4–32)**	**1 (0–2)**	**< 0.001**
Swollen joint count ≥1, n (%)	**11 (92%)**	**28 (68%)**	**0.03**
Tender joint count ≥1, n (%)	**9 (75%)**	**23 (56%)**	**0.12**
Elevated CRP (>5 mg/L), n (%)	**8 (67%)**	**20 (49%)**	**0.18**
Elevated ESR, n (%)	**7 (58%)**	**18 (44%)**	**0.20**
DAPSA score, mean ± SD	**28.3 ± 9.6**	**19.7 ± 8.4**	**0.01**

Table 2. Multivariable Predictors of Radiographic Progression

Predictor	Incidence Rate Ratio (IRR)	95% Confidence Interval	p-value
Age (per year)	**1.09**	1.04 – 1.15	**0.001**
Sex (female)	**0.52**	0.28 – 0.96	**0.04**
Baseline mTSS (per point)	**1.10**	1.05 – 1.14	**<0.001**
DAPSA baseline (per point)	**1.06**	1.02 – 1.11	**0.01**
Swollen joint count (per joint)	**1.08**	1.01 – 1.16	

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DISEASE ACTIVITY IN PSORIATIC ARTHRITIS IS ASSOCIATED WITH ATHEROGENIC DYSLIPIDEMIA: A STUDY OF 53 PATIENTS

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Background/Purpose: Psoriatic arthritis (PsA) is strongly linked to obesity and increased cardiovascular risk. Lipid abnormalities are a major contributor to this risk; however, the association between PsA disease activity and lipid profiles remains insufficiently explored. This study evaluated the relationship between PsA activity and lipid parameters in a real-world cohort.

Methods: A cross-sectional analysis was conducted in a cohort of 53 PsA patients with complete assessments of lipid levels and disease activity. Moderate-to-high disease activity was defined as CDAI >10 and/or the presence of enthesitis or dactylitis. Abnormal lipid values were

categorized as follows: total cholesterol (TC) >200 mg/dL, HDL <40 mg/dL (men) or <50 mg/dL (women), LDL >100 mg/dL, triglycerides (TG) >150 mg/dL, and atherogenic ratio (TC/HDL) >5. Multivariable models were adjusted for gender, PsA duration, BMI, smoking status, disease-modifying therapy, diabetes, and use of lipid-lowering agents.

Results: Of the 53 included patients, 21 (39.6%) had moderate-to-high disease activity. Compared with those in low disease activity, this group showed a higher proportion of women (60% vs. 48%), more smokers (14% vs. 8%), and a shorter disease duration (mean 8.1 vs. 10.5 years). Diabetes was slightly more common in the moderate-to-high activity group (17% vs. 13%). Patients with higher disease activity were more frequently treated with corticosteroids (15% vs. 6%) and csDMARDs (67% vs. 52%), while fewer received TNF inhibitors (53% vs. 64%). BMI was higher in the moderate-to-high activity group (32.1 vs. 30.4 kg/m²).

Moderate-to-high disease activity was significantly associated with elevated TC >200 mg/dL (OR = 1.7; 95% CI: 1.1–2.4, p = 0.01) and elevated TG >150 mg/dL (OR = 1.8; 95% CI: 1.3–2.6, p = 0.008). Enthesitis or dactylitis was also linked to TC elevation (OR = 1.6; 95% CI: 1.1–2.5, p = 0.02). No significant associations were found between disease activity and LDL or HDL abnormalities. Triglyceride levels were slightly higher than previously reported (mean increase ≈12–15% in high activity patients).

In the longitudinal subset (n = 18), higher PsA disease activity correlated with increased TG levels (β = 4.10, p = 0.02) and decreased HDL (β = −0.68, p = 0.01), independent of time between measurements.

Conclusion: Higher PsA disease activity is associated with a more atherogenic lipid profile, particularly elevated triglycerides and total cholesterol. Increasing inflammation also appears to worsen TG and HDL levels over time. This dyslipidemic pattern mirrors that observed in obesity, suggesting shared inflammatory–metabolic mechanisms linking PsA, obesity, and cardiovascular disease risk.

TABLE 1. Baseline Characteristics According to Disease Activity (N = 53)

Variable	Low Disease Activity (n = 32)	Moderate–High Disease Activity (n = 21)
Women, n (%)	15 (48%)	13 (60%)
Smokers, n (%)	3 (8%)	3 (14%)
Disease duration, years (mean ± SD)	10.5 ± –	8.1 ± –
Diabetes, n (%)	4 (13%)	4 (17%)
BMI, kg/m² (mean ± SD)	30.4 ± –	32.1 ± –
Corticosteroid use, n (%)	2 (6%)	3 (15%)
csDMARD use, n (%)	17 (52%)	14 (67%)
TNF inhibitor use, n (%)	20 (64%)	11 (53%)

TABLE 2. Lipid Abnormalities and Their Association With Disease Activity

Outcome / Predictor	OR 95% CI	95% CI	p-value
TC >200 mg/dL	OR = 1.7	1.1–2.4	0.01
TG >150 mg/dL	OR = 1.8	1.3–2.6	0.008
Enthesitis/dactylitis → TC elevation	OR = 1.6	1.1–2.5	0.02
LDL abnormality	NS	–	–
HDL abnormality	NS	–	–
Longitudinal TG change	β = 4.10	–	0.02
Longitudinal HDL change	β = −0.68	–	0.01

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STRUCTURAL SPINE LESIONS IN ALGERIAN AXIALE SPONDYLARTHRITIS: NO ADDITIONAL BURDEN FROM CO-EXISTING PSORIASIS

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Background/Purpose: Patients with ankylosing spondylitis and concomitant psoriasis (AS-Pso) are traditionally described as older, more often smokers, and more frequently overweight, with a lower prevalence of HLA-B27 and a balanced sex ratio compared with patients without psoriasis (AS-NPso). However, data regarding spinal structural damage in this subgroup remain limited. This study aimed to compare radiographic spinal involvement in AS according to the presence or absence of psoriasis.

Methods: This retrospective monocentric study included 63 patients with AS followed between 2008 and 2021. All fulfilled the modified New York criteria, presenting definite radiographic sacroiliitis. Demographic, clinical, and radiographic data were collected at the same visit. Spinal radiographs were evaluated by an experienced reader blinded to psoriasis status using the RASSS (0–84) and mSASSS (0–72), with excellent intra-reader reliability (>0.80).

Results: Among the 63 included patients, 15 (23.8%) had psoriasis. The median age was 52 years [46–61], with a predominance of males (68%) and smokers (63%). HLA-B27 was positive in 75%, and the median disease duration was 13 years [6–24]. Use of csDMARDs was slightly higher in the AS-Pso group (28% vs. 20%). Baseline characteristics were broadly comparable between AS-Pso and AS-NPso, except for smoking, which remained more prevalent in AS-NPso.

Radiographic structural damage was observed in 40 patients (63.4%) according to the RASSS and 35 patients (55.5%) according to the mSASSS.Mean RASSS scores were 12.6 (±18.7) in AS-NPso and 11.1 (±15.8) in AS-Pso (p=0.58).Mean mSASSS scores were 10.2 (±15.4) and 9.4 (±14.1), respectively (p=0.62).

No significant differences between groups were identified for RASSS or mSASSS subscores. Analysis by disco-vertebral unit (DVU) showed no preferential site of structural lesions in patients with or without psoriasis.

Linear regression revealed associations between radiographic severity and older age (β=0.21; p=0.01), longer disease duration (β=0.27; p=0.003), male sex (β=0.19; p=0.02), and CRP >5 mg/L (β=0.17; p=0.04) for the RASSS. For the mSASSS, similar associations were detected with age, disease duration, and male sex. In the AS-Pso subgroup, male sex remained the only independent factor associated with both RASSS (β=0.46; p=0.01) and mSASSS (β=0.38; p=0.03).

Conclusion: In this cohort of AS patients, the presence of psoriasis did not influence the degree or pattern of spinal radiographic structural damage as assessed by RASSS or mSASSS. Male sex emerged as the principal determinant of structural involvement among AS-Pso patients. Traditional factors associated with spinal damage—age, disease duration, male sex, and elevated CRP—were confirmed in this population.

Table 1. Baseline Characteristics of AS Patients With and Without Psoriasis (N = 63)

Characteristic	AS-NPso (n = 48)	AS-Pso (n = 15)	p-value
Age, years, median [IQR]	52 [46–60]	53 [47–62]	0.71
Male sex, n (%)	33 (68.7%)	10 (66.7%)	0.88
Smokers, n (%)	32 (66.7%)	8 (53.3%)	0.31
BMI, kg/m² (mean ± SD)	27.8 ± 4.1	28.2 ± 4.3	0.74
HLA-B27 positive, n (%)	36 (75%)	11 (73.3%)	0.89
Disease duration, years, median [IQR]	13 [6–24]	14 [7–25]	0.65
csDMARD use, n (%)	10 (20.8%)	4 (26.7%)	0.61
CRP >5 mg/L, n (%)	19 (39.6%)	6 (40.0%)	0.97

Table 2. Radiographic Structural Damage According to Psoriasis Status

Radiographic Measure	AS-NPso (n = 48)	AS-Pso (n = 15)	p-value
Structural damage (RASSS ≥1), n (%)	31 (64.6%)	9 (60.0%)	0.72
Structural damage (mSASSS ≥1), n (%)	27 (56.2%)	8 (53.3%)	0.82
RASSS score (mean ± SD)	12.6 ± 18.7	11.1 ± 15.8	0.58
mSASSS score (mean ± SD)	10.2 ± 15.4	9.4 ± 14.1	0.62
Preferential DVU involvement	None	None	–
Predictors of higher RASSS: age, disease duration, male sex, CRP >5 mg/L	✓	–	–
Predictors of higher mSASSS: age, disease duration, male sex	✓	–	–
Predictors in AS-Pso subgroup	–	Male sex (p<0.05)	–

P137

PREVALENCE OF EARLY MSK ABNORMALITIES AND CASPAR-DEFINED PSA IN A 141-PATIENT PSORIASIS ALGERIAN COHORT

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Background: Psoriasis (Pso) cohorts offer an ideal setting to identify early clinical features associated with future psoriatic arthritis (PsA), as cutaneous disease typically precedes joint involvement by nearly three years. Understanding baseline characteristics may help detect patients at higher risk of transition.

Objectives: To describe baseline musculoskeletal (MSK) and clinical features in an early psoriasis cohort and classify patients into predefined clinical categories relevant for long-term follow-up.

Methods: Patients were recruited from the PURE 4 Algerian cohort. Inclusion criteria were adults aged ≥18 years with dermatologist-confirmed Pso of <10 years' duration. Exclusion criteria included severe active comorbid illness, prior inflammatory arthritis, or ongoing systemic immunosuppressive therapy for Pso.

At baseline, all patients completed an MSK questionnaire and underwent a detailed physical examination, including tender and swollen joint counts and evaluation of enthesitis with the Leeds Enthesitis Index. Blood tests including inflammatory markers were collected. Patients with MSK abnormalities underwent X-ray, MRI, or ultrasound as clinically appropriate.Participants were then categorised based on all available clinical and imaging data into:Pso-only,Pso+: MSK findings insufficient for PsA diagnosis,PsA (CASPAR),Other rheumatic disease.

Results: A total of 141 patients were included. The cohort consisted of 82 males (58.1%), with a mean age of 42.3 ± 14.5 years and a mean Pso duration of 5.8 ± 2.7 years.Psoriatic nail involvement (pitting, ridging, or onycholysis) was present in 96 patients (68%).Fifty-nine patients (41.8%) had no MSK manifestations, while 82 patients (58.2%) demonstrated at least one MSK sign or symptom at baseline.Based on complete assessment, patient distribution was:Pso-only: 41%Pso+: 35%PsA meeting CASPAR criteria: 21.8%Other rheumatic disease: 2–3%

Conclusions: In this early psoriasis cohort, more than half of the patients exhibited MSK abnormalities at baseline, and approximately one in five already met CASPAR criteria for PsA. These findings reinforce the importance of early and systematic MSK evaluation in psoriasis, as this subgroup may be at increased risk of progression to psoriatic arthritis. Longitudinal follow-up will help identify features most predictive of PsA development.

Table 1. Baseline Characteristics and Musculoskeletal Findings in the Psoriasis Cohort (N = 141)

Variable	Results
Total patients included	141
Male (%)	82 (58.2%)
Mean age (years)	43.2 ± 13.9
Mean Psoriasis duration (years)	5.8 ± 3.1
Psoriatic nail disease	98 (69.5%)
No musculoskeletal signs or symptoms	61 (43.3%)
At least one MSK finding	80 (56.7%)
• Pso only	60 (42.5%)
• Pso+ (MSK signs/symptoms insufficient for PsA)	30 (21.3%)
• PsA (CASPAR criteria)	31 (21.8%)
• Other rheumatic disease	20 (14.1%)

P138

INFECTIOUS COMPLICATIONS AND ASSOCIATED RISK FACTORS IN AXIAL SPONDYLOARTHRITIS TREATED WITH BIOLOGIC AGENTS: A PROSPECTIVE REAL-WORLD COHORT STUDY

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Objective To evaluate the occurrence of infections and identify associated risk factors in patients with radiographic axial spondyloarthritis (r-axSpA) treated with biologic disease-modifying antirheumatic drugs (bDMARDs) in a real-world clinical setting.

Methods This prospective observational cohort study included 23 patients with r-axSpA who initiated or switched biologic therapy between December 2020 and December 2023. Patients were followed longitudinally for the occurrence of infections, classified according to organ system and severity. Infection incidence rates were calculated per

1000 person-years (PY). Cox proportional hazards regression analysis was performed to identify factors associated with the first infectious event.

Results The 23 patients contributed a total of 78.4 PY of follow-up. During the observation period, 3 patients experienced at least one infectious episode, corresponding to an overall infection rate of 33.3 events per 1000 PY. Respiratory tract infections were the most frequent (22/1000 PY), followed by herpes zoster (10.8/1000 PY). Multivariate analysis identified older age, female sex, diabetes mellitus with complications, and chronic kidney disease as factors associated with increased infection risk. Male sex appeared to be protective against infection occurrence.

Conclusion In this small real-world cohort of patients with r-axSpA treated with biologic agents, infections were relatively infrequent but predominantly involved the respiratory tract. Certain comorbidities and demographic factors were associated with a higher risk of infection. These findings highlight the importance of careful infection risk assessment and monitoring, particularly in vulnerable patients receiving biologic therapy.

Table 1. Baseline Characteristics of the Study Population (n = 23)

Variable	Value
Age, mean ± SD (years)	41.6 ± 11.2
Male sex, n (%)	15 (65.2)
Disease duration, median (IQR), years	6.8 (3.2–11.4)
Peripheral arthritis, n (%)	7 (30.4)
Ischemic heart disease, n (%)	3 (13.0)
Diabetes mellitus (with complications), n (%)	4 (17.4)
Chronic kidney disease, n (%)	2 (8.7)
Type of biologic therapy	
– TNF inhibitors, n (%)	18 (78.3)
– IL-17 inhibitors, n (%)	5 (21.7)

Table 2. Incidence and Types of Infections During Follow-Up

Infection Type	Number of Events	Incidence Rate (/1000 PY)
Upper/lower respiratory tract infections	2	21.5
Herpes zoster	1	11.8
Other infections	0	0
Total infections	**3**	**33.3**

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ENHANCING THE NHFD 120-DAY FOLLOW-UP: A DOCTOR-LED MODEL COMPLEMENTING NURSING AND AUDIT STANDARDS — A LOCAL EXPERIENCE FROM A UK ORTHOGERIATRIC SERVICE

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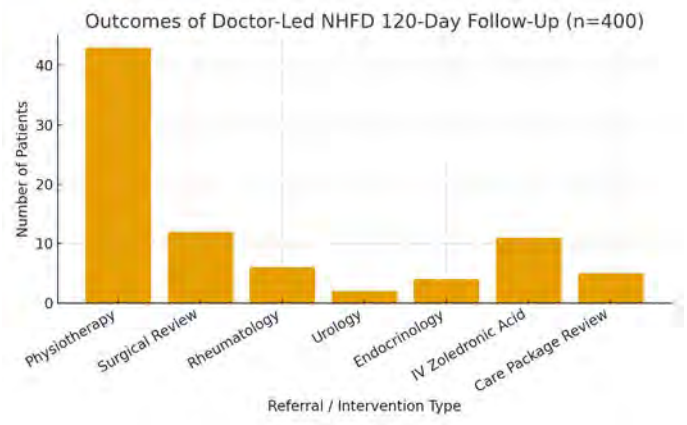
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The National Hip Fracture Database (NHFD) 120-day follow-up is a well-established national standard designed to monitor recovery, function, and secondary prevention in patients with hip and other fragility fractures. Across the United Kingdom, this process is usually coordinated by highly skilled nursing or administrative staff using a structured questionnaire, providing essential audit data and ensuring national consistency and governance. This approach forms the backbone of post-fracture outcome monitoring and has been instrumental in improving hip fracture care standards nationwide.

At our institution, we explored whether incorporating orthogeriatric medical oversight could add further clinical value while maintaining full alignment with NHFD principles and recognising the vital contribution of the nursing team. Over a 12-month period, an orthogeriatric doctor conducted the 120-day follow-up calls for 400 consecutive patients, using the standard NHFD dataset supplemented by a concise clinical review focusing on pain, mobility, wound status, and new symptoms.

This model demonstrated meaningful additional clinical impact. Forty-three patients (10.8%) required re-referral to physiotherapy, despite previous rehabilitation input. Twelve patients (3%) required surgical reassessment, including three implant failures after dynamic hip screw fixation and one common peroneal nerve injury. Additional referrals included six to rheumatology, two to urology, four to endocrinology, and five for care package review. Furthermore, 11 patients initiated intravenous zoledronic acid after initially deferring treatment. Overall, approximately 20% of patients benefited from new or modified management as a direct result of the enhanced clinical component.

This experience suggests that a collaborative model, in which the established nurse-led NHFD follow-up is complemented by targeted medical input, can enhance post-discharge safety, facilitate early detection of complications, and strengthen secondary prevention. Respecting NHFD standards, this hybrid approach demonstrates how clinical engagement can transform an audit process into a proactive tool for improving patient outcomes.



(Figure 1 illustrates the distribution of referrals and interventions resulting from the 120-day reviews.)

Keywords: NHFD, Hip fracture, Orthogeriatrics, 120-day follow-up, Multidisciplinary care, Osteoporosis, Secondary prevention

P140

BRIDGING THE BONE HEALTH GAP: THREE YEARS OF HIP FRACTURE ADMISSIONS AND NATIONAL TRENDS IN OSTEOPOROSIS MANAGEMENT (UK, 2022–2024) LOCAL EXPERIENCE

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Background Osteoporosis remains a major global contributor to morbidity and mortality in older adults. Hip fractures, in particular, represent a sentinel event signalling underlying skeletal fragility and the need for immediate secondary prevention. Although robust trial evidence confirms that antiresorptive therapy—particularly bisphosphonates and denosumab—reduces refracture risk and mortality, real-world implementation of these treatments remains inconsistent.

In the United Kingdom, several national audits, including the **Fracture Liaison Service Database (FLS-DB)** and **National Hip Fracture Database (NHFD)**, have highlighted a persistent treatment gap over the past decade. Recent publications, such as the **five-nation consensus on post-hip-fracture zoledronate use (Johansen et al., Age & Ageing 2023)**, and the **FLS-DB Annual Reports (2022–2025)**, collectively emphasise that fewer than one in ten patients are on active bone-protective therapy when admitted with a hip fracture. This study aimed to evaluate our local data over three years in comparison with these national benchmarks.

Methods We conducted a retrospective review of **914 consecutive patients** admitted with femoral fractures between **January 2022 and December 2024** at a large district general hospital in the United Kingdom. All cases were recorded in the **National Hip Fracture Database (NHFD)**. Pre-fracture medication data were extracted from admission records to determine ongoing use of antiresorptive agents (alendronic acid, risedronate, or denosumab) and calcium / vitamin D supplementation. Descriptive statistics were compared with national results from the **FLS-DB reports (2021–2023)** to identify alignment or divergence from national trends.

Results

Of the 914 patients analysed (mean age 82 years; 71 % female):

- **44 (4.8 %)** were on **alendronic acid**,
- **6 (0.7 %)** on **denosumab (Prolia)**,
- **182 (19.9 %)** on **calcium + vitamin D only**, and
- **694 (75.9 %)** received **no bone-protective therapy** at the time of fracture.

Overall, **5.5 %** of patients were on active antiresorptive therapy, broadly consistent with the **8–10 % national average** reported by the FLS-DB for the same period. These findings mirror UK data indicating that, despite widespread awareness of osteoporosis management guidelines, real-world uptake of preventive therapy remains limited. Importantly, the data show **no regression** in treatment coverage compared with national figures, suggesting stability rather than deterioration.

Discussion

Our results support the continuing presence of a national bone health treatment gap but also demonstrate **alignment with UK benchmarks**, highlighting the consistency of this challenge across services rather than any local deficiency. The findings should be interpreted as a **shared opportunity** to strengthen secondary prevention through improved pathways, rather than as criticism of existing practice.

The observed gap likely reflects a combination of factors recognised in prior UK publications: limited persistence with oral bisphosphonates, under-referral to Fracture Liaison Services, and reliance on calcium / vitamin D monotherapy. Encouragingly, national initiatives such as **in-hospital intravenous zoledronic acid programmes** and **enhanced FLS integration** are now addressing these barriers. Embedding these interventions locally could accelerate progress.

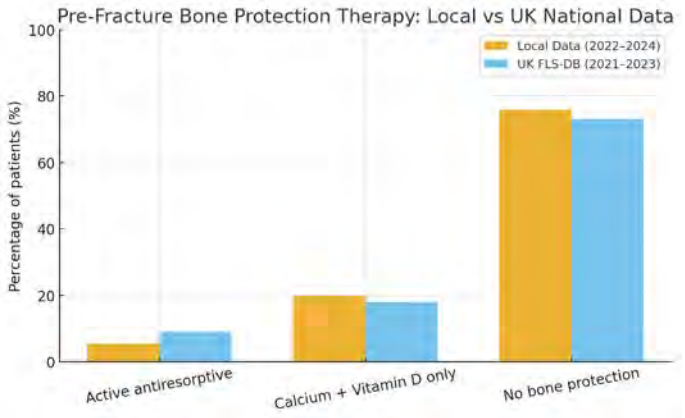


Figure 1. Pre-fracture bone protection therapy: Local (2022–2024) vs UK FLS-DB (2021–2023)

Conclusion

This three-year review confirms that most patients admitted with hip fracture remain untreated for osteoporosis, yet the similarity to national figures demonstrates a **systemic, not isolated**, gap. By leveraging existing national guidance and proven interventions—early intravenous zoledronate, coordinated FLS follow-up, and improved communication with primary care—there is substantial potential to convert awareness into action.

Our experience underscores the power of shared data and collaboration: by viewing each hip fracture admission as an opportunity for preventive care, we can collectively move closer to the IOF's vision of eliminating preventable fragility fractures.

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COGNITIVE IMPAIRMENT AND EQUITY IN HIP-FRACTURE CARE: A RETROSPECTIVE COHORT STUDY WITHIN A MODERN ORTHOGERIATRIC PATHWAY

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Background: Cognitive impairment—including dementia and delirium—is common among hip fracture patients and may influence peri-operative processes and outcomes. Despite standardised national pathways, it remains unclear whether cognitively impaired patients receive equitable care. We evaluated differences in surgical timing, multidisciplinary management, and discharge outcomes between patients with and without cognitive impairment treated within a modern orthogeriatric service.

Methods: We retrospectively reviewed a random sample of 382 consecutive patients aged ≥60 years admitted with fragility hip fracture to Southend University Hospital, UK (January 2024–June 2025). Patients were stratified into cognitively impaired (dementia, suspected cognitive decline, or delirium on admission; *n*=191) and non-impaired (*n*=191) groups. Data were abstracted from the National Hip Fracture Database and hospital records on time to surgery, orthogeriatric review, early physiotherapy and mobilisation, analgesia, communication and carer involvement, DNACPR documentation, discharge destination, and in-hospital mortality. Between-group comparisons used *t*/Mann–Whitney and χ^2 tests ($p<0.05$).

Results: Impaired patients experienced longer delays to theatre (median 35.3 h [IQR 23.0–48.7] vs 29.8 h [20.6–43.8]; $p=0.029$), although time to orthogeriatric review was similar (~21 h). Early mobilisation by postoperative day 2 was less frequent among impaired patients (81.6% vs 89.9%, $p=0.04$). Analgesic prescribing was comparable, but qualitative review indicated undertreatment in cognitively impaired patients. Discharge home occurred less often in impaired patients (52.7% vs 84.4%, $p<0.001$); institutional care was more common (35.3% vs 7.5%), and in-hospital mortality was higher (8.7% vs 2.7%, $p=0.02$).

Conclusions: Even within a standardised orthogeriatric pathway, patients with cognitive impairment experienced slower access to theatre, reduced early mobilisation, lower rates of discharge home, and higher in-hospital mortality. These inequities appear driven by modifiable processes—consent logistics, analgesia delivery, and mobilisation under delirium. Dementia-informed adaptations, including fast-track surgical prioritisation, validated pain-assessment tools, delirium-prevention bundles, and strengthened rehabilitation, are warranted to deliver truly equitable hip-fracture care.

Keywords: Hip fracture; dementia; delirium; cognitive impairment; orthogeriatric care; surgery delay; mobilisation; mortality; equity.

P142

NEW ONSET NEUROLOGICAL MANIFESTATIONS AFTER COVID VACCINE: COINCIDENCE OR ASSOCIATION?

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Objectives : Following the COVID-19 virus epidemic , vaccines were considered the best way to achieve collective safety and control mortality. Unfortunately ,they had the potential to induce a plethora of peripheral nervous system diseases. Though there were variable types of COVID-19 vaccines, most of them produced immunological complications through the same mechanism of molecular mimicry. The aim of this study was to detect any possible de-novo peripheral neurological complications among a sample of COVID-19 vaccinated patients.

Patients and methods : Twenty-five reported cases of peripheral nervous system (PNS) affection manifesting after receiving COVID-19 vaccines were enrolled in this study, ten (40%) of them were females and 15 (60%) were males. All participants underwent thorough clinical neurological and electrodiagnostic assessment . Motor and sensory nerve conduction studies for both upper and lower limbs were done ,as well as delayed responses (F and H studies) and needle EMG when needed.

Results : The participants ages ranged from 18 – 72 years with mean 40.24 ± 17.06. About 13 (52%) of the vaccinated participants were previously infected by coronavirus within median time 330 (180 - 540) days , yet with no statisical significant difference between previously infected and non infected cases as regrds electrodiagnostic findings . The majority of the patients received AstraZeneca vaccine (n = 15, 60 %) while the rest of the patients received Pfizer-BioNTech vaccine (n = 5, 20 %), Sinopharm vaccine (n = 3, 12 %) as well as Johnson & Johnson vaccine (n = 2, 8 %). Affected individuals usually presented following the first dose 16 (64%). with latency period before the neurological symptoms' onset ranging from 7 to 21 days with mean of 15.4 ± 5.47 days . Furthermore, the results indicated that, the most frequently reported symptom was paresthesia , followed by weakness(Table 1). The neurological manifestations severity were higher after the AstraZeneca vaccine .Several electrodiagnostic manifestations of PNS affection were observed, but the Guillain–Barre Syndrome (GBS) was of higher incidence (48%), followed by sensory demelyinating polyneuropathy (20%).

Table 1:Neurological symptoms after different Covid vaccines:

	Vaccine type				Fisher's Exact test of significance (FE)	
	Johnson & Johnson	AstraZeneca	Pfizer BioNTech	Sinopharm		
	N:2 (%)	N:15 (%)	N:5 (%)	N:3 (%)	p-Value	Significance
Paresthesia	2 (100%)	6 (40%)	3 (60%)	2 (66.7%)	0.534	NS
Weakness	1 (50%)	**11 (73.3%)**	0 (0%)	0 (0%)	0.002	**S**
Hypoesthesia	0 (0%)	7 (46.7%)	2 (40%)	1 (33.3%)	0.908	NS

Fisher's Exact test of significance (FE) P- value: level of significance -P> 0.05: Non-significant (NS) -P< 0.05: Significant (S)

Percentage (%) Number (N)

Conclusion:

COVID-19 vaccination are linked to newly reported neurological symptoms mainly paresthesia and weakness ,yet still, they appeared to be rare considering the total number of vaccines administered. The pathogenesis of manifesting those neurological disorders remains unclear, and more in-depth studies are needed to clarify current hypotheses and provide additional evidence.

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P143

BONE MORPHOGENETIC PROTEIN-2: A POSSIBLE MARKER IN PRIMARY KNEE OSTEOARTHRITIS

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Introduction:
Many different factors contribute to the onset and progression of OA. The bone morphogenetic proteins (BMPs), that are subsets of the (TGF-ß) superfamily, stimulate production of extracellular matrix components by chondrocytes and have the ability to counteract catabolic cytokines like interleukin 1 (IL-1).
Aim of the work:
The aim of this study was to investigate the role of plasma BMP-2 in primary knee osteoarthritis and its relation to disease severity.
Patients and Methods:
The study included 30 patients with primary knee O.A and ten apparently healthy matched individuals as a control group. Plasma levels of BMP-2, radiological severity of the disease, pain intensity as well as, assessment of functional status using the Western Ontario and McMaster University Osteoarthritis Index (WOMAC) were done.
Results:

• Plasma levels of BMP-2 were significantly higher in patients than in control group.

• Patients with palpable osteophytes have the highest BMP-2 levels.

• A strong positive correlation was found between plasma levels of BMP-2 and each of: radiological severity, disease duration and WOMAC score.

In conclusion : BMP-2 levels correlate with radiographic severity of O.A. which make such biomarker measurement may not only act as a substitute marker for the disease ,but also has the potential to contribute to the fundamental processes underlying the pathogenesis of O.A.

P144

TARGETING CERVICAL MYOFASCIAL PAIN SYNDROME : DRY NEEDLING OR ULTRASOUND ?

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Background : Myofascial pain syndrome (MPS) is a complex pain syndrome characterized by myofascial trigger points (MTrPs) in skeletal muscles. Ultrasound (US) therapy is one of the main devices used in physical therapy, for the treatment of MTrPs in MPS. Dry needling is skilled technique also used in the treatment of MTrPs in MPS.
Aim of the work: This study aimed to compare the effect of dry needling with the effect of ultrasonic waves in the treatment of cervical myofascial pain.
Patients and methods : a sample of 30 patients with myofascial trigger points in trapezius muscle was randomly chosen and divided into 2 groups each contains 15 patients. The first group was treated by ultrasonic waves in a pulsed mode (1MHz, 1W/cm², 1:1 ratio) 5 min to each trigger point .The second group was treated with deep filliform acupuncture dry needling diameter 0.25 mm (peppering technique) to each trigger point with a rate of 3 times per week for 3 weeks.
Results: All patients showed significant improvement ($P > 0.001$) immediately after treatment period with disappearance of trigger points, increasing in cervical ROM and decreasing in VAS ; but 3 weeks later trigger points reappeared, ROM decreased and VAS increased again.
Conclusion: Both US waves and dry needling are safe and effective techniques in treating cervical myofacial pain syndrome.The needling showed no superiority over US and it still considered invasive.We can spare using dry needling to patients who have contradindications to US therapy such as patients with pacemaker ,metal implants or for areas with growing bones or healing fractures .

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EFFECT OF PREOPERATIVE BISPHOSPHONATE THERAPY ON BONE MINERAL DENSITY IN PATIENTS WITH PHPT ONE YEAR AFTER PARATHYROIDECTOMY

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Objective: Parathyroidectomy [PTE] is the optimal strategy for primary hyperparathyroidism [PHPT]. But in some cases, conservative treatment, including bisphosphonates [BPh], can be used. The question 'can preoperative BPh therapy affect bone recovery following PTE' - remains unresolved.
The aim of this study was to evaluate the impact of preoperative BPh therapy on changes in bone mineral density [BMD] one year after PTE, as measured by both DXA and 3D-DXA.
Materials and methods: We included 25 patients (1 man, 24 women) receiving BPh before surgery. The median duration of BPh receiving was 15 months. The median duration of DXA before and after surgery was 1 year. A control group without BPh therapy (matched for gender, age, and baseline BMD values at 3 sites) was selected using the matched

pair method. 3D-DXA analysis was performed using 3D-Shaper v.2.14 software. The statistical analysis – using the R language and the Statistica v.13 software package.
Results: At disease onset, both groups had comparable calcium-phosphorus metabolism parameters, except for elevated β-CTx levels in the non-BPh group (p<0.001). The trend towards statistically significant differences was observed in the levels of phosphorus (p=0.0036), alkaline phosphatase (p=0.014) and osteocalcin (p=0.001), each of which was higher in the non-BPh group. No differences were observed in 3D-DXA parameters pre-surgery.
In the BPh group, significant BMD improvements were observed only in the lumbar spine [LS] (p<0.001), and in the volume of trabecular bone at the total hip [TH] (p=0,001). Conversely, in the non-BPh group, BMD increased substantially at the LS, TH (both p<0.001), and femoral neck [FN] (p=0.001). 3D-DXA revealed increases in cortical bone density at the TH (p=0.001) and in the volume of trabecular bone at the TH and FN (p<0.001).
Post-surgery, both groups showed comparable BMD increases in key skeletal regions at the femur. However, 3D-DXA revealed trends toward higher increases in cortical bone thickness in the non-BPh group.
Conclusion: 3D-DXA provides insights into cortical and trabecular bone structure, crucial for fracture risk prediction in PHPT patients. Preoperative BPh therapy may negatively affect post-PTE BMD recovery, particularly in cortical bone. Further research is required.

P146

PROGNOSTIC VALUE OF THE C-REACTIVE PROTEIN/ALBUMIN RATIO IN MULTIPLE MYELOMA

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Introduction: Multiple myeloma (MM) is a malignant plasma cell disorder with chronic inflammation affecting disease progression and prognosis. C-reactive protein (CRP) reflects inflammation, while serum albumin indicates nutritional status. The CRP/albumin ratio (CAR) is a simple prognostic biomarker in several cancers, but its role in MM remains unclear. This study evaluated the association between CAR at diagnosis and prognosis.
Patients and methods: This retrospective observational study included 55 patients diagnosed with MM in a rheumatology department between January 2010 and December 2025. Demographic, clinical, and biological data were collected. The CAR was calculated, and patients were stratified into two groups: low CAR (≤ 0.5) and high CAR (> 0.5). Outcomes assessed included clinical status, mortality, and complications. A p-value < 0.05 was considered statistically significant.
Results: The mean age at diagnosis was 65.2 ± 10.9 years, with a male predominance (34 men, 61.8%; 21 women, 38.2%). Impaired general condition (performance status ≥ 2) was observed in 29 patients (52.7%). CRAB features were frequent : bone involvement (49 patients, 89.1%), anemia (26 patients, 47.3%), hypercalcemia (15 patients, 27.3%), and renal impairment (12 patients, 21.8%). Mean serum albumin was 33.8 ± 5.2 g/L, with hypoalbuminemia (< 35 g/L) in 31 patients (56.4%). Mean CRP was 37.7 ± 37.1 mg/L, and mean CAR was 1.15 ± 1.05 (low 28, 50.9%; high 27, 49.1%). Fourteen patients (25.5%) were eligible for intensive treatment, while 41 (74.5%) were not. During follow-up, 29 patients (52.7%) died. A high CAR was significantly associated with poorer general condition (p = 0.045), ineligibility for intensive treatment (p = 0.03), higher mortality (p = 0.048), and more complications (p = 0.029), particularly infections (p = 0.02). Associations with anemia (p=0.08) and renal impairment (p=0.09) were not significant. CAR was not correlated with age at diagnosis (p = 0.62).
Conclusion: The CAR is a simple, clinically relevant biomarker for prognostic stratification in MM. High CAR predicts poor general condition, ineligibility for intensive treatment, higher mortality, and more complications. Incorporating CAR may help identify high-risk patients early and guide personalized management.

P147

ROLE OF IMAGING IN EARLY DETECTION AND PROGNOSTIC STRATIFICATION OF MULTIPLE MYELOMA IN RHEUMATOLOGY PRACTICE

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Introduction Bone involvement is a hallmark of multiple myeloma (MM) and a common presentation in rheumatology. Imaging is essential for diagnosis, assessment of skeletal involvement, and prognostic evaluation. This study evaluated the diagnostic yield of conventional radiography and MRI, and the association between radiological lesions and ISS stage.
Patients and methods This retrospective observational study included 55 patients with MM followed in a rheumatology department. Radiological data at diagnosis and the International Staging System (ISS) score were analyzed. The diagnostic performance of conventional radiography and MRI was assessed, and the association between bone involvement on MRI and prognosis, as reflected by the ISS score, was examined. A p-value < 0.05 was considered statistically significant.
Results Conventional radiographs (skull, spine, pelvis, rib cage, and long bones) were performed in 52 patients (95%) and were normal in 10 (19%). Abnormalities included punched-out lesions (22, 42%), vertebral compressions (28, 54%), long bone fractures (9, 17%), diffuse demineralization (12, 23%), and multiple lesions (21, 40%). Whole-body MRI including spine and pelvis was performed in 40 patients (73%) and revealed multiple lesions (29, 73%), vertebral compressions (24, 60%), fractures (5, 13%), plasmacytomas (18, 45%), neurological involvement (9, 23%), epiduritis (8, 20%), and marrow replacement (11, 28%). Among 10 patients with normal radiographs, MRI detected lesions in 8 (80%), including 5 without CRAB criteria. Regarding the ISS score, patients were distributed as follows: stage I, 22 patients (40%); stage II, 19 patients (34.5%); stage III, 14 patients (25.5%). Extensive MRI involvement (multiple lesions and/or plasmacytomas) was significantly associated with higher ISS (II–III) (p = 0.04).
Conclusion Conventional radiography has limited diagnostic yield in initial MM evaluation. Whole-body MRI is the most effective modality for early detection of bone and marrow lesions, especially in patients with normal radiographs and no CRAB criteria. MRI extent correlates with ISS stage, supporting its central role in diagnosis and prognostic stratification in rheumatology practice.

P148

ASSOCIATION BETWEEN RADIOLOGICAL FINDINGS AND PAIN IN LUMBAR SCIATICA

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Introduction Lumbar sciatica is a common cause of pain and functional limitation. While imaging identifies structural lesions, the relationship between radiological findings and clinical severity remains unclear. This study aimed to assess the correlation between lumbar imaging findings and pain in patients with common lumbar sciatica.

Patients and methods This retrospective observational study included 95 patients followed in a rheumatology department for lumbar sciatica between January and December 2025. Clinical data included pain intensity (VAS), functional limitation (Oswestry Disability Index, ODI), and signs of radiculopathy (Lasègue, and Sonnette) as well as the Schöber index. Imaging included standard lumbar radiographs and spinal MRIs. For statistical analysis, a p-value < 0.05 was considered significant.

Results: The mean age was 68 ± 14.7 years, with a male-to-female ratio of 0.77. A history of previous low back pain was reported in 47 patients (58.7%). Mean VAS was 6.7 ± 1.4/10, and mean ODI was 40 ± 11%. Neurological signs included a positive Lasègue in 35 patients (36.9%) and a positive "Sonnette" in 28 patients (29.5%). The mean Schöber index was 3.5 ± 0.9 cm. On standard lumbar radiographs, disc space narrowing was observed in 48 patients (50.5%), signs of lumbar canal stenosis in 25 (26.3%), facet arthrosis in 38 (40%), and spondylolisthesis in 12 (12.6%). Spinal MRI revealed nerve root compression in 32 patients (33.7%), disc protrusions in 40 (42.1%), foraminal stenosis in 22 (23.2%) and degenerative disc changes in 45 (47.4%). Nerve root compression on MRI was significantly correlated with higher VAS (p = 0.001) and ODI (p = 0.035), whereas abnormalities detected only on standard radiographs showed no correlation.

Conclusion : Nerve root compression detected on spinal MRI correlates significantly with pain intensity and functional limitation in patients with lumbar sciatica, whereas standard radiographs are poorly predictive. MRI is therefore a valuable tool for identifying structural causes of radicular pain and guiding management, especially in patients with severe or persistent symptoms.

P149

LISTENING TO PATIENTS: SATISFACTION AND EXPERIENCE IN A RHEUMATOLOGY DAY CARE UNIT

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Background :
The rheumatology day care unit (RDCU) is an essential component of patient management, providing monitoring and administration of biological therapies, bisphosphonate infusions, and intra-articular injections. Assessing patient satisfaction and feedback is therefore crucial to improving the quality of care.
Objective :To evaluate patients' satisfaction with the functioning of the RDCU and to identify the factors associated with the level of satisfaction.
Method : A 13 item questionnaire was administered to all patients attending the RDCU from 12 January to 24th . Patient satisfaction was assessed using a a visual analogue scale (0-100, 0 meaning completely unsatisfied, 100 meaning completely satisfied). Further information was collected on conditions of the RDCU, including waiting time, satisfaction with the role of medical and nursing staff (satisfaction level with their friendliness, question answering, care delivery, privacy during consultation, clarity of the given information) using a 5-point Likert scale (1 : completely unsatisfied to 5 : totally satisfied).
Results : In total, 33 patients were included with a mean age of 59.6 ± 14.7 years and 69,7% were female. Patients consulted for the following : biologic therapy administration (n :14 , 42,4 %), bisphosphonate infusions (n :8 , 24,2 %), and intra articular injections (n : 11, 33,4 %).
The mean level of satisfaction with the RDCU was 88 ± 9,7. Regarding waiting time, 15 (45,5%) of patients were totally satisfied while 1 (3%) were totally unsatisfied. However, 8 (88 %) of patients admitted for intra articular injections were totally unsatisfied while 3 were totally satisfied. 66,7 % of patients were very satisfied with the cleanliness of the unit , 72,7 % were totally satisfied with the comfort . 97% were very satisfied with the friendliness of the staff and 93,9% were very satisfied by their question answering and clarity of given informations . 84,9 % were very staisfied by the quality of cary delivery and privacy during conusltation.
Overall, most patients reported high levels of satisfaction with the quality of care provided . Very high satisfaction was observed regarding the staff's friendliness ,the privacy respect and unit conditions . Waiting time was also positively rated, particularly among patients receiving intravenous treatments. In contrast, patients attending the unit for intra-articular injections reported lower satisfaction levels, with waiting time being the main source of dissatisfaction.
Conclusion : Patients were overall very satisfied with the functioning of the RDCU , particularly with the quality of care and staff professionalism . However, waiting time emerged as an area for improvement . Targeted organizational adjustments could further enhance patient satisfaction and optimize the functioning of the RDCU.

P150

SJÖGREN'S SYNDROME: MORE PRONOUNCED ARTICULAR INVOLVEMENT IN SERONEGATIVE FORMS

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Background:
Sjögren's syndrome (SS) is an autoimmune disease that may present with articular involvement, often influenced by the immunological profile. Specific autoantibodies, particularly anti-SSA/SSB, are traditionally associated with distinct phenotypes; however, their impact on articular manifestations remains controversial.
The aim of this study was to compare the characteristics of articular involvement between patients with and without specific autoantibodies.
Methods:
We conducted a monocentric retrospective study including patients followed for SS defined according to the 2016 ACR/EULAR classification criteria between 2000 and 2024. Patients were divided into two groups: G1, seronegative patients, and G2, seropositive patients.
The characteristics of articular involvement were compared between the two groups.

Results:
A total of 48 patients were included, all female. The mean age was 63.15 ± 8.06 years in G1 versus 56.64 ± 11.23 years in G2 (p = 0.032). Articular involvement was present in 100% of patients in G1 compared with 89.28% in G2 (p = 0.136). Isolated inflammatory arthralgia was the most frequent manifestation, observed in 65% of G1 and 71.42% of G2 patients (p = 0.344). Arthralgia involved both large and small joints without a specific predilection in 65% of G1 versus 39.28% of G2 patients (p = 0.307).

The mean number of nocturnal awakenings was significantly higher in G1 (1.25 ± 1.48) compared with G2 (0.10 ± 0.41; p < 0.001). The mean duration of morning stiffness was longer in G1 (21.75 ± 26.17 minutes) than in G2 (6.25 ± 9.77 minutes; p = 0.006). Patients in G1 had a higher mean number of tender joints (6.85 ± 6.32 vs 3.96 ± 3.50 in G2; p = 0.049). The mean number of swollen joints was 1.35 ± 4.48 in G1 versus 0.32 ± 0.98 in G2 (p = 0.245). The mean patient global assessment was 5.85 ± 1.85 in G1 compared with 5.29 ± 1.56 in G2 (p = 0.552). The mean DAS28-CRP was 3.55 ± 0.63 in G1 versus 3.24 ± 0.70 in G2 (p = 0.156), and the mean DAS28-ESR was 4.34 ± 0.68 in G1 versus 4.32 ± 0.88 in G2 (p = 0.96).
Conclusion:
Articular manifestations are frequent in both forms of Sjögren's syndrome. However, articular involvement appears to be more severe in seronegative patients, particularly with regard to nocturnal awakenings, duration of morning stiffness, and number of tender joints.

P151
SEROPOSITIVE AND SERONEGATIVE PRIMARY SJÖGREN'S SYNDROME: A SHARED CLINICAL PHENOTYPE

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Background:
Primary Sjögren's syndrome (pSS) is a heterogeneous autoimmune disease that may be associated or not with the presence of anti-SSA/Ro and/or anti-SSB/La autoantibodies. So-called "seropositive" forms, characterized by the presence of anti-SSA/SSB antibodies, are classically associated with an increased risk of systemic manifestations. This study aimed to compare the frequency and nature of systemic manifestations between seropositive and seronegative patients.
Methods:
We conducted a monocentric retrospective study including patients followed for pSS defined according to the 2016 ACR/EULAR classification criteria. Patients were divided into two groups according to their immunological profile: G1, seronegative patients, and G2, seropositive patients.
For each group, systemic manifestations were collected from medical records between 2000 and 2024.
Results:
A total of 48 patients were included, all female. The mean age was 63.15 ± 8.06 years in G1 versus 56.64 ± 11.23 years in G2 (p = 0.032). Lymph node involvement was observed in 10% of patients in G1 and 10.71% in G2 (p = 0.938). Pulmonary involvement was reported in 35% of patients in G1 compared with 46.42% in G2 (p = 0.439). Cardiac involvement was present in 10% of G1 patients versus 7.14% in G2 (p = 0.731). Renal involvement was diagnosed in 5% of patients in G1 compared with 17.82% in G2 (p = 0.192). Cutaneous involvement was present in 15% of G1 patients versus 32.14% in G2 (p = 0.184). Neurological involvement was identified in 15% of patients in G1 and 25% in G2 (p = 0.411).
Conclusion:

In our study, a wide spectrum of systemic manifestations was observed. However, their frequency and nature were comparable between seropositive and seronegative forms of primary Sjögren's syndrome.

P152
IMPACT OF IMMUNOLOGICAL PROFILE ON BIOLOGICAL PARAMETERS IN PRIMARY SJÖGREN'S SYNDROME

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Background:
Primary Sjögren's syndrome (pSS) is an autoimmune connective tissue disease classically associated with the presence of anti-SSA/Ro and/or anti-SSB/La autoantibodies. However, a subgroup of patients may lack specific serological markers and are referred to as "seronegative." Some studies have reported a higher frequency of leukolymphopenia and hypergammaglobulinemia in seropositive patients [1].
The aim of this study was to compare biological parameters between seropositive and seronegative patients with pSS.
Methods:
We conducted a monocentric retrospective study including patients followed for pSS defined according to the 2016 ACR/EULAR classification criteria over a 24-year period (2000–2024). Patients were divided into two groups according to their immunological profile: G1, seronegative patients, and G2, seropositive patients.
Biological data, including complete blood count (CBC), erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), and serum protein electrophoresis, were collected from medical records and analyzed.
Results:
A total of 48 patients were included, all female. The mean age was 63.15 ± 8.06 years in G1 versus 56.64 ± 11.23 years in G2 (p = 0.032). The mean CRP level was 7.18 ± 10.44 mg/L in G1 compared with 5.27 ± 7.28 mg/L in G2 (p = 0.469). Mean ESR was 36 ± 21.42 mm/h in G1 versus 33.22 ± 23.02 mm/h in G2 (p = 0.789). A biological inflammatory syndrome was present in 10% of G1 patients and 10.71% of G2 patients (p = 0.938).
No significant differences were observed between the two groups regarding CBC parameters: mean leukocyte count (G1: 6,855 ± 2,908/mm³ vs G2: 5,749 ± 1,932/mm³; p = 0.12), mean neutrophil count (G1: 4,118 ± 2,237/mm³ vs G2: 3,322 ± 1,381/mm³; p = 0.138), mean lymphocyte count (G1: 2,039 ± 742/mm³ vs G2: 1,835 ± 717/mm³; p = 0.344), mean platelet count (G1: 257,100 ± 97,826/mm³ vs G2: 240,107 ± 88,550/mm³; p = 0.533), and mean hemoglobin level (G1: 12.78 ± 1.51 g/dL vs G2: 12.15 ± 1.71 g/dL; p = 0.196).
Mean serum albumin levels were 41.35 ± 3.47 g/L in G1 and 40.43 ± 3.66 g/L in G2 (p = 0.457). Hypergammaglobulinemia was observed in 25% of G1 patients and 42.5% of G2 patients (p = 0.947).
Conclusion:
Our study showed no significant impact of immunological profile on biological parameters in primary Sjögren's syndrome.
Reference:

1. Mekki S, et al. *Revue du Rhumatisme*. 2023;90:A216–A217.

P153

HEALTHCARE PATHWAY OF PATIENTS WITH PRIMARY SJÖGREN'S SYNDROME

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Background: Primary Sjögren's syndrome (pSS) is an autoimmune connective tissue disease characterized by nonspecific symptoms. This may lead to delayed diagnosis and management.
The aim of this study was to evaluate the healthcare pathway of patients with pSS.
Methods: We conducted a monocentric retrospective study including patients followed for pSS defined according to the 2016 ACR/EULAR classification criteria between 2000 and 2024.
Sociodemographic data at diagnosis, disease characteristics, and healthcare pathway features were collected from patient interviews and medical records.
Results: A total of 48 patients were included, all female. The mean age was 59.35 ± 10.45 years (range 30–76). The mean age at onset of glandular symptoms was 48.5 ± 10.93 years (range 25–71). The mean age at diagnosis of Sjögren's syndrome was 51.6 ± 10.71 years (range 28–72). The mean delay between symptom onset and confirmed diagnosis was 30.02 ± 49.86 months (range 2–288).
Physicians consulted prior to referral to our department were as follows: general practitioner (92.3%), internist (23.07%), and rheumatologist (15.38%). Consultations took place in the public healthcare sector in 61.53% of cases and in the private sector in 38.46% of cases.
The number of physicians consulted before diagnosis was one in 69.3% of patients and two in 30.76%, with a mean of 1.31 ± 0.48 physicians. The number of consultations before establishing the diagnosis was one in 61.53% of patients, two in 23.07%, three in 7.69%, and more than three in 7.69% of patients.
Conclusion: The healthcare pathway of patients with primary Sjögren's syndrome is often long and complex, involving several healthcare providers before definitive diagnosis by a rheumatologist. This study highlights the need for better awareness among primary care physicians regarding the manifestations of pSS, in order to promote earlier diagnosis and appropriate management.

P154

THE MULTIPLE FACES OF SACRAL INVOLVEMENT

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Background:
Sciatic pain is a frequent reason for consultation in rheumatology, most often of degenerative origin. In rare cases, it may reveal a serious underlying condition, particularly malignancy. We report two cases of sciatica secondary to sacral bone metastases, highlighting the importance of a thorough etiological workup in patients with symptoms resistant to first-line treatment.
Clinical observations:

Case 1:
A 44-year-old woman with a history of left-sided colon cancer treated surgically in 2015, followed by adjuvant chemotherapy completed in 2016, with removal of the implantable venous access device in 2024 due to prolonged remission.

She was hospitalized on December 3, 2024, for left sacroiliitis complicated by a 13-cm psoas muscle collection. Despite broad-spectrum antibiotic therapy with cefotaxime and teicoplanin, follow-up CT imaging showed progression of the collection. The patient subsequently developed a drug reaction with eosinophilia and systemic symptoms (DRESS) secondary to antibiotic therapy, leading to its discontinuation.

A sacroiliac biopsy was performed. Bacteriological analysis, including direct examination and cultures, was negative, as were multiplex bacterial PCR and *Mycobacterium tuberculosis* PCR. A surgical biopsy was subsequently carried out and revealed a metastasis from a colonic adenocarcinoma. The hypermetabolic nature of the lesion was confirmed on PET scan, with no evidence of other distant metastases. The patient was then referred to the oncology department for further management.

Case 2:
An 85-year-old man with a history of non-stented coronary artery disease was initially admitted to our department in January 2025 for management of chronic mechanical lumbosciatica, bilateral S1 distribution, more severe on the left side. Standard radiography showed features of an old L3 fracture and narrowing of the L5–S1 disc space. He received three methylprednisolone injections and physical rehabilitation without clinical improvement.

Given this atypical course, pelvic CT was performed, revealing a locally advanced soft tissue mass centered on the left sacral ala, with ill-defined lytic margins and homogeneous enhancement, without calcifications or fatty components. The lesion caused focal cortical disruption with extension into the presacral space and invasion of the left sacral foramina at S1, S2, S3, and S4 levels. It infiltrated the ipsilateral piriformis muscle, extended to the sacroiliac joint and iliac bone with cortical lysis, reached the sciatic canal, and showed intracanalar extension.

CT-guided biopsy revealed histological and immunohistochemical features consistent with sacroiliac involvement by a small-cell neuroendocrine carcinoma. Extensive investigations failed to identify the primary tumor.

Discussion:
These two cases illustrate that sciatica may be the presenting manifestation of bone metastases, even in the absence of a known malignancy. Advanced age, chronicity of symptoms, resistance to first-line treatments, and the presence of red flags should prompt further investigations, including cross-sectional imaging and biopsy when appropriate.

Conclusion:
In cases of atypical sciatica—particularly when painful, chronic, and treatment-resistant—a neoplastic origin should be considered. These cases underscore the need for a comprehensive etiological workup to avoid delays in diagnosis and management, which may significantly impact prognosis.

P155

SERONEGATIVE SJÖGREN'S SYNDROME: CLINICAL AND SOCIODEMOGRAPHIC CHARACTERISTICS

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Background: Primary Sjögren's syndrome (pSS) is an autoimmune disease classically associated with the presence of anti-SSA/Ro and/or anti-SSB/La autoantibodies. However, a subgroup of patients presents with a suggestive clinical picture in the absence of specific serological markers.
The absence of autoantibodies may influence patient characteristics. This study aimed to describe the clinical and sociodemographic features of seronegative patients with pSS.
Methods: We conducted a monocentric retrospective study including patients followed for pSS defined according to the 2016 ACR/EULAR classification criteria between 2000 and 2024. Patients were divided into two groups according to immunological profile: G1, seronegative patients, and G2, seropositive patients.
Sociodemographic characteristics were analyzed using data extracted from medical records.
Results: A total of 48 patients were included, all female. The mean age was 63.15 ± 8.06 years in G1 versus 56.64 ± 11.23 years in G2 (p = 0.032). Postmenopausal status was observed in 90% of G1 patients compared with 82.14% in G2 (p = 0.213). The mean number of pregnancies was higher in G1 (4.5) than in G2 (2.53) (p = 0.02). Mean body mass index was 26.4 ± 5.48 kg/m² in G1 versus 25.44 ± 5.44 kg/m² in G2 (p = 0.612). The sicca syndrome began at a mean age of 51.7 ± 9.42 years in G1 compared with 46.21 ± 11.51 years in G2 (p = 0.087). pSS was diagnosed at a mean age of 54.6 ± 10.12 years in G1 versus 49.46 ± 10.78 years in G2 (p = 0.102). The mean diagnostic delay was 35.3 ± 30.47 months in G1 and 39.96 ± 60.54 months in G2 (p = 0.753).
Conclusion: The absence of autoantibodies did not result in a longer diagnostic delay in primary Sjögren's syndrome. However, seronegative patients were older at diagnosis and had a higher number of pregnancies.

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EVALUATION OF THE BURDEN ON CAREGIVERS OF PATIENTS OPERATED ON FOR HIP TRAUMA

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Objective:
Blunt hip trauma is a life-altering event for both the patient and their family. In our country, where hospital capacities are limited, patients are often discharged after a short stay. Consequently, family caregivers must manage a new disabling situation that can significantly impair their own health and well-being. Our objective is to evaluate the burden on family caregivers of patients operated on for hip trauma and to identify the factors associated with the severity of this burden.
Materials and Methods:
This was a three-month analytical cross-sectional study including caregivers of relatives operated on for hip trauma. The caregiver burden was assessed using the Zarit Burden Interview (ZBIT). Anxiety and depressive disorders were evaluated using the Hospital Anxiety and Depression Scale (HADS). Professional impact was measured via the Work Productivity and Activity Impairment Questionnaire (WPAI), and Quality of Life (QoL) was assessed using the SF-12 (12-Item Short Form Survey).
Results:
The average number of family caregivers per patient was 2 for 18 patients. Evaluation of the care burden according to the Zarit scale showed a moderate-to-severe burden in 53.3% of cases and a severe burden in 20% of cases. Regarding absenteeism, it was total for caregivers employed in the public sector. Psychological evaluation of caregivers revealed that 50% suffered from definite anxiety and depression. The SF-12 assessment showed a more pronounced alteration in the mental component score, with an average of 37.82 ±12[range: 24.92–55.90]. In univariate analysis, a significant positive association was found between the severity of the burden and the presence of anxiety-depressive disorders (p = 0.01), as well as the degree of kinship (p = 0.02). Similarly, a higher number of caregivers involved was associated with a more severe burden (p = 0.01).
Conclusion:
Given that the impact of hip trauma is immense on natural caregivers, it is essential to establish national recommendations ensuring a bio-psycho-social approach to alleviate this burden.

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FUNCTIONAL IMPACT OF LUMBOSCIATICA IN THE ELDERLY

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Objective :
Lumbosciatica (LS) is one of the most disabling conditions affecting the elderly. However, most research has focused on younger adults due to the significant socioeconomic consequences in that demographic. Our objective was to evaluate the functional impact of LS in elderly patients and to identify predictive factors for functional limitation.
Materials and Methods :
This was a descriptive cross-sectional study conducted at the Rheumatology Department of the Taher Sfar University Hospital in Mahdia. The study included 31 patients presenting with common lumbosciatica. Functional assessment was performed using the Quebec Back Pain Disability Scale and the Dallas Pain Questionnaire (DPQ).
Results :
The study included 31 patients (18 women) with a mean age of 68 years (range: 65–99). The average disease duration was 6.59 years (range: 3 months – 20 years).
Obesity was noted in 35.5% of patients (mean BMI of 28.97). Spinal syndrome was clinically observed in 41.9% of cases.
Pain was rated as severe (VAS ≥ 70 mm) in 22.6% of patients.
The mean Quebec score was 40.70 (range: 5–76), with 35.5% of subjects showing major functional impairment (Quebec score ≥ 50).

The LS impact was significant across several DPQ categories: Activities of Daily Living (ADL): 52.94% ; Work and Leisure Activities: 43.70% ; Anxiety and Depression: 31.61% ; and Social Interest: 27.42%
Statistical analysis showed no significant association between functional limitation and age, sex, obesity, VAS pain score, or the duration of symptoms.

Conclusion :

Lumbosciatica significantly impairs the functional capacity of elderly patients. These findings suggest that management of this population must be improved, moving beyond pain control to address overall quality of life and age-related comorbidities.

P158

MANAGEMENT OF ANKLE SPRAINS IN GENERAL PRACTICE: KNOWLEDGE AND APPLICATION OF THE OTTAWA ANKLE RULES

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Objective :

The Ottawa Ankle Rules (OAR) are designed to identify injuries that fall outside the scope of simple ankle sprains, thereby reducing the number of unnecessary radiological examinations. The objective of this study was to evaluate the knowledge and practical application of the Ottawa Ankle Rules among general practitioners (GPs).

Materials and Methods :

This was a prospective, descriptive cross-sectional study conducted over a one-month period. We surveyed GPs regarding the specific criteria that prompt them to prescribe X-rays for ankle trauma, as well as their therapeutic management once an ankle sprain is diagnosed. An online questionnaire was distributed via email to GPs in the Mahdia and Monastir regions (contact details provided by the Regional Medical Council), with a four-week response deadline.

Results :

Forty-seven GPs responded to the survey (34 women and 13 men), 83% of whom were under the age of 45. Regarding clinical volume, 55% saw between 1 and 5 trauma cases per week, 30% saw 5 to 10 cases, and 15% saw more than 10.
For prescription habits, radiographs were prescribed in 89.5% of cases. Among the Ottawa criteria, tenderness over the fifth metatarsal was the most frequently cited (68%), followed by functional impotence (inability to bear weight) (57%), and tenderness over the navicular bone (51%).
Notably, none of the participating GPs were familiar with the Ottawa Ankle Rules in their entirety.

Conclusion :

Despite its limitations (small sample size), our study highlights a significant gap in the daily application of the Ottawa Ankle Rules for ankle trauma. These rules have proven reliability in clinical diagnosis and are essential for reducing the incidence of unnecessary radiographs.

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EVALUATION OF SEXUAL QUALITY OF LIFE IN CHRONIC LOW BACK PAIN

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Objective :

Sexual life plays an important role in preserving a good quality of life for both patients and their partners. Chronic low back pain (CLBP), as well as other musculoskeletal disorders, can affect all activities of life, including sexual functioning. The aim of this study was to evaluate the impact of chronic low back pain on the sexual life of patients and to identify associated factors.

Materials and Methods :

This was a cross-sectional study involving 144 patients suffering from chronic low back pain. We specifically studied the relationship between CLBP and sexual quality of life using a validated questionnaire: the Sexual Quotient (SQ), which consists of 10 questions, each scored from 0 to 10, with a final total score ranging from 0 to 100.

Results :

The mean age was 53.87 years [range: 23–79]. The mean pain VAS score was 4.72 [range: 1–9]. The average duration of low back pain was 6.5 years. For the Quebec Back Pain Disability Scale, the mean score was 45.3 [range: 5–92]. The results for the Dallas Pain Questionnaire domains were as follows:

- 53.1% impact on daily activities
- 47.6% impact on work/leisure activities
- 45.0% impact on anxiety/depression
- 33.4% impact on sociability

Regarding treatment, 57.2% of patients were using analgesics, 5.5% were on NSAIDs, 20% had received local corticosteroid injections, 34% had undergone physical rehabilitation, and 4.1% had required surgery for associated refractory lumbosciatica. Regarding sexual dysfunction, 34.5% of patients reported no sexual activity, and 2.1% described their sexual life as catastrophic (SQ score < 20).

Conclusion :

Chronic low back pain significantly impairs sexual quality of life and frequently leads to the cessation of sexual activity. These results suggest that sexual health should be an integral part of the clinical assessment for CLBP. Management should be multidisciplinary, addressing not only physical pain but also the psychological and relational consequences of the disease.

P160

QUALITY OF LIFE IN CHRONIC LOW BACK PAIN AND LUMBOSCIATICA: A STUDY OF 152 TUNISIAN PATIENTS

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Objective :
Quality of Life (QoL) is a complex concept largely influenced by an individual's physical and psychological health, as well as their level of independence. The objective of our study was to evaluate the QoL of patients suffering from chronic low back pain (CLBP) and lumbosciatica (LS) and to identify associated factors.
Materials and Methods :
This was a descriptive cross-sectional study conducted at the Rheumatology Department of the Taher Sfar University Hospital in Mahdia. The study included 152 patients consulting for common CLBP or LS.
Pain Intensity: Measured using the Visual Analogue Scale (VAS).
Quality of Life: Assessed using the SF-36 (Short Form-36 Health Survey).
Functional Impact: Evaluated using the Quebec Back Pain Disability Scale.
Mood Disorders: Assessed using the Hospital Anxiety and Depression (HAD) Scale.
Results :
The mean age of the patients was 53.7 ± 11.3 years (range: 23–79), with a female predominance (61.2%). The mean pain VAS score was 46.5 ± 50 mm (range: 1–9), and the mean disease duration was 6.4 ± 5.1 years (range: 5 months – 24 years).
The overall mean SF-36 Scores was 41.3 ± 16.4 : The Physical Component Summary (PCS) was 35.5 ± 19.7 and The Mental Component Summary (MCS) was 47.1 ± 17.8.
An impaired quality of life (OMS < 66.7) was noted in 90.8% of patients.
Regarding Functional & Mood Scores, The mean Quebec score was 45.2 ± 19.5. The mean depression score was 8.7 ± 2.9 and the mean anxiety score was 9.3 ± 4.8.
Statistical analysis revealed a significant association between impaired QoL and Depression (p = 0.015), Anxiety (p = 0.002), and Functional disability (Quebec score) (p = 0.012)
There was no significant association between QoL and age, sex, obesity, pain VAS, or the duration of the disease.
Conclusion :
Chronic low back pain and lumbosciatica, which cause significant functional and socio-professional disability, can severely diminish the quality of life of those affected.

P161

EPIDEMIOLOGICAL PROFILE OF ANKLE TRAUMA IN PHYSICAL MEDICINE AND REHABILITATION: A STUDY OF 73 CASES

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Objective :
The ankle is a vulnerable joint that is frequently subject to trauma. While the clinical course is often favorable, complications can arise in the short or long term, potentially compromising ankle function. Our primary objectives were to study the epidemiological and clinical characteristics of ankle trauma in a rehabilitation setting and to identify potential complications and their associated factors.
Materials and Methods :
We conducted a descriptive and analytical retrospective study of the records of 73 patients treated at the Physical Medicine and Functional Rehabilitation Department of the Taher Sfar University Hospital in Mahdia. The study focused on ankle trauma over a three-year period.
Results :
The mean age of the population was 41.5 ± 14.8 years, with a sex ratio (M/F) of 0.58.
The most frequent cause of trauma was a fall (41.1%), followed by domestic accidents (26%).
Ligamentous injuries were present in 60.3% of cases, followed by bone lesions (fractures) in 38.3%, and joint dislocation in 1.4%.
Late-stage complications were noted in 68.4% of patients, including: Complex Regional Pain Syndrome (CRPS/Algodystrophy): 34.2%, Joint Stiffness: 26%, and Ankle Osteoarthritis: 8.2%
Statistical analysis revealed a significant association between the occurrence of late complications and Age (p = 0.001), Type of lesion (p < 0.001), Surgical treatment (p = 0.001), and Number of functional rehabilitation sessions (p = 0.006).
Conclusion :
This study provides a foundation for future research with larger populations to better investigate these complications. Identifying these risk factors is essential to optimizing management and improving long-term outcomes for patients with ankle trauma.

P162

MOOD DISORDERS IN ELDERLY PATIENTS WITH CHRONIC LOW BACK PAIN

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Objective :
Chronic low back pain (CLBP) is a frequently reported symptom among the elderly and has the potential to threaten their functional independence.

Depression is often a recurrent condition, triggered and exacerbated by both psychological stress and medical illnesses. The objective of this study was to measure the impact of chronic low back pain on psycho-behavioral factors within the geriatric population.

Materials and Methods :

This was a cross-sectional study involving 72 patients over the age of 65 suffering from chronic low back pain, conducted over a seven-month period . We investigated the relationship between CLBP and mood disorders (anxiety and depression) using the Hospital Anxiety and Depression (HAD) scale.

Results :

The mean age of the patients was 68.50 years (range: 65–79 years), with women representing 52.8% of the cohort.

Pain was mechanical in 97.2% of patients and inflammatory in 2.8%. The mean pain VAS score was 4.13 (range: 1–9).

Treatment Modalities: 52.8% of cases were on analgesics, 77.8% on NSAIDs, 25% received local corticosteroid injections, 33.3% underwent physical therapy, and 5.6% had surgical treatment.

Mood Assessment (HAD Scale): Depression: Scores ranged from 4 to 13 with a mean of 8.36. Notably, 44.4% of the population showed no depressive symptoms (score ≤ 7). The mean anxiety score was 7.22 (range: 1–15). Results showed that 58.3% had no anxiety, 19.4% had doubtful anxiety (score 8–10), and 22.2% had definite anxiety (score > 10).

Conclusion :

Due to the increased prevalence of mood disorders among elderly patients with low back pain, systematic screening for both depression and anxiety in this population is essential. Such screening allows for the implementation of well-targeted, multidisciplinary management plans.

P163

SIMULTANEOUS DOUBLE FEMORAL AND TIBIAL OSTEOTOMY IN THE TREATMENT OF SEVERE GENU VARUM IN YOUNG ADULTS

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Objective:

Severe constitutional knee deformities in young adults, particularly varus malalignment, present significant challenges in planning and therapeutic management. The primary goal of treatment is to delay the onset of knee osteoarthritis as much as possible by restoring a near-normal mechanical axis. One surgical alternative is the simultaneous double osteotomy of the femur and tibia in a single operative session.

Case report:

We report the case of a 30-year-old male with dwarfism secondary to multiple epiphyseal dysplasia, who presented with bilateral knee pain and severe genu varum. Clinical examination revealed preserved mobility in both knees with an intercondylar distance of 25 cm. Radiological assessment showed preserved joint spaces with an HKA angle of 149° on the right and 145° on the left. Given the significant functional impairment, a conservative surgical approach was chosen: a simultaneous distal femoral and proximal tibial osteotomy.

The first step involved a lateral closing-wedge femoral valgus osteotomy, stabilized by a DCS plate. The second step consisted of a medial opening-wedge tibial valgus osteotomy, stabilized by a T-plate, with the bone wedge from the femoral osteotomy used as an autograft.

Postoperative recovery was uneventful. Partial weight-bearing was delayed until the 45th day, accompanied by rehabilitation and muscle strengthening. Full weight-bearing was permitted at 3 months following radiological confirmation of consolidation at both osteotomy sites.

The contralateral side was operated on using the same technique one year later, with favorable clinical and radiological outcomes.

At the one-year follow-up, the patient reported high satisfaction with the functional outcome of both knees, despite a slight residual varus noted on weight-bearing long-leg radiographs.



Discussion:

Combined distal femoral and proximal tibial osteotomy for severe genu varum is a complex procedure that is infrequently described in the literature. The advantage of performing both osteotomies in a single procedure is the reduction in the number of anesthesia sessions and the acceleration of the overall rehabilitation protocol.

Conclusion:

Simultaneous double femoral and tibial osteotomy appears to be a highly effective option for severe genu varum, provided it is well-mastered. When assisted by computer navigation, the procedure becomes more reliable, precise, and reproducible.

P164

BILATERAL FEMORAL NECK FRACTURES ON PATHOLOGICAL BONE IN YOUNG ADULTS: A REPORT OF TWO CASES

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Objective:

Simultaneous bilateral femoral neck fractures are extremely rare and typically occur following high-energy trauma or seizures. In young adults, the occurrence of such injuries after minor trauma should raise suspicion of underlying bone fragility. We report two cases of bilateral femoral neck fractures associated with phosphorus-calcium metabolic disorders.

Case report:
Two patients (aged 36 and 40) presented with bilateral femoral neck fractures following a simple slip (low-energy trauma). Case 1 is a 36-year-old patient being treated for distal tubular acidosis. Case 2 is a 40-year-old patient with end-stage chronic renal failure on hemodialysis. Clinical examination revealed total functional impairment of both lower limbs. Radiological assessment confirmed, in both cases, displaced true bilateral intracapsular cervical fractures in coxa vara.
Both patients underwent emergency surgery. Reduction on an orthopedic table followed by bilateral internal fixation using a DHS (Dynamic Hip Screw) was performed in a single operative session. In postoperative care, weight-bearing was delayed until radiological signs of consolidation appeared. Consolidation was achieved in both patients.
At the two-year follow-up, the patients demonstrated complete pain-free walking autonomy. Imaging showed no signs of avascular necrosis (AVN) of the femoral head or non-union.



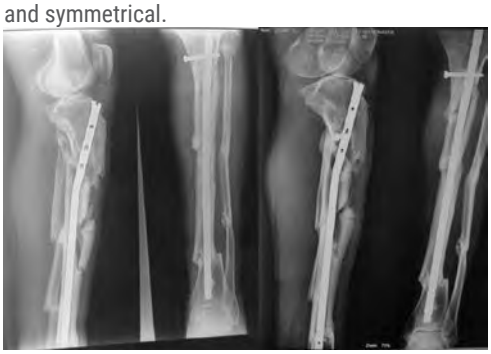
Discussion:
Bilateral femoral neck fractures resulting from minor trauma are pathognomonic of bone-weakening diseases. Chronic renal failure and distal tubular acidosis induce major disturbances in mineral metabolism (renal osteodystrophy, osteomalacia), compromising the mechanical strength of the femoral neck.
The therapeutic challenge lies in early fixation to limit the risk of necrosis—which is particularly high in young patients—and in managing the underlying metabolic pathology to promote healing. The choice of the DHS plate provides the necessary stability to counteract the significant shearing forces at the femoral neck.
Conclusion:
Bilateral femoral neck fractures in young adults after minimal trauma necessitate a comprehensive metabolic workup. Early, stable internal fixation combined with the correction of calcium-phosphorus imbalances leads to excellent functional outcomes and prevents serious complications such as cephalic necrosis.

P165
TRI-FOCAL LEG FRACTURE: A CASE STUDY MANAGED BY INTRAMEDULLARY NAILING

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Objective:
Tri-focal (or triple-level) tibial fractures are rare injuries, typically resulting from high-energy kinetic trauma. They present a major therapeutic challenge due to the complexity of reduction and the high risk of vascular complications or non-union, particularly within the intermediate bone segments. We report a case of a tri-focal leg fracture in an adult successfully treated with internal fixation.
Case report:
A 50-year-old male with no significant medical history was admitted following a road traffic accident (direct impact by a car). Radiological assessment revealed a closed tri-focal fracture of the right leg, involving three distinct fracture sites along the tibial shaft. The patient underwent emergency surgery. The therapeutic strategy consisted of closed-reduction intramedullary nailing (IMN) of the tibia under fluoroscopic guidance, with proximal and distal interlocking.
Satisfactory reduction was achieved for all three fracture sites using a closed approach. Weight-bearing was initially restricted, followed by protected partial weight-bearing starting at the 6th week. Clinical and radiological consolidation was achieved synchronously across all three fracture sites by the 5-month mark. No complications such as infection, malunion, or compartment syndrome occurred.
At the one-year follow-up, the patient demonstrated a normal gait without technical aids or pain. Knee and ankle range of motion were fully preserved and symmetrical.



Discussion:
The treatment of multi-focal tibial fractures remains a subject of debate (external fixation vs. nailing). However, closed intramedullary nailing is widely considered the "gold standard" as it preserves the periosteal blood supply and the fracture hematoma - crucial factors for the consolidation of intermediate segments that are often devascularized. The main difficulty lies in maintaining rotational and axial alignment across multiple levels simultaneously.
Conclusion:
Tri-focal leg fractures are rare clinical entities. Closed intramedullary nailing provides sufficient stability for reliable consolidation of all fracture sites while minimizing the risk of skin complications and infection.

P166

CHRONIC CALCIFYING HOFFA'S DISEASE: A CASE REPORT IN A 75-YEAR-OLD PATIENT

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Objective:
Hoffa's disease, or infrapatellar fat pad impingement syndrome, results from chronic entrapment of the adipose tissue between the femur and the patella. While inflammation and fibrosis are common features, progression to calcification or ossification (ossifying Hoffitis) is rare and can mimic neighboring soft tissue tumors. We report a case of symptomatic calcified Hoffa's disease in a 75-year-old patient.
Case report:
A 75-year-old female patient presented with a two-year history of disabling anterior right knee pain, without recent trauma. Physical examination revealed a firm subpatellar mass and limited range of motion. MRI Imaging revealed a mass within the Hoffa fat pad, characterized by a marked low signal (hypointense) on both T1 and T2-weighted sequences, with no central enhancement, indicating significant calcification. The mass measured 3 cm in its largest dimension and exerted a mass effect on the patellar tendon.



Surgery consisted in a resection of a whitish, stony-hard mass embedded within remodeled fatty tissue.
Histological examination confirmed the diagnosis of Hoffa's disease at the stage of extensive fibrosis associated with calcified remodeling and areas of fibrocartilaginous metaplasia (extra-synovial osteochondroma). Postoperative recovery was uneventful, with the resolution of joint locking and a return to painless walking at the 3-month follow-up.
Discussion:
Chronic Hoffa's disease typically progresses through three stages: inflammation, fibrosis, and finally calcification or ossification. In elderly patients, this terminal stage can pose a diagnostic challenge, often requiring differentiation from para-articular osteochondromas or soft tissue chondromas. MRI is the gold standard for diagnosis, demonstrating the characteristic signal void of calcification within the infrapatellar fat. Total surgical resection is the treatment of choice at this stage, offering an excellent functional prognosis.
Conclusion:
Although rare in its calcified stage, Hoffa's disease should be included in the differential diagnosis of anterior knee masses in the elderly. Radio-pathological correlation is essential to confirm the benign nature of the lesion and to validate the success of surgical intervention.

P167

GIANT LIPOMA OF THE SHOULDER: A CASE REPORT OF AN UNUSUAL 30-CM TUMOR

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Objective:
Lipomas are the most common benign mesenchymal soft tissue tumors. They are classified as "giant" when they exceed 10 cm in their largest dimension or weigh more than 1000 g.
Case report:
A 40-year-old female patient presented with a voluminous swelling on her right shoulder that had been progressively evolving for over 10 years. The primary complaints were aesthetic concerns and functional discomfort (difficulty with clothing and lying in a supine position). Clinical examination revealed a soft, non-tender, mobile mass measuring approximately 30 cm along its long axis.
MRI Imaging revealed a massive lesion occupying the entire posterior scapular region, showing a signal intensity identical to subcutaneous fat (hyperintense on T1 and T2-weighted sequences, with a complete signal drop on fat-saturation sequences). The mass was well-circumscribed, with no evidence of invasion into adjacent muscle structures or suspicious thickened septa.
A complete surgical excision was performed via a direct approach. The operative specimen confirmed an encapsulated fatty mass measuring 30 x 18 x 10 cm.
Histological examination concluded a benign mature lipoma, with no cellular atypia or signs of malignancy (liposarcoma).
Postoperative recovery was uneventful. At the 6-month follow-up, the patient showed excellent healing, full recovery of shoulder mobility, and high aesthetic satisfaction.



Discussion:
Giant lipomas of the shoulder are rare and can pose a diagnostic challenge in differentiating them from well-differentiated liposarcomas. MRI is the modality of choice to confirm the lipomatous nature and screen for signs of malignancy (size > 10 cm, septa thicker than 2 mm, or nodular areas). Despite the impressive 30-cm size in this case, the encapsulated appearance and lack of enhancement pointed toward benignity. Surgical treatment remains the standard of care, relieving mechanical constraints and improving the patient's quality of life.
Conclusion:
Giant lipomas, though benign, can reach spectacular dimensions when allowed to evolve over several decades. MRI is indispensable for preoperative assessment. Careful surgical resection ensures a complete cure with a near-zero risk of recurrence, provided the excision is total.

P168

SURGICAL MANAGEMENT OF CONGENITAL MACRODACTYLY OF THE SECOND TOE: A CASE REPORT

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Objective :
Congenital macrodactyly is a rare, non-hereditary malformation characterized by the hamartomatous overgrowth of all mesenchymal elements (bone, fat, skin, and nerves) of one or more digits. In the foot, this condition leads to significant cosmetic deformity, footwear difficulties, and gait disturbances.
Case report :
We report the case of a 6-year-old boy presenting with isolated, progressive hypertrophy of the second left toe since birth.
In clinical presentation, there is a massive enlargement of the ray causing a mechanical obstacle to normal footwear and an aesthetic complex.
X-rays revealed marked longitudinal and diametric overgrowth of the phalanges and the corresponding metatarsal.
Due to the severity of the overgrowth and the limited potential for conservative remodeling, a ray resection (amputation) was performed. This was combined with a first web space plastoplasty to close the gap, reconstruct the interdigital space, and ensure a harmonious forefoot contour. Postoperatively, healing was uneventful with no skin necrosis or infection. At the latest follow-up, the functional outcome was excellent.
The patient demonstrated a normal gait pattern and was able to wear standard commercial shoes without discomfort. The parents reported high satisfaction with the cosmetic appearance of the foot.



Discussion :
The management of macrodactyly is challenging due to its progressive nature. While conservative procedures (such as debulking or epiphysiodesis) may be attempted in mild cases, radical ray resection remains the gold standard for severe, disproportionate macrodactyly. It provides a definitive solution to footwear issues. The inclusion of a web space plastoplasty is crucial to prevent "V-shaped" foot deformities and to achieve a natural-looking forefoot width.
Conclusion :
Macrodactyly of the second toe is a disabling condition. In severe forms, surgical resection combined with commissural reconstruction is an effective and reliable treatment. It provides a stable functional result and a satisfactory aesthetic outcome, allowing the child to reintegrate into normal physical and social activities.

P169

TOTAL KNEE ARTHROPLASTY FOR GENU VALGUM: A RETROSPECTIVE ANALYSIS OF FUNCTIONAL AND RADIOLOGICAL OUTCOMES IN 40 CASES

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Objective:
Genu valgum presents a specific surgical challenge during Total Knee Arthroplasty (TKA) due to associated bone remodeling, lateral soft-tissue contractures, and complex ligamentous imbalance. This study aimed to evaluate the functional and radiological outcomes of TKA in patients with genu valgum, identify factors influencing postoperative

performance, and propose practical recommendations based on our clinical experience.

Materials and Methods:

We conducted a retrospective study of 40 TKAs implanted for genu valgum deformity. Functional assessment was performed using the Knee Society Score (IKS) (Knee and Function sub-scores). Radiological analysis included the measurement of the Hip-Knee-Ankle (HKA) angle pre- and postoperatively, as well as patellar tracking evaluation. Intraoperative parameters analyzed included the surgical approach, lateral release techniques, bone cut management, residual laxity, and patellar resurfacing. Statistical significance was set at $p < 0.05$.

Results:

Successful correction of the mechanical axis was achieved in 35 cases (87.5%). Failure to achieve neutral alignment was significantly associated with severe valgus (HKA > 200°, $p = 0.022$) and tibial cut technical errors. Functional improvement was significant, with a substantial increase in the postoperative IKS score. Residual medial laxity was the strongest predictor of a lower IKS score ($p = 0.005$).

Patellar resurfacing, although performed selectively, significantly improved postoperative flexion ($p = 0.009$). Additionally, a rehabilitation duration of 3 months was associated with superior functional outcomes ($p = 0.023$). Postoperative patellar tracking was satisfactory in most cases, regardless of whether resurfacing was performed.

Conclusion:

TKA for genu valgum yields excellent results provided the surgical strategy is tailored to the severity of the deformity. This includes rigorous control of tibial cuts, precise ligamentous balancing to eliminate medial laxity, and the use of a lateral approach for severe cases. Selective patellar resurfacing and early rehabilitation further optimize functional recovery.

The findings of this study have led to the development of a decision-making algorithm to improve the reproducibility and performance of TKA in the valgus knee.

P170

FUNCTIONAL OUTCOMES AND HEALTH-RELATED QUALITY OF LIFE FOLLOWING TOTAL KNEE ARTHROPLASTY

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Objective:

Knee osteoarthritis (KOA) is a leading cause of disability worldwide, with a rising incidence linked to aging and obesity. When conservative management fails in advanced stages, Total Knee Arthroplasty (TKA) serves as the definitive surgical solution. This study aims to evaluate the functional recovery, psychological impact, and overall quality of life (QoL) in patients following TKA.

Materials and Methods:

We conducted a retrospective, analytical study of patients undergoing TKA between January and December 2022. Multiple validated instruments were utilized for assessment: the New Knee Society Score (New IKS) and the Knee Injury and Osteoarthritis Outcome Score (KOOS) for joint-specific function; the Short Form-36 (SF-36) for general QoL; the Pittsburgh Sleep Quality Index (PSQI) for sleep hygiene; and the Hospital Anxiety and Depression Scale (HADS) for psychological screening.

Results:

The cohort (mean age 64.9 years, predominantly female) presented with severe baseline morbidity: 70% had varus deformities, and 80% had a limited walking perimeter (< 500m).

Significant improvements were observed in the mean KOOS (73.2 post-op vs. 33.3 pre-op) and New IKS scores (improving to a mean of 80 post-op). The SF-36 scores demonstrated statistically significant gains, particularly in the Physical Component Summary (PCS).

Sleep quality improved dramatically ($p < 0.001$), with the prevalence of "good sleepers" rising from 14% to 86%. Furthermore, "definite anxiety" and "definite depression" rates fell from 25% to 8% and 15% to 7%, respectively.

Univariate analysis confirmed that functional and QoL improvements were independent of age, sex, or BMI.

Discussion:

The significant reduction in anxiety and depression scores post-TKA suggests that joint replacement surgery provides benefits far beyond mechanical stability; it restores psychological equilibrium by resolving chronic pain and social isolation. The restoration of sleep (PSQI) appears to be a major mediator in the improvement of the SF-36 mental component. However, despite high satisfaction rates, a gap remains between clinical success and patient expectations, highlighting the need for thorough preoperative counseling.

Conclusion:

TKA provides substantial multi-dimensional benefits, significantly improving disease-specific function, sleep quality, and psychological health.

In our hospital setting, these results validate TKA as a highly effective intervention for advanced knee osteoarthritis, regardless of patient demographics.

P171

SHORT- AND MEDIUM-TERM CLINICAL AND RADIOLOGICAL OUTCOMES OF BIPOLAR HEMIARTHROPLASTY FOR FEMORAL NECK FRACTURES

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Objective :

Bipolar hemiarthroplasty (BH) has significantly advanced the management of displaced femoral neck fractures in the elderly. These implants were designed to minimize acetabular wear and erosion, a common complication associated with unipolar prostheses (Austin-Moore or Thompson). This study aims to evaluate the clinical and radiological outcomes, as well as the quality of life, in patients treated with BH in the short and medium term.

Materials and Methods :

We conducted a retrospective study of 100 bipolar hemiarthroplasties performed for femoral neck fractures. Patients were evaluated clinically using the Postel-Merle d'Aubigné (PMA) score, radiologically through standard follow-up imaging, and for quality of life using the SF-36 Health Survey (Physical Component Summary - PCS and Mental Component

Summary - MCS).

Results :

The postoperative complication rate included one case of early-onset infection and two cases of early posterior dislocation. At a mean follow-up of 31.2 months, 77.2% of patients achieved satisfactory results according to the PMA score.

The mean SF-36 PCS (Physical) was 33.8, and the mean SF-36 MCS (Mental) was 44.6.

The majority of patients showed stable implant positioning with no significant acetabular erosion during the study period.

Discussion :

Our findings suggest that BH is a reliable procedure, particularly regarding pain relief and the restoration of walking ability. These functional gains correlate well with radiological stability. The "buffer effect" provided by the polyethylene interface appears to protect the acetabular cartilage, delaying the onset of asymptomatic wear.

While literature suggests that BH offers superior clinical and radiological outcomes compared to unipolar prostheses, it comes at a higher financial cost. Furthermore, a selection bias was noted in our series: BH was primarily accessible to patients with adequate social security coverage, reflecting a higher socioeconomic status which may independently influence quality of life scores.

Conclusion :

Based on these short- and medium-term outcomes, bipolar hemiarthroplasty remains the treatment of choice for displaced femoral neck fractures in elderly patients without pre-existing osteoarthritis. It provides a balanced compromise between surgical simplicity and the preservation of the acetabulum.

P172

OUTCOMES OF THE LATARJET PROCEDURE FOR RECURRENT ANTERIOR SHOULDER INSTABILITY IN COMPETITIVE HANDBALL PLAYERS: A LONG-TERM FOLLOW-UP STUDY

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Objective:

Recurrent anterior shoulder instability poses a significant therapeutic challenge in high-demand overhead and contact athletes, such as handball players. The Latarjet procedure is often preferred for its "triple-lock" effect.

Materials and Methods:

We conducted a retrospective study of 16 male competitive handball players (mean age: 27 years) who underwent the Latarjet procedure for chronic anterior instability. Clinical assessment focused on the dominant shoulder, which was involved in the majority of cases. Preoperative evaluation revealed glenoid or humeral bone loss (Hill-Sachs lesions) in 80% of the cohort. Functional outcomes were measured using the Walch-Duplay and the Western Ontario Shoulder Instability (WOSI) scores at a mean follow-up of 15months.

Results:

The primary mechanism of initial injury was a traumatic sporting collision in all cases. Postoperatively, 43.75% of patients returned to their pre-injury level of competition within an average of nine months. One patient (6.25%) experienced a recurrence of instability following a new high-energy trauma. At the final follow-up, the mean Walch-Duplay score was 82.7, with 68.75% of patients achieving "Excellent" or "Good" results. The mean WOSI score was 57.04/2100. While 87.5% of patients reported high satisfaction, three patients (18.75%) described persistent functional discomfort during overhead sports activities, specifically during the late cocking phase of throwing.

Discussion:

The Latarjet procedure demonstrates excellent stability and high patient satisfaction rates in the long term. However, the return-to-play rate at the same competitive level remains a critical point of discussion. The discrepancy between clinical stability and subjective sporting comfort in handball players suggests that while the bone block effectively prevents recurrence, subtle deficits in proprioception or range of motion (internal rotation) may impact high-level throwing performance. Bone loss remains a primary indication, justifying the choice of this technique over soft-tissue repair in this population.

Conclusion:

The Latarjet procedure is a reliable and robust technique for treating recurrent shoulder dislocation in handball players. It provides excellent long-term joint stability; however, athletes should be counseled that returning to the elite level of competition may be influenced by residual functional discomfort during high-velocity throwing.

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FUNCTIONAL OUTCOMES OF SURGICAL MANAGEMENT FOR MASON TYPE IV RADIAL HEAD FRACTURES IN ATHLETES: A THREE-CASE SERIES

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Objective:

Radial head fractures are common yet polymorphic, often presenting diagnostic and therapeutic challenges. When associated with elbow dislocation (Mason Type IV), these complex injuries threaten not only the stability and mobility of the elbow but also the distal function of the wrist and hand. This study aims to evaluate the clinical, radiological, and functional outcomes of various surgical methods used to treat Mason Type IV fractures in young, athletic patients.

Materials and Methods:

We report three cases of Mason Type IV radial head fractures (classified according to the Broberg and Morrey modification) resulting from sports-related accidents. Three distinct therapeutic strategies were employed: Radial head resection associated with external fixation, Open Reduction Internal Fixation (ORIF) using buried headless compression screws, and Prosthetic replacement with a pyrocarbon radial head prosthesis.

Evaluation at the final follow-up included clinical stability, range of motion, standard radiographic assessment, and the Mayo Elbow Performance Score (MEPS).

Results:

At the final follow-up, all patients demonstrated stable elbows with nearly full range of motion. Functional evaluation via MEPS yielded "Fair" to

"Good" results. However, only one patient successfully returned to their pre-injury level of athletic activity.

Discussion:

Based on these results and a literature review, a precise preoperative assessment is mandatory to identify bone and ligamentous injuries that compromise elbow stability. Systematic intraoperative testing in both sagittal and frontal planes is essential.

Resection, though historically common, should generally be abandoned in the presence of destabilizing lesions, as it increases the risk of proximal radial migration and valgus instability.

ORIF is the ideal indication for Type IVa fractures but carries risks of secondary necrosis, non-union, and stiffness.

Radial Head Arthroplasty (RHA) appears to be the superior option for Type IVb fractures. By restoring the lateral column, RHA can stabilize the elbow even in the presence of difficult-to-repair medial collateral ligament injuries.

Conclusion:

The management of Mason IV fractures in athletes is demanding. While ORIF is preferred when feasible, radial head prosthesis offers encouraging results by restoring stability through a rigorous surgical technique, ultimately facilitating functional recovery.

P174

LIMB-SALVAGE SURGERY FOR PRIMARY MALIGNANT BONE TUMORS OF THE PROXIMAL HUMERUS: A MULTI-CENTER STUDY

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Objective:

The proximal humerus is the fourth most common site for primary malignant bone tumors. The primary goal of limb-salvage surgery is to achieve oncologically safe resection margins while preserving the maximum possible function of the upper limb.

Materials and Methods:

We conducted a retrospective, bicentric study over a 12-year period (2012–2024), involving 13 patients treated for primary malignant bone tumors of the proximal humerus. Resection margins were evaluated according to the Enneking/MSTS classification. Functional outcomes were assessed using the MSTS functional score, alongside radiological follow-up and complication analysis.

Results:

The mean age was 41.7 years, with a mean follow-up of 58.6 months. The cohort included 6 chondrosarcomas, 4 osteosarcomas, and 3 Ewing sarcomas. Resection types according to Malawer's classification included intra-articular (Type A): 6 cases (S4S5, S3S4S5, S3S4) and extra-articular (Type B): 7 cases (S3S4, S3S4S5).

Reconstruction methods were varied: 4 cement-augmented nails (spacer), 1 reverse Total Shoulder Arthroplasty (rTSA), 1 massive tumor prosthesis, 4 scapulohumeral arthrodeses, 1 segmental reconstruction with epiphyseal preservation, and 2 suspensionplasties (Symeonides procedure). The mean MSTS functional scores were: rTSA: 85%, Tumor prosthesis: 82%, Epiphyseal preservation: 80%, Cemented nail: 75%, Arthrodesis: 71%, and Suspensionplasty: 60%.

One patient died due to local recurrence. Complications included local recurrence, infection, and prosthetic instability.

Discussion:

Reconstructing the proximal humerus post-resection is a major surgical challenge. The success of conservative surgery relies on oncological safety while attempting to preserve the axillary nerve and the deltoid muscle. This requires meticulous preoperative planning (MRI, PET-CT) and intraoperative frozen section analysis. While prosthetic reconstructions (rTSA and tumor prostheses) offer superior functional scores, they are associated with higher risks of instability and infection compared to biological reconstructions or arthrodesis. These complex procedures should ideally be performed in specialized oncological centers.

Conclusion:

Oncological clearance must remain the absolute priority over functional reconstruction. The final functional outcome depends heavily on the type of bone resection, but even more so on the preservation or reconstruction of the abductor apparatus (deltoid and rotator cuff). Early detection remains the most critical factor in improving both survival and functional prognosis.

P175

COMPLEX BIPOLAR FOREARM TRAUMA IN CHILDREN: MONTEGGIA INJURY ASSOCIATED WITH AN IPSILATERAL DISTAL FRACTURE

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Objective :

Monteggia fracture-dislocations are well-documented injuries in the pediatric population. However, their association with a fracture of the distal fourth of both forearm bones—referred to as a "bipolar" or "double-level" injury—is extremely rare. This configuration creates a "floating" intermediate bone segment, significantly increasing instability and therapeutic complexity.

Case report :

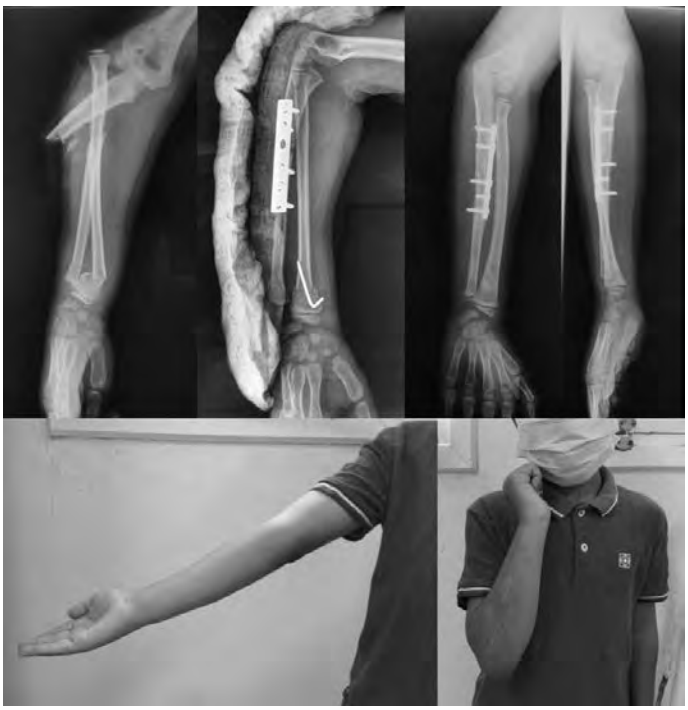
A 7-year-old child was admitted following a sports accident with an open trauma (Gustilo-Anderson type I / Cauchoix 1) of the right forearm. Radiographic evaluation revealed a complex injury pattern: A diaphyseal fracture of the ulna associated with an anterior dislocation of the radial head (Bado Type I Monteggia lesion) and a minimally displaced fracture of the distal fourth of the ipsilateral radius and ulna.

The patient underwent emergency surgery for stabilization of both injury sites.

Following wound debridement, an open reduction of the ulna was performed and stabilized with a compression plate. This maneuver resulted in the spontaneous and stable reduction of the radial head. The distal radial fracture was stabilized using percutaneous styloid pinning (K-wiring).

Bone healing was achieved within 6 weeks. The hardware was removed after 18 months.

At the 2-year final follow-up, the functional result was excellent, with a full range of motion in the elbow (flexion-extension and prono-supination) and wrist. No growth complications or physeal issues were observed.



Discussion :
The primary challenge in bipolar fractures is restoring the length and alignment of the ulna, which is an absolute prerequisite for maintaining the reduction of the radial head. While intramedullary nailing is often preferred in children, the use of a compression plate in this specific case provided the rigid stability necessary to manage a multi-level unstable forearm. Distal radial pinning completed the stabilization of the forearm frame, preventing secondary displacement.
Conclusion :
The association of a Monteggia lesion with a distal forearm fracture is a surgical emergency. Stable osteosynthesis, combining plate fixation and pinning, prevents classic complications such as non-union or chronic radial head dislocation, ensuring a full long-term functional recovery.

P176
ULNAR NERVE COMPRESSION BY POST-TRAUMATIC HETEROTOPIC OSSIFICATION: A CASE REPORT

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Objective :
Neurogenic heterotopic ossification, also known as para-osteoarthropathy, is a frequent complication following severe traumatic brain injury. While these ossifications typically impair joint mobility, their development can also lead to complex peripheral nerve compressions. We report a case of ulnar nerve compression at the elbow, where the nerve was completely encased by an osteoma in a brain-injured patient.
Case report :
A 30-year-old male with a history of severe traumatic brain injury (requiring a 25-day stay in intensive care) presented with progressive symptoms of right ulnar neuropathy. He reported paresthesias in the fourth and fifth digits, associated with elbow stiffness. Clinical examination revealed a hard, bone-like mass on the medial aspect of the right elbow.
Computed Tomography revealed a massive osteogenic formation in the epitrochlear (medial epicondyle) region. The imaging characteristically showed circumferential encasement of the ulnar nerve, with the osteoma literally surrounding the nerve within its groove.
Electromyography confirmed severe ulnar neuropathy at the elbow with a major conduction block.
The patient underwent surgery for complete resection of the osteoma. Intraoperatively, the nerve was meticulously liberated from its "bony straitjacket."
Postoperative outcomes included a complete restoration of elbow range of motion, a progressive resolution of preoperative paresthesias, and a satisfactory short-term sensory recovery.
Discussion
This case illustrates the unique pathogenesis of neurogenic heterotopic ossification, where newly formed bone does not merely displace adjacent structures but can literally incorporate them. The topography of the epitrochlear-olecranon groove (cubital tunnel) is critical due to the limited anatomical space.
This observation highlights the necessity of cautious neurolysis. Unlike classic tunnel syndromes, the rapid resolution of symptoms following resection confirms that the compression here is purely mechanical and extrinsic. The neurological prognosis remains favorable provided the intervention is timely.
Conclusion
Ulnar nerve compression by neurogenic heterotopic ossification is a rare etiology that should be considered in any brain-injured patient presenting with sensory-motor deficits in the upper limb. Surgical resection provides a dual benefit: restoring joint function and achieving effective nerve decompression.

P177
TUBERCULOUS OSTEOMYELITIS OF THE HUMERAL HEAD SECONDARY TO BCG VACCINATION

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Objective :
Given the endemic risk of tuberculosis in our country, BCG (Bacillus Calmette-Guérin) vaccination is mandatory at birth. Various cases of osteomyelitis secondary to the BCG vaccine have been reported in the literature. We report a case of tuberculous osteomyelitis of the humeral head following BCG vaccination in an 11-month-old infant.
Case Report :
An 11-month-old infant presented with right shoulder pain lasting for one month, accompanied by a fever. The patient was born at full term with normal psychomotor development, and his vaccination schedule was up to date.
Physical examination revealed severely painful range of motion in the right shoulder and the presence of right axillary lymphadenopathy, with no local inflammatory signs. Standard shoulder X-rays showed a poorly defined epiphyseo-diaphyseal osteolytic lesion of the proximal humerus with cortical breakthrough.

An MRI confirmed the expansive nature of the osteolytic process, showing extension into the joint space and surrounding soft tissues. Based on these findings, a surgical biopsy was performed; the histological results were consistent with bone tuberculosis. The patient was started on an antitubercular regimen (Isoniazid, Rifampin, and Ethambutol) with outpatient radiological follow-up.

At the 9-month follow-up, the patient is doing well with a normal growth curve. Radiologically, the lesion shows significant improvement and is currently healing.

Discussion :

The *Mycobacterium bovis* BCG strain used for vaccination was developed in 1921 by the Pasteur Institute from an attenuated bovine strain. According to the World Health Organization (WHO), approximately 100 million newborns are vaccinated with BCG worldwide each year.

The prevalence of osteomyelitis secondary to BCG vaccination is rare, estimated to occur in between 1 in 3333 and 1 in 100000000 vaccinations. The development of a BCG infection following vaccination may often be explained by the presence of a previously undiagnosed immunodeficiency.

Conclusion

BCG-induced osteomyelitis is a rare but potentially serious complication of vaccination. Prompt clinical suspicion, coordinated diagnostic investigations, and the early initiation of appropriate antibiotic therapy generally lead to a favorable prognosis.

P178

TRANSCRANIAL MAGNETIC STIMULATION IN THE REHABILITATION OF PATIENTS WITH MULTIPLE SCLEROSIS

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In the context of multiple sclerosis (MS), a disease characterized not only by structural damage to myelin and axons but also by maladaptive plasticity of neural networks, TMS offers unique opportunities for non-invasive neuromodulation. The fundamental premise for this method is the concept of synaptopathy, according to which an inflammatory environment in the central nervous system disrupts synaptic transmission mechanisms (glutamatergic and GABAergic) long before neuronal death. Rhythmic TMS allows us to interfere with these processes, inducing phenomena similar to long-term potentiation (LTP) or long-term depression (LTD), thereby restoring functional connectivity in the brain and compensating for neurological deficits. The method is based on Faraday's law of electromagnetic induction.

A powerful, short-duration current pulse flowing through a coil generates a high-intensity alternating magnetic field (up to 2-3 Tesla), which easily penetrates the skin, aponeurosis, and cranial bones. In the conductive tissues of the brain, this field induces a secondary electric field, the vector of which is directed perpendicular to the magnetic flux. When the induced current reaches a threshold, depolarization of the membranes of cortical neurons occurs, primarily in the region of the axonal colliculi or the axonal curvatures of interneurons. However, the therapeutic effect of rTMS is due not so much to the depolarization itself as to post-stimulation changes in cortical excitability that persist after the session. Neurophysiological effects are strictly dependent on the stimulation frequency. Low-frequency stimulation (≤ 1 Hz) traditionally has an inhibitory effect, reducing the excitability of cortical areas through mechanisms similar to long-term depression (LTD) of synaptic transmission. In contrast, high-frequency stimulation (≥ 5 Hz) increases cortical excitability, mimicking long-term potentiation (LTP). Of particular interest are modern Theta Burst Stimulation (TBS) protocols, which achieve a powerful modulatory effect in a significantly shorter time (3–5 minutes) compared to classical protocols. The mechanisms of these plastic changes are associated with the activation of NMDA receptors, changes in intracellular calcium concentrations, and the expression of neurotrophic factors, particularly BDNF (brain-derived neurotrophic factor), the level of which is often reduced in MS. It is the ability of rTMS to influence BDNF secretion and trigger axon sprouting that makes this method pathogenetically justified for neurorehabilitation. One of the most clinically significant and proven applications of rTMS in MS is the treatment of spasticity. The pathophysiology of spasticity in demyelinating diseases is associated not only with the disinhibition of spinal reflexes due to damage to the pyramidal tract but also with altered excitability of the primary motor cortex (M1). Studies using paired stimulation have shown that patients with spasticity have impaired intracortical inhibition (SICI) mechanisms mediated by GABA-A receptors. The therapeutic strategy in this case is aimed at restoring corticospinal control.

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TRANSCRANIAL ELECTRICAL STIMULATION IN THE REHABILITATION OF PATIENTS WITH MULTIPLE SCLEROSIS

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The therapeutic value of tDCS in chronic diseases such as MS is due to its long-term effects ("offline effects"), which persist from minutes to weeks after the stimulation session. These phenomena are based on mechanisms of synaptic plasticity similar to long-term potentiation (LTP) and long-term depression (LTD). The molecular cascade triggered by tDCS includes modulation of NMDA glutamate receptors, changes in intracellular calcium concentrations, and, most importantly, increased expression of brain-derived neurotrophic factor (BDNF). In multiple sclerosis, where inflammation suppresses neurotrophin production and impairs remyelination mechanisms, BDNF induction by tDCS may play a neuroprotective role. Furthermore, modern studies using resting-state fMRI demonstrate that tDCS can alter the global architecture of neural networks, strengthening functional connections between distant brain regions, which is critical for compensating for the "disconnection syndrome" characteristic of the demyelinating process. The effect on glial cells should also not be overlooked: microglia and astrocytes are also sensitive to electric fields, and modulating their activity can reduce local neuroinflammation.

Cognitive impairment, which affects up to 60–70% of MS patients, manifests primarily as decreased information processing speed, working memory, and attention deficits. The anatomical substrate of these functions is the dorsolateral prefrontal cortex (DLPFC), which serves as the primary target for tDCS in cognitive rehabilitation protocols. The standard electrode placement involves placing the anode on the left DLPFC (point F3 in the international 10-20 system) and the cathode on the contralateral brow ridge (Fp2) or right DLPFC (F4).

Clinical studies demonstrate that a course of anodal tDCS of the left DLPFC (10-20 sessions of 20 minutes, 1.5-2 mA) significantly improves performance on attention tests (PASAT) and the Symbol-Digit Test (SDMT). The mechanism of improvement is associated with increased

excitability of the prefrontal cortex, which facilitates the recruitment of neural resources for complex cognitive tasks. An important aspect is the synergy between tDCS and cognitive training: stimulation administered directly during task performance ("online") is more effective than stimulation at rest. This supports the concept of "activity-dependent plasticity": the electric field does not create new skills, but rather strengthens neural pathways that are voluntarily activated by the patient. Of particular interest is the finding that tDCS can reduce the phenomenon of "cognitive fatigue"—the depletion of mental resources during prolonged exercise, which is subjectively perceived by patients as a reduction in "brain fog."

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VIRTUAL REALITY TECHNOLOGIES IN COMPREHENSIVE REHABILITATION FOR MULTIPLE SCLEROSIS

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In the modern neurorehabilitation paradigm, virtual reality (VR) technologies are viewed not simply as a way to add variety to routine physical therapy sessions, but as a complex neurophysiological tool that allows for the creation of so-called "enriched environments." For patients with multiple sclerosis (MS), whose daily activities are often limited by motor deficits, fatigue, and apathy, standard physical therapy methods may prove insufficient to stimulate adaptive changes in the central nervous system. VR technologies immerse patients in a computer-simulated world where interaction occurs in real time through multimodal sensory channels: visual, auditory, and tactile (haptic feedback).

A fundamental difference between VR therapy and traditional methods is the ability to manipulate feedback. In the physical world, a patient with paresis receives a signal of failure (failure to raise an arm, loss of balance), which reinforces the pathological pattern and the phenomenon of "learned disuse." In a virtual environment, we can programmatically enhance the avatar's range of motion, creating the illusion of success and activating the brain's reward system (dopaminergic pathways), which is critical for maintaining motivation and inducing neuroplasticity. Furthermore, VR enables the implementation of motor learning principles with high-intensity and task variability that cannot be replicated in a traditional gym, thereby ensuring training of not only motor but also cognitive functions within a single session.

The effectiveness of VR rehabilitation is based on several key neurobiological mechanisms, the most important of which is the activation of the mirror neuron system. Observing the actions of a virtual avatar performing limb movements from a first-person perspective activates the same neural networks in the premotor and parietal cortex as the actual movement. This phenomenon, known as “action observation,” when combined with ideomotor training, promotes the reorganization of motor maps in the cortex and the restoration of lost connections, even in cases of severe paresis.

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BIOFEEDBACK TECHNOLOGIES IN MULTIPLE SCLEROSIS NEUROREHABILITATION

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Biofeedback (BFB) is a non-pharmacological therapeutic approach based on the fundamental principles of cybernetics and P.K. Anokhin's theory of functional systems. The method involves creating an external, artificial feedback circuit that allows the patient to receive real-time information about their physiological functions, which are usually unconscious or impaired due to a pathological process. In the context of multiple sclerosis (MS), where demyelination and axonal degeneration lead to the disruption of natural sensorimotor connections and distortion of proprioceptive information, BFB acts as a "sensory prosthesis." The technology transforms physiological signals (muscle electrical activity, brain rhythms, postural parameters, sphincter pressure) into perceptible visual or auditory images. This closes the broken reflex circuit and activates supraspinal control mechanisms, teaching the patient to voluntarily regulate impaired functions through operant conditioning and neuroplasticity.

The clinical effectiveness of biofeedback in multiple sclerosis relies on the central nervous system's ability to functionally reorganize even in the context of chronic neurodegenerative processes. The pathophysiological basis for functional recovery under the influence of biofeedback training is the phenomenon of "disinhibition" of functionally inactive but anatomically intact neural pathways, as well as the formation of new synaptic connections bypassing the damaged areas (vicariation). In MS, movement impairment is often associated not so much with complete paralysis as with disruption of afferent signal transmission: the brain sends a command to a muscle but does not receive a clear response, leading to incoordination and ataxia. Biofeedback compensates for this deficit through sensory substitution: proprioceptive information distorted by demyelination of the dorsal columns of the spinal cord is replaced by a high-precision visual signal on a monitor screen.

Regular training with biofeedback promotes the consolidation of motor skills. During the learning process, a transition occurs from energy-consuming, consciously controlled movement (involving the prefrontal cortex) to automated execution mediated by the basal ganglia and cerebellum. Importantly, biofeedback affects not only the effector component but also the psychoemotional state. Visualizing success (for example, successfully relaxing a spastic muscle, displayed on a graph) activates the limbic system and dopaminergic reward pathways, which reduces anxiety, increases motivation for rehabilitation, and creates an internal locus of control over the disease.

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FUNCTIONAL ELECTRICAL STIMULATION IN COMPREHENSIVE REHABILITATION FOR MULTIPLE SCLEROSIS

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The method is based on the ability of short electrical pulses (usually rectangular, biphasic, and charge-compensated) to depolarize the axonal membrane of peripheral nerves. When correcting gait in patients with MS, the primary target is the common peroneal nerve (n. peroneus communis) in the region of the fibular head. Stimulation of this nerve causes contraction of the tibialis anterior and peroneal muscles (mm. peronei), enabling dorsiflexion and eversion of the foot. This is critical during the swing phase, preventing toe drag and the need for compensatory movements (circumduction, hip hyperextension, or "hip hiking").

Mechanism of action of FES is not limited to simple muscle contraction. Modern neuroimaging and electrophysiological data (TMS, fMRI) indicate a powerful afferent component of stimulation. The electrical impulse activates not only efferent motor fibers (alpha motor neurons) but also afferent sensory fibers (types Ia, Ib, and II). This massive flow of proprioceptive information reaches the spinal cord and then the sensorimotor cortex, closing reflex arcs and strengthening the cortical representation of the stimulated limb. In the literature, this phenomenon is described as the "therapeutic effect" of FES: regular use of the device leads to increased corticospinal excitability and a reorganization of neural networks according to the Hebbian principle ("neurons that fire together, wire together"). Clinically, this is manifested in the fact that after a course of FES, the patient begins to walk better even without the device turned on—a phenomenon unachievable with passive orthoses (AFOs). Furthermore, stimulation of the peroneal nerve causes reciprocal inhibition of antagonist muscles (the gastrocnemius and soleus muscles) through the activation of spinal interneurons. In patients with MS, who typically experience spasticity in the posterior calf muscles, this effect plays a key role in normalizing gait biomechanics, preventing equinus foot placement and reducing the risk of contractures.

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SMART REHABILITATION FOR MULTIPLE SCLEROSIS

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Types of Smart Technologies in MS Rehabilitation

Wearable Sensors and IoT Devices

Wearable sensors and Internet of Things (IoT) devices enable real-time symptom monitoring and gait analysis, critical for MS patients with mobility impairments. These devices capture motion, biometric data, and daily activity patterns, facilitating continuous disease monitoring in natural settings. For example, smart insoles and motion trackers provide objective data on gait characteristics and balance, which are essential for assessing disease progression and tailoring interventions. Cognitive monitoring is also advancing through AI-driven analysis of keystroke dynamics and neuropsychological test scoring, enabling unobtrusive assessment of cognitive impairment. This continuous monitoring supports early detection of symptom changes and personalized treatment adjustments.

Tele-Rehabilitation Platforms

Tele-rehabilitation platforms leverage internet communication technology to deliver physical and cognitive rehabilitation remotely, overcoming barriers of mobility, travel costs, and limited access to specialized care. These platforms provide virtual physical therapy sessions, remote monitoring, and patient education, improving accessibility and adherence. Tele-rehabilitation has demonstrated significant impacts on motor, cognitive, and participation parameters in MS patients, making it a vital tool especially in the context of the COVID-19 pandemic and beyond. By facilitating frequent and convenient access to care, tele-rehabilitation enhances patient engagement and continuity of treatment.

AI and Machine Learning Applications

AI and machine learning algorithms analyze large-scale patient data—including demographics, genetics, clinical presentations, and radiological findings—to improve diagnostic accuracy, tailor management plans, and predict disease progression. These technologies automate neuropsychological test scoring and analyze passive data streams from wearables, providing insights into cognitive and motor function. AI-driven virtual physiotherapy assistants (VPAs) offer real-time feedback and personalized support, enhancing adherence and reducing in-person visits. The integration of AI in smart rehabilitation represents a paradigm shift toward data-driven, adaptive care models that respond dynamically to patient needs.

Virtual and Augmented Reality (VR/AR)

VR and AR technologies provide immersive, multi-sensory environments for motor and cognitive rehabilitation. VR stimulates neuroplasticity through repetitive, task-oriented feedback, improving balance, movement, and cognitive function. Clinically validated VR programs for MS patients have shown improvements in motor skills and cognitive abilities by activating mirror neuron systems and promoting synaptic reorganization. AR complements VR by overlaying digital information onto the real world, facilitating functional training in daily living activities. These technologies enhance engagement and efficacy in rehabilitation programs.

Mobile Health (mHealth) Apps

mHealth apps support symptom tracking, medication adherence, and self-management, empowering patients to actively participate in their care. These apps provide user-friendly interfaces, reminders, and progress tracking, which improve adherence and facilitate communication with healthcare providers. mHealth technologies also enable remote monitoring of symptoms and adverse events, optimizing clinical interventions and reducing the need for in-person visits. Their integration with clinical care enhances the continuity and personalization of rehabilitation.

Robotics and Exoskeletons

Robot-assisted gait training (RAGT) and exoskeletons assist severely disabled MS patients in regaining mobility and functional independence. RAGT uses weight support systems and exoskeletons to generate repetitive gait movements, improving gait characteristics, balance, and lower limb stability. These devices reduce spasticity and enhance muscle strength, decreasing fall risk and improving quality of life. Robotic assistants, such as those developed in the RAMCIP project, provide physical and cognitive support at home, demonstrating high acceptance among patients and medical personnel.

Personalization and Adaptive Treatment Plans

Smart rehabilitation emphasizes personalized treatment plans that

adapt to individual symptom profiles, disease progression, and patient feedback. Technologies such as wearable sensors combined with AI-driven analytics enable real-time adjustments in therapy intensity, duration, and modality. For instance, transcranial magnetic stimulation (TMS) parameters are optimized based on individual patient responses to improve spasticity and cognitive function. Similarly, VR and RAGT programs are tailored to target specific motor and cognitive impairments, maximizing efficacy.

Data analytics play a pivotal role in creating dynamic rehabilitation plans. By continuously analyzing patient data, clinicians can modify interventions to match evolving needs, enhancing adherence and outcomes. Integrated systems that combine wearables with AI feedback exemplify this approach, enabling proactive and responsive care. Personalization also extends to lifestyle modifications, including home environment adaptations and assistive devices, which support mobility and independence.

Outcome Measures and Efficacy

Outcome measures (OMs) are essential for tracking progress and informing treatment adjustments in smart rehabilitation. The American Physical Therapy Association's Multiple Sclerosis Outcome Measures Task Force recommends standardized OMs such as the Nine-Hole Peg Test (NHPT) for upper-extremity function, Modified Fatigue Impact Scale (MFIS) for fatigue, Timed 25-Foot Walk test (T25FW) and Multiple Sclerosis Walking Scale (MSWS-12) for gait and walking ability, Multiple Sclerosis Functional Composite (MSFC) for multidimensional assessment, and Six-Minute Walk Test (6MWT) for endurance. These measures provide objective and patient-reported data to quantify symptom severity and treatment effectiveness.

The clinical decision-making process involves selecting OMs based on patient goals, symptom profiles, and clinical utility. For example, a patient with relapsing-remitting MS may be assessed using NHPT, MFIS, T25FW, and MSWS-12 to tailor interventions targeting upper-extremity function, fatigue, and gait. The availability of minimal detectable change data enhances the sensitivity of these measures to treatment effects. While OMs offer valuable insights, their implementation is limited by clinician knowledge and symptom heterogeneity, necessitating further research and standardized core sets for different practice settings.

Future Directions and Ethical Considerations

Emerging trends in smart rehabilitation include brain-computer interfaces (BCIs) and digital twins, which promise to revolutionize MS management by enabling direct neural control of assistive devices and personalized disease modeling. Equitable access to these technologies is critical to ensure that all patients, including underserved communities, benefit from advancements. Ethical considerations such as data security, informed consent, and the risk of over-reliance on technology must be addressed to maintain patient trust and safety.

Collaborative research between technologists, clinicians, and patients is essential to refine smart rehabilitation tools and ensure they meet real-world needs. This interdisciplinary approach will facilitate the development of affordable, accessible, and effective interventions that enhance independence and quality of life for MS patients.

Conclusion

Smart rehabilitation for multiple sclerosis represents a transformative shift in patient care, integrating advanced technologies and personalized treatment plans to address the complex and heterogeneous symptoms of MS. Wearable devices, tele-rehabilitation, AI, VR, robotics, and mHealth apps enable continuous monitoring, tailored interventions, and improved adherence. Personalized plans that adapt in real-time enhance outcomes by targeting individual needs, while standardized outcome measures quantify progress and guide clinical decisions. Despite challenges in accessibility, cost, and patient engagement, the future of smart rehabilitation is promising, with emerging technologies and collaborative research poised to overcome these barriers. By embracing these innovations, healthcare professionals can empower MS patients to achieve greater independence and improved quality of life, ultimately transforming the landscape of MS care.

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PRELIMINARY PROTEOMIC ANALYSIS OF HUMAN OSTEOARTHRITIC CHONDROCYTES EXPOSED TO HYDROSTATIC PRESSURE OF VARIOUS MAGNITUDES

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Objective

The purpose of the present study aimed at investigating the role of possible protein mediators involved in oxidative stress and inflammatory balance in human osteoarthritic OA) chondrocyte exposed to hydrostatic pressure (HP) of various magnitudes a preliminary mass spectrometry–based proteomic analysis.

Material and Methods

Human OA chondrocytes were obtained from femoral heads of patients with coxarthrosis according to ACR criteria, subjected to total hip arthroplasty. For the present study, the cells were subjected for 3 h to cyclic low HP (1–5 MPa) or high continuous static HP (24 MPa) generated by a unique prototype of pressurization system (*Fioravanti, A et al. Indian J. Med. Res. 2010*). Proteomic analysis by mass spectrometry was conducted on cellular lysates before and after pressure treatments of OA chondrocytes Moreover, gene expression levels of oxidative stress markers and of NF-kB pathway were detected by quantitative real-time polymerase chain reaction qRT-PCR. Mitochondrial superoxide anion (O2-) production was detected by flow cytometry.

Results

The data showed that high continuous static HP induced a significant increase of ROS release and of gene expression of specific markers involved in oxidative stress in comparison to basal conditions. Opposite results were obtained with cyclic low HP. Furthermore, the analysis of the p65, p50 and Chuck confirmed the activation of NF-kB pathway in the OA chondrocytes subjected to high continuous static HP in comparison to basal condition and cyclic low HP. Moreover, the bioinformatic analysis of proteomics data revealed, specifically, in chondrocytes stimulated with high continuous static HP, specific proteins that lead to the induction of a pro-inflammatory state and oxidative stress. In contrast, under basal conditions and upon stimulation with cyclic low HP, the expression of protective proteins belonging to inflammatory pathways and associated with oxidative stress was induced.

Conclusions

Although exploratory in nature this study supports the key role of mechanical stress in the development and progression of OA. Furthermore, these data could support the selection of an appropriate physical exercise and the design of optimal rehabilitative programs for patients with OA.

P185

IMPACT OF THE SINGLE NUCLEOTIDE POLYMORPHISM T-786C OF GENE NOS3 ON CLINICAL MANIFESTATION AND CARDIOVASCULAR RISK IN PATIENTS WITH ANKYLOSING SPONDYLITIS

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Objective: To evaluate the impact of T-786C gene NOS3 polymorphism on clinical characteristics and the CVR formation in patients with AS.
Material and Methods: The study included 176 patients diagnosed with AS. Genotyping was carried out according to the polymorphism of the T-786C gene NOS3 by the polymerase chain reaction method (PCR).
Results: In AS patients with CT genotype it was detected a statistically significantly higher BASMI score (CT 5.0 [4.0; 7.0] vs. CC 4.0 [3.0; 5.0], p<0.001) and uric acid (CT 346.5 [277.0; 446.0] vs. CC 267.0 [212.0; 346.5], p=0.007). Regarding the lipid profile, no statistically significant differences were obtained in the comparison groups (total cholesterol - CC: 5.6 [4.7; 6.3] vs CT: 5.4 [4.4; 6,5], p>0,05; LDL – CC: 3.4 [2.6; 4.0] vs CT 3.5 [3.0; 4,2], p>0,05).
Patients with SNP of CC had a higher incidence of 2nd radiological stage of sacroiliitis (CT 36 (52.9%) vs. CC 72 (69.2%), p=0.031), and in the CT group – 4th radiological stages (CT 20 (29.4%) vs. CC 14 (13.5%), p=0.01). The sacroiliitis stages of the study groups differed at a statistically significant level (p=0.03). There was a higher rate of detection of 0 radiological stage of coxitis (CT 4 (5.7%) vs. CC 2 (2.9%), p=0.001), as well as 3rd (CT 14 (20.0%) vs. CC 12 (11.3%), p<0.05) and 4th radiological stage of sacroiliitis (CT 14 (20.0%) vs. CC 0 (0.0%), p<0.05). The incidence of spondylitis in the patient group was statistically significantly higher in the CT group (CT 34 (52.9%) vs. CC 20 (69.2%), p<0.001).
Detecting the CT genotype in arterial hypertension (AH) (CT 28 (50.0%) vs. CC 32 (33.3%), p<0.05) was significantly more often diagnosed, and in the group of patients with CC genotype.
Conclusion: The predictive role of the CT genotype of NOS3 2786T > C polymorphism in patients with AS was shown not only more pronounced changes in axial spine, but simultaneously increased comorbidity with AH, a key factor of CVR.

P186

ASP229GLY POLYMORPHISM OF THE TLR4 GENE AND CARDIOVASCULAR RISK IN PATIENTS WITH ANKYLOSING SPONDYLITIS

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Objective: To evaluate the contribution of the Asp229Gly polymorphism of the TLR4 gene to the course and progression of ankylosing spondylitis and conditions associated with cardiovascular risk.

Materials and Methods: The study included 176 patients diagnosed with AS. Genotyping of the Asp229Gly polymorphism of the TLR4 gene was performed using polymerase chain reaction. Results: The lowest BASMI was registered for patients with the AA genotype (AA 4.0 [3.0; 6.0] vs. AG 7.0 [5.0; 9.0] vs. GG 6.5 [5.5; 7.0], p=0.003), and AA homozygotes had the lowest CRP level (AA 6.1 [2.7; 13.5] vs. AG 23.4 [13.6; 33.2] vs. GG 21.5 [7.1; 65.0], p=0.015, p1.2=0.017. AG heterozygotes had the lowest cholesterol value (AA 5.6 [4.6; 6.5] vs. AG 3.2 [3.1; 3.4] vs. GG 5.4 [4.6; 6.7], p=0.044, p1,2=0,001, p2,3=0,004). The highest uric acid level was recorded among patients with GG homozygotes (AA 301.0 [227.0; 415.0] versus GG 426.0 [356.0; 496.0], p=0.039).

The lowest proportion of patients with spondylitis was reliably detected among AA homozygotes (AA 46 (28.7%) versus AG 2 (50.0%) versus GG 6 (75.0%), p1,3=0.005, p=0.016). When comparing the stages of sacroiliitis, carriage of the A allele was associated with a higher frequency of sacroiliitis 2 (AA 104 (65.0%) AG 2 (50.0%) GG 2 (25.0%), p1,3=0.03) and 3 radiographic stages (AA 28 (17.5%) AG 2 (50.0%) GG 0 (0.0%), p2.3=0.029). GG homozygotes had a higher proportion of patients with stage 4 radiographic stage with a small number of carriers of this genotype (AA 28 (17.5%) AG 0 (0.0%) GG 6 (75.0%), p1.3<0.001, p2.3=0.015). In general, the differences in the comparison groups were statistically significant (p=0.001).

Conclusion. Genotyping for the Asp229Gly SNP in the TLR4 gene will allow us to identify groups of AS patients with an increased risk of AS progression and the development of metabolic disorders included in the CVR factors.

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REHABILITATION IMPACT ON FUNCTIONAL STATUS IN A PATIENT WITH SPINAL CORD INJURY-RELATED OSTEOPENIA

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Objectives: To highlight the impact of cervical spinal cord injury (SCI) on bone mineral density and functional status, and to evaluate the effects of a targeted rehabilitation program in a patient with SCI-associated osteopenia.
Materials and Methods: We report the case of a 45-year-old patient with traumatic cervical SCI at C6–C7, surgically treated with metallic fixation and bone grafting (AIS B, neurological level C7). The patient was admitted for tetraparetic motor deficit, impaired standing and gait, deficits in transfers and activities of daily living (ADLs), sensory disturbances with bilateral upper-limb paresthesia, low back pain. Bone mineral density was assessed using dual-energy X-ray absorptiometry (DXA), while lumbar muscle strength and mobility were evaluated with the Tergumed system (isokinetic testing). Functional status was assessed using the Functional Independence Measure (FIM), Barthel Index, ADL scale, and pain intensity using the Visual Analog Scale (VAS). Assessments were performed at admission and discharge. The patient was hospitalized in our clinic for 14 days. The rehabilitation program included individualized physiotherapy, occupational therapy, Vojta therapy, lumbar spine–specific strengthening, therapeutic massage, and lumbar supportive therapy.
Results: DXA evaluation revealed severe osteopenia at the left hip (T-score −2.4, Z-score −2.2) and osteopenia at the lumbar spine (T-score −1.5, Z-score −1.2). Baseline assessment showed markedly reduced lumbar muscle performance and mobility, with flexion torque of 150.8

Nm, extension torque of 20.9 Nm, and limited lumbar range of motion (72° in flexion and 43° in extension). Following the rehabilitation program, improvements were observed in lumbar muscle strength (flexion increased to 160.8 Nm and extension to 25.6 Nm) as well as in lumbar mobility, with range of motion increasing to 75° in flexion and 46° in extension. Functional evaluation indicated severe dependence (FIM 60/126, Barthel Index 15/100, ADL 2/10). Pain intensity decreased from 4/10 at admission to 2/10 at discharge.

Conclusions: Cervical SCI is associated with early bone mineral density loss, particularly at the hip, contributing to pain and functional impairment. A targeted, multidisciplinary rehabilitation program may improve musculoskeletal performance, reduce pain, and support functional recovery in patients with SCI-related osteopenia, potentially lowering the risk of osteoporosis-related complications.

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EVOLVING TRENDS IN SECONDARY PREVENTION OF FRAGILITY FRACTURES: A 2025 COHORT COMPARED WITH A PRE PANDEMIC HISTORICAL COHORT

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Background: Antiosteoporotic therapy is essential in the secondary prevention of fragility fractures. Over the past decade, clinical practice has evolved with the introduction of new therapeutic options and broader use of potent agents. This study compares a contemporary cohort from 2025 with a prepandemic historical cohort, focusing on demographic and functional characteristics and, particularly, on differences in antiosteoporotic treatment strategies.

Methods: A descriptive comparison was conducted between a 2025 cohort of 258 patients with major fragility fractures and a prepandemic historical cohort of 168 outpatients with symptomatic osteoporosis. Variables analyzed included age, sex distribution, baseline functional status (Barthel Index), and antiosteoporotic treatment prescribed.

Results: The 2025 cohort was older (mean 87.5 ± 6.7 years) than the historical cohort (mean 83.36 ± 5.6 years). Both cohorts showed a predominance of women, more pronounced in the historical group (85,1% vs. 79,4%). Functional status differed substantially: the 2025 cohort exhibited greater impairment (Barthel 71.0 ± 29.6), whereas the historical cohort showed better baseline function (mean Barthel 87,4 ± 16.8). Treatment patterns also diverged. In the 2025 cohort, denosumab was the predominant therapy (75.4%), followed by teriparatide (8.6%), zoledronic acid (3.0%), abaloparatide (5.6%) and romosozumab (1.3%). In contrast, the historical cohort showed a more heterogeneous distribution, with denosumab 57.3%, oral bisphosphonates 30.2%, and teriparatide 6%. Newer osteoformers (abaloparatide, romosozumab) were not available in the prepandemic period. Calcium and vitamin D supplementation was universal in both cohorts.

Conclusions: The 2025 cohort represents an older and more functionally impaired population compared with the prepandemic historical cohort. Despite this, the contemporary cohort received more intensive antiosteoporotic therapy, with a clear predominance of denosumab and the incorporation of newer anabolic agents. Overall use of osteoformers was higher in 2025 (15,5% vs. 6%), reflecting a shift toward more potent and targeted secondary prevention strategies in modern fragility fracture care.

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FUNCTIONAL STATUS AND FRAILTY PROFILE OF A COHORT OF PATIENTS RECEIVING ANTI OSTEOPOROTIC TREATMENT IN SECONDARY PREVENTION

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Background: Secondary prevention after a major fragility fracture is essential to reduce the risk of subsequent fractures, particularly in very elderly and functionally vulnerable populations. This study describes the clinical characteristics, functional status, and antiosteoporotic treatment prescribed at discharge in a cohort of patients hospitalized for major osteoporotic fractures.

Methods: A descriptive analysis was conducted on 258 patients admitted with major fragility fractures (proximal femur fractures). Sociodemographic variables, fracture type, functional status (Barthel Index, Lawton IADL, FAC, CFS), sarcopenia screening (SARCF), nutritional assessment, and treatment at discharge were collected.

Results: The mean age was 87.53 ± 6.67 years (range 66–102), and 33.6% were admitted from longterm care facilities. Pertrochanteric fractures accounted for 38.8% of cases, subcapital fractures for 35.3%, and other fractures for 25.9%. Among 241 patients assessed for gait support, 60.6% required one or more assistive devices.

Functional assessment showed a mean Barthel Index of 71.04 ± 29.55. Attending to Lawton Index, 63.8% of our sample were dependent for 4 or more instrumental activities. Mobility evaluation according to Functional Ambulation Classification (FAC) revealed that 68.6% scored 4–5 (independent ambulators), while 31.4% scored ≤3. Frailty evaluated by the Clinical Frailty Scale (CFS) was high: 62.4% scored ≥5 (frailty from mild to severe), and 12.9% were classified as vulnerable (score 4). Sarcopenia screening (SARCF) was performed in 84.5% of the cohort, with a modal score of 4 and 14.2% showing symptoms compatible with sarcopenia. Nutritional assessment (n=190) showed that 47.4% of patients evaluated were wellnourished, 38.9% were at risk of malnutrition, and 13.7% were malnourished.

At discharge, 75.4% received denosumab, 8,6% teriparatide, 3.0% zoledronic acid, and 5.6% and 1.3% were prescribed abaloparatide and romosozumab, respectively; 6.3% recieved other therapies.

Conclusions: This cohort represents a very elderly, frail population with high functional dependence and significant prevalence of sarcopenia

and nutritional risk. Despite this complexity, most patients received antiosteoporotic therapy at discharge, with denosumab being the predominant option. These findings highlight the importance of individualized secondary prevention strategies in highrisk older adults following major fragility fractures.

P190

HIGHER BMI ASSOCIATES WITH ELEVATED VEGF, LDL, AND BLOOD PRESSURE IN RHEUMATOID ARTHRITIS

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Objective.
Evaluate the impact of high BMI on biochemical and clinical markers in rheumatoid arthritis (RA).
Material and Methods.
We studied 80 patients with rheumatoid arthritis, assessing 22 serum and clinical markers.
Results.
Women comprised 77.5% of the cohort; mean age was 53.9 years (range 18–73). BMI positively correlated with LDL (ρ=0.430; p<0.001), systolic (ρ=0.544; p<0.001) and diastolic blood pressure (ρ=0.448; p<0.001), and VEGF (ρ=0.296; p=0.008). Stepwise regression identified SBP, age, rheumatoid factor (RF), total cholesterol, and LDL as independent predictors of BMI. The Enter model explained 49.7% of BMI variance ($R=0.705$, $R^2=0.497$, p<0.001). Regression equation:
BMI = 6.820 + 0.112×SBP + 0.088×Age + 0.010×RF − 1.349×Total Cholesterol + 2.091×LDL
Collinearity was acceptable (VIF<2). Total cholesterol was paradoxically higher in participants with lower BMI (p=0.015), likely reflecting cardioprotective HDL or sample size. HDL was not a predictor of BMI (p=0.887).
Cluster analysis based on BMI and RF identified two groups (n=57 and n=23). Cluster 2, with higher BMI and RF, showed elevated VEGF (12.35 vs 11.99 pg/mL; p=0.003), hsCRP (3.63 vs 2.66 mg/L; p=0.003), SBP (144.8 vs 131.4 mmHg; p=0.006), DBP (93.0 vs 82.3 mmHg; p<0.001), and LDL (4.01 vs 2.93 mmol/L; p<0.001). Anti-cyclic citrullinated peptide antibodies were also higher, though not significantly.
Conclusions.
Higher BMI in RA patients is associated with elevated VEGF, hsCRP, LDL, SBP, and DBP. BMI correlates with LDL, blood pressure, and VEGF. Independent predictors of BMI include SBP, age, RF, total cholesterol, and LDL, highlighting the interplay between adiposity, vascular, and inflammatory parameters in RA.

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EARLY ONSET OF ANKYLOSING SPONDYLITIS FOLLOWING COVID-19 INFECTION IN AN HLA-B27 POSITIVE YOUNG PATIENT

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Objective: To report a case of early and agressive onset of ankylosing spondylitis (AS) in a young HLA-B27 positive patient following SARS-CoV-2 infection and to highlight COVID-19 as potential trigger for inflammatory rheumatic disease.
Methods: We describe the clinical presentation,laboratory findings,imaging characteristics and therapeutic management of a young patient who developed inflammatory back pain after confirmed COVID-19 infection.Clinical evaluation focused on features of inflammatory back pain and spinal mobility.Laboratory investigations included complete blood count,inflammatory markers and HLA-B27 testing. Imaging assessment was performed using radiographic examination(X-ray) and magnetic resonance imaging(MRI) of sacroiliac joints. The diagnosis was established according to the Assessment of SpodyloArthritis International Society (ASAS) classification criteria for axial spondyloarthritis. Treatment response was assessed clinically after initation of therapy.
Results: A 23-year old patient with no prior rheumatologic history presented with inflammatory low back pain,nocturnal pain and morning stiffness lasting more than 60 minutes,starting approximately 15 weeks after confirmed COVID-19 infection. The SARS-CoV-2 infection had a mild clinical course and did not require hospitalization. There was no history of peripheral arthritis,psoriasis,uveitis or inflammatory bowel disease. Laboratory evaluation revealed elevated inflammatory markers ,including erythrocyte sedimentation rate of 45 mm/h,C-reactive protein of 139 mg/L and fibrinogen level of 540 mg/dl. HLA-B27 testing was positive,while other autoimmune serologies were negative. X-ray of the sacroiliac joints demonstrates some structural damages and MRI of the sacroiliac joint demonstrated active inflammation, bilateral sacroiliitis,partial fusion of the sacroiliac bones ,consistent with advanced ankylosis.
Initial treatment with nonsteroidal anti-inflammatory drugs ,Methotrexate and physical therapy was insufficient. Due to persistently high disease activity ,biological therapy(Etanercept) was initiated,resulting in clinical improvement.
Conclusions: This case suggests a possible association between COVID-19 infection and the early,aggressive onset of ankylosing spondylitis in genetically predisposed young patients. Persistent inflammatory back pain following SARS-CoV-2 infection should prompt early rheumatologic evaluation and timely initation of appropriate therapy to limit disease progression.
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P192

DELAYED DIAGNOSIS OF CLASSICAL HOMOCYSTINURIA PRESENTING WITH CEREBRAL VENOUS THROMBOSIS AND VERTEBRAL FRACTURES

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Homocystinuria (HCU; OMIM #236200) is a rare autosomal recessive disorder caused by a deficiency of the enzyme cystathionine β-synthase (CBS). This genetic defect leads to impaired methionine metabolism with elevated levels of homocysteine and methionine in the blood and urine. Clinical manifestations are variable and include damage of the nervous system (developmental delay, intellectual impairment), visual system (ectopia lentis, myopia), skeletal system (osteoporosis, skeletal abnormalities), as well as life-threatening thromboembolic complications. Diagnosis is based on the detection of hyperhomocysteinemia and confirmed by identifying pathogenic mutations in the *CBS* gene.
Objective: To present a clinical case of late-diagnosed HCU complicated by cerebral venous thrombosis and severe osteoporosis with pathological vertebral fractures.
Case report: At the age of 8 years and 5 months, a female patient with previously diagnosed pectus carinatum and progressive high-grade myopia suddenly developed focal neurological symptoms. Examination revealed cerebral venous thrombosis, significant hyperhomocysteinemia (275 μmol/L), and bilateral lens subluxation. Two months later, back pain manifested. Dual-energy X-ray absorptiometry showed low bone mineral density in the lumbar spine (Z-score -3.6 SD). MRI revealed multiple compression fractures of the vertebrae (T12, L1-L3). Molecular genetic analysis identified compound heterozygous pathogenic variants in the *CBS* gene: c.833T>C (p.Ile278Thr) and c.1498_1499del (p.Ser500AlafsTer38), which definitively confirmed the diagnosis of classical HCU.
Conclusion: This case demonstrates that delayed diagnosis of classical HCU leads to severe complications: thrombosis and osteoporosis. The key diagnostic clue is an unexplained combination of ophthalmological, neurological, and skeletal disorders, necessitating homocysteine level testing. Early pathogenetic therapy and multidisciplinary follow-up are essential for improving the prognosis.

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GERODERMA OSTEODYSPLASTICUM: A RARE CAUSE OF SEVERE OSTEOPOROSIS AND VERTEBRAL FRACTURES IN A CHILD

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Geroderma osteodysplasticum (GO; OMIM#231070) is a rare autosomal recessive connective tissue disorder caused by mutations in the *GORAB* gene. Its distinctive features include congenital wrinkled, lax skin and severe osteoporosis leading to pathological fractures.
Objective: To analyze the phenotype and features of bone complications (osteoporosis, pathological fractures) in a 17-year-old female patient with GO, discussing key diagnostic aspects through a clinical case presentation.
Case report: Since birth, the patient presented with the characteristic GO features: wrinkled skin, joint hypermobility, congenital hip dislocation, and foot deformities. Her first low-energy fracture (tibia) occurred at 4 months of age. By 15 years of age, her history included multiple low-energy fractures affecting the tibia, femur, and digital phalanges. Spinal pain manifested at age 11. MRI revealed a grade I compression fracture of T12 and wedge deformities of the T10-L2 vertebral bodies. At the age of 17, whole genome sequencing identified compound heterozygous pathogenic variants in the *GORAB* gene: c.332del (p.Pro111fs) and c.631_632del (p.Lys211fs), confirming the diagnosis of HO. Laboratory evaluation at our clinic at age 17 showed normal calcium-phosphate metabolism parameters and bone turnover markers. Dual-energy X-ray absorptiometry (DXA) revealed a lumbar spine BMD Z-score of -1.7 SD and a total body (excluding the head) BMD Z-score of -1.3 SD. Follow-up MRI confirmed an old grade III compression fracture of T12 and grade I wedge deformities of L1-L2 (according to Genant). Bisphosphonate therapy (pamidronic acid) was initiated.
Conclusion: This clinical case demonstrates a key paradox of GO: the development of multiple low-energy and compression fractures of the spine in childhood with borderline BMD values. This indicates a primary impairment in the quality (microarchitecture) of bone tissue, not just its mineral density. This case highlights the need for a comprehensive fracture risk assessment (including spinal MRI) and the importance of genetic testing for the verification of GO in patients with severe osteoporosis and a dysplastic phenotype.

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RISK FACTORS FOR OSTEOPOROSIS AND FRACTURES IN RHEUMATOID ARTHRITIS PATIENTS

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Objective: Osteoporosis as a major extra-articular complications of RA, not only increasing the risk of fractures but also impairing functional capacity, quality of life, and life expectancy. The purpose of this investigation was to determine risk factors for osteoporosis (OP) in patients with rheumatoid arthritis (RA).
Matherial and Methods: We recruited 200 RA patients from the Clinic for heart, blood vessels and rheumatic disease of the University Clinical Center in Sarajevo treated between December 2023 to December 2025 with bone mineral density (BMD) results. Participants were categorized into osteoporosis or osteopenia, and normal groups based on lumbar spine or hip bone mineral density (BMD) T-scores. The data were collected from medical records of each patients and association between osteoporosis and related risk factors were recorders. The differences were tested using chi-square and Mann –Whitney tests. The level of statistical significance was set at $p<0,05$.
Results: In this study population 188 women (94%) and 12 men (6%), the mean age of the patients was 58,73±8,56 years, and 76 patients (38%) were in the osteoporotic group (T score ≤-2,5 SD in L2-L4 in the lumbar spine or in the femoral neck). The patients were significant older in the group with RA 62,12±9,52 years, compared to patients without

RA, 55,35±7,63 (p<0,01). RA patients with osteoporosis had a higher frequency of fractures in 28 patients (14%) than those in other group especially fractures of the femur (p<0,01).The average BMI of the patients with RA was significantly lower 28,93±8,32 compared to patients without RA (33,36±4,86) (p<0,05).The patients with low BMD had significantly older age and longer period for corticoids usage.

Conclusion This study reveals female, age, postmenopausal status, low BMI, longer period of corticosteroid usage as major risk factors for osteoporosis in rheumatoid arthritis.

Keywords: rheumatoid arthritis, osteoporosis, fractures, bone mineral density, risk factors of osteoporosis

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PATIENT SUPPORT ACTIVITIES BY HEALTHCARE PROFESSIONALS IN OSTEOPOROSIS CARE

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Objective

Low persistence with osteoporosis treatment remains major issue in clinical practice. This study aimed to characterize and classify osteoporosis-related support activities conducted by healthcare professionals involved in osteoporosis care in Japan.

Material and Method

Subjects were healthcare professionals (nurses, pharmacists, physical therapists, etc., excluding physicians) working at orthopedic facilities in Japan, being involved in patient instruction for self-injectable osteoporosis medications within previous 3 months. Anonymous web-based questionnaire survey was conducted to assess implementation status of six support activities defined as important for treatment continuity: In-hospital training, Patient education, Patient communication, Patient list management and follow-up scheduling, Inter-professional collaboration, and promoting follow-up visits. Scores for each activity were standardized, and cluster analysis was performed based on these scores.

Results

A total of 1,053 healthcare professionals responded, including 891 nurses and 66 pharmacists and others. Cluster analysis with heatmap visualization classified respondents into five clusters: Cluster 1 (high implementation of all activities, 23.7%); Cluster 2 (limited Patient list management and follow-up scheduling, with other activities implemented, 16.4%); Cluster 3 (limited Inter-professional collaboration, with other activities implemented, 27.5%); Cluster 4 (limited Patient education and Patient communication, 17.0%); and Cluster 5 (low implementation of most activities, 15.4%).

Conclusion

This study revealed that support activities by healthcare professionals in osteoporosis care in Japan was classified into several characteristic patterns across institutions. These activities can be categorized into “building in-hospital system” and “direct patient-centered approaches”. These findings provide a useful framework for understanding institutional strengths and gaps in osteoporosis support and provides a basis for future research examining the association between support activities and treatment persistence.

Disclosures

This study was conducted in collaboration with Asahi Kasei Pharma Corporation.

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CHALLENGES IN SARCOPENIA SCREENING IN KNEE OSTEOARTHRITIS: INTERPRETING SARC-F AND FUNCTIONAL TEST FINDINGS

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Objective: The study aimed to determine whether knee osteoarthritis (KOA) confounds SARC-F screening results, functional performance, and muscle mass assessment, and to evaluate their clinical utility for SP diagnosis for this population.

Methods: A total of 176 women were enrolled: 83 females (control group) without any musculoskeletal disorders (mean age 65.1±7.5 years) and 93 patients with KOA grade 2–3 (Kellgren–Lawrence; mean age 64.9±6.5 years). SP risk was screened using the SARC-F questionnaire. Muscle strength was assessed by handgrip dynamometry and the sit-to-stand test. Muscle mass was measured by whole-body DXA using appendicular lean mass (ALM) and ALM index (ALMI) for calculation.

Results: The groups did not differ in age, height, or waist/hip circumferences. However, women with KOA had higher body weight and BMI (p<0.001). Analysis of SARC-F questions showed a strong association between KOA and difficulty climbing 10 stairs: 50% of patients with KOA reported severe difficulty/inability to perform this test vs 4.6% of controls (p<0.0001), while 4.6% of subjects with KOA reported no difficulty climbing 10 stairs vs 36.2% of controls.

Responses to other questions of the SARC-F questionnaire did not differ significantly between groups, as did the total score of the SARC-F questionnaire. Failure to perform the sit-to-stand test (≥15 sec) was confirmed in 37.5% of subjects with KOA and 16.7% of women of the control group (p=0.0009). Handgrip strength indices did not differ significantly between the groups. Additionally, low ALM and low ALMI rates were similar in both groups.

Conclusion: As SARC-F results do not differ in patients with KOA, it appears suitable for SP screening in this population. The sit-to-stand test may have limited diagnostic value in subjects with KOA and requires further validation. Stair-climbing difficulty appears to be disease-specific, does not affect SARC-F results, and reflects load-bearing joint involvement in KOA.

Disclosures: The authors declared no competing interests.

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PIGMENTED VILLONODULAR SYNOVITIS IN THE GLENOHUMERAL JOINT: A RARE BUT AGGRESSIVE ENTITY

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Objective(s)
To share our clinical experience in diagnosing and managing pigmented villonodular synovitis (PVNS) of the shoulder, highlighting early detection, diagnostic challenges, and individualized treatment strategies.
Material and Methods
A 63-year-old woman presented with progressive right shoulder pain for seven months, without a history of trauma. Initial imaging suggested subacromial pathology: ultrasound demonstrated a full-thickness retracted supraspinatus tear associated with marked joint effusion, while radiographs showed an increased subacromial space. Diagnostic and therapeutic shoulder arthroscopy was performed, revealing diffuse brownish synovial proliferation highly suggestive of PVNS. Histopathological analysis confirmed the diagnosis. An extensive arthroscopic synovectomy combined with rotator cuff repair was undertaken.
Results
Early postoperative evolution was favorable, with pain reduction and functional improvement. However, symptoms recurred six months later. One year after the initial diagnosis, radiographs revealed progressive glenohumeral joint space narrowing and advanced arthropathy. Given the structural deterioration and persistent symptoms, reverse total shoulder arthroplasty was indicated. Intraoperatively, residual PVNS was identified and excised. Postoperatively, the patient experienced rapid pain relief and progressive functional recovery, with satisfactory short-term outcomes.
Conclusions
PVNS is a rare, benign but locally aggressive synovial disorder, most frequently involving the knee (≈80%), with shoulder localization accounting for only 1–2% of cases. Diagnosis relies on clinical suspicion, MRI findings (classically T2 hypointense areas due to hemosiderin deposition) and histopathological confirmation showing hyperplastic synovium with multinucleated giant cells and hemosiderin-laden macrophages. Complete synovectomy remains the first-line treatment; however, diffuse forms are associated with recurrence rates ranging from 20% to 40%. Adjuvant therapies such as radiotherapy or targeted biologic agents (e.g., infliximab, pexidartinib) may be considered in recurrent or unresectable cases. Arthroplasty combined with synovectomy is indicated in the presence of severe joint destruction.
In our case, the clinical interest lies in the uncommon shoulder localization of PVNS and its aggressive evolution despite early arthroscopic management. Progressive glenohumeral arthropathy ultimately required reverse total shoulder arthroplasty, which provided effective pain relief and functional improvement.
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DISLOCATION AND MORTALITY AFTER HEMIARTHROPLASTY: UP TO 7-YEAR FOLLOW-UP OF A RANDOMIZED TRIAL AND A TARGET TRIAL EMULATION COMPARING THE DIRECT LATERAL AND POSTEROLATERAL SURGICAL APPROACH

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Background
The APOLLO trial reported a higher incidence of dislocation after hemiarthroplasty with the posterolateral approach (PLA) than with the direct lateral approach (DLA) at 6-month follow-up. Whether DLA is associated with long-term disadvantages, such as impaired mobility and potential effects on mortality, remains uncertain and requires longer follow-up and larger sample sizes. We therefore performed a target trial emulation using nationwide registry data, with APOLLO as the target trial.
Methods
We emulated the APOLLO trial using the Dutch Arthroplasty Register, including all adults who underwent hemiarthroplasty for hip fracture between 2018 and 2022 in ten hospitals participating in APOLLO. Eligibility criteria, treatment strategies (DLA vs. PLA), follow-up, and outcome definitions were highly similar to the original trial. Outcomes were revision (all-cause and for dislocation) and all-cause mortality, assessed up to 7 years after hemiarthroplasty.
Results
APOLLO included 843 patients (49% DLA, 51% PLA); the emulated cohort comprised 14,386 procedures (46% DLA, 54% PLA). Revision for dislocation was more frequent after PLA in both datasets (APOLLO: 2.0% vs. 0%; emulation: 1.1% vs. 0.5%). Revision for any reason was also more frequent after PLA (APOLLO: 5.1% vs. 4.2%; emulation: 3.2% vs. 2.3%). ASA scores and all-cause mortality were higher in the emulated cohort than in the target trial, with no meaningful differences between approaches. Two-year mortality was 29.5% after DLA and 29.9% after PLA in the APOLLO trial, and 35.4% and 35.6%, respectively, in the emulation cohort. With longer follow-up, absolute differences in mortality between DLA and PLA increased slightly in favor of DLA, but no statistically meaningful differences were observed.
Conclusions
Neither the target trial nor the emulation revealed long-term disadvantages of DLA in terms of revision or all-cause mortality. These findings support the use of DLA in hemiarthroplasty for hip fracture.

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PREDICTORS FOR FALLING WITHIN SIX MONTHS AFTER SURGERY IN PATIENTS WITH HEMIARTHROPLASTY AFTER AN ACUTE FEMORAL NECK FRACTURE

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Background
For patients who underwent hip hemiarthroplasty, usually due to a femoral neck fracture from a fall, subsequent falls can have life-threatening consequences. This study identified predictors for falling in patients from a clinical trial comparing the direct lateral and posterolateral approach.
Methods
Patients were included if they participated in the APOLLO trial. This secondary analysis divided patients into 'fallers' during 6 months follow-up, 'non-fallers,' and 'unknown.' Two logistic regression analyses were conducted: one using variables collected pre-surgery and one using variables available at discharge. The outcome variable 'fallen within 6 months after hemiarthroplasty' was dichotomous.
Results
Among the patients with known fall status, 219 (48%) fell one or more times and 240 (52%) were non-fallers. Fall status was unknown for 384 (46%) of the 843 APOLLO trial participants. Falling was associated with five pre-surgery variables: impaired mobility, ADL difficulties, neurological and pulmonary comorbidities, and dementia. At discharge, falling was associated with impaired mobility, ADL difficulties, and in-hospital complications. The pre-surgery model had an R^2 of 0.217 and an Area Under the Curve (AUC) of 0.730 (95% CI 0.7-0.8), while the discharge model had an R^2 of 0.216 and an AUC of 0.709 (95% CI 0.7-0.8). Both models showed moderate predictive ability for falling.
Conclusions
This study highlights the substantial incidence of falls after hemiarthroplasty for femoral neck fractures and identifies predictors for falling within six months. In-hospital complications emerged as a novel discharge-time predictor and represent a potentially modifiable target for fall prevention. The multidisciplinary team should prioritize fall prevention, and future research should validate prediction models and assess whether fall prevention strategies can effectively reduce falls.

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IS THE PHYSICAL PERFORMANCE OF PATIENTS INFLUENCED BY THE SURGICAL APPROACH OF HEMIARTHROPLASTY AFTER A FEMORAL NECK FRACTURE?

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Background

After a hip fracture, patients are at increased risk of recurrent falls and related injuries. Postoperative physical performance is an important determinant of this risk. This study evaluated whether surgical approach influences postoperative physical performance after cemented hemiarthroplasty for femoral neck fractures.
Methods

The study population was a subsample of a prospective nationwide multicenter randomized controlled trial comparing the direct lateral approach (DLA) and the posterolateral approach (PLA) after hemiarthroplasty. Physical performance was assessed 3–4 months postoperatively using the Short Physical Performance Battery (SPPB; range 0–12, higher scores indicate better performance). Secondary outcomes included fear of falling measured with the Falls Efficacy Scale–International (FES-I; range 16–64) and fall-related emergency room visits. Trial registration: NCT04438226.
Results

Seventy patients were included (35 DLA, 35 PLA). Mean SPPB score was 6.6 (SD 2.9) after DLA and 7.6 (SD 3.0) after PLA, corresponding to a mean difference of 1.03 points on the 12-point SPPB scale (95% CI −0.37 to 2.48). No statistically significant difference was observed in total SPPB score. Gait speed was faster after PLA compared with DLA (median 4.06 vs. 4.53 seconds, p=0.035). Fear of falling at 3 months was higher after DLA than after PLA (mean FES-I score 35.9 vs. 26.9, p<0.05). No between-group difference was observed in fall-related emergency room visits during follow-up.
Conclusion

Although no statistically significant difference was observed in overall physical performance, patients treated with PLA showed faster gait speed and lower fear of falling. The observed difference of approximately one point on the SPPB may be clinically relevant for early functional recovery after hip fracture.

P201

PHOSPHATURIC MESENCHYMAL TUMOR LOCALIZATION USING GA-68-DOTATATE PET/CT

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INTRODUCTION
Oncogenic osteomalacia, also known as tumor-induced osteomalacia (TIO), is an uncommon paraneoplastic syndrome characterized by hypophosphatemia resulting from phosphaturic mesenchymal tumors (PMT) that secrete elevated levels of fibroblast growth factor 23 (FGF23). Conventional imaging techniques have demonstrated limited efficacy in localizing FGF23-secreting tumors. This report examines the diagnostic utility of Gallium 68-DOTATATE PET/CT (Ga-68-DOTATATE) in the localization of PMT.
METHODS
A prospective recruitment and retrospective chart review was performed

involving 34 patients with suspected TIO who underwent Ga-68-DOTATATE imaging between 2017 and 2025. Imaging findings were correlated with histopathology and/or clinical follow-up to establish the final diagnosis.
RESULTS
The most frequently reported presentations were insufficiency fractures (56%) and muscle and bone pain (50%). The median phosphorus level at presentation was 1.7 mg/dL (IQR 1.4–2.1 mg/dL). All participants exhibited normal serum calcium (IQR 8.9–9.6 mg/dL), with a median parathyroid hormone (PTH) level of 62 pg/mL (IQR 58–137 pg/mL). Median intact FGF23 concentration was 325.5 pg/mL (IQR 102.75–803 pg/mL). The median interval from symptom onset to TIO diagnosis was 2.5 years.
Patients underwent an average of two prior imaging modalities before Ga-68-DOTATATE, including whole-body sestamibi scans, octreotide scans, MRI, and FDG-PET CT. Ga-68-DOTATATE successfully identified a PMT in 19 cases, with a mean SUVmax of 16.8 (±10.9). The sensitivity, specificity, and accuracy of Ga-68-DOTATATE were 86.4%, 83.3%, and 85.3%, respectively. Multivariable analysis indicated that the presence of DOTATATE-avid fractures was significantly associated with a localizing scan (OR 9.45, 95% CI 1.33–98.4, p=0.003).
CONCLUSION
Ga-68-DOTATATE demonstrates high accuracy for PMT localization and offers superior sensitivity when compared to FDG PET/CT. It may be considered as a first-line modality for localizing lesions in patients with TIO. Timely diagnosis facilitates the prevention of chronic hypophosphatemia consequences and enables curative intervention. Although DOTATATE-avid fractures can result in false positives, they may also correlate with a greater likelihood of obtaining a localizing scan.

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DECREASED KIDNEY FUNCTION IS ASSOCIATED WITH LOWER L1 DENSITY ON OPPORTUNISTIC COMPUTED TOMOGRAPHY: COMPARISON OF DIFFERENT CLINICALLY AVAILABLE TOOLS

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Introduction
Chronic kidney disease–mineral and bone disorder (CKD-MBD) patients have different outcomes compared to common osteoporosis patients, and reliable diagnostic tools for determining prognosis and guiding therapy are not clearly established. Measurement of bone density from opportunistic computed tomography (CT) is a promising novel diagnostic tool.
Objective
Comparison of different clinically available bone parameters: areal bone mineral density (aBMD), trabecular bone score (TBS), 3D-densitometry (3D-DXA) and density of L1 vertebral body from opportunistic CT across CKD subjects defined by estimated glomerular filtration rate (eGFR).
Material and Methods
A cross-sectional study of all subjects that underwent a CT scan including the L1 vertebra, DXA and eGFR measurements (within 6 months interval) between years 2020-2025. The associations between eGFR and bone parameters: CT density of L1 vertebra, BMD at lumbar spine, neck and total femur, trabecular bone score (TBS) and 3D DXA, where trabecular and cortical volumetric BMD, surface BMD and cortical thickness were assessed. Patients were analysed within specific CKD stages and division of eGFR quartiles was done.
Results
From a total number of abdominal and thoracic CTs (n=29473), of which 280 subjects also underwent DXA, a total number of 134 patients who had all DXA parameters available in both the femur and the lumbar spine, eGFR measurement and a fully accessible L1 vertebra body for on the CT, were analysed. From those, 98 were women (73,1%) and 36 men (26,9%), with median age 66 years. Among all bone parameters, L1 CT density showed a significant difference, between Q1 (mean 145,6 HU) and Q4 (median 92,2 HU, p=0,004). Associations between CT L1 density (Spearman ρ=0,308, p=0,0009), BMI (Spearman ρ=-0,26, p=0,0048), age (Spearman ρ=-0,509, p<0,0001) and eGFR were observed. No difference in discrimination between CKD stages or quartiles when adjusted for age and BMI was observed.
Conclusion
This study shows significant association between eGFR and L1 body CT density which is stronger than DXA parameters. Although the association was significantly influenced by age and BMI, what is clearly a limitation, as well as small sample size, opportunistic CT shows a rich and underutilised source of diagnostic data and warrants further investigation.

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POST-DISCHARGE OUTPATIENT BALANCE TRAINING PROVIDES COMPARABLE FUNCTIONAL RECOVERY TO EARLY INPATIENT TRAINING AFTER FRAGILITY HIP FRACTURE SURGERY

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Objectives: Postoperative rehabilitation after fragility hip fractures is essential for recovery, and beyond early mobilization, intensive balance training may further improve functional outcomes. However, evidence comparing the optimal timing and setting of intensive balance training remains limited. This study aimed to compare functional outcomes in patients undergoing fragility hip fracture surgery who received early intensive inpatient balance training versus outpatient balance training after hospital discharge.
Material and Methods: This retrospective cohort study included patients aged ≥60 years who underwent surgery for fragility hip fractures, including intertrochanteric and femoral neck fractures. Patients were classified according to rehabilitation pathway: an inpatient group initiating intensive balance training during hospitalization and an outpatient group receiving a comparable program after discharge. Functional recovery was assessed using the Barthel Index at baseline (postoperative) and at 1, 3, and 6 months. Longitudinal outcomes were analyzed using multilevel Gaussian models accounting for repeated measures, with adjustment for age, sex, body mass index, Charlson Comorbidity Index, baseline functional status, and surgical variables. Predictive margins

and adjusted mean differences were estimated. Secondary outcomes included the EuroQol visual analogue scale (EQ-VAS) and postoperative ambulatory status.
Results: Of 85 eligible patients, 3 were excluded, leaving 82 for analysis: 39 in the inpatient group (47.6%) and 43 in the outpatient group (52.4%). Barthel Index scores improved over time in both groups, and predictive margins demonstrated progressive recovery across follow-up. In crude analysis, inpatient rehabilitation was associated with an 11.2-point higher Barthel Index than outpatient rehabilitation (95% CI 2.3 to 20.1). After adjustment, the mean difference decreased to 4.5 points (95% CI −3.5 to 12.6) and was not statistically significant (p>0.05). EQ-VAS and ambulatory status were also not significantly different between groups.
Conclusion: Intensive outpatient balance training after hospital discharge achieved functional recovery comparable to early intensive inpatient balance training. These findings suggest that outpatient balance training may be a resource-efficient alternative while maintaining patient outcomes and potentially reducing hospital utilization.

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PREHOSPITAL DELAY IS ASSOCIATED WITH INCREASED 1-YEAR MORTALITY AFTER FRAGILITY HIP FRACTURE SURGERY

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Objectives: Timely management of fragility hip fractures is essential, as treatment delays are associated with adverse outcomes. Although time to surgery after hospital admission has been widely studied, the effect of the prehospital phase, defined as the interval from injury to hospital arrival, remains less well established. This study aimed to evaluate the association between prehospital timing and postoperative outcomes in older adults with fragility hip fractures.
Material and Methods: This confirmatory prognostic factor study used a retrospective cohort design. Patients aged ≥60 years with fragility hip fractures (intertrochanteric or femoral neck fractures) who underwent surgical intervention were included. Patients were categorized into a delayed-arrival group (>24 hours) and a control group (≤24 hours). Outcomes included postoperative complications, length of hospital stay, and mortality at 30 days and 1 year. Statistical analyses included exact tests, t-tests, and adjusted risk regression models to account for potential confounders.
Results: A total of 393 patients were included, of whom 61 (15.5%) experienced prehospital delays >24 hours and 332 (84.5%) arrived at the hospital within 24 hours. Postoperative complications occurred in 44.1% of the delayed group and 50.7% of the control group (adjusted risk ratio 0.87, 95% CI 0.64 to 1.17, p=0.059). Length of hospital stay was not significantly different between groups (mean difference -0.73 days, 95% CI -1.63 to 0.17, p=0.112). Similarly, 30-day mortality was comparable between groups (1.74% vs 3.21%, p=0.437). In contrast, 1-year mortality was significantly higher in the delayed group (29.3% vs 17.4%, p=0.049).
Conclusions: Prehospital delays exceeding 24 hours were associated with a significantly increased risk of 1-year mortality in older adults with fragility hip fractures, despite no significant differences in short-term complications or 30-day mortality. These findings underscore the importance of early hospital presentation after injury to improve long-term survival outcomes.

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WHAT ARE THE PREDICTIVE FACTORS OF A GOOD RESPONSE TO ANTI-TNFA THERAPY IN PATIENTS WITH SPONDYLOARTHRITIS?

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Introduction:
Spondyloarthritis (SpA) encompasses a group of chronic inflammatory rheumatic diseases that primarily affect the axial skeleton, but also involve the entheses and peripheral joints. The aim of this study was to identify the sociodemographic, clinical, and paraclinical factors associated with a good response to anti-TNFα therapy in patients with SpA.
Materials and Methods:
This was a retrospective, descriptive, and analytical study including patients with SpA, regardless of the clinico-radiological phenotype, who received anti-TNF therapy for more than six months. Sociodemographic, clinical, biological, and radiological data were collected. The clinico-biological therapeutic response was assessed using the ASDAS-ESR score at baseline, 6 months, and 12 months. A p-value < 0.05 was considered statistically significant.
Results:
Fifty-five patients were included, with a mean age of 48.3 ± 10.8 years [28–69] and a male predominance (M/F = 1.39). The mean age at symptom onset was 32 ± 10 years [19–56], at diagnosis 36 ± 10 years [19–60], and at initiation of biologic therapy 44 ± 10 years [21–67]. The median disease duration before starting biologic therapy was 17 years [2–49]. Four patients (7.2%) reported a family history of SpA.

Regarding disease phenotype, 41 patients (74.5%) had primary axial and radiographic ankylosing spondylitis, 7 (12.7%) had psoriatic arthritis, and 7 (12.7%) had SpA associated with inflammatory bowel disease (5 cases of Crohn's disease and 2 of ulcerative colitis). Coxitis was identified in 38.2% of cases (n = 21) and uveitis in 14.5% (n = 8). HLA-B27 was positive in 65.5% of patients (n = 36).

As for biologic treatment, 26 patients (47.3%) received infliximab, 11 (20%) adalimumab, 10 (18.2%) certolizumab, 6 (10.9%) etanercept, and 2 (3.6%) golimumab. The mean ASDAS-ESR values before initiation of biologic therapy, at 6 months, and at 12 months were 3.2 ± 0.7, 2.4 ± 0.6, and 2.3 ± 0.8, respectively.
No significant correlation was found between the decrease in ASDAS-ESR scores at 6 and 12 months and age, sex, educational level, smoking status, disease duration, SpA phenotype, HLA-B27 or antinuclear antibody positivity. However, a high body mass index (BMI) was correlated with significantly higher ASDAS-ESR scores at 6 and 12 months (p = 0.015 and 0.02, respectively) compared to patients with normal weight, while higher baseline CRP and ESR levels predicted a better response to anti-TNFα therapy at 6 and 12 months (p = 0.003 and 0.004).
Conclusion:
High baseline CRP and ESR levels appear to be potential predictive markers of a good response to anti-TNFα therapy, whereas a high BMI was associated with reduced therapeutic efficacy.

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INDOMETHACIN-INDUCED GRANULOMATOUS HEPATITIS: A RARE BUT REAL CASE

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Introduction

Granulomatous hepatitis is a rare histopathological entity with various etiologies, characterized by the presence of epithelioid and giant-cell inflammatory granulomas within the liver tissue. Although drug-induced causes are uncommon, they should be considered after excluding other etiologies. We report here a rare case of granulomatous hepatitis secondary to indomethacin use in a patient followed for ankylosing spondylitis (AS).

Case Description

Mrs. F, 65 years old, diabetic, has been followed for AS with bilateral coxitis since 2010, treated with non-steroidal anti-inflammatory drugs (NSAIDs), specifically indomethacin at a dose of 100–150 mg/day. Due to persistent disease activity (ASDAS-CRP = 3.4; BASDAI = 6.2; Lequesne index (hips) = 11), initiation of biological therapy was considered.

Pre-therapeutic workup revealed significant biological inflammation (ESR = 120 mm/h, CRP = 100 mg/L, serum protein electrophoresis showing polyclonal hypergammaglobulinemia) and moderate cholestasis (GGT and ALP approximately twice the normal value without cytolysis). Infectious workup (tuberculosis screening, viral hepatitis serologies, Wright test, syphilis and toxoplasmosis serologies) was negative.

Thoraco-abdomino-pelvic (TAP) CT scan showed homogeneous hepatosplenomegaly without portal hypertension. Antinuclear antibodies (ANA) were positive (titer: 1/160), while anti-smooth muscle (anti-SMA), anti-SLA, and anti-LKM1 antibodies were negative. Liver biopsy revealed a portal and periportal lymphocytic infiltrate with non-caseating epithelioid granulomas, without giant cells. Histological examination confirmed the absence of fibrosis, cirrhosis, or malignant tumor cells.

Given this histological pattern of granulomatous hepatitis, primary biliary cholangitis (PBC) was considered, but antimitochondrial antibodies, anti-gp210, and anti-sp100 antibodies were negative. Sarcoidosis was also suspected, but phosphocalcic balance was normal, the TAP scan showed no lymphadenopathy or pulmonary infiltrates, and angiotensin-converting enzyme levels were normal.

Drug-induced etiology was suspected due to chronic high-dose indomethacin use as self-medication. Indomethacin was discontinued, resulting in a progressive normalization of GGT and ALP levels, with complete normalization after 4 months. Pharmacovigilance investigation identified indomethacin as responsible for the hepatic injury. The patient was subsequently started on secukinumab 150 mg/month, achieving satisfactory control of her rheumatologic disease (ASDAS-CRP = 2.2) and stable liver function tests.

Conclusion

Granulomatous hepatitis is associated with a heterogeneous group of conditions, primarily including primary biliary cholangitis, tuberculosis, sarcoidosis, and hepatitis B and C. Drug-induced cases, particularly related to NSAID use, are rare and often facilitated by self-medication exceeding recommended doses and duration, highlighting the crucial importance of therapeutic education.

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PREVALENCE OF ANTINUCLEAR ANTIBODIES AND CORRELATION WITH CLINICAL ACTIVITY IN RHEUMATOID ARTHRITIS

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Introduction : Rheumatoid arthritis (RA) is a systemic autoimmune disease primarily affecting the joints. Although specific autoantibodies such as rheumatoid factor (RF) and anti-citrullinated peptide antibodies (ACPA) are well characterized, antinuclear antibodies (ANAs)—traditionally associated with connective tissue diseases—are frequently detected in isolated RA. their exact prevalence and clinical and prognostic value in this disease remain poorly defined. The aims of this study were to determine the prevalence and characteristics of ANAs in RA and to evaluate their association with disease activity.

Patients and Methods : We conducted a retrospective, descriptive, and analytical study including RA patients according to the 2010 ACR–EULAR criteria, after excluding any associated connective tissue diseases. Demographic, clinical, and biological data (RF, ACPA, and ANAs by indirect immunofluorescence on HEp-2 cells) were collected. Disease activity was assessed using DAS28 score. A value of $p<0.05$ was considered statistically significant.

Results : A total of 140 patients were included, with a mean age of 51 ± 14 years and a sex-ratio F/M of 3. The median duration of the disease was 11 years[1-35]. RF was positive in 80% of patients (n=112), with a mean level of 354±120 IU/mL and ACPA in 60% (n=84), with a mean level of 74.8±25 IU/mL. RA was erosive with radiographic carpal involvement in 98.5% (n=138). All patients were receiving methotrexate at a mean dose of 14.8±3.4 mg/week. NSAIDs and corticosteroids were used in 98% and 84%, respectively. The mean DAS28-CRP was 4.1±0.9 and the DAS28-VS was 4.9±1.1. ANAs were positive in 62.1% (n=87), with titers ranging from 1:160 (15.7%) to 1:1280 (9.2%). Speckled fluorescence was most frequent (88.5%). All ANA+ patients were anti-dsDNA negative. Among 40 ANA+ patients tested for extractable nuclear antigens, 15% were positive, mainly anti-SSA (38%), anti-Ro52 (38%) and anti-SSB (19%). ANA+ patients showed a non-significant trend toward higher DAS28 (OR=1,94 ; p=0,09).

Conclusion : Our study demonstrated that ANAs positivity is common in RA without associated connective tissue diseases, reflecting a broader autoimmune profile. However, their presence was not significantly associated with higher disease activity, indicating that ANAs do not appear to be a reliable prognostic marker in RA.

P208

PREVALENCE OF HYPERCALCEMIA AND HYPOCALCEMIA IN HIGH-RISK GROUPS IN THE RUSSIAN FEDERATION

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Objectives: Assess prevalence of hyper- and hypocalcemia in high-risk of osteoporosis and low-energy fractures groups.
Material and methods: We conducted a blood calcium screening analysis using data obtained from primary healthcare facilities across six regions of the Russian Federation between November 2024 and June 2025. The study targeted individuals aged 50 years and older, women included in the study were in menopause. Patients enrolled the study during routine preventive check-ups and health screenings. Measurements included total calcium and albumin levels. Laboratory tests were performed at the participating healthcare facilities.
Results: Among 11,830 screened individuals the overall prevalence of calcium metabolism disorders was 29.1%. Hypercalcemia was detected in 3.3% of participants, while hypocalcemia was present in 25.8%. Hypercalcemia was more frequent in women (3.5%) compared to men (2.7%), whereas hypocalcemia was higher in men (28.0% vs. 25.0% in women). The prevalence of both hyper- and hypocalcemia exceeded the average in older age groups: among individuals aged 70–79.9 years, elevated albumin-corrected calcium was found in 3.9% and decreased levels in 28.3%; in those over 80, elevated albumin-corrected calcium was found in 6.6% and decreased levels in 26.8%. Gender-specific analysis showed the highest hypercalcemia rates in individuals over 80 years (women 7.2%, men 4.9%), while hypocalcemia peaked in the 70–79.9-year age group (women 27.4%, men 31.2%).
Conclusions:
Calcium metabolism disorders are clinically significant and highly prevalent: both hyper- and hypocalcemia are often secondary to serious underlying conditions and can lead to life-threatening complications. However, epidemiology of hyper- and hypocalcemia in the Russian Federation is poorly understood. As this research showed calcium imbalance is widespread among individuals over 50 and postmenopausal women in the Russian Federation, with prevalence varying significantly by age and sex. In the Russian Federation, serum calcium is not routinely measured in clinical practice because it is not included in standard biochemical panels. These findings highlight the need for implementing targeted screening programs in high-risk populations to enable early detection and intervention.

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THE COMPREHENSIVE INVESTIGATION OF THE DIFFERENTIAL EXPRESSION PROFILE OF CORONARY ARTERY DISEASE AND OSTEOPOROSIS

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Objective
The objective of this study is to identify the still unclear specific differentially expressed genes (DEGs) linking Coronary artery disease (CAD) and osteoporosis, including the involved pathways.
Material and Methods
Fourteen datasets were selected from the Gene Expression Omnibus (GEO), with 7 datasets for each CAD or osteoporosis group. Datasets in each group were analyzed to identify Differentially Expressed Genes (DEGs) using the GEOquery and limma packages in R. Also, Batch effects were removed, and datasets were merged in each group using the sva package. Adj.P.Val (FDR) cut-off of less than 0.05 and |log2 foldchange| ≥ 0.5 were used for recognizing the up- and down-regulated genes within each group of study. Cross-group DEGs overlap was evaluated using Rank-Rank Hypergeometric Overlap (RRHO) Analysis in R, and the common DEGs were under an overrepresentation enrichment analysis to connect the DEGs with pathways. Protein-protein network analysis and hub gene identification using STRING and Cytoscape were also conducted.
Results
Final results showed that 56 statistically significant common DEGs were reached between the two groups. The results of Enrichr-KG enrichment highlighted the regulation of mitotic cell cycle phase transition (GO:1901990) as the most significant term (P-value<0.05) across the gene set. Panther GO enrichment analysis also showed biological process (BP), including negative regulation of cardiac muscle cell myoblast differentiation (GO:2000691) as one of the ten top significantly enriched BP. Network analysis identified two hub genes according to degree centrality, closeness centrality, and maximal clique centrality (MCC), namely, BUB1B and CCNB1.
Conclusions
The implication of BUB1B or RUB1 in a variety of biological processes, such as aging and pathologies like heart disease, is re-identified in our study, and as one of the genes linking heart disease and osteoporosis through its activity involved in spindle checkpoint function and proper chromosome segregation during cell proliferation. As CCNB1 is also involved in cell mitosis regulation in accordance with BUB1B, it can be suggested as a new gene linking CAD and osteoporosis via the same mechanism.

P210

HANDGRIP STRENGTH MAY OVERESTIMATE SARCOPENIA IN PATIENTS WITH HAND OSTEOARTHRITIS: A PILOT STUDY

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Objective
To evaluate the relationship between handgrip strength, lower extremity muscle mass, and functional performance, and to explore the potential limitations of handgrip-based sarcopenia screening in patients with hand osteoarthritis.
Material and Methods
This pilot cross-sectional study included 10 patients diagnosed with hand osteoarthritis according to the EULAR classification criteria (1). Handgrip strength of the dominant hand was assessed using a dynamometer and lower extremity functional performance was evaluated using the Chair Stand Test (CST). In accordance with the iSarcoPRM diagnostic algorithm, impairment in either handgrip strength or CST performance was considered suggestive of probable sarcopenia and prompted further

evaluation. In patients requiring further evaluation, lower extremity muscle mass was assessed using the Sonographic Thigh Adjustment Ratio (STAR) based on quadriceps muscle thickness adjusted for body mass index (BMI), with values <1.0 for females indicating sarcopenia (2).

Results

Low handgrip strength was identified in 9 patients; however, all demonstrated normal CST performance. According to the STAR, sarcopenia was not confirmed in 7 of these patients. Despite reduced handgrip strength, quadriceps muscle thickness adjusted for BMI, as assessed by the STAR, remained within normal limits in the majority of cases.

Conclusion

Handgrip strength may overestimate sarcopenia in patients with hand osteoarthritis. Reduced handgrip strength in this population does not necessarily reflect impaired lower extremity muscle mass or functional performance. Therefore, reliance on handgrip strength alone may be misleading. Incorporating lower extremity assessments within the iSarcoPRM diagnostic algorithm may improve the accuracy of sarcopenia screening in patients with hand osteoarthritis.

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P211

DEVELOPMENT AND VALIDATION OF THE PEDIATRIC OSTEOPOROSIS KNOWLEDGE ASSESSMENT FOR PHYSICIANS (POKAP)

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Objective

To develop and psychometrically validate a physician-targeted instrument designed to assess knowledge of pediatric osteoporosis.

Materials and Methods

This cross-sectional methodological study was conducted in Turkey between September and November 2024. The Pediatric Osteoporosis Knowledge Assessment for Physicians (POKAP) was developed based on evidence-based guidelines and expert consensus. An initial pool of 64 items was generated and evaluated for content validity by an expert panel, followed by item reduction and psychometric analyses. The questionnaire was administered online to 321 physicians from specialties involved in pediatric osteoporosis care. These included Physical Medicine and Rehabilitation, Orthopedics, General Pediatrics, and pediatric subspecialties such as endocrinology, metabolism, neurology, nephrology, and gastroenterology. Construct validity was examined using exploratory and confirmatory factor analyses, and internal consistency was assessed using Cronbach's alpha. Model fit was evaluated using the chi-square/degrees-of-freedom ratio (CMIN/df), goodness-of-fit index (GFI), adjusted GFI (AGFI), root mean square residual (RMR), root mean square error of approximation (RMSEA), and information criteria (AIC and BIC).

Results

Content validity analysis reduced the initial 64-item pool to 34 items, yielding a scale-level content validity index of 0.796. Exploratory factor analysis demonstrated excellent sampling adequacy (KMO = 0.925; Bartlett's test $p < 0.001$) and supported a four-factor structure explaining 63.43% of the total variance, with factor loadings ranging from 0.497 to 0.837. Confirmatory factor analysis confirmed good model fit (CMIN/df = 1.837, GFI = 0.901, AGFI = 0.874, RMSEA = 0.051). The final 22-item POKAP showed excellent internal consistency (Cronbach's α = 0.914), with subscale alpha values ranging from 0.643 to 0.894.

Conclu

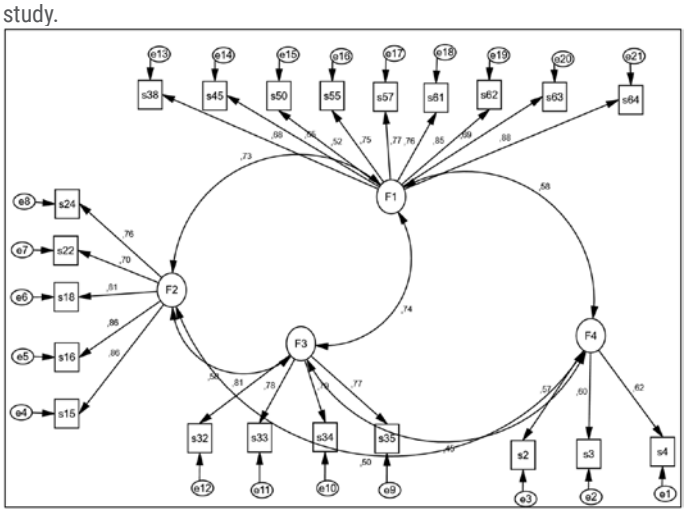
POKAP is a valid and reliable instrument for assessing pediatric osteoporosis knowledge among physicians. Its multidimensional structure allows both overall and domain-specific evaluation of knowledge and may be useful for educational needs assessments, training programs, and future research aimed at improving pediatric bone health care.

Figure 1. Confirmatory factor analysis (CFA) model

Figure 2. Factor retention analyses

Ethics statement

The University of Health Science Hamidiye Scientific Research Ethics Committee reviewed and approved studies involving human participants. The participants provided written informed consent to participate in this study.



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DESIGNING INCLUSIVE MOBILE GOVERNMENT SERVICES IN THE MIDDLE EAST: A USER EXPERIENCE–CENTERED FRAMEWORK

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Mobile government (m-government) services constitute a central pillar of digital transformation strategies across the Middle East. Governments in the region have invested extensively in mobile platforms to improve public service efficiency, accessibility, and citizen engagement. Despite these efforts, adoption and sustained use of m-government services remain uneven, largely due to user experience (UX) challenges. This paper presents a comprehensive investigation of UX issues affecting mobile government services in the Middle Eastern context. Drawing on an extensive review of academic literature, regional digital government reports, and empirical UX studies, the paper identifies key usability, accessibility, linguistic, cultural, and trust-related barriers. Based on these findings, a contextualized UX framework is proposed to guide the design of inclusive, usable, and culturally responsive m-government services. The study contributes to both theory and practice by extending UX discourse into non-Western public sector contexts and offering actionable guidance for policymakers and designers.

P213

INFLUENCE OF TREATMENT PATIENTS WITH RHEUMATOID ARTHRITIS ON COMPLICATIONS IN TOTAL JOINT ARTHROPLASTY

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Abstract

Introduction: Surgical treatment of patients with rheumatoid arthritis (RA) is associated with an increased risk of complications. This is due to the presence of prolonged therapy with glucocorticoids, disease-modifying and genetically engineered biological drugs, osteoporosis, as well as the activity of the underlying disease

Objective: To conduct a comparative analysis of the effect of RA treatment on local complications, such as periprosthetic infection, periprosthetic fractures, wound complications, ligamentous disorders in total joint arthroplasties (TJA) in patients with RA.

Materials and methods: 1113 TJA (649 and 464 total knee and hip replacements) in patients with RA, which were performed in the period from 2004 to 2024, were analyzed.

Results: In patients with therapy of methotrexate at an average dose of 12.5 mg per week, the incidence of local complications was 7.87%. In patients receiving Leflunomide, complications were detected in 9.29% of cases. In group of patients with Sulfasalazine intake, local complications were detected in 7.73% of cases. The complication rate of 7.01% was determined in group of patients who received Glucocorticoids at an average dose of 7.5 mg (recalculation in Prednisone). 1.87% of complications were observed in patients with intake of genetically engineered biological drugs. The highest incidence of local complications was found in patients with RA who had no therapy (27.27%).

Conclusion: The risk of local complications was 3 or more times higher in group of patients with RA without any treatment. So, TJA in patients with RA without treatment are often accompanied by a high risk of intra- and postoperative complications.

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COMPARATIVE ANALYSIS OF PERIPROSTHETIC FRACTURES IN TOTAL HIP ARTHROPLASTY BETWEEN PATIENTS WITH RHEUMATOID ARTHRITIS AND OSTEOARTHRITIS

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Surgical treatment of patients with rheumatoid arthritis (RA) is associated with an increased risk of complications due to the presence of an inflammatory process, prolonged intake of glucocorticoids (GC), disease-modifying and genetically engineered biological drugs, reduced physical activity, functional disorders and severe osteoporosis. All this contributes to an increased risk of intraoperative complications, including periprosthetic fractures.
Objective: to conduct a comparative analysis of periprosthetic fractures, which included intraoperative fractures of the large and small trochanter, as well as the acetabulum, during total hip arthroplasty (THA) in patients with RA and osteoarthritis (OA).
Material and methods: 1173 hip replacement operations were performed in patients with RA and OA in the period from 2004 to 2024 (OA – 709, RA – 484).
Results: A total of 41 (3.49%) periprosthetic fractures were diagnosed during THA. Of these:
- 23 (4.96%) fractures occurred in patients with RA;
- 18 (2.54%) in patients with OA.
In most cases, osteosynthesis with intraosseous sutures, circular sutures with wire or plate was performed for the treatment of periprosthetic fractures (61.8%), and Wagner's long revision leg was also used. Osteosynthesis was performed more often in patients with OA (66.7%), less often in patients with RA (43.5%).
Statistical analysis of the data revealed a significantly higher number of complications in the group of RA patients ($p=0.0288$). Significant differences were also obtained in the analysis of each type of complications ($p<0.05$).
Conclusion: obtained results confirmed that the risk of periprosthetic fractures was 2 times higher in RA patients than in patients with OA. Therefore, these patients require a special approach, which includes in the competent medical perioperative treatment of osteoporosis and careful handling of bone and surrounding soft tissues during the operation.

P215

THE PREVALENCE OF RHEUMATOID ARTHRITIS IN ALBANIAN FEMALE PATIENTS WITH LOW BONE MINERAL DENSITY

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Objective: This study aimed to assess the correlation between the prevalence of rheumatoid arthritis and changes in bone mineral density in Albanian females.
Method: In this study, a sample of 2198 women, who presented to the rheumatology outpatient clinic in Tirana, was involved. All of them completed a specific questionnaire for risk factors of osteoporosis, and bone mineral density was measured for each subject by Achilles ultrasound technique, which is specifically used for screening studies.
Results: The prevalence of osteopenia and/or osteoporosis was 36.5% (N=803), while the prevalence of rheumatoid arthritis was 19.9% (N=437). Overall, 298 (13.6%) of females who participated in this study were ≤ 50 years old, compared to 1900 (86.4%) of females who were >50 years old. A model of binary logistic regression was used to evaluate the relation between low bone mineral density and rheumatoid arthritis. Hosmer-Lemeshow test was applied to evaluate the validity of the above model. Statistical analysis was performed by Statistical Package for Social Sciences (SPSS), version 17.0. In the gross model (not adjusted), low bone mineral density was positively associated with rheumatoid arthritis (OR=1.49, 95% CI=1.21-1.85). Prevalence of rheumatoid arthritis was higher in females with low bone mineral density (24%), compared to females with normal bone mineral density (17.5%) (P <0.001).
Conclusions: Rheumatoid Arthritis is an autoimmune disease, which correlates with changes in bone mineral density. A positive relation between RA disease and low bone mineral density was found in Albanian women enrolled in this study.
Keywords: osteoporosis, rheumatoid arthritis
Conflict of interest: none declared

P216

ADJUVANT CHEMOTHERAPY WITH TAXANES CAUSES NO OVARIAN FAILURE NOR OSTEOPENIA IN RATS

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Background: The majority of women with breast cancer survive long due to improvements in diagnosis and treatments. Osteoporosis has been identified as a late complication of tumor therapy in breast cancer. The suggested cause of osteopenia/osteoporosis is linked to a negative effect of chemotherapy on the ovarian function, which leads to estrogen deficiency. The purpose of this study was to investigate the effect of Docetaxel chemotherapy (DOC) on ovarian function and bone mass.
Material &Methods: 50 female SD rats were ovariectomized (OVX) or had a sham-ovx (SHAM) at the age of six month. According to the literature, a significant osteopenia develops after 12 weeks after ovx. After 12 weeks group 1 was treated with 6 cycles of DOC in a 3-week interval (SHAM/DOC). The other groups received a placebo treatment (OVX/plac), (SHAM/plac). Bone Mineral Density (mg/cm^2) of the lumbar vertebrae was assessed after 12 weeks after ovx and 12 weeks post chemotherapy by using Hologic QDR 4500 (small-animal mode). At the end of the trial the ovarian function was investigated by taking a vaginal smear test and the serum estrogen level. A histological evaluation of the ovaries was done to determine changes after chemotherapy.
Results: OVX caused a significant decrease in BMD, serum estrogen level and vaginal atrophy. There was no sign of developing an ovarian failure or vaginal atrophy after chemotherapy. The ovarian function was sufficient to ensure hormonal effects in the vagina. The estrogen level was significant higher in the treatment-group (SHAM/DOC) than in the OVX-control-group. Densitometry showed no significant decrease of BMD during the treatment with Docetaxel in the SHAM/ DOC-group.
Conclusion: The present study underlines that a DOC chemotherapy has no negative effect on the ovarian function or on bone mass in hormone competent animals. Further investigations are needed to clarify the relation between chemotherapy and cancer treatment induced bone loss (CTIBL).

P217

COMPARISON OF THE GERMAN DVO FRACTURE RISK THRESHOLDS AND REMS-FRAGILITY SCORE IN THE ASSESSMENT OF THE INDIVIDUAL FRACTURE RISK

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Background: The determination of individual fracture risk and skeletal fragility is becoming increasingly relevant for a timely osteoporosis intervention and treatment. In recent years, different prediction models have been established to determine a probability associated to the risk of MOF or hip fractures including femoral BMD. Among these, the German DVO risk algorithm (developed by the Guideline Group of the German Umbrella Organization of Scientific Osteology Societies) is a step-by-step approach that classifies patients in groups of 3-years fracture risk incidence. The investigation aimed to compare the DVO fracture risk with the REMS-Fragility Score (FS), a dimensionless parameter (1-100) that provides information insight bone quality and skeletal fragility.
Material and Methods: In an observational study we recorded the data of patients who underwent DXA and REMS scans at an Orthopaedic Institute. The collection included DXA- and REMS- measurements at femur / lumbar spine, general patient information, medical and fracture history. Comparison between DVO and REMS-FS was analyzed using a Kruskal-Wallis test and Wilcoxon test.
Results: A total of *n* = 256 patients (128 per anatomical site) were analyzed. FS differed significantly across the DVO 2023 threshold groups (<3%, 3-5%, 5-10%, >10%) at both sites. Median FS increased stepwise with higher DVO thresholds from 14.58 (Q1–Q3: 12.68–21.12) in the < 3% group to 22.92 (19.53–29.94) 3-5% group, 33.38 (25.76–42.57) 5-10% group, and 55.50 (34.73–66.08) in the >10% group at femoral site. Lumbar spine, median FS increased from 24.08 (Q1–Q3: 21.60–28.07) in the < 3% group to 27.26 (23.87–33.38) 3-5% group, 29.98 (24.75–41.66) 5-10% group, and 40.65 (28.54–56.57) in the >10% group. Post-hoc comparisons showed significant differences (p< 0,05) between all group

pairs.
Summary: The results show a good level of agreement between DVO risk algorithm 2023 and REMS-FS, thus further reinforcing the hypothesis that quantitative information of bone fragility plays a crucial role in skeletal fragility and fracture risk. These results also confirm the efficacy of FS in identifying high risk subjects. REMS ultrasound technology appears to be a valuable tool allowing a timely indication for intervention and preventive strategies.

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ASSESSMENT OF THE COGNITIVE AND PHYSICAL PROFILE OF PATIENTS ADMITTED TO LONG-TERM CARE AS A VARIABLES OF FALLS RISK

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Objective: To evaluate the cognitive and motor impairment of patients institutionalized in long-term care homes as predictive variables of fall risk for this population.
Methods: Twelve patients were evaluated, six male and six female, with a mean age of 81.3 ± 8.7 years and classified as dependency grade I and II in three long-term care facilities for the elderly people, with a stay period of 2 to 36 months. Data on cognitive characteristics were collected through the questionnaire Mini-Mental State Examination (MMSE), while the Tinetti Performance-Oriented Mobility Assessment (POMA) and Short Physical Performance Battery (SPPB) protocols were used to assess balance.
Results: In this first phase, the SPPB protocol was used, but it proved inapplicable to a more vulnerable population. The protocol results showed 05 participants with low scores, 05 were unable to perform, and 02 with moderate scores, indicating the tool's ineffectiveness. Given these limitations, the POMA was subsequently applied to better capture functional mobility and fall risk. According to the POMA, 66.7% of the participants (n=8) were classified as having a high risk of falls (score <19), 16.7% (n=2) presented a moderate risk (score between 19 and 24), and 16.7% (n=2) demonstrated a low risk (score >24). Most older adults (75%) scored <20 on the MMSE, indicating cognitive impairment associated with low education level.
Conclusion: We consider that the degree of dementia with other cognitive changes together with visual difficulties, in general, compromise the understanding and performance of tests. Regardless of the difficulty in applying the tests, the results confirm the real risk of falls for this sample and demonstrate the importance of therapeutic interventions and ergonomic adaptations to minimize the risks of falls and the limitations imposed by them. This reinforcing the need for more sensitive and adaptable assessment tools in frail older populations.

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INFLUENCE OF OSTEOARTHRITIS IN PATIENTS WITH LOW BONE MINERAL DENSITY AS A PREDICTOR OF THE RISK OF FALLS IN FRAIL ELDERLY INDIVIDUALS

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Objective: The cross-sectional study was based on a first phase of a prospective study to assess the risk of falls and fractures and aims to analyse the influence of osteoarthritis as a predictor of risk of falls in older people with low bone mineral density.
Methods: 151 male and female participants with low bone mineral density were divided in control group (N=49;67.8±4.9yrs) and study group with Osteoarthritis (N=102; 71.1±5.5yrs). Dual energy x-ray absorptiometry (DXA) was used to evaluate Total lean mass (TLM) and bone areas. Handgrip strength (HGS), Short physical performance battery (SPPB), Chair stand test (CST) reach test (RT) and single leg stance (SLS) were also assessed.
Results: Descriptive analysis showed similar values between groups and no statistical differences were found between body composition, only in the SLS performance test. Despite similar results, in all balance tests the group with associated osteoarthritis obtained a lower performance compared to the control group. In the correlation between variables, while the control group did not show correlations between the balance test variables, the study group showed important correlations between all tests, highlighting the reach test and single leg stance. Regarding total lean mass (TLM), which directly influences balance and is related to aging and falls, the study group presented the greatest losses, which may be linked to the higher average age of this group.
Conclusion: Although the research addressed patients with low bone mineral density, it was evident from the large number of patients with osteoarthritis (102 of the total 151 patients evaluated) and their lower performance in balance tests, that the risk of falls can be aggravated by joint impairment, which compromises the entire postural structure and consequently increases not only the risk of falls but also of fractures due to low bone mineral density.

P220

INFLUENCE OF POOR SLEEP QUALITY ON FRAILTY AND INCREASED RISK OF FALLS IN COMMUNITY-DWELLING ELDERLY PEOPLE

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Objective: This cross-sectional study was based on a first phase of a prospective study to assess the risk of falls and fractures. It aims to analyse the influence of poor sleep quality on the frailty of elderly outpatients.

Methods: It was investigated 96 male and female participants (69.7±5.9

yrs.), who were divided according to the Pittsburgh sleep quality questionnaire as normal sleep group (NSG, n=50) and poor sleep group (PSG, n=46). Dual energy x-ray absorptiometry (DXA) was used to evaluate total body mass (TBM), total lean mass (TLM) and bone areas. Handgrip strength (HGS), Short physical performance battery (SPPB) and Chair stand test (CST) were also assessed.

Results: The descriptive analysis showed similar values between the groups and no statistical differences were found. For the PSG, the TBM had a 28.3% influence on the Appendicular skeletal mass (ASM/H²) and 8.9% on CST; the TLM had a greater influence than the NSG for the bone density sites, with 28% and 24.2% for Femoral bone mineral density (FBMD) and Lumbar bone mineral density (LBMD), respectively; the ASM/H² also had a greater influence on HGS with 37%.

Conclusion: The results of the comparison between groups of frail elderly individuals with non-restorative sleep and normal sleep, demonstrated that poor sleep appears to negatively affect physical performance variables, as well as lean mass and bone mineral density. Therefore, these multifactorial conditions in older individuals with poor sleep may increase frailty and risk of falls, consequently, fractures in older adults.

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ESTABLISHING THE ASSOCIATION BETWEEN THE METHYLATION STATUS OF BMP2 GENE PROMOTER AND THE PATHOGENICITY OF OSTEOPOROSIS

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Objectives
Osteoporosis (OP) is the most common metabolic bone disorder, characterized by decreased bone mass and increased fracture risk, particularly in postmenopausal women. Bone remodeling is regulated by osteocytes, osteoblasts, and osteoclasts, whose activities are influenced by genetic and epigenetic factors. DNA methylation, an epigenetic mechanism involving cytosine methylation at CpG islands in gene promoter regions, has been implicated in several human diseases, including OP. Bone morphogenetic protein 2 (BMP2) is a key bone-forming factor that promotes osteoblast differentiation and bone matrix protein expression. This study aimed to determine the methylation status of the BMP2 promoter in women with OP, compare it with healthy controls, and assess the relationship between BMP2 promoter methylation and serum BMP2 levels.
Material and Methods
A total of 51 postmenopausal Saudi female blood samples were analyzed, including 30 patients diagnosed with osteoporosis and 21 age-matched healthy controls. Genomic DNA was extracted and subjected to bisulfite treatment, followed by methylation-sensitive polymerase chain reaction (MS-PCR) to assess methylation patterns at three different regions of the BMP2 promoter. Serum BMP2 concentrations were measured using enzyme-linked immunosorbent assay (ELISA). Statistical analyses were performed to compare methylation status and serum BMP2 levels between groups and to evaluate their association.
Results
The BMP2 promoter was found to be hypomethylated at two distinct regions in patients with osteoporosis compared to healthy controls. This hypomethylation was accompanied by a statistically significant increase in serum BMP2 levels in the OP group. The observed changes suggest an inverse relationship between BMP2 promoter methylation and BMP2 protein expression in osteoporosis.
Conclusion
These findings confirm the essential role of BMP2 in bone remodeling and repair in osteoporosis and demonstrate that its expression correlates with disease severity. Altered methylation of the BMP2 promoter may serve as a potential epigenetic biomarker for early diagnosis of osteoporosis. Furthermore, therapeutic strategies aimed at enhancing BMP2 expression may have long-term protective effects if applied during the osteopenia stage, potentially preventing progression to osteoporosis and reducing fracture risk.
Keywords: Osteoporosis, DNA methylation, Epigenetics, BMP2

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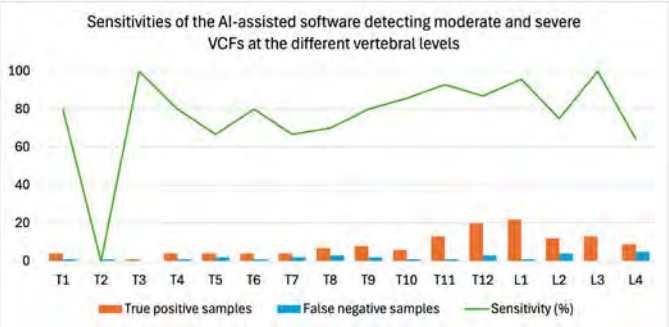
AI-ASSISTED OPPORTUNISTIC DETECTION OF VERTEBRAL COMPRESSION FRACTURES IN CT SCANS

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BACKGROUND: Vertebral compression fractures (VCFs), a hallmark of osteoporosis, are often asymptomatic. In this study, we evaluated the diagnostic utility of an artificial intelligence (AI) software for the opportunistic detection of VCFs in computed tomography (CT) scans.
METHODS: This dual-center retrospective study was conducted at the University Health Network, Toronto, Canada. Consecutive thoracic, abdominal and spine CT scans, from January 1–10, 2023 and June 1–10, 2024, were analyzed using Nanox.AI software HealthOST V1.1 1.0.2, if the following criteria were met: age 50 years and above, sagittal scans with at least 4 vertebrae between T1-L4, and availability of a radiology report. All eligible scans were also reviewed by two expert musculoskeletal radiologists. The Genant semiquantitative technique was used, with moderate and severe VCFs corresponding to height reductions of 25%-40%, and greater than 40%, respectively. A scan was flagged as positive if at least one moderate or severe VCF was identified. The results from software and the original reports were compared to those of the expert radiologists (gold standard). If both software and experts flagged it as positive, regardless of the vertebral level(s), the sample was considered true positive for overall diagnostic performance.
RESULTS: Of the 638 consecutive CT scans, 504 satisfied the inclusion criteria and were successfully analyzed. AI software identified 113 scans as positive, and 391 scans as negative for moderate or severe VCFs. Radiologists excluded 11 scans, and validated 493 scans (17 spine, 164

chest, 188 abdomen/pelvis and 124 chest/abdomen/pelvis). The mean age was 69.9 years (SD 11.2), with 47.9% females. The prevalence was 18% by our expert radiologists. The overall sensitivities and specificities of the software were 90% (95%CI: 82%-95%) and 93% (95%CI: 90%-95%) [PPV of 74% (95%CI: 67%-81%) and NPV of 98% (95%CI: 96%-99%)], while those of the original reports were 49% (95%CI 38%-60%) and 99% (95%CI: 97%-100%), respectively. The sensitivities of the AI software at vertebral levels are shown below.
CONCLUSIONS: AI software can enhance the sensitivity of opportunistic detection of moderate and severe VCFs in thoracic, abdominal and spine CT scans, potentially helping radiologists improve reporting accuracy.



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ANALYTICAL IMPACT OF METHOD-DEPENDENT VARIABILITY IN BONE ALKALINE PHOSPHATASE IMMUNOASSAYS

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Objective: This study compared the analytical performance and clinical agreement of four bone-specific alkaline phosphatase (bALP) immunoassays across distinct patient subgroups, as the availability of multiple commercial assays may lead to discrepancies in patient results.
Material and methods: Remnant serum samples from 140 subjects (20 non-CKD controls, 80 CKD patients stratified by GFR, 20 haemodialysed patients, and 20 kidney-transplanted patients) were analysed using IDS BAP® EIA, IDS-iSYS Ostase®, Access Ostase® and Liaison XL Ostase®. Results are expressed in µg/L. Samples were also analysed using Hydrasis ISO-PAL 15 electrophoresis, to quantify bone- and liver-specific ALP fractions. Associations were assessed using Spearman's correlation and agreement was evaluated using Bland–Altman analysis. Absolute and logarithmic differences were used to assess constant and proportional bias, respectively. Differences across clinical subgroups were tested using Kruskal–Wallis's test.
Results: Significant correlations were observed for all assay pairs (Spearman's ρ = 0.816–0.984). However, Bland–Altman analyses revealed systematic differences between methods. The widest limits of agreement and largest biases were observed in comparisons involving the Liaison XL assay. Healthy controls showed limited dispersion and low bias, whereas CKD and dialysis patients exhibited increased dispersion, particularly for assay pairs involving Liaison XL. Both constant and proportional biases differed significantly across patient subgroups for selected assay pairs, indicating a population-dependent effect on assay agreement ($p < 0.05$). Proportional biases ranged from 3.96% to 90.69%, depending on the assay pair and patient population. All immunoassays correlated with bALP fraction (Spearman's ρ = 0.590–0.693). However, visual inspection of comparison graphs showed that samples deviating from the expected correlation were associated with higher liver-specific ALP fractions.
Conclusion: Despite correlations between bALP immunoassays, significant biases were observed, indicating limited interchangeability between methods. These discrepancies were amplified in CKD and dialysed populations, underscoring the need for careful clinical interpretation, particularly for patient follow-up, and reinforcing the importance of assay harmonisation and standardisation.

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SHOULD A SURGERY BE PERFORMED FOR CERVICO OSTEOARTHRITIC MYELOPATHIES DECOMPENSATED BY TRAUMA TO THE CERVICAL SPINE: ABOUT 37 CASES

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The incidence of the spinal cord trauma (SCT) in Algeria is 20 people/1000 inhabitants. SCT can lead to spinal cord injury with out bone involvement, particularly when a narrow cervical canal (NCC) preexists. 75% of people over 65 have a narrow cervical canal, which is the most common risk factor for spinal cord injury. Furthermore, the cervical cord is more vulnerable because it is less well vascularized, particularly in the elderly population.
We report the experience of the neurosurgery department in the care of 37 patients with cervico osteoarthritic myelopathies whose ages are between 56-78 years old and who are victims of various accidents manifested by incomplete tetraplegia evaluated by the score by JOA. Our course of action was: hospitalization of patients; implementation of a therapeutic regimen based on corticoids 2 mg/kg/d associated with adjuvant treatment; the wearing of a cervical collar and not a minerva given the absence of spinal instability; and nursing, Reassessment of the JOA score on D3 post-trauma then patient discharge. Patients systematically reviewed in spine consultation at 1 month with a reassessment of the JOA.
The neurological and functional benefit of decompressive and stabilization surgery remains controversial. In our study, early surgery did not improve neurological and functional recovery and was not associated with fewer medical complications or shorter hospital stay. Moreover, there is no evidence in the literature to encourage routine early surgery in patients with SCT on NCC with out vertebral fracture. In addition, potential preoperative complications must be taken into account, particularly in the elderly population. In the acute phase, the most frequent indications for surgery are the presence of signs of clinical and/or radiological instability. The criteria traditionally used in favor of remote surgery are worsening or stagnation of a neurological state after a phase of improvement.

P225

PLACE OF CURRENT IMPLANTS IN THE MANAGEMENT OF CERVICO OSTEOARTHRITIC MYELOPATHY (COM) ABOUT 150 CASES

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Objective: Cervic osteoarthritic myelopathy is a cervical spinal cord suffering associating a narrowing of the dimensions of the cervical canal of osteoarthritis origin, the natural evolution of the pathology is towards progressive aggravation until tetraplegia. At present there is no medical treatment, so it is an almost exclusively surgical treatment that both decompresses the cervical spinal cord.
Case report: We report a series of 150 cases collected in the neurosurgery department, carrying CAM at the operative stage and having benefited from decompression with the addition of prosthetic material, namely cervical prostheses. The whole difficulty of the management of CAM is to pose an indication for surgery at the right time, the addition of implants in this surgery has al lowed on the one hand to restore spinal biomechanics but also to restore a function of lost neck mobility.
Conclusion: We are convinced that although the cost of acquisition is relatively high, the addition of cervical prostheses allows a restoration of function and a social and professional reintegration of patients

P226

OS ODENTOIDEUM ABOUT 03 CASES

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Objective: Bone odentoidum or mobile odontoid process is one of the malformations of the cervico-occipital hinge. It is about a defect of union of the center of ossification of the odontoid on the body of the axis. The malformation exposes you to atlo-axoid instability and the risk of bulbo-medullary compression.
Methods: We report the observation of 03 active men whose age varied between 18-247 years with a notion of craniocervical trauma and who presented progressively in 2 years persistent cervical pain and stiffness with heaviness of the four limbs with discreet sphincter disorders.
Results: The clinical examination objectified spastic tetraparesis with associated sensory disturbances Lateral flexion and extension radiographs can provide useful information about C1-C2 in stability. Computed tomography (CT or simple) is useful to define bony relationships at the base of the skull, C1 and C2. The de gree of C1-C2 instability identified on cervical radiographs is not correlated with the presence of myelopathy. A sagittal diameter of the spinal canal at the C1-C2 level of.13 mm correlates with the myelopathy detected on clinical examination. MRI can show spinal cord compression and signal changes in the cord that cor relate with the presence of myelopathy. To behave given the clinical examination, the patients show signs of deficit associated with imaging objectifying a compression of the bulb, a surgical indication is posed, the intervention consisted of an occipital cra niectomy opening of the occipital foramen and the posterior arc of C1 followed by C3 occiput osteosynthesis using polyaxial rods and screws.
Conclusion: The mobile odontoid process or os odontoideum is a rare anomaly of the cervico-occipital hinge for which we will recall the clinical, radiological, etiological and prognostic aspects for an adequate management. Clinical examination revealed spastic tet raparesis with associated sensory disturbances. Cervical CT and MRI confirmed the odontoid-axoid dislocation, the CT on the one hand revealing a corticalized ovoid ossicle in place of the odontoid and the MRI on the other hand the myelomalacia. The therapeutic result was conclusive after surgical approach by posterior approach. The os odontoideum designates a small bone in a position cranial to the axis and independent of the odontoid. The em bryonic, vascular or even traumatic origin are evoked to explain the pathogenesis. It can be discovered incidentally in asymptomatic patients or cause sudden death without the diagnosis being recognized. If symptomatic, the age of discovery is variable and the clinical signs are upper neck pain, neck stiffness, torticollis, spinal cord or cervical radicular compression syndrome without any notion of recent spinal cord injury. Standard radiographs, bet ter cervico-occipital CT, show a rounded or ovoid ossicle, separated from the base of the odontoid and corticalized, unlike recent fractures of the odontoid. MRI shows the repercussions on the bulbo-medullary junction. The approach of choice is the posterior approach to decompress the nervous structures and stabilize the spine. Functional rehabilitation is essential. In asymptomatic subjects, prophylactic surgery is discussed after dynamic X-rays.

P227

CERVICAL SPINAL INJURY SECONDARY TO A SPORTS ACCIDENT ABOUT 29 CASES

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Objective : Trauma to the cervical spine can be differentiated from a therapeutic point of view, in two situations: The unstable spine (fracture + ligament rupture) where the potential neurological risk, medullary or radicular, guides in a completely hierarchical and validated way the conduct to be held on the ground and then at a distance. The microtraumatic spine where, as we know, the frequency of 'common' spinal pain, and the functional, socio-professional and athletic repercussions, which vary greatly from one patient to another for the same lesion, involve more diagnostic and therapeutic pathways. individualized and, for the majority, primarily or even solely conservative.
Methods: We report a series of 29 patients admitted as part of the emergency at the level of the neurosurgery department/central hospital of the army and treated surgically in emergency fol lowing various sports accidents. all the difficulty of management is based on the right indication:- Should a great sportsman be operated on or not?- If so, what is the benefit?- And above all can he resume his sporting activity of competition?
Results: Of the 29 athletes who had spinal cervical lesions with out medullary, 21 were indicated for surgery: - 07 patients operated by an anterior approach with dissectomy followed by placement of a cervical cage and anterior osteosynthesis on one level.- 04 patients via the posterior route due to articular collisions, having benefited from fixation via the posterior route.08 patients when to them were of orthopedic indication with installation of a cervical collar with a rigorous clinical radio control.
Conclusion: The surgical indication is always posed in front of spinal instability, this must be discussed at length and with the consent of the patient in athletes. orthopedic treatment is indi cated when the elements of spinal stability are not compromised, otherwise surgery is the only therapeutic recours. The management of high-level athletes requires in-depth compression of the lesion mechanisms, careful reading of

radiological images and multidisciplinary management. not only surgical but functional and rheumatological rehabilitation.

P228

COGNITIVE STATUS MODULATES THE PROTECTIVE EFFECT OF COHABITING CAREGIVERS ON FALL-RELATED FRACTURES IN OLDER ADULTS

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Objective(s)
To assess the association between cohabiting caregiver presence and the incidence of falls and fractures in older adults, and to determine whether comorbidity burden and cognitive status modify this relationship.

Material and Methods
An observational study was conducted including 313 older adults. Falls and fractures were recorded during follow-up. Caregiver status (cohabiting vs non-cohabiting) was assessed during the geriatric multidimensional assessment. Comorbidity burden was evaluated using the Charlson Comorbidity Index (CCI), and cognitive function using the Mini-Mental State Examination (MMSE). Patients were stratified by CCI (0–1 vs 2–6) and MMSE (>27 vs <27). Group comparisons were performed using the chi-square test.

Results
Overall, 160 patients (51.1%) experienced at least one fall and 126 (40.3%) sustained a fracture.Cohabiting caregiver presence was associated with a lower, but non-significant, incidence of falls compared with patients without a caregiver (47.9% vs 53.9%; p = 0.29), while fracture incidence was comparable between groups (39.0% vs 41.3%; p = 0.71).Stratification by comorbidity burden did not reveal statistically significant differences in fall-related fractures to caregiver presence in either low-risk (CCI 0–1: 33.3% vs 55.6%; p = 0.50) or high-risk patients (CCI 2–6: 47.6% vs 53.8%; p = 0.27), although a consistent trend toward fewer falls was observed among high-risk patients with a caregiver.

In contrast, cognitive status strongly modified the association between caregiver presence and falls related fractures. Among patients with preserved cognitive function (MMSE >27), the incidence of falls was markedly lower in those with a cohabiting caregiver compared with those without (12.5% vs 60.0%; p ≈ 0.02). No protective effect of caregiver presence was observed in patients with cognitive impairment (MMSE <27:40.0% vs 42.6%; p = 0.65).

Conclusion(s)
Cohabiting caregiver presence was not associated with a global reduction in related fractures, However, cognitive status emerged as a key determinant of caregiver effectiveness, with a significant protective effect observed only in cognitively preserved patients. These findings suggest that caregiver-based fall prevention strategies should be tailored according to cognitive status and that additional targeted interventions are required for cognitively impaired individuals.

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SARCOPENIA – NATURAL PART OF AGING?

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Sarcopenia – natural part of aging ?
Sarcopenia – progressive loss of muscle mass and function, that occurs as a natural part of aging. It affects about five to thirteen people, ages 60 to 70, up to 50% of people who are 80 or older. It is characterized by a decline in skeletal muscle mass, strength and physical performance in older adults associated with reduced quality of life, increased risk of requiring long term care, a significant economic burden, on both patients and their families.
It is not a surprise that loss of muscle mass has many downsides. It is closely linked with a greater incidence of falls and makes you more likely to brake a bone. Also, it can put you at risk for post-operative complications, longer hospital stays, linked with metabolic disorders, cognitive impairment and mortality. Both men and women start losing muscle mass as they get older. It's a gradual decline of about 3-5% each decade, starting at age 30.

Causes
• decreased protein synthesis
• hormonal changes
• nervous system changes
• lack of exercise
• being overweigh or obese
• chronic illness
• nutrient deficiencies.

Early signs of sarcopenia
• muscle weakness
• increased fatigue
• decreased physical activity
• thinner limbs
• slower walking speed

Advanced sarcopenia symptoms
• difficulty with daily activities
• poor balance of falling
• need cane or walker
• loss of independence
• more visible muscle wasting
• poor posture

Sarcopenia prevention
• increased protein intake
• include vitamin D in diet
• eat nutritious foods

• engage in strength training

• regular aerobic exercise

Whether you're 50 or 90, it is important to stay on top of your health and well being. Everyone experiences some amount of muscle loss as they age, but with sarcopenia, it happens much faster. It maybe time to begin treatment for sarcopenia if there are any of the above mentioned signs. There are ways to treat and even reverse the effects of the condition. If you've experienced muscle weakness or any other symptom of sarcopenia, call your healthcare institution to diagnose the condition and develop a personal treatment plan.

P230
FIBROMYALGIA

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Fibromyalgia – chronic widespread pain
Fibromyalgia involves widespread body pain and it is a long term condition. The pain happens along with fatigue. It can involve issues with sleep, memory and mood. It affects the way the brain and spinal cord process painful and non-painful signals, so sensitivity to pain increases. Fibromyalgia has no medical sign. Symptoms often start after a triggering event that include injuries, surgery, infections or emotional stress. Women are more affected than men.
Patients have:

• Headaches

• pain due to temporomandibular joint disorders

• anxiety

• depression

• irritable bowel syndrome.

Patients may also have endometriosis, interstitial cystitis. The causes vary from person to person. It is thought that a combination of genetic and environmental factors are involved, but genetics alone is not enough. Patients have changes in the way the central nervous system processes pain messages. Patients with fibromyalgia have a chemical imbalance with low levels of serotonin, noradrenaline and dopamine in the brain. These hormones are important in processing pain messages from different parts of the body and in regulating mood, appetite, sleep, behavior and stress responses.

Fibromyalgia tends to run in families and there is usually a trigger for it – stressful or traumatic event. The most common symptoms are pain and morning stiffness all over the body, sensitivity of the skin and muscles to touch and pressure. Fatigue, anxiety, sleep problems, tension headaches. Fibromyalgia is difficult to treat, there is no cure. Treatment, medication, lifestyle changes and complementary therapies are aimed at reliving symptoms, improving quality of life and daily functioning. Physical activities – aerobic exercise, walking, cycling, swimming, stretching exercises are recommended. People are less tired, in a better mood, function better and their quality of life improves.
Fibromyalgia is estimated to affect 1.8% of the population. Weight management is helpful for reducing fibromyalgia impact. Several forms of electrical neuromodulation improve functioning. Fibromyalgia causes a substantial economic and societal burden, due to disability and reduced work hours.

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MEDIUM TERM REAL WORLD OUTCOMES AND SAFETY OF INTRA ARTICULAR POLYACRYLAMIDE HYDROGEL INJECTION FOR KNEE OSTEOARTHRITIS

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Objective
Knee osteoarthritis (OA) is a prevalent cause of pain and functional limitation, with synovial inflammation playing a central role in symptom generation and disease progression. Durable nonsurgical treatment options remain limited. This study aimed to evaluate mediumterm clinical outcomes, patient satisfaction, and safety following intraarticular injection of a nondegradable polyacrylamide hydrogel for symptomatic knee OA in realworld clinical practice.
Material and Methods
A prospective observational study was conducted in a tertiary orthopaedic setting. All patients received a single 6 mL intraarticular injection of a polyacrylamide hydrogel according to standardised procedural guidance. Outcome measures were collected at baseline and at 12 and 52 weeks postinjection. Primary outcomes included visual analogue scale (VAS) pain score and WOMAC pain and total scores. Treatment response was assessed using OARSI responder criteria. Patients were enrolled into structured remote followup and completed an anonymous satisfaction questionnaire. Adverse events and subsequent interventions were recorded.
Results
A total of 316 patients were treated, with 116 patients providing complete 52week outcome data (age range 41–89 years; Kellgren–Lawrence grade 2–4). Statistically significant improvements were observed at 12 and 52 weeks compared with baseline for VAS pain (67 vs 43 vs 46; $p < 0.0001$), WOMAC pain (59 vs 36 vs 41; $p < 0.0001$), and WOMAC total score (60 vs 39 vs 40; $p < 0.0001$). Eightyfour percent of patients met OARSI responder criteria at one year. Ninetyfive patients completed an unselected satisfaction survey, with 68% indicating they would recommend the treatment and 62% reporting overall satisfaction. Adverse events were uncommon (<1%). Three patients experienced postinjection inflammatory reactions, including one requiring arthroscopic washout; all microbiological investigations were negative.
Conclusion
Intraarticular polyacrylamide hydrogel injection was associated with significant and sustained improvements in pain and function at one year, with a low complication rate in routine clinical practice. These findings support its use as a jointpreserving nonsurgical treatment option for selected patients with symptomatic knee osteoarthritis.
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P232

PREVALENCE OF OSTEOPOROSIS IN POST LIVER TRANSPLANT PATIENTS

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Objective
This study aimed to determine the prevalence of osteoporosis in post-liver transplant patients and to evaluate the relationship between bone mineral density (BMD) with various variables.

Material and Methods
This cross-sectional observational study was conducted at Max Super Speciality Hospital, New Delhi. Adults (≥18 years) who had completed at least six months after liver transplantation were included. Bone mineral density was assessed by dual-energy X-ray absorptiometry. Biochemical evaluation included renal and liver function tests, serum calcium, phosphate, 25 OH Vit D, intact parathyroid hormone, bone turnover markers (P1NP, β-CTX), serum testosterone in males, estradiol in females, glycosylated hemoglobin, and thyroid function tests. Duration of exposure to corticosteroids, tacrolimus, and mycophenolate was recorded. Correlation analysis was performed using Pearson's coefficient.

Results
A total of 95 patients were included in the final analysis. Osteoporosis was observed in 32.6% of patients, while 32.6% had osteopenia, indicating that nearly two-thirds of the cohort had low bone mass. BMD demonstrated a significant inverse correlation with duration since transplantation at the lumbar spine, neck of femur (NOF), and total hip. Duration of corticosteroid therapy showed significant negative correlations with BMD at the spine ($r = -0.214$, $p = 0.0369$), NOF ($r = -0.351$, $p = 0.0005$), and total hip ($r = -0.322$, $p = 0.0014$). Similarly, tacrolimus exposure was inversely correlated with BMD at the spine ($r = -0.243$, $p = 0.0177$), NOF ($r = -0.343$, $p = 0.0007$), and total hip ($r = -0.334$, $p = 0.001$). Mycophenolate exposure demonstrated weaker associations, with non-significant correlation at the spine but significant inverse correlations at the NOF ($r = -0.232$, $p = 0.0239$) and total hip ($r = -0.215$, $p = 0.0362$). Radiographic vertebral fractures were detected in 11.6% of patients.

Conclusion
Osteoporosis and osteopenia are highly prevalent after liver transplantation. Prolonged immunosuppression, pre-existing liver pathology, longer post-transplant duration, hepatic osteodystrophy and hypogonadism are important determinants of bone loss. Routine assessment of bone health and gonadal status, with early preventive strategies, is essential to reduce fracture risk in this population.

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POLYACRYLAMIDE HYDROGEL AS AN INJECTABLE SYNOVIAL IMPLANT: EVIDENCE AND OPPORTUNITY IN KNEE OSTEOARTHRITIS MANAGEMENT

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Objectives 2.5% injectable polyacrylamide hydrogel (2.5% iPAAG) acts as a synovial implant that integrates into the joint lining, restoring elasticity and reducing mechanical stress. This abstract summarizes evidence supporting 2.5% iPAAG as a long-term treatment for knee osteoarthritis, including mechanism of action, histological integration, safety, and clinical outcomes from randomized and observational studies.

Methods Evidence includes histopathology showing synovial integration, biomechanical modelling, long-term observational data, and prospective trials:
ROSA: RCT comparing 2.5% iPAAG (N=119) vs HA (N=120) over 1 year, with a 5-year iPAAG extension (58 completers).

LUNA: Prospective cohort (N=199) with 12-month data.

All WOMAC normalized to a 100-point scale.

Results Animal histology demonstrates stable synovial integration of 2.5% iPAAG with minimal inflammation up to 24 months, with connective fibres anchoring the hydrogel. Modelling shows reduced synovial stress, supported by an equine OA model where 2.5% iPAAG restored synovial elasticity to healthy levels.
In ROSA, 2.5% iPAAG showed non-inferiority to HA at Week 26 for WOMAC pain (LS mean change −18.5 vs −14.8; difference 3.7 [95% CI −0.8; 8.1]), with a similar trend at Week 52. Long-term 2.5% iPAAG extension data showed sustained benefit at 5 years (pain −16.2; stiffness −12.7; function −11.4; all $p<0.0001$). No serious device-related AEs occurred.

In LUNA, 12-month LS mean improvements were 17.0 (pain), 18.5 (stiffness), and 18.8 (function), all $p<0.0001$ vs baseline, with no serious device-related events.

Both studies confirm durable symptom relief and a favourable safety profile, findings that are further supported by long-term observational data and registry experience showing that 2.5% iPAAG remains safe for up to 10 years post-injection, including in patients who subsequently undergo knee replacement.

Conclusions 2.5% iPAAG functions as an implant within the synovial membrane and demonstrates clinically meaningful benefits in the knee joint. Evidence from open-label studies indicate that its therapeutic effect can be sustained for up to five years. Furthermore, long-term follow-up data support the safety of 2.5% iPAAG, with observations extending up to ten years after injection, including in patients who later required knee replacement.

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ASSESSMENT AND REAUDIT OF FRAX RISK ASSESSMENT FOR PATIENTS WITH RHEUMATOID ARTHRITIS SEEN IN RCHT OUTPATIENT GENERAL RHEUMATOLOGY CLINICS

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This report presents the full audit and reaudit cycle evaluating adherence to NICE and NOGG standards for fracture risk assessment (FRAX) in patients with rheumatoid arthritis (RA) attending RCHT general Rheumatology clinics. Baseline audit (2024) of 105 patients demonstrated very low FRAX documentation (3/105, 2.9%), low DEXA documentation (11/105, 10.5%), and limited evidence of osteoporosis treatment (13 patients). Following introduction of a standardised FRAXbased assessment pathway, the prospective reaudit (2025) of 109 patients demonstrated 100% FRAX completion (109/109), increased DEXA requesting (70/109, 64.2%), and osteoporosis treatment present/initiated in 82 patients. This confirms a closedloop improvement with full compliance achieved for FRAX documentation.

Background

Rheumatoid arthritis is a recognised independent risk factor for osteoporosis and fragility fractures. National guidance (NICE/NOGG) recommends routine fracture risk assessment using FRAX in adults aged 50 years and over, with bone mineral density (DEXA) scanning or treatment where indicated. The 2024 baseline audit at RCHT Rheumatology Department identified missed opportunities for proactive risk assessment and prevention, prompting pathway redesign to embed FRAX into routine care.

Aim

To evaluate compliance with NICE/NOGG fracture risk assessment standards in RA patients and assess the impact of a standardised FRAXbased pathway.

Objectives

1. Determine the proportion of RA patients with documented FRAX risk assessment.
2. Evaluate DEXA scanning where indicated by FRAX or clinical risk factors.
3. Assess osteoporosis treatment initiation where indicated.
4. Complete a reaudit to confirm improvement and close the audit loop.

Method

Baseline Audit (2024): Retrospective review of at least 100 consecutive ≥ 50-year-old RA patients seen in general rheumatology clinics from May to September 2024 based on the data obtained from RADAR platform and summarized in the Excel spreadsheet. Data items: age, FRAX documentation, DEXA documentation, osteoporosis treatment. Reaudit (2025): Prospective review after implementing the FRAX pathway. Data items: FRAX major and hip risks, NOGG risk category, DEXA referral and outcomes, pharmacological treatment, and followup plan.

Results

Baseline (2024): 105 patients; FRAX documented in 3/105 (2.9%); DEXA documented in 11/105 (10.5%); DEXA without FRAX in 8; patients on/with osteoporosis treatment noted: 13. Age median 72.0 years (range 50–91); ≥65 years: 74 (~70.5%).

Reaudit (2025): 109 patients; FRAX documented in 109/109 (100.0%); DEXA requested in 70/109 (64.2%); osteoporosis treatment present/initiated in 82 patients.

Baseline vs Reaudit comparison:

Measure Baseline (n/N, %) Reaudit (n/N, %) Absolute Δ (pp)

FRAX documented 3/105 (2.9%) 109/109 (100.0%) 97.1

DEXA

requested/documented 11/105 (10.5%) 70/109 (64.2%) 53.7

Patients on/started

osteoporosis treatment 13/105 (12.4%) 82/109 (75.2%) 62.8

Conclusions

The introduction of a structured FRAX pathway achieved full compliance with national standards for FRAX documentation and substantially improved downstream investigation and management. The findings close the audit loop and support continued use of the pathway with periodic reaudit to ensure sustainability.

Recommendations

· Maintain mandatory FRAX assessment for all adults with RA (≥50 years) at each clinic review.

· Apply NOGG thresholds to guide DEXA requests and treatment decisions; document DEXA outcomes with Tscores and FRAXwithBMD where available.

· Ensure timely initiation (or optimisation) of osteoporosis therapy for high/very high risk patients or where DEXA is unsuitable.

· Provide continuing education and brief prompts in clinic systems to preserve 100% FRAX compliance.

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THE EFFECTS OF DELAY IN TIME TO SURGERY OF HIP FRACTURES PATIENTS IN A DISTRICT HOSPITAL IN UNITED KINGDOM

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Aims

In this study we set about to investigate whether extra theatre time helps in the reduction of time to surgery which inturn improves patient outcome after fracture of neck of femur.

Introduction

Whiston Hospital, part of the Mersey and West Lancashire Teaching Hospitals NHS Trusts, treats about 50 to 55 Hip fracture patients per month during the winter season. Some of the patients come with co-morbidities while others develop new problems or suffer exacerbation of the pre-admission medical issues during their stay in the hospital. After creating an extra session of trauma theatre we wanted to see if these could be better controlled.

Methodology

The Ward Manager and Ortho-geriatric registrar reviewed the medical records of the list of patients who were admitted in December 2023-January 2024 and then those admitted in December 2024 -January 2025 to identify any changes in the incidence of new complications developing in these patients after the Trauma theatre operating time was extended into the evening, under the same operating surgeon to reduce time to surgery.

Results

Prior to the extended evening trauma list there were 104 hip fracture patients were admitted in the winter months 0f December 2023/Jamuary 2024. 28.8% patients underwent surgery after 36 hours of admission. Of those whose whose surgery was delayed beyond 36 hours, 63.75% developed post op complications.

In the group that was seen after the extended evening list was created, during the winter months of December 2024/January 2025, 94 hip fracture patients were admitted. Time to surgery was more than 36 hours in 27.8% patients. Of those whose time to surgery was more than 36 hours, 38.05% developed complications.
Complications ranged from lower limb cellulitis, constipation to hospital acquired pneumonia, acute kidney amongst others.
Some patients were having to starve longer periods due to extended theatre time. patients on evening list could get cancelled due to comorbidities.
Conclusion
We did not observe any significant reduction in time to surgery with introduction of evening theatre list. The post-operation complications were noted to have significantly reduced. Hip fracture patients require early time to surgery to improve the risk of post operation complications leading to better outcomes. This will require well organised hip fracture management team working through the time of admission till the date of discharge. of hip fracture patients

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NEUROVISCERAL DYSFUNCTION AND CHRONIC PAIN IN RHEUMATOID ARTHRITIS: IMPLICATIONS FOR BONE LOSS AND OSTEOPOROSIS RISK

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Objectives:
To evaluate the neurovisceral impact of chronic pain in patients with rheumatoid arthritis (RA) and to explore the relationship between pain severity, disease activity, autonomic dysfunction and bone mineral density (BMD), as markers of secondary osteoporosis risk.
Material and Methods:
A cross-sectional observational study was conducted in 34 patients with rheumatoid arthritis, diagnosed according to ACR/EULAR 2010 criteria. The study group included 26 women (76.5%) and 8 men (23.5%), with a mean age of 52.6 ± 9.8 years and mean disease duration of 7.4 ± 4.1 years.
Pain intensity was assessed using the Visual Analog Scale (VAS), disease activity by DAS28-CRP, and autonomic dysfunction by the COMPASS-31 questionnaire. Neurovisceral manifestations were evaluated clinically, including functional gastrointestinal symptoms, autonomic cardiovascular disturbances, fatigue and sleep disorders.
Bone status was assessed by dual-energy X-ray absorptiometry (DXA) at the lumbar spine (L1-L4) and femoral neck. Osteopenia and osteoporosis were defined according to WHO criteria. Correlation analyses were performed between pain intensity, inflammatory activity, autonomic dysfunction scores and BMD values.
Results:
Moderate-to-severe chronic pain (VAS ≥50 mm) was present in 21 patients (61.8%). Patients with severe pain exhibited significantly higher COMPASS-31 scores compared with those with mild pain (38.4 ± 9.6 vs 21.7 ± 8.3, p<0.01), indicating pronounced autonomic dysfunction.
DXA evaluation revealed reduced BMD in 19 patients (55.9%), including osteopenia in 13 (38.2%) and osteoporosis in 6 (17.6%). Patients with low BMD demonstrated higher disease activity (DAS28-CRP 4.6 ± 0.8 vs 3.7 ± 0.6, p=0.01), higher pain intensity (VAS 62.1 ± 14.3 vs 45.8 ± 12.6, p=0.02) and higher COMPASS-31 scores (41.2 ± 8.9 vs 26.4 ± 9.1, p<0.01).
COMPASS-31 scores correlated positively with VAS (r=0.57, p=0.002) and DAS28-CRP (r=0.42, p=0.01), and negatively with lumbar spine BMD (r=-0.39, p=0.02), suggesting an association between autonomic dysfunction, inflammatory burden and bone loss.
Conclusions:
Chronic pain in rheumatoid arthritis is associated with significant neurovisceral and autonomic dysfunction, higher inflammatory activity and reduced bone mineral density. The interplay between persistent pain, autonomic imbalance and systemic inflammation may represent an important pathway contributing to secondary osteoporosis in RA. Incorporating neurovegetative assessment and DXA evaluation into routine management of RA patients with chronic pain may improve early identification of individuals at increased risk for bone loss and skeletal fragility.

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DOUBLE TROUBLE: TWO INCOMPLETE ATYPICAL FEMORAL FRACTURES IN A SINGLE FEMUR

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Objective:
Atypical femoral fractures (AFF) are well described in patients on bishosphonate therapy with an incidence of up to 1 in 1000 after longterm treatment. In over 30% of cases, they are bilateral with incomplete AFFs frequently identified contalateral to complete AFF. [1] However, multiple incomplete AFFs in the same femur are very rare.
Method:
We report on a patient who presented with a complete AFF and found to have two incomplete AFFs in the contralateral femur.
Results:
A 78-year-old Caucasian woman presented to the emergency department after falling on her left hip. Radiographs revealed a complete subtrochanteric AFF of the left femur and two incomplete AFFs in the contralateral right femur. She had a diagnosis of osteoporosis treated with alendronate for eight years and reported one month of prodromal right hip pain. Apart from smoking and menopause, she had no other risk factors for osteoporosis. Her left AFF was surgically treated with a long, locked cephalomedullary nail and bisphosphonate therapy was discontinued. In the absence of complete fracture lines, prophylactic fixation of the right femur was discussed but declined in favour of conservative management.
Conclusion:
This case describes the rare finding of two incomplete AFFs in one femur in association with a contralateral complete AFF. This is a reminder of the need for judicious use of bisphosphonates beyond 5 years. Stopping bisphosphonates may lower the risk of AFF by about 70% while teriparatide may reduce the time to healing of sugically treated AFFs. However, it's role in incomplete AFFs is less clear. Prophylactic surgery for incomplete AFF's is considered when there is pain or a fracture line. Furthermore, the natural history of incomplete AFFs is not determined with some healing spontaneously. Given that our patient has two incomplete AFFs, she may be at greater risk for fracture propagation and requires close clinical and radiographic monitoring.

Below: Complete AFF (left femur) and two incomplete AFFs (right femur)



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We have no conflicts of interest to declare.

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BODY COMPOSITION IN BARIATRIC SURGERY CANDIDATES

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Introduction: Obesity is a multifactorial chronic conditon impacting the body composition (lean, fat and bone masses) and the cardiometabolic health. Bariatric surgery can have negative effects on bone health and increases the risk of fragility fratures. Its complex physiopathology includes hormonal, mechanical and nutritional factors.

Aims:

This study aimed to determine the body composition in candidates to obesity surgery.

Methods: The study included individuals with BMI ≥ 35 kg/m² candidates to obesity surgery, followed in both Endocrinology and Surgery Departments. Anthropometric data were evaluated and a DXA scan (*Hologic Horizon A*^{R}) was done to assess the body composition including BMD and lean and fat masses. The statiscal analysis was done with software SPSS®, version 29.

Results: 20 individuals, 16(80%) females, mean age 51.3±9.1 years and mean BMI 41.7±1.4 Kg/m^2. The total fat and lean masses (Kg) were 49.9±10.4 and 63.8±11.3, respectively. The fat and lean masses índices (Kg/m^2) were 17.9±4.2 and 22.8±2.9 respectively, while the apendicular lean mass index was 9.6±1.2. The android-to-gynoid (A/G) ratio was 1.13±0.1 and the mean area of visceral adipose tissue was 237.7±85.3 cm^2 (males 332 cm², females 214 cm²). Mean total BMD L1-L4 (g/cm^2) was 1.004±0.2 (mean Z-score -0.30±1.7 SD) for females and 1.050±0.1 (mean Z-score 0.0±0.8 SD) for males. Mean total BMD femoral neck (g/cm^2) was 0.84±0.1 (mean Z-score 0.1±1.3 SD) for females and 0.94±0.1 (mean Z-score 0.8±0.8 SD) for males. Regarding BMD classification, there were no cases of osteopenia/osteoporosis in men, while 4 women had osteopenia and 1 had osteoporosis.

Discussion and Conclusions:

The A/G ratio and the area of visceral adipose tissue of this population showed values higher than cardiometabolic risk thresholds. That was mainly true for the male population which showed a higher both A/G ratio and visceral adipose tissue area. There were no cases of sarcopenia and appendicular lean mass was above the respective diagnostic limits. However, in the female group there were 25% cases of osteopenia/osteoporosis. This study highlights the importance of studying the body composition in candidates to bariatric surgery, in order to early diagnose bone fragility, sarcopenia and cardiometabolic risk factors, thus allowing for preventive therapeutic measures.

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OPPORTUNISTIC DIAGNOSIS OF OSTEOPOROTIC VERTEBRAL FRACTURES THROUGH CT-SCAN

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Osteoporosis is a bone metabolic disease characterized by compromised bone strenght predisposing to fragility fractures.

Although vertebral fractures (VF) are among the most common ones, they remain substantially underdiagnosed and undertreated. Opportunistic diagnosis of vertebral fractures through CT-scan has been proposed as an efficient method for VF detection allowing for osteoporosis identification and early patient treatment.

Objectives: To identify patients with vertebral fractures through thoracic, abdominal and pelvic CT scans performed for other diagnostic purposes, diagnose and treat osteoporosis.

Material and Methods: prospective study conducted from October 2023 to September 2024.

CT scans were analysed and those with at least one VF were selected to enter the study.

Exclusion criteria: active oncological disease, chronic kidney disease, severe psychiatric disease or substance abuse; those already receiving osteoporosis treatment, those followed in endocrinology/rheumatology clinics and those lacking essential clinical information were included only for demographic analysis. The eligible patients underwent clinical evaluation and biochemical and DXA testing. Antiresorptive therapy was initiated when appropriate. Statistical analyses were performed using Excel®.

Results: From a total of 430 CT scans, 206 patients were identified with VF, 64 were excluded and 68 died during the data-collection period. Seventy-four patients (40 [54%] females) were eligible for osteoporosis

assessment, and 16 ultimately attended the clinical evaluation. Deceased patients were significantly older (84 vs. 75 years, p < 0.01) and more frequently had ≥2 vertebral fractures (47% vs. 28%, p = 0.02). Twelve patients (16%) had a previously known fragility fracture, 28% were active smokers, 22% were on oral anticoagulants, 32% were on antidepressants/antipsychotics and 20% were on corticosteroids. Mean PTH level was 88.1 ± 87.5 pg/mL (14-72 pg/mL), and mean serum 25-hydroxyvitamin D was 20.5 ± 15.1 ng/mL.

Conclusions: Within one year, opportunistic CT-scan evaluation identified 74 patients eligible for osteoporosis management. Notably, 68 patients died before their eligibility could be determined, underscoring both the vulnerability of this population and the need for earlier detection. Our findings reinforce that osteoporosis remains underrecognized and undertreated. Opportunistic VF detection on routine CT scans represents a valuable and efficient strategy to identify high-risk individuals who might otherwise remain undiagnosed.

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SLEEP QUALITY IN COMMUNITY RHEUMATOLOGY PATIENTS: RESULTS OF A MULTICENTER OBSERVATIONAL STUDY

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Objectives

To evaluate sleep quality (SQ) in community-based rheumatology patients according to rheumatic conditions, comorbidities, treatments, and lifestyle habits, and to compare results with those of the general population (GP).

Methods

A cross-sectional observational study was conducted by fifteen rheumatologists in the Paris region and included 180 consecutive patients. Sleep duration, sleep quality, sleep disturbances, contributing factors, lifestyle habits, and the impact of physical activity were analyzed.

Results

The cohort consisted of 75% women (80% postmenopausal), with a mean age of 66.4 years and a mean BMI of 26.4 kg/m². Mechanical rheumatic disorders were predominant (72.5%), while inflammatory diseases accounted for 60.5%. The most frequent conditions were osteoarthritis (37.7%), low back pain (24%), rheumatoid arthritis (15.4%), osteoporosis (9.7%), spondyloarthritis (8.6%), tendinitis (8.6%), polymyalgia rheumatica (6%), and psoriatic arthritis (5%).

Mean sleep duration was shorter than in the GP (6 h 44 min vs 6 h 58 min), with longer sleep onset latency (34 vs 25 minutes). Only 26% of patients reported good SQ compared with 35% in the GP. Sleep quality was rated as average in 46%, poor in 9%, and very poor in 19%. SQ was better in inflammatory than in mechanical disorders, except for spondyloarthritis, which was associated with severe pain-related sleep disruption.

Sleep disturbances were reported by 92.5% of patients, particularly women. Nocturia, anxiety, and pain were the main contributing factors. Physical activity improved SQ in 51.6% of patients, especially morning exercise, gym-based activity, and sessions lasting less than 3.5 hours per week. Tea, coffee, and corticosteroids were not associated with impaired sleep.

Conclusion

Sleep disturbances are highly prevalent in community rheumatology patients, particularly in mechanical disorders. Despite frequent use of hypnotics and anxiolytics, sleep complaints remain insufficiently addressed. Systematic screening and targeted management should be integrated into routine rheumatologic care.

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MACHINE LEARNING FOR OSTEOPOROSIS RISK PREDICTION IN THAILAND'S AGING POPULATION

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Introduction

Osteoporosis poses a significant public health challenge for older adults in Thailand. As of 2022, the elderly population (≥60 years) exceeded 12 million, representing over 18% of the total populace [1]. An estimated 25% of this group (approximately 3 to 4 million individuals) are affected by or at high risk of osteoporosis. The projected rise in hip fracture incidence is concerning, estimated to reach 450–780 cases per 100,000 elderly by 2025 [2]. These fractures carry severe consequences: around 20% mortality within one year and up to 40% long-term disability [3]. Critically, 80–90% of at-risk individuals remain undiagnosed and untreated, indicating a major gap in current prevention strategies.

Purpose

This study's primary purpose, developed in collaboration with orthopedic and radiologist specialists, was to develop and validate a machine learning model capable of accurately predicting osteoporosis risk using routine clinical data from elderly patients. A secondary aim was to quantify the relative importance of key bone health indicators, specifically Trabecular Bone Score (TBS), alongside Bone Mineral Density (BMD) and Body Mass Index (BMI), to enhance early detection and improve decision-making for proactive fracture prevention in Thailand's aging society.

Methods

This analysis utilized clinical health data from 5,000 individuals to identify osteoporosis risk factors. Key variables included demographic information (age, sex), clinical data (BMI, and ICD9 codes), Trabecular Bone Score (TBS), and Bone Mineral Density (BMD). The modeling pipeline was implemented in Python using the scikit-learn framework. Feature selection was performed using Sequential Forward Floating Selection (SFFS), followed by supervised model training on the processed data, which included applying SMOTE (Synthetic Over-sampling Technique) to balance the dataset and improve detection of underrepresented cases. To ensure clinical relevance and interpretability, SHAP (SHapley Additive exPlanations) values were applied to quantify feature contribution. Exploratory analysis involved visualizing the distributions of Age, TBS, and BMD to identify patterns and potential risk thresholds, consistent with standard clinical assessment goals (e.g., determining the proportion of individuals with T-scores ≤−2.5 for osteoporosis).

Results

The analysis revealed established clinical patterns: a negative correlation was observed between age and BMD, and between age and TBS, confirming that bone density and microarchitecture tend to decline with aging. A significant positive correlation (r=0.79) was found between TBS and BMD, highlighting their complementary roles. The evaluation of multiple machine learning algorithms (logistic regression, SVM, random forests, XGBoost) identified XGBoost as the top performer, achieving an AUC of 0.98. Feature importance analysis using SHAP confirmed that

TBS ranked as a top predictor, alongside BMD and BMI, reinforcing its value as a key indicator of bone quality and fracture risk. The model also noted a relationship between dyslipidemia (elevated lipid levels) and increased osteoporosis likelihood.
Conclusion
The interdisciplinary integration of clinical expertise and data science successfully yielded a high-performing machine learning model (XGBoost, AUC = 0.98) for osteoporosis risk prediction. The findings underscore that relying solely on BMD is insufficient; incorporating TBS significantly enhances predictive accuracy and interpretability. The final model provides a valuable, proactive tool for identifying high-risk individuals early, thus supporting clinical decision-making and offering the potential to reduce the national burden of osteoporotic fractures in Thailand's rapidly growing elderly population.

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PREDICTORS FOR POOR OUTCOME AFTER HIP REPLACEMENT FOR ELDERLY FEMORAL NECK FRACTURE

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Introduction

Hip fractures among the elderly represent a significant public health issue, characterized by elevated mortality, morbidity, and healthcare expenditures. While bipolar hemiarthroplasty (BHA) is the standard treatment for displaced femoral neck fractures, long-term functional outcomes remain inconsistent. Research has predominantly focused on surgical techniques and mechanical failures, with limited exploration of non-surgical factors such as patient comorbidities and cognitive status.

Effective recovery hinges on precise surgical intervention and immediate postoperative mobilization to minimize complications. We hypothesize that optimal functional outcomes rely on a combination of surgical efficiency and baseline patient characteristics, including pre-injury ambulatory status and cognitive health. Identifying independent predictors is critical for risk stratification and the formulation of targeted care protocols.

This study aims to identify predictive factors associated with poor functional outcomes in elderly patients undergoing BHA for isolated femoral neck fractures. Additionally, we seek to develop and validate the Integrated Scoring System in Elderly Patients with Isolated Femoral Neck Fractures (ISSIFN) as a clinical tool for predicting functional recovery.
Materials and Methods

Settings and Subjects: This retrospective study was conducted between January 2015 and December 2021. It included elderly patients with low-energy femoral neck fractures who underwent BHA, with a minimum follow-up of two years. Exclusion criteria encompassed pathological fractures, high-energy trauma, bilateral fractures, and insufficient medical records, resulting in a final cohort of 399 patients.

Measurements: Demographic and clinical data were collected from electronic medical records, including age, gender, comorbidities, and surgical parameters. The Charlson Comorbidity Index (CCI) and the American Society of Anesthesiologists (ASA) classification assessed preoperative physical condition. Cognitive impairment was evaluated using the Mini-Mental State Examination (MMSE), with scores under 25 indicating cognitive impairment.
Surgical Procedure and Postoperative Management: All patients underwent BHA via the piriformis-sparing approach, preserving key muscles while ensuring joint stability. Postoperative pain management protocols were standardized, allowing for weight-bearing as tolerated when patients reported mild pain.

Outcome Measurements: Patients were followed at multiple intervals, with functional outcomes assessed using the Harris Hip Score (HHS). Scores were classified into good (80–89) and non-good (<80) outcomes, with deaths within two years categorized as non-good outcomes.

Statistical Analysis: Data analysis was performed using STATA version 14.0. Descriptive statistics summarized demographic data, while multivariate logistic regression identified predictors of functional outcomes.

Development and Validation of the Integrated Scoring System

The ISSIFN was developed from the cohort, utilizing logistic regression to determine associations between predictors and outcomes. The score was calculated based on regression coefficients, and receiver operating characteristic (ROC) curve analysis established a cut-off score for optimal predictive power.
Results

Participant Flow and Baseline Characteristics

From an initial cohort of 605 patients treated with bipolar hemiarthroplasty (BHA), 399 were included in the final analysis after excluding individuals with pathological fractures, prior revisions, or insufficient follow-up data. The population was predominantly female (77.44%), with a mean age of 80.14 ± 7.9 years. Physical status assessment indicated that 50.75% were classified as ASA 3, reflecting severe systemic disease, and the mean Charlson Comorbidity Index (CCI) was 4.29 ± 1.21. Cognitive impairment, defined as a Mini-Mental State Examination (MMSE) score <25, was present in 12.03% of participants.

Surgical and Clinical Parameters

All patients underwent BHA via a piriformis-sparing approach. The mean hip bone mineral density (BMD) T-score was -2.37 ± 1.22, while the average serum vitamin D level was 26.18 ± 12.89 ng/ml. Notably, 85.21% of patients experienced a time-to-operation exceeding three days, and 13.53% had a time-to-rehabilitation greater than three days. At the two-year follow-up, functional outcomes were assessed using the Harris Hip Score (HHS), revealing "poor" outcomes (HHS <80 or mortality) in 47 patients.

Development of the ISSIFN Scoring System

Univariable analysis demonstrated that age ≥80, ASA 3, cognitive impairment, and pre-fracture dependency were significantly associated with poor outcomes ($p < 0.05$). Multivariable logistic regression identified five independent predictors for the ISSIFN: Cognitive Impairment (6 points; aOR: 421.25), Time to Operation > 3 days (4 points; aOR: 45.60), Time to Rehabilitation > 3 days (3 points; aOR: 15.99), Pre-fracture Dependency (2 points; aOR: 7.24), BMD < -2.5 (2 points; aOR: 5.76).

Validation and Model Performance

The ISSIFN demonstrated excellent discriminatory power with an Area Under the ROC Curve (AUC) of 0.9331. The optimal cut-off score, determined by the Youden Index, was 8.5. At this threshold, the ISSIFN predicted poor functional outcomes with a sensitivity of 89% and specificity of 85%.

Discussion

The ISSIFN score offers a robust, objective framework for predicting long-term functional outcomes in elderly hip fracture patients. The data indicate that while biological factors, such as bone mineral density, are important, cognitive status and timelines for care are the most significant predictors of success.

The substantial adjusted odds ratio for cognitive impairment (aOR: 421.25) indicates that patients with MMSE scores <25 are at extreme risk for poor outcomes, likely due to their inability to adhere to essential postoperative protocols. Additionally, the 45-fold increase in the odds of poor outcomes associated with surgical delays beyond three days (aOR: 45.60) highlights a critical bottleneck in care.

Despite the benefits of the piriformis-sparing approach, these advantages are diminished if rehabilitation is delayed beyond three days. By utilizing the ISSIFN cut-off of 8.5, clinicians can quickly identify high-risk patients upon admission, enabling the implementation of intensified orthogeriatric care and expedited rehabilitation pathways to reduce the likelihood of poor functional outcomes.

Conclusion

The ISSIFN is a highly sensitive and specific tool for predicting functional outcomes following bipolar hemiarthroplasty. Prioritizing cognitive assessment and minimizing surgical and rehabilitative delays are crucial strategies for enhancing the quality of life in this vulnerable population.

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EVALUATION OF OSTEOSARCOPENIA OF THE ELDERLY FROM THE REPUBLIC OF MOLDOVA

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Background. The aging process involves a series of age-related musculoskeletal physiological changes, which represent an important indicator of health status, with a significant impact on the autonomy.
The purpose of the study was to evaluate the prevalence of osteosarcopenia and its association with age related changes in the elderly.
Material and Methods. The descriptive epidemiologic study included 613 elderly (73.16±0.24 years), who were examined according to clinical evaluation, laboratory and complex geriatric assessment(CGA). Based on the Canadian Classification of the elderly, 3 comparable groups were formed: young elderly(65-74 years) – 417(49.59%), mature elderly - 162(26.43%) and old elderly – 34(5.54%). Osteosarcopenia was diagnosed according to EWGSOP2 2018 criteria for sarcopenia and WHO criteria for osteoporosis.
Results. The weight of osteosarcopenia constituted 35.73% of patients from the general group, the highest was determined in the old elderly – 64.71% vs mature elderly – 48.15% vs young elderly – 28.54%($p<0.05$). A greater number of old, compared to mature and young elderly, met the criteria for osteosarcopenia: SARC-F – 6.79±0.44 pt. vs 5.34±0.21 pt. vs 3.77±0.12 pt., p=0.001; dynamometry – 16.82±1.4 kg vs 19.68±0.1 kg vs 24.76±0.56 kg, p=0.003; MMT – 40.35±3.44 kg vs 44.73±1.21 kg vs 55.42±1.09 kg, p=0.001; physical performance SPPB – 3.94±0.60 pt. vs 6.79±0.26 pt. vs 8.21±0.15 pt., p=0.0001; T-score -2.72±0.19 DS vs -2.63±0.08 DS vs -2.11±0.25 DS, p=0.002. The prevalence of osteoporosis by study groups was higher for the old elderly group 67.65%, then mature 5.88% and young 46.52%. The osteosarcopenia syndrome correlated with the severity of the frailty syndrome (r=0.50; p=0.05), with decreased autonomy (ADL, r=-0.59; p=0.05; IADL, r=-0, 63; p=0.05), presence of depression - DGS, r=0.42; p=0.05 and with MMSE cognitive disorders, r=-0.42; p=0.05. The value of 25-OH-Vitamin D per study group was: old elderly – min. value. 4.6 ng/ml, max. value 35.47 ng/ml; mature elderly - min. value 4.98 ng/ml, max. value 60.59 ng/ml; young elderly - value min. 20.17 ng/ml, max. value 86 ng/ml.
Conclusion. The osteosarcopenia syndrome was more frequently determined for old elderly patients with a major impact on both autonomy - cognitive and emotional status.
Key-words: osteosarcopenia, osteoporosis, elderly.

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MULTIFOCAL ATHEROSCLEROTIC VASCULAR DISEASE IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Introduction. Rheumatoid arthritis is a disease with high cardiovascular risk.
Objective. To assess the frequency of multifocal atherosclerosis (MFA) and its relationship with clinical manifestations in patients with rheumatoid arthritis (RA).
Materials and methods. The study included 100 patients with a confirmed diagnosis of RA. The mean age of the patients was 48.5±10.3 years; the majority were women (83%). The median disease duration was 120.0 [62.0; 204.0] months. Seropositivity for RF was detected in 73% of patients, and for ACCP in 78%. According to the DAS28-CRP index, 20% of patients had moderate disease activity, and 80% had high activity. The advanced stage of RA was diagnosed in 75% of patients, and the late stage in 23%. The mean values of activity indices were: SDAI - 33.3±10.8, CDAI - 31.3±10.2. The median ESR was 38.0 [24.0; 58.0] mm/h, and CRP - 12.3 [6.1; 27.4] mg/l. Joint erosions at the time of inclusion in the study were present in 79% of patients. According to radiographic examination, most patients had stage 2 (54%) or stage 3 (26%) disease. Systemic manifestations of RA were noted in 41% of the examined patients. Traditional CVD risk factors were identified in 62.0% of RA patients: overweight (BMI > 25 kg/m²) - in 44.0%, family history of cardiovascular pathology - in 31.0%, sedentary lifestyle - in 43.0%, arterial hypertension - in 41.0%. At the time of the study, 8.0% of patients were smokers. Atherosclerotic lesions of the common carotid (CCA) and femoral (FA) arteries were assessed using ultrasound Dopplerography, determined

by the presence of an atherosclerotic plaque (AP). The coronary artery calcium (CAC) was evaluated using a 32-row computed tomography scanner according to the standard Agatston method.
Results. Among the examined patients, APs were detected in 26 (45.6%) individuals. In terms of localization, APs were found in the CCA in 33.0% and in the FA in 34.0%. An elevated CAC according to MSCT was established in 17.0% of patients. Ultimately, the diagnosis of multifocal atherosclerosis (MFA) was verified in 25 (25.0%) of the studied individuals. We divided the patients into two groups: with MFA and without MFA. When comparing the groups, it was found that patients with MFA were significantly older ($p<0.001$) and had a higher BMI ($p<0.05$), however, no statistically significant differences were found in RA duration ($p=0.66$). Furthermore, in the MFA group, there were significantly more patients with swollen ($p<0.05$) and painful joints ($p<0.01$). In patients with MFA, the CCA IMT was greater: 0.60 mm [0.57; 0.69] versus 0.57 mm [0.50; 0.64] in patients without MFA ($p<0.05$). The FA IMT was also significantly greater in patients with MFA. For the FA, the IMT was 0.63 mm [0.55; 0.80] versus 0.56 mm [0.47; 0.68] in the group without MFA ($p<0.05$). The FA IMT demonstrated a direct correlation with disease activity indices: DAS28-CRP, SDAI, and CDAI ($r=0.4$).
Conclusion. It was established that multifocal atherosclerosis is detected in 25% of patients with RA. Its presence correlates with higher arthritis activity. This justifies the need for active screening for atherosclerosis, especially in the femoral arteries, in RA patients with high disease activity, regardless of the disease duration.

P245

THE EFFECT OF ALBANIAN URBAN LYRIC MUSIC ON PATIENTS WITH SARCOPENIA

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Objective: Evaluating the effect of urban lyric music on patients with sarcopenia
The muscle function and mass loss with age is a natural phenomenon. In the seventh and eighth decades of life, muscle strength decreases by 20-40% and the rate of reduction gradually increases with age. In patients with sarcopenia, the serum cortisol level is dysregulated, which further increases the stress level in them.
Material and methods: In total, 163 patients diagnosed with sarcopenia were included in the study: 92 women (56.4%) and 71 men (43.5%). Sarcopenia was defined as a relative skeletal mass index (SMI) of ≤ 5.77kg/m2. The mean age of the study group was 67±3.4 years. All patients were assessed for serum cortisol levels at 8 a.m. (5-23 mcg/dL) and 4 p.m. (3-13 mcg/dL) and SMI at baseline and on the 90th day of the study. All patients were referred to listen to 45-60 minutes per day of urban lyric music in the early morning and afternoon hours, by Albanian singers such as Tefta Tashko Koço, Marije Kraja, Jorgjie Truja and works by composer Lola Gjoka, for 90 days. Individuals suffering from diseases that affect muscle mass or receiving treatment that influence serum cortisol levels, were excluded from this study.
Results: At the beginning of the study, the SMI level of the patients was 3.5.93±0.66kg/m2. The serum cortisol level at the beginning of the study showed oscillations, with increased values at 8 a.m., 43±6.7 mcg/dl and at 4 p.m., 23±4.3mcg/dl. On the 90th day of the study, a period in which patients were treated with listening to Albanian urban lyric music twice a day for 45-60 minutes, the SMI value was 4.1±0.9kg/m2 and the serum cortisol level was at 8 a.m., 25±1.6mcg/dl and at 4 p.m., 16±0.9mcg/dl. A correlation was found between serum cortisol levels and muscle mass in the study group ($p<00.5$, $r=1$). The data confirms an improvement in serum cortisol levels in patients after 90 days of treatment with listening to Albanian urban lyric music.
Conclusion: The study shows that Albanian urban lyric music affects blood cortisol levels and directly influences the muscle mass levels. This music affects the reduction of stress levels and the improvement of serum cortisol levels, reducing the rate of muscle catabolism.

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HOW GOOD I FEEL WITH A CORTISONE PILL !

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Glucocorticoids-induced osteoporosis (GIOP) affects 0.7-1.5% of adults in the world. An estimated 30% of long-term glucocorticoids (GC) users develop secondary osteoporosis. GIOP patients most often experience spine fractures, whom risk is 2.5-3 fold higher than general population. Hip fracture is the second most common fracture. Since the first 3 months of GC treatment are critical for bone loss, adequate prevention of GIOP should be immediately implemented through lifestyle modification and calcium and vitamin D supplementation. In addition, anti-resorptive therapy should also be promptly considered.
A 74-years-old woman came to our attention for an initial evaluation due to 3 vertebral fractures, all of which occurred in recent years without traumatic events. She had never been treated with anti-osteoporosis drugs. We studied the main risk factors for osteoporosis, such as early menopause, family history, smoking, alcohol consumption, and diseases or therapies known to cause secondary forms of osteoporosis. Her entire medical history was negative for the identification of a clear predisposing factor. Bone densitometry showed osteoporosis (T-score in lumbar tract -2.7 SD, at femoral neck -2.5 SD), unchanged since menopause. So our patient had 3 major fragility fractures without any predisposing factors. How strange! Finally, we asked her again if she had ever been subjected to chronic treatment with GC and got the answer: she confessed that for several years she had been taking oral prednisone 50 mg (2-3 times a week) for analgesic purposes without medical advice. She had clearly undervalued the harmful effects in light of the significant perceived benefits on pain.
In conclusion, we recommend always taking a complete medical history and carefully assessing the main fracture risk factors, paying particular attention to the use of as-needed glucocorticoids, whose side effects on bone are underestimated by most patients and whose use is often not reported to physicians.

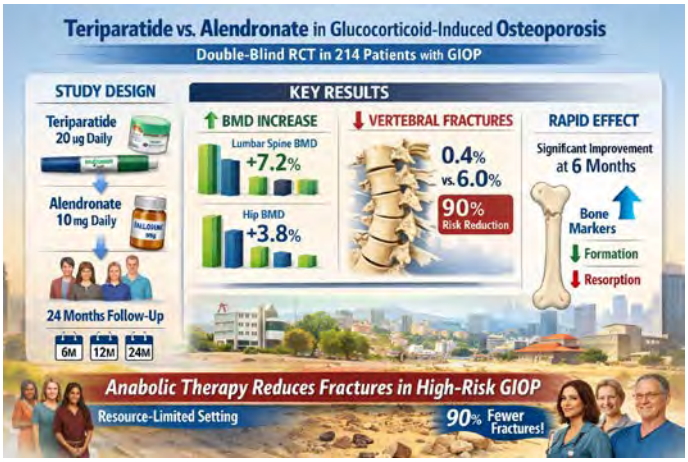
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TERIPARATIDE VERSUS ALENDRONATE IN GLUCOCORTICOID-INDUCED OSTEOPOROSIS: A DOUBLE-BLIND RANDOMIZED CONTROLLED TRIAL WITH FRACTURE OUTCOMES FROM A RESOURCE-LIMITED SETTING

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Background:
Glucocorticoid-induced osteoporosis (GIOP) is a major cause of secondary osteoporosis and fragility fractures, particularly in low- and middle-income countries where long-term steroid use is common. Evidence directly comparing anabolic and antiresorptive therapies in patients at high fracture risk remains limited. This study compared the efficacy, fracture outcomes, and mechanistic effects of teriparatide versus alendronate in established GIOP.
Methods:
In this double-blind randomized controlled trial, 214 adults (22–65 years) receiving long-term glucocorticoid therapy (≥5 mg/day prednisone equivalent for ≥3 months) with osteoporosis were randomized to daily subcutaneous teriparatide (20 µg, n=107) or oral alendronate (10 mg, n=107), with calcium and vitamin D supplementation. Primary outcome was percentage change in lumbar spine bone mineral density (BMD). Secondary outcomes included total hip BMD, vertebral fracture incidence, early treatment response, bone turnover markers, and safety over 24 months.
Results:
Significant between-group differences in lumbar spine BMD were evident as early as 6 months ($P < 0.001$). At 24 months, lumbar spine BMD increased by 7.2 ± 0.7% with teriparatide versus 3.4 ± 0.7% with alendronate ($P < 0.001$). Total hip BMD gains were also greater in the teriparatide group (3.8 ± 0.6% vs. 2.4 ± 0.6%; $P = 0.005$). New vertebral fractures occurred significantly less frequently with teriparatide compared with alendronate (0.4% vs. 6.0%; $P = 0.004$), representing an approximate 90% relative risk reduction. Teriparatide produced marked increases in bone formation markers, consistent with its anabolic mechanism, while alendronate primarily suppressed bone resorption. The greatest skeletal benefits were observed in patients with prior vertebral fractures and very low baseline BMD. Both treatments were generally well tolerated, with no significant differences in serious adverse events.
Conclusion:
In patients with glucocorticoid-induced osteoporosis at high fracture risk, teriparatide provided earlier and significantly greater improvements in spinal and hip BMD and substantially reduced vertebral fracture incidence compared with alendronate. These findings support an anabolic-first treatment strategy for severe GIOP, particularly in high-risk patients, and are highly relevant for resource-constrained healthcare systems where fracture-related disability carries major socioeconomic consequences.
Keywords: Glucocorticoid-induced osteoporosis, Teriparatide, Alendronate, Vertebral fractures, Bone mineral density



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OSTEOSARCOPENIA: A HIGH-RISK PHENOTYPE FOR FRACTURES, HOSPITALIZATIONS, AND MORTALITY IN OLDER ADULTS

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Background:
Osteosarcopenia, the coexistence of osteoporosis and sarcopenia, is increasingly recognized as a high-risk phenotype in older adults. While both conditions individually increase fracture and mortality risk, their combined impact remains underexplored. Early identification may guide interventions to reduce adverse outcomes.

Methods:
We conducted a prospective cohort study of **1,200 community-dwelling adults aged ≥65 years** (mean age 72.4 ± 5.6; 58% female). Osteoporosis was defined by **DXA T-score ≤ −2.5** and sarcopenia by **EWGSOP2 criteria** (low muscle mass + low strength). Participants were categorized as: neither, osteoporosis only, sarcopenia only, or osteosarcopenia. Outcomes included **incident fractures, hospitalizations, functional decline, and all-cause mortality** over 3 years. **Cox proportional hazards models** adjusted for age, sex, BMI, comorbidities, and medications.

Results:
Osteosarcopenia prevalence was **12%**, osteoporosis only 28%, sarcopenia only 14%, and neither 46%. Fracture incidence was **28% in osteosarcopenia** vs 15% (osteoporosis only), 12% (sarcopenia only), and 5% (neither). Adjusted hazard ratios (osteosarcopenia vs neither) were: **fractures 5.2 (3.4–7.8), hospitalizations 2.8 (1.9–4.1), mortality 3.6 (2.2–5.9); $p < 0.001$** for all. Functional decline was faster in osteosarcopenia (gait speed −0.15 m/s/year, SF-36 physical score 12 points, $p < 0.01$). Kaplan–Meier analysis showed the steepest decrease in fracture-free and overall survival for osteosarcopenia.

Conclusion:
Osteosarcopenia is a high-risk phenotype associated with fractures, hospitalizations, functional decline, and mortality. Integrated assessment and interventions targeting **both bone and muscle health** are essential. Recognition of osteosarcopenia as a distinct clinical entity may improve risk stratification and guide preventive strategies.

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UNDERDIAGNOSED VERTEBRAL FRACTURES: OPPORTUNISTIC DETECTION USING CHEST AND ABDOMINAL CT SCANS

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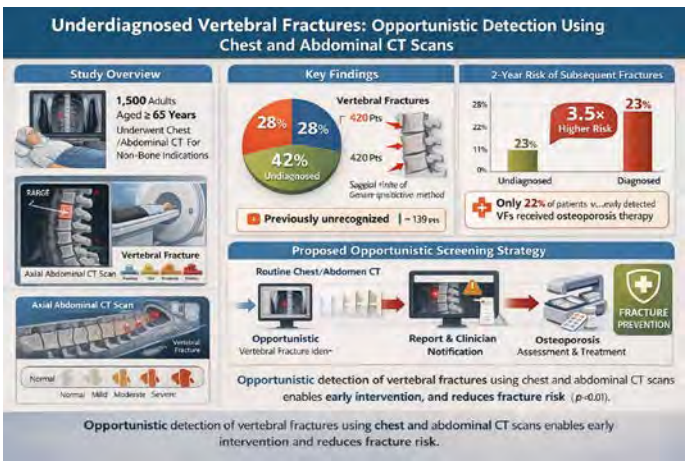
Background:
Vertebral fractures (VFs) are the most common osteoporotic fractures but are frequently **underdiagnosed**, delaying treatment and increasing risk of subsequent fractures. Routine chest or abdominal CT scans performed for other indications may allow **opportunistic detection** of VFs, improving early diagnosis and intervention.

Methods:
We retrospectively analyzed **1,500 adults aged ≥65 years** who underwent chest or abdominal CT. VFs were assessed using the **Genant semi-quantitative method**. Clinical records were reviewed to determine prior recognition and osteoporosis treatment. Outcomes included **prevalence of undiagnosed VFs, subsequent fracture risk, and treatment initiation**. Logistic regression adjusted for age, sex, BMI, and comorbidities.

Results:

- VFs were present in **28% (n=420)**; **67% (n=281)** were previously unrecognized.
- Undiagnosed VFs were associated with a **3.5-fold higher risk of subsequent fractures** (HR 3.5, 95% CI 2.1–5.8, p < 0.001).
- Only **22% of patients** with newly identified VFs received osteoporosis therapy.
- Older age, male sex, and higher BMI independently predicted underdiagnosis (p < 0.05).

Conclusion:
Vertebral fractures are frequently missed but can be opportunistically detected on routine CT scans. Early identification enables **timely intervention**, reducing fracture risk and morbidity. Integrating vertebral fracture assessment into routine CT reporting, potentially with **automated or radiologist-driven tools**, represents a feasible strategy to improve osteoporosis care.



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THE IMPACT OF CONCOMITANT OSTEOARTHRITIS ON THE SEVERITY OF RHEUMATOID ARTHRITIS AND THE TREATMENT RESPONSE

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Introduction. The combination of rheumatoid arthritis (RA) with osteoarthritis (OA) is a common practical problem. In patients with RA onset at a young and middle age, OA is considered a secondary process caused by joint biomechanics disorders due to RA. The severity of RA depends on the disease activity, which is evaluated by indices that include mainly subjective indicators. The commonest index, DAS28-CRP/ESR, contains only one objective laboratory indicator: CRP or ESR. Additionally the severity of joint syndrome in patients with RA may be caused by secondary OA.
The aim of the present study was to assess the OA influence on the intensity of the joint syndrome and the response to the standard RA therapy.
Materials and methods. The study included 260 patients with a verified diagnosis of RA, 221 women (85%), 39 men (15%) aged from 28 to 83 years (mean age 58.2 ± 3.7 years), with established and late stage of the disease, 2-4 radiological stage. The vast majority of patients were seropositive for RF (82.3%) and ACCP (92.3%). All patients received standard therapy with traditional immunosuppressants, and 64 patients (24.6%) received biological or target drugs. 165 (63.5%) patients received systemic glucocorticoids (GC) in a persistent regimen, and 214 (82.3%) patients regularly took non-steroidal anti-inflammatory drugs. The activity of RA was assessed by the DAS28-CRP or DAS28-ESR indices, and the response to treatment was assessed by the dynamics of this index. The diagnosis of concomitant OA was performed based on the clinical features of the joint involvement and imaging data (X-ray, CT, MRI, sonography).
Results. In the observed group, 232 (89.2%) patients corresponded to the level of moderate and high RA activity, while 86 people (33%) did not show signs of active synovitis of small joints and joints of the upper extremities, and in 93 (35.8%) ESR and CRP did not exceed normal values. An unsatisfactory or insufficient response to treatment according to the dynamics of the DAS28-CRP/ESR index was noted in 127 patients, which is 48.9%. X-ray signs of OA were observed in 119 (45.8%) patients, with the frequency of OA reaching 57.5% (73 patients) in the non-responders subgroup, while OA was diagnosed less frequently in the responders – in 33.1% of cases (44 patients). When comparing demographic and clinical indicators in subgroups with concomitant OA (OA+) and without concomitant OA (OA-), significant differences were found in terms of average age, frequency of metabolic and cardiovascular diseases, frequency of use, and dose of GC. In the OA+subgroup, there was a significant excess of joint pain intensity according to VAS (7.92±0.96 and 5.04±0.87, respectively, t=2.2 p<0.05), general health assessment (86.3±6.15 and 53.18±7.91, respectively, t=3.3, p<0.05), as well as a significant decrease in the mean number of swollen joints (1.18±0.36

vs 3.23±0.85, t=2.32 p<0.05) and mean ESR (19.34±3.18 vs 28.46±2.12, t=2.2 p<0.05, t=2.24, p<0.05).
Conclusions. OA, detected in 45.8% of RA patients, is associated with older age, the presence of comorbid pathology, long-term use of GC, and worse response to standard anti-rheumatic therapy. Patients with a combination of RA and OA, in the absence of objective signs of active synovitis, have higher joint pain intensity and worse overall health indicators, with lower number of swollen joints and ESR. These results demonstrate a significant contribution of secondary OA to the intensity of joint involvement as well as to the standard treatment failure.

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EFFECTS OF TWO-YEAR DENOSUMAB TREATMENT ON HIP BONE ARCHITECTURE IN POSTMENOPAUSAL OSTEOPOROSIS ASSESSED BY DXA-BASED 3D MODELING

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Objective: Denosumab is a fully humanized monoclonal antibody targeting the receptor activator of nuclear factor κB ligand and has demonstrated robust efficacy in significantly increasing bone mineral density (BMD) and reducing fracture risk. However, data on the effects of denosumab on volumetric BMD (vBMD) remain limited. Given the increasing use of denosumab as both a first-line and sequential therapy, this study aimed to investigate its real-world effects on three-dimensional dual-energy X-ray absorptiometry (3D-DXA)–derived parameters, with particular attention to the influence of prior antiresorptive therapy.
Methods: This retrospective study included 101 postmenopausal women with osteoporosis who were treated with denosumab for two years and underwent DXA assessments both before and after treatment. In addition to areal BMD (aBMD), hip structural parameters were evaluated using 3D-Shaper software, including cortical and trabecular vBMD, integral vBMD (trabecular plus cortical), cortical surface BMD (sBMD), and cortical thickness.
Results: Among the study population, 51.5% (52/101) had a prior history of antiresorptive therapy. Patients with prior antiresorptive treatment were older than treatment-naïve patients (68.1 ± 7.8 vs. 63.9 ± 8.8 years, $P = 0.013$), while body mass index (BMI) was comparable between groups (22.1 ± 2.8 vs. 21.9 ± 2.6 kg/m², $P = 0.808$). After two years of denosumab treatment, significant increases in aBMD were observed at the lumbar spine (5.5 ± 4.5%), femoral neck (2.7 ± 6.6%), and total hip (3.2 ± 5.6%) (all $P < 0.001$). Three-dimensional DXA analysis demonstrated significant increases in integral vBMD (3.4 ± 6.1%, $P < 0.001$), trabecular vBMD (3.2 ± 13.3%, $P = 0.016$), and cortical vBMD (3.8 ± 6.9%, $P < 0.001$). Cortical sBMD and cortical thickness also increased significantly (4.7 ± 7.9%, $P < 0.001$; and 1.3 ± 4.6%, P = 0.008, respectively). After adjustment for age and BMI, no significant differences were observed in changes in aBMD or 3D-DXA parameters according to prior antiresorptive treatment history.
Conclusions: Two years of denosumab treatment resulted in significant improvements in both aBMD and 3D-DXA–derived parameters, including volumetric BMD, regardless of prior antiresorptive therapy history.

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REAL-LIFE INDICATIONS AND EFFECTIVENESS OF DENOSUMAB IN A HIGH-COMPLEXITY PUBLIC TERTIARY CENTER: A RETROSPECTIVE STUDY

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Objectives: To evaluate the real-life indications and therapeutic outcomes of denosumab in a specialized rheumatology-based osteoporosis clinic of a high-complexity tertiary public center, focusing on a population with significant comorbidities.
Material and Methods: Patients receiving denosumab for osteoporosis (OP) were identified at a tertiary referral hospital through a retrospective review of electronic medical records from January 2013 to December 2024. We analyzed demographics, indications for treatment, densitometric evolution, and bone turnover markers. For comparative analysis, patients were categorized based on prior osteoporosis treatment: prior use of zoledronic acid versus no prior use. Continuous variables are expressed as median [IQR] and categorical variables as (frequency, percentage). Differences between groups were assessed using Wilcoxon and Chi-square or Fisher's exact tests. All analyses were performed using R software.
Results: The study included 211 patients (median age 72.0 [63 - 82] years; 84.8% female). Prior exposure to oral bisphosphonates was reported in (181, 85.8%) patients, while (135, 64%) had used intravenous bisphosphonates (mainly zoledronic acid, n=114). Significant comorbidities included immune-mediated rheumatic diseases (39.8%), advanced kidney disease (32.7%), type 2 diabetes (14.7%) and smoking (8.5%). The most frequent indications were renal dysfunction (43.6%) and failure of intravenous bisphosphonate therapy (34.6%). Denosumab treatment resulted in a significant reduction in C-terminal telopeptide levels (delta −56%, p<0.001) and increased bone mineral density at the femoral neck (+5%, p=0.018), total hip (+3%, p=0.058) and lumbar spine (+3%, p=0.012). When comparing patients with prior zoledronic acid use to those without, a statistically significant difference was observed at the total hip (+1.7% [−4.5 - 8.8] vs. +8.9% [0.0 - 18.4]; p=0.037). At the lumbar spine and femoral neck, no significant differences were found between the groups (+2.6% [−2.2 - 8.1] vs. +7.0% [0.7 - 17.0]; p=0.124 and +7.2% [−3.9 - 16.4] vs. +4.7% [−0.5 - 24.4]; p=0.407, respectively). Regarding bone turnover, both groups showed comparable reductions in CTX levels (−57.7% [−72.7 - −17.9] vs. −51.1% [−64.2 - −11.9]; p=0.680).
Conclusions: In this real-world high-complexity setting, denosumab was predominantly indicated for patients with renal dysfunction and those failing intravenous bisphosphonates. The treatment effectively suppressed bone turnover and improved bone mineral density, demonstrating a blunted yet positive response in patients with prior zoledronic acid exposure. These findings support denosumab as a valuable therapeutic option for managing severe osteoporosis in multimorbid populations.

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MAPPING FRAGILITY FRACTURES IN STATE OF SÃO PAULO: DEMOGRAPHICS, OUTCOMES, AND REGIONAL VARIATION FROM REGULATION RECORDS

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Objectives: Fragility fractures (FF) are increasingly straining health systems as populations age, yet Brazil still lacks recent, standardized population-based information to guide prevention strategies and service allocation. This study sought to map the epidemiologic profile of fragility fractures in São Paulo State by integrating patient-level demographic/clinical characteristics with location-based measures of occurrence/referral and broader socioeconomic/environmental contextual indicators.
Material and Methods: Retrospective study using the São Paulo State Hospital Regulation System (SIRESP) urgency/emergency orthopedic records from 2019 to 2023. Records from individuals <30 years, with incompatible diagnoses/high-energy trauma, or inconsistent data were excluded. Records were then subjected to manual review. The Spearman test was for temporal trend, ANOVA for latitude-band differences, and multivariable logistic regression for mortality predictors.
Results: Among 89,669 fragility fractures, patients were 73 ± 15 years on average and 67% were women. The main sites were proximal femur (52%), distal radius (22%), proximal humerus (16%), vertebral (2%), and multiple fractures (0.6%). In-regulation mortality was 0.2% (207 deaths), mostly after proximal femur fractures (95%). In femur fractures, mortality increased with age (OR 1.06/year, CI 1.05-1.08), male sex (OR 1.92, CI 1.44-2.55), and longer resolution time (OR 1.07/day, CI 1.05-1.08). From 2019 to 2023, annual volume rose 50.5% (12,967→19,517), with the steepest increases in distal radius (+83.2%) and vertebral (+72.0%) fractures. Fracture rates differed by latitude (212.7/100,000 at −25 to −23.7° vs 220.1/100,000 at −21.2 to −19.9°; p≤0.001), showing higher fracture rates but lower mortality at lower latitudes (p=0.01); Human Development Index (HDI) also varied by latitude but showed no clear association with fracture or mortality rates.
Conclusion: Fragility fractures increased substantially in São Paulo State and predominantly affected older women. Mortality predictors suggest that faster access to definitive care may improve outcomes. Latitude-related differences indicate regional heterogeneity, supporting localized prevention strategies and care-pathway optimization.

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CLINICAL FEATURES AND ASSESSMENT OF EPICARDIAL ADIPOSE TISSUE IN PATIENTS WITH ACTIVE RHEUMATOID ARTHRITIS AND CHRONIC HEART FAILURE

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Objective: to evaluate the clinical features and thickness of epicardial adipose tissue (EAT) in patients with rheumatoid arthritis (RA) and chronic heart failure (CHF).
Materials and methods: the study included 100 patients with a reliable diagnosis of RA with high disease activity and insufficient therapy effectiveness. All patients underwent echocardiography with an assessment of the thickness of the EAT along the anterior wall of the right ventricle. CHF was assessed according to the recommendations of the European Society of Cardiology.
Results: All RA patients were divided into groups – without CHF (n=39), with the pre-stage of CHF (n=35) and with the presence of CHF (n=26). The thickness of the EAT was 5.8 [2.4; 10.1] mm. In the group without CHF – 5.5 [2.4; 8.4] mm, in the group with pre-stage of CHF – 5.6 [2.4; 9.0] mm, in the group with CHF – 6.4 [2.5; 10.1] mm. When evaluated by groups, significant differences in the thickness of the EAT were noted (p=0.08). There was a direct correlation of EAT with the age of patients in the entire group (r=0.3, p <0.05), as well as in the group of patients with CHF (r=0.4, p <0.05). The thickness of the EAT in the general group was directly correlated with the presence of risk factors for cardiovascular diseases (CVD) (r=0.3, p <0.05), as well as with the presence of hypertension (r=0.4, p <0.05) and systolic blood pressure (SBP) (r=0.2, p <0.05), the presence of complaints of shortness of breath (r=0.3, p <0.05) and edema on objective examination (r=0.3, p <0.05). This correlation was even more strongly demonstrated in the group of patients with CHF with the presence of CVD risk factors (r=0.5, p <0.05) and hypertension (r=0.7, p <0.05) and the presence of edema (r=0.4, p <0.05), while no correlating with the level of SBP and shortness of breath was found.
Conclusion: in patients with high-activity rheumatoid arthritis, correlations were found with the thickness of the EAT with clinical parameters and with the presence of one or more risk factors for CVD. In the group with CHF, there is an additional correlation of EAT with the presence of edema. Patients with CHF pre-stage had no correlation with EAT.

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EFFECTIVENESS OF REMS TECHNOLOGY FOR SHORT-TERM MONITORING OF ROMOSOZUMAB EFFECT AT THE FEMORAL SITE IN POSTMENOPAUSAL WOMEN

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Objective(s): Romosozumab (RMZ) is a humanized monoclonal IgG2 antibody that selectively inhibits sclerostin, exerting a unique dual mechanism of action by stimulating bone formation and reducing bone resorption. This retrospective observational study aimed, for the first time, to evaluate the effectiveness of Radiofrequency Echographic Multi Spectrometry (REMS) for short-term monitoring of RMZ treatment in a cohort of post-menopausal women.

Materials and Methods: Post-menopausal women eligible for RMZ therapy were enrolled and monitored before (baseline) and at six-months (T1) follow-up. All the patients underwent REMS scans at the femoral site at both time-points to assess bone mineral density (BMD), T-score and Fragility Score (FS) values. Changes over time were analyzed using paired *t*-tests. Analyses were stratified by key variables (e.g., age group, BMI, prior osteoporosis therapy, number of vertebral fractures) to assess potential heterogeneity of treatment effects.

Results: A total of $n = 27$ patients (mean age: 71.7 ± 7.3 years) completed the six-months follow-up and were included in the analysis. At T1 a statistically significant increase in BMD was observed compared with baseline, with a 3.0% increase at the total hip (0.725 ± 0.103 g/cm² *vs*. 0.704 ± 0.108 g/cm²; $p = 0.004$) and a 2.7% increase at the femoral neck (0.573 ± 0.085 g/cm² *vs*. 0.558 ± 0.091 g/cm²; $p = 0.006$).

Conclusion(s): This retrospective observational study demonstrates, for the first time, the effectiveness of REMS technology in monitoring the short-term effects of RMZ in post-menopausal women, confirming the findings reported in the literature using standard densitometric technologies such as dual energy X-ray absorptiometry (DXA). Overall, thanks to its radiation-free nature, high-precision, high-portability and low-costs, REMS appears to be a valuable tool for assessing the real-world short-term clinical effectiveness of RMZ therapy.

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SENSITIVITY-OPTIMIZED MACHINE LEARNING FOR NON-INVASIVE SARCOPENIA SCREENING IN COMMUNITY-DWELLING OLDER ADULTS: THE BUSHEHR ELDERLY HEALTH PROGRAM

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Objective: To develop and validate a high-sensitivity machine learning screening tool for sarcopenia using routine clinical variables, optimized to minimize false negatives.

Material and Methods: We analyzed data from 4,110 older adults in the Bushehr elderly health program, defining sarcopenia using EWGSOP2 criteria. Recursive feature elimination using regularized logistic regression and XGBoost identified top predictors. Twelve base classifiers and three ensembles were trained on the training set (80%) using SMOTEENN resampling. Decision thresholds were dynamically tuned via internal cross-validation to maximize the F2-score, with validation on a 20% independent test set. Model performance was evaluated using AUC, sensitivity, specificity, and F2-score.

Results: The cohort (median age 66.0 years, 54.2% female) showed 18.4% sarcopenia prevalence. The multilayer perceptron (MLP) was the optimal screening model, achieving the highest discriminatory power (AUC 0.86, sensitivity 0.89, specificity 0.66, F2 0.70) and a negative predictive value of 0.97, validating its utility for rapid triage (Table and Figure). Voting ensemble yielded comparable performance (AUC 0.86, sensitivity 0.86), while the stacking ensemble maximized specificity (0.72) at the cost of sensitivity (0.80). MLP superiority suggests non-linear interactions between predictors (Table).

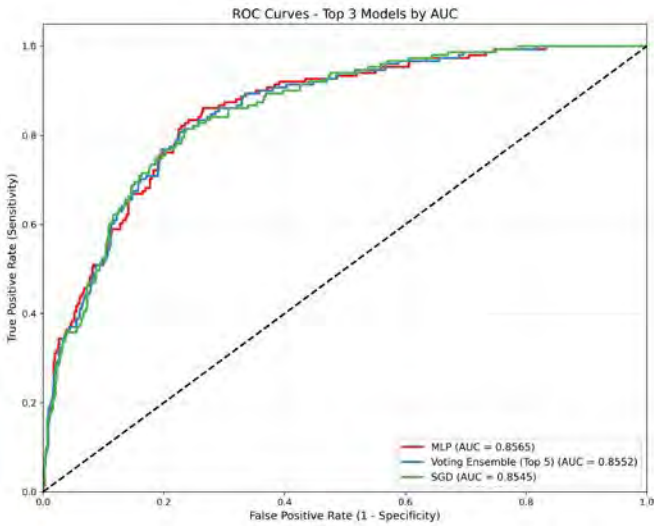
Conclusion: This sensitivity-optimized MLP classifier utilizing routine metrics effectively screens for sarcopenia. By prioritizing false-negative reduction, the framework facilitates risk stratification and timely intervention. An online risk calculator was developed based on these models.

https://osteosarcopenia-risk-calculator-u9pvs4ecg7euxryfcec3mc.streamlit.app/

Table: Performance of the top five models for sarcopenia screening using 11 features.

Model	F2-Score	Sensitivity	Specificity	ROC-AUC
MLP	0.699	0.894	0.662	0.857
Voting Ensemble (Top 5)	0.691	0.861	0.693	0.855
Extra Trees	0.691	0.861	0.693	0.844
SGD	0.691	0.861	0.692	0.854
Logistic Regression	0.681	0.861	0.673	0.854
Feature importance: Independence in dressing, chronic renal failure, diabetes, hormone replacement therapy, difficulty climbing stairs, osteoarthritis, sex, age, thigh circumference, forearm circumference, and weight.				

Figure: ROC curves of top sarcopenia screening models.



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OPTIMIZING OSTEOSARCOPENIA SCREENING: DIRECT VERSUS COMBINED MACHINE LEARNING APPROACHES IN COMMUNITY-DWELLING OLDER ADULTS

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Objective: To evaluate machine learning models for osteosarcopenia screening by comparing direct classification against a combined framework of low bone mass and sarcopenia models.

Material and methods: We analyzed baseline data of 4,110 older adults from the Bushehr elderly health program, defining osteosarcopenia as coexistent sarcopenia (EWGSOP2) and low bone mass (DXA T-score < -1.0). The study compared direct joint classification versus a combined approach using a stacking meta-learner to aggregate calibrated classifiers. Following an 80/20 stratified split, we employed hybrid feature selection (recursive feature elimination with cross-validation) and SMOTEENN resampling to address class imbalance. Classification thresholds were F2-optimized via 5-fold cross-validation with isotonic calibration. We used AUC, sensitivity, specificity, and F2-score to measure model performance.

Results: Among participants (median age 66.0; 54.2% female), the prevalence of osteosarcopenia was 17.1%. Feature selection prioritized anthropometrics, comorbidities, and functional metrics as key predictors (Table). The direct extra trees model achieved acceptable screening metrics (AUC 0.84, sensitivity 0.87, specificity 0.66, F2 0.67). The Combined framework (XGBoost/balanced stacking) enhanced sensitivity (0.89) while maintaining comparable predictive performance (AUC 0.84, specificity 0.65, F2 0.67). Alternatively, an extra trees/multilayer perceptron configuration offered higher specificity (0.73) with slightly reduced sensitivity (0.83).

Conclusion: Accounting for the joint probability of bone and muscle health yields higher sensitivity than direct classification. This strategy allows for context-specific model selection and supports a tiered screening protocol, triaging high-risk individuals for confirmatory DXA to ensure timely intervention. These models are available as a web-based risk assessment tool.

https://osteosarcopenia-risk-calculator-u9pvs4ecg7euxryfcec3mc.streamlit.app/

Table: Performance of the top six models for osteosarcopenia screening using 18 features.

Model	F2	Sensitivity	Specificity	AUC
Extra Trees (Direct)	0.668	0.872	0.656	0.838
MLP (Direct)	0.667	0.865	0.664	0.847
Random Forest (Direct)	0.662	0.872	0.645	0.839
Extra Trees + MLP	0.674	0.830	0.725	0.841
Balanced Stacking + MLP	0.674	0.830	0.725	0.841
Random Forest + Extra Trees 0.674 0.872 0.668 0.841				
Feature importance: weight, sex, hormone replacement therapy, age, forearm circumference, chronic renal failure, parity, difficulty climbing stairs, diabetes, waist circumference, fear of falling, difficulty walking, smoking status, fracture cause, difficulty lifting, height, MNA score, thigh circumference.				

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ONE-YEAR THROMBOEMBOLIC RISK FOLLOWING FRACTURES IN ADULTS AGED ≥50 YEARS: RESULTS FROM A NATIONWIDE RETROSPECTIVE COHORT

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Objectives

Numerous studies based on the inpatient treatment period have demonstrated an increased risk of thromboembolic and hemorrhagic vascular events (THVEs) after fractures, especially in elderly patients. However, the epidemiology of THVEs after hospital discharge, particularly population-level estimates by fracture type, remains unknown.

Material and Methods

We conducted a nationwide retrospective register-based study using pseudonymised inpatient data obtained from Austrian social insurance authorities and the Federal Ministry of Labour, Social Affairs, Health, and Consumer Protection. We included all patients in Austria ≥50 years hospitalised with any kind of fracture (2016-2020). Thrombotic and bleeding diagnoses were grouped as THVEs. We estimated the 1-year cumulative incidence function (CIF) using competing risk methodology, with death as a competing event.

Results

We analysed a cohort of patients who sustained any type of fracture (N=102,941; mean age 75.5, SD 12.1; females 69.8%) and who had not been hospitalized due to THVEs before fracture. Within this cohort, 4857 (4.7%) patients experienced a THVE.

Using competing risks analysis with death as a competing event (11,047 deaths, 10.7%), the 1-year cumulative incidence of THVE was 2.73% (95% CI: 2.63%-2.83%). Stratification by fracture type revealed significant heterogeneity (Gray's test p<0.001): femur and lumbar/pelvis fractures had the highest risk (3.3%), while forearm fractures had the lowest (1.2%). This variation strongly correlated with patient age, as femur fracture patients were oldest (mean age 80.2 years) and forearm fracture patients youngest (67.7 years).

Cerebral infarction was the most common (1,427 events, 1-year CIF: 0.78%, 95% CI 0.72-0.83), followed by pulmonary embolism (627 events, 0.40%, 95% CI 0.36-0.44) and myocardial infarction (681 events, 0.35%, 95% CI 0.31-0.39). Increasing age was associated with higher THVEs risk (SHR = 1.039 per year, 95% CI 1.036–1.043, p < 0.001), while females had significantly lower risk compared to males (SHR = 0.799, 95% CI 0.737–0.867, p < 0.001).

Conclusion

THVEs risk after fracture is substantial but varies significantly by fracture type and patient age. These findings support fracture-specific and age-stratified approaches to long-term prophylaxis rather than uniform protocols. The competing risk of death far exceeds THVEs risk, emphasizing the importance of appropriate statistical methods.

P259

A REAL-WORLD INVESTIGATION OF ROMOSOZUMAB IN EUROPEAN CLINICAL PRACTICE: DESIGN AND RATIONALE OF THE PRIME STUDY

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Objective: Romosozumab (Romo) is a dual-effect sclerostin inhibitor indicated for postmenopausal women with severe osteoporosis at high fracture risk. PRIME (Prospective Romosozumab Investigation in Multiple European countries) is an ambispective (retrospective and prospective), real-world evidence (RWE) study to describe patient characteristics, treatment patterns, transition to antiresorptive therapy and Romo persistence across 8 European countries. Secondary objectives are to identify persistence predictors and assess site and patient characteristics by country.

Materials/Methods: Patients will be recruited from Belgium, Germany, Greece, Italy, Spain, Sweden, Switzerland and the UK (**Figure**). Data collection at 3 levels began in April 2025:

- Patient: demographics, comorbidities, fracture/treatment history and bone health before/after Romo initiation
- Site: characteristics, prescribing practices and local protocols
- Country: guidelines and reimbursement policies

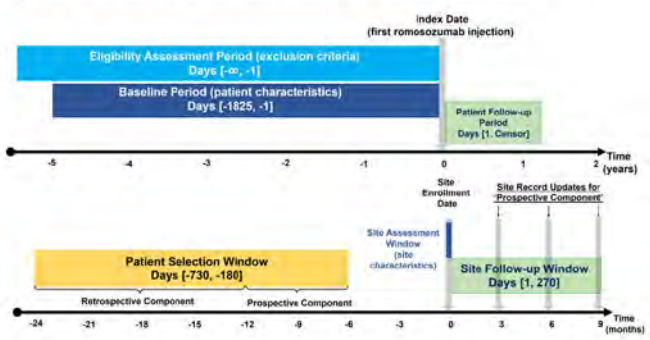
Eligible patients received their first Romo dose 24–26 months before enrolment; recruited participants are followed for 9 months. Incorporating retrospective data on participants who discontinued or completed a 12month Romo course prior to enrolment, and prospective data, enables inclusion of more patients with complete 12-month follow-up. Extending follow-up by 3 months supports assessment of antiresorptive

transitions. Exclusion criteria included recent enrolment in osteoporosis clinical trials. Persistence and adherence will be measured by proportion of days covered in a year, discontinuation rates and Romo completion. Persistence predictors will be analysed using Cox and logistic regression; subgroup and sensitivity analyses are planned.

Results: The expected study completion date is September 2026. As of November 2025, 99 sites have enrolled from all 8 countries; expected final sample size is 3,500 patients from 120 sites.

Conclusion: The design of PRIME differentiates it from other RWE studies, capturing the most recent clinical practice across Europe. By integrating multi-level data, PRIME will offer a broad, nuanced understanding of current Romo prescribing and utilisation patterns.

Figure: PRIME study design from patient (top) and site (bottom) perspectives



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Disclosure of Conflict of Interest (within past 24 months):

AM: Employee and stockholder of UCB.

ML: Employee of UCB.

PO: Employee of UCB.

AS: Honoraria for lectures from Amgen, Astra Zeneca, Sandoz and UCB.

NN: Consulting fees: Sandoz, Theramex and UCB; Speakers fee: Abiogen, Theramex and UCB.

OS: Received honoraria for educational meetings from Accord Health, Pharmacos and UCB.

ET: Employee of UCB.

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IDENTIFYING HIGH-RISK SUBGROUPS FOR OSTEOPOROSIS IN TYROL NURSING HOMES: PULSE-ECHO ULTRASOUND COMBINED WITH FRAX

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Objective(s)

Osteoporosis is the most common disorder of bone metabolism and often remains undetected until a fragility fracture occurs. Austria has one of the highest incidences of osteoporotic fractures worldwide. Older adults living in nursing homes (NH) are particularly vulnerable, yet access to standard bone mineral density assessment may be limited in long-term care. This study aimed to assess osteoporosis probability among nursing home residents in Tyrol (Western Austria) using an accessible diagnostic alternative.

Material and Methods

A cross-sectional study was conducted including 235 nursing home residents aged ≥50 years in Tyrol. Participants were examined in two settings: urban and rural nursing home residents. Exclusion criteria were age <50 years, prior knee surgery or prosthesis, allergy to ultrasound gel, and pregnancy. Anthropometric data were collected, and osteoporosis probability was assessed using pulse-echo ultrasound combined with FRAX. Measurements were performed by trained radiographers and validated by a physician. Statistical analyses were adjusted for age, gender, living situation (urban/rural) and body mass index (BMI).

Results

A point-of-care approach combining pulse-echo ultrasound - based assessment of bone density with FRAX enabled rapid and efficient screening of nursing home residents. Consistent with previous studies, osteoporosis probability was higher in women than in men and increased markedly with age. The highest-risk subgroup was comprised women aged over 70 years with low BMI, identifying them as the most vulnerable population. Our preliminary data also showed that 28% of men had a high osteoporosis risk and 13% had a medium risk, highlighting that male nursing home residents also exhibit a clinically relevant osteoporosis risk.

Conclusion(s)

Pulse-echo ultrasound combined with FRAX identified a substantial burden of elevated osteoporosis probability among nursing home residents, particularly in older women with low BMI. Practical screening approaches may help prioritize high-risk individuals for further evaluation and timely osteoporosis management in long-term care.

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THE EFFECTIVENESS OF THE INTENSIVE CARE PROGRAM FOR FLS IMPLEMENTATION TO REDUCE MORPHOMETRIC VERTEBRAL FRACTURES IN OSTEOPOROSIS PATIENTS AT VERY HIGH FRACTURE RISK COMPARED TO THE PRIMARY CARE PHYSICIAN-LED STANDARD CARE: JOINT-08 TRIAL

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Objectives:

Recently, initial use of osteoanabolic agents is recommended in goal-

directed treatment algorithms for patients at very high fracture risk (VHFR). Although FLS and Osteoporosis Liaison Service (OLS) have been established to improve the osteoporosis management, the effectiveness of these intensive care programs which integrate osteoanabolic therapies has not been established. We designed a clinical trial to investigate the effectiveness of intensive care (FLS-CARE) aligned with the goal-directed osteoporosis treatment compared with usual care in patients at VHFR.

Methods and Analysis:

Japanese Osteoporosis Intervention Trial-08 (JOINT-08), a multi-center, site classification into two groups, on-going intervention study, involves postmenopausal Japanese women at VHFR aged 55 and older, defined by any of: bone mineral density (BMD) T-score < -3.3, two or more prevalent vertebral fractures, at least one semi-quantitative (SQ) grade 3, one or more fragility fractures with BMD T-score < -2.5, or a prevalent hip fragility fracture.

The patients in FLS-CARE group are registered at medical institutions with a Japan Osteoporosis Society-certified physician and OLS manager and receive an intensive care program integrating goal-directed osteoporosis treatment and FLS/OLS support (education on osteoporosis and treatment management). Patients in the control (PCP-CARE) group receive standard care at the discretion of their primary care physician.

The primary endpoint of this study is the incidence of morphometric vertebral fractures by SQ grade at 12 months, and the key secondary endpoint is the incidence of morphometric vertebral fractures at 24 months. The other secondary end points are adherence, persistence, incidence of non-vertebral fractures, incidence of worsening of vertebral fracture by SQ grade, changes in BMD at lumbar spine, femoral neck, and total hip at 12 months as well as descriptive analyses of adverse events.

Conclusion:

JOINT-08 is the first study to investigate the effectiveness of an intensive care program, combining goal-directed osteoporosis treatment and patient management by an OLS manager in postmenopausal osteoporosis at VHFR. The findings will be crucial for advancing treatment strategies to prevent osteoporotic fractures.

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BEFORE THE FALL: BALANCE PROBLEMS AND BONE DENSITY IN POSTMENOPAUSAL WOMEN

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Introduction Postmenopausal osteoporosis is commonly viewed in the context of reduced bone mineral density and the consequent risk of fractures. However, falls play a central role in the occurrence of osteoporotic fractures, and balance-related complaints such as unsteadiness and staggering often emerge before an actual fall event. In addition to biological determinants, fall risk may also be influenced by living conditions and the level of social support. In this respect, balance problems may be more pronounced among postmenopausal women who live alone.

Objective The aim of this study was to explore the relationship between bone mineral density and balance-related symptoms, including staggering and falls, in postmenopausal women, and to assess whether living alone may modify this association.

Methods This cross-sectional observational study included postmenopausal women attending a physical medicine and rehabilitation outpatient clinic who had undergone bone mineral density assessment within the preceding six months. Bone mineral density measurements of the lumbar spine and femoral neck were recorded, and the lowest T-score for each participant was used for analysis.

Information on staggering and falls during the previous one month and one year was obtained by self-report. Living arrangements (living alone or with family/caregivers) were recorded and considered an indicator of social vulnerability.

Based on balance-related clinical features, participants were categorized into three groups: asymptomatic individuals, those reporting staggering without recent falls (pre-fall instability), and those with a history of falls. Bone mineral density values were compared across groups, with additional analyses stratified by age (<65 and ≥65 years). The study was conducted as an exploratory analysis including a total of 75 participants, and statistical significance was set at $p<0.05$.

Table 1. Demographic and Clinical Characteristics According to Clinical Phenotypes

	Asymptomatic (n=25)	Pre-fall Instability (n=25)	Fall Group (n=25)	p value
Age (years)	61.8 ± 7.9	66.4 ± 6.8	70.2 ± 6.1	0.001
Height (cm)	152.6 ± 4.8	152.1 ± 4.5	151.9 ± 5.2	0.73
Weight (kg)	77.1 ± 12.6	71.8 ± 11.9	67.4 ± 10.8	0.018
Body Mass Index (kg/m²)	33.1 ± 5.2	30.4 ± 4.9	28.9 ± 4.6	0.012
Menopause duration (years)	15.9 ± 8.7	21.8 ± 9.1	25.6 ± 8.4	<0.001
Bone Mineral Density (g/cm²)	0.852 ± 0.121	0.744 ± 0.108	0.682 ± 0.094	<0.001
Lowest T-score −1.8 ± 0.6 −2.3 ± 0.5 −2.7 ± 0.4 <0.001				
Smoking – Yes	2 (8.0%)	4 (16.0%)	5 (20.0%)	0.42
Alcohol use – Yes	1 (4.0%)	1 (4.0%)	2 (8.0%)	0.78
Menopause type – Natural	22 (88.0%)	21 (84.0%)	20 (80.0%)	0.74
Living alone – Yes	2 (8.0%)	7 (28.0%)	9 (36.0%)	**0.021**

Table 2. Frequency of Staggering and Falls According to Clinical Phenotypes

	Asymptomatic n (%)	Pre-fall Instability n (%)	Fall Group n (%)	p value
Staggering in the past 1 month – Yes	3 (12.0%)	18 (72.0%)	20 (80.0%)	<0.001
Staggering in the past 1 year – Yes	6 (24.0%)	21 (84.0%)	23 (92.0%)	<0.001
Falls in the past 1 month – Yes	2 (8.0%)	0 (0.0%)	9 (36.0%)	**0.004**
Falls in the past 1 year – Yes	5 (20.0%)	4 (16.0%)	14 (56.0%)	0.006

Conclusion The findings of this study indicate that lower bone mineral density in postmenopausal women is associated with balance-related problems and an increased risk of falls. Balance disturbances occurring in the absence of a fall may represent an early stage of vulnerability preceding fall events. In addition to biological factors, social conditions such as living alone should also be considered when evaluating fall risk in this population.

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IDENTIFYING GAPS IN OSTEOPOROSIS MANAGEMENT: A CLINICAL AUDIT IN A MULTIDISCIPLINARY FACILITY

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Objective:
To assess the adherence to osteoporosis screening, diagnosis, and management national guidelines in a multidisciplinary clinical setting, and to identify specific gaps in physician knowledge and real-life clinical practice.

Material and Methods:
A mixed-methods internal audit in a multidisciplinary clinic was conducted. A knowledge and practice survey was distributed to 64 physicians across eight specialties. A retrospective review of 100 clinical records (general practitioners, endocrinologists, gynaecologists, rheumatologists, traumatologists) was focused on patients meeting age/risk criteria for osteoporosis. An additional review of 20 routine chest/abdominal imaging studies (CT/MRI) was performed to assess the reporting of incidental vertebral fractures. Data extraction was focused on fracture history documentation, FRAX tool utilisation, Dual-Energy X-ray Absorptiometry (DXA) referrals, diagnosis coding, and treatment initiation for fragility fractures and high-risk patients.

Results:
The survey response rate was 26.6% (17/64). While all respondents acknowledged the importance of osteoporosis, only 23% correctly identified all risk factors relevant to their specialty. Understanding of low-energy fractures was inconsistent. Clinical record analysis revealed significant practice gaps: among 14 eligible general practitioner records, only 3 (7.5%) resulted in a DXA referral, with no FRAX assessments performed. Only one endocrinologist routinely used the FRAX tool in his daily practice. None of 5 patients with diabetes mellitus had a FRAX assessment; overall, 12 of 20 endocrine patients underwent or were referred for DXA. Gynaecologists demonstrated no engagement in osteoporosis screening for postmenopausal women. Rheumatologists initiated treatment for only 2 out of 6 potentially eligible patients. Review of 20 imaging studies identified 8 cases of vertebral height loss (21-34%), yet this was reported as a potential fracture in only 2 cases. Among 11 patients with low-energy fractures identified in traumatology department, only 4 were referred to a specialist; osteoporosis was not diagnosed in any of these cases, neither the treatment was recommended. Patients' fracture history in medical records was unclear in most cases as the obstacles of trauma (low/high energy) if it was depicted.

Conclusion:
This audit reveals critical systemic gaps in osteoporosis care, including underutilisation of risk assessment tools (FRAX), low engagement in osteoporosis care by primary care and gynaecologists, poor management of fragility fractures, and under-reporting of vertebral fractures on imaging. These findings highlight an urgent need for targeted education, standardised referral pathways, and improved interdisciplinary coordination to enhance secondary fracture prevention.

P264

IMPROVED NEUTROPHILS ISOLATION TECHNIQUE FOR INVESTIGATION OF NEUTROPHIL EXTRACELLULAR TRAPS

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Background: Neutrophils are involved in the pathogenesis of various infections, COVID-19, as well as atherosclerosis, thrombosis and embolism, cancer and rheumatic diseases, being an important element of the normal immune response. In this regard, mechanisms of mobilization, activation, apoptosis and formation of neutrophil extracellular traps (NETs) by neutrophils are of a great concern for many years. The major technical obstacle for assessment of functional state of neutrophils is the lack of an accepee method for isolation a pure cell fraction that does not contain a significant amount of non-viable or activated neutrophils.

Methods. Blood samples were obtained from 29 healthy volunteers. Circulating neutrophils of peripheral blood were isolated from buffy coat using both stepwise iohexol density gradient with 1080 and 1090 kg/m3 densities as well as control ficoll-amidotrizoate based gradient consisted of 1077 and 1119 kg/m3 steps (Sigma-Aldrich, USA). These protocols were compared by fraction purity (using microscopy of a stained smear), cell viability (by trypan blue staining), and cell activation (by nitroblue tetrazolium test). Induction of NET formation was performed using phorbol myristate acetate (50 nmol/l). Both spontaneous and induced NETs were visualized by fluorescence microscopy using 1.25 μM SYBR green and monoclonal antibodies to myeloperoxidase labeled with R-phycoerythrin. Results are expressed as means and 95% confidence intervals (M (95%CI)). Differences were considered significant at $p<0.05$.

Results. When comparing the characteristics of the neutrophil fraction isolated by our method with the control, higher values of neutrophil fraction purity were noted. The method we developed allowed us to isolate neutrophils with a higher viability percentage (84.74 (83.99-85.49)% and 76.84 (75.32-78.36)%, respectively) and a lower percentage of activated cells (13.10 (12.92-13.28)% and 15.36 (15.00-15.72)%, respectively). The differences in the mean values of viability and the percentage of activated cells were statistically significant ($p<0.001$). In addition, in our experiments, the iohexol-based gradient was characterized by greater stability during storage, ease of sterilization, constant isoosmolarity, and the absence of ficoll adhesion to the cells. The average proportion of spontaneous NET formation for the iohexol-containing gradient was 3.8 (2.6-5.0)%, for the control gradient - 7.9 (7.0-8.8)%; for PMA-induced NET formation - 12.2 (9.0-15.4)% and 15.3 (13.6-17.0)%, respectively.

Conclusion. The method we developed provides an increased proportion of viable and inactivated neutrophils compared to the prototype and can be used for a detailed study of neutrophils in various infectious diseases. In addition, iohexol allows to obtain easily the required density of the medium, maintaining its physiological osmolarity. The insignificance of the activating effect of the modified gradient on neutrophils is due to the absence of components adhering to cells in its composition, which also determines the preservation of the tinctorial properties of cells after passing through iohexol-containing gradients. There was significant effect of the choice of the isolation protocol on the intensity of NET formation.

P266

CURRENT PRACTICE AND BARRIERS IN FRAGILITY HIP FRACTURE MANAGEMENT: INSIGHTS FROM A NATIONAL SURVEY OF THAI ORTHOPAEDIC SURGEONS

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Objective

Despite well-established recommendations for the treatment and secondary prevention of fragility fractures, implementation remains challenging. Understanding local practice realities and barriers is therefore essential for adapting global guidelines to national health systems. This study assessed the management of fragility hip fractures in elderly patients in Thailand, focusing on the perspectives of orthopaedic surgeons.

Material and Methods

We conducted a questionnaire-based survey of orthopaedic surgeons in Thailand who are actively involved in the care of patients with fragility fractures, focusing on acute management, secondary prevention, and overall perceptions of care. The survey was adapted and translated from the "Survey of Awareness and Attitudes to the Management of Fragility Fractures" developed by the Asia Pacific Orthopaedic Association. It was piloted with 10 volunteer orthopaedic surgeons and refined for clarity, comprehensiveness, and validity. The final questionnaire was distributed online in collaboration with the Royal College of Orthopaedic Surgeons of Thailand using registered membership contacts.

Results

Of 223 responses, 199 were eligible. Most participants practiced in tertiary public hospitals (36.2%), had <5 years of experience, and managed 0–5 cases weekly. According to respondents, hip fracture fast-track protocols were available in 79.4% of hospitals, and 58.8% had fracture liaison services. Only 22.6% of respondents reported achieving surgery within 48 hours in > 90% of their patients, and 46.7% prescribed osteoporosis treatment to ≥75% of patients. University-affiliated hospitals were more likely to prescribe osteoporosis medication (OR 4.68, 95% CI 1.87–11.67), while cost concerns reduced prescribing (OR 0.40, 95% CI 0.20–0.81). Private hospitals had the highest odds of surgery within 48 hours (OR 104.43, 95% CI 7.21–1513.05). Implant unavailability was the main barrier to expedited surgery (OR 0.20, 95% CI 0.04–0.91).

Conclusions

Although hip fracture fast-track protocols and fracture liaison services are increasingly available, timely surgery and osteoporosis treatment remain suboptimal. Addressing cost barriers, improving implant logistics, and expanding diagnostic access are essential to strengthen fragility fracture care in Thailand.

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FACTORS INFLUENCING THE DEVELOPMENT OF CHRONIC POSTOPERATIVE PAIN AFTER LARGE JOINT REPLACEMENT IN RHEUMATOID ARTHRITIS

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Objective: To evaluate the effect of a number of clinical and psychological factors on the persistence of chronic postoperative pain for one year after hip and knee replacement in patients with rheumatoid arthritis.

Material and Methods: The study consistently included patients with rheumatoid arthritis who were admitted to the rheumoorthopaedic department from May 2022 to May 2024 for routine total knee/hip replacement. All patients were examined by a rheumatologist before surgery with an assessment of the disease activity according to DAS28-CRP, and were also asked to fill out the following questionnaires: Health Assessment Questionnaire (HAQ), painDETECT, Hospital Anxiety and Depression Scale (HADS), Pain Catastrophizing Scale.

Results: A total of 350 patients were recruited, 279 women (79.7%) and 71 men (20.3 %) The average age was 57.2±14.1 years, the average duration of the disease was 14.9±10.8 years. The age of onset (Me [25‰;75‰] was 45 [29;55] years. The majority of patients had the stage II or III according to the Steinbroker's classification (44.5% and 35.9%, respectively). 20.3% showed signs of osteonecrosis. On average, signs of moderate disease activity were observed before surgery (DAS28-CRP was 3.6±1.1). 82.9% and 26.4% of patients received and conventional and biological disease-modifying antirheumatic drugs, respectively. After 12 months, 17.1% of patients continued to complain of pain in the area of the operated joint in the absence of infection or instability of the prosthesis components. The likelihood of pain retention correlated with the following factors ($p < 0.05$): female gender, depression or high anxiety according to HADS, high disease activity (DAS28-CRP≥5.1), neuropathic component of pain(painDETECT>18), a tendency to catastrophize pain (PCS>21), signs of central sensitization (CSI>40). Protective factors were methotrexate intake and low disease activity. Patients who underwent total arthroplasty for aseptic necrosis were significantly less likely to suffer from chronic postoperative pain.

Conclusion: Factors such as female gender, the presence of neuropathic pain, depression/anxiety, and a tendency to catastrophize pain can contribute to the persistence of chronic pain in patients with rheumatoid arthritis after total knee and hip arthroplasty.Methotrexate intake and low disease activity before surgery had a protective effect.

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ASSESSMENT OF FACTORS INFLUENCING FUNCTIONAL OUTCOME AFTER TOTAL KNEE REPLACEMENT IN RHEUMATOID ARTHRITIS

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Objective: To evaluate the effect of a number of clinical factors on the functional status for one year after knee replacement inpatients with rheumatoid arthritis.
Material and Methods: The study consistently included patients with rheumatoid arthritis who were admitted for routine total knee replacement. All patients were examined by a rheumatologist before surgery with an assessment of clinical and pharmacological history and the disease activity according to DAS28-CRP. Knee joint function before and 12 months after surgery was assessed using the Knee Society Score (KSS). Patients were also asked to fill Health Assessment Questionnaire (HAQ) before surgery.
Results: A total of 221 patients were recruited (173 women (78.2%); the average age 55.8±13.9 years). Before surgery the average value of DAS28-CRP was 3.9±1.2, HAQ - 1,5±0,6. The KSS function averaged 48.3±16.4 before TKA and 86.0±7.7 12 months after TKA. The number of patients with KSS levels <70 (unsatisfactory) at the end of the cohort follow-up was only 12 (5.4%). Insufficient functional outcome was associated with moderate/high inflammatory activity at the time of surgery(p=0.023), initially pronounced functional disorders (HAQ>2, p=0.049), and the use of leflunomide (p=0.005). There was no clear relationship between the development of postoperative pain after12 months and the presence of an insufficient functional result (OR = 1.263 [95% CI 0.347-4.59] p=0.527).
Conclusion: The presence of signs of inflammatory activity, pronounced functional disorders, as well as taking leflunomide may contribute to an unsatisfactory functional outcome after total knee arthroplasty in rheumatoid arthritis. Further researchis required to clarify the data obtained.

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POLYMORPHISMS OF THE KCNS1, COMT, IL6R AND CTLA4 GENES AND DEVELOPMENT OF POSTOPERATIVE PAIN IN PATIENTS WITH RHEUMATOID ARTHRITIS WHO UNDERWENT TOTAL KNEE OR HIP REPLACEMENT

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Objective: to assessing relationship of the polymorphisms of the KCNS1, COMT, IL6R and CTLA4 genes and the development of postoperative pain (POP) in rheumatoid arthritis (RA)patients who underwent total knee (TKA) or total hip (THA) arthroplasty.
Material and methods: The study group consisted of 85patients with RA knee or hip (79.7% of women, 57.2±13.1years) who underwent TKA or THA. The presence of POP was determined when pain in the area of surgical intervention ≥40 mm (100 mm visual analog scale, VAS) persisted or appeared 12 months after surgery. All patients underwent genotyping of polymorphisms of the genes KCNS1 (rs734784), COMT (rs4633), IL6R (rs8192284) and CTLA4 (rs231775) by polymerase chain reaction in real time using original sequence-specific primers and samples labeled with various fluorescent labels. Registration and interpretation of the obtained results were carried out on the DT-96 amplifier (DNA-Technology LLC, Russia).
Results: POP was observed in 30.6% of patients who underwent TKA or THA. Statistical analysis revealed no differences in the frequencies of the genotypes of the studied genes (p>0,05). The presence of a homozygous genotype of the GG polymorphism of the KCNS1 gene (rs734784) was associated with the presence of POP in accordance with the recessive genetic model (GG vs AA+AG; odds ratio (OR) – 18.67 [95% confidence interval (CI): 4.64; 75/16]; p<0.001). The presence of at least one C allele in the genotype of the COMT polymorphism (rs4633) was associated with a pronounced tendency to increase the risk of developing POP compared with the TT genotype (OR=2.83[95% CI: 0.81; 9.97]; p=0.06) in accordance with the dominant genetic model. The multiplicative model (T vs C) turned out to be statistically significant (OR=2.21 [95% CI: 1.08; 4.54]; p=0.06). In the study of CTLA4 gene polymorphism (rs231775), carriers of at least one minor G (AG+GG) allele had a lower risk of developing POP compared with AA genotype (OR=0.27[95% CI: 0.09; 0.80]; p=0.01). There was no significant correlation between the development of POP and the carrier of different genotypes and alleles of the IL6R (rs8192284) gene.
Conclusions: There is a statistically significant association the polymorphism of the KCNS1 (rs734784) and COMT (rs4633) genes and the development of chronic POP in patients who underwent TKA or THA. Carriage of the minor allele of the CTLA4 (rs231775) gene had a protective effect. Further studies of the genetic predisposition to POP are required on more clinical material.

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CLINICAL FEATURES OF HAND OSTEOARTHRITIS IN WOMEN WITH DIFFERENT BODY MASS INDEXES IN POSTMENOPAUSE

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Study objective. To evaluate the characteristics of hand osteoarthritis in postmenopausal women with varying body weight and bone density.

Materials and methods. A cross-sectional study of 122 postmenopausal women was conducted. The study group included 80 patients with hand osteoarthritis (60 ± 5 years old), and the control group included 42 women without joint pathology (57 ± 4 years old). The diagnosis of hand osteoarthritis was verified according to the EULAR criteria (2023) and confirmed radiographically. Exclusion criteria included diabetes mellitus, systemic inflammatory connective tissue diseases, upper extremity injuries, acute infectious processes, heart failure, chronic kidney disease stages 4–5, as well as professions and hobbies that place increased stress on hand joints. All study participants completed a questionnaire, dynamometry, and body composition assessment using dual-energy X-ray densitometry at standard points and in "total body" mode.

Results. The median AUSCAN index was higher in women with normal body weight (16 [12; 24.5]) compared to the overweight and obese groups (15 [9.5; 26.5] and 12.5 [9; 20.75], respectively); however, the differences did not reach statistical significance. Obese patients had higher lumbar

spine T-score values than normal-weight patients (−0.32 ± 2.00 and −1.73 ± 1.64; p = 0.01). In patients with osteoarthritis and osteoporosis combined, more pronounced functional impairment, significant limitations in daily activities, and a lower total body fat percentage were observed (38.84 ± 6.35% and 43.03 ± 6.73%; p = 0.0013).

Conclusion: In postmenopausal women with hand osteoarthritis, decreased muscle strength and functional impairment are exacerbated by the combination of osteoporosis. Body mass index is positively associated with bone mineral density but is associated with decreased muscle strength, highlighting the need for a comprehensive body composition assessment.

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INTRIGUING STATISTICS OF OSTEOPOROSIS AMONG MENOPAUSAL WOMEN IN THE ADJARA REGION

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Objectives. Osteoporosis is a chronic skeletal disease characterized by reducing of bone density, which leads to increased fragility and a higher risk of skeleton's bones fractures. As the global population ages, its prevalence and related healthcare costs are expected to rise, especially among postmenopausal women.**Aim of study.**This study aimed to assess bone density in menopausal women, given its critical importance to their health. Specifically, we sought to investigate the association between menopause and bone density, analyze regional variations, and systematically compare our findings with global data.Through this approach, we aimed to deepen understanding and contribute to improved clinical care for menopausal women in the Adjara Region. **Materials and Methods.** This study was conducted at JSC Seamen's Medical Centre-2010 in Batumi, Adjara, Georgia between 2023 and 2024.A total of 151 women aged 45-55 years were stratified into two age groups based on year of birth:1968-1974 and 1975-1979. Their bones condition were evaluated using an Ultrasound Bone Densitometer (Sonost 2000).Bone mineral density (BMD) was assessed according to World Health Organization criteria based on T-scores, expressed as standard deviations (SD).**Results.**The first group made up 70.2% of the participants (n=106),whereas the second group accounted for 29.8% (n=45).In the first group (1968-1974), 13.2% (n=14) were diagnosed with osteoporosis, 63.2% (n=67) with osteopenia and 23.6% (n=25) had normal bone density. Among the second group (1975-1979), 13.3% (n=6) were diagnosed with osteoporosis,57.8% (n=26) with osteopenia, and 28.9% (n=13) had normal bone density.**Conclusion.** Among the 151 participants, born between 1968-1979, 13.24% (n=20) were found to have osteoporosis, 61.58% (n=93) had osteopenia, and only 25.16% (n=38) exhibited normal bone density. Analysis of trend across various age groups reveals a concerning pattern: individuals in the first group are significantly more likely to experience osteopenia and osteoporosis. In contrast, individuals in the second group demonstrate a remarkable ability to maintain normal bone density. The findings indicate that approximately half of menopausal women in Adjara had osteopenia, one quarter had normal bone mineral density, and one in eight had osteoporosis. In contrast to global data, where osteoporosis affects approximately one third of menopausal women, the prevalence in our cohort was notably lower.**Keywords.** Menopause, Osteoporosis, T-score.

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TRYPTOPHAN–KYNURENINE PATHWAY ALTERATIONS IN THE SERUM OF OLDER ADULTS WITH DYNAPENIA AND SARCOPENIA

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Objectives: Age-related activation of the kynurenine pathway may contribute to sarcopenia by promoting oxidative stress and mitochondrial dysfunction in skeletal muscle. Given limited evidence in older adults, this study aimed to evaluate serum tryptophan (TRP) and its metabolites—kynurenine (KYN), 3-hydroxykynurenine (3-HK), and 3-hydroxyanthranilic acid (3-HAA)—in older adults with preserved muscle mass and strength (group A), dynapenia alone (group B), and sarcopenia (group C).
Materials and Methods: Patients aged ≥60 years hospitalized in a geriatric ward were included in the study. Dynapenia was defined as low handgrip strength (<16 kg in women, <27 kg in men). Sarcopenia was diagnosed based on dynapenia with low appendicular skeletal muscle mass (ASM; <20 kg in men, <15 kg in women), assessed by bioimpedance using the Sergi's equation. Serum TRP, KYN, and 3-HK were measured using RP-HPLC-UV, and 3-HAA using RP-HPLC. Analyses included Spearman correlation, Kruskal–Wallis test, and logistic regression.
Results: The study included 133 participants (mean age 79.0 ± 7.3 years; 72.9% women): 61.9% in group A, 6.3% in group B, and 31.7% in group C. Median serum TRP and KYN concentrations increased stepwise from group A to C (TRP p=0.09; KYN p=0.07), with similar non-significant trends for 3-HK and 3-HAA (p>0.1). ASM and ASM/height² were significantly inversely correlated with serum KYN and 3-HK. Logistic regression showed a higher likelihood of sarcopenia with older age (OR=1.15; 95% CI 1.07–1.23; p<0.001) and higher serum KYN (OR=1.024; 95% CI 1.004–1.044; p=0.017), independent of TRP levels and sex.
Conclusions: In older adults, increased kynurenine pathway activation is associated with reduced muscle mass and a higher risk of sarcopenia. Kynurenine-related metabolites may represent potential biomarkers and therapeutic targets for age-related muscle loss.
Acknowledgments: The authors would like to thank dr. Łukasz Ołdak for conducting biochemical analyses.

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PHOSPHOLIPASE C-Y1 REGULATES BMSC FATE BY PROMOTING OSTEOGENESIS AND INHIBITING ADIPOGENESIS THROUGH THE CACNA1C/CA2+ PATHWAY

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Objectives: Imbalanced differentiation of bone marrow stromal cells (BMSCs), characterized by enhanced adipogenesis and suppressed osteogenesis, is a key pathological mechanism in osteoporosis. This study aimed to elucidate the role and underlying mechanism of phospholipase C-γ1 (PLC-γ1) in BMSCs differentiation to identify novel therapeutic targets for osteoporosis.

Methods: PLC-γ1 was silenced in BMSCs *in vitro* to assess its effects on differentiation. Osteogenic markers and calcium nodule formation were measured, while adipogenic differentiation was evaluated via marker expression and Oil Red O staining. BMSC-specific PLC-γ1 conditional knockout (cKO) mice (floxed PLC-γ1, PRX1-Cre^{+}) were generated with floxed PLC-γ1 mice serving as controls. Femoral bone mineral density (BMD) and microstructure were analyzed by μ-CT, and formation of bone marrow adipocytes, osteoblasts, osteoclasts, and chondrocytes was histologically examined. RNA sequencing (RNA-seq) of BMSCs identified CACNA1C as a key potential downstream candidate. The IP_3 receptor, acting downstream of PLC-γ1, was silenced to evaluate osteogenic markers and CACNA1C expression. Confocal microscopy was used to determine whether the CACNA1 agonist Bay K8644 could rescue Ca^{2+} influx in PLC-γ1 deficient BMSCs. Finally, the ability of Bay K8644 to reverse the osteogenic-adipogenic imbalance and bone defects caused by PLC-γ1 knockout was tested both *in vitro* and *in vivo*.

Results: Silencing PLC-γ1 in BMSCs reduced osteogenic markers such as ALP activity and calcium nodule formation, while increasing adipogenic markers such as lipid droplet formation. PLC-γ1 cKO mice exhibited lower bone mass, impaired bone microstructure, reduced bone formation, and increased bone marrow adiposity. RNA-seq pinpointed CACNA1C as a significantly downregulated gene following PLC-γ1 knockout. Silencing the IP_3 receptor in BMSCs abolished the pro-osteogenic effect of PLC-γ1 and downregulated CACNA1C. Bay K8644 restored Ca^{2+} influx in PLC-γ1-deficienct BMSCs. Furthermore, Bay K8644 treatment rescued the impaired osteogenesis and enhanced adipogenesis *in vitro*, and ameliorated bone loss, microstructure deterioration, and marrow adiposity in PLC-γ1 cKO mice.

Conclusions: PLC-γ1 in BMSCs promotes osteogenic differentiation, inhibits adipogenic differentiation, and maintains normal bone mass via the CACNA1C-dependent calcium signaling pathway.

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ANALYSIS OF 25(OH)D LEVELS IN PATIENTS WITH OBESITY AND OSTEOPOROSIS

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Introduction. Vitamin D deficiency is one of the most important links in the pathogenesis of osteoporosis. Obesity plays a significant role among the factors affecting the synthesis and metabolism of vitamin D. Research objectives. To study the level of 25(OH)D in patients with obesity and osteoporosis.

Materials and methods. The level of vitamin D (intermediate form - 25(OH)D) in blood serum was analyzed in 82 patients with obesity and osteoporosis (27 men, 55 women aged 48–79 years). All patients calculated BMI according to A. Quetelet: body weight/height2 (kg/m2). With BMI ≥30 kg/m2 was diagnosed obesity. The diagnosis of diabetes mellitus was considered an exclusion criterion to avoid additional factors affecting the level of 25(OH)D.

Results and discussion. According to BMI indicators, patients were divided into 4 groups: 25 – 29.9 kg/m2 – overweight (n=19), 30 – 34.9 kg/m2 – obesity 1 degree (n=22), 35 – 39.9 kg/m2 – obesity 2 degree (n=27), 40 kg/m2 and more – obesity 3 degree (n=14). Most patients in groups 1 and 2 (73.7% and 72.7%) had vitamin D deficiency (25.8±2.6 ng/ml and 23.1±2.8 ng/ml), and no significant differences were found between the groups. Among patients in groups 3 and 4, vitamin D deficiency prevailed (16.7±4.1 ng/ml and 14.9±3.8 ng/ml), and there was a significantly higher number of patients ($p<0.05$) with severe vitamin D deficiency. A negative correlation was found between the level of 25(OH) D and BMI of patients ($r= - 0.12$, $p=0.04$), which allows us to consider obese patients as a risk group for vitamin D deficiency. No relationship was found with the age of patients.

Conclusions: patients with overweight have a decrease in vitamin D3 levels, and the degree of decrease correlates with the degree of obesity, which, in turn, increases the risk of osteoporosis. These findings justify the need to increase individual preventive doses of vitamin D3 in patients with obesity. Consequently, it is necessary to identify obese patients as a separate risk group for vitamin D deficiency, determine their serum 25(OH)D levels, and recommend higher doses of cholecalciferol if deficiency or insufficiency is detected.

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CORTICAL AND TRABECULAR BONE CHANGES IN MEN WITH HAEMOPHILIA: FINDINGS FROM THE HAEMOPHILIA OSTEOPOROSIS REGISTRY (THOR)

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Objective: To compare cortical and trabecular bone density and microarchitecture at the radius and tibia in men with haemophilia (PWH) versus controls, and to examine change over one year.

Material and Methods: Eighty-seven men (76 controls, 11 PWH; ≥18 years) underwent high-resolution peripheral quantitative computed tomography (HR-pQCT) at baseline and one-year follow-up at the 4% and

30% radius and tibia. Outcomes included total volumetric bone mineral density (vBMD), cortical vBMD, trabecular vBMD, trabecular number, and cortical thickness. Mixed-effects models tested group differences and longitudinal change using a time×group interaction term, reporting β-coefficients. Models were adjusted for age, weight, and height.
Results: After adjustment, PWH demonstrated substantially lower bone density and impaired microarchitecture compared with controls at both skeletal sites. At the radius, PWH had lower total vBMD (β=−57.3 mg/cm³, p<0.001), trabecular vBMD (β=−47.8 mg/cm³, p<0.001), trabecular number (β=−0.24 mm⁻¹, p<0.001), and cortical thickness (β=−0.30 mm, p=0.026). At the tibia, similar or greater deficits were observed, including reduced total vBMD (β=−54.8 mg/cm³, p<0.001), trabecular vBMD (β=−62.5 mg/cm³, p<0.001), trabecular number (β=−0.40 mm⁻¹, p<0.001), and cortical thickness (β=−1.50 mm, p<0.001). No significant change over time was detected in either group; all time×group interaction terms were non-significant (p>0.57), indicating comparable longitudinal trajectories over one year.
Conclusion: Men with haemophilia exhibit marked deficits in bone density and microarchitectural integrity at both the radius and tibia compared with controls, with stability of parameters over one year. These findings support routine bone health screening and targeted skeletal risk-reduction strategies in PWH.

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MUSCLE STRENGTH AND ITS CORRELATION WITH SERUM URIC ACID

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Objective:
The study aimed to associate muscle strength with serum uric acid(UA) in adults with or without gout.
Material and Method:
This study included 100 male individuals, of whom 50 were known to have gout and the other 50 were not diagnosed with gout(they might have asymptomatic hyperuricemia or a normal level of uric acid). The mean age of the individuals was 55(SD 5.3) years, ranging from 43 to 74. The average time of established diagnosis(for gout patients) was 6 years. Most patients(35 patients) were taking long-term prevention with allopurinol or febuxostat. Muscle strength was measured using a handgrip dynamometer. The combined grip strength (sum of the highest values of both hands) was evaluated. Serum uric acid was measured twice at a six-month interval.
Results:
Evaluating the individuals without gout, UA was positively associated with muscle strength, especially in patients with asymptomatic hyperuricemia. In gout patients mean serum uric acid level was 6.9 mg/dl, but in this group, no positive correlation with muscle strength was observed.
Conclusion:
Serum UA is positively associated with handgrip strength in adults without gout. The presence of gout disease neutralizes the positive impact of high uric acid levels on muscle strength.

P277
OSTEOPOROSIS IN ANKYLOSING SPONDYLITIS

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Objective: Prevalence of osteoporosis and related factors in patients with ankylosing spondylitis

Material and Methods: This is a retrospective cohort study and includes 95 patients with ankylosing spondylitis who met the ACR/EULAR diagnostic criteria. Demographic data such as age and gender, disease duration, disease activity and medication use were analyzed. Disease activity was measured using the Ankylosing Spondylitis Disease Activity Score with C-reactive protein. Bone mineral density was measured by dual-energy X-ray absorptiometry and results were expressed as T-score (osteoporosis T-score ≤ −2.5).

Results: The average age of the patients was 46 years and the average duration of the disease was 8 years. 83% patients were male and 17% female. 64% patients had high disease activity and 36% had moderate disease activity. All patients were treated with biological disease-modifying anti-rheumatic drugs and non-steroidal anti-inflammatory drugs. Osteoporosis was found in 21% of patients with ankylosing spondylitis. In patients with high disease activity osteoporosis was found in 18%. In females, osteoporosis was found in 14%, while in males in 7%. In patients who had more than 5 years of ankylosing spondylitis, osteoporosis was found in 16%. Osteoporotic fractures were recorded in 2% of patients, mainly affecting the vertebrae and coxofemoral joints.

Conclusions: This study highlights the importance of assessing and monitoring bone density in patients with ankylosing spondylitis. High disease activity and its duration are risk factors for the development of osteoporosis. Females with ankylosing spondylitis are affected by osteoporosis more than males. Early identification and monitoring of bone density in these patients may allow for preventive interventions through medications and reduce osteoporosis complications, such as fractures.

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OSTEOARTHRITIS AND HYPOTHYROIDISM

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Objectives: To determine the frequency of osteoarthritis in patients with hypothyroidism

Material and Methods: This is an observational study involving 80 patients with hypothyroidism who complained of joint and spine pain. All patients had been diagnosed with hypothyroidism and were being treated. Age and gender, disease duration, thyroid stimulating hormone, free thyroxin t4 and radiographs of the painful joints and spine were included and analyzed. X-ray criteria for osteoarthritis include joint space narrowing, osteophytes and subchondral sclerosis.

Results: The mean age of the patients was 42 years and the mean duration of the disease was 11 years. 64% of patients were female and 36% were male. Osteoarthritis was found in 15% of patients with hypothyroidism. 11% were female and 4% were male. Elevated thyroid stimulating hormone and free thyroxin t4 levels were found in 56%. Knee osteoarthritis was found in 7% of patients, hip osteoarthritis in 4%, spine osteoarthritis in 3% and hand osteoarthritis in 1%. In patients with the highest concentrations of thyroid stimulating hormone and free thyroxine t4, osteoarthritis was higher, in 12% of patients, compared with patients with normal levels of thyroid-stimulating hormone and free thyroxine t4, in 3% of patients.

Conclusions: Thyroid hormone metabolism plays an important role in osteoarthritis. Our study indicated that higher elevated thyroid stimulating hormone and free thyroxin t4 concentrations may increase the risk of osteoarthritis. Females with hypothyroidism are generally affected by osteoarthritis more than males

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SURGICAL APPLICATION OF AN ADVANCED INTRAMEDULLARY TELESCOPIC CONSTRUCT FOR PATHOLOGICAL FEMORAL FRACTURES AND THEIR SEQUELAE IN PATIENTS WITH SYSTEMIC SKELETAL DISEASES

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Objectives: To assess an advanced locked intramedullary telescopic construct for surgical management of pathological femoral fractures and deformities in patients with systemic skeletal diseases.
Material and Methods: A retrospective review included 17 ambulatory patients (10 females, 7 males; mean age 14.8 years, 8–21) with femoral pathological fractures/deformities due to osteogenesis imperfecta type I (9 patients), monostotic fibrous dysplasia (6 patients) or D-resistant rickets (2 patients). 17 procedures were performed: open reduction and osteosynthesis and, when indicated, corrective osteotomy (Sofield–Miller). Fixation used a locking rod (proximal locking holes; distal dual-plane locking) coupled with a T-shaped telescopic component with matching hole diameter and spacing. Distal locking was performed for both the rod and the telescopic component; after union, the inferior distal locking screw was removed to enable telescopic sliding. Follow-up was 5 years.
Results: Deformity correction and fracture/osteotomy union occurred within the expected timeframe in all cases. The construct provided stable fixation, prevented rotational and distraction displacement, and eliminated the need for cast immobilisation. No refractures or deformity recurrences were observed. Telescopic function and longitudinal bone growth were maintained, with improved lower-limb weight-bearing capacity.
Conclusions: This construct integrates stable locked intramedullary osteosynthesis with a growing telescopic rod, providing reliable fixation and sustained support for femoral growth in systemic skeletal diseases.

P280

RESPIRATORY MUSCLE PERFORMANCE ASSESSED FOLLOWING INTERMITTENT HYPOXIA–HYPEROXIA THERAPY IN PATIENTS WITH METABOLIC SYNDROME AND MUSCULOSKELETAL COMORBIDITIES

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Objective: Musculoskeletal disorders and metabolic syndrome (MS) often coexist, and their combined presence may negatively affect respiratory function, highlighting the importance of interventions that address these conditions. Intermittent hypoxia-hyperoxia therapy (IHHT) consists of alternating cycles of low and high oxygen exposure and has been shown to produce notable effects on a variety of pathological conditions. The objective of this study was to investigate whether IHHT influences respiratory parameters measured using a device designed to evaluate the strength and performance of the respiratory musculature.
Material and methods: The study included 79 patients diagnosed with MS, all of whom also presented musculoskeletal disorders, admitted to the Balneal and Rehabilitation Sanatorium of Techirghiol, and underwent standard comprehensive medical rehabilitation. Respiratory muscle function was assessed in all patients using a portable device designed to evaluate inspiratory muscle performance.
Results: Maximum MIP ($p = 0.485$ vs. 0.390), mean MIP ($p = 0.464$ vs. 0.519), maximum PIF ($p = 0.856$ vs. 0.851), mean PIF ($p = 0.464$ vs. 0.519), maximum S-index ($p = 0.967$ vs. 0.510), and mean S-index ($p = 0.999$ vs. 0.568) showed no statistically significant differences between the intervention and control groups.
Conclusions: Since this device primarily targets the inspiratory muscles, the relatively short duration may be insufficient to induce significant adaptations in the musculature, even though IHHT is recognized for its potential to improve muscle endurance and pulmonary function.
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SPECIFIC EVALUATION USING BIOELECTRICAL IMPEDANCE ANALYSIS IN ELDERLY PATIENTS WITH SARCOPENIA

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Objective: The etiology of sarcopenia involves multiple risk factors, which are still not fully understood. Identifying the underlying mechanisms and developing targeted interventions are key focuses of current medical research (1). The objective of this study was to investigate whether tendencies toward dehydration are associated with an increased risk of sarcopenia in elderly patients undergoing rehabilitation.
Material and Methods: Forty medically stable elderly patients (≥65 years) admitted to the Balneal and Rehabilitation Sanatorium of Techirghiol were included. Sarcopenia was screened using the SARC-F questionnaire. Hydration status, total body water, intracellular water, extracellular water, skeletal muscle mass, and appendicular skeletal muscle mass were assessed using bioelectrical impedance analysis (BIA). Correlations between hydration status, muscle mass, and sarcopenia screening results were analyzed.
Results: A significant proportion of patients admitted to the rehabilitation unit screened positive for sarcopenia using the SARC-F questionnaire. Among these patients, hydration status showed a significant correlation with muscle parameters evaluated by BIA, suggesting that decreased hydration may contribute to reduced muscle quantity and quality.
Conclusion: These findings emphasize the importance of monitoring hydration, a potentially modifiable determinant, and underscore the need for further research to clarify the interplay between hydration, muscle composition, sarcopenia, and functional outcomes in rehabilitation.
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P282

POST-FRAGILITY FRACTURE OSTEOPOROSIS ASSESSMENT AND TREATMENT GAP IN A TERTIARY MILITARY HOSPITAL IN ROMANIA

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Objective(s):

To evaluate endocrine-led osteoporosis assessment and initiation of anti-osteoporotic treatment following fragility fractures in a tertiary military hospital.
Material and methods:

We performed a retrospective audit of patients aged ≥50 years with low-trauma fractures who were evaluated by the Endocrinology Department during 2025. Collected data included age, sex, fracture site, documentation of osteoporosis risk assessment, laboratory evaluation for secondary osteoporosis (serum calcium, 25-hydroxyvitamin D, parathyroid hormone), prescription of calcium and vitamin D supplementation, initiation of anti-osteoporotic medication, and referral for specialist follow-up.
Results:

A substantial number of patients with fragility fractures were assessed, the majority being women. Hip and vertebral fractures were the most frequent fracture sites, followed by distal radius and proximal humerus fractures. Most patients underwent some degree of metabolic bone evaluation; however, laboratory assessment for secondary causes of osteoporosis was inconsistent. Calcium and vitamin D supplementation was commonly prescribed, while initiation of specific anti-osteoporotic therapy occurred in only a proportion of cases. A standardized post-fracture osteoporosis management pathway was not consistently available.
Conclusion(s):

Despite endocrinology involvement, significant gaps persist in post-fragility fracture osteoporosis assessment and treatment initiation. Implementation of a structured fracture liaison service–type pathway coordinated by endocrinology may improve secondary fracture prevention in this tertiary care setting.
Disclosures:

The authors declare no conflicts of interest.

P283

BONE HEALTH OUTCOME FOLLOWING ADRENALECTOMY VERSUS CONSERVATIVE MANAGEMENT IN 119 POSTMENOPAUSAL WOMEN WITH NON-FUNCTIONAL ADRENAL TUMORS

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Background: Non-functional adrenal tumors (NFATs) might require adrenalectomy or a conservative strategy, both having a potential bone influence [1-10].
Objective: To compare the bone profile of postmenopausal women with NFATs who underwent either adrenalectomy or conservative management.
Methods: This is a retrospective, longitudinal, single-center study. Inclusion criteria: women in menopause (age range: 45 to 85 years) with NFATs. Exclusion criteria: prior exposure to anti-osteoporotic therapy, overt Cushing syndrome, hormonally active tumors, bone ailments. DXA parameters, bone turnover markers (BTMs) were assessed at baseline and during follow-up. This is a university hospital (tertiary center of endocrinology) analysis amid a real-life setting with ethical approval from both hospital and university (7634 from 04/04/2025 and 37 from 22/09/2025).
Results: 119 postmenopausal women were included, 89.1% were managed conservatively and 10.9% underwent adrenalectomy (age

groups at baseline: 60.9±7.2 versus 54.2±6.9 years, p=0.074). Mean follow-up duration was 28.5 ± 19.1 months. Postoperative insufficiency occurred in 7.7% (surgery group). L1-L4 lumbar and femoral neck BMD changes showed no-between group differences. Total hip T-score change in non-surgery group (-1.05 ± 1.04 to -1.04 ± 0.92) was statistically significant lower than found in surgery group (-1.75 ± 0.29 to -1.60 ± 0.56, p=0.023). BTMs' changes between the study groups were similar at the end of follow-up period: CrossLaps (p=0.26), osteocalcin (p=0.55), and P1NP (p=0.39).

Conclusion: In postmenopausal women with NFATs, adrenalectomy was associated with an improvement of hip DXA results with similar BTM change.

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P284

BILATERAL ADRENALECTOMY FOR METASTATIC CLEAR CELL RENAL CELL CARCINOMA: ADRENAL INSUFFICIENCY AND BONE STATUS IN THE CONTEXT OF VITAMIN D DEFICIENCY

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Objective: Vitamin D deficiency represents a key modulator of bone metabolism in the context of advanced malignancy and bilateral adrenal insufficiency [1-10].

Methods: Case report. Ethical approval no. 37/22.09.2025.

Results: We present the case of a 52-year-old male with metastatic clear cell renal cell carcinoma and a complex oncologic–endocrine history. The patient had a prior cutaneous sebaceous carcinoma and was subsequently diagnosed with a large left renal tumor (16 cm) with bilateral adrenal, pulmonary, and cutaneous metastases. He underwent cytoreductive left radical nephrectomy with bilateral adrenalectomy, followed by systemic oncologic therapy. Postoperatively, permanent adrenal insufficiency developed, with persistently elevated ACTH requiring lifelong hormone replacement and prednisone adjustment. Imaging studies demonstrated osteoarticular degenerative changes and small osteolytic lesions, consistent with increased skeletal risk in the oncologic and endocrine context. Bone metabolism evaluation initially showed vitamin D deficiency 21.6 ng/mL (normal>30), associated with high resorption marker CrossLaps 1.15 ng/mL (normal:0.161-0.737). Vitamin D supplementation was started, leading to normalization of serum vitamin D concentrations 40.9 ng/mL (normal>30), and a subsequent reduction of bone resorption markers (normal:0.161-0.737). First-line immunotherapy was initiated, with continued vitamin D supplementation.

Conclusion: Maintaining adequate vitamin D levels may contribute to more favorable bone turnover dynamics, supporting its role as a modifiable factor in skeletal health in cancer-related adrenal insufficiency.

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BILATERAL ADRENAL TUMORS WITH MILD AUTONOMOUS CORTISOL SECRETION (MACS): WHEN DXA UNDERESTIMATES BONE FRAGILITY

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Objective: MACS may have significant metabolic and skeletal implications [1-10]. We report a complex endocrine case illustrating these effects beyond bone density.
Methods: Case report. Ethical approval was obtained from both hospital and university (7634 from 04/04/2025 and 37 from 22/09/2025).
Results: We present the case of a 75-year-old woman (menopause at 42 years) admitted for endocrine evaluation, referred for recurrent episodes of palpitations and hypertensive crises (systolic blood pressure up to 240 mmHg). Her medical history was notable for arterial hypertension, obesity, impaired glucose metabolism. Laboratory evaluation revealed impaired glucose metabolism with HbA1c=6.23% (normal:4.8-5.9) and fasting glucose 123=mg/dL. Adrenal hormonal evaluation showed low-normal ACTH=8.25pg/mL(normal:7.2-63.3), morning plasma cortisol=17.01µg/dL(normal:4.82-19.5), and incomplete suppression after 1-mg overnight dexamethasone=3.73µg/dL(normal<1.8), consistent with MACS. Plasma metanephrines and normetanephrines were within normal ranges, excluding pheochromocytoma. Computed tomography identified bilateral adrenal nodules measuring up to 2.8cm on the left and 2cm on the right. Vitamin D levels were insufficient=29.38ng/mL(normal:30-100). Bone turnover markers were within normal ranges: osteocalcin=21.62ng/mL(normal:15-46), P1NP=40.1ng/mL(normal:20.25–76.31), and CrossLaps=0.48 ng/mL(normal:0.152-0.858), PTH=51.74pg/mL(normal:17.3-74.1). DXA showed osteopenia, with L1-L4 BMD=1.002g/cm²,T-score=-1.6, Z-score=-0.2, femoral neck BMD=0.706g/cm²,T-score=-2.3, Z-score=-0.8, total hip BMD=0.788g/cm²,T-score=-1.8, Z-score=-0.5). Trabecular bone score was 1.275, indicating impaired bone microarchitecture. Vertebral fractures were identified on imaging. Osteopenia associated with impaired bone microarchitecture and vertebral fractures required antiresorptive therapy and vitamin D supplementation.
Conclusion: This case suggests that DXA alone may underestimate skeletal fragility in MACS, highlighting the need for comprehensive fracture assessment.

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BONE FRAGILITY IN MILD AUTONOMOUS CORTISOL SECRETION (MACS) WITH PRIMARY HYPERPARATHYROIDISM (PHPT): BEYOND BONE DENSITY

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Objective: MACS may affect bone, particularly when associated with PHPT leading to vertebral fractures that may not be reflected by reduced bone mineral density (BMD) on DXA [1-9]. We report such a case.
Methods: Case report. Ethical approval was obtained from both hospital and university (7634 from 04/04/2025 and 37 from 22/09/2025).
Results: We present the case of a 78-year-old woman referred for endocrine evaluation of persistent hypercalcemia. Her medical history was notable for left breast cancer treated by mastectomy and chemotherapy, a hepatic lesion under surveillance, chronic kidney disease, and cardiovascular comorbidities. Hormonal evaluation showed low-normal ACTH=6.11pg/mL(normal:7.2-63.3), elevated morning plasma cortisol=20.25 µg/dL(normal:4.82-19.5), and incomplete suppression after 1-mg overnight dexamethasone=3.78µg/dL(normal<1.8), consistent with MACS.CT identified a left adrenal incidentaloma (1.21cm). Parathyroid ultrasound and CT identified a right superior parathyroid lesion (0.6cm).Laboratory findings were consistent with PHPT: serum total calcium was 10.4mg/dL(normal:8.6-10.3), and PTH=119.5pg/mL (normal:17.3-74.1), serum phosphorus was 4.6 mg/dL(normal:2.7-4.5). Vitamin D status was adequate under supplementation, with 25-hydroxyvitamin D=36.6ng/mL(30-100). Renal function showed chronic impairment, with creatinine=1.61mg/dL(normal:0.3-1.2), estimated glomerular filtration rate was approximately 30mL/min/1.73m². Bone metabolism evaluation demonstrated active remodeling, with bone turnover markers in the upper-normal range: osteocalcin=42.75ng/mL(normal:15-46),P1NP=48.82ng/mL(normal:20.25-76.31), alkaline phosphatase=146U/L(normal:40-150), and CrossLaps=0.72ng/mL(normal:0.33-0.782). DXA showed osteopenia: L1-L4 BMD=1.052g/cm²,T-score=-1.2, Z-score=0.9, femoral neck BMD=0.797g/cm²,T-score=-1.5, Z-score=0.5), total hip BMD 0.841=g/cm²,T-score=-1.2, Z-score=0.6, and distal radius BMD=0.807g/cm²,T-score =-1.3, Z-score=-0.8). Reduced trabecular bone score (1.182) and vertebral fracture indicated skeletal fragility despite DXA scores remaining above the osteoporotic threshold. Parathyroidectomy and

anti-osteoporotic therapy were recommended.
Conclusion: This case showed that MACS and PHPT may cause bone fragility that is underestimated by DXA.
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BONE PROFILE IN POSTMENOPAUSAL WOMEN WITH ADRENAL TUMORS ACCORDING TO CORTISOL SECRETION STATUS: A CROSS-SECTIONAL STUDY

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Background: Adrenal incidentalomas challenge current concepts of bone health, as even mild cortisol excess may exert clinically relevant skeletal effects, particularly in postmenopausal women [1-3].
Objective: To compare the bone profile of postmenopausal women with adrenal tumors according to cortisol secretion status, mild autonomous cortisol secretion (MACS) and non-functioning adrenal tumors (NFAs) with that of controls without adrenal tumors.
Methods: This is a retrospective study including women in menopause (age range: 45 to 85 years). Exclusion criteria: hormonally active adrenal tumors, bone-affecting conditions, and prior exposure to anti-osteoporotic therapy. Based on post 1 mg dexamethasone suppression test cortisol levels, patients with adrenal tumors were classified as MACS (cortisol>1.8µg/dL) or NFAs (cortisol≤1.8µg/dL), while controls had no adrenal tumors. BTMs and DXA-derived skeletal parameters, including TBS, were assessed. This is a university hospital analysis with ethical approval from both hospital and university (7634 from 04/04/2025 and 37 from 22/09/2025).
Results: In the total study population (N=461), demographic characteristics were comparable across MACS (N=33), NFAs (N=80), and controls (N=348), with no significant differences in age (61.19±8.15 vs 61.29±8.40 vs 61.60±7.80 years, p=0.926).

Body mass index (BMI) differed significantly across groups (p=0.018), being highest in the MACS group (31.25±6.11kg/m²). BTMs including osteocalcin, P1NP, and CrossLaps, were similar across groups, with no statistically significant differences (all p>0.8). Fragility fracture prevalence was similar in MACS (12.1%), NFA (7.5%), and controls (8.4%) (p = 0.715). BMD, T-scores, and TBS were similar across groups (all p>0.3).

DXA category distribution differed significantly (p=0.031), with higher osteoporosis prevalence in MACS (33.3%) and NFA (30.7%) than in controls (18.3%).
Conclusion: In postmenopausal women with adrenal tumors, MACS was associated with a higher BMI and an increased prevalence of osteoporosis, despite similar BMD values, BTMs, TBS and fracture prevalence compared with NFAs and controls.
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P288

IS VITAMIN D DEFICIENCY DURING PREGNANCY ASSOCIATED WITH ISOLATED LOW FT4 LEVELS ?

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Introduction: The literature has sought to determine the causes of isolated low serum FT4 levels with normal TSH levels during pregnancy, and so far the results have been contradictory and unclear. Vitamin D acts through its receptor (VDR), present in various tissues, including the thyroid gland, where it can directly regulate thyroid hormone production. Thus, vitamin D may influence thyroid function at the cellular level. FT3/FT4 are considered indicators of the complex relationship between thyroid hormone resistance and vitamin D metabolism. **Material and methods:** 547 pregnant Bulgarian women were studied, mean age 30±5 years. FT4 (9.3-17.0 ng/L), TSH (0.27-4.2 mIU/L), 25(OH)D (30-100 ng/ml) were studied. We introduced four categories of 25(OH)D - Severe deficiency <10 ng/ml; Moderate deficiency 10-20 ng/ml; Insufficiency 20-30 ng/ml; Sufficiency >30 ng/ml. From the entire group of 547 pregnant women, those with a FT4 level below 9.3 ng/L were selected, which turned out to be 26.3% (144/547). From this group (n-144) were separated: *Group 1.* pregnant women with hyperthyroidism – TSH <0.01 mIU/L and under thyreostatic treatment (n-7); *Group 2.* pregnant women with clinical hypothyroidism - TSH >4.2 mIU/L without or with treatment (n-70); *Group 3.* pregnant women with isolated low FT4 below 9.3 ng/L, with normal TSH (0.27-4.2 mIU/L) and without treatment (thyreostatic or levothyroxine) – n-67. **Aim:** This group 3 is the subject of our study in order to search for a possible relationship between vitamin D deficiency and an isolated low level of FT4. **Results:** It turned out that vitamin D deficiency in pregnant women was present in group 1 - 57.1% (4/7), in group 2 - 78.9% (56/70), in group 3 - 79.1% (53/67). In group 3, only 20.9% (14/67) of pregnant women have sufficient vitamin D level, compared to 79.1% (53/67) with varying degrees of deficiency / insufficiency (p<0.001) - namely severe deficience in 3.8% (2/53), deficiency in 41.5% (22/53) and insufficiency in 54.7% (29/53), NS. The combination of vitamin D

deficiency/insufficiency and isolated low FT4 is present in 3.8% (2/53) of pregnant women in the first trimester, 49.1% (26/53) in the second trimester and 47.1% (25/53) in the third trimester. Therefore, in 96.2% (51/53) the combination of both disorders is present in the second and third trimesters of pregnancy. **Conclusion:** The direct and significant relationship between vitamin D deficiency and isolated low FT4 levels leads us to believe that vitamin D deficiency may be the cause or at least contribute to isolated low FT4 levels.

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A CLINICAL STUDY OF CIRCULATING EXERKINES IN MENOPAUSAL WOMEN: IRISIN LEVELS IN RELATIONSHIP WITH OBESITY

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Background. Irisin represents a novel biomarker in the musculoskeletal health assessment, being released from the muscle as response to physical activity. Apparently paradoxical, irisin seems higher in obese vs non-obese subjects, probably in relationship with a complex panel of interferences between exerkines and adipokines, but only a limited amount of clinical data are available so far.
Objective. We aimed to assess the circulating (blood) irisin (CBI) in obese vs non-obese adults, in addition to glucose and bone status assessments.
Methods. This is a prospective clinical study. Inclusion criteria: menopausal adults, age ≥ 50, signed informed consent. Exclusion criteria: prior diagnosis of osteoporosis, malignancies, insulin therapy, bone metabolic disorders, chronic kidney disease. Protocol of fasting assays: CBI (ELISA, MyBioSource, catalogue number MBS706887, intra-/inter-assay precision: <8%/<10%), 25-hydroxyvitamin D (25OHD), PTH (parathomone), bone turnover markers (BTMs): osteocalcin, P1NP, CrossLaps; glycaemia, insulin (+ HOMA-IR calculation). DXA (GE Lunar Prodigy) provided bone mineral density/T-score. Ethical Committees approvals: 32/30.9.24 and 97/20.11.24 (two centers).
Results. Two sub-groups were analyzed based on body mass index (BMI): obese (BMI≥30kg/sqm) vs non-obese (O vs nonO group, 41 patients per group, age of 63.1±7.99 vs 62.9±10.5, p=0.9). CBI was statistically significant higher in O vs nonO group [median(interquartile interval) of 96.1(64.4-128.0) vs 50.1(30.4-94.7) ng/mL, p=0.01). 25OHD was statistically significant lower in O vs nonO group (26.7±7.1 vs 32.4±8.1 ng/mL, p=0.0008) with similar PTH and BTMs (p>0.5 for each). Glucose status showed higher fasting glycaemia (107.3±11.8 vs 98.7±12.2, p=0.002), insulin [51.8(4.4-6.3) vs 10.27(7.8-14.0), p=0.0002], HOMA-IR [2.85(1.9-3.6) vs 1.2(1.0-1.5). p=0.0002], respectively, increased femoral neck and total hip T-score (mean of -1 vs -1.2 SD, p=0.03, respectively, -0.17 vs -0.84 SD, p=0.007) in O vs non-O group.
Conclusion. Irisin is higher in obese vs non-obese, age- and sex-matched menopausal females.
Acknowledgment. This research is part of the project IRI-OP-OB "Crossroad of metabolism and bone: the impact of irisin, bone turnover and inflammatory markers in patients with menopausal osteoporosis and obesity" (PN-IV-P8-8.3-ROMD-2023-0262)

P290

ELISA-BASED IRISIN TESTING AND VITAMIN D DEFICIENCY: A STUDY IN ANTI-OSTEOPOROTIC DRUGS-NAÏVE MENOPAUSAL ADULTS

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Background. There are only a limited number of studies to address the myokine irisin assays in daily practice in relationship with vitamin D (VD) status. VD might influence the secretion of myo/adipokines, but no clear relationship with irisin has been established yet.
Objective. We aimed to evaluate irisin levels in VD deficient (VDD) versus VD sufficient (VDS) females.
Methods. These are preliminary results of a bi-centric, prospective, transversal study (Ethical approvals: 32 from 09/30/2024 and 97 from 11/20/2024) in menopausal women who signed the informed consent. We excluded males, premenopausal women, individuals <50 years, adults with prior diagnosis of osteoporosis, parathyroid tumors, cancers, bone and kidney metabolic ailments, current exposure to corticotherapy or insulin therapy. Irisin was assessed via enzyme-linked immunosorbent assay (ELISA) kit, (MyBioSource, USA, San Diego) in addition to bone metabolism assessments, and central DXA (Lunar Prodigy).
Results. 48 patients were included in group VDD vs 41 in VDS [25-hydroxyvitamin D (25OHD) ≥30 ng/mL], that were age-matched (62.29±10.19 vs 63.56±8.16, p=0.5), and years-since-menopause-matched (15.82±9.55 vs 16.11±9.00, p=0.8). Ionized and total serum calcium, respectively, phosphorus, and PTH were similar 3.95±0.31

vs 4.11±0.27 mg/dL, p=0.07; 9.29 ±1.00 vs 9.53±0.46 mg/dL, p=0.16; 3.53±0.53 vs 3.73±0.49 mg/dL, p=0.6; 42.45±15.13 vs 42.09±15.63 pg/mL, p=0.9). Circulating irisin [median(IQR)] was similar between the groups: 91.85 (44.76-121.76) vs 71.17 (38.76-97.43) ng/mL (p=0.5). Total alkaline phosphatase was not statistically significant different in VDD vs VDS: 71.70 (62.60-83.89) vs 74.00 (65.92-82.71) U/L (p=0.58), neither osteocalcin: 19.26 (17.62-22.85) vs 21.06 (18.08-23.67) ng/mL (p=0.5), nor CrossLaps: 0.39±0.19 vs 0.40±0.16 ng/mL (p=0.7). Lumbar, femoral neck and total hip bone DXA-based mineral bone density were similar in VDD vs VDS.

Conclusion. Circulating irisin is similar in menopausal adults with normal and non-normal 25OHD levels.

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P291

DIABETIC KETOACIDOSIS AND HYPOCALCAEMIA FOLLOWING SURGERY FOR FEMORAL NECK FRACTURE IN AN ANTI-OSTEOPOROTIC TREATMENT-NAÏVE, TYPE 1 DIABETIC, MENOPAUSAL ADULT

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Objective. Type 1 Diabetes Mellitus (T1DM) is a well-established fracture risk. [1–10] We aim to present a case of life-threatening metabolic instability post-surgery for femoral neck fracture (FNN). **Methods.** Case report (Ethical approval 758/3.11.2025). **Results.** A 59-year-old female (menopause at 50) with a decade-history of T1DM developed acute respiratory failure and severe metabolic anomalies 24-h post-surgery for low-trauma FNN. Emergency computed tomography pulmonary angiography excluded a pulmonary embolism and showed a thyroid incidentaloma of 1.67 cm without vertebral fractures. Recurrent diabetic ketoacidosis (pH of 7.0, glycaemia of 260 mg/dL, glycated haemoglobin A1c of 6.8%) required an intensive care stabilization. Lab findings revealed significant inflammation [C-reactive protein 85.87 mg/L (Normal<5)], hypocalcaemia [total serum calcium 8.17 mg/dL (Normal:8.8–10.6)], hypomagnesaemia [magnesium 1.77 mg/dL (Normal:1.90–2.5)], and normal phosphorus of 2.7 mg/dL (Normal:2.5–4.5), hypoproteinaemia [total proteins 6.28 g/dL (Normal:6.6–8.3)], hypoalbuminemia [3.4 g/dL (Normal:3.5–5.2)], normal thyroid function [thyroid stimulating hormone of 1.71 µUI/mL (Normal:0.35–4.94)] with negative autoimmunity. DXA confirmed osteoporosis: lowest T-score at L2-L4 lumbar spine of -4.5 (at FN of -3.1). Bisphosphonate therapy (risendronate) was initiated plus calcium and vitamin D. **Conclusion.** Novel diagnosis of osteoporosis might be established amid severe complication (FNN) in an individual with otherwise high-fracture risk. Real-life setting also requires a multidisciplinary team for the peri-fracture surgery and recovery in addition to starting anti-osteoporotic medication. Uncontrolled hypocalcaemia and severe metabolic anomalies might limit/postpone the intravenous medication as first-line.

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P292

HYPOCALCEMIA: A CHALLENGE FOR POSTOPERATIVE CARE FOLLOWING THYROIDECTOMY FOR GOITER WITH RETROSTERNAL EXTENSION

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Background/Objective: Early postoperative hypocalcemia is a frequent post-thyroidectomy (Tx) complication [1-10]. We aim to present such case of a female who underwent Tx for compressive goiter with retrosternal extension.

Method: Case report. Ethical approval: 35/09.22.2025.

Results: A 59-year-old female presented with dysphagia, dysphonia and cough. Normal thyroid function [TSH 0.37 mIU/mL (normal: 0.35-

4.94), freeT4 17.18 pmol/L (normal: 9-19)] and negative autoimmunity associated high-normal total calcium 10 mg/dL (normal: 8.6-10), reduced 25-hydroxyvitaminD 25 ng/mL (normal>30), normal PTH 39 pg/mL (normal: 17.3-74.1). DXA was normal: L1-L4 BMD 1.023 g/cm^2, T-score -0.2; femoral neck BMD 0.929 g/cm^2, T-score +0.7; total hip BMD 1.115 g/cm^2, T-score +1.4. Cervical ultrasound revealed multinodular goiter with left lobe retrosternal extension. Computed tomography confirmed retrosternal extension in upper mediastinum, anterior and posterior of the left trachea, in contact with carotid arteries and jugular veins and mediastinal vessels. She underwent Tx with benign follicular disease confirmation. First day postoperatively, she developed symptomatic hypocalcemia (total calcium 8.31 mg/dL), which was managed with cholecalciferol 4000 UI/day and IV/oral calcium, followed by a normalization within 3 days (total calcium 9.6 mg/dL, 25-hydroxyvitamin D 29.55 ng/mL, and PTH 22.97 pg/mL). Two months post-surgery, mineral metabolism remained normal (total calcium 9.04 mg/dL, 25-hydroxyvitaminD 35.05 ng/mL) under cholecalciferol 2000 UI/day.
Conclusion: Hypocalcemia requires a multidisciplinary team upon Tx especially in large or retrosternal goiters.
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BONE STATUS IN A YOUNG FEMALE WITH PRIMARY AMENORRHEA

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Background/Objective: Long-term hypo-estrogenism in teenagers and young adults impairs peak bone mass and bone mineral density (BMD). We aim to introduce such a case [1-10].
Method: Case report. Ethical approval no. 35/22.09.2025.
Results: A 24-year-old female, with primary amenorrhea and hypergonadotropic hypogonadism, was admitted for bone status assessment for the first time across lifespan. Genetic testing: 46 XX karyotype; MLPA testing for CYP21A2 revealed no pathogenic variants. The patient refused estrogen replacement until the age of 22, when she started estradiol valerate 2 mg and norgestrel 0.5 mg. After 2 years, she ceased oral estrogens due to liver cytolysis. After 3 months: FSH 58.27 mUI/mL (normal:3.85-8.78), LH 61.55 mUI/mL (normal:2.12-10.89), estradiol 16.56 pg/mL (normal:22.4-115), testosterone 0.81 ng/mL (normal:0.1-0.75). Mineral metabolism was normal: total calcium 9.9 mg/dL (normal:8.5-10.2), 25-hydroxyvitamin D 39.39 ng/mL (normal>30), PTH 21.18 pg/mL (normal:17.3-74.1). Bone formation marker osteocalcin was normal 25.24 ng/mL (normal:15-46), with high resorption marker CrossLaps 0.86 ng/mL (normal:0.33-0.782). DXA showed low BMD for age (no incidental fractures): L1-L4 BMD 1.106 g/cm^2, Z-score -1.5, femoral neck BMD 0.834 g/cm^2, Z-score -2.0; total hip BMD 0.836 g/cm^2, Z-score -1.8, with partially degraded microarchitecture TBS 1.299. The patient restarted oral estrogen replacement with ethynyl estradiol 0.02 mg and drospirenone 3 mg, and continued cholecalciferol 2000 UI/day.
Conclusion: Estrogen replacement remains the first option for a low BMD in young adults, especially if there are no fractures.
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MANAGEMENT OF OSTEOMALACIA AND TERTIARY HYPERPARATHYROIDISM IN A FEMALE WITH MULTIPLE FRACTURES

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Background/Objective: Defective osteomalacia-related bone mineralization impairs bone microarchitecture and strength causing bone deformities, and high fracture risk, which can be further enhanced by hyperparathyroidism [1-10]. We aim to introduce such case.
Method: Case report. Ethical approval 35/22.09.2025.
Results: A 52-year-old female underwent left parathyroidectomy for osteomalacia-related tertiary hyperparathyroidism (THP) due to uncontrolled osteomalacia 17 years ago (menopause at 47). Then, severe osteoporosis (vertebral, rib and clavicular fractures) required 5-year bisphosphonates regimen, followed by drug holiday. After 9 years, DXA-BMD showed osteopenia: lumbar BMD 1.116 g/cm^2, T-score -0.5; total hip BMD 0.984 g/cm^2, T-score -0.1; third distal radius BMD 0.666 g/cm^2, T-score -2.4. Zoledronate 5 mg/year was administered. One year later, normal total calcium 9 mg/dL (normal:8.5-10.2), normal PTH 74.1 pg/mL (normal:17.3-74.1), low 25-hydroxyvitamin D 19.7 ng/mL (normal>30), supressed bone turnover markers: osteocalcin 12.82 ng/mL (normal:15-46), P1NP 16.08 ng/mL (normal:20.25-76.31), and CrossLaps 0.13 ng/mL (normal:0.33-0.782) were found. DXA was stationary: lowest T-score at third distal radius BMD 0.658 g/cm^2, T-score -2.5. No parathyroid remnant tumours were found at 99m-Technetium sestamibi scintigraphy. Computed tomography revealed post-osteomalacia hourglass shaped thorax. Incidental fractures (T7, T8 and T9) required continuing bisphosphonates.
Conclusion: Uncontrolled hypovitaminosis D causing THPT may lead to multiple fractures even in young adults, requiring parathyroidectomy in severe cases. Overlapping menopausal osteoporosis poses supplementary therapy challenges.

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OSTEOPOROSIS IN A PATIENT WITH NON-FUNCTIONING PARATHYROID ADENOMA: HOW FAR TO PRIMARY HYPERPARATHYROIDISM?

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Background/Objective: Non-functioning parathyroid adenomas are rare tumours incidentally discovered during imaging for unrelated ailments [1-10]. We aim to introduce such case.
Method: Case report. Ethical approval no. 35 from 09/22/2025.
Results: A 62-year-old female was admitted for paraesthesia and muscle cramps. (menopause at 54). She had normal serum total calcium 9.9 mg/dL (normal: 8.5-10.2), ionized calcium 3.9 mg/dL (normal: 3.9-4.9), PTH 40 pg/mL (normal: 17.3-74.1), and 25-hydroxyvitaminD 62 ng/mL (normal>30), reduced bone formation marker osteocalcin 12 ng/mL (normal: 15-46), but normal P1NP 20 ng/mL (normal: 20.25-76.31), and normal resorption marker [CrossLaps 0.18 ng/mL (normal: 0.177-1.015)]. DXA confirmed osteoporosis: L1-L4 lumbar BMD 0.864 g/cm^2, T-score -1.7; femoral neck BMD 0.569 g/cm^2, T-score -2.5; total hip BMD 0.664 g/cm^2, T-score -2.3; third distal radius BMD 0.654 g/cm^2, T-score -0.7. The patient received IV zoledronate 5 mg/year. Starting from a neck ultrasound, computed tomography confirmed a right parathyroid adenoma of 0.68x1.08x1.01 cm (without primary hyperparathyroidism). During 1-year follow-up, calcium and PTH remained normal: total calcium 9.4 mg/dL, PTH 69.58 pg/mL, 25-hydroxyvitamin D 40.54 ng/mL. Bone turnover markers remained stationary, except for low resorption (CrossLaps 0.05 ng/mL). Cervical ultrasound revealed a stationary parathyroid tumour of 0.46x0.62x0.26 cm. Parathyroid 99m-Technetium

sestamibi scintigraphy did not show any hyperactive foci.
Conclusion: Whether intermittent PTH secretion from non-functioning adenomas contributes to osteoporosis remains an open issue. A potential switch from a non-functional profile to primary hyperparathyroidism requires lifelong follow-up.
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PARAMETERS OF MINERAL METABOLISM AND THEIR VARIATIONS IN NORMOCALCEMIC PRIMARY HYPERPARATHYROIDISM

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Background/Objective: Normocalcemic primary hyperparathyroidism may present classical complications (e.g. osteoporosis) or asymptomatic with accidental detection [1-10]. We aim to introduce such case.
Method: Case report. Ethical approval 35/22.09.2025.
Results: A 54-year-old female (menopause at 48), with Graves' disease treated with radioiodine iodine therapy 7 year prior, showed during surveillance intermittently high serum total calcium (ranges:10.2–10.7 mg/dL, normal:8.4–10.2) and PTH (ranges:65–82.28 pg/mL, normal:15-65), with normal bone formation markers osteocalcin 44.94 ng/mL (normal:15–46), P1NP 76.29 ng/mL (normal:20.25–76.31). and increased resorption CrossLaps 0.91 ng/mL (normal:0.33–0.782), DXA revealed osteopenia: L1–L4 BMD 1.050 g/cm^2, T-score -1.1, Z-score -1; femoral neck BMD 0.840 g/cm^2, T-score -1.2, Z-score -0.9; total hip BMD 0.880 g/cm^2, T-score -1.0, Z-score -0.9. After 7 years, serum total calcium was mildly increased 10.3 mg/dL with normal ionized calcium 4.08 mg/dL (normal:3.8-4.8), PTH 66.31 pg/mL, 25-hydroxyvitaminD 28.86 ng/mL (normal>20), and no kidney dysfunction/stones. DXA-BMD was stationary: L1–L4 BMD 1.101 g/cm^2, T-score -0.7; femoral neck BMD 0.830 g/cm^2, T-score -1.2; total hip BMD 0.855 g/cm^2, T-score -1.0; third distal radius BMD 0.844 g/cm^2, T-score -0.4. During follow-up, neck ultrasound and 99m-Technetium sestamibi scintigraphy were negative; currently, computed tomography detected a left para-tracheal parathyroid nodule of 1.19 cm. Further cholecalciferol was continued (1000 UI/day).
Conclusion: This case highlights the importance of longitudinal assays in normocalcemic hyperparathyroidism, due to their high variability, heterogeneous presentation, and localization challenges for small parathyroid tumours.
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THE LINK BETWEEN NORMOCALCEMIC PRIMARY HYPERPARATHYROIDISM AND ACROMEGALY, BEYOND MULTIPLE ENDOCRINE NEOPLASIA TYPE 1

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Background/Objective: Multiple endocrine neoplasia (MEN) type 4 is found in patients with negative MEN1 testing (acromegaly and primary hyperparathyroidism) [1-10]. We aim to introduce such case.
Method: Case presentation (ethical approval no. 35/22.09.2025)

Results: A 58-year-old female (menopause at 52) had hypophysectomy and gamma knife radiotherapy for somatropinoma causing acromegaly and continued with octreotide LAR and cabergoline. One decade later, normocalcemic hyperparathyroidism was confirmed based on total serum calcium 10.1 mg/dL (normal:8.6-10), PTH 118 pg/mL (normal:17.3-74.1) with normal 25-hydroxyvitamin D 29.86 ng/mL (normal>30), bone turnover markers: osteocalcin 28.65 ng/mL (normal:15-46), P1NP 62.64 ng/mL (normal:20.25-76.31), CrossLaps 0.57 ng/mL (normal:0.183-1.06). Osteopenia (lowest T-score at third distal radius: BMD 0.772 g/cm^2, T-score -1.2, Z-score -0.5) plus vertebral fractures at T10, T11, T12 required zoledronate 5 mg/year. Ultrasound, computed tomography, and 99m-Technetium sestamibi scintigraphy found a right lower parathyroid tumour of 2.3 cm. For 2 years, she developed kidney micro-stones and experienced normal/high-normal calcaemic level and stationary PTH until she agreed for parathyroidectomy. Menin testing was negative. One day postoperatively she had hypocalcaemia: total calcium 7.33 mg/dL with normal PTH 47.1 pg/mL, but 3 months later, high PTH relapsed (with normal total calcium, vitamin D and kidney function) in addition to negative imaging testing for a parathyroid tumour.
Conclusion: Negative MEN1 in acromegalic patient with a parathyroid tumour is suggestive for MEN4. Normocalcemic variant may be part of the phenotype, and does not exclude complications (e.g. fractures).
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OSTEOPOROSIS MANAGEMENT IN A FEMALE PATIENT WITH AUTOIMMUNE POLYGLANDULAR SYNDROME TYPE 2 AND CHRONIC KIDNEY DISEASE –RELATED SECONDARY HYPERPARATHYROIDISM

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Background/Objective: Glucocorticoid and thyroid replacement in autoimmune poly-glandular syndrome type 2 (APS2) might contribute to bone loss. Comorbidities such as secondary hyperparathyroidism due to chronic kidney disease (CKD) further increase fracture risk [1-10]. We aim to introduce such case.
Method: Case report (ethical approval 35/22.09.2025)

Results: A 55-year-old-female with APS2 syndrome (menopause at 45) developed primary adrenal insufficiency at 47 [morning plasma cortisol 6 mg/dL (normal:6.7-22.6)] and myxoedema [TSH 46 mUI/mL (normal:0.5-4.5), free thyroxine 8.47 pmol/L (normal:9-19)] requiring prednisone and levothyroxine replacement. DXA showed osteopenia:

L1–L4 BMD 0.906 g/cm^2, T-score -2.3; femoral neck BMD 0.726 g/cm^2, T-score -2.2; total hip BMD 0.887 g/cm^2, T-score -1. After 3 years, osteoporosis was confirmed: L1–L4 BMD 0.834 g/cm^2, T-score -2.9; femoral neck BMD 0.705 g/cm^2, T-score -2.4; total hip BMD 0.887 g/cm^2, T-score -1. She started denosumab (60 mg/6 months). After 1 year, secondary hyperparathyroidism was confirmed amid CKD: total serum calcium 8.57 mg/dL (normal:8.4-10.3), PTH 149.5 pg/mL (normal:15-65), 25-hydroxyvitamin D 27.1 ng/mL (normal>30); creatinine 1 mg/dL (normal:0.5-1.2); eGFR 67mL/min/1.73m^2 (Normal>90). She had normal osteocalcin 22.79 ng/mL (normal:15-46), and suppressed resorption marker CrossLaps 0.14 ng/mL (normal:0.33-0.782). DXA showed lowest T-score of -1.9 (L1–L4 BMD 0.955 g/cm^2) and an incidental T5 vertebral fracture. Denosumab was continued in association with alphacalcidol.
Conclusion: Glucocorticoid and thyroid replacement might interplay with osteoporosis management in APS2 across lifespan.
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MALE OSTEOPOROSIS: FROM PLUNGING GOITER TO INCIDENTAL DETECTION OF FRACTURES

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Background/Objective: Fragility fractures in men are frequently associated with secondary causes such as hypogonadism, hypercortisolism or other endocrine anomalies [1-10]. We aim to introduce such case.
Method: Case report. Ethical approval: 35/22.09.2025.
Results: A 57-year-old male was admitted for neck compressive goitre with positive Pemberton sign. He had altered glucose tolerance (2-h glucose of 182 mg/dL during 75-gram oral glucose tolerance test) with normal thyroid function [TSH 1.32 mIU/mL (normal:0.35-4.94), freeT4 13.83 pmol/L (normal:9-19)] and negative thyroid antibodies. Thyroid ultrasound showed multinodular goitre with retrosternal extension that required computed tomography (which confirmed it and incidentally detected T8, T9, T10, L4, and L5 vertebral fractures). The patient had normal adrenal [ACTH 15.72 pg/mL (normal:7.2-63.3), morning cortisol 7.01 mg/dL (normal:4.82-19.5)] and gonadal function [FSH 7.52 mUI/mL (normal:1.27-19.26), testosterone 3.5 ng/mL (normal:1.75-7.81)]. Mineral metabolism was normal [total serum calcium 9.03 mg/dL (normal:3.9-4.9), PTH 35.58 pg/mL (normal:17.3-74.1), 25-hydroxyvitamin D 43.06 ng/mL (normal>)], so were bone turnover markers [alkaline phosphatase 77 U/L (normal:40-150), osteocalcin 22.36 ng/mL (normal:15-46), CrossLaps 0.52 ng/mL (normal:0.33-0.782)]. DXA showed low BMD for age: L1–L4 BMD 1.039 g/cm^2, T-score -1.6, Z-score -2.0; femoral neck BMD 0.799 g/cm^2, T-score -2.1, Z-score -1.7; total hip BMD 0.941 g/cm^2, T-score -1.1, Z-score -1. He underwent total thyroidectomy, and started zolendronate 5 mg/year.
Conclusion: Incidentally detected fractures may uncover osteoporosis in males without traditional risk factors.
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OVERLAP BETWEEN PERSISTENT PRIMARY HYPERPARATHYROIDISM, OSTEOPOROSIS AND BONE METASTASES: MANAGEMENT CHALLENGES

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Background/Objective: Primary hyperparathyroidism (PHPT) increases risk of osteoporosis and cardiac arrhythmias [1-10]. We aim to introduce such patient.
Method: Case report (Ethical approval no. 35/22.09.2025)

Results: A 69-year-old female (menopause at 39) was admitted for symptomatic atrial fibrillation and hypercalcemia. Medical history includes: persistent PHPT for the past 12 years after right parathyroidectomy (PTx), complicated with osteoporosis (she underwent bisphosphonates for 3 years, followed by denosumab 7 months prior due to bone metastases from a breast carcinoma), kidney stones and atrial fibrillation. After PTx, she had persistently high PTH up to 93 pg/mL (normal:17.3-74.1) and total serum calcium 11 mg/dL (normal:8.4-10.2). DXA showed osteoporosis with lowest T-score -2.5 at femoral neck, and partially degraded microarchitecture (TBS 1.241). Ultrasound revealed a right parathyroid adenoma of 0.66 X 0.43 cm. On current admission, total calcium was high 10.3 mg/dL. She underwent re-do right PTx. One day postoperatively normal total serum calcium 9.6 mg/dL and PTH 69 pg/mL were found. One month postoperatively mineral metabolism was normal [total calcium 9.6 mg/dL, PTH=24.92 pg/mL, 25-hydroxyvitamin D 27.15 ng/mL (normal>30)]. Bone turnover markers were suppressed: osteocalcin 8.88 ng/mL (normal:15-46), P1NP 13.31 ng/mL (normal:20.25-76.31), CrossLaps 0.12 ng/mL (normal:0.33-0.782). DXA showed a BMD improvement: L1–L4 BMD 1.033 g/cm^2, T-score -1.2; femoral neck BMD 0.697 g/cm^2, T-score -2.4; total hip BMD 0.851 g/cm^2, T-score -1.2; third distal radius BMD 0.727 g/cm^2, T-score -1.7. She continued denosumab.
Conclusion: Overlapping PHPT-related osteoporosis and mammary cancer-associated bone metastases requires a tailored interventional strategy.
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OSTEOGENESIS IMPERFECTA AND THE CHALLENGES OF DECREASING THE RISK OF FRAGILITY FRACTURES

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Background/Objective: Osteogenesis imperfecta (OI) leads to bone fragility from young ages [1-10]. We aim to introduce the OI-related bone status in a young female.
Method: Case report (Ethical approval 35/22.09.2025)

Results: A 30-year-old woman with OI was admitted for bone evaluation. Medical history included short stature and kidney stones. She had positive maternal history of OI, but her two siblings were OI-free. At the age of 18, DXA showed reduced BMD for age, with lowest Z-score -3.0 (lumbar L1-L4) and multiple fractures (including vertebral). IV ibandronate for 3 years was administrated, followed by zoledronate 5 mg/year, with an additional incidental vertebral fracture. After another 2 years, DXA showed: L2–L4 BMD 0.951 g/cm^2, Z-score -1.2; femoral neck BMD 0.836 g/cm^2, Z-score -0.9; total hip BMD 0.882 g/cm^2, Z-score -0.4, and drug holiday was initiated and prolonged for 7 years. Latest follow-up revealed normal mineral metabolism parameters: total serum calcium 9.6 mg/dL (normal:8.5-10.2), PTH 52.2 pg/mL (normal:17.3-74.1), 25-hydroxyvitamin D 20.3 ng/mL (normal>30), osteocalcin 21.01 ng/mL (normal:11-43), P1NP 37.61 ng/mL (normal:15.13-58.59), and CrossLaps 0.152 ng/mL (normal:0.136-0.689). DXA confirmed a stationary BMD: L2–L4 BMD 0.993 g/cm^2, T-score -1.7, Z-score -0.9; femoral neck BMD 0.867 g/cm^2, T-score -0.9, Z-score -0.3; total hip BMD 0.894 g/cm^2, T-score -0.9, Z-score -0.2/ No incidental fractures were found. The patient remained in drug holiday.
Conclusion: Bisphosphonates remain an important tool for improving fracture risk even in young patients with OI, but decision of drug holiday should be taken into consideration according to the real-life outcome.
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CALCIUM METABOLISM: A KEY PLAYER AMONG TRANSIENT COMPLICATIONS OF TOTAL THYROIDECTOMY

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Background/Objective: A frequent complication after total thyroidectomy (Tx) is hypocalcaemia, while dysphonia is rarely found nowadays [1-10]. We aim to introduce the case of a young female with post-Tx hypocalcaemia and dysphonia.
Method: Case report (Ethical approval 35/22.09.2025)

Results: A 32-year-old female was admitted post-Tx for Graves's disease with postpartum onset. Prior to Tx, the patient had normal serum total calcium [9.1 mg/dL (normal:8.4-10.2)] and 25-hydroxyvitamin D [30.7 ng/mL [normal>30)] under cholecalciferol 2000 UI/day. Thyroid function normalized [thyroid stimulating hormone (TSH) 3.5 mIU/mL (normal: 0.35-4.94)] under methimazole. Thyroid antibodies were positive [anti-thyroperoxidase 75.77 UI/mL (normal<16), anti-thyroglobulin 220.2 UI/mL (normal:0-115), anti-TSH receptor antibody 3.16 UI/L (Normal<1.75)]. Cervical ultrasound showed a large goitre before Tx. Post-Tx pathological report confirmed adenomatous nodular goitre and lymphocytic thyroiditis. Postoperatively she developed symptomatic hypocalcaemia for which she received alfacalcidol and calcium supplementation (IV and oral). The patient also experienced dysphonia (bilateral recurrent laryngeal nerve paresis) requiring oral methylprednisolone for one month. A week postoperatively serum calcium normalised 8.6 mg/dL, but PTH remained low 15.63 pg/mL, with further normalization within one month. Dysphonia improved within 5 months.
Conclusion: Hypocalcaemia does not necessarily correlates with dysphonia following Tx, but highlights a more difficult surgical approach (e.g. large goitre, fibrosis post-methimazole). Corticotherapy to address dysphonia might aggravate dysphonia.

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P303

HYPERTHYROIDISM AND MILD AUTONOMOUS CORTISOL SECRETION AS CONCURRENT CAUSES FOR MALE OSTEOPOROSIS

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Objective: Male osteoporosis is usually related to secondary causes such as hyperthyroidism and excessive cortisol secretion [1-10]. We aim to introduce such patient.
Method: case report. Ethical approval no. 29336 from 10/17/2025.
Results: A 59-year-old male had a history of toxic multinodular goiter for the past 2 years and a recent episode of acute bilateral submaxillary sialadenitis. On admission, he had normal thyroid stimulating hormone and free levothyroxine under thiamazole 5 mg/day and negative anti-thyroid antibodies. Computed tomography showed bilateral adrenal tumors of 1.8 cm on the right and 2.4 cm on the left. Basal adrenocorticotropic hormone was low-normal [8.98 pg/mL(normal:7.2-63.3)], high-normal plasma morning cortisol [16.47µg/dL(normal:4.82-19.5)] and cortisol after 1-mg-dexamethasone suppression test indicated mild

autonomous cortisol secretion(MACS) [1.88µg/dL(normal:<1.8)]. Mineral metabolism and bone turnover markers were normal. Dual-Energy X-Ray Absorptiometry(DXA) confirmed osteoporosis: lumbar BMD 0.838g/sqcm, T-score -3.2, femoral neck BMD 0.722g/sqcm, T-score -2.7, total hip BMD 0.809g/sqcm, T-score -2.2. Bone microarchitecture was partially degraded (TBS 1.322). He had vertebral fractures at spine X-Ray and bone scintigraphy showed degenerative changes in multiple joints. Zoledronate 5mg/year was administered in addition to cholecalciferol 2000IU/day and decision of total thyroidectomy was made. Genetic testing was recommended due to bilateral adrenal tumors but the patient declined.

Conclusion: Hyperthyroidism and MACS have a negative impact on bone health and decision of pharmacological or surgical intervention must be individualized.

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P304

ASSOCIATION OF POSTOPERATORY HYPOPARATHYROIDISM FOLLOWING SURGERY FOR PAPILLARY THYROID CARCINOMA AND PITUITARY DISEASE: IMPLICATIONS FOR BONE PROFILE

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Objective: Hypoparathyroidism is one of the most clinically important complications of thyroidectomy, either by incidental removal or temporary damage of the parathyroid glands [1-10]. We aim to introduce a patient with postoperatory hypoparathyroidism after thyroidectomy for differentiated thyroid carcinoma (TC).

Method: case report. Ethical approval no. 29336 from 10/17/2025.

Results: A 46-year-old male was admitted for evaluation after total thyroidectomy for papillary TC. He was known with macroprolactinoma diagnosed at 39 complicated with hypogonadotropic hypogonadism, central hypothyroidism and adrenal insufficiency. The patient followed cabergoline 0.5mg/week but self-decided to stop levothyroxine and prednisone substitution at 41. Currently, thyroid panel showed high Thyroid Stimulating Hormone(TSH) 5.6µIU/mL(normal:0.35-4.94) and normal free levothyroxine 11.52pmol/L(normal: 9-19) under levothyroxine 100µg/day with negative thyroglobulin. Mineral metabolism revealed low parathormone 14.68pg/mL(normal:17.3-74.1), normal blood calcium 9.73mg/dL(normal:8.6-10), high phosphorus 4.8mg/dL(normal:2.5-4.5) and normal 25-hydroxyvitamin D 32.92ng/mL(normal: >30) under vitamin D supplements. Prolactin was high 22.12ng/mL(normal:2.64-13.13) under cabergoline 1 mg/week; adrenocorticotropic hormone and morning plasma cortisol were normal. Oral calcium supplements, alphacalcidol 0.5µg/day were initiated and radioiodine (50mCi) administration was decided; cabergoline was increased to 1.25mg/week.

Conclusion: Biochemical and hormonal screening for hypoparathyroidism is mandatory after total thyroidectomy, especially when radioiodine and TSH suppressive therapy are necessary and pituitary disorder is present in order to prevent long-term impact on bone health.

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P305

UNDIFFERENTIATED PLEOMORPHIC SARCOMA ADJACENT TO THE TIBIA: IMAGING AND DIAGNOSTIC PITFALLS

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Objective: Soft tissue sarcomas are highly aggressive tumors with rapid local invasion and potential involvement of adjacent skeletal structures [1-9]. We aim to introduce such case.
Method: case report. Ethical approval no. 29336 from 10/17/2025.
Results: This was a 57-year-old female admitted for a progressively growing mass on the anterior left for the past 5 months. She was known with total thyroidectomy for multinodular goiter 13 years prior. At clinical examination, the mass was painful but without local inflammatory signs. Magnetic resonance imaging(MRI) revealed a tumor of 4.8/2.5/4.6 cm in the adipose tissue of the proximal third on the left calf with aggressive features, dermal extension and no periosteal/cortical invasion. Computed tomography confirmed the soft tissue mass with heterogeneous aspect. Bone scintigraphy showed an area with mildly increased uptake in the proximal left tibia. Mineral metabolism assays showed normal blood calcium and phosphorus, high 25-hydroxyvitamin D 55ng/mL(normal:30-100) with low-normal parathormone 18.13pg/mL(normal:17.3-74.1). Osteocalcin was low 13.99ng/mL(normal:15-46), normal alkaline phosphatase 93IU/L(normal:35-104), P1NP 73.18ng/mL(20.25-76.31) and CrossLaps 0.32ng/mL(normal:0.183-1.06). Surgical excision of the tumor was performed and pathological report revealed high-grade undifferentiated pleomorphic sarcoma pT2NxG3 and Ki67 60% at immunohistochemistry. Next generation sequencing for genetic tumoral profile evaluation was declined by the patient. She was referred to oncologic monitoring and decision of adjuvant therapy.
Conclusion: Multidisciplinary approach and precise imaging assessment are mandatory to establish tumor origin and correct management of aggressive soft tissue sarcomas.
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P306

OSTEOPENIA IN A PATIENT WITH NEWLY DETECTED BREAST MALIGNANCY: CHALLENGES OF MANAGEMENT

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Objective: Breast cancer and its management, including surgery, radiotherapy, chemotherapy and aromatase inhibitors have a negative impact on skeletal health and can accelerate bone loss [1-10]. We aim to introduce such case.
Method: case report. Ethical approval no. 29336 from 10/17/2025.
Results: A 50-year-old female with personal history of recurrent nephrolithiasis was admitted for calcium-phosphate metabolism assessment. Clinical evaluation revealed hypoplastic right breast compared to the left with skin retraction. Of note, her family medical history included her aunt and cousin with breast cancer. Biochemical panel showed mild anemia and leukopenia, normal renal function and electrolytes. Blood calcium was normal [9mg/dL (normal: 8.5-10.2)], as well as 25-hydroxyvitamin D [28.7ng/mL (normal: >30)] and parathormone [35.31pg/mL (normal: 17.3-74.1)]. Bone turnover markers were normal. Dual-Energy X-Ray Absorptiometry(DXA) revealed osteopenia: L1-L4 BMD 1.026g/sqcm, T-score -1.4, femoral neck BMD 0.778g/sqcm, T-score -1.7, total hip BMD 0.822g/sqcm, T-score -1.5 and partially degraded bone microarchitecture (TBS 1.320). Breast ultrasound showed a mass of 1.3 cm with spiculated margins and internal calcifications in the right breast. Computed tomography confirmed right breast calcification of 1.24 cm with an adjacent mass of <1 cm. Tumor markers such as carcinoembryonic antigen were negative. She was referred to oncologic and surgical evaluation for decision of conservative or operative treatment.
Conclusion: Careful monitoring of bone status is mandatory for patients with breast cancer especially when aromatase inhibitors are recommended in order to initiate adequate antiosteoporotic medication.
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P307

CLINICAL CONSEQUENCES OF HYPOPARATHYROIDISM AFTER TOTAL THYROIDECTOMY FOR DIFFERENTIATED THYROID CANCER

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Objective: Hypoparathyroidism following thyroidectomy is still a significant issue despite advancement of surgical techniques and patient preparation. The resulting hypocalcemia ranges from asymptomatic biochemical variations to severe tetany [1-8]. We aim to introduce such patient.
Method: case report. Ethical approval was no. 29336 from 10/17/2025.
Results: A 49-year-old female was diagnosed with multinodular goiter with a dominant nodule in the left thyroid lobe of 2.3 cm, hypoechoic, vascularized and with microcalcifications. Her personal medical history also included a uterine myoma of 3.4cm diagnosed 3 months prior with negative tumor markers. She successfully underwent total thyroidectomy and pathological report revealed a papillary thyroid microcarcinoma. Subsequently, she presented with paresthesia and muscle cramps and thyroid panel showed Thyroid Stimulating Hormone 0.62µIU/mL(normal: 0.35-4.94), free levothyroxine 15.87pmol/L(normal: 9-19)] under 100µg levothyroxine/day. Parathormone was decreased 14.9pg/mL(normal: 17.3-74.1), low-normal blood calcium 8.5 mg/dL(normal: 8.5-10.2), phosphorus 2.9mg/dL(normal: 2.5-4.5) and low 25-hydroxyvitamin D 25ng/mL(normal: >30). Bone turnover markers showed decreased osteocalcin 10.7ng/mL(normal: 15-46), normal alkaline phosphatase 58IU/L(normal: 38-105), P1NP 34.7ng/mL(normal: 20.25-76.31) and CrossLaps 0.397ng/mL(normal: 0.33-0.782). After 4 days of intravenous calcium gluconate 1g/day the symptoms remitted and she was recommended oral calcium supplements 1.2g/day in addition to cholecalciferol 2000IU/day and alphacalcidol 1µg/day.
Conclusion: Prompt and adequate treatment of post-surgical hypoparathyroidism can minimize the severity of clinical manifestations and long-term consequences of hypocalcemia in these cases.
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P308

INTERPLAY BETWEEN HORMONAL AND METABOLIC DISTURBANCES AFFECTING SKELETAL HEALTH IN RELAPSED CUSHING'S DISEASE

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Objective: Cushing's disease is associated with increased fracture risk even in young male patients [1-6]. We aim to introduce a case of post-thyroidectomy hypocalcemia in a subject with relapsed Cushing's disease.
Method: case report. Ethical approval was no. 29336 from 10/17/2025.
Results: A 40-year-old male had a history of microadenoma-related Cushing's disease diagnosed at 33. He underwent trans-sphenoidal hypophysectomy followed by secondary adrenal insufficiency under substitution with prednisone that remitted in 6 months and remained in Cushing's disease remission for 4 years. Currently,biochemical and hormonal relapse of Cushing's disease was found: adrenocorticotropic hormone 64.78pg/mL (normal: 7.2-63.3), plasma cortisol after 2x2mg dexamethasone suppression test 14.74µg/dL, after 2x8mg dexamethasone suppression test 5.08µg/dL, 24-hour free urinary cortisol 428.4µg/24h (normal: 4.3-176), complicated with type 2 diabetes mellitus, arterial hypertension and hypogonadism. In addition, neck ultrasound showed a hypoechoic thyroid nodule of 2.6 cm in the right lobe. He underwent total thyroidectomy and pathological report confirmed a follicular adenoma. Postoperatory, he experienced hypocalcemia with blood calcium 8.35mg/dL(normal: 8.8-10.6), low 25-hydroxyvitamin D 27.85ng/mL (normal: >30) and normal parathormone. Bone formation markers were suppressed: osteocalcin 2.27ng/mL (normal: 14-42), P1NP 6.99ng/mL (normal: 20.25-76.21) and bone resorption was normal: CrossLaps 0.25ng/mL (normal: 0.182-0.801). Beside calcium, vitamin D supplements and levothyroxine 100µg/day, he was recommended Pasireotide LAR 10mg/month and oral antidiabetic and antihypertensive drugs.
Conclusion: The concomitant presence of hypercortisolism, hypogonadism, type 2 diabetes mellitus and mineral metabolism

disturbances represents a constellation of factors that deteriorate bone health.

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P309

CERVICAL SEROMA AFTER TOTAL THYROIDECTOMY FOR DIFFERENTIATED THYROID CANCER IN A YOUNG MALE: THE POTENTIAL ROLE OF CALCIUM-VITAMIN D STATUS

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Background: Risk factors for seroma formation after total thyroidectomy include local aspects such as the extent of surgery and systemic contributors such as postsurgical hypocalcemia and hypoparathyroidism. We aim to introduce a case of cervical seroma following thyroid cancer surgery [1-6].
Method: case report. Ethical approval no. 29336 from 10/17/2025.
Results: A 33-year-old male presented as an emergency for left anterior cervical pain and compressive symptoms during the past 2 days. He was diagnosed with a thyroid nodule of 3 cm in the left lobe 2 years prior to admission. Currently, thyroid ultrasound confirmed the nodule with increased size of 4.7 cm and tracheal deviation to the right, while computed tomography revealed extension to the jugular notch. He underwent total thyroidectomy with pathological report of papillary thyroid microcarcinoma. One week later, clinical examination revealed an anterior cervical swelling with local erythema. At neck ultrasound he had 3 subcutaneous hypoechoic fluid collections anterior to the trachea of 2.8 cm, left paramedian of 3.9 cm and right paramedian of 2.1 cm indicating postsurgical seroma. Thyroid Stimulating Hormone was 2.48μIU/mL (normal: 0.35-4.94) under levothyroxine 100μg/day with negative thyroglobulin and anti-thyroglobulin antibodies. Total serum calcium was 9.7mg/dL (normal: 8.5-10.2), low 25-hydroxyvitamin D 16.7ng/mL (normal: 30-100) and normal parathormone 50.08pg/mL (normal: 17.3-74.1). Needle aspiration of the seroma was performed with complete remission and no subsequent re-accumulation. Vitamin D supplementation with cholecalciferol 2000 UI/day was initiated.
Conclusion: Postsurgical evaluation of mineral metabolism may provide additional information for the patient's risk of seroma accumulation. In this case, vitamin D deficiency may contribute to impaired tissue healing and fluid accumulation.

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P310

AN EXPLORATORY STUDY OF ANGIOPOIETIN-LIKE 4 (ANGPTL4) IN OBESE MENOPAUSAL WOMEN: AN ANALYSIS BEYOND BONE MINERAL DENSITY

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Background/Objective. Angiopoietin-like 4 (ANGPTL4), a key regulator of lipids metabolism, is connected to glucose control. An interplay with adipogenic-osteogenic differentiation balance is proposed, been a promising alternative as future candidate against osteoporosis. The bone connection is either direct or by multiple signalling pathways (inflammation, insulin resistance, adipokines-related lipids influence). We aim to analyse ANGPTL4 in obese vs non-obese women in relationship with mineral metabolism, DXA-BMD and other adipokines.
Methods. This is an exploratory, bi-centric study. Ethical

approvals: no.32/09/30/2024 and no.97/11/20/2024 (PN-IV-P8-8.3-ROMD-2023-0262). Inclusion criteria: menopause, age ≥50. Exclusion criteria: diabetes, dyslipidaemia, cancers, kidney, bone (e.g. osteoporosis) and metabolic disorders (other than obesity). Study protocol: fasting blood testing of glycaemia, mineral metabolism assays [e.g. 25-hydroxivitamin D (25OHD)], and adipokines based on ELISA detection (Quantibody® Human Obesity Array 3, RayBiotech, Inc, Norcross, GA, USA, QAH-ADI-3, inter-assay precision<20%). Central DXA (GE Lunar Prodigy) and 75-gram oral glucose tolerance test (providing 2-h glycaemia) were performed.

Results

12 women with obesity (BMI ≥30kg/m^2, 32.83±1.47 kg/m^2) vs 12 females with non-obesity (BMI<30 kg/m^2,23.61±2.70 kg/m^2, p<0.001) had similar age (60.00±7.15 vs. 53.88±6.98 years, p=0.1), 2-hour glycaemia (155 vs 112 mg/dL, p=0.21), and DXA-BMD (g/cm^2) at lumbar spine (0.998±0.165 vs 1.029±0.142, p=0.6), femoral neck (0.998±0.165 vs 1.029±0.142, p=0.6), and total hip (0.958±0.08 vs 0.904±0.41, p=0.2). Obesity group had lower 25OHD (26.8 vs 34.35 ng/mL, normal<30, p=0.015), and, after adjustment, lower ANGPTL4: [mean(95%CI): 16.03(16.4673.44) vs 47.62(12.78, 25.19) ng/mL, p=0.003).Obesity group: ANGPTL4 correlated with interleukin-10 (pg/mL): r=0.9, p<0.0001. Non-obesity group: ANGPTL4 negatively correlated with serum phosphorus (mg/dL): r= -0.711, p=0.0142, and positively with tumour necrosis factor receptor I (ng/mL): r=0.75, p=0.0522.

Conclusion. ANGPTL4 is lower in obese vs age- and 3-sites BMD-matched, non-obese menopausal women. ANGPTL4 showed no direct correlation with DXA-BMD, or mineral metabolism assays, except for an inverse relationship with phosphorus in non-obese females, which suggests a distinct significance based on BMI (as found for the adipokines panel).

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DIAGNOSTIC PITFALLS OF A NEARLY-COMPLETELY CALCIFIED THYROID NODULE IN A YOUNG FEMALE: DOES THE MINERAL METABOLISM COUNT?

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Objective: Thyroid nodules with near-complete calcification may be long-standing benign lesions, but malignancy cannot be excluded. Moreover, ultrasonographic suspicious features might be hidden by the extensive calcification and fine-needle aspiration(FNA) can be technically limited. We aim to introduce a case of a near-completely calcified thyroid nodule associated with compressive symptoms [1-5].

Method: case report. Ethical approval was no. 29336 from 10/17/2025.

Results: A 45-year-old female was admitted for thyroid evaluation due to mild compressive symptoms. She was known with a right thyroid nodule of 2.6 cm with cystic degeneration since the age of 43. On admission, thyroid function was normal with Thyroid Stimulating Hormone 1.09µIU/mL(normal: 0.35-4.94), free levothyroxine 14.88pmol/L(normal: 9-19), increased calcitonin 6.13pg/mL(normal: 1-4.8) and negative anti-thyroid antibodies. Blood calcium was normal 9.1mg/dL(normal: 8.5-10.2), as well as phosphorus 3.9mg/dL(normal: 2.3-4.7) and parathormone 35.81pg/mL(normal: 17.3-74.1) with decreased 25-hydroxyvitamin D 22.47ng/mL(normal: >30). Bone turnover markers were within normal range. Thyroid ultrasound showed the right lobe with an almost entirely calcified nodule of 2.8 cm with a protrusive area towards the upper part of the thyroid, in close contact with the anterior thyroid capsule. Computed tomography confirmed the right lobe nodule with almost total calcification that protruded from the thyroid contour. Ultrasonographic malignancy criteria were unclear and FNA was considered with low rate of success because of the massive calcification, hence she was referred to total thyroidectomy. Vitamin D supplementation with cholecalciferol 2000IU/day was also recommended.

Conclusion: In this case, the absence of reliable ultrasound imaging and cytological assessment in the presence of compressive symptoms pointed towards surgical treatment despite indeterminate malignancy criteria.

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COMPLETE MANAGEMENT IN WOMEN WITH OSTEOPOROSIS AND LOCOMOTIVE SYNDROME

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Background. Locomotive Syndrome (LoS) describes mobility limitations (walking, sit-to-stand, stair climbing, activities of daily living) caused by impairment of the locomotive organs and is associated with a higher risk of future need for nursing care. Osteoporosis and other musculoskeletal disorders frequently contribute to LoS.

Aim. To evaluate whether a *complete management* strategy combining medication plus a standardized rehabilitation program improves pain and functional status more than medication alone in older women with LoS and osteoporosis.

Methods. Forty-eight elderly *female* LoS patients (71–80 years), all diagnosed with osteoporosis and previously diagnosed with early lumbar spinal stenosis and osteoarthritis, were fully assessed and categorized as LoS Stage 1 or 2. Participants were randomized equally to an

experimental group (EG: medication + rehabilitation) or a control group (CG: medication only). Rehabilitation included TENS, deep oscillation therapy, and mixed kinetic training (resistance, aerobic, proprioceptive exercises) delivered daily for 12 sessions, followed by an adapted home-training program. Outcomes were assessed at baseline and post-rehabilitation: pain (VAS), functional independence (Katz ADL index), and 25-question Geriatric Locomotive Function Scale (GLFS-25). Analyses were performed using SPSS 22.0.

Results. Both groups showed improvement after rehabilitation. Pain reduction was greater in EG, with significant decreases in VAS in EG ($p < 0.001$) and CG ($p = 0.004$), and a statistically significant between-group difference post-intervention ($p < 0.05$). Functional outcomes improved significantly in EG, with post-rehabilitation between-group differences reaching statistical significance ($p < 0.05$), particularly for VAS and Katz index.

Conclusions. In older women with osteoporosis and LoS, rehabilitation improves pain and function, while adding medication may provide additional benefit—especially for pain reduction and ADL independence—potentially enhancing quality of life and supporting strategies aimed at slowing LoS progression.

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ACUTE ANTERIOR UVEITIS FOLLOWING ZOLEDRONIC ACID ADMINISTRATION: A CASE REPORT

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Introduction:
Bisphosphonates are widely used and well-established agents in the treatment of postmenopausal osteoporosis due to their efficacy in reducing bone resorption and fracture risk. Intravenous zoledronic acid is frequently preferred because of its potent antiresorptive effect and convenient once-yearly administration. Although bisphosphonates are generally well tolerated, rare but potentially serious inflammatory ocular adverse effects have been reported. These include anterior uveitis, episcleritis, scleritis, and, less commonly, optic neuritis. Awareness of such complications is essential, particularly in patients with a prior history of ocular or neurologic inflammatory disease.

Case Report:
A 65-year-old woman was evaluated for postmenopausal osteoporosis. Dual-energy X-ray absorptiometry revealed a T-score of −3.0 at the total femur and lumbar spine (L1–L4). After exclusion of secondary causes of osteoporosis, intravenous zoledronic acid therapy was initiated. Approximately 24 hours after infusion, the patient developed sudden-onset unilateral severe eye pain accompanied by photophobia and blurred vision. She was promptly referred to ophthalmology. The diagnosis of acute anterior uveitis was established. Comprehensive evaluation for infectious, rheumatologic, and systemic inflammatory causes was unremarkable, and no alternative etiology was identified.

The patient showed gradual clinical improvement, with complete resolution of ocular inflammation and full recovery of visual acuity. No recurrence was observed during follow-up.

Discussion:
Bisphosphonate-associated ocular inflammation is rare but clinically significant. Acute anterior uveitis is the most frequently reported manifestation and typically occurs within 24–72 hours after drug administration, with intravenous formulations carrying a higher risk than oral agents. Although the exact pathophysiological mechanism remains unclear, activation of γδ T lymphocytes and subsequent proinflammatory cytokine release are thought to play a role. Patients with a history of uveitis or optic neuritis, including those with demyelinating diseases such as multiple sclerosis, may be particularly susceptible. This underscores the importance of careful ophthalmologic and neurologic history-taking prior to bisphosphonate initiation.

Conclusion:
This case highlights acute anterior uveitis as a rare but serious adverse effect of zoledronic acid. Clinicians should exercise caution when prescribing bisphosphonates to patients with a history of ocular inflammation or optic neuritis and consider alternative osteoporosis treatments in high-risk individuals.

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CORRELATION BETWEEN THE HEALTH STATUS OF ADULT PATIENTS WITH OSTEOARTHRITIS WITH THEIR FAMILY APGAR SCORES

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Title:Correlation between the Health Status of Adult patients with Osteoarthritis with their FamilyAPGAR scores.

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Abstract

Background: Osteoarthritis (OA) is a highly prevalent musculoskeletal disease, severely impacting functional capacity and quality of life (QOL). Given the chronic nature of OA and its associated QOL deterioration, understanding the role of social support, particularly family function, is essential for comprehensive patient care.

Objective: This study determined the correlation between the health status (symptoms and QOL) of adult OA patients and their family functionality, as measured by the WHOQOL-BREF, WOMAC, and Family APGAR.

Methodology: A quantitative, correlational study was conducted on 50 adult OA patients via purposive sampling. Instruments used were the WHOQOL-BREF (QOL), WOMAC (symptoms), and Family APGAR (family function). Data were analyzed using Pearson's r.

Results: Participants reported moderate OA pain (M=8.06) and stiffness (M=3.64), with Physical Health scoring lowest on the WHOQOL-BREF (M=66.41). Most participants (68.00%) reported a Highly Functional Family. Family functionality showed a statistically significant moderate positive correlation with the **Psychological** (r=0.3880), **Environment** (r=0.4507), and **Overall QOL** (r=0.4230) domains. No significant correlation was found with the objective WOMAC physical domains (Pain, Stiffness, Physical Function).

Conclusion: A functional family unit acts as a crucial protective psychosocial factor. Family support does not alter the objective severity of OA symptoms but significantly improves the patient's emotional well-being and overall QOL perception. This highlights the necessity of incorporating family-centered interventions into the comprehensive management of osteoarthritis.

Keywords: Humans (H), Adult (A), Middle Aged (MA), Quality of Life (QOL), Family Support, Outpatients, Osteoarthritis(OA), Pain, Health Status

P315

ASSOCIATION BETWEEN SARCOPENIA AND FAILURE OF VERTEBRAL AUGMENTATION FOR OSTEOPOROTIC VERTEBRAL COMPRESSION FRACTURES: DOES VITAMIN D STATUS MATTER?

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Objective:
Osteoporotic vertebral compression fractures (OVCFs) remain a major cause of pain and disability in aging populations, with vertebral augmentation limited by postoperative complications. Sarcopenia and vitamin D deficiency, common contributors to skeletal fragility, may impair bone–muscle integrity and healing. This study investigates whether sarcopenia and serum vitamin D status predict mechanical failure following vertebral augmentation for OVCFs.

Material and Methods:
This retrospective single-center cohort included 124 patients aged >60 years who underwent percutaneous kyphoplasty (KP) or vertebroplasty (VP) for OVCFs between 2012 and 2025. Patients with secondary osteoporosis, malignancy, or spinal infection were excluded. Sarcopenia was assessed on preoperative CT using the cross-sectional area of the psoas muscle at the L3 level, normalized by height (cm^2/m^2), with established sex-specific cut-off values. Bone mineral density (BMD) was measured by quantitative CT (QCT), and T-scores were recorded from the lumbar region. Serum 25-hydroxyvitamin D [25(OH)D] levels obtained within 3 months were classified as deficient (<20 ng/mL), insufficient (20–29 ng/mL), or sufficient (≥30 ng/mL). The primary outcome was augmentation failure, defined as new or adjacent refracture, revision surgery, or ≥5 mm anterior vertebral height loss at 12 months. Secondary outcomes included residual back pain (VAS ≥4) and 1-year mortality. Multivariate logistic regression and Cox models assessed predictors, including an interaction term (sarcopenia × vitamin D category).

Results:
A total of 124 patients (mean age 71.8 ± 6.9 years; 97 females, 27 males) were analyzed. Sarcopenia was present in 56 patients (45.2%), and vitamin D deficiency (<20 ng/mL) in 74 (59.7%). The mean lumbar QCT T-score was −3.1 ± 0.6. Augmentation failure occurred in 28 patients (22.6%): 19/56 with sarcopenia (33.9%) versus 9/68 without (13.2%, p = 0.008). Failure was higher in vitamin D–deficient patients (22/74, 29.7%) compared with sufficient ones (6/50, 12.0%, p = 0.021). Combined sarcopenia and vitamin D deficiency showed the highest failure rate (38.2%, OR 3.4, 95% CI 1.3–8.9, p = 0.04).

Conclusion:
Sarcopenia and vitamin D deficiency were significant predictors of mechanical failure after vertebral augmentation in OVCFs. Patients with both conditions had the highest risk of refracture and height loss, underscoring the combined effect of muscle and metabolic fragility on surgical outcomes. These findings support routine preoperative assessment of muscle mass and vitamin D status; prospective studies should test whether targeted optimization reduces failure and improves long-term recovery.

Keywords: sarcopenia, vitamin D, vertebral augmentation, kyphoplasty, osteoporotic fractures

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ASSOCIATION BETWEEN SARCOPENIA AND LOW VITAMIN D LEVELS WITH IMPLANT FAILURE AFTER HIP FRACTURE SURGERY: A SINGLE-CENTER RETROSPECTIVE STUDY

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Background
Sarcopenia are highly prevalent in elderly patients with osteoporotic hip fractures and are linked to increased mortality and poorer functional outcomes. However, their relationship with mechanical failure of internal fixation remains unclear.

Objectives
This study aimed to evaluate whether CT-defined sarcopenia and low serum 25-hydroxyvitamin D [25(OH)D] levels are associated with implant failure after osteosynthetic treatment of osteoporotic hip fractures.

Study Design & Methods
A retrospective cohort study was conducted on patients ≥ 60 years who underwent proximal femoral nail antirotation (PFN-A) or lag screw fixation for low-energy intertrochanteric or femoral-neck fractures (2015–2025). Exclusion criteria included pathologic or high-energy fractures, malignancy, and revision surgery.
Sarcopenia was determined using the cross-sectional area of the psoas major at L3 on preoperative CT images (normalized for height; lowest sex-specific tertile = sarcopenic). Serum 25(OH)D levels within 1 month of surgery were categorized as deficient < 20 ng/mL, insufficient 20–29 ng/mL, sufficient ≥ 30 ng/mL.
Implant failure was defined as cut-out, varus collapse > 5°, or revision surgery within 12 months. Radiographic parameters, fracture classification (AO/OTA), reduction quality, and Tip–Apex Distance (TAD) were recorded. Logistic regression assessed associations between sarcopenia, vitamin D status, and implant failure after adjusting for age, sex, BMI, BMD, TAD, and fracture type.

Results
142 patients (mean age 66.2±5.4 years, 88 female, 54 male), sarcopenia prevalence was 43 %, and vitamin D deficiency 62 %. Mechanical failure was observed in 26 patients, 18 % in postoperative 12 months. We hypothesize that sarcopenic patients with deficient vitamin D will show a threefold higher odds of implant failure (adjusted OR ≈ 3.2, p < 0.05) compared to non-sarcopenic, vitamin-D-sufficient counterparts. A significant interaction effect (p < 0.05) between sarcopenia and vitamin D status was observed.

Conclusions
Both sarcopenia and vitamin D deficiency may independently and synergistically predict early mechanical failure after hip fracture fixation, suggesting that combined "osteosarcopenia" markedly effects fixation stability. Preoperative assessment and optimization of muscle mass and vitamin D levels could improve fixation longevity and functional recovery in osteoporotic patients.

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RESISTANT SECONDARY OSTEOPOROSIS FOLLOWING ADOLESCENT-ONSET ANOREXIA NERVOSA IN A YOUNG WOMAN: A CASE REPORT

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Objective
To highlight that anorexia nervosa with onset during adolescence may lead to severe, resistant secondary osteoporosis at a young age.

Materials and Methods
Clinical data, laboratory results, serial dual-energy X-ray absorptiometry (DXA) measurements, and radiological imaging of a young female patient followed for osteoporosis and presenting with back pain were retrospectively evaluated.

Results
A 29-year-old woman presented with back pain and had been followed with a diagnosis of osteoporosis. Her medical history revealed a diagnosis of anorexia nervosa at the age of 16, with disordered eating behaviors developing after psychosocial body image pressure during adolescence. Her pre-illness height and weight were reported as 172 cm and 58 kg. At presentation, her height was 161 cm and body weight was 44 kg. She had a history of secondary amenorrhea; however, regular menstrual cycles had resumed over the past three years with medical management. She had no history of smoking or alcohol use, and no other cause of secondary osteoporosis was identified. Serum calcium and 25-hydroxyvitamin D levels were within normal ranges.
The patient was diagnosed with osteoporosis in 2022 and had been treated with alendronate and denosumab during follow-up. Despite treatment, serial DXA measurements demonstrated persistently low bone mineral density with Z-scores below −2 in the lumbar spine and femoral regions. Previous imaging revealed osteoporotic compression fractures at the T6, T7, and T12 vertebrae. At presentation lateral thoracic spine radiographs demonstrated a compression fracture at the T3 vertebra. Additionally, she sustained a low-trauma hip fracture requiring surgery.

Conclusion
This case demonstrates that anorexia nervosa may result not only in reduced bone mineral density but also in a multidimensional clinical picture characterized by recurrent vertebral fractures, height loss, low-trauma hip fracture, secondary amenorrhea, and functional impairment. Disease progression despite antiresorptive therapy suggests that bone loss associated with anorexia nervosa may be resistant. Therefore, anorexia nervosa should be considered in the etiology of secondary osteoporosis in young individuals, and bone health should be evaluated early using a comprehensive approach.

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PATHOLOGICAL FRACTURE FROM OSTEOSARCOMA ARISING IN POLYOSTOTIC PAGET DISEASE OF BONE: A CASE REPORT

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Background: Paget disease of bone (PDB) is a chronic skeletal disorder characterized by excessive and disorganized bone remodeling. Although the condition is generally benign, malignant transformation—most commonly to osteosarcoma—occurs in fewer than 1% of cases. Such tumors are aggressive, rapidly progressive, and often present initially with pathological fractures.

Case Presentation: A 55-year-old woman presented with acute left arm pain and functional impairment following a low-energy fall. Radiographs demonstrated a displaced pathological fracture through a humeral lesion exhibiting mixed lytic–sclerotic changes consistent with PDB. Laboratory studies revealed markedly elevated alkaline phosphatase, and whole-body scintigraphy confirmed polyostotic involvement. Biopsy established the diagnosis of high-grade osteoblastic osteosarcoma. The patient received neoadjuvant cisplatin–doxorubicin chemotherapy and zoledronic acid, with partial biochemical but minimal radiologic response. Due to extensive local disease, amputation was performed. She completed postoperative chemotherapy and continues under multidisciplinary surveillance.

Conclusion: Osteosarcoma arising from polyostotic PDB is a rare, life-threatening complication. Pathological fracture may be the first indicator of malignant degeneration. Early biopsy, careful radiologic evaluation, and coordinated oncologic management are crucial to improving outcomes

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HIP FRACTURES IN THE AGING GLOBAL POPULATION: AN ESCALATING PUBLIC HEALTH CRISIS

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Abstract
Objective: This study aimed to systematically assess the global burden of hip fractures among adults aged ≥70 years from 1990 to 2021, focusing on incidence, prevalence, and years lived with disability (YLDs), and to evaluate trends, socioeconomic drivers, and future projections to inform targeted public health strategies.
Methods: Using data from the Global Burden of Disease (GBD) 2021 study, we analyzed incidence, prevalence, and YLDs rates for hip fractures in adults ≥70 years across 204 countries and territories. Analyses were stratified by age, sex, sociodemographic Index (SDI), and region. Statistical methods included estimating average annual percentage changes (EAPCs), frontier efficiency analysis, decomposition analysis, and forecasting models (ARIMA and exponential smoothing) to project trends to 2050.
Results: In 2021, there were 10.97 million new cases, 21.59 million prevalent cases, and 1.91 million YLDs globally among adults ≥70 years

or older. From 1990 to 2021, incidence and prevalence rates increased significantly (EAPCs: 0.62 and 0.83, respectively). The burden was higher in women and peaked in those aged ≥95 years. High SDI regions carried the highest absolute burden, but the most rapid growth occurred in middle SDI regions. Decomposition analysis identified population growth as the primary driver of increased burden (76.95–97.97% of the increase), followed by population aging. Frontier analysis revealed significant efficiency gaps in several high SDI countries (e.g., the US, Australia). SDI showed a strong positive correlation with burden rates, particularly above a threshold of 0.75. Forecasts indicated a persistently higher burden for women by 2050.

Conclusion: The burden of hip fractures in older adults is substantial, increasing, and unevenly distributed across demographics and regions. Effective public health strategies must address high-risk groups (e.g., women, very elderly) and regions (high and middle SDI) through improved prevention, early screening, and optimized resource allocation.

Keywords: Hip fracture, elderly, disease burden, GBD study, incidence, prevalence, YLDs, SDI, global health

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GLOBAL, REGIONAL AND NATIONAL BURDEN OF KNEE OSTEOARTHRITIS 1990-2021: A SYSTEMATIC ANALYSIS OF THE GLOBAL BURDEN OF DISEASE STUDY 2021

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Objective: The systematic analysis aimed to assess the levels and trends of knee osteoarthritis (KOA) in 204 countries and territories from 1990 to 2021.

Methods: We analyzed the data on the Global Burden of Diseases 2021 and reported the KOA burden and the trends from 1990-2021 by age-standardized incidence rate (ASIR), age-standardized prevalence rate (ASPR) and disability-adjusted life years (DALYs). All estimates were presented as counts and age-standardized rates per 100,000 people, calculating the estimating average annual percent change (EAPCs) with 95% uncertainty intervals (UIs).

Results: From 1990 to 2021, the KOA burden still showed an increasing trend globally, faster in females than males; the 35-39 years population has faster KOA symptoms, and 45-49 years have faster prevalence and DALYs. The high-middle SDI regions are experiencing the fastest increase. East Asia has the fastest growth, and North America has shown a stable trend with no change. The top 9 fastest growing countries and territories were Oman, Equatorial Guinea, Thailand, Saudi Arabia, Sudan, China, Taiwan (Province of China), Maldives, and Pakistan. By 2050 of prediction, there may be an obvious decreasing trend in KOA burden. Frontier analysis indicates the presence of unrealized opportunities to close the KOA burden gap in most countries and territories. Decomposition analyses indicate that population growth accounted for more than 70% of the global KOA burden. SDI level was positively associated with KOA burden increasing, and ASIR or HDI was not associated with the burden EPAC.

Conclusion: KOA is still a major global health challenge. Although there is variation between countries and regions, most countries' KOA burden is increasing, especially among females and young adults.

Keywords: Knee osteoarthritis, Burden, Trend, Incidence, Prevalence, DALYs

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EVALUATION AND MANAGEMENT STRATEGIES OF ACETABULAR SIDE OSTEOLYSIS AFTER TOTAL HIP ARTHROPLASTY

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Background

The wear of the liner after total hip arthroplasty (THA) is an important cause of prosthesis loosening, and the long-term wear of the liner often leads to a large amount of osteolysis around the prosthesis. Osteolysis is different from simple bone defect. The remaining cancellous bone is in a state of osteoporosis, and the cortical bone often loses its function. For such a large range of osteolysis, how to perform revision has always been a major challenge that troubles orthopedic joint surgeons. This study aims to review the cases of acetabular side osteolysis in the recent three years, and carry out treatments such as traditional revision, bone grafting + revision, and revision with 3D printed prostheses for cases of osteolysis with different ranges, so as to provide new ideas for the treatment of clinical cases of acetabular side osteolysis.

Methods

This study collected THA patients with different degrees of osteolysis caused by the wear of the polyethylene liner from 2020 to 2023, and a total of 49 patients were collected. Preoperative X-ray and CT (computed tomography) scans were performed to determine the range and degree of osteolysis, and the cases of osteolysis caused by periprosthetic infection were excluded. A retrospective analysis was carried out on 49 patients (52 hips) with acetabular osteolysis treated during THA revision surgery. According to the Paporsky classification, there were 5 hips of type I, 34 hips of type II, and 13 hips of type III. Methods such as biological large acetabular cups, biological acetabular cups + cancellous bone particle grafting, and customized prostheses were used to repair patients with different types of bone defects. Regular follow-up was carried out after the operation. The Harris method was used to evaluate the hip joint function, and the X-ray film was used to determine whether the prosthesis was loose and whether the transplanted bone was integrated.

Results

The 49 patients presented with hip pain symptoms on average 14.7 years after the primary replacement surgery. Among them, there were 12 cases in the traditional revision group, 28 cases of bone grafting + revision, and 9 cases of revision with 3D printed prostheses. All 49 patients were followed up, with an average follow-up period of 23 months (ranging from 5 to 33 months). The average Harris score after the operation was 81.7 points, which was an average improvement of 41.3 points compared with that before the operation. One hip required re-revision due to dislocation, and the rest had good results. There was no loosening or subsidence of the prosthesis on the X-ray film, and continuous trabecular bone could be seen passing through the junction of the transplanted bone and the host bone.

Conclusion

In the THA revision surgery caused by osteolysis, for a small range of osteolysis, traditional revision with a large cup can be adopted; for moderate bone defects, bone grafting + revision can achieve good prosthesis stability; for a large range of osteolysis or large defects affecting the prosthesis stability, the method of using 3D printed customized prostheses can achieve good results.

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3D PRINTED ACETABULAR PROSTHESIS FOR PAPROSKY Ⅲ TYPE BONE DEFECTS IN THA REVISIONS

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Background
The utilization of 3D-printed prostheses has witnessed a growing trend in the acetabular revision procedures of total hip arthroplasty (THA), particularly in cases characterized by irregular and extensive bone defects or osteolysis. This research was designed to assess the mid-term performance of 3D-printed prostheses in THA revision.
Methods
Conducted as a retrospective study, it involved the screening of patients undergoing aseptic revision THA due to prosthesis loosening and acetabular bone defects from May 2023 to December 2024. The study specifically focused on including those patients who received 3D-printed acetabular prostheses. Demographic information of the enrolled patients was systematically gathered for analysis.
Results
Totally, there were 19 patients who underwent acetabular revision with 3D-printed prostheses were recruited for this study. The average age of the participants was 65.34 years, ranging from 57 to 81 years old. The mean follow-up duration was 15.4 months, spanning from 6 to 23 months. Eleven hips presented with Paprosky ⅡA type defects, and eight cases had type ⅡB defects. At the final follow-up, all the prostheses in the 3D-printed group remained firmly fixed, achieving an implant survival rate of 100%.
Conclusion
This study has shown that the application of 3D-printed prostheses in THA revision yields favorable mid-term clinical and radiological results.

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THE ASSOCIATION BETWEEN MONOCYTE-TO-ALBUMIN RATIO AND LONG-TERM MORTALITY IN GERIATRIC HIP FRACTURE: A RETROSPECTIVE COHORT OF 2115 PATIENTS

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Objective: This retrospective study evaluated the association between monocyte-to-albumin ratio (MAR) and long-term mortality in geriatric hip fractures.
Methods: We collected the demographic and baseline information of geriatric patients with hip fractures in our hospital, and followed up on the survival data. Multivariate Cox proportional hazards regression model, restricted cubic spline, and propensity score matching (PSM) methods were used to identify the linear and non-linear associations between MAR and long-term mortality.
Results: Two thousand one hundred and fifteen patients were included in this study, with a mean age of 79.36±6.74 years. There were 672 males and 1443 females, 1529 intertrochanteric fractures, and 586 femoral neck fractures. The patients were divided into three subgroups: 731 low MAR (9.23±2.17) group, 693 medium MAR (14.48±1.47) group, and 691 high MAR (22.48±5.35) group. The mean follow-up period was 38.57 months. Duration of the follow-up, there were a total of 636 all-cause deaths, 198, 184, 254 in the low, medium, and high MAR groups, respectively. The study found a U-shaped association between MAR and mortality, and 10.37 was an inflection point. When MAR was less than 10.37, every one-unit increase in MAR, the mortality of patients decreased by 6% (HR=0.94; 95%CI: 0.88-0.99; *P*=0.0322). When MAR was greater than 10.37, every one-unit increase in MAR, the mortality of patients increased by 1% (HR=1.01, 95%CI:1.00-1.03; *P*=0.0175). In the PSM and models, we found that the results were stable and the inflection point was 10.39 and 10.36, respectively.
Conclusion: This study demonstrates that the MAR exhibits a U-shaped association with long-term mortality in geriatric hip fracture patients, with an optimal balance observed at MAR=10.37. The association reflects the interplay between monocyte inflammatory activation and nutritional albumin reserve. MAR is a composite biomarker identifying high-risk populations and guiding individualized management strategies targeting inflammation-nutrition balance.

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THE URIC ACID TO HDL-C RATIO AS A NOVEL PREDICTOR OF MORTALITY IN ELDERLY HIP FRACTURE PATIENTS: A STUDY REVEALING A SATURATION EFFECT

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Objective: To investigate the association between the uric acid to high-density lipoprotein cholesterol ratio (UHR) and long-term all-cause mortality in elderly patients with hip fractures.
Methods: We collected demographic and baseline information from geriatric patients with hip fractures aged 65 years or older who were admitted to our hospital. The UHR was calculated from admission laboratory data. The primary endpoint was all-cause mortality during the follow-up period. The relationship between UHR and mortality was analyzed using multivariate Cox proportional hazards regression models, with restricted cubic splines and a two-piecewise model to explore potential nonlinearity and identify an inflection point.
Results: We included 304 patients in this study, 104 males and 200 females. The mean age was 80.00±6.50 years. The mean follow-up period was 34.42±14.76 months, and there were 82 all-cause deaths. A nonlinear relationship was observed between UHR and mortality, with an inflection point at UHR = 166.17. Below this threshold, a 1-unit increase in UHR was significantly associated with a 1% increase in mortality risk (HR = 1.01, 95% CI: 1.00-1.03, P = 0.0326). Above this threshold, no significant association was found (HR=1.00, 95% CI: 1.00-1.00, *P*=0.8050). After adjusting for multiple confounders, UHR remained an independent predictor of mortality, indicating a "saturation effect."
Conclusion: UHR is an independent predictor of long-term mortality in elderly patients with hip fractures, exhibiting a nonlinear relationship characterized by a saturation point. Further prospective studies are needed to validate the UHR threshold and assess its clinical utility.
Keywords: Uric acid; High-density lipoprotein cholesterol; Hip fractures; Elderly; Mortality; Prognostic biomarker; Nonlinear relationship.

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CAN WE SLOW THE BONE? ZOLEDRONIC ACID IN CRANIOFACIAL POLYOSTOTIC FIBROUS DYSPLASIA

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Background
Fibrous dysplasia of bone (FD) is a rare skeletal disorder caused by defective osteoblastic differentiation, being associated with bone pain, deformity, and fractures. Treatment options remain limited. Although bisphosphonates, particularly zoledronic acid (ZA) and pamidronate, have been reported to improve pain, their effects on disease progression are unclear.
Case Report
We report the case of a 44-year-old woman with craniofacial polyostotic FD since the age of 6. Medical history included controlled hyperthyroidism, menarche at 13 years, and menopause at 41 years. Since 2023, the patient presented progressive right mandibular enlargement and worsening pain refractory to analgesic therapy. No visual, auditory or neurological deficits were observed. Serial craniofacial CT scans (2019-2024) showed extensive craniofacial FD with a mixed radiological pattern, combining ground-glass hyperdense areas and lytic/cystic lesions, associated with marked bone expansion. Predominant involvement included the right hemimandible (with progressive cystic expansion, cortical thinning, and focal discontinuity extending to the condyle), left temporal bone and mastoid, sphenoid body and wings, occipital bone, and bilateral frontal bones. Bone scintigraphy showed increased uptake limited to craniofacial bones. Laboratory evaluation revealed markedly elevated bone turnover markers (bone-specific alkaline phosphatase, C- and N-terminal telopeptide of type I collagen, and osteocalcin), with normal calcium, phosphate, parathyroid hormone, thyroid stimulating hormone, thyroxine, vitamin D, prolactin, insulin-like growth factor 1, and growth hormone. Mandibular biopsy confirmed FD, with negative MDM2 expression and no evidence of malignancy. Densitometry showed osteoporosis (OP) at the distal radius (T-score -5.3) and femoral neck (T-score -2.8). ZA was initiated in April 2025, resulting in significant pain improvement and radiological disease stability.
Conclusion
This case illustrates severe craniofacial polyostotic FD and OP. ZA was associated with significant pain improvement, and radiological stabilization, supporting its use in symptomatic FD particularly with concomitant OP, although long-term effects on disease progression require further study.

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MEDICATION-RELATED OSTEONECROSIS OF THE JAW AND ATYPICAL FEMUR FRACTURES ASSOCIATED WITH ANTIRESORPTIVE THERAPY IN OSTEOPOROSIS: A 10-YEAR RETROSPECTIVE ANALYSIS

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Background
Medication-related osteonecrosis of the jaw (MRONJ) and atypical femur fractures (AFF) are rare but serious adverse events associated with antiresorptive therapy for osteoporosis (OP). Post-event management remains controversial. We aim to describe MRONJ and AFF cases secondary to antiresorptive treatment over a 10-year period in a tertiary rheumatology center.
Methods
We conducted a retrospective observational study including all MRONJ and AFF cases diagnosed between 2014 and 2024. Sociodemographic, clinical, and therapeutic data were collected. Descriptive analysis was performed, comparisons between MRONJ and AFF groups were conducted using appropriate statistical tests. Statistical significance was set at $p<0.05$.
Results
Thirteen patients were included: 9 (69.2%) with MRONJ and 4 (30.8%) with AFF. All patients were female, with a mean age of 72.1 ± 6.6 years and a mean OP duration of 13.7 ± 5.1 years. Prior fractures were present in 53.8% of patients. Mean baseline lumbar spine BMD was 0.948±0.2g/cm² and femoral BMD was 0.796±0.8g/cm². ONJ occurred in 3 patients receiving denosumab (Dmab) and 6 receiving bisphosphonates (BPs), while all AFF cases occurred in patients receiving alendronate. AFF patients had a longer OP duration prior to the event (14.1 ± 2.9 vs. 7.9 ± 4.9 years; p=0.043) and antiresorptive exposure (8.5 (IQR 11) vs. 3 (IQR 3.1) years; p=0.011). Among MRONJ, Dmab was associated with shorter exposure time than BPs (p=0.024). All patients discontinued antiresorptive therapy; 53.9% received subsequent OP treatment: 5 (38.5%) teriparatide and 2 (15.4%) Dmab.
Conclusion
Consistent with previous reports, AFF was associated with longer antiresorptive exposure. Interestingly, in MRONJ cases, Dmab occurred after a shorter treatment period compared to BPs. Although treatment discontinuation after MRONJ or AFF remains controversial, antiresorptives were stopped in all cases. In patients with high fracture risk, subsequent OP treatment is challenging. Teriparatide appears to be the preferred option after BPs-related events and may support tissue healing; however, its use after Dmab can be associated with bone loss. Therapeutic options following teriparatide remain limited, and optimal sequential strategies are undefined.

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A PANORAMIC VIEW OF OSTEOARTHRITIS IN NEPAL: KNOWLEDGE, ATTITUDES, AND PRACTICES AMONG ADULTS AND SELF-MANAGEMENT STRATEGIES AMONG PATIENTS WITH KNEE OSTEOARTHRITIS

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Introduction and objectives:
Osteoarthritis (OA) is a highly prevalent joint condition and a leading cause of pain, functional limitation, and reduced quality of life worldwide. Knee osteoarthritis is particularly disabling, contributing to long-term disability and reduced mobility. In Nepal, despite a growing OA burden, there is limited evidence on community-level knowledge, attitudes, and practices (KAP) related to OA, as well as on self-management strategies adopted by patients with knee OA. Insufficient awareness and suboptimal self-management may perpetuate disability and poor outcomes. Self-management encompasses an individual's ability to manage symptoms, treatment, and the physical and psychological consequences of living with a chronic disease and is considered a first-line approach in knee OA management. Misconceptions regarding OA causes, risk factors, and management persist due to inadequate public understanding. KAP surveys help identify these gaps, informing interventions to promote healthy behaviors and improve disease management. To our knowledge, no study in Nepal has evaluated community-level OA knowledge and patient self-management strategies. This study aimed to assess KAP regarding osteoarthritis among adults in the Dhulikhel community and explore self-management strategies among patients with knee OA attending Dhulikhel Hospital.
Methods: Two cross-sectional surveys were conducted. Both questionnaires were developed from existing literature, validated by an expert committee for face and content validity, and pretested among 10% of participants. The first survey included 385 community adults who completed a self-administered questionnaire on KAP on OA. Knowledge was scored out of ten, with one point for each correct answer. Attitude (five items) and practice (two items) were rated on five-point Likert scales. Participants were categorized into quintiles: very poor (0–20%), poor (21–40%), satisfactory (41–60%), good (61–80%), and very good (81–100%). Use of preventive strategies, including exercise and weight management, was recorded. The second survey included 101 patients with knee OA, assessed for self-management strategies using a 27-item self-administered questionnaire. Items were rated on a five-point Likert scale from always to never. Reported strategies were compared with guideline-recommended approaches and the five most commonly used strategies were identified.
Results: Among community adults, most had satisfactory knowledge (n = 216, 56%), good attitudes (n = 233, 60%), and satisfactory practices (n = 150, 39%). Fewer than half engaged in recommended preventive strategies: exercise (n = 161, 42%) and weight management (n = 177, 46%). Among patients, adherence to guideline-recommended strategies was low: exercise (n = 20, 20%), weight reduction (n = 4, 4%), and topical agents (n = 37, 37%). The top five management strategies were massage (49%), thermal therapy (45%), prayer (40%), topical agents (37%), and prescribed medication (35%).
Conclusion: Knowledge of osteoarthritis in the community was only satisfactory, and preventive practices were limited. Patients favored passive management over guideline-recommended strategies. These findings highlight the urgent need for targeted education and policy interventions to promote evidence-based self-management, informing national strategies for osteoarthritis prevention and management in Nepal.
Key words: Osteoarthritis, Knowledge, Attitude, Practice, Self-management

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IMPACT OF THERAPEUTIC PATIENT EDUCATION ON INTERNALIZED STIGMA IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Introduction : Rheumatoid arthritis (RA) is a chronic inflammatory disease, characterized by a progressive impairment of functional abilities and major psychosocial consequences. Among these, internalized stigma has emerged as a social phenomenon that may negatively affect patients' self-esteem and quality of life. Therapeutic patient education (TPE) aims to enhance patients' understanding of the disease and promote self-management.

Objective : To determine the impact of therapeutic patient education on internalized stigma among patients with RA.

Methods : We conducted a 10-month prospective study in patients with RA, diagnosed according to the 2010 ACR/EULAR criteria. At baseline (T0), sociodemographic characteristics and RA-related clinical parameters were collected. Internalized stigma was assessed using the Internalised Stigma of Mental Illness–Rheumatoid Arthritis scale (ISMI-RA). All patients attended a therapeutic patient education (TPE) session aimed at improving disease-related knowledge. A follow-up assessment of internalized stigma was performed one month later (T1) using the same scale.

Results : We included 80 patients. The mean age was 61.1 ± 8.6 years, with a male-to-female ratio of 0.11. Fifty-nine patients (73.8%) were unemployed. The majority (41.3%) were illiterate. Thirty-nine patients (49%) had a middle socioeconomic status. The mean age at RA diagnosis was 42.2 ± 14.5 years. The median disease duration was 20 years [23.25–29]. The mean disease activity score (DAS28-CRP) was 4.64 ± 1.27. RA was erosive in 96.3% of cases. The median HAQ was 1.2 [1–1.95]. At baseline, internalized stigma was severe in 61.3% of patients, with a mean ISMI-RA score of 3.05 ± 0.79. Regarding ISMI-RA subscales, Alienation was the most affected dimension. It was severe in 70% of patients, with a mean score of 3.38 ± 0.75. The "Stigma Resistance" subscale was minimal in 46.3% of patients, with a mean score of 2.16 ± 0.63. After the TPE program, the mean ISMI-RA score significantly decreased to 2.22 ± 0.52 ($p<0.001$). The proportion of patients with severe internalized stigma dropped to 2.5%, in favor of minimal and mild forms. All mean subscale scores of the ISMI-RA significantly decreased ($p<0.001$), except for the "Stigma Resistance" subscale, whose mean score significantly increased to 3.22 ± 0.42 ($p<0.001$). The variation in ISMI-RA score after the TPE was significantly influenced by

socioeconomic status (p=0.015), CRP level (p=0.047), rheumatoid factor positivity and serum titer (p=0.018 and p=0.02), as well as the presence of a total knee replacement (p=0.018).

Conclusion : These findings support the integration of TPE programs to reduce internalized stigma and enhance psychosocial well-being, while highlighting the need for further studies to confirm and expand on these effects.

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ASSESSMENT OF HEALTH RELATED QUALITY OF LIFE IN PATIENTS WITH SYSTEMIC LUPUS ERYTHEMATOSUS IN KAZAKHSTAN

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Objectives: To assess clinical features and health-related quality of life in systemic lupus erythematosus.
Methods: The study included 187 patients over the age of 18 with a diagnosis of SLE, predominantly women (95.2%), of young age (33.85 ± 10.58 years). SF-36 and LupusQol were used to assess HRQoL, with the questionnaires completed by 102 patients in Russian and 85 in Kazakh.
Results: The racial background was Caucasian - 8.3%, Asians - 91.7%, including 83.2% of Kazakh nationality. Duration of the disease at the time of inclusion in the study - 5 (2;9) years, time from the appearance of the first signs of SLE to verification of the diagnosis - 4.5 (3.0;12) years. One third of patients were diagnosed with SLE at the debut, in 63% of patients skin, neurological and other rheumatic diseases were diagnosed. Half of the patients (47%) had high disease activity (17.64 ± 8.80), with a mean level of irreversible organ damage of 59.8%. Clinical manifestations of SLE:skin involvement (75.5%), joints (79.4%), mucosal lesions (46.1%), non-scarring alopecia (75.5%), neuropsychiatric disorders (49%), hematological (54.9%), and immunological changes (100%). HRQoL assessment using the Russian version of the questionnaires revealed a significant decline across all scales, particularly on the "Emotional Health" scale -23 [19.00; 26.50]) (LupusQol) and "Role-Emotional Functioning" -33.30 [0.00; 100.00]) and "Role-Physical Functioning"-25.00 [0.00; 100.00] scales (SF-36). The analysis of questionnaires in the Kazakh version also revealed a decrease in scores on all scales, a significant decrease on the scales of "Pain" (38.32 [33.30; 55.00] and "Burden to others" - 35.32 [30.30; 45.00] (LupusQol). Patients showed significant fatigue according to LupusQol - 59.40 [42.19; 81.25] and a significant decrease on the scale of "Vitality" - 50.00 [35.00; 61.25] (SF-36). Lower disease activity improved LupusQoL scores; greater damage worsened quality.
Conclusion: HRQoL was impaired in systemic lupus erythematosus and worsened with higher disease activity and organ damage.

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THE ADDED VALUE OF TRABECULAR BONE SCORE (TBS) IN EVALUATING FRACTURE RISK AMONG POLISH WOMEN

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Introduction
To evaluate the trabecular bone score (TBS) from lumbar spine (L1–L4) dual-energy X-ray absorptiometry (DXA) scans in Polish women aged 40–76 with and without osteoporotic fractures. The relationship between TBS, fracture risk (FRAX and FRAX adjusted TBS), and bone mineral density (BMD) at the lumbar spine, femoral neck, and total hip was investigated. No studies have been conducted in the Polish population so far to confirm the effectiveness of TBS in assessing fracture risk.
Objective
This study aimed to evaluate TBS L1-L4 in Polish women and to correlate TBS values (TBS BMD and TBS T-score) and BMD at the L1-L4 neck and total hip with fracture risk
Patients and methods
933 Polish women aged 40-76 years were included into the study. DXA scans of the proximal femur and lumbar spine were performed. Subjects with scan artifacts or extreme BMI were excluded. TBS was assessed via TBS Medimaps software; values ≤ 1.23, 1.23–1.31, and ≥ 1,31 indicated deteriorated, partially deteriorated, and normal bone microarchitecture, respectively. Patients were divided into two groups: those with low-energy fractures (n = 173) and without fractures (n = 760). The risk of fracture was assessed using the Polish version of the FRAX calculator and FRAX adjusted for TBS.
Results
TBS correlated negatively with age (r ≈ -0.36) and BMI (r ≈ -0.14). TBS and TBS T-scores were significantly lower in the fracture group ($p < 0.001$). The prevalence of osteoporotic fractures was highest in the low TBS group (28.8%) and significantly lower in the intermediate (13.0%) and high (11.9%) categories ($\chi^2=24.0$, $p<0.001$). In logistic regression, low TBS was associated with a more than threefold higher risk of fracture compared to high TBS (OR=3.0; 95% CI: 1.84–4.98; $p<0.001$). TBS models showed lower AIC and higher AUC compared with DXA alone. The addition of TBS to DXA-based models improved model fit and discrimination, with TBS remaining a significant predictor in multivariable models. In subgroups with osteopenia or osteoporosis, TBS retained statistical significance.
Conclusions
The results of our study highlight the importance of incorporating TBS into the routine clinical evaluation of bone status among Polish women. TBS provides complementary information to BMD and improves fracture risk assessment when integrated with the FRAX calculator.Routine assessment of TBS may improve clinical management of osteoporosis.

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REDUCING PAIN AND IMPROVING FUNCTIONAL ABILITY AFTER APPLICATION OF RADIAL EXTRACORPOREAL SHOCK WAVE THERAPY IN PATIENTS WITH KNEE OSTEOARTHRITIS

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Objective: Knee osteoarthritis is a common musculoskeletal disorder that leads to pain and reduced functional ability. of the patients. Radial extracorporeal shockwave therapy (RECTUB) has been proposed as a safe, non-invasive, alternative conservative treatment for osteoarthritis of the knee.

Material and methods: The study represents prospective, monocentric, interventional, non-randomized clinical study of 40 RECTUB treated patients (totalling 5 weekly sessions with 5-minute application of 2000 impulses, 2 Bar intensity, 10 Hz frequency at painful knee points) and kinesitherapy. The patients' progress was monitored on the Numeric scale of pain and the WOMAC Index. The clinical findings were evaluated before the treatment started; immediately after its completion and 3 and 6 months afterwards.

Results: Statistically significant differences were found of the total WOMAC index and its three subscales at the end of the first, second and third control. The three subscale WOMAC index median was 9, 4, 2, and 2 respectively for subscale 1; 3 and 0 for subscale 2; 34.5, 12.5, 7.5 and 8 at baseline and the three follow-up examinations and subscale 3 respectively, at the beginning and the three follow-up examinations. Regarding the Numeric Scale of Pain scored a mean of 7, 4, 2, and 2, respectively, before treatment and at the three follow-up examinations after treatment. It was found that patients had reduced pain intensity was maintained even for 6 months after the applied physical treatment.

Conclusions: RECTUB is becoming a treatment option for knee osteoarthritis with insufficient scientific papers published on its effectiveness. In a systematic review and meta-analysis of 14 randomized studies published in Spain, RECTUB was found to contribute to greater reduction of pain and improvement of WOMAC index values in a short time. Regarding the effectiveness of RECTUB treatment in patients with knee osteoarthritis for 6 months, as per Shieh meta-analysis measuring pain intensity according to the VAS scale and the degree of functionality according to the WOMAC index, it was found that pain reduction and improvement of the patients' functionality were maintained up to 6 months after the application of this physical modality.

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THE RELATIONSHIP BETWEEN DIGITAL HEALTH LITERACY LEVELS AND PAIN AND PSYCHOSOCIAL FACTORS IN PATIENTS WITH FIBROMYALGIA: PİLOT STUDY

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Objective: Fibromyalgia syndrome (FMS) is a chronic pain syndrome characterized by widespread pain that impairs functionality and quality of life, and is closely associated with psychosocial factors such as anxiety and depression. With the increasing use of digital health resources in chronic pain management, digital health literacy (DHL) has become a significant factor. This study aimed to examine the relationship between DHL levels and pain and psychosocial symptom burden in FMS patients.

Materials and Methods: This pilot study included 66 adults with FMS (63 women, 3 men). Demographic and sociocultural characteristics, perceptions of data safety, and access to health-related information sources were recorded. DHL was assessed using the 8-item eHealth Literacy Scale (eHEALS), and participants were classified as having low or high DHL based on a cutoff score of ≥26. Pain intensity and psychosocial factors were assessed using the Numeric Pain Rating Scale (NPRS), Revised Fibromyalgia Impact Questionnaire (FIQR), Hospital Anxiety and Depression Scale, Short Illness Perception Questionnaire, Perceived Stress Scale-10, Pain Catastrophizing Scale, and Tampa Kinesiophobia Scale.

Results: No significant differences were observed between DHL groups in terms of gender, marital status, education level, occupation, or income ($p > 0.05$). Individuals with higher DHL were significantly more likely to use Google and YouTube for health-related information searches ($p = 0.014$ and $p = 0.044$). Clinically, the low DHL group showed significantly higher FIQR scores ($p = 0.047$), night-time pain severity ($p = 0.009$), and perceived stress levels ($p = 0.006$) compared to the high literacy group. DHL showed a weak but statistically significant negative correlation with perceived stress level ($r = -0.326$; $p = 0.008$). No significant association was observed with other pain or psychosocial variables.

Conclusion: In FMS patients, low DHL is associated with increased disease burden, more severe night-time pain, and higher perceived stress levels. These findings demonstrate that DHL is a clinically significant factor associated with symptom severity and higher perceived stress levels with potential indirect implications for coping mechanisms and may be considered in patient education and self-management strategies.

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EVALUATION OF CHATBOT-GENERATED TREATMENT RECOMMENDATIONS AND RESPONSES TO PATIENT QUESTIONS IN KNEE OSTEOARTHRITIS: PRELIMINARY RESULTS

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Objective: Chatbots using large language models are used in clinical decision-making processes. This study aims to evaluate the concordance of knee osteoarthritis (OA) recommendations generated by chatbots with the ESCEO guideline, and the characteristics of responses to patients' questions.

Material and Methods: Clinical data from twenty knee OA cases presenting with knee pain to the physical medicine and rehabilitation (PMR) outpatient clinic in December 2025 were recorded, including medical history, physical examination, and radiographic findings. Data were entered into ChatGPT-5.2 and Gemini-3 using the same standardized prompt for all cases, with each query was conducted in isolated and anonymous sessions with prior conversation history cleared. Treatment recommendations generated by the models and responses to a single patient-initiated treatment-related question were recorded. Recommendations were independently classified as concordant, partially concordant, or discordant according to the ESCEO 2019 guideline by two blinded PMR specialist researchers. Readability of responses to questions was assessed using Flesch Reading Ease (FRE) and Flesch–Kincaid Grade Level (FKGL); understandability (PEMAT-U) and actionability (PEMAT-A) were evaluated using PEMAT; and empathic characteristics of the responses were assessed by a five-point Likert scale. Inter-rater agreement was analyzed for all assessments.

Results: Recommendations were guideline-concordant in 75% of cases for ChatGPT and 65% for Gemini, with 15% discordant for both models ($p = 0.746$). The mean FRE scores were 54.78 for ChatGPT and 52.73 for Gemini ($p = 0.346$), and the mean FKGL scores were 10.77 and 11.66, respectively ($p = 0.074$). PEMAT-U scores were higher for Gemini ($p = 0.022$), whereas PEMAT-A scores did not differ significantly ($p = 0.102$). Empathy scores were significantly higher for Gemini (4.75 vs 4.35; $p = 0.046$). Inter-rater agreement was good to excellent across all assessments (κ/ICC > 0.80; $p < 0.001$).

Conclusion: Chatbots provide largely ESCEO-concordant recommendations for knee OA; however, using them alone may pose risks to clinical safety. Chatbot responses are generally empathetic, understandable, and actionable, but simplification of language is needed to enhance readability and accessibility.

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OSTEOPOROSIS AWARENESS AND KNOWLEDGE GAPS IN PATIENTS WITH ANKYLOSING SPONDYLITIS

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Objective

Ankylosing spondylitis (AS) is a chronic inflammatory rheumatic disease characterized not only by progressive spinal ankylosis but also by profound alterations in bone metabolism. AS is associated with accelerated bone loss, impaired bone quality, and a markedly increased risk of fragility fractures. However, osteoporosis remains underdiagnosed in this population, partly due to insufficient patient awareness. The aim of this study is to evaluate osteoporosis awareness and knowledge levels in patients with AS and to explore their associations with demographic and clinical characteristics.

Material and Methods

This cross-sectional study includes 91 patients aged ≥18 years who fulfilled the ASAS 2009 criteria for ankylosing spondylitis. After obtaining informed consent, demographic characteristics, educational status, clinical features, comorbidities, and treatment history were recorded. Osteoporosis awareness was assessed using the Osteoporosis Awareness Scale (OAS), and osteoporosis-related knowledge was evaluated using the Revised Osteoporosis Knowledge Test (R-OKT), both validated in Turkish. Questionnaires were administered either face-to-face or via an online platform. Statistical analyses were performed using SPSS v29.0, with $p<0.05$ considered statistically significant.

Results

Among 91 patients, the mean total R-OKT score was 13.84 out of 32, indicating a low level of osteoporosis-related knowledge. The mean total OAS score was 64.98 out of 124, reflecting insufficient osteoporosis awareness. Subgroup analysis of R-OKT revealed that the 'nutrition' was the least recognized domain (9.59/26; 36.88%).

Subgroup analysis of OAS revealed that 'risk factors' demonstrated the lowest score (8.41/20, 42.05%). OAS scores were significantly higher in women compared with men ($p=0.007$). Patients with higher education levels demonstrated significantly greater awareness than those with primary education ($p=0.010$).

Conclusion

Despite their high fracture risk, patients with ankylosing spondylitis demonstrate low osteoporosis awareness and knowledge. The influence of sociodemographic factors highlights the need for targeted, structured educational interventions to improve early recognition and prevention of osteoporotic fractures in this vulnerable population.

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CASCADE VERTEBRAL FRACTURES IN ERDHEIM-CHESTER DISEASE: A RARE MANIFESTATION OF QUALITATIVE BONE FRAGILITY

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Objective Erdheim-Chester disease (ECD) is a rare non-Langerhans histiocytosis with frequent bone involvement, but spontaneous vertebral fractures are exceptional. We report a case of cascade vertebral fractures in ECD despite normal bone mineral density, highlighting qualitative bone fragility.

Methods A case of confirmed ECD presenting with cascade thoracolumbar fractures is described. Bone status was assessed by serial CT scans, 18F-FDG PET-CT, dual-energy X-ray absorptiometry (DXA), and comprehensive laboratory workup including bone turnover markers, endocrine and inflammatory parameters. Informed consent was obtained.

Case report A 70-year-old man followed for ECD presented with spontaneous thoracolumbar pain without trauma. June 2025 CT showed multiple sequential compression fractures (T7, T9-T12, L1-L3, minimal L4), evolving from an isolated T7 fracture two months earlier . DXA revealed normal T-scores (femoral neck +0.1, lumbar spine +0.1) with mild distal radius osteopenia (-1.2). 18F-FDG PET-CT confirmed persistent diffuse spinal medullary hypermetabolism consistent with active ECD infiltration, whereas extra-osseous lesions (renal, peritoneal, splenic) regressed. No osteoporosis, corticosteroid exposure, or secondary endocrine/rheumatologic cause was identified. Biological and endocrine workup was normal except for mild anemia (Hb 10.6 g/dL), lymphopenia (740/mm³), CRP 31 mg/L, alkaline phosphatase 158 IU/L. Management included lumbar bracing, opioid analgesia, and a single 5 mg zoledronic acid infusion. At three-month follow-up, complete pain resolution allowed discontinuation of brace and opioids, with full functional recovery.

Conclusion Cascade spontaneous vertebral fractures represent a rare but severe complication of ECD due to qualitative bone fragility from histiocytic medullary infiltration despite preserved bone density. Orthopedic stabilization combined with zoledronic acid provided rapid and sustained improvement. ECD should be considered in the differential diagnosis of unexplained vertebral fractures.

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TISSUE-SPECIFIC RESPONSES OF 3D-CULTURED HUMAN MESENCHYMAL STEM CELLS (MSCS) IN OSTEOGENIC COMMITMENT INVOLVES SIMULTANEOUSLY RAPID RESPONSES IN TRANSCRIPTIONAL AND MITOCHONDRIAL PROCESSES

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Objective: Mesenchymal stem cells (MSCs) are progenitors of osteoblasts, a critical cell type in osteoporosis (OP), and among the most easily accessible cell source for bone tissue engineering. While the transcriptional and molecular program for osteogenic commitment is well known, the impact of metabolic—including mitochondrial processes—and physical alterations such as 3-dimensional (3D) *in vitro* culture on this process is still being unraveled.

Materials & Methods: Whole transcriptome analyses was performed on standard 2D- and 3D-cultured human MSCs from different sources, with functional validation performed in terms mitochondrial activity assays and osteogenic differentiation.

Results: Whole transcriptomic analyses revealed significant enrichment of cell adhesion and mitochondria-related pathways in two sources of MSCs after 3D culture, with functional validation demonstrating larger spheroid formation, augmentation of mitochondrial activity, as well as upregulation of key osteogenic markers RUNX2 and osteoprotegerin in 3D-cultured source-specific MSCs. The rapidity of transcriptional responses within hours was surprising, and directly implicated mitochondrial processes. 3D culture further enhanced osteogenic commitment as evidenced by single-cell RNA sequencing, which demonstrated enrichment of cell clusters with high expression of mitochondrial- and osteogenesis-related genes. Functional validation was performed in which inhibition of mitochondrial function suppressed osteogenic differentiation in short-term 3D-cultured MSCs.

Conclusion: 3D culture rapidly promote the transcriptional program of osteogenesis as well as mitochondrial processes in human MSCs. These findings implicate the translational value of understanding how modulation of *in vitro* processes can significantly impact stem cell commitment.

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EFFICACY CONSISTENCY OF SB16 TO REFERENCE DENOSUMAB IN POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS: SUBGROUP ANALYSIS BY DEMOGRAPHIC AND BASELINE DISEASE CHARACTERISTICS OF A RANDOMIZED PHASE III CLINICAL TRIAL

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Objective:
A randomized, double-blind, multicenter phase III study (NCT04664959) in postmenopausal osteoporosis confirmed clinical similarity of SB16 biosimilar denosumab to reference denosumab (DEN).[1] Since clinical features may influence responses to DEN, we conducted exploratory analysis on comparing efficacy between SB16 and DEN across various patient subgroups.
Material and Methods:
456 patients were randomized to receive either SB16 (n=225) or DEN (n=231) and included in the full analysis set.[1] Patients were analyzed to compare the treatment difference in 90% confidence intervals (CIs) (and 95% CIs) by demographics and baseline disease characteristics, including age, body mass index (BMI), prevalent vertebral fracture status, prior oral bisphosphonate (BP) use and smoking status.[1] Percent changes from baseline (%CFB) in lumbar spine (LS), total hip (TH), and femoral neck (FN) BMD were assessed across these subgroups at month 12. Post-hoc subgroup analysis compared SB16 to DEN using an ANCOVA with the baseline BMD as a covariate.
Results:
At month 12, consistent treatment effects were observed between SB16 and DEN of adjusted least square mean (LSM) within subgroups for %CFB in LS BMD. The treatment difference (SB16-DEN) in the 90% CIs were as follows: age < 70 years, 0.33 [-0.25, 091]; age ≥ 70, 0.78 [-0.31, 1.87]; BMI < 25 kg/m^2, 0.51 [-0.29, 1.30]; BMI ≥ 25 kg/m^2, 0.07 [-0.82, 0.96]; patients with prevalent vertebral fracture, 0.42 [-0.43, 1.27]; patients without prevalent vertebral fracture, 0.32 [-0.50, 1.14]; patients with prior oral BP uses, 1.07 [-0.65, 2.79]; patients without prior oral BP uses, 0.23 [-0.40, 0.85]; patients who smoke, -1.01[-2.97, 0.04]; and patients who do not smoke, 0.50 [-0.11, 1.11]. The subgroup analysis of the treatment differences in TH BMD and FN BMD at 12 months were also consistent with the overall analyses results.
Conclusion:
SB16 had shown overall consistent efficacy in LS BMD, TH BMD, and FN BMD to DEN by month 12 within subgroups by demographic and baseline disease characteristics of its Phase 3 study which further supports biosimilarity of SB16 to DEN.
Reference:
1. Langdahl B et al. J Clin Endocrinol Metab. 2025;110(6): e1951-e1958.

P339

IMPACT OF ACUTE FRACTURE ON OPPORTUNISTIC BONE DENSITY MEASUREMENT FROM WRIST X-RAYS USING IBEX BH

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Objective: To compare areal Bone Mineral Density (aBMD) at the Ultra-Distal (UD) and Third Distal (TD) regions of interest (ROIs) in patients with acute UD fractures versus a non-fracture group using IBEX BH software on opportunistic wrist X-rays.
Material and Methods: A total of 167 wrist X-rays were analysed (mean age 69 years, 70% female), including 57 participants with an acute UD region fracture and a subset of 48 X-rays containing both measurable TD and UD regions. Unlike typical post-healing assessments, this study utilised images taken immediately post-fracture and prior to healing. aBMD values and T-scores were calculated using IBEX BH and compared between groups.
Results: The fracture group demonstrated a significantly higher aBMD in the UD region compared to the non-fracture group ($p<0.05$), with a mean T-score difference of 0.52. In contrast, the fracture group showed significantly lower aBMD in the TD region ($p<0.05$), with a mean T-score difference of -1.16. This divergence indicates that acute fracture may inflate aBMD readings within the fractured UD region compared with a pre-fracture assessment, masking the lower density observed in the adjacent TD region.
Conclusion: Caution is required when interpreting aBMD in regions with acute fractures, as density may be overestimated in the fractured ROI. Significant discrepancies between UD and TD T-scores should be anticipated in acute trauma cases, suggesting that adjacent non-fractured regions may provide a more reliable assessment of underlying bone health in this context.

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ASSOCIATION BETWEEN LIPOPROTEIN(A), VITAMIN D STATUS, AND CARDIOVASCULAR RISK ESTIMATED BY SCORE

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Background: A Short-Term Observational Study Background: Cardiovascular disease and osteoporosis share common pathophysiological mechanisms, including chronic inflammation, lipid disturbances, and endocrine dysregulation. Lipoprotein(a) [Lp(a)] is a genetically determined and independent cardiovascular risk factor, while vitamin D deficiency is highly prevalent and associated with adverse cardiovascular and skeletal outcomes. Evidence regarding their interaction within the cardiovascular–bone interface remains limited.
Objective: To investigate the association between serum Lp(a) concentrations, vitamin D status, and estimated cardiovascular risk assessed by the SCORE algorithm during a 3-month.
Methods: This observational study included 82 adult participants followed over a observation period. Serum levels of Lp(a), 25-hydroxyvitamin D [25(OH)D], lipid profile, and glucose were assessed during routine laboratory evaluations. Vitamin D status was categorized as deficiency (<50 nmol/L), insufficiency (50–75 nmol/L), or sufficiency (>75 nmol/L). Cardiovascular risk was estimated using the SCORE system. Comparisons were performed across vitamin D categories. Correlation analysis and multivariate regression models adjusted for age, sex, body mass index, and lipid parameters were applied.
Results: Vitamin D deficiency was observed in 46% of participants. Median Lp(a) concentrations were significantly higher in individuals with vitamin D deficiency compared with those with sufficient vitamin D levels (41.2 vs. 25.6 mg/dL; p = 0.02). Participants with low vitamin D status were more frequently classified into higher SCORE-estimated cardiovascular risk categories (p = 0.04). Serum 25(OH)D levels demonstrated a significant inverse correlation with Lp(a) concentrations (r = −0.31; p = 0.01). After multivariate adjustment, vitamin D deficiency remained independently associated with elevated Lp(a) levels (β = −0.29; p = 0.03) and increased SCORE-estimated cardiovascular risk (OR 1.9; 95% CI 1.02–3.6).
Conclusion: Over a 3-month observational period, vitamin D deficiency was independently associated with higher Lp(a) concentrations and increased estimated cardiovascular risk. These findings reinforce the relevance of vitamin D status as an integrative marker within the cardiovascular–bone interface.

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QUALITY OF LIFE AND FUNCTIONAL IMPACT OF FOOT DISEASE IN GOUT

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Background:

Gout is the most common inflammatory rheumatism. It usually presents as an acute, spontaneously resolving arthritis. The joints most frequently affected are the first metatarsophalangeal (MTP) joint, the midfoot, and the ankle. Although foot disease is common in gout, its consequences have not been well described.
Objectives:
The aim of this study was to evaluate the prevalence of foot problems in patients with gout and their functional impact and effect on quality of life.
Methods:

This was a prospective study including patients with gout diagnosed according to the 2015 ACR/EULAR criteria. Clinical characteristics of the disease were recorded. Foot posture was assessed using the Foot Posture Index (FPI). Overall pain was evaluated using the visual analogue scale (VAS), foot pain using the Foot Function Index (FFI), global disability using the Health Assessment Questionnaire (HAQ), and quality of life using the SF-12 questionnaire.
Results:

Thirty-six patients were included. The mean age was 71.1 ± 8.1 years, with a sex ratio of 2. The mean disease duration at the time of the study was 7.1 years for primary gout and 5.4 years for secondary gout. Regarding pain, the mean VAS score was 4.5, the mean global FFI score was 4.7, and the mean FFI pain domain score was 5. According to the FPI, 16.7% of patients had supinated foot deformities and 4.1% had pronated foot deformities. The mean HAQ score was 1.2, and 75% of patients presented with disability. The mean SF-12 physical component summary score was 41.3, while the mean mental component summary score was 49.9 indicating a decline in quality of life.
Conclusion:

This study provides a better understanding of foot disease in gout and its functional and quality of life impact. We emphasize the importance of foot care in order to adopt a new management approach that focuses primarily on orthotic treatment in patients with gout.

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CLINICAL CHARACTERISTICS AND MANAGEMENT OF ASEPTIC FEMORAL HEAD OSTEONECROSIS

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Introduction:
Aseptic osteonecrosis is a common condition that predominantly affects young adults. It results from necrosis of the epiphyseal bone secondary to ischemic or cytotoxic mechanisms, leading to pain and progressive functional impairment. The femoral head accounts for more than 75% of sites of aseptic osteonecrosis and may occur unilaterally, bilaterally, or in a multifocal manner, sometimes reflecting an underlying systemic condition.

Objective:
To describe the demographic, clinical, radiological, and therapeutic characteristics of aseptic osteonecrosis of the femoral head (AOFH).

Methods:
A retrospective study was conducted on 42 patients followed for AOFH in the Rheumatology Department of Farhat Hached Hospital in Sousse between 2001 and 2023. Collected data included age, sex, functional complaints, topography, risk factors, radiological stages according to the Arlet and Ficat classification, and therapeutic modalities.

Results:
The mean age of patients was 41.34 years (range: 14–72 years), with a male-to-female ratio of 1:1. AOFH was unilateral in 38.1% of cases, bilateral in 47.6%, and multifocal in 12%. Mechanical pain was the main reason for consultation (80% of cases), associated with functional impairment in 76%. AOFH was idiopathic in 38% of cases. Other etiologies, in decreasing order of frequency, included prolonged corticosteroid therapy (26.8%), dyslipidemia (9.3%), hematologic disorders (7%), chronic alcohol use (5%), hemochromatosis (2.7%), and trauma (2.3%). MRI enabled diagnosis at early stages in 20% of cases, when plain radiographs were often normal. Ficat stage IV was the most frequently observed (52%). Initial management was conservative (physical therapy, analgesics, and load reduction); however, 19.5% of patients required total hip arthroplasty.

Conclusion:
AOFH is an irreversible and potentially disabling condition, with a frequently unfavorable outcome in the absence of early management. MRI is the key investigation for early diagnosis, and radiological staging guides therapeutic decision-making. Conservative treatment is considered in early stages, whereas advanced forms warrant prosthetic surgical intervention.

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MUSCULOSKELETAL DISORDERS IN PIANISTS: PREVENTION IS BETTER THAN CURE

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Introduction:
Musculoskeletal disorders (MSDs) are a frequent issue among musicians, particularly pianists, whose demanding practice combines prolonged postures, repetitive movements, and significant biomechanical constraints. These factors increase the risk of pain and functional limitations. Prevention, which is essential to limit the occurrence of MSDs, remains insufficiently integrated into pianists' practice. This study aims to describe MSDs among Tunisian pianists, identify contributing factors, and emphasize the importance of improved implementation of preventive measures in this population.

Materials and Methods:
This was a descriptive study conducted among 35 actively practicing pianists in Sousse (Tunisia), aged between 18 and 60 years, with equal numbers of women and men and no prior rheumatologic history. Participants completed a questionnaire collecting sociodemographic and professional data, playing habits, pain assessment using a visual analog scale (VAS), pain management strategies, and the impact of pain on daily activities measured by the Disabilities of the Arm, Shoulder and Hand (DASH) score.

Results:
More than half of the respondents had been practicing the piano for less than 10 years (57.1%), and slightly more than one quarter practiced for more than 20 hours per week. The majority (80%) played between 3 days (28.6%) and 6 days (34.3%) per week. Most participants reported taking breaks during practice sessions, although one quarter never took breaks. Overall, 94.3% reported experiencing pain, most commonly in the lower back and shoulders (25.7% and 17%, respectively). Pain was reported at least once per week by most participants (37.1%) and was rated as moderate in intensity (VAS score 3–5). Women reported more severe upper limb pain than men, with a mean DASH score of 21.94. The mean DASH score for the entire cohort was 24.97 ± 16.57. To limit or reduce pain and MSDs, pianists tended to adopt specific postural strategies. Regarding posture, 74.3% used an adjustable stool and 37.1% preferred sitting in the middle. Slightly less than half (45.7%) reported keeping their back straight, while 82.9% flexed their elbows at approximately 90°. However, more than one third (37.1%) were unable to specify their back position. The impact of MSDs on daily activities increased with the number of practice days per week ($p = 0.011$). Most pianists reported lacking information on MSD prevention (68.6%).

Conclusion:
Pianists frequently experience pain, mainly related to the duration of practice sessions, insufficient breaks, and sometimes inadequate postures. Preventive measures remain largely neglected. The implementation of programs incorporating targeted exercises, self-rehabilitation practices, and an educational component aimed at correcting postural habits and disseminating preventive information appears essential to reduce the frequency and impact of MSDs among pianists.

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COMPARISON OF MCKENZIE METHOD AND MULLIGAN CONCEPT IN THE MANAGEMENT OF CHRONIC LOW BACK PAIN

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Introduction: Chronic low back pain is defined as pain lasting more than 3 months. It leads to physical and psychological deconditioning, causing disruption in both professional and personal life. Management of chronic low back pain is multidisciplinary, with physical therapy being the first-line treatment. Often, standard protocols are supplemented by one of two techniques: Mulligan Concept or McKenzie Method. This raises the question: which technique is more effective for managing chronic low back pain?

Objective: To compare the effectiveness of the McKenzie Method versus the Mulligan Concept in the rehabilitation of patients with chronic low back pain.

Materials and Methods: This experimental comparative study involved 10 patients followed at the physical medicine department. Patients were divided into two groups: Group A received a standard protocol combined with the McKenzie Method, while Group B received the standard protocol combined with the Mulligan Concept. Each group comprised five patients. The comparison between groups focused on several criteria: pain assessed by the Visual Analog Scale (VAS), functional capacity measured by the EIFEL score, spinal and pelvic flexibility (finger-to-floor distance, Schober's index, inclination, rotation), lumbar endurance (Sorensen test), and quality of life measured by the DALLAS self-questionnaire. Evaluations were performed at baseline and after 6 weeks of rehabilitation.

Results: The average age of the 10 patients (6 women, 4 men) was 41.9 years, with an average symptom duration of 1.04 years. The McKenzie group demonstrated a mean pain reduction of 3.1 on the VAS, compared to 4.25 in the Mulligan group. For mobility, McKenzie resulted in a 19 cm improvement in finger-to-floor distance and a 3.8 cm improvement in Schober's index, while Mulligan showed improvements of 15 cm and 2.5 cm, respectively. Lumbar endurance increased from 41s to 115s for McKenzie, versus 40s to 85s for Mulligan. In terms of functional capacity (EIFEL), McKenzie achieved an average gain of 51%, compared to 33% for Mulligan. Quality of life improved significantly for both groups, with a 25.33% improvement for Group A (McKenzie) and a 24.67% improvement for Group B (Mulligan).

Discussion: The results indicate that the McKenzie Method is superior, particularly in terms of spinal and pelvic flexibility, showing a more significant average gain compared to Mulligan. McKenzie also demonstrated better improvements in functional capacity (from 76% to 16%) compared to Mulligan (from 65% to 32%). Psychologically, a gain of 2 was observed for McKenzie, compared to 1.4 for Mulligan.

Conclusion: Based on the results of our study, the McKenzie Method appears to be more effective than the Mulligan Concept as an adjunctive approach in the management of chronic low back pain.

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PULSED RADIOFREQUENCY TREATMENT OF ARTICULAR BRANCHES OF FEMORAL AND OBTURATOR NERVES USING ULTRASOUND AND FLUOROSCOPY GUIDANCE IN MANAGEMENT OF COXARTHROSIS: A RANDOMIZED TRIAL

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ABSTRACT

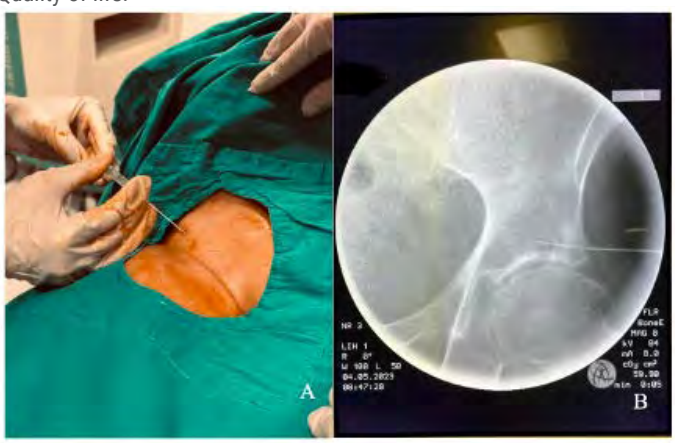
Objective: This study investigated the effects of pulsed radiofrequency (PRF) of articular branches of femoral and obturator nerves on pain, functional level, functional capacity, and quality of life (QOL) in patients with coxarthrosis.

Methods: Twenty-eight patients with coxarthrosis were randomized to PRF (n = 14) or nerve block (n = 14) groups. In PRF group, PRF was applied twice for 120 seconds at 42 °C to each nerve, followed by injection of 6 mg betamethasone and 1 cc 1% lidocaine under fluoroscopic and ultrasonographic guidance. Block group received the same injections without PRF. Pain (Visual Analog Scale, VAS), active and passive range of motion (ROM), Harris Hip Score (HHS), 6-Minute Walk Test (6-MWT) and SF-36 were assessed at baseline and at 2, 4, and 12 weeks.

Results: Both groups showed significant improvements in resting, movement and night VAS scores at all follow-ups ($p<0.05$). Pain relief was 92.3% in PRF group and 78.6% in block group at week 12. ROM, HHS, and 6-MWT improved in both groups ($p<0.05$), except 6-MWT in block group at week 12 was similar to baseline ($p>0.0125$). Most SF-36 domains improved in both groups ($p<0.05$), except emotional well-being in PRF group ($p>0.05$). No significant differences were found between groups ($p>0.05$).

Conclusions: Both PRF and nerve block of articular branches of femoral and obturator nerves, under fluoroscopic and ultrasonographic guidance, provide significant pain relief, improved functional level and capacity, and enhanced QoL in coxarthrosis patients unsuitable for surgery.

Keywords: Coxarthrosis, Nerve block, Pain, Pulsed Radiofrequency, Quality of life.





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OSTEOPOROSIS ASSOCIATED WITH CELIAC DISEASE PRESENTING WITH SEVERE IMPAIRMENT OF QUALITY OF LIFE

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Background: Celiac disease is a chronic immune-mediated enteropathy that may present with extra-intestinal manifestations due to nutrient malabsorption. Secondary osteoporosis is a serious but often underdiagnosed complication, particularly in patients without evident gastrointestinal symptoms.

Case presentation: We report the case of a 44-year-old woman who presented with progressive diffuse bone pain, recurrent low-impact fractures, severe fatigue, and marked impairment in quality of life over a two-year period. Laboratory evaluation revealed hypocalcemia, severe vitamin D deficiency, elevated parathyroid hormone levels consistent with secondary hyperparathyroidism, and mildly increased alkaline phosphatase. Dual-energy X-ray absorptiometry demonstrated severe osteoporosis (lumbar spine T-score −3.2; femoral neck −2.9). Serological testing showed markedly elevated anti–tissue transglutaminase IgA with normal total IgA levels and positive anti-endomysial antibodies. Duodenal biopsy confirmed Marsh–Oberhuber type 3 celiac disease.

Management and outcome: The patient was treated with a strict gluten-free diet, calcium and vitamin D supplementation, and anti-resorptive therapy. Over 12 months, biochemical parameters normalized, bone density improved, and quality of life markedly recovered.

Conclusion: Osteoporosis may be the primary manifestation of celiac disease. Screening for celiac disease should be considered in patients with unexplained osteoporosis.

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BONE AND NUTRITIONAL BIOMARKERS ASSOCIATED WITH FRAGILITY FRACTURES INDEPENDENTLY OF BONE MINERAL DENSITY: A REAL-WORLD COHORT STUDY

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Objectives

To evaluate clinical, biochemical and nutritional biomarkers associated with fragility fractures independently of bone mineral density (BMD) in a real-world cohort.

Materials and Methods

We conducted a cross-sectional observational study including **232 consecutive patients** referred to a tertiary outpatient bone clinic. Patients were classified into **fractured (n = 54)** and **non-fractured (n = 178)** groups based on documented history of low-energy fractures. Demographic variables, anthropometric parameters, BMD values, FRAX score, and a wide panel of biochemical markers were collected. Group comparisons were performed using independent samples t-test or non-parametric equivalents when appropriate. Statistical significance was set at $p < 0.05$.

Results

Patients with fractures showed significantly lower lumbar spine T-score compared with non-fractured patients (mean difference 0.59, $p = 0.015$). Among biochemical parameters, fractured patients had significantly lower **serum albumin** (mean difference 0.17 g/dL, $p = 0.026$) and **serum magnesium** levels (mean difference −0.11 mg/dL, $p = 0.007$). **Mean corpuscular volume (MCV)** was also significantly reduced in the fractured group (mean difference −3.35 fL, $p = 0.024$). Renal function, assessed by serum creatinine and estimated glomerular filtration rate, showed a trend toward worse values in fractured patients. No significant differences were observed for age, body mass index, vitamin D levels, calcium, parathyroid hormone, or inflammatory markers. FRAX score did not significantly differ between groups.

Conclusions

In this cohort, fragility fractures were associated not only with lower BMD but also with alterations in nutritional and metabolic biomarkers, particularly albumin, magnesium, and MCV. These findings suggest that systemic nutritional and metabolic status may contribute to fracture risk independently of BMD and traditional risk assessment tools, supporting a more comprehensive, multidimensional approach to fracture risk evaluation.

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ULTRASOUND-GUIDED PROLOTHERAPY IN CHRONIC ROTATOR CUFF TENDINOPATHIES

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Objective(s):
To assess the effects of ultrasound-guided prolotherapy on pain, function and quality of life in patients with chronic rotator cuff tendinopathies refractory to conventional treatment.
Material and Methods:
A retrospective observational study was performed in 63 patients aged 45–70 years with chronic rotator cuff tendinopathies of more than three months' duration. Patients were allocated to an intervention group (n=31), receiving two ultrasound-guided injections of 15% dextrose at weeks 0 and 4 combined with 16 rehabilitation sessions, or to a control group (n=32), receiving rehabilitation alone. Evaluations were conducted at baseline, week 4 and week 8. Outcome measures included pain assessed by the visual analogue scale (VAS), function measured by the QuickDASH questionnaire, and health-related quality of life evaluated using the EQ-5D index.
Results:
The intervention group showed a greater reduction in pain compared with controls, with VAS scores decreasing from 7.2 ± 1.1 to 2.5 ± 1.0 versus 6.9 ± 1.2 to 4.3 ± 1.1, respectively ($p<0.01$). Functional outcomes improved in both groups, with a more pronounced reduction in QuickDASH scores in the intervention group (64.1 ± 9.3 to 26.9 ± 8.4) compared with the control group (63.7 ± 8.7 to 36.9 ± 9.1), showing a favorable trend ($p=0.08$). EQ-5D index values increased from 0.49 ± 0.12 to 0.70 ± 0.10 in the intervention group and from 0.51 ± 0.11 to 0.65 ± 0.09 in the control group ($p=0.11$).
Conclusion(s):
In this cohort, ultrasound-guided prolotherapy combined with rehabilitation was associated with a greater reduction in pain and a trend toward improved functional outcomes and quality of life compared with rehabilitation alone, supporting its use as a complementary treatment option in chronic rotator cuff tendinopathies.
Acknowledgments:
The authors thank the rehabilitation team involved in patient management and follow-up.
Disclosures:
None declared.

P349

IMPLEMENTATION OF A FRACTURE LIAISON SERVICE AND POST–HIP FRACTURE OSTEOPOROSIS TREATMENT RATES IN A TERTIARY HOSPITAL (2024–2025)

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Objectives
To evaluate the impact of the implementation of a hospital-based fracture liaison service (FLS) on osteoporosis treatment rates after hip fracture using a standardized healthcare quality indicator.
Material and Methods
A retrospective observational study was conducted after the implementation of an FLS in 2024. Eligible patients were those aged ≥65 years discharged after hospitalization for hip fracture between January 2024 and December 2025. The primary outcome was the healthcare quality indicator IPDMAL02-T applied to hip fracture patients, defined as the percentage of eligible patients receiving active osteoporosis treatment after discharge. Active treatment included prescription or administration of osteoporosis drugs, including hospital-dispensed medication or intravenous zoledronic acid.
Results
A total of 195 patients hospitalized for hip fracture during 2024–2025 met inclusion criteria. In 2024 (n=60), 95.0% were women (mean age 86.6 years) and 5.0% were men (mean age 84.7 years). In 2025 (n=35), 88.6% were women (mean age 88.3 years) and 11.4% were men (mean age 85.0 years). After FLS implementation, 69% of patients received active osteoporosis treatment in 2024, increasing to 78% in 2025. These treatment rates exceeded the 50% benchmark established by the regional public health insurer. Most treatments were initiated within the first months after fracture.
Conclusions
The implementation of a structured hospital-based FLS was associated with a progressive increase in osteoporosis treatment rates after hip fracture, clearly surpassing the predefined healthcare system target. These findings support the effectiveness of FLS programs in secondary fracture prevention in very elderly, high-risk patients.
Disclosures
The authors declare no conflicts of interest.

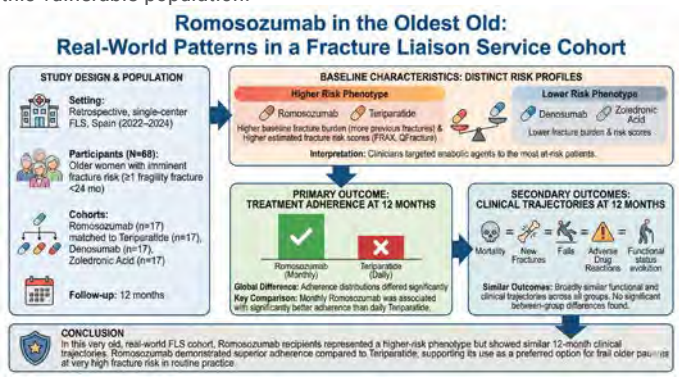
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ROMOSOZUMAB IN THE OLDEST OLD: REAL-WORLD PATTERNS IN FRACTURE LIASON SERVICE COHORT

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Objective To characterize older adults receiving osteoporosis pharmacotherapy in routine Fracture Liaison Service care—focusing on adherence as the primary outcome—and to describe secondary functional, laboratory, and densitometric trajectories over 12 months.
Material and Methods We conducted a retrospective, single-center observational cohort study (Hospital Universitario de Navarra FLS, Spain, 2022–2024). Women at imminent fracture risk (≥1 fragility fracture within 24 months before baseline) initiating romosozumab were included. For each patient, one comparator initiating denosumab, zoledronic acid, or teriparatide was selected, matched by calendar time (same month ±3 months). Baseline variables and outcomes were assessed at 3 and 12 months. Between-group comparisons were performed using non-parametric tests (Kruskal–Wallis and Fisher–Freeman–Halton exact tests), with Holm–Bonferroni correction for pairwise comparisons.
Results Sixty-eight patients were included (n=17 per group). Baseline profiles differed significantly across treatments, reflecting clinical allocation: the romosozumab and teriparatide groups presented a higher-risk phenotype, characterized by higher baseline fracture burden and higher estimated fracture risk scores (FRAX and QFracture) compared to denosumab and zoledronic acid ($p<0.05$). During the 12-month follow-up, no significant between-group differences were observed for mortality, emergency visits, falls, new fractures, or adverse drug reactions. However, adherence distributions differed significantly at 12 months ($p<0.001$). Monthly romosozumab was associated with significantly better adherence (100%) compared to daily teriparatide (52.9%) (Holm-adjusted $p=0.016$). Functional and clinical trajectories were broadly similar across all treatment groups.
Conclusion In this very old FLS cohort, romosozumab recipients represented a higher-risk phenotype but showed broadly similar 12-month clinical trajectories compared with other therapies. Notably, monthly romosozumab demonstrated superior adherence compared to daily teriparatide in patients at very high fracture risk, supporting its utility as a preferred therapeutic option in routine geriatric practice for this vulnerable population.



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ARTIFICIAL INTELLIGENCE FOR OSTEOPOROSIS SCREENING AND FRACTURE RISK PREDICTION IN OLDER ADULTS: THE OSTEOFRACT-AI STUDY PROTOCOL

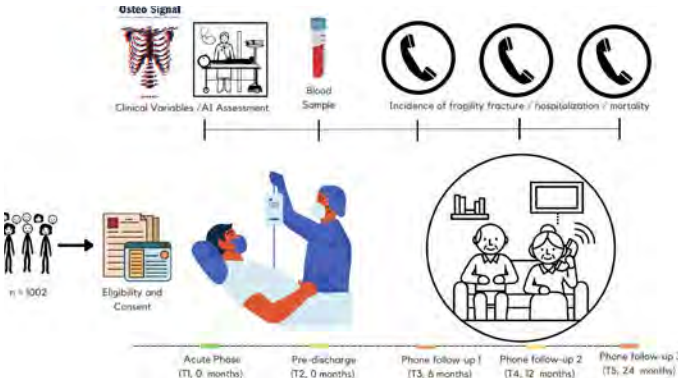
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Objective To evaluate the clinical utility and diagnostic accuracy of an Artificial Intelligence (AI) tool for opportunistic osteoporosis screening using routine chest X-rays in hospitalized older adults. Secondarily, to develop and validate a multimodal predictive nomogram for 2-year fracture risk, integrating AI-derived bone health scores, inflammatory biomarkers (immunoporosis), and comprehensive geriatric assessment variables, while addressing potential gender disparities in fracture risk stratification.
Material and Methods This is a prospective, observational, longitudinal study conducted at the Geriatric Department of the Hospital Universitario de Navarra (Spain). The study will recruit 1,002 hospitalized patients aged ≥75 years.

- **Intervention:** Routine chest X-rays will be retrospectively analyzed using a Deep Learning software (Osteo Signal®) to generate a bone health score.
- **Comparators:** AI scores will be compared against Radiofrequency Echographic Multi Spectrometry (REMS) densitometry, FRAX scores, and functional tests (PASE, 5-sit-to-stand).
- **Biomarkers:** Pre-discharge blood samples will be analyzed for osteo-inflammatory markers (NLR, PLR, SII).
- **Follow-up:** Participants will be followed for 24 months to record incident fragility fractures, mortality, and readmissions.
- **Statistics:** Area Under the Receiver Operating Characteristic Curve (AUC-ROC) will assess diagnostic performance. Multivariate Cox regression will be used to construct the predictive nomogram (OSTEOFRACT-AI).

Results We hypothesize that the AI algorithm will demonstrate high sensitivity for osteoporosis detection in this frailty-enriched cohort, comparable to REMS and superior to clinical risk factors alone. We anticipate identifying distinct "immunoporosis" profiles that correlate with higher fracture risk. The study aims to validate a cost-effective, opportunistic screening strategy that utilizes existing radiological resources to reduce the diagnosis gap, particularly in underdiagnosed older men. The final output will be a validated, sex-adjusted predictive tool for clinical use.
Conclusion The OSTEOFRACT-AI project proposes a novel, scalable approach to fracture prevention in the oldest old by repurposing routine chest X-rays through AI. If validated, this strategy could democratize access to osteoporosis screening in resource-limited



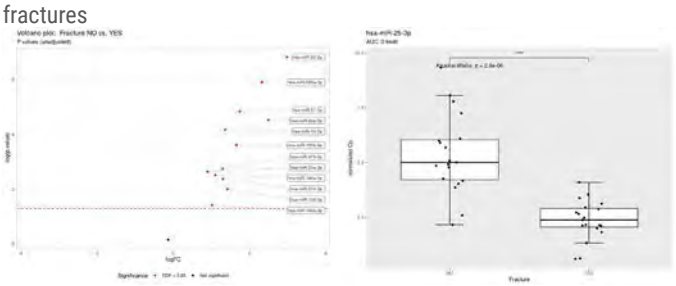
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THE BONE-MUSCLE CROSSTALK IN HIP FRACTURE: INSIGHTS FROM MULTI-TISSUE MIRNA PROFILING

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Introduction:
Hip fracture is the ultimate consequence of osteosarcopenia, often driven by the simultaneous deterioration of bone and muscle tissue. While inflammatory biomarkers have been characterized in this population, the specific epigenetic crosstalk between bone and muscle remains unexplored. We aimed to characterize the microRNA (miRNA) signature simultaneously in bone, muscle, and serum of hip fracture patients to identify circulating biomarkers that reflect tissue-specific pathophysiology.
Methods:
We performed a cross-sectional multi-tissue analysis in 40 older adults: 20 patients with low-trauma hip fracture (HF) and 20 non-fractured controls undergoing elective hip arthroplasty (OA). Samples of trabecular bone, gluteus medius muscle, and fasting serum were collected during surgery. Expression levels of a panel of candidate miRNAs were quantified using qPCR. Data were normalized using endogenous (U6/RNU5G for tissues) or exogenous (UniSp2 for serum) controls. Statistical analysis included Kruskal-Wallis tests and ROC curve analysis.
Results:
We identified a striking molecular discordance between the musculoskeletal tissues.
Bone tissue in HF patients exhibited a massive upregulation of stress-related miRNAs, most notably miR-25-3p ($p < 0.001$, AUC=0.95) and miR-320a ($p < 0.001$), suggesting an active local remodeling or inflammatory response.
Conversely, muscle tissue showed a generalized downregulation of the same targets, including miR-25-3p ($p = 0.013$) and miR-125b-5p ($p < 0.001$), indicative of anabolic resistance or cellular senescence.
Crucially, the serum profile mirrored the muscle signature. Circulating miR-25-3p was significantly downregulated in HF patients ($p <$ **0.001,** AUC=0.94), contrasting with the high levels found in bone.
Conclusion:
Hip fracture patients present a "molecular storm" in bone (upregulation) but a "molecular silence" in muscle and serum (downregulation). These findings suggest that circulating miRNAs, particularly miR-25-3p, act as systemic reporters of muscle quality and frailty rather than indicators of local bone trauma. This highlights the potential of serum miR-25-3p as a non-invasive biomarker for sarcopenia in the context of osteoporotic fractures



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THE IMPACT OF HEALTH INSURANCE COVERAGE OF CHUNA MANUAL THERAPY ON TREATMENT PATTERNS AND HEALTHCARE UTILIZATION: A NATIONWIDE CLAIMS DATA ANALYSIS (2018–2019)

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Objectives
In April 2019, Chuna Manual Therapy was included in Korea's National Health Insurance system. This policy change was expected to influence treatment patterns and healthcare utilization within traditional Korean medicine; however, empirical evidence based on nationwide data remains limited.
Materials and methods
We conducted a nationwide before–after observational study using Health Insurance Review and Assessment Service (HIRA) claims data. The study population included patients treated for spinal disorders who received Chuna Manual Therapy during the 12 months following insurance coverage implementation (April 8, 2019–April 7, 2020). Healthcare utilization patterns during this period were compared with those observed in the 12 months prior to coverage. Outcomes included the number of visits per disease episode, treatment duration, use of concomitant therapies, and healthcare cost components borne by insurers and patients.
Results
Following insurance coverage, the number of patients with recorded Chuna Manual Therapy claims increased from 53,037 to 1,160,710. At the episode level, the mean number of visits per disease decreased from 5.01 ± 7.83 to 3.90 ± 5.01 ($p < 0.05$), and treatment duration was reduced from 6.02 ± 9.40 to 4.33 ± 5.97 days ($p < 0.05$). Utilization of concomitant therapies, including acupuncture, cupping, percutaneous infrared radiation therapy, and electroacupuncture, also declined significantly. In addition, both patient out-of-pocket payments and insurer expenditures per episode decreased after coverage implementation ($p < 0.05$ for all comparisons).
Conclusions
The inclusion of Chuna Manual Therapy in Korea's National Health

Insurance system was associated with notable changes in treatment patterns and healthcare utilization, including fewer visits, shorter treatment duration, and altered use of complementary therapies. These findings suggest that insurance coverage may influence care delivery structures in traditional Korean medicine. Further longitudinal and controlled studies are required to evaluate the implications of these utilization changes for clinical outcomes and healthcare efficiency.

Keywords
Chuna Manual Therapy; Health insurance coverage; Healthcare utilization; Treatment patterns; Claims data

P354

ORIENTAL MEDICINE AS COLLABORATING TREATMENTS WITH CONVENTIONAL TREATMENTS FOR KNEE OSTEOARTHRITIS A PRISMA-COMPLIANT SYSTEMATIC REVIEW AND META-ANALYSIS

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Objectives:
We aimed to evaluate the effectiveness and safety of oriental medicine (OM) treatments as monotherapy and add-on therapy compared to conventional treatments for knee osteoarthritis and assess the quality of evidence for these results.
OM treatment included acupuncture, herbal medicine, pharmacoacupuncture, and moxibustion.
Materials and Methods:
PubMed, Embase, Cochrane, Google Scholar, 4 Korean medical databases (KoreaMed, Korean Studies Information Service System, Research Information Service System, and Oriental Medicine Advanced Searching Integrated System), and one Chinese database (China National Knowledge Infrastructure) were searched for articles published between January 1, 2000, and January 1, 2021. Randomized controlled trials (RCTs) investigating the effect of OM interventions, single or combined with conventional treatments, on knee osteoarthritis were searched. The risk of bias and quality of evidence of the included studies were evaluated using the Cochrane Collaboration's risk of bias tool and Grading of Recommendations, Assessment, Development, and Evaluation methods, respectively.
Results:
A total of 3911 relevant studies were retrieved and only 23 studies were included for systematic review. Most of the studies showed a significant effect on knee osteoarthritis. 21 studies comparing single OM treatment with conventional treatment were included in the meta-analysis. The effect size of standardized mean difference (SMD) was analyzed as a "small effect" with 0.48 (95% CI −0.80 to −0.16, Z = 2.98, P = .003). In addition, a meta-analysis of 4 studies comparing integrative treatment with conventional treatment showed a "very large effect" with 1.52 (95% CI −2.09 to −0.95, Z = 5.19, P < .001).
Conclusion:
Our results suggest that single OM treatment and integrative treatment significantly reduce pain in patients with knee osteoarthritis. However, there is a limited number of RCTs considering integrative treatment which implies more related RCT should be conducted in the future.

Keywords: acupuncture, herbal medicine, hyaluronic acid injection, knee osteoarthritis, moxibustion, NSAIDs

Abbreviations: AEs = adverse events, CI = confidence interval, HA = hyaluronic acid injections, NSAIDS = nonsteroidal antiinflammatory drugs, OA = osteoarthritis, OM = oriental medicine, RCTs = randomized controlled trials, SMD = standardized mean difference, VAS = visual analog scale.

P355

GENERALIZABILITY OF AN OPPORTUNISTIC AI TOOL THAT IDENTIFIES PATIENTS WITH LOW BONE DENSITY USING CONVENTIONAL X-RAY ACROSS RACE AND SEX

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Objective: To assess the potential of a medical device software tool, Rho, which uses a locked machine learning algorithm to identify patients with low BMD from standard x-rays, to improve screening in typically underscreened patients by demonstrating its performance across sex and race.
Material and Methods: Rho analyzed x-rays of 513 patients (54% female; 26% Asian, 22% Black, 24% Hispanic, 28% White; 61% low BMD) from six US centers and classified patients as having low BMD or not. Performance was evaluated using DXA BMD (acquired within one year of the x-ray) as ground truth. Area under the receiver operating characteristic curve (AUC), sensitivity and specificity were assessed in pre-defined subgroups of sex and race.
Results: Of 513 patients, the algorithm identified 143 true positives, 14 false positives, 172 false negatives and 184 true negatives. Performance did not differ, as evidenced by overlapping confidence intervals, between females and males: AUC was 0.87 (0.83-0.90) and 0.83 (0.78-0.87), specificity was 0.94 (0.89-0.98) and 0.92 (0.88-0.96), and sensitivity was 0.48 (0.42-0.54) and 0.41 (0.34-0.49), respectively. Similar performance values were observed for each race, and did not differ between races.
Conclusions: Disparities in screening rates are documented across sex and race, but many adults, regardless of sex and race, will have a conventional x-ray performed at some point. If implemented clinically, a Rho Positive finding is intended to prompt the referring clinician to conduct a clinical fracture risk assessment and refer for DXA if appropriate. These results suggest that Rho has the potential to augment the current standard of care and help address screening disparities by flagging patients at-risk of low BMD with similar performance in different sexes and races. Most flagged patients would truly have low BMD by DXA. False negative patients would be missed, but since the device analyzes x-ray data that already exists, these patients are not subjected to additional radiation exposure. Physicians are not made aware of Rho Negative findings, thus these patients would continue to receive the current standard of care.
Disclosures: The authors are/were employees of 16 Bit. MC and AB are inventors on a patent for the underlying technology.

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POTENTIAL TO AUGMENT OSTEOPOROSIS CANADA GUIDELINES FOR DXA REFERRAL WITH FRAX CALCULATED USING A FEMORAL NECK ESTIMATE FROM AN OPPORTUNISTIC SCREEN OF LOW BONE DENSITY FROM STANDARD X-RAY

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Objective: To assess the potential of a femoral neck (FN) T-Score estimate from an opportunistic screen of low bone density from standard x-rays (Rho) to improve patient referral for DXA when used as an input to FRAX.

Material and Methods: In a retrospective dataset of consecutive patients with a Rho-eligible x-ray, DXA and FRAX inputs available, we calculated FRAX MOF score with FN T-Score estimated by Rho (FRAX-Rho) and measured by DXA (FRAX-DXA). We classified patients as eligible for (i) DXA referral based on FRAX-Rho ≥ 10 or age-specific Osteoporosis Canada guidelines (OC-DXA); and (ii) pharmacotherapy based OC guidelines (OCRX). We considered the cost of DXA, risk of fracture, cost and risk reduction of pharmacotherapy, and cost of fracture to model costs of different DXA referral methods.
Results: In 1199 patients (74% female; 50-93 years of age; 56% low bone mass [lowest DXA T-Score > -2.5 and < -1] and 17% osteoporosis), had referral for DXA been based on OC-DXA or FRAX-Rho, 89/734 (12%) or 93/552 (17%; p=0.02) patients referred would qualify for OCRX, respectively. FRAX-Rho would have referred a net of 182 fewer patients, caught 4 additional eligible for OCRX, and would not have missed any eligible for OCRX, leading to cost savings > $34,000 (whereas referral based on OC-DXA incurred a cost > $9000). FRAX-Rho vs OC-DXA would refer half as many young men (<65 y) and one third as many older men (≥65 y).
Conclusions: OC guidelines are meant to improve DXA referral by considering age and risk factors, but still rely on a care provider to initiate a clinical fracture risk assessment (CFRA). Rho findings (of a patient likely having low BMD) are intended to prompt a CFRA. The current study suggests that calculating FRAX-Rho, and referring for DXA if FRAX-Rho ≥ 10, would result in DXA referrals with high diagnostic yield in a cost-effective manner. The Rho finding could be delivered to primary care providers with a weblink to the FRAX calculator, pre-filled with some patient parameters available from the Rho-analyzed x-ray (age, sex, estimated FN T-Score). As Rho findings are only available in patients who happen to have a Rho-screened x-ray, FRAX-Rho is not intended to obviate the OC guidelines, which serve all patients. Rather, when FRAX-Rho is available, it would refer fewer patients but still send all those eligible for therapy based on OC guidelines, potentially reducing DXA wait-times.
Disclosures: The authors are/were employees of 16 Bit. MC and AB are inventors on a patent for the underlying technology, assigned to 16 Bit.

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STUDY OF THE ROLE OF ENVIRONMENTAL FACTORS IN PAGET'S DISEASE OF BONE IN TUNISIA

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Introduction:
The prevalence of Paget's disease of bone has been declining in recent years. Genetic and environmental factors have been reported.
We studied environmental factors in patients with Paget's disease.

Materials and methods:
We conducted a retrospective, cross-sectional, descriptive study of patients followed for Paget's disease in the rheumatology department of Hédi Chaker Hospital in Sfax over a 25-year period from 2000 to 2025. We collected sociodemographic data and data on exposure to environmental factors.

We collected data on 91 patients with Paget's disease of bone. The average age of patients at the time of diagnosis of PD was 67.75 ± 9.7 years. We observed a male predominance, with a sex ratio (M/F) of 1.39. We collected data on exposure to environmental factors in 81 patients and observed the following:
-Contact with animals in 44.21% of patients: farm animals (38.1%), dogs (35.71%), and cats (26.19%).
-Exposure to wood heating during childhood in 23.5% of patients (n=19).

-Exposure to tobacco in 47.67% of patients (n=41).

-Occupational exposure to arsenic in 13.58% of farmers (n=11).

-Exposure to heavy metals in 17% of patients working in a metallurgical factory. (n=21)

Discussion:
Regarding contact with animals, especially dogs, recent studies have suggested that CDV is present in 100% of cases of pagetic cells (1). Exposure to tobacco and wood smoke has been shown to stimulate osteoclastogenesis. Another factor studied was toxins, including arsenic acid and heavy metals, which are suspected of increasing the risk of developing PDB(2).

Conclusion:
The study of environmental factors provides insight into the pathophysiology of the decline in the prevalence of Paget's disease of bone.
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EVALUATION OF CLINICAL AND BIOLOGICAL RESPONSE TO BISPHOSPHONATES IN PAGET'S DISEASE OF BONE

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Introduction:
Bisphosphonates are currently the first-line treatment for Paget's disease(PD). They have improved the control and prognosis of PD.
The response to treatment was assessed at 12 months on clinical and biological grounds.

Patients and methods:
We conducted a retrospective, cross-sectional, descriptive study of patients followed for Paget's disease of bone in the rheumatology department of Hédi Chaker Hospital in Sfax. We collected sociodemographic data and information on anti-osteoclast treatments received. We evaluated the clinical and biological response (rate of reduction in ALP) to treatment at 12 months.

Results:
We collected data from 91 patients with Paget's disease of bone. In 84.7% of cases (n=77), the diagnosis was made after the age of 60. 58.2% were men (n=53) and 41.8% were women (n=38).

We identified 84.61% of patients treated with bisphosphonates (n=77).

The bisphosphonates prescribed were: zoledronic acid in 62.34% of patients (n=48), pamidronate in 28.57% (n=22), risedronate in 6.49% (n=5), and etidronate in 2.6% (n=2).
-For zoledronic acid: A clinical and biological assessment was performed in 70.83% of patients (n=34): An improvement in pain was noted in 85.29% of patients. A normal PAL rate was noted in 88.24% of patients (n=30), while the remaining 4 patients had a reduction in PAL, with 75% (3 patients) having a reduction in PAL greater than 70%.

-For pamidronate: Clinically: An improvement in pain was observed in 90.9% of patients, and a clinical relapse was noted in 9.09%. Biologically, a biological assessment was performed in 20 patients: Biological remission was observed in 1 patient, and a reduction in PAL was observed in 19 patients, 10 of whom had a reduction in PAL of more than 70%.

-For risedronate: Clinically, clinical improvement was noted in 60% of patients. Biologically, remission was noted in 40% of patients, and a reduction in PAL was noted in 40%, i.e., 2 patients with a decrease of 39.48% and 32.28%, respectively, from the initial PAL level.

-For etidronate: Clinically, we noted an improvement in pain in both cases. Biologically, a reduction in PAL was observed of 69.92% in one patient and 55.92% in the other.

Conclusion:
Nitrogen-containing bisphosphonates, such as alendronate, pamidronate, risedronate, and zoledronic acid, are preferred because of their high affinity for bone. In our study, zoledronic acid and etidronate were clinically the most effective in relieving pain, with no clinical relapse observed. Biologically, zoledronic acid was the treatment associated with the highest remission rate.

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IMPACT OF CERVICOBRACHIAL NEURALGIA ON SLEEP: MOS SLEEP SCALE

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Introduction:
Cervicobrachial neuralgia (CBN) is a common degenerative condition that causes nociceptive or neuropathic pain, which can affect patients' quality of life, particularly their sleep. The aim of our study was to assess the impact of CBN on sleep quality using the MOS Sleep Scale (Medical Outcomes Study Sleep Scale).

Patients and methods:
This was a retrospective, cross-sectional, descriptive study conducted in the rheumatology department, collecting data on patients being treated for cervicobrachial neuralgia. We collected sociodemographic data, the duration of CBN, and pain intensity assessed using the VAS pain scale. We assessed sleep quality in these patients using the MOS Sleep Scale. This is a 12-item questionnaire that explores six dimensions: Sleep quantity (considered optimal for a duration of between 7 and 8 hours, and suboptimal if less than 7 hours), number of hours of sleep, sleep disturbances, sleep adequacy, daytime sleepiness, snoring, and waking up with shortness of breath or headaches.

Each subdomain of the MOS Sleep Scale was converted into a score on a scale of 0-100, where 0 represents poor sleep quality and 100 represents good sleep quality. Depending on the domain, a high score indicates favorable sleep, or conversely, sleep disorders.

Results:
Thirty patients with cervicobrachial neuralgia were included, 90% of whom were women. The average age was 50.5 years [22–75]. In 90% of patients, CBN had been present for more than three months. The average pain intensity, as assessed by the VAS, was 6.2/10. Approximately one-quarter of patients (26.7%) reported waking up during the night.

Regarding the MOS Sleep Scale, for sleep quantity, we observed an average of 5.83 hours of sleep per night [4–8], with optimal sleep (7–8 hours) reported in 30% of patients. The sleep adequacy score was 34.7 ± 10, while the sleep disturbance score was 57.8 ± 26.8. The daytime sleepiness score was 63.6 [20–60], the score for waking up with shortness of breath or headaches was 75 [45–80], and the snoring score was 58.3 [37–95]. These results reflect a significant impairment in sleep quality in our population.

Conclusion:
Cervicobrachial neuralgia causes pain that can be chronic and intense, leading to sleep disturbance. Our study shows that CBN impacts sleep quality, contributing to an impairment in patients' quality of life.

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FAMILIAL RISKS OF OSTEOPOROSIS AND OSTEOPOROSIS RELATED FRACTURES IN FIRST-, SECOND- AND THIRD-DEGREE RELATIVES - A NATIONWIDE FAMILY STUDY

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Abstract

Objective: Osteoporosis (OP) is a common degenerative disorder with complex genetic distribution. No large nationwide family study of the hereditary of OP has been published. This first nationwide study aimed to determine the familial risks of OP and OP related fractures in twins, full-siblings, half-siblings, and cousins in Sweden.

Design: The Swedish Multigeneration register was linked to the National Patient Register (NPR) to investigate the heredity of OP between 1997 and 2018. Offspring born by Swedish parents were included. The adjusted familial hazard ratios (HRs) with 95% confidence interval (CI) were determined for OP and OP fractures among twins, siblings, half-siblings, and cousins. Adjustments were made for birth year, sex, educational level, and comorbidities.

Results: Totally 6 548 562 individuals (48.77% women) were included with mean age 41 years (range 0-87 years) at end of follow up of. Totally 57 869 (0.88 %) individuals were affected with OP and 403 660 (6,16%) individuals with OP fractures. Familial adjusted HRs were increased for both OP and OP related fractures in twins, siblings, half-siblings, and cousins. The adjusted familial HR for OP were for twins HR=2.92 (95%CI 2.32-3.67), siblings HR=2.22 (95%CI 2.14-2.31), half-siblings HR=1.74 (95%CI (1.55-1.94), and cousins HR=1.81 (95%CI 1.55-2.11). The familial risk was especially high for young individuals born before 1976 with adjusted familial HR=22.88 (95%CI. 13.98-37.45).

Conclusions: Heredity is a predictor for future risk of OP and OP related fractures in the Swedish population. Heredity might be of value to identify individuals predisposed for OP for individualized targeted intervention.

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INDICATION CRITERIAS FOR AGN1 TO RESTORE BONE STRUCTURE IN THE PROXIMAL FEMUR

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Background: While the need for systemic pharmacological therapy after osteoporosis related index fractures is well documented, surgical adjuncts like local osteo enhancement procedure (LOEP) and AgN1 are still not very often used in clinical work. Furthermore, there are still no established indication criteria for the application of AgN1. We have developed the following indications at our institution.

Material and Methods: AgN1 is approved as a void filler in the proximal femur. Since 2023, we have used AgN1 in 37 patients and 46 proximal femurs with the aim of creating an anatomical bone structure. We identified three indications and also developed a list of criteria (medical items, context factors) for the indication to perform LOEP based on pharmacological osteoporosis therapy recommendations.

Results: AgN1 was used for 3 different indications: Secondary fracture prevention after major osteoporotic fracture (MOF). As concomitant procedure in the treatment of MOF. For defect filling after osteosynthesis material removal (OSME). Important factors in decision-making were the risk of re-fracture in connection with OSME, sufficient time for informed consent in combination with emergency surgery (fracture treatment) and fracture prevention (elective). The strictest criteria were applied in elective secondary prevention due to possible complications. Decision-making aids were: MOF, a fracture under established osteoporosis therapy, history of fragility fractures, family history of osteoporosis and -associated fractures, glucocorticoid use, lifestyle (smoking and alcohol), DXA T-score < -2.5, FRAX fracture risk of > 10%, unsteady gait and tendency to fall. Ultimately, experts consisting of orthopedic surgeons and an internist decided whether surgery was indicated. Contraindications are poor general health, frailty, cognitive impairment and apparent coxarthrosis. AgN1 was used in 37 patients or 46 proximal femurs (OSME 11 patients, secondary fracture prevention 19, concomitant 6) without adverse events.

Conclusion: To date, no indication criteria for the use of AgN1, LOEP, have been defined for the clinical setting outside of studies. Our criterias may help other surgeons in the future indicating LOEP. However, surgeons must be trained in this simple but still demanding procedure. As some patients have fallen after surgery without suffering a fracture of the proximal femur, the results appear promising.

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SOMETHING IS NOT RIGHT! – SUBSEQUENT FRACTURES AND THERAPY GAPS

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Objectives With secondary fracture rates reaching 5–10% or higher, Fracture Liaison Services (FLS) are essential for mitigating risk. Pharmacological interventions can reduce fractures by 20–68%. Although FLS is effective at identifying high-risk patients, the real-world efficacy of FLS in preventing recurrences is still in question.

Materials and Methods: In 2024, our FLS provided specific treatment recommendations to all 484 patients identified with osteoporosis-related fractures. Here we present our 1-year follow-up (FU) data, regarding new fractures, treatment adherence, and possible reasons for treatment failure.

Results: In 2024, 484 mostly female patients (69.2%; mean age 72.7) received a specific outpatient treatment proposal after osteoporosis assessment. Of those, only 180 received treatment. We lost 59 patients (12.2%) to FU: 4 moved, and 55 died. 57 patients (82.5% women), had at least one subsequent fracture; 8 had 2; and 3 had 3 subsequent incidents with fractures. This resulted in 57 patients with 71 events and 81 fractures. Index fracture sites were vertebral body (18; 31.6%); hip

(11; 19.3%); pelvis, pelvic ring (9; 15.8%); proximal humerus (5; 8.8%); and others (14; 24.5%). Subsequent fractures were major osteoporotic fractures (MOF) in 74.1% (60 patients), 20 were osteoporosis-related but not MOFs, and 1 resulted from adequate trauma. 27 fractures (47.4%) occurred under therapy. In 13 cases (43.3%), therapy was not initiated by general practitioners. In 2 cases (6.7%), therapy could not begin due to medical issues. 4 (13.3%) refused therapy, and in 11 cases (36.7%), the fracture occurred before the therapy appointment. Only 2 had a change in therapy after a subsequent fracture. 17/81 new fractures were proximal femur fractures, and 12 were pelvic ring fractures.

Conclusion: 11.8% fracture rate suggests that standard care often fails to address individual risk profiles. Infrastructural barriers are primary causes of delayed treatment, severely compromising patient adherence. Streamlining workflows is therefore essential for rapid therapy initiation. The incidence of proximal femur fractures underscores the limited efficacy of systemic pharmacotherapy at these specific site. This highlights a critical need for surgical adjuncts, such as local osteo-enhancement procedure, to provide immediate mechanical stability where drugs alone are insufficient.

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REAL LIFE DATA FROM AN ORTHOPEDIC FRACTURE LIAISON SERVICE (FLS)

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Objectives While International Osteoporosis Foundation (IOF) sets global standards via the Best Practice Framework, local success of a Fracture Liaison Service (FLS) depends on regional networks and stakeholder integration. These factors directly influence the «therapy gap" (TG). Our orthopedic department's FLS addresses all surgical inpatients, providing structured diagnostic and treatment recommendations for follow-up (FU) care.

Materials and Methods: We prospectively screen all inpatient fractures, excluding patients under 50, those with high-energy trauma and orthogeriatric patients who start therapy during hospital stay. The remaining undergo osteoporosis assessment, including dental status, laboratory findings, medical history, comorbidities, previous fractures, menopause, lifestyle, and family history. FLS offers individualized diagnostic and therapeutic proposals. During 1-year FU, we check whether recommendations had been implemented. Other questions concern DXA, specific therapy, new fractures, adverse events, mortality, and involved specialists.

Results: In 2024, we treated over 1300 inpatient fractures. After excluding 291 orthogeriatric patients and others 484 underwent specific osteoporosis assessment (mean age 72.7), all having osteoporosis (37%). 335 (69.2%) were female. Lost to FU was 4/484 (0.82%). 55 (11.4%) died in the first year. 58 (12%) needed dental therapy. DXA was proposed in 444, performed in 208, (46.8%). 40 had no DXA indication. 34 (7.7%) declined DXA and in 80 it was not indicated due to further physicians (18%). In 122 reason for missing DXA remains unclear (27.5%). 180/484 (37.2%) had therapy. Non-initiation included patient refusal (41; 8.5%), contraindications despite willingness (7; 5.6%) and refusal by GP (119; 24.6%). Different human factors led to non-initiation in 20 (4.1%). Diagnostic gap (DG) was 53.2%; TG 62.8%. TG calculated with deceased patients, patients lost to follow-up, waiting for dental therapy, with contraindications and "overruled" indication by GPs was 27.4% (68/180). How DG and (estimated) first year mortality influence TG remains unclear.

Conclusion: TG is not just a service failure; it reflects complex correlations between human factors, clinical judgment, patient preferences, and contraindications. While FLS coordinates care, final decisions must involve primary care physicians and patient-centered context. Thus, the gap functions less as a rigid metric and more as a guiding framework for integrated, individualized treatment.

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GLP-1 RECEPTOR AGONISTS AND MUSCULOSKELETAL OUTCOMES: A SYSTEMATIC LITERATURE REVIEW AND META-ANALYSIS

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Introduction: This systematic review/meta-analysis aims to synthesize clinical data on the effects of Glucagon-like peptide-1 (GLP-1) receptor agonists (RAs) on key relevant bone, muscle, and joint outcomes. The primary objective is to establish whether these agents are safe for the musculoskeletal system; secondarily, the study examines their potential protective role in mitigating age- and disease-related decline and in improving some key relevant outcomes in musculoskeletal health.

Methods: MEDLINE, Cochrane Central Register of Controlled Trials (CENTRAL) (both via Ovid® platform) and Embase were searched in March 2025 to identify relevant randomized controlled trials (RCTs) or real-world evidence (RWE) studies to be included. This bibliographic search was completed with manual search. A random-effect model meta-analysis was performed for any outcome reported in at least 2 studies. Subgroup analyses were performed on the type of GLP-1 RAs, type of comparator used and study design. Sensitivity analyses were performed to test the robustness of the data. This work has been performed in adherence with PRISMA statement. (PROSPERO Record ID: CRD420251024082).

Results: From 1,148 potentially relevant references, 61 articles (47 RCTs, 13 RWE studies and 1 pharmacovigilance study, combining a

total of 1,250,778 individuals) met the inclusion criteria. Different GLP1-RAs were represented across the panel of studies i.e., semaglutide, liraglutide, exenatide, dulaglutide, and tirzepatide (dual agonist GIP/GLP-1), as well as others such as albiglutide, lixisenatide, and SAR425899 (bamadutide). No effect on bone outcomes (i.e., bone mineral density (all sites) and fractures (all sites) were observed when models included the most adjusted effect size. Regarding muscle outcomes, a significant decrease of lean body mass/fat-free mass was consistently observed with GLP1-RAs in the global model (k=28, SMD0.52, 95%CI -0.8; -0.23, I^2 88%, p-value for heterogeneity <0.0001), which remained robust in all sensitivity analyses. Subgroup analyses showed that the effect was mainly driven by liraglutide and semaglutide, with a decrease in lean body mass/fat-free mass observed when GLP-1 RAs were compared with placebo. No publication bias was found. Regarding joint outcome, models revealed no significant change in WOMAC pain, physical function and stiffness.

Conclusion: This meta-analysis is the first to investigate the effects of GLP-1 RAs on a large panel of musculoskeletal health outcomes. While no effect on bone outcomes and joint outcomes was found, effects on muscle mass outcomes (i.e., decrease of lean body mass/fat-free mass) were observed, apparently in line with body weight reduction. The clinical relevance of these results needs to be firmly established. Further studies in this field, including those looking at muscle function and using multivariate models considering confounding are needed to better reinforce the models and final findings.

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EFFECTS OF ROMOSOZUMAB AND TERIPARATIDE ON BONE CALLUS FORMATION ENHANCEMENT AFTER INTRAMEDULLARY NAILING IN OSTEOPOROTIC PATIENTS WITH INTERTROCHANTERIC FRACTURES: A COMPARATIVE STUDY

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INTRODUCTION

Intertrochanteric fragility fractures in osteoporotic patients are associated, one year after surgical treatment, with high morbidity and delayed fracture healing due to impaired bone metabolism. Intramedullary nailing is the standard procedure, however, enhancement of bone callus formation remains a critical determinant of successful fracture union. Bone anabolic agents, such as Romosozumab (ROMO) and Teriparatide (TPTD) besides preventing a new fracture, have also shown potential to improve bone healing, but comparative data in these patients are limited. The aim of the present study was to compare the effects of ROMO versus TPTD on bone callus formation and the fracture healing process.

MATERIALS AND METHODS

This 12 months study was performed at the Trauma Center of "Ospedale del Mare" in Naples, Italy. Sixty postmenopausal women (age 67-83), were selected for the study; other inclusion criteria were: BMI 23-26, BMD T-score between -2.5 and -4, ASA score 2, and an AO31 A2-A3 femoral fracture type.

The study population was divided into two groups: 30 patients were treated with ROMO 210 mg/month sc, and 30 patients with TPTD 20 mcg/day sc, respectively.

X-rays were performed to evaluate callus formation and progression to fracture union by the mRUST score (modified Radiographic Union Scale for Tibia) adapted for femur at predetermined intervals (3-6-12 months).

Adapted Femoral mRUST Score PROFORMA

SECTION 1 – Patient Demographics

Variable	Value
Patient Study ID	_____
Age (years)	_____
Sex	☐ Male ☐ Female
BMI (kg/m²)	_____
Affected side	☐ Left ☐ Right
Date of injury	____ / ____ / _____
Mechanism of injury	☐ Low-energy fall ☐ Other: _____

SECTION 2 – Baseline Clinical Characteristics

Variable	Value
Osteoporosis diagnosed	☐ Yes ☐ No
DEXA available	☐ Yes ☐ No
If yes – T-score	_____
ASA score	☐ I ☐ II ☐ III ☐ IV
Relevant comorbidities	☐ Diabetes ☐ Smoking ☐ CKD ☐ Steroid use ☐ Other:

SECTION 3 – Fracture Characteristics

Variable	Value
AO/OTA classification	☐ 31-A1 ☐ 31-A2 ☐ 31-A3
Stability	☐ Stable ☐ Unstable
Comminution	☐ Yes ☐ No
Reduction quality	☐ Good ☐ Acceptable ☐ Poor

SECTION 4 - Surgical Details

Variable	Value
Date of surgery	____ / ____ / _____
Time from injury to surgery (days)	_____
Implant type	☐ Short IM nail ☐ Long IM nail
Cephalomedullary device	☐ Yes ☐ No
Distal locking	☐ Static ☐ Dynamic
Intraoperative complications If yes, specify	☐ Yes ☐ No _____

SECTION 5 – Postoperative Management

Variable	Value
Weight bearing	☐ Immediate WBAT ☐ Partial ☐ Delayed
Osteoporosis treatment initiated If yes	☐ Yes ☐ No ☐ Bisphosphonates ☐ Denosumab ☐ Teriparatide ☐ Romosozumab
Rehabilitation protocol	☐ Standard ☐ Modified

SECTION 6 – Radiographic Assessment Schedule

3-Month Follow-up

Cortex	Score (1–4)
Medial	☐1 ☐2 ☐3 ☐4
Lateral	☐1 ☐2 ☐3 ☐4
Anterior	☐1 ☐2 ☐3 ☐4
Posterior	☐1 ☐2 ☐3 ☐4
Total mRUST (4–16)	_____

6-Month Follow-up

Cortex	Score (1–4)
Medial	☐1 ☐2 ☐3 ☐4
Lateral	☐1 ☐2 ☐3 ☐4
Anterior	☐1 ☐2 ☐3 ☐4
Posterior	☐1 ☐2 ☐3 ☐4
Total mRUST (4–16)	_____

12-Month Follow-up

Cortex	Score (1–4)
Medial	☐1 ☐2 ☐3 ☐4
Lateral	☐1 ☐2 ☐3 ☐4
Anterior	☐1 ☐2 ☐3 ☐4
Posterior	☐1 ☐2 ☐3 ☐4
Total mRUST (4–16)	_____

SECTION 8 – Healing Interpretation

Time Point	Healing Status
3 months	☐ Poor ☐ Progressive ☐ Advanced
6 months	☐ Delayed ☐ Progressive ☐ Advanced
12 months	☐ Union ☐ Delayed union ☐ Non-union

SECTION 9 – Complications and Reoperations

Variable	Value
Mechanical failure	☐ Yes ☐ No
Cut-out / Cut-through	☐ Yes ☐ No
Non-union	☐ Yes ☐ No
Reoperation required If yes, reason	☐ Yes ☐ No _____

RESULTS

Patients treated with ROMO, six months after surgery, demonstrated a significantly higher mRUST scores compared with those receiving TPTD

(13.7 ± 1.3 vs 12.2 ± 1.4, p<0.01), indicating earlier cortical bridging and enhanced radiographic callus maturation; these differences were reduced at 12 months.

Radiographic Bone Healing Assessed by mRUST Score after Intramedullary Nailing of Intertrochanteric Fractures

Comparison between Romosozumab and Teriparatide Groups

Outcome	Time Point	Romosozumab (n = 30)	Teriparatide (n = 30)	Mean Difference (95% CI)	p value
mRUST score (mean ± SD)	3 months	10.5 ± 1.5	9.3 ± 1.6	1.2 (0.5 to 1.9)	0.002
	6 months	13.8 ± 1.3	12.3 ± 1.4	1.5 (0.9 to 2.1)	<0.001
	12 months	15.4 ± 0.8	14.9 ± 1.0	0.5 (−0.1 to 1.0)	0.081
Patients with ≥3 bridged cortices, n (%)	3 months	19 (63%)	13 (43%)	—	0.11
	6 months	25 (83%)	18 (60%)	—	0.041
	12 months	29 (97%)	28 (93%)	—	0.55
Radiographic union achieved, n (%)	6 months	23 (77%)	19 (63%)	—	0.26
	12 months	29 (97%)	28 (93%)	—	0.55
Time to radiographic union (months, mean ± SD)	—	5.4 ± 1.1	6.3 ± 1.4	−0.9 (−1.5 to −0.3)	0.004

Data are presented as mean ± standard deviation or number (percentage). mRUST, modified Radiographic Union Score for Tibial fractures. Between-group comparisons were performed using independent t-tests or Mann–Whitney U tests for continuous variables and chi-square or Fisher's exact tests for categorical variables. A two-sided p-value < 0.05 was considered statistically significant.

CONCLUSIONS

In osteoporotic patients, following intramedullary nailing of intertrochanteric fragility fractures, Romosozumab may promote a more rapid and pronounced bone callus formation than Teriparatide. Further randomized controlled studies are needed to confirm these results and define optimal treatment protocols.

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HUMAN UCMSC-DERIVED EXOSOMES ENHANCE KNEE FUNCTION AND ATTENUATE OSTEOARTHRITIS PROGRESSION IN A PRECLINICAL ANIMAL STUDY

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Background: Mesenchymal stem cells (MSCs) show therapeutic potential in osteoarthritis (OA), but their clinical use is limited by low cell yield and the need for extensive ex vivo expansion. Exosomes derived from human umbilical cord MSCs (UCMSCs) represent a promising cell-free alternative with comparable regenerative and anti-inflammatory properties.

Methods: UCMSC-derived exosomes (UCMSC-Exos) were isolated and characterized by nanoparticle tracking analysis. Their in vitro effects were assessed in IL-1β–stimulated chondrocytes via mRNA expression profiling and Alcian blue staining. In vivo efficacy was evaluated in a rat anterior cruciate ligament transection (ACLT) model using functional assessments and histological analyses.

Results: UCMSC-Exos suppressed catabolic markers (IL-1β, MMP-3, Col X) and increased anabolic markers (TIMP-1, aggrecan, Col II) in chondrocytes. Intra-articular administration of UCMSC-Exos attenuated OA progression, improving gross joint morphology and reducing cartilage degeneration. Treated knees showed higher glycosaminoglycan and Col II content and reduced MMP13 expression. Functionally, UCMSC-Exos improved weight-bearing symmetry and treadmill endurance after ACLT.

Conclusion: UCMSC-derived exosomes mitigate IL-1β–induced chondrocyte inflammation, promote matrix synthesis, and reduce catabolic activity. In vivo, they preserve cartilage integrity and enhance knee function following joint injury. These findings support UCMSC-Exos as a promising cell-free therapeutic strategy for OA.

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AUTOMATED DEEP LEARNING ESTIMATION OF BONE MINERAL DENSITY AND T-SCORE FROM RADIOGRAPHS FOR ENHANCED BONE HEALTH ASSESSMENT

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Abstract

Objective(s): Osteoporosis is widely prevalent worldwide, characterized by decreased bone mineral density (BMD) and an increased risk of fractures. Accurate assessment of BMD and T-scores is crucial for early detection, intervention, and risk stratification. This study aims to develop a non-invasive deep learning-based method capable of predicting BMD and T-scores from routine radiography, enabling broader and lower-cost bone health screening and improving early screening coverage at the public health level.

Material and Methods: To overcome the reliance of traditional BMD measurements on specialized equipment and trained operators, we propose a multi-model fusion deep learning framework. The framework integrates three convolutional neural networks (Xception, EfficientNetV2S, and MaxBlurPooling model) and fuses their predictions via a simple average to improve accuracy and stability. The dataset spans multiple centers, comprising 5,000 radiographies, and is split into training, validation, and external evaluation stages. Evaluation metrics include Pearson correlation coefficient (r) and area under the receiver operating characteristic curve (AUC), simultaneously assessing BMD prediction, T-score inference, and osteoporosis classification performance. Additionally, the study analyzes the impact of inter-center data distribution on predictive robustness to provide evidence for applicability across diverse populations and devices.

Results: On the internal dataset, the model achieved a r = 0.86; on the external validation set, r = 0.82, with osteoporosis classification AUCs reaching up to 0.90, indicating robust predictive performance and good generalization. Further analyses show that despite distribution differences across centers, the model maintains stable predictive confidence across multiple imaging devices and acquisition conditions. Compared with traditional screening, the method offers clear advantages in cost, accessibility, and turnaround time, supporting broad applicability in clinical practice and public health settings.

Conclusion(s): These results demonstrate the potential of this AI-driven, non-invasive approach as a cost-effective adjunct for opportunistic osteoporosis screening, complementing DXA in settings with limited access and addressing population-specific needs in Asian cohorts.

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AI AND LLM-INTEGRATED REVERSE SHOULDER ARTHROPLASTY PLANNING IMPROVES EFFICIENCY, IMPLANT POSITIONING, AND SAFETY: A COMPARATIVE STUDY

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Objective(s):
Develop and evaluate a fully offline AI- and large language model (LLM)-integrated Reverse shoulder arthroplasty (RSA) planning system to enhance efficiency, accuracy, and safety vs conventional manual planning.
Material and Methods:
We built an integrated RSA planning platform combining automated 3D reconstruction, landmark detection and measurement, implant and screw trajectory optimization, and dynamic impingement assessment. Scapula and humerus segmentation was performed using nnU-Net v2 for 3D reconstruction. Landmark detection employed principal component analysis and power iteration for axis estimation with sphere fitting for joint geometry. For scapular screw planning, multiple spiral trajectories were evaluated at 15° intervals using Rodrigues rotation, selecting the longest intraosseous path. Bony impingement was assessed by collision detection. An LLM assistant (Llama-2-7B) was fine-tuned using low-rank adaptation (LoRA, rank=8) on 5,000 surgical commands to enable multilingual function calling and interactive implant adjustment. Planning performance was compared with a manual workflow using standard commercial tools (segmentation, implant positioning, screw planning, and surgical guide design).
Results:
AI/LLM markedly improved planning efficiency (AI < 9 minutes vs manual ≥ 25 minutes; 64% faster, $p<0.001$). Implant positioning accuracy favored AI (mean angular error 2° vs 5°, $p<0.01$). Screw trajectory safety improved (cortical breach <1% AI vs 20% manual, $p<0.05$). Dynamic impingement gain: +15° in impingement-free elevation ($p<0.05$). Landmark measurements: glenoid center 4.83 mm, radius 2.51 mm, orientation 5.92°, retroversion 5.20°, inclination 4.30°. The LLM module achieved 95.2% task completion with 93.75% function call accuracy across 160 command sets in English and Chinese (Putonghua and Cantonese).
Conclusion(s):
Fully offline AI- and LLM-integrated RSA planning significantly enhances efficiency, implant alignment, and screw trajectory safety relative to manual planning. The multilingual LLM assistant enables intuitive adjustments while preserving surgeon control, supporting standardized, faster, and safer shoulder arthroplasty workflows

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LOOK THRICE BUT FRACTURE ONCE- A CLOSED LOOP THREE CYCLE AUDIT OF BONE PROTECTION PRESCRIPTION POST HIP FRACTURE AT DISCHARGE AND 12 MONTHS LATER IN A MODEL FOUR HOSPITAL ON THE ATLANTIC COAST

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Objective
To assess practice of prescribing of bone protective treatment in a post hip fracture patient cohort at the time of discharge and at one year post discharge, assessing at three time points.
Material and Methods
A closed loop three phase audit in the form of a retrospective review of bone protection post hip fracture was undertaken in a model four hospital in Ireland. The Plan-Do-Study-Act tool was utilised to guide this audit, the standard being audited against was the fifth Irish Hip Fracture Standard (IHFS). Each cycle of the audit looked at a one month period namely August of 2021, 2022 and 2024 with follow up at one year to assess adherence. The inclusion criteria being aged sixty-five or above with a hip fracture within the time period of the study, those with fracture of shaft of femur were excluded.
Results
There were 32 patients in the first cycle of the audit, 18 patients in the second cycle and 17 in the third cycle of the audit. The majority of the cohort in the first and second cycle were female, 23(74%) and 16(89%), with the majority being male in the third cycle 9(53%) with mean age of 82 years. The first cycle demonstrated that 21(65%) were prescribed bone protective treatment with 8(31%) on treatment one year post hip fracture. The second cycle demonstrated that 9(50%) were initiated on bone protection on discharge with 7(78%) on treatment at the one year juncture. The third cycle showed that 14(82%) were prescribed bone protective treatment on or before discharge with 7(50%) on treatment one year post hip fracture.
Conclusions
This audit demonstrates suboptimal adherence to the IHFS and will serve as the catalyst for rethinking our orthogeriatric service with an emphasis on education of staff along with improving communication with community colleagues on the need for ongoing active management of these patients. Of note the second cycle demonstrates that whilst prescription of bone protection has disimproved adherence for those prescribed these agents has in fact improved since the first cycle. The third cycle demonstrates similar adherence with the standard as in the second cycle but disimproved long term adherence.

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INVESTIGATION OF THE SAFETY AND EFFICACY OF A SINGLE INTRA-ARTICULAR INJECTION OF SINOGEL® FOR THE MANAGEMENT OF KNEE OSTEOARTHRITIS

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The objectives for this study were i) to investigate the safety and local tolerance of Sinogel® administered by intra-articular (IA) injection to the knee and ii) to evaluate its effect upon knee pain.
Sinogel®, is medical device containing sodium hyaluronate 2.4% and sodium chondroitin 1.6%, indicated for pain or reduced mobility due to degenerative affections, post-traumatic disorders or joint alterations. In this open-label multicentre prospective study, 82 patients with knee osteoarthritis (OA) received a single 3ml IA injection of Sinogel®. Principal eligibility criteria were age ≥45 and ≤80 years; Kellgren-Lawrence Grade 2 to 3 severity OA of the knee and moderate pre-treatment pain intensity defined as a Visual Analogue Scale (VAS) score ≥50mm on a 0-100mm VAS for pain. After informed consent, screening and treatment (Day 0) patients attended for up to 4 in-person visits 1, 2, 4 weeks and 6 months after IA injection, plus a phone follow-up at 3 months.
A total of 82 of 89 patients screened were included and received treatment – 81 completed follow-up. Sinogel® was well tolerated, with no serious adverse events (SAEs) or device deficiencies reported. Treatment-emergent adverse events (TEAEs) occurred in 41.5% of patients, but all were mild or moderate in intensity. Adverse device effects (ADEs) were reported in 7.3% of patients, none were severe. All ADEs resolved within 3 days. No significant changes in erythema, swelling, hardening, or injection site pain were observed after treatment. No significant changes in vital signs (systolic blood pressure, diastolic blood pressure and heart rate), weight, or severe local reactions were reported.
Significant pain reduction was observed over 6 months. The mean (SD) VAS score decreased from 67.5 (10.4) mm at baseline to 14.5 (16.3) mm at 6 months ($p<0.0001$). Use of rescue medication (paracetamol) was limited, with 59.8% of patients taking at least 1 dose during the study.
Sinogel® demonstrated a favourable safety and tolerability profile, with minimal adverse effects and no SAEs. The device effectively reduced knee pain, with sustained improvement over 6 months. Although uncontrolled, the results support the safety and efficacy of Sinogel® for treating knee OA.

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SKELETAL IMPACT OF PARATHYROID SURGERY IN PATIENTS EVALUATED IN A RHEUMATOLOGY SETTING

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Background: Mild Primary Hyperparathyroidism (MPH), whether normocalcemic or not, is frequently identified within rheumatology pathways but remains poorly characterized. In these forms, the skeletal benefit of parathyroidectomy is uncertain. Better defining its impact may help clarify the value of surgery beyond biochemical cure alone.
Methods: we conducted a single-center retrospective study between 2011 and 2024, including patients initially evaluated in rheumatology for skeletal involvement and subsequently operated on for MPH (total calcium ≤ 110 mg/l). The skeletal impact of parathyroidectomy was assessed at 2 years on lumbar spine and total hip Bone Mineral Density (BMD), two relevant sites because of their sensitivity to postoperative changes.
Results: among the 160 patients seen in rheumatology, 27 had MPH (mean total calcium 102,7 g/l; mean PTH 105 pg/ml) with skeletal involvement (osteoporosis in 81,5 %) (Table 1, Figure 1). Immediate surgical success was 100 % according to the Miami criterion (≥ 50 % PTH drop). Postoperative complications including transient hypoparathyroidism (18,5 %), transient recurrent nerve palsy (7,4 %), and one surgical site infection. At 2 years, total calcium and PTH had normalized in all patients (mean reductions of 9,3 mg/l and 64,3 pg/mL, respectively), confirming sustained biochemical cure. In contrast, BMD remained stable at both the lumbar spine and total hip, with no significant postoperative improvement (Figure 2).
Conclusion: in patients with MPH and skeletal involvement, parathyroidectomy stabilizes BMD at 2 years but does not induce measurable improvement, despite complete biochemical normalization. These findings suggest that the skeletal benefits of surgery may be limited in mild forms.

Variables	All n = 27 (%)
Female sex	21 (77,8)
Age (y)	70,9 ± 9,6
BMI (kg/m²)	25,5 ± 7,7
Intoxication	
Tobacco	3 (11,1)
Alcohol	3 (11,1)
Osteoporosis (T-score ≤ -2,5 at ≥ 1 site)	22 (81,5)
Fracture	
Wrist	6 (22,2)
Vertebral	8 (29,6)
Proximal humerus	3 (11,1)
Preoperative bone densitometry	
Spine BMD (g/cm²)	0,824 ± 0,137
Total hip BMD (g/cm²)	0,709 ± 0,143
Spine T-score	-2,3 ± 1,3
Total hip T-score	-2,1 ± 1,1
Biochemistry	
Total calcium (mg/l)	102,7 ± 3,4
Ionized calcium (mmol/l)	1,38 ± 0,1
Albumin (g/l)	42,4 ± 4,7
Corrected calcium (mmol/l)	2,5 ± 0,2
Phosphate (mg/l)	27,4 ± 4,7
PTH (pg/ml)	105 ± 41,9
Vitamin D (ng/ml)	39,2 ± 4,1
24-hour urinary calcium (mg/24h)	274,1 ± 131,7
Preoperative localization workup	
US	27 (100)
CT-scan	15 (56)
Cholin PET/CT	9 (33)
Scintigraphy MIBI	27 (100)
Perioperative data	
Unilateral exploration	23 (85,2)
Conversion to bilateral exploration	6 (22,2)
No. of glands removed	1 [1-2]
Intraoperative PTH drop (pg/ml)	67 [56-75]
Postoperative complications	
Transient hypoparathyroidism	5 (18,5)
Transient recurrent nerve palsy	2 (7,4)
Surgical-site infection	1 (3,7)
Pathology	
Parathyroid adenoma	23 (85,2)
Multiple adenoma	5 (21,7)

Table 1. Baseline demographic, clinical, biochemical, imaging, and perioperative characteristics of the 27 patients operated for mild primary hyperparathyroidism with skeletal involvement. Continuous variables are expressed as mean ± standard deviation or median [95%CI], and categorical variables as number (percentage)

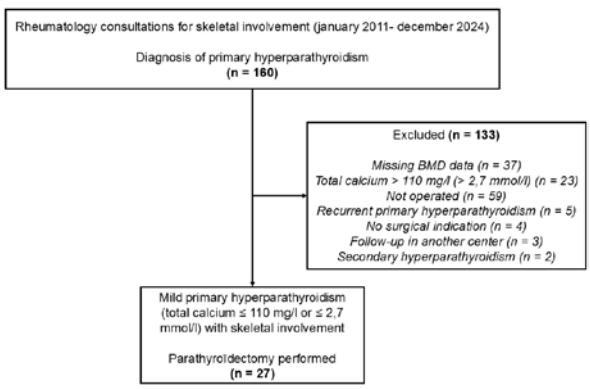


Figure 1. Study flow-chart

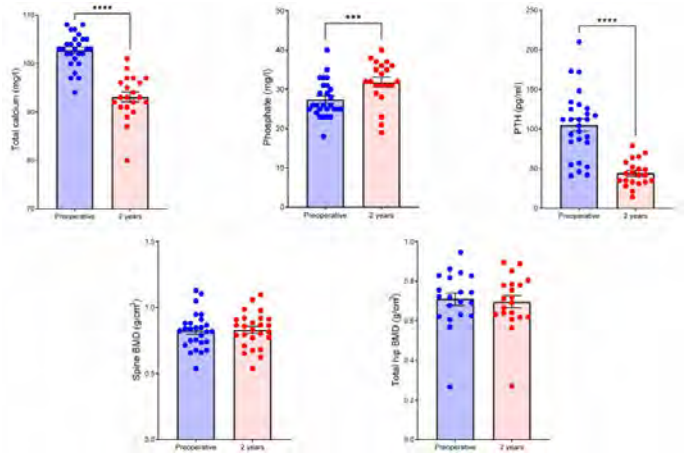


Figure 2. Biochemicals and bones results 2 years after parathyroidectomy

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RETROSPECTIVE ANALYSIS OF ADULT PATIENTS WITH LOW ALKALINE PHOSPHATASE LEVELS

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Objectives: Low serum alkaline phosphatase (ALP) level is a hallmark of hypophosphatasia, but may also be associated with some secondary causes. Low ALP levels may frequently remain unrecognized and therefore not undergo further diagnostic evaluation. Identifying the patients with persistently low ALP levels is important for diagnosis of adult onset hypophosphatasia.

Methods: Low readings of ALP levels, under 30 IU/L in the recent year were evaluated. Medical records of patients with low ALP levels were extracted. Comorbidities, medications, calcium, inorganic phosphor, magnesium parathormone levels were recorded from files.

Results: Medical records of 294 patients with ALP levels under 30 IU/L within the last year were analyzed. 219 were female and 75 were male. The mean age of the group was 40.2 years. 18 patients had inflammatory diseases (inflammatory bowel disease, rheumatologic diseases), 23 patients had malignancy, 7 patients were under antiresorbtive drugs, 7 patients had chronic kidney disease, 1 patient had chronic liver disease. 20 patients were analyzed as low ALP levels during hospitalisation/intensive care unit admittance. 13 patients were under steroid treatment. 4 patients had bariatric surgery and 6 patients had severe hypertriglyceridemia. All of the patients had normal calcium and phosphor levels. 171 patients had low ALP with repeated measurements. 58 patients had persistently low ALP levels without identifiable secondary cause in medical records. One patient had daughter with known odontohypophosphatasia, the patients' genetic result is unknown. Two patients were referred for genetic evaluation recently. There were 4 patients diagnosed as hypophosphatasia in adulthood period. One patient who was diagnosed at 64 years old due to low ALP levels and atypical femoral fractures and through family evaluation, two daughters of her were diagnosed as hypophosphatasia. They had no dental problems but they had fatigue and chronic pain. One 45 year old female patient was diagnosed as hypophosphatasia after evaluation due to persistently low ALP levels and poor dental history beginning in childhood period. 54 of these patients were not evaluated for persistantly low ALP levels.

Discussion: Adult onset hypophosphatasia is a rare disorder and due to non-specific clinical manifestations may frequently be underdiagnosed. Low ALP levels are frequently under recognized. Being aware of persistently low ALP levels in patients without secondary causes is important to identify adult onset hypophosphatasia particularly in clinically mild phenotypes.

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BUROSUMAB IS ASSOCIATED WITH A DECREASED FREQUENCY OF HYPERTENSION IN ADULTS WITH X-LINKED HYPOPHOSPHATEMIA

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Introduction:
X-linked Hypophosphatemia (XLH) is characterized by elevated FGF23 levels resulting in renal phosphate wasting and osteomalacic bone disease. Treatment options include burosumab, an FGF23 neutralizing antibody which improves renal phosphate reabsorption. XLH is a multi-system disease with increasingly recognized cardiovascular risk factors including obesity and hypertension (HTN). This study aimed to identify the frequency of HTN in adults with XLH and associated risk factors.
Methods:
We examined adult blood pressure (BP) data from the multinational prospective outcomes in XLH Disease Monitoring Program (NCT03651505) and the randomized control trial, burosumab vs conventional therapy (NCT02312687 / 02526160). BP was collected during study visits.
Hypertension (HTN) was defined as systolic BP≥140 mmHg or diastolic BP≥90 mmHg as per the International Society of Hypertension. Clinical parameters including age, sex, body mass index (BMI), parathyroid hormone (PTH) levels and treatment were assessed for association with HTN. Clustered cohort data were analyzed using a generalized estimated equation.
Results:
The study included 359 participants (252 female, 70%) with a median age of 39.7 years (IQR 30.4, 50.0) at first BP measurement. A total of 5,804 BPs were collected over 4.95 years (IQR 2.36, 5.39). Burosumab therapy increased from 18% (66/359) at study initiation to 99% (356/359) at study completion, with a median treatment duration of 3.74 years (IQR 1.86–5.55). Overall, 16% of BP measurements (922/5,804) met criteria for hypertension. Systolic blood pressure was ≥130 mmHg in 29% of measurements (1,715/5,804) and ≥140 mmHg in 11% (657/5,804).
Multivariable analysis identified that older age (OR 1.02, p<0.001, 95%CI CI 1.01-1.04), male sex (OR 1.64, p=0.002, 95%CI 1.20-2.25), increased BMI (OR 1.06, p<0.001, 95%CI 1.04-1.07) and serum PTH levels (OR 1.02, p=0.02, 95%CI 1.00-1.03) were independently associated with HTN. Conversely, burosumab treatment was associated with a decreased odds of HTN (OR 0.68, p<0.001, 95% CI 0.57-0.81).
Conclusions:
Adults with XLH have a frequency of HTN comparable to that of the general population and share similar associated risk factors including older age, male sex, and higher BMI and PTH levels. Burosumab was associated with a 32% reduction in HTN, an observation which merits further study to determine the mechanism of this finding.

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CLINICAL AND DENSITOMETRIC PROFILE OF OSTEOPOROSIS IN RHEUMATOID ARTHRITIS: SEX-RELATED DIFFERENCES IN REAL-WORLD PRACTICE

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Introduction :
Rheumatoid arthritis (RA) is a chronic inflammatory disease associated with an increased risk of osteoporosis and fragility fractures. Bone loss in RA results from multifactorial mechanisms, including systemic inflammation, disease duration, functional disability and long-term glucocorticoid exposure. Although female sex is traditionally considered a major risk factor for osteoporosis, sex-related differences in bone involvement among patients with RA remain insufficiently characterized in real-world clinical settings. The aim of this study was to analyze the clinical and densitometric profile of osteoporosis in RA according to sex and to identify associated factors.

Methods :
This was a retrospective, single-center study including patients with RA fulfilling the 2010 ACR/EULAR classification criteria. Collected data included demographic characteristics, body mass index (BMI), disease duration, disease activity assessed by DAS28, and exposure to glucocorticoids.
Bone mineral density (BMD) was measured by dual-energy X-ray absorptiometry (DXA) at the lumbar spine and femoral neck. Osteoporosis was defined by a T-score ≤ −2.5 and/or the presence of fragility fractures. Clinical and densitometric characteristics were analyzed according to sex.

Results :
A total of 118 patients with RA were included, comprising 99 women and 19 men (female-to-male ratio = 5.2). The mean age was 56.9 ± 11.6 years, and the mean disease duration was 12.1 ± 5.5 years. The mean BMI was 29.2 ± 5.1 kg/m², with 70.7% of patients being overweight or obese.
Disease activity was high, with a mean DAS28 of 5.66 ± 1.09 and a mean C-reactive protein level of 29.3 mg/L. Mean BMD T-scores were −1.8 ± 1.44 at the lumbar spine and −1.5 ± 1.43 at the femoral neck.
Osteoporosis was diagnosed in 47% of patients and was significantly more prevalent in women than in men (p = 0.015), demonstrating a significant association between female sex and osteoporosis in RA. Women showed predominantly lumbar spine involvement, whereas men presented greater femoral neck impairment.
Fragility fractures were observed in 16.9% of patients (6.8% femoral fractures, 6.8% vertebral fractures, and 3.4% wrist fractures), occurring more frequently in women (p = 0.02). Osteoporosis was significantly associated with older age, longer RA duration, higher inflammatory activity, and glucocorticoid exposure (p < 0.05).

Conclusion :
Osteoporosis is a frequent complication of rheumatoid arthritis and is significantly associated with female sex, with distinct densitometric and fracture patterns according to sex. These findings highlight the importance of systematic bone health assessment in patients with RA, integrating sex and inflammatory burden to improve fracture risk prevention strategies.

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SEX AS A DETERMINANT OF COMORBIDITY PROFILE AND THERAPEUTIC RESPONSE IN RHEUMATOID ARTHRITIS

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Introduction: Rheumatoid arthritis (RA) is a chronic systemic inflammatory disease frequently associated with multiple comorbidities that may influence disease severity, functional outcomes, and therapeutic response. Sex-related biological and behavioral differences may contribute to variations in comorbidity patterns and their clinical impact. Understanding these differences is essential for optimizing personalized management strategies in RA. This study aimed to investigate sex-related differences in comorbidity profiles among patients with RA and to evaluate their impact on disease activity and therapeutic response.

Methods: We conducted a retrospective, single-center study including patients diagnosed with RA according to the 2010 ACR/EULAR classification criteria. Comorbidities assessed included major cardiovascular risk factors (hypertension, diabetes mellitus, and smoking) and osteoporosis. Comparative analyses were performed according to sex to evaluate differences in comorbidity prevalence and their association with disease activity and treatment response. Disease activity was assessed using the Disease Activity Score in 28 joints (DAS28), inflammatory burden by C-reactive protein (CRP), pain by visual analog scale (VAS), and functional disability by the Health Assessment Questionnaire (HAQ). Multivariate analysis was performed to identify independent predictors of therapeutic response.

Results: A total of 118 patients were included, comprising 99 women and 19 men (male-to-female ratio = 0.19). The mean age was 56.9 ± 11.6 years, and the mean disease duration was 12.1 ± 5.5 years.Osteoporosis was the most prevalent comorbidity, affecting 47% of patients, and was significantly more frequent in women than in men (65% vs. 35%, $p < 0.0001$). Diabetes mellitus was present in 34.7% of patients, with no significant sex difference (18% in women vs. 16% in men, $p = 0.63$). Hypertension was observed in 33.1% of patients and was more prevalent in women (37% vs. 25%, $p = 0.01$). Active smoking was significantly more frequent in men compared to women (53% vs. 4%, $p < 0.0001$).Disease activity was high, with a mean DAS28 of 5.66 ± 1.09 and a mean CRP level of 29.3 mg/L, reflecting substantial inflammatory burden. The mean pain VAS score was 52.5 ± 20.3 mm, and the mean HAQ score was 1.66 ± 0.85, indicating moderate to severe functional impairment.

Multivariate analysis demonstrated that osteoporosis ($p = 0.01$), cardiovascular risk factors ($p < 0.01$), and active smoking ($p < 0.01$) were independently associated with poorer therapeutic response, regardless of age, sex, or baseline inflammatory activity. These findings suggest that comorbidities significantly contribute to disease severity and may negatively influence treatment outcomes.

Conclusion: Comorbidities are highly prevalent in patients with RA and significantly influence disease severity and therapeutic response. Sex-related differences in comorbidity profiles, particularly osteoporosis and smoking, highlight the importance of comprehensive, individualized assessment. Integrating comorbidity management into routine RA care may improve therapeutic outcomes and support a more personalized treatment approach.

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FROM BELIEFS TO BEHAVIOR: BARRIERS SHAPING PHYSICAL ACTIVITY ENGAGEMENT IN CHRONIC INFLAMMATORY DISEASES

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Background

Chronic inflammatory rheumatic diseases (CIRD) are characterized by chronic inflammation and functional impairment, often leading to physical inactivity. Evidence supports that regular physical activity improves physical function, reduces disability, and enhances quality of life in this population.

Objectives

To evaluate physical activity levels in patients with chronic inflammatory rheumatic diseases (CIRD) and to identify key perceived barriers and patient beliefs related to exercise participation.

Methods

We conducted a cross-sectional study including patients followed for chronic inflammatory rheumatic diseases. Sociodemographic and clinical characteristics, disease activity, pain intensity assessed by visual analog scale (VAS), and functional disability measured by the Health Assessment Questionnaire (HAQ) were collected. Physical activity levels, perceived barriers, and patient beliefs regarding exercise were assessed using a self-administered questionnaire.

Results

A total of 55 patients were included, of whom 63.3% had rheumatoid arthritis, 26.7% spondyloarthritis, and 10% psoriatic arthritis. The female-to-male ratio was 1.63, with women accounting for 70% of the cohort. The mean age was 48.4 ± 13.6 years, and the mean disease duration was 13.5 ± 5.3 years. Mean body mass index was 28 ± 3.4 kg/m², mean pain VAS score was 52.5 ± 20.3 mm, and mean HAQ score was 0.8 ± 0.4. Educational attainment was distributed as follows: university or higher (29%), secondary (22%), primary (33%), and illiteracy (16%). Regular physical activity was reported by 22% of patients. Among physically inactive patients, 90% expressed willingness to engage in exercise. The main reported barriers were joint pain (48%), lack of motivation (24%), fatigue (14%), joint deformities (10%), and limited access to appropriate facilities (5%). Patients with higher educational levels (secondary or university) were significantly more likely to engage in regular physical activity compared with those with primary education or illiteracy ($p = 0.02$). Nearly all patients (97%) perceived physical activity as beneficial and expressed interest in adapted exercise programs. Factors positively associated with favorable exercise perceptions included younger age ($p = 0.025$), higher educational level ($p = 0.04$), and higher socioeconomic status ($p = 0.02$).

Conclusions

Physical activity participation in patients with chronic inflammatory rheumatic diseases is strongly influenced by patient beliefs and perceived barriers. Higher educational and socioeconomic levels are associated with greater engagement in exercise. These findings highlight the importance of developing tailored, patient-centered physical activity programs to enhance adherence, improve functional outcomes, and optimize quality of life in this population.

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BEYOND PAIN: FUNCTIONAL DISABILITY AND PSYCHOLOGICAL DISTRESS IN CERVICOBRACHIAL NEURALGIA

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Background
Cervicobrachial neuralgia (CBN), resulting from cervical nerve root compression, is a frequent cause of consultation in outpatient practice. Beyond pain and motor impairment, CBN may lead to substantial functional limitations and psychological distress, ultimately compromising patients' quality of life.
Objectives
To evaluate the extent of functional disability and psychological burden in patients with cervicobrachial neuralgia and to assess their impact on quality of life, with the aim of informing more comprehensive management strategies.
Methods
We conducted a descriptive cross-sectional study including 47 patients diagnosed with cervicobrachial neuralgia. Pain intensity was assessed using the visual analogue scale (VAS) for cervical and radicular pain. Functional disability was evaluated using the Neck Disability Index (NDI), while psychological distress was assessed using the Hospital Anxiety and Depression Scale (HADS).
Results
Forty-seven patients were included, comprising 40 women and 7 men (female-to-male ratio 5.7). The mean age was 52.3 ± 13.7 years (range 22–75), and 67.4% were professionally active. Mean disease duration was 4.34 years. The most common comorbidities were diabetes mellitus (26.2%), hypertension (7.1%), and connective tissue diseases (7.1%). Mechanical factors were predominant, with heavy load carrying (38.3%) and exposure to vibratory movements (35.2%) identified as major triggering factors. Clinical presentation was unilateral in 51.1% of cases and bilateral in 46.8%, with a non-dermatomal distribution observed in 46.8%. Mechanical pain was reported by 70.2% of patients, and cervical stiffness was present in 74.5%. The main etiologies were cervical osteoarthritis (68.1%) and cervical spinal canal stenosis (47.8%).
Mean VAS scores were 5.98 ± 1.6 for cervical pain and 6.26 ± 1.9 for radicular pain. Functional assessment revealed a mean NDI score of 34.6 ± 8, corresponding to severe disability. Psychological evaluation demonstrated a high prevalence of anxiety symptoms (HADS-A: 89.4%), exceeding that of depressive symptoms (HADS-D: 52.8%). Pain intensity was significantly correlated with functional disability ($p = 0.038$), and functional disability was significantly associated with sex ($p = 0.046$). No significant association was observed between NDI and age ($p = 0.20$) or disease duration ($p = 0.405$). Anxiety symptoms were significantly more pronounced in women than in men ($p = 0.04$).
Conclusions
Cervicobrachial neuralgia is associated with marked functional disability and a substantial psychological burden, particularly anxiety, resulting in a significant impairment of quality of life. These findings emphasize the need for a comprehensive, multidisciplinary, and personalized approach to management that integrates both physical and psychological dimensions of the disease.

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SEXUAL DYSFUNCTION AS AN OVERLOOKED DIMENSION OF QUALITY OF LIFE IN WOMEN WITH RHEUMATOID ARTHRITIS

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Introduction:
Rheumatoid arthritis (RA), as a chronic inflammatory disease, has a profound impact on multiple aspects of patients' daily lives, including sexual health and intimacy. Despite its importance, sexual dysfunction remains an underrecognized and insufficiently addressed dimension of quality of life in women with RA, and is rarely evaluated systematically in routine clinical practice. The aim of this study was to assess sexual function in sexually active women with rheumatoid arthritis and to evaluate the relationship between sexual dysfunction and disease-related clinical parameters.
Methods:
We conducted a descriptive cross-sectional study including women diagnosed with rheumatoid arthritis according to the 2010 ACR/EULAR classification criteria. Sexual function was assessed using the validated Female Sexual Function Index (FSFI), a self-administered questionnaire evaluating six domains: desire, arousal, lubrication, orgasm, satisfaction, and pain. Sexual dysfunction was defined as an FSFI score <26. Fatigue was assessed using a visual analog scale (VAS), disease activity was measured using the Disease Activity Score in 28 joints (DAS28), and functional disability was evaluated using the Health Assessment Questionnaire (HAQ).
Results:
A total of 30 women were included. The mean age was 40.03 ± 8.5 years (range: 27–55), and the mean disease duration was 6.7 years. Most patients (84%) were professionally active. The most common comorbidities were diabetes mellitus (26.2%) and thyroid disorders (6.7%). Deforming RA was present in 33.3% of patients, and hip involvement was observed in 23.3%. The mean fatigue VAS score was 7 ± 1.6, and the mean HAQ score was 1.07 ± 0.43.
Regarding disease activity, 33.3% of patients were in remission, 43.4% had moderate disease activity, and 23.3% had high disease activity. Corticosteroids were prescribed in 91.5% of patients. The most frequently used disease-modifying antirheumatic drugs were methotrexate (66.7%) and biologic therapies (70.3%).
All patients reported a decrease in sexual desire since disease onset, mainly related to pain, physical limitations, fatigue, and psychological distress. The mean FSFI score was 23.6, indicating a high prevalence of sexual dysfunction. Overall, 63.3% of patients reported a negative impact of RA on their sexual activity. Statistical analysis demonstrated a significant association between sexual dysfunction and fatigue ($p = 0.03$), higher disease activity ($p = 0.05$), and greater functional disability, as reflected by higher HAQ scores ($p = 0.01$). No significant association was found between sexual dysfunction and patient age ($p = 0.2$).
Conclusion:
This study demonstrates a high prevalence of sexual dysfunction among women with rheumatoid arthritis, significantly associated with fatigue, disease activity, and functional impairment. These findings highlight the importance of systematically assessing sexual health as an integral component of comprehensive RA management. Addressing sexual dysfunction may contribute to improving overall quality of life and patient-centered care outcomes.

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SEASONAL CLIMATIC VARIABILITY AND ITS CLINICAL IMPACT ON DISEASE ACTIVITY IN CHRONIC INFLAMMATORY RHEUMATIC DISEASES

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Introduction:
Climate change has led to increasing variability in environmental conditions, including temperature, humidity, and other climatic factors, which may potentially influence the activity of chronic inflammatory diseases. Determining whether these climatic variations have a measurable impact on disease activity is essential to improve patient management. This study aimed to evaluate the impact of seasonal climatic variability on disease activity in patients with chronic inflammatory rheumatic diseases.
Patients and Methods:
We conducted a retrospective cross-sectional study in the rheumatology department including 30 patients diagnosed with chronic inflammatory rheumatic diseases. Patients were interviewed regarding seasonal variations in their symptoms. Disease activity was assessed using the Disease Activity Score in 28 joints (DAS28) for rheumatoid arthritis (RA) and the Bath Ankylosing Spondylitis Disease Activity Index (BASDAI) for ankylosing spondylitis (AS). Subjective patient-reported outcomes were compared with objective disease activity scores to assess potential seasonal associations.
Results:
Thirty patients were included, with a mean age of 49.43 ± 12.33 years. There was a female predominance, with a male-to-female ratio of 0.5. Regarding educational level, 20% had higher education, 30% secondary education, 13.3% primary education, and 36.7% were illiterate. More than half of the patients (53.3%) were unemployed. Urban residence was reported in 53.3% of patients, while 46.7% lived in rural areas. Rheumatoid arthritis was present in 73.3% of patients and ankylosing spondylitis in 26.7%.
Overall, 73.3% of patients (n=22) reported a perceived impact of climatic changes on disease activity, including 15 patients with RA and 7 with AS. Symptom worsening was most frequently reported during summer (40%), followed by winter (30%). In response to symptom exacerbation, 16 patients reported self-medication, while 6 sought medical consultation.
DAS28 scores were higher during periods of elevated temperatures, with 70% of RA patients presenting a DAS28 score >3.5. Similarly, patients with AS reported increased symptom severity during summer, with 71.4% reporting symptom exacerbation and a mean BASDAI score of 2.1. However, univariate analysis showed that climatic variation was not significantly associated with objective worsening of disease activity scores ($p > 0.01$).
Conclusion:
Although most patients reported subjective worsening of symptoms associated with seasonal climatic variability, objective disease activity measures, including DAS28 and BASDAI, did not demonstrate significant associations. These findings highlight the discrepancy between patient perception and objective disease activity and underscore the need for larger prospective studies to better understand the impact of climatic factors on chronic inflammatory rheumatic diseases and to optimize patient management strategies.

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REAL-WORLD PREDICTORS OF BIOLOGIC THERAPY RESPONSE IN RHEUMATOID ARTHRITIS: FOCUS ON COMORBIDITIES AND BIOMARKERS

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Introduction: The management of rheumatoid arthritis (RA) has been substantially improved by the introduction of biologic disease-modifying antirheumatic drugs. However, therapeutic response remains variable, highlighting the need for a more individualized approach to treatment. The identification of clinical, biological, and comorbidity-related predictors of response represents a key step toward optimizing therapeutic decisions and improving outcomes, particularly in real-world and resource-constrained settings. This study aimed to identify independent predictors of clinical response to biologic therapies at 6 months in patients with RA managed in routine rheumatology practice.
Methods: We conducted a cross-sectional study including 118 patients with rheumatoid arthritis (RA) fulfilling the 2010 ACR/EULAR classification criteria, all treated with biologic DMARDs for at least 6 months. Demographic data (age, sex, BMI), clinical characteristics (disease duration, DAS28, presence of erosions), biological markers (CRP, rheumatoid factor, anti-CCP antibodies), ongoing treatments (conventional DMARDs, biologic DMARDs, corticosteroids), and cardiovascular comorbidities (hypertension, diabetes, dyslipidemia, obesity, smoking) were systematically recorded. Multivariate analyses were performed to identify factors independently associated with clinical response to biologic therapy at 6 months.
Results: A total of 118 patients with rheumatoid arthritis (RA) were included, comprising 99 women and 19 men (female-to-male ratio = 0.19). The mean age was 56.9 ± 11.6 years (range: 28–81), with a mean disease duration of 12.1 ± 5.5 years (2–23). The most frequently observed comorbidities were diabetes mellitus (34.7%), arterial hypertension (33.1%), and dyslipidaemia (11.9%). The mean body mass index was 29.2 ± 5.1 kg/m² (range: 18.9–49.3).
Overall, disease activity was high, with a mean DAS28 score of 5.66 ± 1.09 (range: 2.93–7.93) and a mean C-reactive protein level of 29.3 mg/L (range: 0–154). Mean pain intensity assessed by the visual analogue scale was 52.5 ± 20.3 mm, and functional disability, evaluated using the Health Assessment Questionnaire (HAQ), averaged 1.66 ± 0.85 (range: 0.12–2.87). Rheumatoid arthritis was seropositive in 71.8% of patients and erosive in 94.1%.
Regarding treatment, 83.9% of patients were receiving conventional synthetic disease-modifying antirheumatic drugs (csDMARDs), and 99.2% were on oral corticosteroid therapy. At six months of follow-up, 60.1% of patients achieved a good therapeutic response to biologic agents.
In multivariate analysis, anti–citrullinated protein antibody (ACPA) positivity ($p = 0.001$) and early initiation of biologic therapy (≤ 1 year) ($p < 0.001$) were identified as independent predictors of a favourable therapeutic response. Conversely, elevated C-reactive protein levels ($p < 0.001$) and the presence of diabetes mellitus ($p = 0.003$) were significantly associated with a poorer response to biologic treatments.
Conclusion: In this cohort of RA patients, early initiation of biologic therapy and positive response for anti-CCP antibodies were independent predictors of a favorable clinical response at 6 months. Conversely, elevated baseline CRP levels and the presence of diabetes were

associated with reduced therapeutic efficacy. These findings underscore the importance of integrating both biological markers and comorbidities into treatment decision-making, to optimize personalized management strategies and improve outcomes in RA patients receiving biologic therapies.

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EFFECTS OF INTEGRATED INTERVENTION ON BONE MINERAL DENSITY AND CLINICAL SYMPTOMS IN PATIENTS WITH OSTEOPOROSIS

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Objective: Osteoporosis is a primary disease leading to fractures, chronic low back pain, and impaired physical mobility. When bone mineral density (BMD) falls significantly below the normal range, patients suffer not only from persistent pain but also from a substantially increased risk of fractures. With the advancement of osteoanabolic therapies, concurrent nutritional supplementation and resistance training can further enhance bone mass accrual and symptom relief. This study presents the specific outcomes in bone density improvement and pain reduction of two very-high-risk osteoporotic patients who underwent osteoanabolic treatment integrated with nutritional counseling and resistance exercise guidance provided by health educators.

Materials and Methods: This study is presented as a case report involving two very-high-risk osteoporotic patients. Both subjects received consistent osteoanabolic therapy. During the treatment period, a professional health educator provided nutritional counseling—including recommendations for calcium, vitamin D, and protein intake—and designed individualized resistance exercise programs, such as resistance band training, simple weight-bearing exercises, and core stability exercises. Clinical outcomes were assessed using the Numerical Rating Scale (NRS) for low back pain and bone mineral density (BMD) scans before and after treatment. Follow-up BMD scans were conducted two years post-treatment, specifically measuring changes in the lumbar spine T-score to compare the magnitude of improvement.

Results: This study is presented as a case report involving two very-high-risk osteoporotic patients. Both subjects received consistent osteoanabolic therapy. During the treatment period, a professional health educator provided nutritional counseling—including recommendations for calcium, vitamin D, and protein intake—and designed individualized resistance exercise programs, such as resistance band training, simple weight-bearing exercises, and core stability exercises. Clinical outcomes were assessed using the Numerical Rating Scale (NRS) for low back pain and bone mineral density (BMD) scans before and after treatment. Follow-up BMD scans were conducted two years post-treatment, specifically measuring changes in the lumbar spine T-score to compare the magnitude of improvement.

Conclusion: Integrating nutritional counseling and resistance exercise into an osteoanabolic treatment regimen yields comprehensive benefits for very-high-risk osteoporotic patients. Both patients in this study demonstrated significant increases in bone mineral density (BMD) and substantial pain relief. These outcomes suggest that this combined therapeutic strategy not only promotes bone reconstruction but also enhances muscle strength and stability, leading to a marked improvement in the patients' quality of life. The findings support the clinical feasibility and efficacy of coupling osteoanabolic therapy with lifestyle interventions. Future large-scale, long-term studies are warranted to confirm the sustainability of these therapeutic effects.

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THE STATUS OF CARE FOR MALE OSTEOPOROSIS IN HUNGARY – INSIGHTS BASED ON THE EXPERIENCE OF A DENSITOMETRY LABORATORY

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Osteoporosis affects both sexes but becomes prevalent at a later age in men. After 70 years, hip fracture incidence is similar in men and women, while post-fracture mortality is higher in men. Despite this, men receive anti-osteoporotic care less frequently.

Objective: Patients from all regions of Hungary are referred to our laboratory for bone densitometry. We assessed the frequency of bone density testing in men compared with women and their osteological status at presentation.

Materials and Methods: We analyzed densitometry measurements performed between 2019 and 2023 using a Lunar Prodigy device. Bone mineral density (BMD) was measured at the lumbar spine, femoral neck, total hip, and proximal radius. Prior low-trauma fractures, FRAX risk factors and fracture probability, and treatment status were recorded. Each male patient was matched with a female control based on age, BMI, and femoral neck T-score.

Results: Over five years, 12,205 patients were examined; 915 (7.5%) were men, 60% older than 60 years. The proportion of men remained unchanged. Prior fractures occurred in 222 men (24%), 77% in those over 60 years (prevalence 31%). Based on femoral T-scores, 30% had normal bone mass, 49% osteopenia, and 21% osteoporosis; prior fractures were present in 17%, 22%, and 41% of men versus 9%, 40%, and 46% of female controls. FRAX-HIP was 5.3% in osteoporotic men and normal in other groups, while in female controls it reached 3.1% in osteopenia and 7.3% in osteoporosis. Smoking, parental fracture, secondary osteoporosis, and glucocorticoid therapy were the most frequent risk factors. Only 34 men (3.7%) received anti-osteoporotic treatment. Seventy-nine osteoporotic men were re-evaluated after a mean of 2.5 years; treatment rates increased from 15% to 32%.

Conclusion: Above 70 years of age, fracture incidence is similar in men and women and represents the third leading cause of mortality. Nevertheless, male osteoporosis remains severely underdiagnosed and undertreated, contributing substantially to the increasing burden of low-trauma fractures.

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COMPARISON OF URINARY TRACT INFECTION IN ELDERLY HIP FRACTURE PATIENTS: EARLY VERSUS DELAYED INSERTION OF URINARY CATHETERS

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Objective: To compare urinary tract infection (UTI) in elderly hip fracture patients between early and delayed urinary catheterization.
Material and Methods: A retrospective chart review was conducted in hip fracture patients aged ≥60 years between January 2018 and December 2022. A total of 199 patients met the inclusion criteria: 70 in the early catheterization group (catheter inserted upon admission) and 129 in the delayed catheterization group (catheter inserted when unable to void). UTI was defined using CDC criteria. Primary outcome was UTI; secondary outcomes were length of hospital stay (LOS) and mortality. Multivariable regression analysis was performed to adjust for catheter duration.
Results: UTI incidence was significantly higher in the early catheterization group than in the delayed group (22.9% vs 10.9%, p=0.024). Catheter duration was longer in the early group (9.5±3.6 vs 4.1±3.1 days, p<0.001). LOS and mortality were not significantly different on univariate analysis. After adjustment for catheter duration, the difference in UTI was no longer statistically significant (adjusted OR 1.06, 95% CI 0.35–3.15), while LOS remained significantly longer in the early catheterization group.
Conclusion: Although early urinary catheterization was associated with higher UTI incidence, this association disappeared after adjusting for catheter duration, suggesting that prolonged catheter use—not timing of insertion—is the key driver of UTI risk. Delaying catheterization when feasible and minimizing catheter duration may reduce UTI risk and shorten hospitalization in elderly hip fracture patients.
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Conflicts of interest: The author declares no conflict of interest.

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RISK FACTORS FOR LOW-ENERGY DISTAL RADIUS FRACTURE IN OLDER ADULTS FOLLOWING MINOR FALLS: A RETROSPECTIVE STUDY

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Objective: To identify risk and protective factors associated with low-energy distal radius fracture in older adults following minor falls.

Material and Methods: We conducted a retrospective study of adults aged ≥60 years presenting after minor falls between January 1, 2018 and December 31, 2022. Patients were classified into a distal radius fracture group and a no-fracture group. Demographic characteristics and potential risk/protective factors, including clinical and lifestyle variables, were collected from medical records. Univariable and multivariable logistic regression analyses were performed to identify independent associations.

Results: 80 patients met the inclusion criteria (60 with distal radius fractures and 20 without fractures). Female sex was associated with higher fracture risk (OR 4.17–4.71; 95% CI 1.25–17.72; p=0.022). Calcium and vitamin D intake were protective (calcium: OR 0.06, 95% CI 0.01–0.34, p=0.001; vitamin D: OR 0.03, 95% CI 0.00–0.28, p=0.002). After adjustment for sex, calcium and vitamin D intake remained independently protective (adjusted OR 0.05, 95% CI 0.01–0.28; adjusted OR 0.02, 95% CI 0.00–0.22, respectively).

Conclusion: In older adults sustaining minor falls, female sex was associated with increased risk of low-energy distal radius fracture, while calcium and vitamin D intake were independently protective. These findings support fracture-prevention strategies in older adults that emphasize adequate calcium and vitamin D intake, particularly among higher-risk groups.

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Disclosures: The authors declare no conflict of interest.

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FRACTURES AND BONE MINERAL DENSITY LOSS IN ADULTS LIVING WITH HIV IN LOW- AND MIDDLE-INCOME COUNTRIES: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Objective
To synthesise low- and middle-income country (LMIC) evidence on fractures and bone mineral density (BMD) loss, including associations with antiretroviral therapy (ART) and pre-exposure prophylaxis (PrEP) and fracture/BMD risk factors, in adult people living with HIV (PLHIV) or using PrEP.
Methods
We searched Embase, Medline, SciElo, WHO Global Index Medicus for evidence on fractures and BMD in PLHIV in LMICs. Analysis included meta-analysis, network meta-analysis (NMA) and component NMA. We

examined heterogeneity with subgroup analysis and meta-regression. 38 studies were included. PROSPERO: CRD42024587101

Results

Pooled fracture prevalence was 10% [95%CI 5, 16%] (self-reported/vertebral imaging) (n=20 studies), 19% [11, 30%] in PLHIV for >5 years, and 25% [14, 39%] with vertebral imaging. HIV is associated with prevalent fracture OR 2.1 [1.2, 3.6] (n=2 studies). In longitudinal DXA studies PLHIV have greater BMD loss than HIV-negative adults, varying with type of ART: over 1-year TDF-ART is associated with 3.5% [3.0, 4.1] more BMD loss (4 studies; n=577) than HIV negative groups. In PLHIV, fracture risk factor analyses for traditional risk factors were sparse and imprecise (few fractures). Lower BMI and smoking were most consistently associated with future BMD loss. TDF ART vs non-TDF ART may be associated with prevalent fracture (pooled OR 1.7, [0.72, 4.1]). For PrEP, NMA of 7 RCTs (21,236 people) suggests TDF monotherapy vs placebo may increase fracture risk (RR 1.3 [0.97, 1.7], but GRADE low certainty evidence). However, TDF PrEP (vs placebo) is associated with greater BMD loss, more so in those adhering to PrEP (BMD difference −1.2% [−1.6, −0.81]). In PLHIV, RCT evidence shows lower BMD for TDF vs non-TDF ART. No study investigated fracture prevention. Two small pilot studies showed possible benefits of exercise on BMD. Two studies concluded FRAX assessment may underestimate fracture risk in PLHIV.

Conclusion

Fractures are frequent in adult PLHIV in LMICs. Exposure to TDF and smoking accelerate bone loss and may increase fracture risk, with TDF-related BMD declines like those seen in menopause. Other risk factors are understudied, and research mainly involves adults <50yrs. Existing risk assessment tools may underestimate fracture risk in adult PLHIV, and significant evidence gaps remain.

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EFFECTS OF BISPHOSPHONATES ON PERIPROSTHETIC BONE LOSS AFTER TOTAL HIP ARTHROPLASTY

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Objective: Periprosthetic bone loss is a major cause of implant loosening after total hip arthroplasty (THA). Bisphosphonates may mitigate postoperative loss, but comparative effects remain unclear. This study aims to assess the effect of alendronate in patients with normal preoperative bone mass undergoing THA and to compare zoledronic acid with alendronate in osteoporotic patients.

Material and Methods: In this prospective randomized study, adults undergoing primary THA were allocated according to baseline bone status. Normal BMD (bone mineral density) patients received either no specific postoperative treatment (control) or alendronate (calcium-vitamin D 600 mg/day plus alendronate-vitamin D 70 mg/week). Osteoporotic patients received zoledronic acid (calcium-vitamin D 600 mg/day, calcitriol 0.25 μg/day, and zoledronic acid 5 mg annually) or alendronate (calcium-vitamin D 600 mg/day, calcitriol 0.25 μg/day, and alendronate-vitamin D 70 mg/week). BMD of seven Gruen zones, spine, and hip was measured at day 7, month 3, month 12, and annually. Ethical approval and informed consent were obtained.

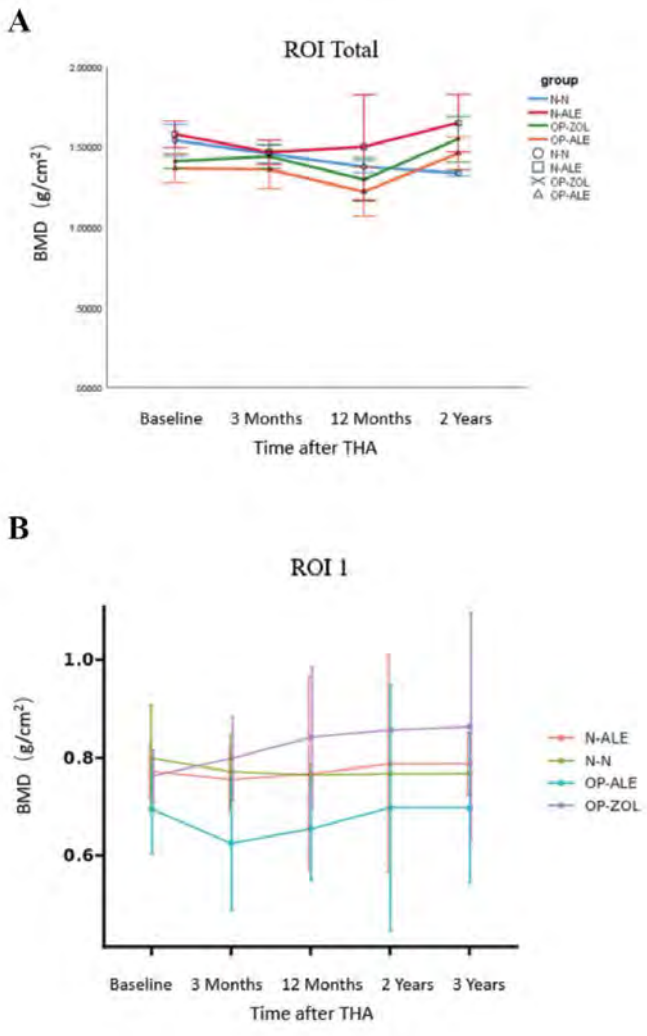
Results: A total of 202 patients were included (normal BMD control 42; normal BMD + alendronate 42; osteoporosis + zoledronic acid 62; osteoporosis + alendronate 56). In normal BMD patients, controls showed decreased total Gruen-zone BMD at 3 months (−4.82%, p = 0.013) and remained below baseline at years 2–3 (−5.23%, −5.10%). The alendronate group showed a smaller early decrease, and significant increases above baseline at 2 years (+4.47%, p = 0.048) and 3 years (+4.52%, p = 0.047). Among osteoporotic patients, alendronate caused approximately 5% BMD loss at 3 months, most prominent in zone 1 (−9.25%). Zoledronic acid produced consistent zone-1 BMD gains at years 1–3 (+11.40%, p = 0.018; +12.23%, p = 0.013; +12.83%, p = 0.038), significantly exceeding alendronate, except at 3 months (+4.74%, p = 0.089).

Conclusions: Alendronate preserves periprosthetic BMD in normal BMD patients after THA, whereas zoledronic acid provides superior protection in osteoporotic patients.

Table 1. Demographic characteristics of patients undergoing total hip arthroplasty

		Normal BMD			Osteoporosis		
		Control Group	Dose Group(ALE)	*P*	ZOL Group	ALE Group	*P*
N		42	42	> 0.999	62	56	> 0.999
Sex	Male	23	26	> 0.999	25	12	> 0.999
	Female	19	16		37	44	
Height(cm)		161.09±7.58	162.56±7.38	0.966	158.07±7.31	156.56±6.8	0.887
Weight(kg)		64.31±12.10	63.96±14.64	0.621	59.23±10.39	54.08±10.02	0.628
BMI(kg/m²)		25.06±4.38	24.24±5.69	0.671	23.57±3.43	22.13±4.03	0.345
Age		51.63±12.664	46.8±8.9	0.096	66.0±6.860	66.812.4	0.980
MNA-SF Score		12.44±0.81	12.31±0.70	0.652	11.80±0.42	11.90±0.57	0.591

Figure 1 Periprosthetic BMD after total hip arthroplasty in normal BMD patients and osteoporotic patients **(A)** BMD of total Gruen zone **(B)** BMD of Gruen zone 1



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THE USE OF TRASPEDICULAR SCREWS IN THORACIC SPINE AFTER TRAUMA

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PURPOSE OF THE STUDY: The evaluation and adaptation of the surgical technique through the prism of the gold screws in the neck of the fractured vertebra. Correlation with the torque of the screws in the adjacent levels.

MATERIAL AND METHODS: During 42 consecutive surgeries after a fracture in the thoracolumbar spine (fractured vertebra O1 or T12) the torque of all screws was measured. A specially designed instrument was used for the measurements, which can also be used intraoperatively and covers the range of measurable torque. Statistical correlation of the parameters followed (Sigma Plot).

RESULTS: The maximum value of the torque was in the fractured vertebra 1.7 Nm and the minimum 0.346 Nm. The maximum value of the torque was in the normal vertebrae 1.23 Nm and the minimum 0.108 Nm. The torque was statistically significantly different ($p<0.05$) and greater than the torque in the normal vertebrae.

CONCLUSIONS: Transcervical screws are used for stabilization in the vertebral body. Based on the conclusions of this study and previous ones made by the same group, we connect the biomechanical behavior of transcervical screws with the torque. We also connect the answer to the question of whether cement reinforcement is required in osteoporotic vertebrae or not. Based on the results of this study, the use of a transcervical screw in the fractured vertebra is necessary for the spinal fusion to gain stability. In further studies, it may be shown and ultimately proven that in this way the length of the spinal fusion can be reduced.

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A HOME-BASED ONLINE EXERCISE PILATES PROGRAM IN PATIENTS WITH DEGENERATIVE SCOLIOSIS

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Introduction: The importance of the spine for human movement and for the proper functioning of all structural units of the body is immense. A very common condition for the spine is degenerative scoliosis. Researchers are still testing various methods, within the framework of physiotherapy exercise, in their attempt to halt the progression of scoliosis or even reverse it. One of the newest methods, which is under investigation for its effectiveness, is that of Pilates.

Patients and Methods: A single prospective cohort design was used involving 45 patients (54 – 82 years old - 32 female and 13 male), with Cobb angle (15°-42°). Participants engaged in supervised online Schroth-Pilates sessions (Picture-1) two times per week for two months. Primary measures included Cobb angle, ODI (Oswestry Disability Index) and HADS (Hospital Anxiety and Depression Scale) recorded at baseline and post-program.

Results: The overall program completion rate was 82.4%, with no significant adherence differences between age groups and sex. The primary outcome of the parent study was ≥ 30% improvement in Oswestry Disability Index (ODI), 10% improvement in HADS at 8 weeks, and significant improvements were observed in Cobb angle [$F(1,08) = 12.42$, $p < .001$, $\eta^2 = .245$]

Conclusions: A home-based Schroth-Pilates program is a clinically effective method in patients with degenerative scoliosis, achieving high adherence and meaningful improvements in pain and spine functionality. These results support the clinical viability of Pilates program in scoliosis rehabilitation and highlight the need for future controlled and longitudinal studies to confirm the long-term outcomes.

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Picture 1. Pilates exercise in degenerative scoliosis patients

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IMPACT OF A SECONDARY FRAGILITY FRACTURE PREVENTION PROGRAM IN AN ORTHOGERIATRIC CARE CENTER (2014–2024)

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Objectives: Fragility fractures, particularly hip fractures, are associated with increased mortality, disability, and reduced quality of life, with a high risk of subsequent fractures in the early post-fracture period. The objective of this study is to evaluate the impact of a Secondary Fragility Fracture Prevention Program in an Orthogeriatric Center, characterizing its implementation in patients aged 65 years and older and analyzing adherence to osteoporosis treatment and its effect on the reduction of new fragility fractures.

Material and Methods: A retrospective descriptive cohort study was conducted including patients aged ≥65 years with fragility hip fractures managed at an Orthogeriatric Clinical Care Center between 2014 and 2024. Only patients with completed follow-up were included.

Results: A total of 701 patients were analyzed, with a mean age of 83 years. Over time, the program was associated with substantial improvements in secondary fracture prevention indicators. While no patients received osteoporosis treatment indication in 2014, treatment rates increased to 88.7%, 87.0% and 66.0% in 2022, 2023 and 2024, respectively. Densitometry at discharge increased markedly, reaching over 90% in 2022 and remaining high thereafter. The incidence of falls during the first postoperative year decreased to below 10% in recent years. Refracture rates remained relatively low (11.6%, 5.6% and 9.1% in 2022–2024). Lower vitamin D levels at admission were significantly associated with refracture occurrence ($p < 0.05$).

Conclusion: The orthogeriatric secondary fracture prevention program demonstrated a sustained positive impact on osteoporosis management, reducing falls and maintaining low refracture rates over a ten-year period. The association between low vitamin D levels and refracture underscores the importance of metabolic optimization within comprehensive secondary prevention strategies.

Disclosures: The authors declare no conflicts of interest.

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COST–CONSEQUENCE ANALYSIS IN GERIATRIC PATIENTS WITH FRAGILITY HIP FRACTURES TREATED BETWEEN 2018 AND 2022 AT FUNDACIÓN SANTA FE DE BOGOTÁ, COLOMBIA

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Objective: The global population, including Colombia, is aging, which increases the risk of hip fragility fractures due to loss of muscle mass, mobility limitations, and comorbidities. It is estimated that 1 in 3 women and 1 in 5 men over the age of 50 will experience this type of fracture. In Latin America, their management involves direct costs ranging from 4,500 to 6,000 USD. Therefore, the present study aims to determine, through an economic evaluation, the potential cost savings associated with the management of fragility hip fracture fixation compared with an international comparator.

Materials and Methods: A cost–consequence study was conducted in patients aged 65 years or older with hip fractures, treated with osteosynthesis or arthroplasty between 2018 and 2022 within a specialized orthogeriatric program. The results were compared with the 2022 Spanish National Hip Fracture Registry and with international literature.

Results: The average cost per procedure in Spain ranged from 9,231.9 to 10,723.9 USD, while in Colombia it ranged from 1,717.8 to 2,742.0 USD. Compared to the international reference, better clinical outcomes were observed: lower incidence of delirium (-3.4 days), a higher proportion of timely surgeries (+39.2%), reduced length of stay (-3.92 days), and a lower surgical site infection rate (-6). Readmissions were slightly higher (+1.06%). A monthly savings of 3,235.23 USD per patient was identified. If 40% of the city's procedures were performed under this model, the estimated annual savings would be 21,399,105.31 USD.

Conclusion: The implementation of an organized model based on early surgery and a multidisciplinary approach improves clinical outcomes and reduces the costs associated with the treatment of these fractures.

Disclosures: The authors declare no conflicts of interest.

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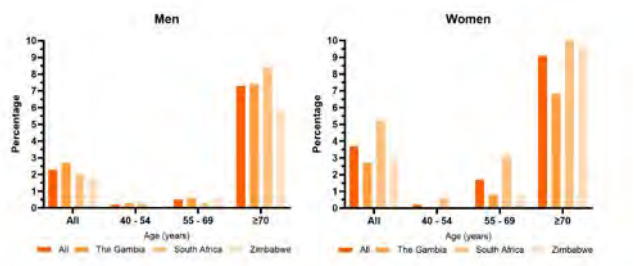
POPULATION-BASED STUDY OF FUNCTIONAL ABILITY AND SARCOPENIA PREVALENCE IN AFRICA: DEVELOPING CONTEXT APPROPRIATE THRESHOLDS (AFRO-SARC)

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Objective: To establish African-specific thresholds for physical function and sarcopenia (AFRO-SARC) and to describe the prevalence of impaired function and sarcopenia across three African populations.
Methods: A population-based sample of adults aged ≥40 years, stratified by sex- and age-band, was recruited using GIS mapping in The Gambia (G), Zimbabwe (Z) and South Africa (SA). Grip strength, gait speed, and chair rise times (CRT) were measured. Harmonised African thresholds were derived using 40-49 years as a reference population, taking 2SD below the mean (grip and gait) or 10th centile (CRT) to define thresholds; interclass correlations assessed country-pooling feasibility. The prevalence of sarcopenia, defined as low grip strength plus slow walk speed, was calculated.
Results: AFRO-SARC thresholds, calculated in 4776 adults (2537[53%] women) were: **grip strength** <28 kg (men) and <18 kg (women); **gait speed** <0.6 m/s (men and women), and **CRT** >17 s (men) and >19 s (women). Prevalence of impaired function was: **grip strength** men: 11.4% (G), 20.7% (SA), 10.4% (Z), women: 13.3% (G), 24.4% (SA), 8.1% (Z); **gait speed** men: 5.2% (G), 5.9% (SA), 6.1% (Z), women: 12.4% (G), 12.6% (SA), 14.0% (Z); **CRT** men: 18.9% (G), 24.2% (Z), women: 16.9% (G), 22.3% (Z). Sarcopenia prevalence overall was 2.3% in men and 3.7% in women (figure), and was greatest in those aged ≥70 years, affecting 7.3% men and 9.1% women. Individuals with showed markedly poorer functional performance, with over 80% scoring below 8 on the SPPB across age groups and had higher prevalence of disability and multimorbidity.
Conclusions: This study provides the first harmonised African thresholds defining poor physical performance and sarcopenia. Findings support context-specific screening strategies by which to target interventions to reduce disability and improve ageing in resource-limited settings.

Figure: Prevalence of AFRO-SARC stratified by age and sex



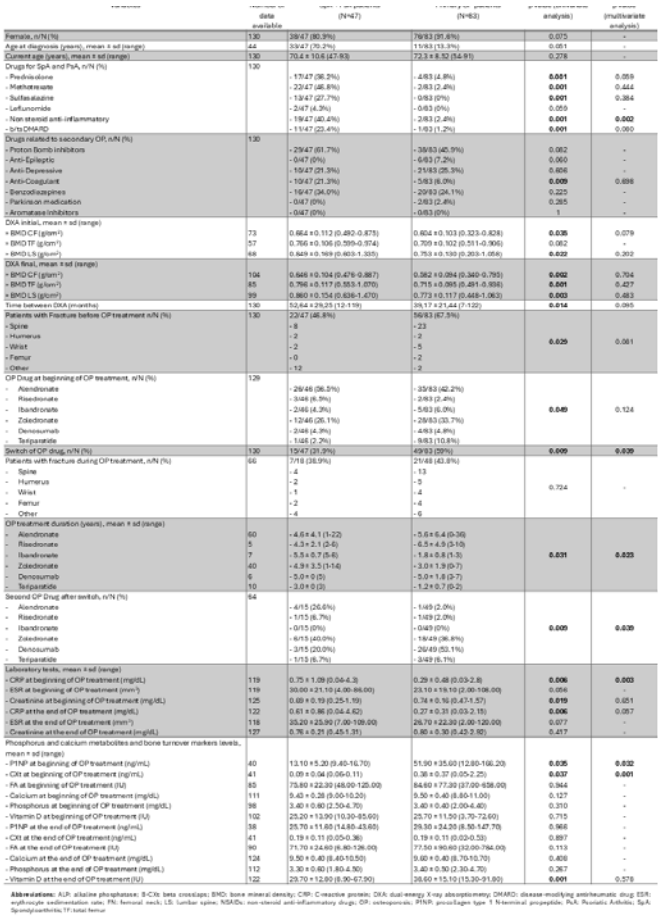
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ANTI-OSTEOPOROTIC TREATMENT EFFICACY IN PATIENTS WITH SPONDYLOARTHROPATHIES – DESCRIPTION OF A TERTIARY CENTER EXPERIENCE

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Introduction: Spondyloarthropathies are a major group of inflammatory rheumatic diseases affecting the axial skeleton and peripheral joints, with spondyloarthritis (SpA) and psoriatic arthritis (PsA) as the most prevalent subtypes. These conditions are recognized risk factors for osteoporosis (OP); however, data on the impact and effectiveness of anti-osteoporotic therapy in these patients remains limited.
Objective: To evaluate the efficiency of anti-OP therapy in patients with PsA/SpA.
Material and Methods: All consecutive patients attending our outpatient clinic over a 3-month period (September to November 2025) with a concomitant diagnosis of SpA or PsA and OP were included. Patients were matched in a 1:2 ratio by age and sex with individuals diagnosed with primary OP. Patients with known secondary causes of OP were excluded. Inclusion criteria required the availability of at least two dual-energy X-ray absorptiometry assessments.
Results: Forty-seven patients with SpA/PsA and concomitant OP (80.9% female) were compared with 83 patients with primary OP (91.6% female). No significant differences were observed in sex, age at OP diagnosis, current age, or use of medications related to secondary OP except for glucocorticoids (p=0.001) [Figure 1].
At baseline, the SpA/PsA group had higher bone mineral density (BMD) at the femoral neck (FN; p=0.035) and lumbar spine (LS; p=0.022), higher C-reactive protein (CRP) levels (p=0.006), and lower bone turnover markers (P1NP, p=0.035; B-CTx, p=0.037).
Following anti-osteoporotic treatment, BMD remained significantly higher in the SpA/PsA group at the FN (0.602±0.101 vs 0.582±0.094 g/cm², p=0.002), total femur (0.739±0.108 vs 0.715±0.095 g/cm², p=0.001), and LS (0.802±0.136 vs 0.773±0.117 g/cm², p=0.003). CRP levels remained higher (0.61±0.86 vs 0.27±0.31 mg/dL, p=0.006), while P1NP (13.10±5.20 vs 51.90±35.60 ng/mL, p=0.035), B-CTx (0.09±0.04 vs 0.38±0.37 ng/mL, p=0.037), and vitamin D levels (29.70±12.80 vs 38.60±15.10 IU, p=0.001) were lower.
Fracture incidence did not differ between groups. In fully adjusted multivariate analyses accounting for OP treatment characteristics, smoking status, and fracture burden, no significant between-group differences were observed.
Conclusions: In our cohort, anti-osteoporotic treatment in patients with SpA/PsA and concomitant OP demonstrated comparable effectiveness to that observed in patients with primary OP, with no differences in fracture incidence. These findings warrant confirmation in larger, well-powered cohorts.



	available data	(N=47)	(N=63)	analysis)	(multivariate analysis)
Female, n/N (%)	130	39/47 (80.9%)	76/83 (91.6%)	0.075	-
Age at diagnosis (years), mean ± sd (range)	44	33/47 (70.2%)	11/83 (13.3%)	0.051	-
Current age (years), mean ± sd (range)	130	70.4 ± 10.6 (47-93)	72.3 ± 8.52 (54-91)	0.278	-
Drugs for SpA and PsA, n/N (%)	130				
- Prednisolone		- 17/47 (36.2%)	- 4/83 (4.8%)	**0.001**	0.059
- Methotrexate		- 22/47 (46.8%)	- 2/83 (2.4%)	**0.001**	0.444
- Sulfasalazine		- 13/47 (27.7%)	- 0/83 (0%)	**0.001**	0.384
- Leflunomide		- 2/47 (4.3%)	- 0/83 (0%)	0.059	-
- Non steroid anti-inflammatory		- 19/47 (40.4%)	- 2/83 (2.4%)	**0.001**	**0.002**
- b/ts DMARD		- 11/47 (22.4%)	- 1/83 (1.2%)	**0.001**	0.060
Drugs related to secondary OP, n/N (%)	130				
- Proton Bomb Inhibitors		- 29/47 (61.7%)	- 38/83 (45.9%)	0.062	-
- Anti-Epileptic		- 0/47 (0%)	- 6/83 (7.2%)	0.060	-
- Anti-Depressive		- 10/47 (21.3%)	- 21/83 (25.3%)	0.606	-
- Anti-Coagulant		- 10/47 (21.3%)	- 5/83 (6.0%)	**0.009**	0.898
- Benzodiazepines		- 16/47 (34.0%)	- 20/83 (24.1%)	0.225	-
- Parkinson medication		- 0/47 (0%)	- 2/83 (2.4%)	0.265	-
- Aromatase Inhibitors		- 0/47 (0%)	- 0/83 (0%)	1	-
DXA initial, mean ± sd (range)					
+ BMD:CF (g/cm²)	73	0.864 ± 0.112 (0.492-0.875)	0.804 ± 0.103 (0.323-0.828)	**0.035**	0.079
+ BMD TF (g/cm²)	57	0.756 ± 0.106 (0.599-0.974)	0.705 ± 0.102 (0.511-0.906)	0.062	-
+ BMD LS (g/cm²)	68	0.849 ± 0.169 (0.603-1.305)	0.753 ± 0.130 (0.203-1.058)	**0.022**	0.392
DXA final, mean ± sd (range)					
+ BMD CF (g/cm²)	104	0.848 ± 0.104 (0.476-0.887)	0.582 ± 0.094 (0.340-0.795)	**0.002**	0.704
+ BMD TF (g/cm²)	85	0.756 ± 0.117 (0.553-1.070)	0.715 ± 0.095 (0.491-0.936)	**0.001**	0.427
+ BMD LS (g/cm²)	99	0.860 ± 0.154 (0.636-1.470)	0.773 ± 0.117 (0.448-1.063)	**0.003**	0.483
Time between DXA (months)	130	52.64 ± 29.25 (12-119)	39.17 ± 21.44 (7-122)	**0.014**	0.065
Patients with Fracture before OP treatment n/N (%)	130	22/47 (46.8%)	16/83 (67.5%)		
- Spine		- 8	- 23		
- Humerus		- 2	- 2	**0.029**	0.061
- Wrist		- 2	- 5		
- Femur		- 0	- 2		
- Other		- 12	- 2		
OP Drug at beginning of OP treatment, n/N (%)	129				
- Alendronate		- 29/46 (56.5%)	- 35/83 (42.2%)		
- Risedronate		- 3/46 (6.5%)	- 2/83 (2.4%)		
- Ibandronate		- 2/46 (4.3%)	- 5/83 (6.0%)	**0.049**	0.124
- Zoledronate		- 12/46 (26.1%)	- 28/83 (33.7%)		
- Denosumab		- 2/46 (4.3%)	- 4/83 (4.8%)		
- Teriparatide		- 1/46 (2.2%)	- 9/83 (10.8%)		
Switch of OP drug, n/N (%)	130	15/47 (31.9%)	49/83 (59%)	**0.009**	**0.039**
Patients with fracture during OP treatment, n/N (%)	66	7/18 (38.9%)	21/48 (43.8%)		
- Spine		- 4	- 13		
- Humerus		- 2	- 5	0.724	-
- Wrist		- 1	- 4		
- Femur		- 2	- 4		
- Other		- 4	- 6		
OP treatment duration (years), mean ± sd (range)					
- Alendronate	60	- 4.6 ± 4.1 (1-22)	- 5.6 ± 6.4 (0-36)		
- Risedronate	5	- 4.3 ± 2.1 (2-6)	- 6.5 ± 4.9 (3-10)		
- Ibandronate	7	- 5.5 ± 0.7 (5-6)	- 1.8 ± 0.8 (1-3)	**0.031**	**0.023**
- Zoledronate	40	- 4.9 ± 3.5 (1-14)	- 3.0 ± 1.9 (0-7)		
- Denosumab	6	- 5.0 ± 0 (5)	- 5.0 ± 1.8 (3-7)		
- Teriparatide	10	- 3.0 ± 0 (3)	- 1.2 ± 0.7 (0-2)		
Second OP Drug after switch, n/N (%)	64				
- Alendronate		- 4/15 (26.6%)	- 1/49 (2.0%)		
- Risedronate		- 1/15 (6.7%)	- 1/49 (2.0%)		
- Ibandronate		- 0/15 (0%)	- 0/49 (0%)	**0.009**	**0.039**
- Zoledronate		- 6/15 (40.0%)	- 19/49 (36.8%)		
- Denosumab		- 3/15 (20.0%)	- 26/49 (53.1%)		
- Teriparatide		- 1/15 (6.7%)	- 3/49 (6.1%)		
Laboratory tests, mean ± sd (range)					
- CRP at beginning of OP treatment (mg/dL)	119	0.75 ± 1.09 (0.04-4.3)	0.29 ± 0.48 (0.03-2.8)	**0.006**	**0.003**
- ESR at beginning of OP treatment (mm³)	119	30.00 ± 21.10 (4.00-86.00)	23.10 ± 19.10 (2.00-106.00)	0.056	-
- Creatinine at beginning of OP treatment (mg/dL)	125	0.69 ± 0.19 (0.25-1.19)	0.74 ± 0.16 (0.47-1.57)	**0.019**	0.651
- CRP at the end of OP treatment (mg/dL)	122	0.61 ± 0.86 (0.04-4.62)	0.27 ± 0.31 (0.03-2.15)	**0.006**	0.057
- ESR at the end of OP treatment (mm³)	118	25.20 ± 23.90 (7.00-108.00)	26.70 ± 22.20 (2.00-126.00)	0.077	-
- Creatinine at the end of OP treatment (mg/dL)	127	0.76 ± 0.21 (0.45-1.31)	0.80 ± 0.30 (0.42-2.80)	0.417	-
Phosphorus and calcium metabolites and bone turnover markers levels, mean ± sd (range)					
- P1NP at beginning of OP treatment (ng/mL)	40	13.10 ± 5.20 (5.40-16.70)	51.90 ± 35.60 (12.80-166.20)	**0.035**	**0.032**
- Ctx at beginning of OP treatment (ng/mL)	41	0.09 ± 0.04 (0.06-0.11)	0.36 ± 0.37 (0.05-2.25)	**0.037**	**0.001**
- PA at beginning of OP treatment (IU)	65	75.80 ± 22.30 (48.00-125.00)	84.60 ± 77.30 (37.00-658.00)	0.944	-
- Calcium at beginning of OP treatment (mg/dL)	111	9.40 ± 0.28 (9.00-10.20)	9.50 ± 0.40 (8.80-11.00)	0.127	-
- Phosphorus at beginning of OP treatment (mg/dL)	99	3.40 ± 0.40 (2.50-4.70)	3.40 ± 0.40 (2.00-4.40)	0.310	-
- Vitamin D at beginning of OP treatment (IU)	102	25.20 ± 13.90 (10.30-65.60)	25.70 ± 11.50 (3.70-72.60)	0.715	-
- P1NP at the end of OP treatment (ng/mL)	38	25.70 ± 11.60 (14.80-43.60)	29.30 ± 24.20 (8.50-147.70)	0.966	-
- Ctx at the end of OP treatment (ng/mL)	41	0.19 ± 0.11 (0.05-0.36)	0.19 ± 0.11 (0.02-0.53)	0.897	-
- PA at the end of OP treatment (IU)	90	71.70 ± 24.60 (6.80-126.00)	77.50 ± 90.60 (32.00-764.00)	0.113	-
- Calcium at the end of OP treatment (mg/dL)	124	9.50 ± 0.40 (8.40-10.50)	9.60 ± 0.40 (8.70-10.70)	0.408	-
- Phosphorus at the end of OP treatment (mg/dL)	112	3.30 ± 0.60 (1.80-4.50)	3.40 ± 0.50 (2.30-4.70)	0.267	-
- Vitamin D at the end of OP treatment (IU)	122	29.70 ± 12.60 (8.90-67.90)	28.60 ± 15.10 (15.30-91.80)	**0.001**	0.578

Abbreviations: ALP: alkaline phosphatase; B-Ctx: beta crosslaps; BMD: bone mineral density; CRP: C-reactive protein; DXA: dual-energy X-ray absorptiometry; DMARD: disease-modifying antirheumatic drug; ESR: erythrocyte sedimentation rate; FN: femoral neck; LS: lumbar spine; NSAIDs: non-steroid anti-inflammatory drugs; OP: osteoporosis; P1NP: procollagen type 1 N-terminal propeptide; PsA: Psoriatic Arthritis; SpA: Spondyloarthritis; TF: total femur

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BILATERAL FEMORAL SHAFT FRACTURES ASSOCIATED WITH LONG-TERM BISPHOSPHONATE THERAPY

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Objective:
To report the clinical course, imaging findings, and management of bilateral atypical femoral fractures (AFFs) in a postmenopausal woman receiving long-term bisphosphonate therapy, emphasizing early recognition and multidisciplinary management.

Material and Methods:
A 64-year-old female with severe osteoporosis on oral alendronate for 3.5 years presented with insidious bilateral thigh pain. MRI demonstrated bilateral mid-diaphyseal stress changes with lateral cortical thickening, endosteal sclerosis, marrow oedema, and periosteal reaction, consistent with incomplete AFFs. Despite offloading, she sustained an acute right femoral shaft fracture following a low-energy fall. Radiographs confirmed a displaced transverse fracture with lateral cortical "beaking."

Surgical management included open reduction, valgisation osteotomy, intramedullary nailing, and lateral plate fixation. Postoperative care included cessation of bisphosphonate therapy, initiation of teriparatide, calcium and vitamin D supplementation, and monitoring of the contralateral femur for prophylactic fixation.

Results:
The right femur achieved stable fixation and satisfactory alignment, permitting early mobilization. Contralateral femoral surveillance identified an incomplete AFF, with prophylactic nailing planned. Metabolic bone evaluation guided long-term osteoporosis management and transition from bisphosphonate therapy.

Conclusion:
AFFs are rare but serious complications of long-term bisphosphonate therapy, often preceded by prodromal thigh pain and stress-related cortical changes detectable on MRI. Early recognition, surgical stabilization of complete fractures, prophylactic management of incomplete fractures, and tailored pharmacological therapy, including anabolic agents, are essential to optimize outcomes and prevent bilateral injury.

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ROBOTIC ARM-ASSISTED TOTAL HIP ARTHROPLASTY PERFORMS EXCELLENTLY AT A MINIMUM OF 3 YEARS FOLLOW-UP

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Objectives
Total hip arthroplasty (THA) aims to relieve pain and restore function in patients with end-stage hip disease. Accurate reconstruction of hip anatomy and precise component positioning are important determinants of clinical outcome and implant longevity. Image-based robotic systems facilitate CT-based planning and reproducible execution. This study assessed radiographic accuracy and clinical outcomes after image-based robotic THA at a minimum follow-up of 3 years.
Materials and Methods
This retrospective study included 95 consecutive patients (69 females, 72.6%) who underwent image-based robotic THA between 2019 and 2021. Mean age was 77.5 years (SD 6.2). Mean follow-up was 3.6 years (SD 0.3), with a minimum follow-up of 3 years. Functional outcome was evaluated using the Harris Hip Score (HHS) preoperatively and at latest follow-up. Accuracy of acetabular component placement was assessed by comparing planned versus achieved cup inclination and anteversion.
Results
Mean preoperative HHS was 49.8 (SD 7.8) and improved to 92.4 (SD 4.6) at final follow-up, corresponding to a +42.6-point improvement and an 85.6% relative increase. Mean absolute deviation between planned and final cup inclination was 1.8° (SD 0.4°), while mean absolute deviation for anteversion was 1.3° (SD 0.2°). One patient (1/95, 1.1%) sustained a traumatic dislocation requiring open reduction. No other complications were recorded.
Conclusions
Image-based robotic THA demonstrated high accuracy in restoring hip joint anatomy, with minimal deviation from planned acetabular positioning, and was associated with substantial functional improvement at a minimum of 3 years follow-up. These findings support the reliability of image-based robotic THA in achieving consistent component placement and favorable mid-term outcomes. Longer-term studies are warranted to confirm durability.

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THE EFFECTIVENESS OF CLOSED VERSUS OPEN KINETIC CHAIN EXERCISES ON PAIN AND FUNCTIONALITY IN ADULTS WITH PATELLOFEMORAL PAIN SYNDROME: A SYSTEMATIC REVIEW

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Objective:

To compare the effectiveness of open kinetic chain (OKC) and closed kinetic chain (CKC) exercise interventions in reducing pain and improving functional outcomes in adults with patellofemoral pain syndrome (PFPS).
Materials and Methods:

A systematic review was conducted in accordance with PRISMA guidelines. Randomized controlled trials (RCTs) published in English between 2016 and 2026 were identified through structured searches of the PubMed and Scopus (Elsevier) databases. Inclusion criteria comprised adults aged >18 years with a confirmed diagnosis of PFPS, a minimum sample size of 50 participants, and a follow-up duration of at least six weeks. Studies evaluating OKC, CKC, or combined exercise interventions were included. Outcomes were assessed using validated clinical measures, including the Visual Analogue Scale (VAS) for pain and the Anterior Knee Pain Scale (AKPS/Kujala) for functional assessment.
Results:

A total of 3,548 records were initially identified. After title and abstract screening, 39 studies underwent full-text review, of which five RCTs met the inclusion criteria. Across the included studies, 484 participants were analyzed, with mean ages ranging from 26.3 ± 7.0 to 39 ± 12.7 years and mean body mass index values between 23.4 ± 5.4 and 30 ± 2.3 kg/m². Participants were allocated to CKC, OKC, or combined CKC-OKC intervention groups. Post-intervention VAS scores improved to 2.5–2.7 in the CKC group, 3.7 in the OKC group, and 1.1 ± 1.7 in the combined group. Corresponding Kujala scores increased to 78.4–80.2, 73.3, and 85.9 ± 13.3, respectively, indicating superior pain reduction and functional improvement with combined interventions.
Conclusion:

Exercise-based rehabilitation is effective in managing patellofemoral pain syndrome. Combined OKC and CKC exercise programs demonstrate greater improvements in pain relief and functional outcomes compared with isolated approaches, with CKC exercises showing relative superiority over OKC alone. A multimodal rehabilitation strategy emphasizing CKC exercises is recommended, although further high-quality studies are required to optimize exercise selection and treatment protocols.

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HIP DISLOCATION AS A CAUSE FOR AVASCULAR NECROSIS OF THE FEMORAL HEAD

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Objective:
To describe the clinical course, imaging features, and management of traumatic avascular necrosis (AVN) of the femoral head following posterior hip dislocation in an adolescent, with emphasis on early MRI diagnosis and risk stratification.

Material and Methods:
A 15-year-old male presented eight months after a traumatic posterior hip dislocation sustained during a football match, initially reduced within approximately two hours. Post-reduction radiographs confirmed concentric reduction with a minimally displaced posterior wall fracture and no intra-articular fragments. The patient underwent protected weight bearing and physiotherapy. Recurrent activity-related groin pain developed six months after injury. Clinical assessment and serial radiographs were followed by magnetic resonance imaging (MRI) for evaluation of post-traumatic complications.

Results:
Radiographs demonstrated preserved joint congruence with subtle superolateral femoral head contour irregularity and no definite collapse. MRI revealed a superolateral necrotic lesion with T1 hypointensity, surrounding T2/STIR marrow oedema, and a subchondral low-signal rim with minimal surface flattening, consistent with traumatic AVN, ARCO stage II (Steinberg IIb). The combined Kerboul angle measured 157 degrees, indicating limited necrotic involvement. Given preserved femoral head sphericity and absence of established collapse, conservative management was selected. Follow-up imaging demonstrated increased marginal sclerosis without progression. At 12 months post-injury, the patient remained ambulatory with near-full pain-free range of motion and stable femoral head morphology.

Conclusion:
Traumatic posterior hip dislocation in adolescents carries a substantial risk of femoral head AVN, even following timely reduction. MRI is essential for early diagnosis and staging when symptoms recur. Lesion extent, structural integrity, and risk stratification tools such as the Kerboul angle are critical in guiding management. Selected early-stage cases may be managed non-operatively with careful surveillance.

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THE USE OF THE IMAGE-BASED SYSTEM FOR FEMORAL NECK FRACTURES: A CASE SERIES

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Objective:
To evaluate early clinical and radiographic outcomes of robotic-arm assisted total hip arthroplasty (THA) using dual mobility (DM) cups in patients with displaced femoral neck fractures, with particular emphasis on implant positioning accuracy, biomechanical restoration, and early functional recovery.

Materials and Methods:
A prospective case series was conducted involving six female patients who sustained displaced femoral neck fractures and underwent robotic-arm assisted THA with DM acetabular components. The mean patient age was 64.8 years (range 55–72), with a mean body mass index of 30.4 kg/m² (range 28.9–32.3). Preoperative CT-based planning and intraoperative robotic execution were employed to optimize acetabular cup orientation and restoration of limb length and femoral offset. Outcome measures included radiographic evaluation of component positioning relative to predefined safe zones, assessment of limb length and offset restoration, Harris Hip Score (HHS), time to independent ambulation, and incidence of early postoperative complications.

Results:
All acetabular components were positioned within predefined safe zones (6/6, 100%). Mean absolute deviation from the preoperative plan was 1.3° ± 0.4° for cup inclination and 1.5° ± 0.6° for anteversion. Mean deviation from planned limb length was +1.6 ± 0.4 mm, and from planned offset was +1.7 ± 0.6 mm. No postoperative dislocations, periprosthetic fractures, implant malposition, or early loosening were observed (0/6, 0%). All patients achieved stable, independent ambulation within six weeks postoperatively. Postoperative HHS values ranged from 80 to 92, with a median score of 86.

Conclusion:
Robotic-arm assisted THA combined with dual mobility acetabular components demonstrated high accuracy in implant positioning, reliable restoration of hip biomechanics, and consistent early functional recovery in patients with displaced femoral neck fractures, without early instability. These preliminary findings support the clinical utility of robotic-assisted strategies in the management of fragility hip fractures and warrant further investigation in larger comparative studies.

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OSTEOMYELITIS OF THE STERNOCLAVICULAR JOINT MIMICKING AN ANTERIOR THORACIC MASS

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Objective:
To highlight the diagnostic challenges of sternoclavicular joint osteomyelitis (SCJ OM), an exceptionally rare entity that may mimic neoplastic or soft-tissue processes.

Material and Methods:
A 69-year-old man with a history of myocardial infarctions, osteoporosis, and chronic respiratory disease presented with a one-month history of progressive swelling over the left sternoclavicular and cervical region, associated with low-grade fever, malaise, and ipsilateral shoulder pain. Clinical examination revealed a firm, tender, mobile anterior chest wall mass with palpable supraclavicular lymph nodes. Laboratory tests demonstrated elevated inflammatory markers (CRP 162 mg/L; neutrophils 13.7 × 10⁹/L). Imaging included computed tomography (CT) and magnetic resonance imaging (MRI) to assess osseous and soft-tissue involvement and exclude malignancy.

Results:
CT showed inflammatory changes surrounding the left SCJ, joint space widening, fat stranding into the supraclavicular and retrosternal spaces, and early cortical sternal erosion suggestive of osteomyelitis. MRI confirmed these findings, excluded alternative diagnoses, and delineated soft-tissue involvement. The patient was treated with a prolonged course of intravenous broad-spectrum antibiotics. Clinical and laboratory follow-up demonstrated complete symptom resolution and normalization of inflammatory markers without the need for surgical intervention.

Conclusion:
Sternoclavicular osteomyelitis is rare and can mimic anterior chest wall masses, posing a diagnostic challenge. MRI plays a pivotal role in confirming diagnosis and guiding management. Early recognition and a multidisciplinary approach allow timely initiation of appropriate therapy, potentially avoiding unnecessary surgery.

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10-YEAR EXPERIENCE WITH THE IMAGE-BASED ROBOTIC MEDIAL UNICOMPARTMENTAL ARTHROPLASTY

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Objective:
To evaluate mid- to long-term implant survivorship, complication rates, and clinical outcomes following robotic arm-assisted medial unicompartmental knee arthroplasty (UKA) in the first reported cohort from Greece, at a minimum follow-up of eight years.

Materials and Methods:
This prospective cohort study included 80 consecutive patients who underwent robotic arm-assisted medial UKA between 2014 and 2016. At final follow-up, five patients were lost, leaving 75 patients available for outcome analysis. Implant survivorship, revision procedures, and surgery-related complications were recorded. Clinical outcomes were assessed preoperatively and at latest follow-up using the Knee Society Score (KSS-knee and KSS-function) and the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC). Follow-up duration and revision characteristics were documented.

Results:
The minimum follow-up was eight years, with a mean follow-up duration of 107.6 ± 3.8 months. Two revisions to total knee arthroplasty were required (2/75, 2.7%), both performed using the MAKO robotic system with a primary TKA construct incorporating a 5 mm medial augment. Crude implant survivorship at latest follow-up was 97.3% (73/75).
Significant improvements were observed in all clinical outcome measures. Mean KSS-knee improved from 52.4 ± 11.3 preoperatively to 91.2 ± 7.1 at latest follow-up, and KSS-function improved from 55.6 ± 13.0 to 88.5 ± 9.2 (both $p < 0.001$). Mean WOMAC total score improved from 55.1 ± 12.6 to 13.2 ± 9.1 ($p < 0.001$). WOMAC subscale scores also demonstrated significant improvements in pain, stiffness, and function (all $p < 0.001$). No additional surgery-related complications were recorded.

Conclusion:
Robotic arm-assisted medial unicompartmental knee arthroplasty demonstrated excellent mid- to long-term outcomes at a minimum eight-year follow-up, with high implant survivorship, a low revision rate, and substantial improvements in patient-reported and clinician-based outcome measures. When revision was necessary, conversion to total knee arthroplasty using a robotic-assisted primary construct with a limited medial augment was feasible and effective. These findings support the durability and clinical reliability of robotic-assisted medial UKA.

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SCIATIC NERVE SIZE AS A MARKER OF SARCOPENIA IN DISCOPATHY

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Objective: Patients suffering from chronic low back pain with associated sciatica, experience neurological symptoms in the lower back and leg. Ultrasonography (US) has been used recently to characterize sciatic nerves. And because of less daily activities and exercise in these patients are likely to experience sarcopenia. We examine the sciatic nerve with ultrasound in patients with LBP and unilateral radiculopathy (sciatica). We evaluate the possible changes of nerve structure (1) in patients with low back pain with unilateral sciatica due to lumbar disc herniation by ultrasound imaging and possible relation with sarcopenia.

Methods: One hundred and twelve (112) volunteer patients' 224 sciatic nerves, aged 19-86 years old, complained for sciatica and they identified with lumbar disc prolapse in MRI, were studied (2),(6) with US (sciatic nerve). Age, sex, height, weight was recorded, and the size and morphology of sciatic nerve were obtained. Sarcopenia was identified by muscle strength, muscle mass and gait speed assessment using the (&) European Working Group on Sarcopenia in Older People (EWGSOP2) criteria. **Results:** The mean size of sciatic nerves were 0.564± 0.033 cm2 in males and 0.482 ± 0.04 cm2 females respectively. Pearson's correlation analysis showed that the mean size was correlated with height and weight. There was no difference in mean size among the different ages. Women had smaller size of the sciatic nerves than men. Also, the "pathologic sciatic nerves (6) have morphology of "edema" and the size were smaller in patients with recently diagnosed disc prolapse in MRI, and in contrast enlargement sciatic nerves in patients with chronic sciatica, radiculopathy and positive MRI for disc prolapse more than 3 years ago (difference = 0.052 cm2). In addition, 23.3.% were diagnosed with probable sarcopenia and 4.8% with severe sarcopenia. Using regression analyses, sarcopenia was positively associated with sciatica (OR=0.11; CI 0.07-0.14); and age (OR=0.007; CI 0.006-0.01).

Conclusion: Peripheral nerve ultrasonography is reliableAnd reproducible (4), (5) diagnostic method in the hands of experienced examiners. The reliability aspect of measuring sciatic nerves and echo - intensity of the sciatic nerve with ultrasound in patients with LBP and unilateral radiculopathy has received little attention in the literature. Also, the relative magnitude of fat/fibrosis infiltration was observed in all cases of chronic sciatica and radiculopathy. The results of this study show that there is a positive correlation between sarcopenia and sciatica in patients with radiculopathy; this association had not been previously confirmed in Greece. Further research with larger samples is indicated in order clarify the precise association of specific characteristics of patients with sarcopenia and discopathy.

Keywords: Sciatic nerve, sciatica, discopathy, disc prolapse, low back pain, sarcopenia, osteoporosis, ultrasonography of sciatic nerve.



FIGURE - 1 - Sciatic nerve in ultrasound

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TELE-EXERCISE WITH PILATES PROGRAM IN INDIVIDUALS WITH SPINAL STENOSIS

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Introduction: After the coronavirus disease (COVID-19) pandemic the tele-exercise has seen as an important mean of therapeutic exercise. This is particularly crucial given that individuals with spinal stenosis often engage with lower levels of physical activity due to barriers of pain and neurological symptoms. **Methods:** We employed synchronous tele-exercise interventions, with Zoom software and Viber software which being the most prevalent platforms (93.8%) in 43 patients [28 female – 15 male, Men age 68m years old] with spinal stenosis certified with MR. Focuses on reducing pain, improving mobility, and strengthening the core through supervised, remote, low-impact movements like lumbar rotations, pelvic tilts, and prone press-ups. It is an effective, accessible alternative to in-person care, using 8-week structured routines to enhance spinal stabilization and reduce nerve compression

Results: We employed synchronous tele-exercise interventions, with Zoom software and Viber software being the most prevalent platforms Interventions primarily focused on muscle strength (Improvement 25.0%) and aerobic training with a median duration of 8.0 weeks [two times per week for one hour]. The mean (standard deviation) adherence was 77.8% (18.7), with variations observed between sex and approaches (synchronous, asynchronous, or hybrid). The most assessed outcomes included physical activity levels (58.3%), adherence (35.3%), pain (25.0%), and physical activity behavior (25.0%). Significant improvements were noted in health status, physical capacity, Anxiety and Depression [HADS - 32%] after tele-exercise implementation.

Conclusions: Tele-exercise interventions, predominantly utilizing synchronous methods and emphasizing muscle strength and aerobic training, are effective and feasible for individuals with Spinal Stenosis. These interventions contribute to improved health outcomes and increased exercise adherence, establishing them as a viable option for promoting physical activity among individuals with SCI. However, the results should be interpreted with caution as the quality of the studies was not considered in this review.

Keywords: Therapeutic Exercise; telehealth; telerehabilitation; Pilates

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Pictue- 1. Pelvic tilt exercises for Core Stabilization

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DESIGN OF A HYBRID REHABILITATION PROGRAM FOR PATIENTS WITH PARKINSON'S DISEASE

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Introduction

Parkinson's disease is a progressive neurodegenerative disorder of the central nervous system, characterized by a broad range of motor and non-motor features that significantly affect patients' functional capacity and quality of life (1). In recent years, therapeutic exercise has been established as a key non-pharmacological intervention, with documented benefits on motor symptoms and quality of life (2). Evidence suggests that different training modalities, including moderate and high-intensity aerobic exercise, progressive resistance training, balance and gait training programs, lead to clinically meaningful improvements. In addition, specialized exercise approaches such as LSVT BIG characterized by high training frequency and a primary focus on large-amplitude movements have been developed (3). However, despite the documented benefits of therapeutic exercise, long-term patient compliance with structured exercise programs remains one of the greatest challenges, limiting the sustainability of therapeutic results.

Purpose

The purpose of the present study was to investigate the most effective forms of therapeutic exercise for improving motor and functional impairments in patients with Parkinson's disease (PD), as well as to design a standardized hybrid exercise program based on international clinical guidelines. Furthermore, it aims to identify the most appropriate method of exercise guidance to ensure optimal patient adherence and long-term commitment.

Materials and Methods

A literature review was conducted in the PubMed, Scopus, and Google Scholar databases, covering the last 10 years, and including systematic reviews and randomized clinical trials. Based on the findings, a hybrid exercise program was designed, with three modes of intervention: (a) face-to-face intervention (including exercise demonstration, verbal guidance, and immediate corrective feedback through physical contact), (b) telerehabilitation via videoconferencing (with exercise demonstration and verbal guidance), and (c) self-guided implementation through an illustrated leaflet (with clear execution instructions). The selection of exercises was based on their effectiveness, safety, and ease of implementation, with the ultimate goal of establishing exercise as a daily routine (Fig. 1). During the pilot implementation of the program, targeted modifications were made, such as rearranging the order of exercises, adding music and rhythmic cues, adjusting intensity, and improving verbal instructions, in order to optimize performance.



Figure 1: Examples of aerobic exercises in sited and standing position

Results

The review indicated that multifactorial exercise programs combining aerobic training, coordination, static and dynamic balance, and functional task practice are the most effective interventions. The proposed rehabilitation program integrates these components and includes exercises performed in various positions and across multiple levels, aiming to enhance functional capacity and motor performance, while prioritizing progression and safety.

Conclusions

Systematic therapeutic exercise substantially improves motor impairments in Parkinson's disease (PD), by enhancing neuroprotective mechanisms. Although most studies demonstrate benefits across a wide range of exercise modalities, the comparative differences between specific approaches have not yet been fully clarified. Therefore, a critical research priority is the optimal "prescription" of exercise in terms of intensity, frequency, duration, and progression, in order to maximize and maintain clinical benefits.

Key Words: Parkinson's Disease, therapeutic exercise, exercise effects, rehabilitation

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THE EFFECTIVENESS OF COMBINED THERAPEUTIC EXERCISE AND PLATELET-RICH PLASMA IN THE CASE OF KNEE OSTEOARTHRITIS

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[Purpose]: Osteoarthritis is the most common form of arthritis worldwide and has detrimental effects on an individual's quality of life. We compared two interventions—an exercise program alone and an exercise program combined with the intra-articular platelet-rich plasma (PRP) injection—focusing on pain and functionality in patients with mild knee osteoarthritis.

[Participants and Methods]: A total of 76 patients (41 men and 35 women) participated in the study. They were divided equally into the control and intervention groups. To assess knee functionality in both groups, we used state-of-the-art assessment tools, namely the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) and Knee Injury and Osteoarthritis Outcome Score (KOOS).

[Results]: The results revealed that following the eight-week exercise program, the intervention group showed significantly better values in the WOMAC scale and in three of the four components of the KOOS scale (pain, symptoms, and activities of daily living). Additionally, we observed that the improvement in WOMAC and KOOS scores was significantly better in the intervention group than in the control group. [Conclusion] Combining PRP and exercise therapy can help improve patients' quality of life. However, PRP preparation protocols and exercise prescriptions must be optimized and tailored to individual patient needs.

[Conclusions - Discussion]: The biological mechanism of the combination of PRP and exercise therapy involves PRP-derived grown factors that reduces inflammation, promotes tissue repair and enhance natural body healing process. Concurrently exercise improves muscle strength and joint function contributing to pain relief targeting the complex pathology of Knee OA, which affects the cartilage and the entire joint. The observed improvements in pain and inflammation may lead to a reduction in medical interventions, thereby lowering the risk of surgery and supporting the cost-effectiveness of this combined approach[13]. By empowering patients to control their condition through non-invasive therapies, the long-term outcomes of OA management can be improved, offering a more sustainable approach to pain relief and the long-term

preservation of joint function. Our findings align with those of previous studies demonstrating the efficacy of PRP in treating OA symptoms and achieving better WOMAC parameters, particularly in the early stages of cartilage degradation[14, 15]. Unsurprisingly, better outcomes were observed in younger patients with lower body mass index and low-grade OA. **Keywords:** Knee osteoarthritis, Platelet-rich plasma injection, Exercise therapy

Control group	Intervention group	Mean difference	
Mean ± SD	Mean ± SD		
KOOS pain initial	64.34 ± 13.88	65.63 ± 13.52	−1.29
KOOS symptom initial	71.58 ± 12.38	65.63 ± 13.52	−0.58
KOOS ADL initial	68.45 ± 8.53	70.29 ± 7.31	−1.84
KOOS QOL initial	53.34 ± 9.14	52.05 ± 7.68	1.29
WOMAC initial	40.24 ± 11.66	39.11 ± 10.94	1.13
KOOS pain final	65.21 ± 13.62	71.76 ± 12.77	6.55
KOOS symptom final	72.34 ± 12.10	77.79 ± 10.97	5.45*
KOOS ADL final	65.21 ± 13.62	74.13 ± 7.05	−4.63*
KOOS QOL final	53.26 ± 9.59	52.24 ± 7.73	1.03
WOMAC final	39.11 ± 11.28	33.74 ± 9.47	5.37*

p-value <0.05.

KOOS: Knee Injury and Osteoarthritis Outcome Score; ADL: activities of daily living; QOL: quality of life; WOMAC: Western Ontario and McMaster Universities Osteoarthritis Index.

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Conflict of interest

The authors have no conflicts of interest to declare.

P406

EFFECTIVENESS OF AN INNOVATIVE THERAPEUTIC EXERCISE PROGRAM ON PHYSICAL AND COGNITIVE FUNCTION IN PEOPLE WITH MILD COGNITIVE IMPAIRMENT DUE TO ALZHEIMER'S DISEASE: A STUDY PROTOCOL FOR A RANDOMIZED CONTROLLED TRIAL

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Objective

Individuals with Mild Cognitive Impairment (MCI) are at increased risk of developing dementia, and non-pharmacological interventions recommended for the management/ prevention of their symptoms (1). Physical exercise has emerged as an effective non-pharmacological intervention for reducing age-related cognitive decline and delaying/ inhibiting the progression of MCI to dementia, as well as for improving physical function in people with MCI (2, 3). The purpose of this randomized clinical trial is to investigate the effectiveness of a multicomponent exercise program (MExeProMCI) on cognitive and functional parameters in individuals with MCI.

Materials and Methods

The study was designed as a parallel, single-blind, randomized controlled trial with three arms. 45 volunteers with MCI aged >50 years will participate. They will be assessed before and after the intervention in terms of gait, balance, functionality, global cognitive function, executive function, and word fluency. The intervention will last three months, with a frequency of two sessions per week in small groups. The intervention groups will be: (EXP1) MExeProMCI program with dual-task exercises (combination with cognitive exercises), (EXP2) same program without cognitive exercises, (CG) control group without structured exercise. The analysis will be performed with descriptive statistics and mixed ANOVA ($p<0.05$). Trial registration: ClinicalTrials.gov NCT07334392.

Results

Main outcome measures will be indicators of kinematic and motor analysis (Nexus Vicon) (Fig. 1), balance (Mini-BESTest), gait (FGA), global cognition (MoCA, COGTEL), and executive function (Stroop test). Secondary outcome measures will include physical performance parameters (SPPB), grip strength (HGST), timed walking (TUG, 6MWT), timed repetitive stand- to- sitting (30sec Sit-to-Stand), fear of falling (FES-I), verbal fluency (WoFiBrief), visuospatial ability and memory (CERAD constructional praxis and constructional praxis recall), and neuropsychiatric parameters (GDS, NPI-12).

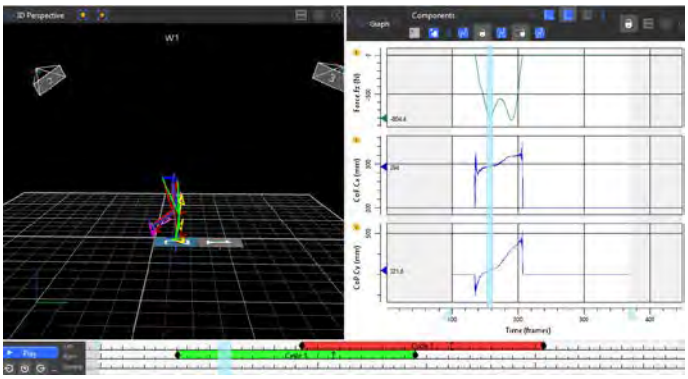


Figure 1. Vertical Ground Reaction Force (Fz) and displacement of Center of Pressure in anterioposterior and mediolateral axis (CoPx, CoPy) in one gait cycle.

Conclusions

It is expected that structured intervention programs will improve physical and cognitive function and contribute to delaying the progression to Alzheimer's disease, while providing useful information on motor variations in people with MCI.

Key words: gait, balance, global cognition, executive function, mci, multicomponent program

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BEYOND BONE DENSITY: THE SILENT ALLIANCE BETWEEN SARCOPENIA AND OSTEOPOROSIS IN THE ELDERLY

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Introduction:
Sarcopenia and osteoporosis are two chronic conditions frequently associated in older adults, characterized respectively by a reduction in muscle mass and bone mineral density. Both contribute to a progressive functional decline, with an increased risk of falls, fractures, and loss of independence. Early and multidimensional diagnosis is essential to identify individuals at risk and to initiate targeted therapeutic interventions. This study aims to evaluate the prevalence and interaction between sarcopenia and osteoporosis in an elderly population through the combined use of bioelectrical impedance vector analysis (BIVA), laboratory testing, physiotherapeutic functional assessments, and quality-of-life questionnaires.
Materials and methods:
A total of 100 patients aged over 65 years, with a residual life expectancy of at least six months, were recruited from geriatric and rehabilitation

services. Each participant underwent blood sampling to assess key bone and muscle markers, including vitamin D, calcium, parathyroid hormone, albumin, and creatinine. Body composition was evaluated using BIVA to detect alterations in lean mass and hydration status. Functional assessment was performed using standardized physiotherapy tests (Timed Up and Go, 5 Times Sit-to-Stand, and Handgrip Strength), while quality of life was assessed using the SF-36 questionnaire. Sarcopenia was diagnosed according to EWGSOP2 criteria, while osteoporosis was identified based on medical history, densitometric findings, and clinical data.
Results:
In the studied sample, the prevalence of sarcopenia was 34%, while osteoporosis was identified in 41% of patients. Twenty-two percent of participants presented with both conditions. Sarcopenic patients showed significantly reduced handgrip strength and poorer performance on functional tests, with statistically significant differences in Timed Up and Go and 5xSTS completion times. BIVA analysis revealed a vector displacement consistent with reduced active cell mass and impaired nutritional status. SF-36 scores demonstrated a marked deterioration in quality of life, particularly in domains related to physical functioning and pain perception, among patients with sarcopenia and osteoporosis. Furthermore, individuals affected by both conditions exhibited a significant vitamin D deficiency, with serum levels below 20 ng/mL in more than two-thirds of cases.
Conclusions:
The integration of laboratory investigations, instrumental assessments, and functional testing allows for a more accurate identification of frailty in older patients. The coexistence of sarcopenia and osteoporosis represents a strong indicator of functional impairment and reduced quality of life. The findings of this study support the importance of multidisciplinary screening strategies in the population aged over 65, aimed at preventing disability, optimizing therapeutic interventions, and improving long-term clinical outcomes.

P408

HYPOPARATHYROIDISM: INCIDENCE AND PREVALENCE IN THE ITALIAN REGION OF VENETO

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INTRODUCTION
Hypoparathyroidism is a disorder characterized by parathyroid hormone deficiency, leading to hypocalcemia, hyperphosphatemia, and hypercalciuria. Worldwide prevalence ranges between 6.4-37 cases per 100,000 people, while incidence is estimated at 0.8-2.3 cases per 100,000 people per year.
OBJECTIVES
This study aimed to evaluate the incidence and prevalence of hypoparathyroidism in the population of the Veneto Region in Italy.
MATERIALS AND METHODS
A retrospective, population-based study was conducted using population registry and administrative healthcare databases of the Veneto Region. Prevalent cases were identified between 2012 and 2025 through either hospital diagnoses of hypoparathyroidism (ICD-9 252.1) or healthcare co-payment exemptions (national code 026 combined with ICD-9 252.1) whichever occurred first. Incident cases were assessed from 2013 to 2024 to exclude prevalent cases. Individuals alive on 01/01/2025 were linked to thyroidectomy procedures and to co-payment exemptions for rare diseases associated with hypoparathyroidism.
RESULTS
During the study period, a total of 3,460 prevalent cases of hypoparathyroidism were identified, corresponding to a mean yearly prevalence of 44.21 cases per 100,000 inhabitants. The total number of incident cases was 1,752, with a mean yearly incidence of 2.99 cases per 100,000 inhabitants. Sex-specific analyses showed that women had a higher mean yearly incidence than men (4.56 vs 1.36 cases per 100,000) and a higher mean yearly prevalence (70.92 vs 16.43 cases per 100,000). The age group with the highest incidence in women was 50–54 years, accounting for 11.9% of incident cases (6.74 per 100,000), whereas in men it was 55–59 years, representing 13.7% of incident cases (2.44 per 100,000). Rare diseases associated with hypoparathyroidism, identified through specific exemption codes, accounted for 1.18% of prevalent cases until 01/01/2025.
CONCLUSIONS
The incidence and prevalence of hypoparathyroidism in the Veneto region are consistent with global estimates. Women show both a higher incidence and prevalence than men, and in both sexes the highest incidence occurs between the fifth and sixth decades of life. Finally, although considered rare diseases, these conditions account for more than 1% of prevalent hypoparathyroidism cases.

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EFFECT OF CHRONIC ADMINISTRATION BASED ON HYDROXYAPATITE-CALCITONIN POLYMERIC NANOPARTICLES FOR OSTEOPOROSIS TREATMENT IN A STREPTOZOTOCIN-INDUCED DIABETES MICE MODEL

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Type-1 Diabetes is one of the most prevalent chronic diseases worldwide, principally characterized by chronic hyperglycemia, which results in painful peripheral neuropathy, bone deterioration and high risk of bone fractures. Recently, the development of nanoparticles has acquired great relevance to promote bone regeneration, because of their oral administration and easy functionalization with molecules can improve the effects of pharmaceutical drugs accelerating considerably the process of regeneration. Nanoparticles of hydroxyapatite-calcitonin were synthetized and evaluated as an alternative treatment. The capability to promote proliferation and mineralization was determined in vitro, meanwhile in vivo, the repair of bone microarchitecture was evaluated using a streptozotocin-induced diabetes mice model. *Invitro*, the administration of hydroxyapatite-calcitonin affects the cell viability, bone mineralization process and the expression of bone proteins such as alkaline phosphatase, osteoprotegerin, osteocalcin and type 2/4 bone metalloproteins related to bone formation. Additionally, *invivo* female BALB/c mice treated with hydroxyapatite-calcitonin nanoparticles (NHCal) showed significant improvement of bone recovery such as an increase of bone volume percentage and trabecular number. Meanwhile,

the histological analysis revealed a significant increase of sympathetic innervation expression, blood vessel formation and the number of infiltrating macrophages into the bone marrow compared to healthy mice.

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ANKYLOSING SPONDYLITIS COMPLICATED BY HYPOPHOSPHATASIA AND RENAL COMORBIDITY: A CASE REPORT

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Objective(s)

To highlight how renal comorbidity, pregnancy–postpartum period, latent tuberculosis infection, and rare genetic disorders influence treatment decisions in the management of ankylosing spondylitis (AS).

Material and Methods

A 25-year-old female patient with a 7-year history of ankylosing spondylitis and a solitary kidney secondary to vesicoureteral reflux was evaluated. Initial treatment consisted of nonsteroidal anti-inflammatory drugs (NSAIDs); however, full-dose therapy could not be administered due to renal comorbidity. During follow-up, the patient became pregnant, and the disease remained in remission throughout pregnancy. In the postpartum period, disease flare occurred with complaints of back and low back pain. Magnetic resonance imaging revealed bilateral active sacroiliitis.

Results

Biological therapy was planned; however, interferon-gamma release assay testing was positive. Following isoniazid prophylaxis, certolizumab therapy was scheduled, but the patient declined biological treatment. Postpartum lumbar magnetic resonance imaging demonstrated vertebral height loss, which was interpreted as early-onset osteoporosis. Genetic testing revealed a heterozygous mutation in the ALPL gene, consistent with hypophosphatasia, and a likely pathogenic mutation in the COL4A3 gene, prompting follow-up for possible Alport syndrome.

Conclusion(s)

As the patient achieved clinical remission with regard to ankylosing spondylitis, follow-up with NSAIDs was continued, and teriparatide therapy was initiated for early-onset osteoporosis. This case demonstrates how renal comorbidity, pregnancy–postpartum period, latent tuberculosis infection, and rare genetic disorders can significantly impact treatment decisions in ankylosing spondylitis. Coexisting genetic and systemic diseases necessitate a personalized treatment approach, and this case emphasizes the importance of disease activity, comorbidities, and patient preferences during the transition to biological therapy.

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THE SIMILARITIES AND DIFFERENCES BETWEEN ATYPICAL FEMORAL FRACTURES (AFFS) AND ATYPICAL PERIPROSTHETIC FEMORAL FRACTURES (APFFS): A SCOPING REVIEW

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Atypical Femoral Fractures (AFFs) and Atypical Periprosthetic Femoral Fractures (APFFs) are rare but significant orthopedic challenges, primarily linked to the long-term use of anti-resorptive agents like bisphosphonates.

Shared Etiology and Pathophysiology: The core pathology for both is substantially suppressed bone turnover due to prolonged BP exposure. This suppression causes microdamage to accumulate without repair, leading to bone hyper-mineralization and brittleness.

Clinically, they share hallmark features, including Prodromal thigh, groin pain lasting weeks to months. And radiologically, A transverse or short oblique fracture line originating at the lateral cortex with minimal comminution, Focal lateral cortical thickening. Leading to the poor outcomes, including delayed healing and high nonunion rates, due to the suppressed healing capacity.

Key Distinctions and Management lies in the context and surgical complexity: for context: AFFs occur in the intact femoral diaphysis and are defined by the ASBMR criteria; APFFs occur around a pre-existing femoral implant, which excluded by the ASBMR criteria. And for surgical Management: AFFs are primarily treated with Intramedullary Nailing. APFFs present a greater technical challenge, often requiring complex options like Open Reduction with Internal Fixation using plates with augmentation, or revision hip arthroplasty.

For both, the anabolic agent Teriparatide is a recommended adjunct to stimulate bone formation and overcome the suppressed bone turnover, thereby accelerating healing. The evidence suggests APFFs are a biologically distinct entity, and a reconsideration of the ASBMR criteria to include PFFs with atypical features is necessary.

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BONE DENSITY RESPONSE TO ROMOSOZUMAB IS MAINTAINED IN THE OLDEST OLD (≥80 YEARS): REAL-WORLD DATA FROM THE UK

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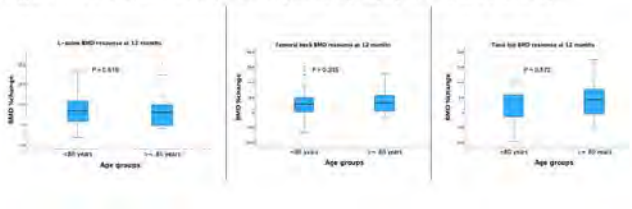
Objectives:
To compare 12-month BMD response to romosozumab in adults ≥80 years versus <80 years and to examine predictors of response, including baseline BMD and bone turnover (PINP).
Materials and Methods:
This prospective, real-world study was undertaken at a UK metabolic bone centre. Post menopausal women initiated on romosozumab for osteoporotic BMD and imminent fracture risk were included. DXA was performed at baseline and 12 months, and percentage BMD change at the total hip (TH), femoral neck (FN), and lumbar spine (LS) was calculated. Twelve-month BMD response was compared between adults ≥80 years and <80 years using independent t-tests (α=0.05). Linear regression models assessed predictors of response.
Results
Among 114 patients, 30 were ≥80 years. Age ranged from 42 to 91 years. The ≥80 group had significantly lower FN BMD, trabecular bone score (TBS), and eGFR, and higher QRISK3 scores compared with those <80 years (all p<0.005). At 12 months, romosozumab increased BMD by 13.1% (±10.3) at the LS, 5.7% (±8.4) at the TH, and 4.1% (±10.6) at the FN (all p<0.001). In multivariable models adjusted for age, baseline BMD, and baseline PINP, baseline BMD was negatively associated with response at the TH (B=−40, p=0.001) and LS (B=−32.2, p<0.001). Each 10 ng/mL increase in baseline PINP contributed to a 1.26% gain at the LS and 0.6% at the FN (both p<0.05). Age did not attenuate anabolic response at any site. Twelve-month BMD response was similar in patients ≥80 and <80 years at all sites (all p>0.05; Figure 2).
Conclusions
Romosozumab elicits significant bone density gains in adults ≥80 years, with preserved anabolic response across all skeletal sites. Age alone does not blunt treatment effect, while baseline turnover and bone density influence response magnitude. These findings support romosozumab as an effective option in the oldest-old, a population with the highest unmet fracture risk.

Figure 1. Baseline characteristics by age group (<80 vs ≥ 80 years)

Variable*	<80 years N= 84[1]	≥80 years N = 30[1]	p-value
Age	70.6 (±7.3)	82.7 (±3)	<0.001*
BMI	24.9 (4.7)	25.4 (8)	0.666
Waist to height ratio	0.54 (0.09)	0.49 (0.07)	0.285
Femoral neck T-score	-2.8 (0.63)	-3.1 (0.75)	0.083
Total hip T-score	-2.4 (0.86)	-2.8 (0.9)	0.045*
L-spine T-score	-2.5 (1.2)	-2.7 (1.2)	0.490
TBS tissue-thickness	1.174 (0.06)	1.142 (0.04)	0.018*
FRAX MOF	24.9 (10)	28.9 (17.6)	0.322
Vertebral fracture (%)	28.7	27.4	0.555
Hip fracture (%)	21.3	24.1	0.467
Alcohol intake (units per week)	3.2	1.2	0.147
Current smoker (%)	14.8	3.4	0.092
Rheumatoid arthritis (%)	10.3	3.8	0.444
Current systemic steroids (%)	7.5	3.4	0.399
Type 2 diabetes (%)	7.1	3.4	0.423
QRISQ3 total score	16.1 (6.8)	29.6 (6.8)	<0.001*
eGFR	77.5 (16.5)	70.5 (12.5)	0.032*
HbA1c	37.11 (7.1)	37.6 (4.5)	0.781
PINP (ng/ml)	53.5 (33.2)	60.9 (41.8)	0.451
Previous anti-resorptive (%)	51.9	50	0.675

[1]mean (±SD); %

Figure 2. Twelve months BMD response by age (<80 vs ≥ 80 years)



P413

NURSE'S ROLE IN PAIN ASSESSMENT FOR ADULTS WITH OSTEOGENESIS IMPERFECTA

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Objective
Osteogenesis imperfecta (OI) is a hereditary connective tissue disorder characterized by various phenotypic manifestations, including bone fragility, osteopenia, recurrent fractures, and progressive skeletal deformities, which can sometimes be lethal. Pain is a common experience for patients with OI, yet few studies address this issue. Also, a few healthcare professionals recognize this symptom. This study aims to evaluate the role of nursing in assessing pain and its intensity in OI patients.
Materials and Methods
Sociodemographic and clinical data were collected from OI patients treated in our department during 2025. Pain was evaluated using the Visual Analogue Scale (VAS), which measures pain intensity from 0 to 100 mm. Descriptive statistical analysis was performed.
Results
Ten patients (seven women) were evaluated (Table 1). The mean age was 53.2 years, and 3 patients were diagnosed in adulthood. According to the Sillence classification, OI type I was the most common form (n=5). The initial fractures primarily occurred in the lower limbs (n=6) during childhood. Kyphoscoliosis was the most prevalent musculoskeletal deformity (n=6). Bisphosphonates were the preferred anti-osteoporotic treatment (n=8). Most patients reported pain during the nursing consultation, with VAS score ranging from 10 to 60 mm. The highest pain levels were observed in patients who had experienced a recent fracture.
Conclusions
Our findings indicate that pain is a prevalent experience among adults with OI, affecting almost all patients in the study. However, in many existing studies, pain is often only assessed when a fracture occurs. Nursing professionals play a crucial role in evaluating this symptom.

Patient	1	2	3	4	5	6	7	8	9	10
Age (years)	71	34	42	52	53	63	44	57	57	59
Gender	Female	Female	Male	Female	Male	Female	Female	Male	Female	Female
Silence classification	Type I	Type I	Type III	Type III	Type I	Type I	Not classified	Type III	Type I	Type III
COL1A1 gene variant	Heterozygous c.769G>A p.(Gly257Arg)	Heterozygous c.751G>T p.(Gly251Cys)	Heterozygous c.1147G>A p.(Gly383Ser)	Heterozygous c.1147G>A p.(Gly383Ser)	Heterozygous c.471+1G>A (IVS5+1G>A)	Heterozygous c.751G>T p.(Gly251Cys)	Refused genetic testing	Heterozygous c.2299G>A p.(Gly767Ser)	unknown	Heterozygous c.3034G>A p.(Gly1012Ser)
First fracture age	31 y	7 y	12 m	8 m	5 y	16 y	Childhood	Neonatal	5 y	Neonatal
First fracture local	Patella	Radius and ulna	Femur	Radius and ulna	Femur	Femur	Femur	Vertebral	Femur	Forearm
Short stature	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	Yes
Mobility	Independent	Independent	Wheelchair	Wheelchair	Crutches	Independent	Crutches	Wheelchair	Independent	Wheelchair
Blue sclera	Yes	No	No	No	Yes	No	Yes	Yes	Yes	No
Kyphoscoliosis	Yes	No	Yes	Yes	Yes	No	No	Yes	No	Yes
Hearing lost	Yes	No	No	No	Yes	No	No	Yes	Yes	No
Tibial anterovatum	No	No	Yes	No	No	No	No	Yes	Yes	No
Codfish vertebrae	No	No	No	No	No	No	Yes	Unknown	No	No
Vitamin D supplementation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Calcium supplementation	Yes	Yes	No	Yes	Yes	No	Yes	No	No	No
Oral biphosphonate	Yes	No	No	No	No	No	Yes	No	Yes	No
Intravenous biphosphonate	No	No	Yes	Yes	Yes	Yes	No	No	No	Yes
Physical exercise	No	Yes	No	No	No	No	No	No	No	No
Type of exercise	0	30'walking	0	0	0	0	0	0	0	0
VAS	50mm	60mm	10mm	40mm	50mm	50mm	0mm	30mm	50mm	40mm

Table 1 - Socio-demographic and clinical data of patients with Osteogenesis imperfecta (OI)

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ACUTE-PHASE RESPONSE FOLLOWING ZOLEDRONIC ACID INFUSION IN OSTEOPOROSIS PORTUGUESE PATIENTS

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Objective

Zoledronic acid infusion is commonly associated with an acute-phase response (APR), a transient inflammatory reaction characterized by fever, myalgia, and flu-like symptoms. This study aims to describe the frequency of APR and the predictors associated with its occurrence in a Portuguese osteoporosis population receiving zoledronic acid infusion.

Material and Methods

Prospective observational study of patients who received zoledronic acid infusion between May and December 2025 in our Fracture Liaison Service. APR was defined as the presence of at least one symptom (fatigue, myalgia, malaise, diffuse pain, headache, or fever) within 72 hours post-infusion and was assessed through a nurse-led telephone consultation one week after treatment.

Baseline demographic and clinical characteristics, comorbidities, analytical parameters, and infusion-related variables were collected. Baseline characteristics were compared according to APR status. Categorical variables were compared using the χ^2 test or Fisher's exact test, and continuous variables using Student's t-test or Mann–Whitney U test, as appropriate. A p-value <0.05 was considered statistically significant.

Variables considered clinically relevant and/or associated with APR in univariate analyses were included in the multivariable logistic regression model.

Results

Our cohort included 105 patients who received zoledronic acid infusion, and APR symptoms were observed in 53 (50.5%). Socio-demographic and clinical data are presented in Table 1.

The most frequent symptoms were fatigue (64.2%), myalgia (62.3%), malaise (58.5%), and diffuse pain (53.8%). Symptom onset occurred predominantly on the first (50.0%) and second day (66.0%), and symptoms typically lasted 1-2 days. First zoledronic acid infusion (OR 4.40, 95% CI 1.81–10.65, p=0.0010) and younger age (OR 0.93 per year, 95% IC 0.88–0.99, p=0.0246) were independently associated with APR symptoms in a multivariable logistic regression model.

Sex and calcium levels were not independently associated with APR.

Conclusion

APR following zoledronic acid infusion was frequent in this real-world osteoporosis cohort, particularly among younger patients and those receiving their first infusion. Nurse-led telephone follow-up proved to be a valuable strategy for the early identification and characterization of APR symptoms, reinforcing the pivotal role of nursing care in post-infusion monitoring, patient education, and timely symptom management.

Table 1 – Socio-demographic and clinical data of patients according to acute-phase response.

	Presence of APR		
	Yes (n=53)	No (n=52)	p
Female, n (%)	45 (84.9)	45 (86.5)	0.9887
Age (years), median [IQR]	71.00 [67.00–78.00]	77.00 [71.50–79.25]	***0.0088***
Previous fractures, n (%)			
Hip fracture	9 (17.0)	7 (13.5)	0.8180
Vertebral fracture	17 (32.1)	18 (34.6)	0.9450
Non-hip or vertebral fracture	10 (18.9)	15 (28.8)	0.3315
Comorbidities and risk factors, n (%)			
Arterial hypertension	17 (48.6)	39 (55.7)	0.4892
Diabetes mellitus	10 (18.9)	12 (23.1)	0.4976
Thyroid disease	8 (15.1)	5 (9.6)	0.4287
Obesity	13 (24.5)	11 (21.2)	0.0577
Chronic kidney disease	0 (0)	2 (3.8)	0.2429
Anxiety syndrome	3 (5.7)	5 (9.6)	0.4882
Depressive syndrome	10 (18.9)	13 (25.0)	0.6005
Alcohol abuse	3 (5.8)	3 (5.7)	1.0000
Smoking	3 (5.8)	6 (11.3)	0.4882
Analytical tests at baseline			
Levels of calcium (mg/dL), median [IQR]	9.62 [9.31–9.89]	9.40 [9.09–9.66]	***0.0130***
Levels of 25-hydroxyvitamin D (ng/mL), median [IQR]	26.10 [21.70–37.00]	28.80 [21.45–39.65]	0.4257
Levels of alkaline phosphatase (U/L), median [IQR]	72.00 [57.00–99.00]	63.00 [57.50–81.00]	0.1955
Levels of phosphate (mg/dL), mean ± (SD)	3.41 ± 0.56	3.38 ± 0.48	0.7584
Glomerular infiltration rate (mL/min./1.73 m2)	60.00 [60.00–60.00]	60.00 [60.00–60.00]	1.0000
Oral bisphosphonate prior use, n (%)	17 (32.1)	19 (36.5)	0.7825
First IV zoledronic acid infusion, n (%)	35 (66.0)	15 (28.8)	***0.0003***

Legend: APR – Acute-Phase Response; p – p value; n – number; IQR – Interquartile Range; SD - Standard Deviation; IV – Intravenous.

P415

DISUSE OSTEOPOROSIS: A CASE SERIES

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Objective: To describe a series of patients with disuse osteoporosis (DOP) and assess clinically relevant bone mineral density (BMD) changes by paired dual-energy X-ray absorptiometry (DXA) following anti-osteoporotic treatment.

Material and Methods: Patients with DOP followed in a rheumatology department were analysed. DOP was defined as a T-score ≤ −2.5 occurring in the context of reduced mechanical loading due to prolonged immobilization (bed-bound or wheelchair dependency), in the absence of primary bone disease. BMD was assessed at baseline and follow-up by DXA (Lunar DPX GE®) at the lumbar spine, femoral neck, total hip and radius. Least significant change (LSC) of the DXA scanner (0.03 g/cm³) was used to define a meaningful BMD variation. Anti-osteoporotic treatment was prescribed according to clinical indication. Paired comparisons were performed using the Wilcoxon signed-rank test.

Results: Seven patients were analysed (median age 53 years;19–81); 14% were female, with a median follow-up of 20 months (4–42). Conditions associated with reduced mechanical loading included neuromuscular disease, spinal cord injury and post-stroke hemiparesis. Additional secondary osteoporosis risk factors were common, including corticosteroid use, inflammatory disease, hypogonadism and prior oncological treatment. Prior fragility fractures were present in 71.4% of patients, mainly vertebral. Five patients had paired baseline and follow-

up DXA (median interval 37.5 months; 26–48) and were evaluable for longitudinal BMD analysis. The median treatment duration before follow-up DXA was 20 months (12–65). Four patients were treated with denosumab and one with teriparatide (12 months of follow-up). BMD increased at the lumbar spine (+15.1%), femoral neck (+12.3%), total hip (+18.1%) and total radius (+6.38%, n=1); a decrease of −1.14% at the one-third radius was observed in one patient (n=1). No differences were observed. One patient sustained a distal femur fragility fracture after 24 months of denosumab treatment.

Conclusion: In this cases series, denosumab was associated with increases in BMD in patients with DOP, in line with previous reports. Data on the use of teriparatide in this specific population are currently lacking. Further prospective studies are needed to define treatment strategies in DOP.

Table 1 - BMD Changes After Treatment with Denosumab (n=4) and teriparatide (n=1)

DXA Anatomical Measurement sites	Pre-treatment median BMD g/cm² (range)		Post treatment median BMD g/cm² (range)	Difference post-treatment (% of improvement)
	All (n=7)		(n=4)	
Lumbar spine	1.115 (0.848 to 1.335)	(0.855 to 1.335)	1.301 (1.019 to 1.416)	+0.144 (↑15.1%) *
Femoral Neck	(0.368 to 0.957)	(0.368 to 0.578)	(0.424 to 0.632)	(↑12.3%) *
Total hip	0.585 (0.362 to 0.794)	0.532 (0.362 to 0.618)	0.588 (0.454 to 0.765)	+0.080 (↑18.1%) *
		(n=1)		
Radius 33%	0.703	-	0.695	-0.008 (↓1.14%)
Total Radius	0.564	-	0.600	+0.036 (↑6.38%) *

*Variation higher than the least significant change of the DXA scanner Lunar DPX GE
BMD - Bone Mineral Density; DXA - dual-energy X-ray absorptiometry

P416

FROM WRIST TO HIP: CAN EARLY FLS INTERVENTION AFTER A DISTAL RADIUS FRACTURE PREVENT THE NEXT FRAGILITY FRACTURE

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Background

Distal radius fracture (DRF) is frequently the first clinical manifestation of osteoporosis and a strong predictor of future major fragility fractures, particularly hip fractures. The risk of a subsequent hip fracture is reported to be **1.4–3.5 times higher** following a DRF, with the majority occurring within two years. This "imminent risk" period represents a key opportunity for secondary prevention. Despite NICE and Royal Osteoporosis Society (ROS) guidance, many patients with DRF are not referred for bone health assessment. The Fracture Liaison Service (FLS) model provides a structured approach for identification, investigation, and treatment. We evaluated whether FLS-led management following DRF at Southend University Hospital reduced the risk of subsequent hip and other fragility fractures.

Methods

We retrospectively reviewed all adults aged ≥50 years presenting with an index DRF between January 2018 and December 2024. Patients were stratified into:

(1) **FLS group:** completed FLS pathway (assessment ≤90 days, DXA scan, initiation of anti-osteoporosis therapy, and falls assessment).
(2) **Non-FLS group:** no referral or incomplete pathway.

The primary outcome was hospital admission with a hip fracture within 24 months. Secondary outcomes included any new major osteoporotic fracture and treatment adherence. Kaplan–Meier survival analysis and multivariable Cox regression were used to estimate hazard ratios (HR) adjusted for age, sex, comorbidities, and previous fractures.

Results

Among **612 eligible patients** (mean age 72 ± 10 years; 78% female), **48%** received full FLS follow-up. Over 24 months, **15.6%** of the non-FLS group sustained a second fragility fracture compared with **8.9%** in the FLS group. Hip fractures occurred in **5.1% vs 2.4%**, respectively. FLS management was associated with a **34% lower hazard** of any secondary fracture (adjusted HR 0.66; 95% CI 0.48–0.91; p = 0.01).

Conclusions

Patients presenting with a distal radius fracture face a high imminent risk of subsequent hip or major fragility fractures. Comprehensive post-fracture management through an FLS pathway significantly reduced secondary fracture rates within two years. These findings reinforce the value of universal FLS coverage and early bone-health optimisation to transform the distal radius fracture from a precursor to a preventable event in the fracture-care continuum.

Keywords: distal radius fracture; hip fracture; fragility fracture; FLS; osteoporosis; secondary prevention; UK

P417

TREAT-TO-TARGET APPROACH IN OSTEOPOROSIS: A REAL-WORLD COMPARISON OF TERIPARATIDE AND DENOSUMAB

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Objective: To compare the effectiveness of teriparatide and denosumab in achieving a predefined Treat-to-Target (T2T) goal in a real-world osteoporosis (OP) cohort.

Material and Methods: A retrospective observational study was conducted including OP patients treated with teriparatide for 18-24 months or denosumab, with baseline and follow-up dual-energy X-ray absorptiometry after 2-3 years. The index skeletal site (IS) was defined as the site with the lowest baseline T-score. The primary outcome was target attainment, defined as achieving a T-score > −2.5 at the IS among patients below target at baseline; target maintenance was assessed separately. Secondary outcomes included site-specific target status and absolute bone mineral density (BMD) change.

Results: Forty-four patients were included (21 teriparatide, 23 denosumab). Most were female (84.1%), with a median treatment initiation age of 70 years. Prior fragility fractures (68.2%) and previous bisphosphonate exposure (65.9%) were common. Baseline characteristics were comparable between groups. The lumbar spine was the most frequent IS, with median baseline T-score of −3.5 in the teriparatide group and −3.1 in the denosumab group (p = 0.254). Among patients below target at baseline, target attainment occurred in 17.6% of teriparatide-treated and 36.4% of denosumab-treated patients (p=0.288). No patient below target at all three skeletal sites achieved simultaneous target attainment. The lumbar spine (LS) demonstrated the highest

attainment rates (28.6% vs 46.7%; p = 0.316). All teriparatide-treated patients already above target maintained target status (n = 4). Median BMD gains at the IS were similar between treatments (0.044 g/cm² vs 0.053 g/cm²; p=0.885), with greater gains at the LS (0.086 vs 0.065 g/cm²; p = 0.696). Treatment type was not associated with BMD change in adjusted analyses; smaller gains were observed with increasing age and higher baseline T-scores. Fragility fractures during follow-up were infrequent (2 vs 1; p=0.599).

Conclusion: In this real-world cohort, attainment of the predefined T2T goal was modest. Improvements were greatest at the LS, and no significant differences were observed between teriparatide and denosumab in adjusted BMD changes, highlighting challenges of implementing a T2T strategy in routine OP care.

Table 1. Baseline characteristics of the study population according to treatment strategy

Variable	Teriparatide (n=21)	Denosumab (n=23)	Overall (n=44)	*p*-value
Female, n (%)	19 (90.5)	18 (78.3)	37 (84.1)	0.416
Age at treatment initiation, median (IQR)	70 (59-80)	74 (60-79)	70 (60-79)	0.638
BMI, median (IQR)	23.5 (22.5-29.4)*	24.7 (21.0-27.3)	24.2 (22.0-27.9)**	0.800
Prior fragility fracture, n (%)	16 (76.2)	14 (60.9)	30 (68.2)	0.276
Prior bisphosphonate therapy, n (%)	15 (71.4)	14 (60.9)	29 (65.9)	0.460
ISS, n (%)				
- LS	9 (42.9)	14 (60.9)	23 (52.3)	
- FN	9 (42.9)	6 (26.1)	15 (34.1)	0.453
- TH	3 (14.3)	3 (13.0)	6 (13.6)	
Baseline T-score at ISS, median (IQR)	-3.5 (-4.1; -3.0)	-3.1 (-3.7;-2.8)	-3.2 (-4.0;-2.8)	0.254

Values are expressed as median (IQR) or as n (%); *available data in 19 patients; **available data in 42 patients; BMI – body mass index; FN – femoral neck; ISS – index skeletal site; LS – lumbar spine; TH – total hip

Table 2. Treat-to-target outcomes according to baseline target status and changes in bone mineral density

Outcome	Teriparatide (n=21)	Denosumab (n=23)	*p*-value
Target attainment (baseline ≤ –2.5)			
ISS	3/17 (17.6)	8/22 (36.4)	0.288
LS	4/14 (28.6)	7/15 (46.7)	0.316
FN	3/13 (23.1)	3/12 (25.9)	1.000
TH	1/8 (12.5)	1/7 (14.3)	1.000
Target maintainment (baseline > –2.5)			
ISS	4/4 (100)	NA	-
LS	6/6 (100)	6/6 (100)	-
FN	6/8 (75)	8/9 (88.9)	0.576
TH	9/9 (100)	10/10 (100)	-
Δ BMD (g/cm²)			
ISS	0.044 (-0.038-0.165) (n=19)	0.053 (0.004-0.085) (n=19)	0.885
LS	0.086 (-0.020-0.166) (n=18)	0.065 (0.039-0.121) (n=18)	0.696
FN	0.012 (-0.012-0.059) (n=19)	0.035 (0.001-0.062) (n=19)	0.370
TH	0.024 (0.001-0.057) (n=18)	0.035 (0.012-0.072) (n=17)	0.443

Values are expressed as median (IQR), with the number of patients with available data indicated in parentheses, or as n/N (%), where N represents the number of patients with available data for each analysis. Δ indicates change from baseline to follow-up. BMD – bone mineral density; FN – femoral neck; ISS – index skeletal site; LS – lumbar spine; NA – not available; TH – total hip.

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REDUCTION OF SUBCHONDRAL BONE MARROW LESIONS CONCURRENT WITH EARLY RECOVERY OF TRABECULAR BONE MINERAL DENSITY IN KNEE OSTEOARTHRITIS FOLLOWING RANKL INHIBITOR ADMINISTRATION FOR THE TREATMENT OF OSTEOPOROSIS: IMPLYING HUMAN OSTEOPOROTIC OSTEOARTHRITIS?

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Objective
To investigate the correlation between reduction of subchondral bone marrow lesions (BMLs) and early recovery of trabecular bone mineral density (TBMD) in osteoporosis (OP) patients with symptomatic knee osteoarthritis (KOA).
Material and Methods
A retrospective study included 56 OP patients (mean age 58.05±5.19 years) with symptomatic KOA and subchondral BMLs refractory to nonsteroidal anti-inflammatory drug therapy. Patients received a RANKL inhibitor (60mg subcutaneously) for OP treatment. Clinical symptoms (visual analog scale and Western Ontario and McMaster Universities Osteoarthritis Index scores), health-related quality of life (Short Form-36), BMLs (modified Whole-Organ magnetic resonance imaging Score and area measurement), knee TBMD (computed tomography Hounsfield unit values), systemic bone mineral density (dual-energy x-ray absorptiometry), and bone turnover markers were evaluated at baseline, 4 weeks, 3 months, and 6 months.
Results
Following a RANKL inhibitor administration, knee pain significantly decreased from baseline (6.64±0.79) at 1-week (4.80±0.93), persisting through 3-month follow-up (1.43±0.49) (all P<0.05). BML scores improved from baseline (5.13±0.96) at 4-week (3.80±0.74) and 3-month (2.82±0.98) follow-ups (both P<0.05), with improvement rates of 26.79% and 46.42% respectively. BML areas decreased from 467.39±112.43 mm² at baseline to 343.38±93.55 mm² at 4 weeks and 294.30±94.55 mm² at 3 months (both P<0.05). Computed tomography Hounsfield unit values significantly increased from baseline (99.61±9.82) to 4-week (110.88±9.67) and 3-month (123.32±11.34) follow-ups (both P<0.05). At 3-month follow-up, reduction in BML areas positively correlated with increased computed tomography Hounsfield unit values (r=0.329, P<0.05). Bone turnover markers significantly decreased, and systemic bone mineral density improved at 6-month follow-up.
Conclusions
In this clinical study, after the application of a RANKL inhibitor for OP treatment, BMLs and knee pain were effectively reduced in OP patients with symptomatic KOA and BMLs. In addition, the correlation between early recovery of TBMD and reduction in BML area was also demonstrated. This study supports the concept of osteoporotic osteoarthritis (OPOA) and highlights the potential of subchondral bone as a target for KOA treatment.

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PULSE DISTRIBUTION ANALYSIS (PDA) AS A DIGITAL BIOMARKER FOR QUANTIFYING MICROCIRCULATORY RESPONSES AND PREDICTING FUNCTIONAL RECOVERY IN ADHESIVE CAPSULITIS

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Objective

To evaluate the clinical utility of the Pulse Distribution Analysis (PDA) scoring system—a non-invasive digital biomarker—for quantifying microcirculatory hemodynamic responses and predicting functional recovery in patients with adhesive capsulitis.

Materials and Methods

Seventy patients with adhesive capsulitis were evaluated using Shoulder Pain and Disability Index (SPADI) and PDA scores derived from radial blood pressure waveforms before and after 3 weeks treatment to characterize longitudinal hemodynamic patterns. To validate the clinical relevance of PDA, four stratification strategies were compared: (1) changes in SPADI pain scores; (2) changes in SPADI disability scores; (3) total SPADI scores classified by median split; and (4) disease duration. Subjects were stratified using median-split and extreme-responder contrast approaches to determine which clinical parameter best reflected the physiological changes captured by the PDA scoring system.

Results

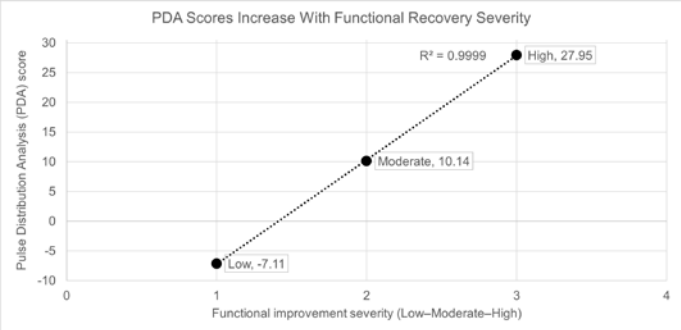
Stratification based on changes in SPADI disability scores demonstrated the strongest association with PDA variations. This functional recovery metric achieved perfect between-group explanatory power ($R^2 = 1.0$) and an inter-group correlation coefficient approaching 1.0, indicating clear separation of vascular response patterns. In contrast, stratification based on pain improvement, overall disease severity, or disease duration showed greater within-group variability and reduced discriminatory performance. Individual-level scatter plot analysis further demonstrated a moderate correlation ($R \approx 0.55$) between PDA score changes and functional disability improvement.

Conclusion

The PDA scoring system represents a robust digital biomarker that closely aligns with functional recovery in adhesive capsulitis. As microvascular responses were more strongly associated with disability improvement than with pain relief or disease duration, PDA provides an objective and physiologically meaningful tool for monitoring rehabilitation progress and predicting recovery trajectories.

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Conflict of Interest: The authors declare no conflicts of interest.



P420

A MIDDLE AGE MAN WITH OSTEOGENESIS IMPERFECTA SWITCHING FROM DENOSUMAB TO ZOLENDRONIC ACID

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A 60-year-old man was referred to the Endocrine Clinic in Nov 2025 for newly diagnosed osteogenesis imperfecta (OI) with history of recurrent fracture. He was detected to have OI after family screening of his son who was the proband of the family. The patient had fracture of metatarsal during sports activity at primary school age, then had fracture of the right upper arm during Taekwondo at age 22. He fell from stairs at age 58 and fractured his left 4th and 5th metatarsal. He did not receive any operation for fracture before. For family history, his mother had history of recurrent fracture. His son had fracture at 2-3 years old then second fracture at age 20s. His elder brother and elder sister did not have any history of fracture. Physical examination showed short stature of height 1.52m. BMI was 22.8. There was mild blue sclera and transparent teeth but no abnormal facies, no hearing loss, no limb deformity and no joint laxity. There was no thoracic cage deformity and no heart murmur. His genetics test revealed that he was heterozygous for the familial COLIA2 p.Gly193Ser missense variant, c. 577G>A. This variant has been reported in multiple cases of osteogenesis imperfecta type 1. The genetic mutation was the same as the proband.

Blood test showed normal bone profile. DXA in 11/2024 showed T score -4.4 at the lumbar spine, T score -2.7 at left total hip and T score of -2.2 at the left femoral neck(FN). The patient was given denosumab (Dmab) 60mg sc in Feb 2025 and Aug 2025 by orthopaedic surgeon. The b-CTX was below 50pg/ml (35-836) and P1NP was below 10 mcg/l (30-110) in Nov 2025. After discussion on the drug treatment, he decided to change to zolendronate 5mg IV infusion, to be scheduled in Feb 2026. The dilemma in this case lies in the difficulty of deciding whether to continue Dmab or switching to bisphosphonate. A case series on 10 adults with OI reported 2.6% gain in BMD at LS (P=0.100) and 4.4% BMD gain at FN (P=0.051) after using Dmab for 12 months. Bisphosphonate in OI patients was studied in 8 studies as compared with placebo, which showed BMD rise in LS in all studies and BMD rise in FN in some studies. Though fracture risk reduction was proven only in two of the studies. Hence, bisphosphonate has more robust evidence. On the other hand, the risk of BMD loss and risk of multiple vertebral collapse upon switching from Dmab to bisphosphonate was explained. In order to minimize risk of rebound vertebral collapse, the patient was planned have bone resorption marker, b-CTX, checked every 3 months after stopping Dmab and another dose of zolendronate may be needed earlier if there is rapid rise in b-CTX.

P421

COMPARISON OF HISTOLOGICAL AND BIOCHEMICAL FINDINGS WITH MAGNETIC RESONANCE IMAGING ON THE DEGENERATION SEVERITY OF MENISCUS

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Objectives: The aim of this study is to determine whether degeneration severities of meniscus assessed using magnetic resonance imaging (MRI) would well estimate those assessed using histological and biochemical examinations.

Material & Methods: Seven lateral menisci from knees with osteoarthritis undergoing total knee arthroplasty (study group) and five from normal controls (control group) were examined for this study. Degeneration severities of the menisci were graded using MRI, histologic and biochemical examinations of the menisci were then performed. Comparative analyses of MRI grading and results of histological/biochemical examinations of the menisci were performed in each group. In addition, comparative analyses of histological/biochemical conditions were performed between specimens of the study group and the control group showing grade 0 on MRI.

Results: All specimens from the control group showed grade 0 on MRI and their histology was also grade 0. In addition, no significant differences in biochemical results were observed among the specimens of the control group. In the lateral meniscus from the study group showing degeneration on MRI it was found that the water and proteoglycan contents increased with increasing grade of degeneration whereas the collagen content decreased. The meniscus specimens of the control group and the study group showing grade 0 on MRI had similar histologic findings but had different biochemical properties. The grade I, II degenerations on MRI were not well matched with the histologic findings in the study group.

Conclusions: Severities of meniscus degeneration on MRI did not well reflect the histologic findings of the meniscus. This finding may be due to the water content of the meniscus. The factors of the high signal intensity of the degenerated lateral meniscus on MRI may be due to the decreased component of collagen and increased proteoglycan. Our findings suggested that caution should be taken when the severities of meniscus degeneration on MRI are attributed to histologic severities of degenerated meniscus.

P422

OPEN WEDGE HIGH TIBIAL OSTEOTOMY WITH BONE MARROW DERIVED MESENCHYMAL STEM CELL FOR MEDIAL KNEE OSTEOARTHRITIS

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Objectives: To analyze the results of isolated autologous bone marrow derived mesenchymal stem cell (MSC) transplantation in conjunction with multiple drilling and medial opening-wedge high tibial osteotomy (HTO).

Material & Methods: Thirty knees in 29 patients with medial uni-compartmental osteoarthritic knee with genu varum were allocated to the cell-recipient group (n=15) or control group (n=15). Patients who had more than 2 compartment osteoarthritic knee joint, malalignment of the knee from femoral causes or more than 15 degree varus deformity were excluded. All patients underwent HTO and cartilage restoration procedure (multiple drilling or micro fracture). The cellrecipient group received transplantation of isolated bone marrow concentrate containing MSCs with hyaluronic biomaterial and fibrin glue whereas the control group only received microfracture alone. The primary outcome measure was International Knee Documentation Committee (IKDC) score at intervals of 3, 6, 9 months and 1 year postoperatively. Secondary outcome measures were 1-year postoperative Magnetic Resonance Observation of Cartilage Repair Tissue (MOCART) scores and secondary arthroscopic findings at implant removal surgery.

Results: Preoperatively defect size and ICRS grade were larger and more severe in the study group. Postoperatively filling up size with cartilage and recovery rate of chondral lesion were superior in the study group. Coverage size of study and control group were 4.4 ± 1.0 and 0.9 ± 0.4, and recovery rate were 79.6 ± 15.4 and 32.0 ± 20.9, respectively. ($p < 0.001$, both categories) MOCART and Koshino score were also better in the stem cell therapy group. (73.7 ± 10.4 and 51.5 ± 10.6 in MOCART and 2.8 ± 0.4 and 1.6 ±0.5 in Koshino score, $p < 0.001$, both categories) IKDC scores improved from 51.9 ± 12.3 to 81.1 ± 5.5 in the study group and 50.5 ± 12.8 to 80.2 ± 4.6 in the control group, respectively. ($p<0.001$, both groups) However there were no difference between two groups.

Conclusions: HTO and cartilage restoration procedure improved knee symptom in medial compartment knee osteoarthritic patients. And regenerative ability of chondral lesion was superior in isolated autologous bone marrow derived MSC transplantation group of patients over 50 years old.

P423

PERFORMANCE OF AN OPPORTUNISTIC SCREEN OF LOW BONE DENSITY FROM STANDARD X-RAY IN THE SINGAPORE POPULATION

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Objective: To assess the performance of an artificial intelligence opportunistic screening tool for low bone mineral density (BMD), Rho (which was validated using North American datasets with T-Scores calculated using white female references values), in patients from Singapore (where T-Scores are calculated with Singaporean reference values). We also aimed to identify the optimal Rho Score threshold to identify low BMD, with a preference for a high specificity to correctly rule-in low BMD.

Material and Methods: We identified patients at the Tan Tock Seng Hospital who had undergone a Rho-eligible x-ray (lumbar spine, thoracic spine, chest, pelvis, hand/wrist and knee) within 2020-2025 and a paired Dual-energy X-ray Absorptiometry (DXA) test within 1 year. These x-rays were retrospectively analyzed by Rho, and ground truth low BMD was determined using the lowest DXA T-Score (of lumbar spine, femoral neck or total hip) calculated with Singaporean reference values. We calculated the area under the receiver-operating characteristic curves (AUC) for the Rho Score at identifying low BMD (T-Score < -1) and identified the optimal Rho Score to yield a high specificity with reasonable sensitivity using the R package cutpointr.

Results: In 409 patients (77% female; 50-100 years of age; 72% low BMD by DXA), FRAX-Rho had an AUC of 0.85 (0.81-0.88). At a Rho Score of 7, specificity was 0.86 (0.81-0.91) and sensitivity was 0.65 (0.61-0.70).

Conclusion: Rho demonstrated high accuracy for identifying potential low BMD in Singapore patients. A score of 7 or higher should be used to flag patients as likely having low BMD. Customizing this threshold is key to optimizing device performance in different populations.

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MURIBACULUM GORDONCARTERI-DERIVED SAM MITIGATES RADIATION-INDUCED OSTEOPOROSIS VIA PROMOTING NUCLEOTIDE SYNTHESIS AND DNA REPAIR

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Objectives

Ionizing radiation (radiotherapy, spaceflight radiation, nuclear accidents) is a confirmed inducer of bone loss and osteoporosis. Improved cancer survival and deep-space exploration make radiation-induced bone injury an urgent challenge, with astronauts facing prolonged low-dose radiation risks. Mainstream treatments regulate bone metabolism broadly instead of targeting radiation-specific mechanisms. This non-specificity limits efficacy and raises long-term safety concerns, underscoring the need for targeted interventions. The "gut-bone axis" is pivotal for skeletal homeostasis, as intestinal microbiota and their metabolites modulate immunity, metabolism, and bone health. However, radiation's impact on gut microbiota and the causal link between radiation-induced dysbiosis and bone loss remain unclear, hampering microbiota-targeted therapies.

Material and Methods

Irradiated mice received FMT, with bone protection verified via microstructure and turnover markers. Fecal multi-omics sequencing (metagenomics, broad-target metabolomics, whole-genome sequencing) identified key bacteria (*Muribaculum gordoncarteri*) and metabolite (S-adenosylmethionine, SAM). Irradiated mice were administered *M. gordoncarteri* or SAM; engineered *Escherichia coli* confirmed SAM's synthesis pathway and bone-protective effect. Bone marrow stromal cells from SAM-supplemented/non-supplemented mice underwent scRNA-seq. Nucleotide metabolic sequencing, DNA damage staining, and electrophoresis evaluated nucleotide synthesis and DNA repair.

Results

FMT from healthy mice significantly improved osteoporosis in irradiated mice by boosting osteogenesis-related gene expression. Metagenomic sequencing revealed radiation altered intestinal microbial profiles, with reduced flora abundance, while supplementary *M. gordoncarteri* counteracted radiation-induced bone loss and enhanced osteogenic activity. Whole-genome sequencing of *M. gordoncarteri* indicated radiation activated its amino acid metabolism pathways. SAM was identified as the key metabolite mediating *M. gordoncarteri*'s bone protection. *M. gordoncarteri* expresses the *metK* gene to produce synthetase, catalyzing methionine conversion to SAM—gastrointestinal supplementation of *metK*-engineered *Escherichia coli* effectively prevented radiation-induced osteoporosis. The scRNA-seq showed radiation caused DNA damage in osteogenesis-related cells, which SAM reversed by activating DNA repair pathways. Nucleotide metabolism sequencing confirmed SAM promoted nucleotide synthesis in these cells, enhancing DNA repair against radiation damage. Clinical data linked intestinal microbiota changes, SAM levels, and radiation-induced bone mineral density alterations.

Conclusion

This study confirms gut microbiota mediates radiation-induced osteoporosis, identifying *M. gordoncarteri*-derived SAM as a key bone protector. SAM mitigates osteoblast DNA damage via enhancing nucleotide synthesis and DNA repair, clarifying the gut-bone axis' role in radiation exposure. The protection of *M. gordoncarteri* and SAM suggests broader systemic radioprotection potential, and clinical-preclinical consistency strengthens translation for radiotherapy patients and astronauts.

P425

OSTEOBLASTIC 11B-HSD1-MEDIATED LOCAL GLUCOCORTICOID REACTIVATION DRIVES GLUCOCORTICOID-INDUCED OSTEOPOROSIS

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Objective:
Glucocorticoid-induced osteoporosis (GIOP) is a major clinical challenge, yet the contribution of local glucocorticoid (GC) metabolism to skeletal toxicity remains poorly understood [1, 2]. 11β-hydroxysteroid dehydrogenase type 1 (11β-HSD1) amplifies GC signaling locally by converting inactive GCs to their active forms [3]. In our previous work, we showed that osteoblastic 11β-HSD1 mediates bone loss under metabolic stress [4]. In this study, we aimed to determine whether local GC reactivation driven by osteoblastic 11β-HSD1 contributes to bone loss in GIOP.

Methods:
A GIOP model was established in mice via oral corticosterone (CORT, 100 ug/ml) administration for 4 weeks. Bone microarchitecture and formation were quantified by micro-CT and dynamic histomorphometry. Systemic GC profiles were analyzed by ELISA, while local GC activation was assessed via gene expression of *11β-HSD1* and the GC-responsive gene *Gilz*. Osteoblast-specific 11β-HSD1 knockout mice (Bglap-Cre; Hsd11b1$^{flox/flox}$, CKO) were generated to evaluate the functional contribution of osteoblastic 11β-HSD1 to GC-induced bone loss.

Results:
CORT administration induced severe trabecular bone loss (BV/TV $p<0.05$ vs. vehicle, Fig. 1a) and marked suppression of bone formation (MAR: $p<0.05$ vs. vehicle, Fig. 1b). Although circulating levels of active GC (CORT) were unchanged (Fig. 1c), serum levels of inactive GC (11-dehydrocorticosterone) were significantly increased ($p<0.05$, Fig. 1d), indicating a dissociation between systemic GC exposure and skeletal damage. In contrast, bone tissue showed marked activation of local GC signaling, with significantly upregulated *Gilz* (GC-responsive gene, Fig. 1e) and *Hsd11b1* (Fig. 1f) expression (both $p<0.05$). Immunofluorescence confirmed that 11β-HSD1 was predominantly expressed in osteocalcin-positive osteoblasts rather than CTSK-positive osteoclasts (Fig. 1g), supporting the presence of osteoblast-localized GC reactivation. Importantly, osteoblast-specific deletion of 11β-HSD1 effectively protected against CORT-induced trabecular bone loss (Fig. 2). While WT mice showed significant reductions in BMD ($p<0.01$), BV/TV ($p<0.05$), and trabecular thickness (Tb.Th, $p<0.01$), these parameters were preserved in knockout mice (all $p>0.05$), supporting a causal role of osteoblastic 11β-HSD1 in mediating GC-induced bone toxicity.

Conclusion:
Our findings identify osteoblastic 11β-HSD1–mediated local GC reactivation as a key contributor to GC-induced bone loss. Targeting osteoblastic 11β-HSD1 may offer a bone-selective strategy to prevent GIOP.

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Figure 1

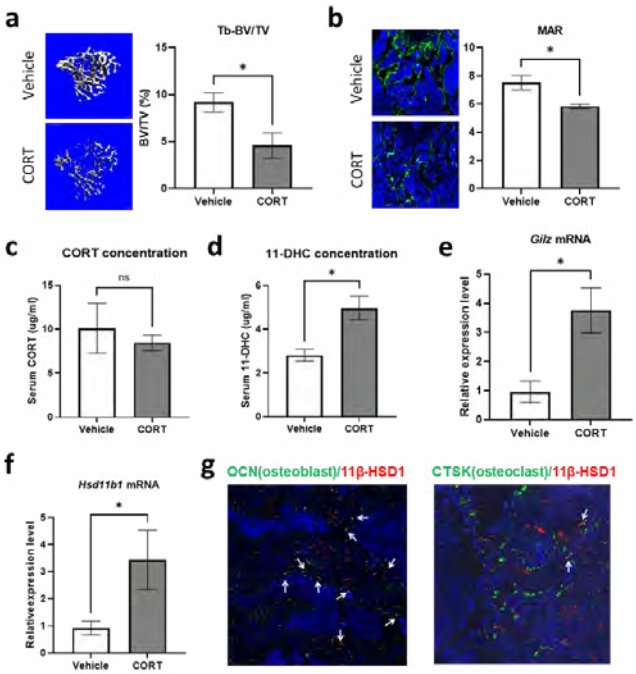


Figure 1. Evaluation of bone mass and local GC signaling in GIOP mice. (a) Tibial trabecular bone microarchitecture and BV/TV. (b) Calcein labeling of bone formation surfaces and MAR analysis. (c-d) Serum levels of CORT and 11-DHC. (e-f) Bone mRNA expression of GC-responsive gene *Gilz* and *Hsd11b1*. (g) Cellular localization of 11β-HSD1 in bone tissue.

Figure 2

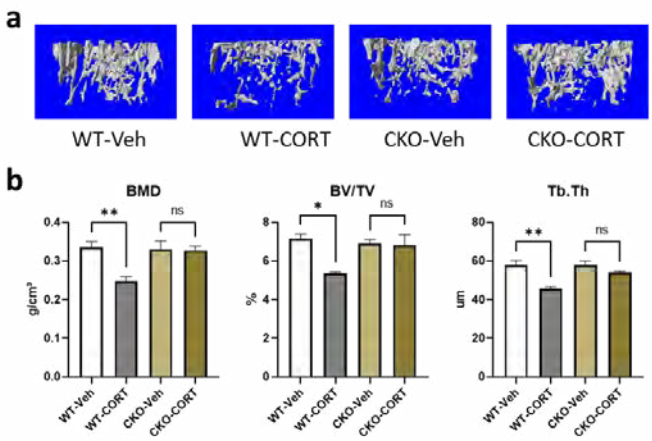


Figure 2. Osteoblast-specific 11β-HSD1 deletion attenuates CORT-induced trabecular bone loss. (a) Representative 3D reconstruction of tibial trabecular bone microarchitecture. (b) Quantification of BMD, BV/TV, and Tb.Th.

P426

PAIN CHARACTERISTICS AND CLINICAL ASSOCIATIONS IN MULTIPLE MYELOMA

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Introduction:
Pain is a common and debilitating symptom in multiple myeloma (MM), resulting from structural bone lesions or neurological complications. It can be classified as nociceptive, neuropathic, or mixed. This study aimed to characterize pain patterns and their clinical associations in patients with MM.
Methods:
We conducted a retrospective study of MM patients. Pain was classified as nociceptive, neuropathic, or mixed; patients with mixed pain were excluded from comparative analyses. Data on pain intensity (VAS), MRI findings, and treatments were collected. Statistical significance was set at $p < 0.05$.
Results:
The study included 55 patients. Bone pain was the most common presenting symptom, reported in 48 patients (87.3%). Pain localization was predominantly lumbar (n = 20, 36.4%), followed by thoracic (n = 12, 21.8%), cervical (n = 8, 14.5%), long bones (n = 3, 5.5%), and flat bones (n = 4, 7.3%). MRI revealed vertebral compression in 24 patients (43.6%), multiple vertebral lesions in 29 (52.7%), spinal cord compression in 9 (16.4%), epiduritis in 8 (14.5%), and fractures in 5 (9.1%). Bone involvement per CRAB criteria was present in 49 patients (89.1%). Pain was classified as nociceptive in 25 patients (45.5%), neuropathic in 21 (38.2%), and mixed in 9 (16.4%). Mean VAS was 6.7 ± 1.9, with 31 patients (56.4%) reporting severe pain (VAS ≥ 7). Analgesic treatment included non-opioids (n = 9, 16.4%), weak opioids (n = 16, 29.1%), and strong opioids (n = 25, 45.5%); 5 patients (9.1%) received palliative radiotherapy. Pain mechanisms were significantly associated with MRI findings: nociceptive pain was more frequently linked to structural lesions (multiple lesions 52% vs 38.1%, p = 0.047; vertebral compression 40% vs 23.8%, p = 0.002), whereas neuropathic pain was associated with neurological complications (spinal cord compression 23.8% vs 0%, p = 0.001; epidural involvement 19% vs 0%, p = 0.001). No significant difference in pain intensity was observed between nociceptive and neuropathic pain (p = 0.49).
Conclusion:
Pain in MM is common and heterogeneous, with nociceptive pain primarily associated with structural bone involvement and neuropathic pain linked to neurological complications. Recognizing pain mechanisms can guide targeted management and improve patient care.

P427

OSTEOPOROSIS AND HEARING LOSS: NATIONWIDE EVIDENCE FOR AN EXTRA-SKELETAL PROTECTIVE EFFECT OF ZOLEDRONIC ACID AND DENOSUMAB

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Objective
To investigate the association between osteoporosis or fragility fractures and the risk of hearing loss, and to evaluate whether long-acting injectable osteoporosis treatments, specifically zoledronic acid and denosumab, are associated with a reduced risk of hearing loss.
Material and Methods
This nationwide retrospective cohort study used data from Taiwan's National Health Insurance Research Database between January 2011 and December 2020. Adults aged ≥50 years with a diagnosis of osteoporosis or fragility fractures were identified and compared with matched controls without these conditions. Propensity score matching was performed using age, sex, and Charlson Comorbidity Index. A second matched cohort compared patients treated with zoledronic acid or denosumab with untreated individuals. Incident hearing loss was the primary outcome. Hazard ratios (HRs) and 95% confidence intervals (CIs) were estimated using Cox proportional hazards models, with subgroup and sensitivity analyses conducted to assess sex differences and treatment duration effects.
Results
Individuals with osteoporosis or fragility fractures had a significantly higher risk of hearing loss compared with matched controls (adjusted HR 1.36, 95% CI 1.33–1.38). Among affected individuals, treatment with zoledronic acid (HR 0.87, 95% CI 0.81–0.93) or denosumab (HR 0.91, 95% CI 0.85–0.97) was associated with a significantly lower risk of hearing loss compared with no treatment. Subgroup analyses demonstrated that zoledronic acid was protective in both sexes, whereas the association for denosumab reached statistical significance only in males. Sensitivity analyses indicated that treatment durations of 2–4 years were associated with the greatest risk reduction.
Conclusion(s)
Osteoporosis and fragility fractures are associated with an increased risk of hearing loss. Long-acting injectable osteoporosis therapies, particularly zoledronic acid, are associated with a reduced risk of hearing loss, suggesting a potential extra-skeletal benefit beyond fracture prevention.

P428

RE-VALIDATION OF THE FRACTURE RISK ASSESSMENT TOOL (FRAX®) IN TAIWAN: TWO COHORTS WITH TEN- YEAR FOLLOW-UP STUDY

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Objective

The Fracture Risk Assessment Tool (FRAX®) is widely employed in Taiwan to estimate the 10-year probability of osteoporotic fractures. However, its predictive validity has not been comprehensively evaluated in this context. This study aims to examine the real-world performance of the FRAX® algorithm in estimating 10-year fracture risk among Taiwanese adults and to determine clinically relevant risk thresholds based on local epidemiological data.

Material and Methods

The data was obtained from two community cohorts established in Taiwan between 2009 and 2010, comprising 1,976 individuals aged 40 years or older. Participants were followed for up to 10 years through linkage with the National Health Insurance Research Database. Ten-year fracture probabilities for major osteoporotic fractures and hip fractures were calculated using Taiwan-specific FRAX models with and without femoral neck bone mineral density (BMD). Receiver operating characteristic analyses were conducted to define optimal intervention thresholds.

Results

During follow-up, 213 participants (10.8%) sustained major osteoporotic fractures (MOF), and 93 (4.7%) experienced hip fractures (HF). In contrast, the model incorporating bone mineral density tended to underestimate fracture occurrence, particularly in older adults. The locally derived fracture prevention risk thresholds, 9.0%~9.1% for MOF and 4.5%~4.7% for HF in FRAX without BMD, provide the most appropriate balance between sensitivity and specificity (Youden index) compared to international reference values and provide evidence-based support for further DXA scans.

Conclusion

FRAX remains a useful fracture risk assessment tool in Taiwan; however, its intervention threshold varies depending on whether BMD is included and the local prevalence of osteoporosis. Re-calibrated thresholds may enhance risk stratification and support more effective fracture prevention strategies in Taiwanese populations.

P430

SINGLE DOSE OF ZOLEDRONATE AFTER HIP AND VERTEBRAL FRACTURE ON LONG-TERM MORTALITY: A REAL-WORLD EVIDENCE STUDY

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Objective

Randomized trials have demonstrated that single dose of zoledronate administration can reduce ten-year fracture risk in low-risk, early postmenopausal women. Whether a single dose of zoledronate confers long-term survival benefits after major osteoporotic fractures in real-world practice is unknown. This study aims to evaluate the association between single-dose zoledronate use and long-term all-cause mortality among patients hospitalized for hip or vertebral fractures in Taiwan.

Material and Methods

We conducted a nationwide retrospective cohort study (n=349,098,455) using Taiwan's National Health Insurance Research Database from 2009 to 2021. Patients hospitalized for a first hip or vertebral fracture and with no prior anti-osteoporosis medication were identified. Individuals who received a single dose of zoledronate were compared with those who received no anti-osteoporosis treatment. A 1:4 propensity score matching was performed based on age, sex, and Charlson Comorbidity Index. Participants were followed until 2022, and mortality risk was analyzed using Cox proportional hazards models.

Results

After matching, a total of 14,261 fracture patients (zoledronate = 2853) were included (mean age 77.6±10.0 years; 73.4% female). The baseline characteristics were well balanced between two groups. After a ten-year follow-up, mortality occurred in 46.7% of patients receiving a single dose of zoledronate and 50.0% of untreated patients. Subjects with osteoporosis fracture received the zoledronate usage were associated with a significantly lower risk of all-cause mortality (HR 0.93, 95% CI 0.87-0.99, p<0.05).

Conclusion

In this nationwide real-world study of older patients with osteoporotic fracture, a single dose of zoledronic acid was associated with lower ten-year mortality. These findings extend evidence from randomized trials to routine clinical practice and support the potential survival benefit of early zoledronate treatment after hip and vertebral osteoporotic fractures in Asian populations, even just a single dose.

P431

ANALYSIS OF IMMEDIATE POOR OUTCOMES AFTER KYPHOPLASTY IN TREATING OSTEOPOROTIC THORACOLUMBAR SPINAL FRACTURE WITH SINGLE SPINEJACK TO DEVELOP THE STRATEGY FOR CONDUCTING KYPHOPLASTY

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Introduction:
Unsatisfied outcomes were not uncommon even though kyphoplasty might achieved immediate relief of symptoms for osteoporotic thoracolumbar fractures with less invasiveness. We intended to develop a strategy for conducting kyphoplasty by reviewing those patients with poor results after kyphoplasty.
Methods: We conducted kyphoplasty by applying single Spinejack into fractured vertebra for 45 patients from January 2022 to December 2024. We usually chose the more collapsed side for placing the Spinejack by examining the pre-operative MR images if the pedicle was not fractured. We routinely started cement injection through the Spinejack with following supplement of cement according to the distribution of cement filling under intermittent fluoroscopy. We usually stopped cement injection as the pre-operative plan.
Results: The average SF-36 score improved from 52 to 81 in the follow-up. Six patients among 45 patients reported dissatisfaction outcomes immediately after kyphoplasty. There were 3 patients with cement leakage and 3 patients with neglected fractures or nearly united fracture by radiological diagnoses. However, they included 5 patients complaining of worse back pain and one patient remaining as painful as pre-operative status. Limited amount cement into nearly united vertebral fracture was attributed for the patient with back pain as pre-operative status. The neglected fractures were treated by another vertebroplasty/ kyphoplasty. The patients with cement leakage were treated conservatively in consideration of no post-operative neurological symptoms.
Conclusion: Pre-operative MRI should include a sagittal view of whole spine to prevent neglected fracture and nearly united fracture. More attention should be paid to fresh vertebral fractures that fracture comminution could cause higher possibility of cement leakage. Postponing kyphoplasty by one to two weeks should be considered to decrease development of cement leakage for new vertebral fracture.

P432

THE SATISFACTORY CLINICAL OUTCOMES WITH LIMITED COMPLICATION JUSTIFIED THE SURGICAL TREATMENT OF FRAGILE PELVIC FRACTURE FOR PATIENTS OLDER THAN 80 YEARS

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Introduction: Conservative treatment was previously preferred for older patients with fragile pelvic fractures in consideration of anesthetic risks. However, medical complications commonly developed because of bed-ridden status and co-morbidities. We therefore investigated the clinical outcomes of patients older than 80 years with fragile pelvic fractures to assess the feasibility of surgical treatment.
Methods: We explored the clinical database of our hospital to search for patients who were operated due to pelvic fractures from 2022 to 2024. We collected patients older than 80 years with intra-operative hemodynamics and postoperative follow-up at least one year. Seventeen patients with mean age of 83.9 ± 2.95 years were enrolled that were 6 male and 11 female patients. The majority of patients were classified as ASA III (68.8%) and ASA II (25.0%). Charlson Comorbidity Index (CCI) assessment revealed that 43.8% of the patients had at least one preexisting comorbidity. The most common injury mechanism was a minor trauma that fell from a standing or sitting height. Regarding surgical treatments, 7 patients were operated with plate fixation and 10 patients were operated with TITS screws with or without anterior column fixation.
Results: Even though the average operative time was 3.16±1.90 hours, most of time was spent in fracture reduction under guide of c-arm intensifier. Ten patients needed no blood transfusion during operations. But, seven patients with plate fixation had average blood transfusion of 1254.3 ml. Among the 17 patients, 14 patients (93.3%) achieved bony union by 6 months post-operative. However, one patient developed loss of reduction that did need further operation but pain medication. No additional operation was performed for complications throughout the whole course of follow-up. Fourteen patients with bony union discontinued pain medication by one month post-operative. The other 3 patients continued occasional analgesic medication during the follow-up. Fifteen patients reported recovery of previous activity level by one year post-operative.
Conclusion: Elderly patients even older than 80 years undergoing surgical fixation for fragile pelvic fractures could achieve timely bony union as usual. Besides, almost 90% of 17 patient restored their previous activity level by one year after operations without continuation of pain medication. Surgical treatment deserved a recommendation for elderly patient with fragile pelvic fractures that caused limited complication.

P433

DESCRIPTIVE STUDY OF OSTEOPOROSIS IN MEN MANAGED IN A FRACTURE LIAISON SERVICE (FLS)

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Background: Osteoporosis in men remains a largely under-diagnosed and under-treated condition. Although the incidence of fragility fractures is lower in men than in women, post-fracture mortality, particularly following hip fracture, is substantially higher. FLS units have proven effective in improving the identification and management of osteoporosis; however, data focused on male population is still limited.
Objective: To describe the cohort of men with osteoporosis managed in our FLS between 2022 and 2025.
Methods: A descriptive cross-sectional study of men with established osteoporosis, defined as a history of fragility fracture, managed at a multidisciplinary fracture prevention unit (Fracture Liaison Service, FLS).

Risk factors, secondary causes of osteoporosis, number and anatomical location of fractures, age at first fracture, and treatments received were analyzed.

Results:

A total of 70 men were included.
The mean age of the cohort was 76.8 ± 12.8 years.
The most frequent fractures were hip fractures (31%), followed by vertebral fractures (29%).Fifteen percent of patients had proximal humerus fractures, 13% distal radius fractures, and 12% fractures at other locations.
Overall, 34% of patients had sustained more than one fragility fracture.
The mean age at first fracture was 73 ± 13 years.
A history of tobacco use was present in 80% of the cohort (current or former smokers), and alcohol consumption was reported in approximately one-third of patients. Other significant risk factors included physical inactivity (65%), diabetes mellitus (32%), and chronic kidney disease, with 27% of patients exhibiting a glomerular filtration rate ≤45 mL/min/1.73 m².
Secondary osteoporosis was identified in 9% of patients due to chronic corticosteroid therapy and in 6% due to hypogonadism or hormonal suppression.
Following evaluation by the Fracture Liaison Service (FLS), pharmacological therapy was initiated in 98% of patients.
Denosumab was the most frequently prescribed agent (43%), followed by zoledronate (23%), oral bisphosphonates (20%), teriparatide (12%), and romosozumab, administered off-label in a single patient.
Calcium and/or vitamin D supplementation was reported in 95% of the cohort.

Conclusions:
Tobacco use and sedentary lifestyle were the most commonly identified modifiable risk factors. Hip and vertebral fractures were the predominant fragility fractures, collectively accounting for approximately two-thirds of all fracture events. Fractures traditionally frequent in women, such as distal radius (Colles) and proximal humerus fractures, were less prevalent in this cohort.
Denosumab and zoledronate were the primary therapeutic choices in 66% of patients, with relatively low prescription of oral bisphosphonates and teriparatide compared to their widespread use in pre- and postmenopausal osteoporosis.
However, studies with greater methodological rigor are required to reinforce our findings

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P434

DESCRIPTIVE ANALYSIS OF PATIENTS MANAGED IN A FRACTURE LIAISON SERVICE FROM MARCH 2019 TO OCTOBER 2025. SIX YEAR FOLLOW-UP

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Background
Fracture Liaison Services (FLS) are multidisciplinary care models aimed at secondary prevention of fragility fractures in patients over 50 years. By providing coordinated post-fracture management, FLS have demonstrated high clinical and cost-effectiveness in reducing subsequent fracture risk.

Objective
To characterize the demographic, clinical, and therapeutic profile of patients with osteoporosis managed in our hospital's FLS over a six-and-a-half-year period.

Methods
We conducted a retrospective observational study of patients ≥50 years with fragility fractures attended in our FLS between March 2019 and October 2025. Data were extracted from electronic medical records, including demographics, fracture history, pharmacological management, supplementation, adherence, and incident fractures. Results are reported as mean ± SD or percentages.

Results
A total of **1,431 patients** were included (mean age 76 ± 9 years; 84% female). **Thirty percent** had a prior fracture, and only **17%** were receiving osteoporosis-specific therapy before FLS enrollment.
Index fracture sites were: **hip** 38% (n=557), **distal radius** 19% (n=297), **vertebra** 17% (n=251), **humerus** 16% (n=237), and **other sites** 9.6% (n=141).
Post-FLS intervention, **83% of patients initiated osteoporosis therapy**: **denosumab** 44% (n=495), **oral bisphosphonates** 31% (n=352), **teriparatide/abaloparatide** 12% (n=138), **zoledronate** 9.8% (n=110), **romosozumab** 2.2% (n=27), **raloxifene/bazedoxifene** 0.1% (n=2).
Supplementation was provided as follows: **vitamin D** 89.5%, **oral calcium** 64.5%. During follow-up, **32 incident fractures** were reported (2.2%), with **treatment adherence exceeding 65%**.

Conclusions

- Fragility fractures predominantly affect women, with **hip fractures** being most common, followed by **distal radius fractures**.
- A substantial proportion of patients had a prior fracture, yet the majority were untreated before FLS enrollment.
- **Denosumab** and oral bisphosphonates were the most frequently prescribed therapies.
- High adherence and a low rate of incident fractures indicate effective secondary prevention.
- Our FLS demonstrates that a **multidisciplinary, coordinated approach** effectively reduces fracture risk through optimized therapy initiation, adherence monitoring, and risk factor management.
- FLS represent an effective model for secondary prevention of fragility fractures in clinical practice.

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P435

LOW BONE MINERAL DENSITY AS A POTENTIAL PREDICTOR OF RECURRENT STROKE AND PNEUMONIA IN PATIENTS WITH STROKE: A HOSPITAL-BASED STUDY

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Background

Patients with stroke are at high risk of recurrent stroke and pneumonia. Low bone mineral density (BMD) is prevalent after stroke, but its prognostic value for these adverse outcomes has not been fully established. We aimed to investigate the correlation between BMD and risks of recurrent stroke and pneumonia among stroke patients in a Taiwanese cohort.

Material and Methods

In this single-center retrospective cohort study, 905 patients with stroke from a hospital-based database in Taiwan (2000-2022) were included. Patients were stratified by femoral and lumbar spine BMD. Recurrent stroke and pneumonia were the primary and secondary outcomes, respectively. Cox proportional hazards regression was performed to assess the associations between BMD and outcomes.

Results

Stroke patients with lower femoral BMD had a significantly increased risk of recurrent stroke, particularly when femoral BMD was below 0.723 g/cm² (HR = 1.423, p = 0.032). In contrast, lumbar spine BMD was not significantly associated with recurrent stroke (HR = 0.963, p = 0.815). Regarding secondary outcomes, lower lumbar spine BMD was significantly associated with an increased risk of pneumonia, whereas femoral BMD showed no significant association with pneumonia.

Conclusions

Low bone mineral density, particularly at the femur, was independently associated with an increased risk of recurrent stroke in patients with stroke. In addition, low lumbar spine BMD was significantly associated with pneumonia. These findings suggest that BMD assessment may provide useful prognostic information and underscore the importance of bone health management in stroke care.

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P436

SUSTAINED DENOSUMAB USE IS ASSOCIATED WITH REDUCED OSTEOARTHRITIS INCIDENCE AND LOWER RISK OF JOINT ARTHROPLASTY COMPARED WITH ONE-TIME USE: A REAL-WORLD COHORT STUDY

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Objectives

To evaluate whether multiple time (sustained) denosumab use is associated with a lower risk of incident osteoarthritis (OA) and subsequent joint arthroplasty compared with one-time denosumab use.

Materials and Methods

We conducted a retrospective cohort study using data from TriNetX, a global federated health research network providing access to electronic medical records from large healthcare organizations. Adults aged ≥50 years receiving denosumab were categorized into multiple time users (defined as ≥2 doses, suggestive of sustained use) and one-time users. Individuals who received other osteoporosis medications or had a diagnosis of osteoarthritis at baseline were excluded. Events of osteoarthritis or arthroplasty occurring within 225 days after the first denosumab injection were excluded to minimize immortal time bias. Propensity score matching was performed to balance baseline characteristics and potential confounders between groups. Cox proportional hazards models were used to estimate hazard ratios (HRs) and 95% confidence intervals (CIs) for incident OA and OA-related joint arthroplasty over a 10-year follow-up period.

Results

After propensity score matching, 40,943 patients were included in each cohort, with baseline characteristics well balanced between groups. Sustained denosumab therapy was associated with a significantly reduced risk of overall osteoarthritis (HR, 0.43; 95% CI, 0.41–0.44), including knee OA (HR, 0.40; 95% CI, 0.37–0.44), hip OA (HR, 0.50; 95% CI, 0.45–0.55), and thumb carpometacarpal OA (HR, 0.43; 95% CI, 0.37–0.51). Continued use was also linked to lower risks of total joint arthroplasty (HR, 0.41; 95% CI, 0.32–0.52), including both total knee and total hip replacement. These findings remained consistent across multiple sensitivity analyses, with a clear dose–response pattern observed.

Conclusions

Multiple time (sustained) denosumab use was associated with a reduced risk of osteoarthritis and a lower likelihood of subsequent joint arthroplasty compared with one-time use. These findings suggest a potential protective association between sustained anti-osteoporotic therapy and joint degeneration. Prospective and mechanistic studies are needed to confirm causality and elucidate biological pathways.

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ASSOCIATION BETWEEN PERIOPERATIVE INTRAUTERINE PROCEDURES AND PERIPROSTHETIC JOINT INFECTION FOLLOWING TOTAL JOINT ARTHROPLASTY: A REAL-WORLD SAFETY ANALYSIS

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OBJECTIVE(S) To evaluate whether undergoing minimally invasive intrauterine procedures, specifically hysteroscopy and dilation and curettage (D&C), within the perioperative period increases the risk of periprosthetic joint infection (PJI) in patients undergoing total joint arthroplasty (TJA).

MATERIAL AND METHODS We utilized the TriNetX global health research network to identify female patients aged ≥45 years who underwent primary TJA (hip or knee) and concomitant intrauterine procedures (hysteroscopy or D&C) within one year before or after the index surgery. A control cohort of TJA patients without these procedures was identified. Propensity score matching (PSM) was performed 1:1 based on age, comorbidities (including diabetes, obesity, and cardiovascular diseases), and baseline medications. The primary outcome was the incidence of PJI, defined by ICD-10 codes for prosthetic infection and CPT codes for revision surgery/implant removal, within 5 years. Kaplan-Meier survival analysis and Cox proportional hazards models were used to estimate the risk.

RESULTSAfter PSM, 1,714 patients were included in each cohort with well-balanced baseline characteristics. The cumulative incidence of PJI was 1.4% in the exposure group (intrauterine procedures) and 1.9% in the control group. Survival analysis revealed no significant difference in PJI-free survival between the two cohorts (Log-Rank p=0.281). The risk ratio was 0.75 (95% CI: 0.44-1.27), indicating no statistically significant increase in infection risk associated with perioperative intrauterine interventions. Sensitivity analyses stratified by procedure timing (preoperative vs. postoperative) yielded consistent results.

CONCLUSION(S) In this large-scale, real-world cohort study, perioperative hysteroscopy and D&C were not associated with an increased risk of PJI following TJA. These findings suggest that these common gynecologic procedures can be safely performed within the perioperative period of joint replacement without compromising orthopedic outcomes. Current practices delaying necessary gynecologic care due to theoretical infection risks may warrant re-evaluation.

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IMPACT OF INCREASED EXERCISE FREQUENCY WITHIN MULTICOMPONENT INTEGRATED CARE ON MUSCLE MASS AND BONE MINERAL DENSITY IN OLDER ADULTS WITH OSTEOPOROSIS: A SECONDARY ANALYSIS OF A RANDOMIZED CONTROLLED TRIAL

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Objective To investigate the effects of varying exercise frequencies within a multicomponent integrated care model on muscle mass and bone mineral density among community-dwelling older adults with osteoporosis.

MethodsThis secondary analysis of the HOPE RCT in Taiwan included participants aged ≥50 years with osteoporosis. Participants were randomized into three groups: Usual Care (UC; n=124), Osteoporosis Care (OC; n=123; guideline-based treatment), and Multicomponent Integrated Care (MIC; n=95). The MIC group received comprehensive interventions, including a progressive exercise program: once-weekly 1-hour sessions for 3 months in Year 1, escalating to twice-weekly 1-hour sessions for 6 months in Year 2. Skeletal muscle index (SMI) and bone mineral density were measured using BIA and DXA, respectively, at baseline, 1-year, and 2-years. Longitudinal changes and inter-group differences were analyzed using GEE and ANOVA.

Results A total of 342 participants (300 females and 42 males; mean age 74.76 ± 8.46 years) were included. Significant differential SMI trajectories were observed in both females (p=0.031) and males (p=0.017). While SMI percentage changes showed no significant difference across groups over the full 2-year period in females (UC, −0.27±6.85; OC, 0.66±4.98; MIC, 1.00±9.22; p=0.418), a landmark analysis of the second year—during which exercise frequency increased—revealed significant group differences (p=0.017). Specifically, the MIC group (SMI +1.11%) significantly outperformed the UC group (SMI -1.20%, p=0.026). No significant difference in SMI was found between the OC and UC groups (p=0.085). Regarding BMD, significant improvements were observed at the hip (HIP) and femoral neck (FN) over the two-year follow-up in both the MIC (HIP: +1.9%, FN: +3.7%) and OC (HIP: +1.9%, FN: +2.4%) groups. In the GEE model, the MIC group showed larger improvements during the second year (HIP: B = +0.021, p < 0.001; FN: B = +0.017, p = 0.003).

Conclusion Multicomponent integrated care effectively attenuates muscle loss and increases BMD in older adults with osteoporosis. The findings highlight that the skeletal muscle and bone health benefits are more pronounced when exercise frequency is increased, underscoring the necessity of sustained and frequent physical activity in clinical care models.

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THE INCIDENCE OF TYPE-2 DIABETES IN PATIENTS TREATED WITH NITROGEN-CONTAINING BISPHOSPHONATES

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Objective
To investigate the risk of incident type 2 diabetes (T2D) in patients treated with nitrogen-containing bisphosphonates (N-BP) for osteoporosis care. Currently, conflicting data on the effect of N-BP on T2D incidence exists.
Material and Methods
In this nationwide retrospective cohort study, risk of T2D was evaluated in 138,858 women and 28,474 men aged 50 years and older who initiated N-BP therapy (alendronate, risedronate, ibandronate, zoledronate) between 2012 and 2021 compared to controls without N-BP therapy (416,574 women and 85,422 men). Data were based on hospital discharge diagnosis (ICD-10) and filled drug prescriptions, obtained from the Austrian Federation of Social Insurances, comprising datasets from 13 single social insurance authorities that cover approximately 98 % of the Austrian population. Cox regression models including relevant covariables (e.g. glucocorticoid use, fractures) were used and T2D defined as first prescription of an antidiabetic drug excluding insulins.
Results
Average age at study entry was 70 years. Incident T2D was significantly more frequent in N-BP users than non-users (5.63% vs. 2.73% in men (p2.3-fold in the unadjusted model (HR 2.32, 95%-CI: 2.18-2.47) to a HR of 1.47 (95%-CI: 1.37-1.57) in the fully adjusted analysis. The risk for incident T2D was highest in the first year after therapy initiation.
Conclusion
This large-scale epidemiological study provides strong evidence, that N-BP use in patients aged 50 years and older may be associated with an increased risk of T2D.

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PROSPECTIVE, REAL-WORLD, OPEN-LABEL, LONGITUDINAL STUDY ON THE EFFECTIVENESS OF FIXED-DOSE COMBINATION OF NAPROXEN AND PARACETAMOL 275/325 MG/TABLET AMONG FILIPINO PATIENTS WITH OSTEOARTHRITIS, A PHASE IV STUDY

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Introduction/Objectives Osteoarthritis (OA) is a prevalent degenerative joint condition that significantly impacts mobility and quality of life. This study investigates the effectiveness and safety of a fixed-dose combination of naproxen and paracetamol in reducing pain scores among Filipino patients with OA.

Methodology This observational, open-label, non-blinded phase 4 clinical trial included adult patients over 18 years old with mild to moderate OA-related pain. Participants were prescribed a fixed-dose combination of naproxen (275 mg) and paracetamol (325 mg) taken twice daily for five days. Pain scores were assessed at baseline and follow-up using a visual analog scale. Secondary endpoints included medication adherence and adverse event incidence. The Wilcoxon matched-pairs signed-rank test was used for statistical analysis.

Results A total of 67 patients participated, with a mean age of 58 years. There was a statistically significant reduction in pain scores at rest (52.9%) and during movement (45.85%) after five days ($p < 0.001$). Complete pain resolution was achieved in 31.34% of patients at rest and 10.45% during movement. The combination therapy was well-tolerated, with three mild adverse events (skin rash, abdominal pain, and palpitations), all resolving without further treatment.

Pain score	Median (IQR)		P-value
	At baseline	At follow-up	
At rest	4 (3)	2 (3)	<0.001
During movement	6 (2)	3 (3)	<0.001

Conclusion The Real-World Study showed that a fixed-dose combination of naproxen and paracetamol was effective in reducing pain associated with osteoarthritis, with early onset of pain relief and a favorable safety profile. The combination allows for lower NSAID dosing without compromising analgesic efficacy, potentially reducing the risk of adverse effects in older adults. This combination offers a promising option for managing osteoarthritis pain, providing significant analgesic benefits while minimizing the risks associated with higher doses of NSAIDs, making it particularly suitable for elderly patients.

Keywords: Naproxen, Paracetamol, fixed-dose combination, pain relief, osteoarthritis, safety

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EPHB3-KO MESENCHYMAL STROMAL CELL THERAPY RECOVERS BONE MASS IN OSTEOPOROTIC MICE

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Objective.
The present study aims to investigate the therapeutic potential of *EphB3*-deficient mesenchymal stromal/stem cells (MSCs) to improve bone condition in osteoporotic animals.
Material and Methods.
We used bilaterally ovariectomized female mice (OVX), as a murine model of osteoporosis, which were intravenously infused twice with either WT or *EphB3*-KO MSCs, at one-month interval, and analyzed one month after the last injection.
Adipose tissue-derived MSCs were isolated from a pool of 6-8 adult mice (4-6 month-old) and cultured in *Mesencult mouse MSC expansion kit* for the first week, followed by complete DMEM supplemented with FBS. Used cells were in the 3rd-4th passage of culture.
Results.
Using microCT analysis, we observed that OVX mice treated with *EphB3*-KO MSCs exhibited a bone phenotype similar to that of healthy control mice, showing higher bone volume and trabecular thickness than those treated with WT MSCs.
To check bone loss progress in the treated mice, the blood serum levels of CTX-1 (a bone resorption biomarker) and the calcium concentration in urine were quantified. Both parameters showed significantly lower values in *EphB3*-KO MSC-treated OVX mice than in OVX osteoporotic mice, thus confirming a reduction in bone loss in the former.
At the cellular level, we proved by flow cytometry that *EphB3*-KO MSC-treated animals had a higher number of pre-osteoblasts and a lower proportion of osteoclasts than untreated OVX group. This reduction in osteoclasts is likely caused by increased *Opg* gene expression and decreased *Rankl* on osteoblast-differentiating *EphB3*-KO MSCs.
Conclusion.
Based on the given results, we propose the EphB3 receptor as an important therapeutic target for treating bone pathologies, such as osteoporosis.

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STATE OF THE PROXIMAL GROWTH PLATE OF THE TIBIA IN DIABETIC RATS AFTER REPEATED FRACTURE

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Objective. The objective of the study is to test histological structure of the growth plate of the tibia in diabetic rats after repeated fracture.
Material and methods. For the purposes of the study we used HE stained sections of the proximal growth plates of the tibiae taken from 24 female diabetic rats with repeated fracture. The repeated fracture was modeled as two 2-mm round openings in the femur and the tibia made in proximal and distal metaphyseal areas. 45-day space between interventions was assigned for complete healing of the femur fracture. Non-diabetic animals with the same interventions and intact animals were used for comparison. Observation terms were 7, 15, 30 and 60 days.
Results. Diabetic animals with repeated fracture exhibited narrowing of the growth plate of the tibia as compared to non-diabetic animals with the fracture in all observation terms by 3.56%, 4.92%, 5.62%, and 7.06%. The most affected zones of the growth plate were the proliferation zone and the osteogenic zone. The proliferation zone narrowed in all observation terms by 3.97%, 5.04%, 7.82%, and 8.97%. Osteogenic zone narrowed by 5.21%, 7.37%, 7.82%, and 8.97%. Inhibition of osteogenic zone activity resulted in decrease of primary spongiosa share also in all terms – by 3.91%, 5.91%, 8.27%, and 9.32%. Unlike those of non-diabetic animals these values showed no sign of restoration.
Conclusion. In diabetic animals, repeated fracture inhibits activities of the growth plate mostly due to proliferation of chondrocytes and osteoblasts. This reduces amount of new cancellous bone and thus affects both formation and remodeling of the bone.

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FRACTURE HEALING AFTER BUROSUMAB TREATMENT IN AN ADULT PATIENT WITH X-LINKED HYPOPHOSPHATAEMIA (XLH) AND DELAYED FEMORAL FRACTURE CONSOLIDATION

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Objective: Delayed fracture consolidation is a frequent complication in patients with XLH. Burosumab, a humanized anti-FGF23 monoclonal antibody, has shown improvement in fracture healing after 24 [(1)] 48[(2,3)] weeks in clinical trials, while evidence in adults treated with conventional therapy (CT) remains limited[(4)] .We describe a case of delayed femoral fracture consolidation treated with burosumab.

Materials and Methods:A 47-year-old woman with XLH was referred due to diaphyseal femoral pain lasting five months. She had received CT from early childhood until adolescence but discontinued treatment until symptom onset. Imaging revealed a left femoral fracture. Laboratory evaluation showed hypophosphataemia (serum phosphorus 1.9 mg/

dL; normal range 2.5–5.6 mg/dL). Quality of life (QoL) was severely impaired (WOMAC: pain 17, stiffness 8, function 55; SF-36: pain 0/100, global health 0/100). CT was initiated but limited by gastrointestinal intolerance. After six months, no improvement in pain, phosphataemia or fracture healing was observed, and burosumab was started.

Results: After six months of burosumab, despite missed doses, phosphataemia improved (pre-dose 2.4 mg/dL; post-dose 2.7 mg/dL), with marked improvement in pain and QoL (WOMAC all domains 0; SF-36 pain 100/100, global health 95/100). Bone turnover markers increased to 2.5 times the upper limit of normal for β-CTX and 2.0 times for alkaline phosphatase. The patient walked without assistive devices at month 9, and complete fracture healing was confirmed at 12 months.
Conclusion: Burosumab promoted fracture healing, improved QoL and corrected hypophosphataemia in an adult patient with a diaphyseal femoral fracture of 12 months' duration, highlighting its potential role in fracture healing in adults with XLH and the limitations of conventional therapy.
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THE BURDEN OF FRACTURES IN MEXICO, 1990 – 2023: A LIFE COURSE ANALYSIS

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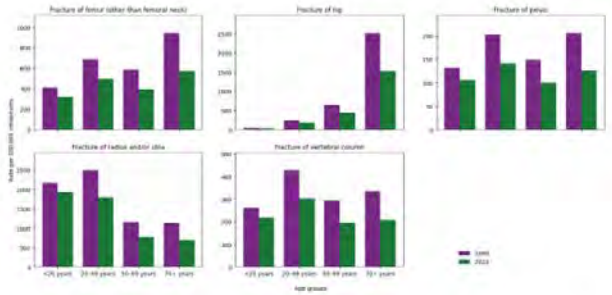
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Objective
To analyze long-term patterns and trends of fractures in Mexico and its regions from 1990 to 2023 by age group.
Material and Methods

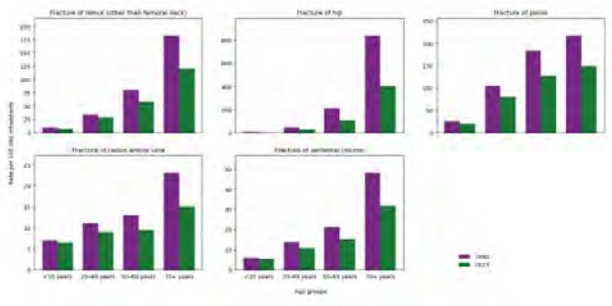
We analyzed estimates from the Global Burden of Disease Study 2023 (GBD) produced by the Institute for Health Metrics and Evaluation, University of Washington. The GBD provides systematic and comparable estimates for diseases and injuries by age and sex across countries and, for selected locations including Mexico, at the subnational level. Fracture-related outcomes were examined nationally and across Mexican regions for the period 1990–2023 using established GBD methods.
For primary analyses, we examined fractures of the hip, vertebrae, pelvis, distal forearm, and femur. For life-course analyses, age groups were categorized as <20 years, 20-49 years, 50-69 years and >70 years.
Results
In 2023, hip fractures predominated among older adults, whereas radius and/or ulna fractures showed the highest incidence in younger and middle-aged populations. Hip fracture incidence was 1,521.6 cases per 100,000 population among adults aged ≥70 years, compared with 46.2 per 100,000 in individuals aged <20 years. Fractures of femur other than femoral neck were also more frequent in adults aged >70 years (570.2 per 100,000). Radius and/or ulna fractures reached incidence rates of 1,938.2 per 100,000 in individuals aged <20 years and 1,797.7 per 100,000 in those aged 20–49 years (figure 1a).
Years lived with disability (YLDs) due to fractures showed distinct age-specific distributions. YLD rates per 100,000 were highest for hip and pelvic fractures among adults aged ≥70 years, while distal forearm fractures accounted for a larger proportion of YLDs in younger and middle-aged groups (figure 1b).

Figure 1.

1a. Changes in age-specific incidence rates of fractures between 1990 and 2023, by fracture type



1b. Age-specific rates of years lived with disability (YLDs) due to fractures in 1990 and 2023



Conclusion
Fractures in Mexico impose an age-dependent pattern across the life course, with higher incidence at younger populations and disability increasingly concentrated in hip and pelvic fractures among older adults. Fracture incidence and YLDs increase markedly among individuals aged ≥70 years, resulting in a substantial fracture-related burden in older age groups. These patterns have important implications for health system planning and population-level fracture prevention policies in Mexico.

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COMPARISON OF THE EFFECTS OF INTRA-ARTICULAR PEPTIDE HYALURONIC ACID AND PRP INJECTIONS ON PAIN AND FUNCTIONAL STATUS IN PATIENTS WITH KNEE OSTEOARTHRITIS

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Objective: This study aimed to compare the effects of peptide–HA and PRP injections on pain and functional outcomes in patients with knee osteoarthritis (OA).
Materials and Methods: 62 patients aged 45–75 years with Kellgren–

Lawrence grade 2 or 3 knee OA who were admitted to the Department of Physical Medicine and Rehabilitation, Istanbul University Istanbul Faculty of Medicine, were included. Patients were randomized into two groups: the peptide–HA group (n=31), which received three intra-articular peptide–HA injections at two-week intervals, and the PRP group (n=31), which received three leukocyte-poor PRP injections at two-week intervals. Clinical assessments were conducted at baseline and at 1 and 3 months after the final injection using the Visual Analog Scale (VAS) and the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC). Within-group comparisons were performed using the Wilcoxon signed-rank test, and between-group differences were analyzed using the Mann–Whitney U test.

Results: The mean age of the patients was 56.61 ± 12.92 years, and 62.9% were female. Significant improvements in WOMAC (pain, stiffness, function) and VAS scores were observed in both groups at 1 and 3 months compared with baseline ($p < 0.001$). At the 1-month follow-up, a significant improvement in VAS rest pain was observed only in the peptide–HA group ($p < 0.001$). At 3 months, WOMAC function ($p = 0.017$) and total scores ($p = 0.021$) were significantly better in the peptide–HA group compared with the PRP group, while no significant differences were observed in other parameters.

Conclusion: Both peptide–HA and leukocyte-poor PRP injections are effective in improving pain and function in knee OA. The 3-month results suggest that peptide–HA may be more advantageous than PRP for functional improvement, while PRP remains effective for symptomatic control. Larger, long-term studies are required to confirm these findings.

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EFFECT OF THE SINGLE NUCLEOTIDE POLYMORPHISM A1166C OF THE AGTR1 GENE ON THE FORMATION OF COMORBIDITY ASSOCIATED WITH CARDIOVASCULAR RISK

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Objective: to evaluate the effect of the A1166C polymorphism of the AGTR1 gene on the clinical manifestations of AS and its role in the development of comorbidity associated with cardiovascular risk.

Materials and methods: The study included 176 patients diagnosed with AS. Genotyping was carried out according to the A1166C (rs5186) polymorphism of the AGTR1 gene by the polymerase chain reaction method (PCR). The statistical analysis was carried out using the Kruskal-Wallis criterion.

Results: Patients with the AA showed a higher BASMI (AA 5.0 [4.0; 6.0] vs. AC 3.0 [3.0; 7.0] vs. CC 4.0 [3.0; 5.0], p=0.024, p1,3=0.023). Carriers of the AA had significantly lower levels of red blood cells (AA 4.7 [4.3; 5.12] vs. AC 5.29 [4.63; 5.6] vs. CC 4.57 [4.38; 4.93], p=0.025, p2.3=0.02) and platelets (AA 252 [223; 297] vs. AC 282 [236; 338] versus CC 283 [254; 333], p=0.0001, p1,3=0.001). Higher glucose values were recorded among C carriers (AA 4.8 [4.36; 5.4] vs. AC 5.4 [5.1; 5.95] vs. CC 5.4 [4.9; 5.8], p=0.0001, p1.3=0.001, p1.2=0.025). The highest triglyceride levels – for the AC (AA 1.3 [0.9, 1.7] vs. AC 1.5 [1.0; 4.1] vs. CC 0.9 [0.8; 1.2], p=0.038).

AC heterozygotes had the highest incidence of hypertension (AA 32 (37.2%) versus AC 8 (80.0%) versus CC 20 (35.7%), p1,2=0.05, p=0.025), dyslipidemia (AA 52 (53.1%) vs. AC 12 (85.7%) vs. CC 26 (46.4%), p1,2=0.012, p2,3=0.006, p=0.031). The statistically significant differences were found for grades of arterial hypertension (AH) (p=0.0001): 2nd – AA 26 (27.1%) versus AC 4 (33.3%) vs. CC 14 (24.1%), p<0.05 and 3rd – AA 0 (0.0%) vs. AC 2 (16.7%) CC 0 (0.0%), p1,2<0.001, p2,3=0.004).

Conclusion: The results obtained reveal a wide range of functions like participation in the formation of AH, the regulation of hematopoiesis, glucose and lipids levels, and the formation of comorbidity – DM, dyslipidemia, kidney pathology in patients with AS.

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DIFFERENTIAL ASSOCIATIONS OF PHYSICAL PERFORMANCE AND FRAILTY WITH FALLS AND MORTALITY IN OLDER ADULTS

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Objective:
To evaluate and compare the independent associations of physical performance and frailty with falls and all-cause mortality, and to determine whether objective performance measures provide distinct prognostic information beyond frailty assessment in older adults.

Methods
This observational study included community-dwelling older adults who underwent comprehensive geriatric assessment. Physical performance was assessed using the Short Physical Performance Battery (SPPB), with scores ≤8 indicating low physical performance. Frailty was assessed using the FRAIL scale and categorized as frail versus non-frail. Participants with incomplete physical performance or frailty data were excluded.Falls were analyzed using multivariable logistic regression, and all-cause mortality was examined using Cox proportional hazards models.

Results
This observational study included 1392 community-dwelling older adults. Baseline characteristics differed according to physical performance and frailty status (Table 1). In multivariable logistic regression analysis (Table 2), SPPB ≤8 was independently associated with falls (OR 2.03, 95% CI 1.39–2.96; p<0.001), whereas frailty was not (OR 1.20, 95% CI 0.81–1.78; p=0.367). Female sex (OR 1.40, 95% CI 1.03–1.90; p=0.031) and malnutrition (OR 1.63, 95% CI 1.20–2.22; p=0.002) were also associated with increased fall risk.
During follow-up, both SPPB ≤8 (HR 1.63, 95% CI 1.08–2.45; p=0.020) and frailty (HR 1.69, 95% CI 1.12–2.53; p=0.012) were independently associated with higher all-cause mortality in Cox regression models (Table 3). Increasing age was associated with mortality (HR 1.09 per year, 95% CI 1.06–1.12; p<0.001), while female sex was protective (HR 0.31, 95% CI 0.22–0.43; p<0.001).

Conclusions
Low physical performance was an independent predictor of falls, whereas frailty was not, indicating that objective performance measures may better capture short-term mobility-related risk. In contrast, both low physical performance and frailty were independently associated with all-cause mortality, reflecting complementary dimensions of vulnerability related to survival. Overall, these findings suggest that physical performance and frailty should not be used interchangeably and support

integrating objective functional testing alongside frailty assessment to improve geriatric risk stratification.

Table 1. Baseline Characteristics According to Falls and Mortality Status

Variable		Falls (-)	Falls (+)	p value	Mortality (–)	Mortality (+)	p value
Age, mean (SD)	Years	75 ± 7	76 ± 7	**0.016**	74 ± 7	79 ± 6	**<0.001**
Sex n (%)	Male	314 (36.8)	143 (26.5)	**<0.001**	241 (26.7)	154 (46.7)	**<0.001**
	Female	539 (63.2)	396 (73.5)		663 (73.3)	176 (53.3)	
Marital status n (%)	Single / divorced / widowed	461 (54.0)	298 (55.3)	0.65	420 (46.5)	201 (60.9)	**<0.001**
	Married	392 (46.0)	241 (44.7)		484 (53.5)	129 (39.1)	
Education level n (%)	Low	439 (62.7)	312 (67.8)	0.075	535 (63.2)	186 (69.9)	0.13
	High	261 (37.3)	148 (32.2)		311 (36.8)	80 (30.1)	
SPPB n (%)	Normal	473 (82.7)	245 (63.5)	**<0.001**	603 (80.0)	86 (52.8)	**<0.001**
	Low	99 (17.3)	141 (36.5)		151 (20.0)	77 (47.2)	
Frailty status n (%)	Non frail	750 (87.9)	402 (74.6)	**<0.001**	783 (86.6)	233 (70.6)	**<0.001**
	Frail	103 (12.1)	137 (25.4)		121 (13.4)	97 (29.4)	
ADL n (%)	Robust	644 (75.5)	353 (65.5)	**<0.001**	715 (79.1)	180 (54.5)	**<0.001**
	Limited	209 (24.5)	186 (34.5)		189 (20.9)	150 (45.5)	
IADL n (%)	Robust	620 (72.7)	310 (57.5)	**<0.001**	669 (74.0)	148 (44.8)	**<0.001**
	Limited	233 (27.3)	229 (42.5)		235 (26.0)	182 (55.2)	
Recurrent falls n (%)	≤1 fall	0 (0.0)	196 (49.2)	—	141 (49.0)	46 (51.1)	0.87
	≥2 falls	0 (0.0)	202 (50.8)		147 (51.0)	44 (48.9)	
Gait speed n (%)	Normal	657 (77.0)	322 (59.7)	**<0.001**	711 (78.7)	149 (45.2)	**<0.001**
	Slow	196 (23.0)	217 (40.3)		193 (21.3)	181 (54.8)	
Nutritional status (MNA) n(%)	Normal	677 (79.4)	358 (66.4)	**<0.001**	702 (77.7)	210 (63.6)	**<0.001**
	Malnutrition	176 (20.6)	181 (33.6)		202 (22.3)	120 (36.4)	
Polypharmacy n (%)	No	280 (40.0)	149 (32.5)	**0.01**	320 (38.7)	79 (29.2)	**0.002**
	Yes	420 (60.0)	309 (67.5)		506 (61.3)	192 (70.8)	
Number of medications	median (IQR)	3 (0–9)	4 (0–11)	**0.01**	3 (0–11)	4 (0–9)	**0.004**
Diabetes mellitus n (%)	No	464 (68.5)	281 (64.2)	0.129	532 (65.9)	180 (68.7)	0.545
	Yes	213 (31.5)	157 (35.8)		275 (34.1)	82 (31.3)	
Urinary incontinence n (%)	No	531 (62.3)	275 (51.0)	**<0.001**	537 (59.5)	176 (53.3)	0.15
	Yes	321 (37.7)	264 (49.0)		366 (40.5)	154 (46.7)	
Hypertension n (%)	No	189 (27.9)	114 (26.0)	0.488	216 (26.8)	75 (28.6)	0.829
	Yes	488 (72.1)	324 (74.0)		591 (73.2)	187 (71.4)	
Ischemic heart disease n (%)	No	549 (81.1)	344 (78.5)	0.297	656 (81.3)	199 (76.0)	0.156
	Yes	128 (18.9)	94 (21.5)		151 (18.7)	63 (24.0)	
Chronic kidney disease n (%)	No	648 (95.7)	406 (92.7)	**0.03**	774 (95.9)	236 (90.1)	**0.001**
	Yes	29 (4.3)	32 (7.3)		33 (4.1)	26 (9.9)	

Values are expressed as mean ± SD, median (IQR), or n (%). Group comparisons were conducted using t-test, Mann–Whitney U test, or chi-square test as appropriate. Abbreviations: SPPB, Short Physical Performance Battery; ADL, Activities of Daily Living; IADL, Instrumental Activities of Daily Living; MNA, Mini Nutritional Assessment.

Table 2. Multivariable logistic regression analysis of factors associated with falls

Variable	OR	95% CI	p-value
Low physical performance	2.03	1.39 – 2.96	**<0.001***
Frailty	1.2	0.81 – 1.78	0.367
Age	1.01	0.99 – 1.03	0.498
Female sex	1.4	1.03 – 1.90	**0.031***
Malnutrition	1.63	1.20 – 2.22	**0.002***
Polypharmacy	1.18	0.89 – 1.57	0.254

Abbreviations: OR, odds ratio; CI, confidence interval; p<0.05 was considered statistically significant.

Table 3. Multivariable Cox proportional hazards analysis for all-cause mortality

Variable	HR	95% CI	p-value
Low physical performance	1.63	1.08 – 2.45	**0.020***
Frailty	1.69	1.12 – 2.53	**0.012***
Age	1.09	1.06 – 1.12	**<0.001***
Female sex	0.31	0.22 – 0.43	**<0.001***
Malnutrition	1.64	1.16 – 2.31	**0.005***
Polypharmacy	1.08	0.75 – 1.54	0.691
CKD	1.61	0.94 – 2.75	0.083

***Abbreviations:** HR, hazard ratio; CI, confidence interval; CKD: Chronic Kidney Disease* p < 0.05*

P448

WHEN RENAL FUNCTION LIMITS MOBILITY: AN AGE-DEPENDENT ANALYSIS OF PHYSICAL PERFORMANCE IN OLDER ADULTS

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Objective

To investigate the association between renal function and low physical performance in older adults and to evaluate age-specific differences between younger-old (60–74 years) and older- old (≥75 years) individuals.

Methods

This retrospective observational study included community-dwelling adults aged ≥60 years who underwent comprehensive geriatric assessment between 2020 and 2025. Individuals with estimated glomerular filtration rate (eGFR) <30 mL/min/1.73 m², acute illness, missing or incomplete Short Physical Performance Battery (SPPB) data were excluded. Low physical performance was defined as SPPB ≤8. Renal function was assessed using eGFR calculated by the Chronic Kidney Disease Epidemiology Collaboration (CKD-EPI) equation, and nutritional status using the Mini Nutritional Assessment–Short Form (MNA-SF). Multivariable logistic regression analyses were performed overall and stratified by age group.

Results

A total of 380 patients were included (mean age 75±7 years, 69% female); 86 (22.6%) had low physical performance. Participants with low SPPB were older, more frequently female, and had lower eGFR, hemoglobin, albumin, and poorer nutritional status, with a higher prevalence of sarcopenia and frailty (p<0.01). In the overall multivariable model, age, female sex, sarcopenia, frailty, and lower nutritional status were independently associated with low physical performance, whereas eGFR was not significant. In age-stratified analyses, eGFR was independently associated with low physical performance in adults aged ≥75 years (OR 0.94 per mL/min/1.73 m², 95% CI 0.91–0.97; p<0.001) but not in adults aged 60–74 years.

Conclusion

Renal function becomes a clinically meaningful determinant of physical performance only in adults aged ≥75 years, when physiological reserve is critically reduced and vulnerability to mobility loss is unmasked. Importantly, in adults aged ≥75 years, renal impairment should not be viewed merely as a laboratory abnormality but as a biological signal of increased vulnerability to mobility loss, fall risk, and fracture susceptibility. Integrating renal and nutritional markers with functional assessment may enable earlier identification of high-risk older adults and support targeted interventions to preserve mobility and prevent falls and fractures.

P449

INDEPENDENT ASSOCIATIONS OF HANDGRIP STRENGTH AND CALF CIRCUMFERENCE WITH IADL AND COGNITIVE PERFORMANCE: EVIDENCE FROM THE TAIZHOU CENTENARIAN COHORT

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Objective: To examine associations between handgrip strength, calf circumference, and functional independence in centenarians, and to explore mediating roles of physical performance, cognition, and nutrition.
Methods: In this cross-sectional study (October–December 2025, Taizhou, China), 558 centenarians (75.3% participation rate, interviewed by 1041 volunteers) from the China Taizhou Centenarian Cohort Study were enrolled (170 men [30.5%], 388 women [69.5%]; median age 101.0 years, IQR 2.0). Standardized assessments included handgrip strength, calf circumference, 4-m gait speed, instrumental activities of daily living (IADL), cognition (AMT4), and nutrition (MNA-SF). Spearman correlations and sequential multivariable linear/logistic regression models were used, with sex-stratified and sensitivity analyses. Mediation by gait speed was assessed via attenuation of the handgrip–IADL association.
Results: Median handgrip strength was 7.5 kg (men 12.5 kg vs. women 6.5 kg, P<0.001). Handgrip strength positively correlated with IADL, AMT4, gait speed, and MNA-SF (all P<0.001). In sequential regressions, handgrip strength independently predicted IADL across models; adjusted R^2 rose from ~4% (unadjusted) to 13–15% (fully adjusted). Gait speed strongly predicted IADL and partially mediated the handgrip–IADL link. After full adjustment (sociodemographics, comorbidities), handgrip strength remained independently associated with cognition in both sexes: in men, +1 kg linked to +0.026 AMT4 points (β=0.026, 95% CI 0.000–0.051, P=0.046); in women, P<0.001. Cognition independently predicted IADL (β≈0.33, P<0.001). Calf circumference independently associated with outcomes: +1 cm linked to 18% lower IADL impairment risk (OR 0.82, 95% CI 0.76–0.89, P<0.001) and 12% lower cognitive decline risk (OR 0.88, 95% CI 0.81–0.95, P=0.002). Regular exercise was protective (OR 0.45, P<0.001); comorbidity burden was not independently significant.
Conclusion: In centenarians, handgrip strength and calf circumference are robustly and independently linked to functional independence and cognitive performance. Handgrip strength centrally connects physical, cognitive, and nutritional domains, with partial mediation by gait speed. Calf circumference offers complementary prognostic value. These findings underscore a persistent muscle–function–cognition axis at extreme age and endorse simple muscle assessments as indicators of intrinsic capacity and healthy aging.

P450

EFFECTS OF DELAYED REPAIR OF PERIPHERAL NERVE INJURY ON THE SPATIAL DISTRIBUTION OF MOTOR ENDPLATES IN TARGET MUSCLE

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Motor endplates (MEPs) are important sites of information exchange between motor neurons and skeletal muscle, and are distributed in an organized pattern of lamellae in the muscle. Delayed repair of peripheral nerve injury typically results in unsatisfactory functional recovery because of MEP degeneration. In this study, the mouse tibial nerve was transected and repaired with a biodegradable chitin conduit, immediately following or 1 or 3 months after the injury. Fluorescent α-bungarotoxin was injected to label MEPs. Tissue optical clearing combined with light-sheet microscopy revealed that MEPs were distributed in an organized pattern of lamellae in skeletal muscle after delayed repair for 1 and 3 months. However, the total number of MEPs, the number of MEPs per lamellar cluster, and the maturation of single MEPs in gastrocnemius muscle gradually decreased with increasing denervation time. These findings suggest that delayed repair can restore the spatial distribution of MEPs, but it has an adverse effect on the homogeneity of MEPs in the lamellar clusters and the total number of MEPs in the target muscle.

P451

DXA-DERIVED PROBABILITY OF HIP FRACTURE IS ELEVATED IN OSTEOSARCOPENIA AMONG COMMUNITY-DWELLING OLDER ASIAN ADULTS

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Objective(s):
This study examined the association of a novel biomechanical marker, probability of HF (P_{Fx}), by gender and ethnicity in a multi-ethnic Singaporean cohort of community-dwelling older adults with OP, SP, and OS.
Material and Methods:
Data from 1,600 older Singaporean adults of Chinese, Indian, and Malay ethnicities were analysed from the Population HEalth and Eye Disease PRofilE in Elderly Singaporeans (PIONEER) cohort [1]. All participants underwent hip DXA scanning. OP was defined using the lowest T-score across three skeletal sites, while SP was classified according to the Asian Working Group for Sarcopenia criteria [2]. Presence of both conditions was considered indicative of OS. P_{Fx} was calculated using DXA-based finite element models (Figure 1A) [3]. High P_{Fx} risk was defined as the top tertile (≥6%), as no standard threshold exists for the marker. Age-adjusted odds ratios (OR) for high P_{Fx} were compared across conditions.
Results:
Among 722 males and 878 females (mean age 72.8 ± 8.2 years), OP showed the strongest association with high P_{Fx} (OR: 17.3 in males; 8.5 in females). SP was modestly associated with high P_{Fx} in both sexes (OR: 1.9). OS was consistently associated with elevated P_{Fx} (OR: 13.3 in males; 5.1 in females). Across all three ethnic groups, similar patterns were observed, with OP conferring the highest P_{Fx} risk, SP the lowest, and OS identifying an intermediate-to-high-risk group (Figure 1B).
Conclusions:
HF risk estimated by P_{Fx} varies according to OP, SP, and OS, with varying gender- and ethnicity-specific patterns. Osteosarcopenia consistently shifted individuals into higher P_{Fx} risk categories across sexes and ethnicities. These findings support the need for integrated musculoskeletal assessment and tailored HF risk prevention strategies

in older adults.

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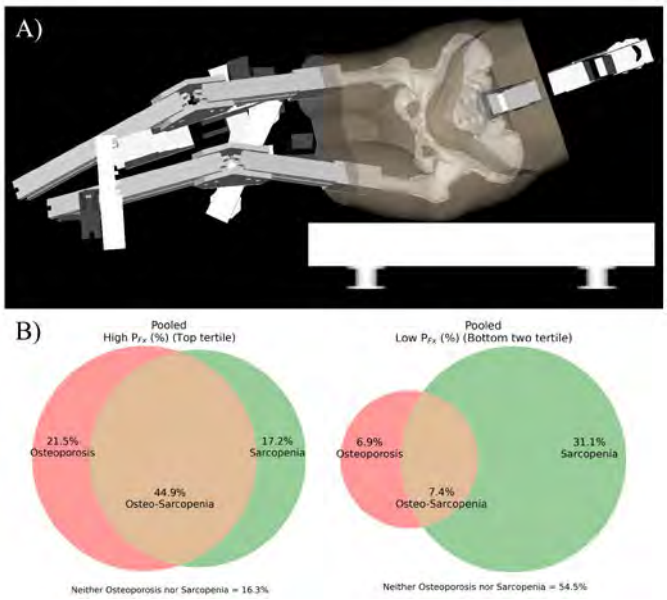


Figure 1: A) DXA-based biofidelic model for evaluating probability of hip fracture given a fall (P_{Fx}). B) Overlap of high and low P_{Fx} participants with osteoporosis, sarcopenia, osteo-sarcopenia.

P452

AGE-RELATED DECLINE IN BONE MINERAL DENSITY AND FEMORAL STRENGTH BY GENDER AND ETHNICITY IN SINGAPORE

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Objective(s):

This study aims to examine how age-related changes in aBMD, and S differ by gender and ethnicity in Singapore's multi-ethnic population.

Material and Methods:

We analysed data from 2,205 older adults who underwent DXA scanning from the Population HEalth and Eye Disease PRofilE in Elderly Singaporeans (PIONEER) cohort [1], comprising Chinese, Indian, and Malay participants. aBMD at the femoral neck was recorded from DXA reports. The scans were subsequently processed into finite element models to compute S. Regression models were applied to assess the relationships between age, aBMD, and S.

Results:

In this cohort, 56% were females (mean age: 73 years). Females showed a higher age-related decline in both aBMD and S than males, with a greater decline in S (Figure 1A). Malay females exhibited the greatest aBMD decline, followed by Indian and Chinese females (Figure 1B). Indian males experienced the greatest aBMD decline, followed by Chinese and Malay males (Figure 1C). Malay females had the greatest decline in S, followed by Chinese and Indian females. Chinese males showed the highest decline in S, compared to Indian and Malay males.

Conclusions:

The results suggest that rates of decline in aBMD and S vary by gender and ethnicity. While Chinese and Indian females showed similar aBMD reductions, Chinese females experienced a more pronounced decline in S. This may help explain why HF rates are higher among the Chinese females in Singapore [2]. The findings highlight the need for gender- and ethnicity-specific risk thresholds to better prevent HF in older adults.

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Acknowledgements: Research is supported by the NRF Singapore under its CREATE programme.

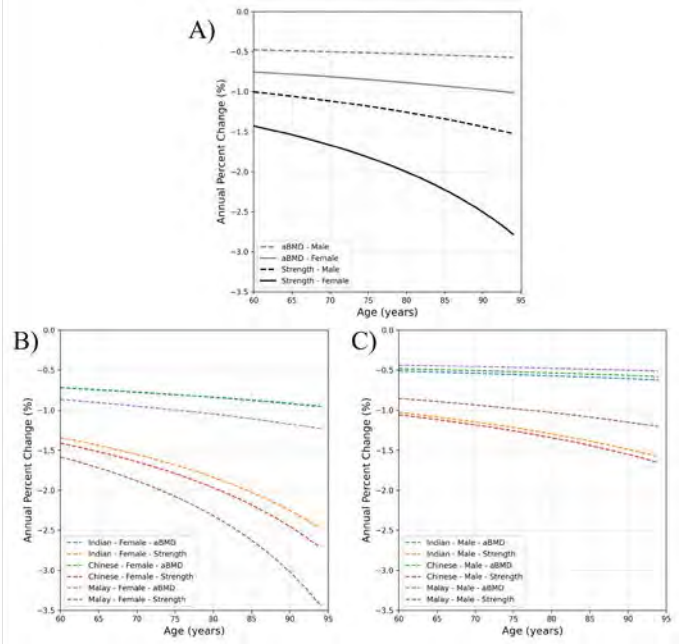


Figure 1: Annual drop in areal bone mineral density (aBMD) at femoral neck and Femoral strength. **A)** Pooled Females and pooled males, **B)** Ethnicity wise females, and **C)** Ethnicity wise males.

P453

BAASTRUP SYNDROME AS INFREQUENT CAUSE OF LOWER BACK PAIN: A CASE REPORT

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Introduction: Baastrup Syndrome also known as Kissing spines is a lumbar interspinous arthrosis. It's a relatively infrequent cause of lower back pain that affects elderly patients with no difference between sexes. It was first described by Christian Ingerslev Baastrup, a Danish radiologist, in 1933. Imaging findings often shows sclerosis of the contact surfaces, flattening and hypertrophy of the spinous processes (kissing spines) due

to degenerative changes of the lumbar spine.
Case report : We presented a case of a 78 year old female with chronic lower back pain subsequently increased by extension and relieved by flexion of the spine. Plain radiograph and CT findings included hyperlordosis with decreased space between adjacent spinous processes L2-L5 and reactive sclerosis of opposing interspinous surfaces also associated with intervertebral disk degeneration, spondyloarthrosis and spondylolysthesis L5-S1. Treatment was conservative, non steroidal anti inflammatory drugs to ease the pain and physiotherapy focused on stretching and strengthing exercises for abdominal and spinal muscles.
Conclusion : Baastrup Syndrome is relatively unknown cause for lower back pain that required to adequately diagnose and treat consequently.
Key words : Baastrup Syndrome, Kissing Spine, interspinosus arthrosis, lower back pain.

P454

PREVALENCE AND CLINICAL ASSOCIATIONS OF OSTEOPOROSIS IN SYSTEMIC LUPUS ERYTHEMATOSUS

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Objective: To investigate the prevalence and clinical associations of osteoporosis in a multicenter cohort of Ukrainian patients (pts) with systemic lupus erythematosus (SLE).
Material and Methods: A total of 121 SLE pts (aged 44 [32-54] years; 87.6% women, of whom 34.9% postmenopausal) were enrolled in three-center cross-sectional study. All pts had guideline-based indications for bone mineral density assessment and underwent dual-energy X-ray absorptiometry (DXA). Most pts (89.3%) had been exposed to glucocorticoids (GC), with a cumulative dose of 19 [10-29] g, treatment duration of 7 [3-11] years, and a current dose of 10 [10-20] mg/day prednisolone-equivalent. Disease activity and cumulative damage were assessed using SLEDAI-2K and SLICC/ACR Damage Index. Laboratory evaluation, performed contemporaneously with DXA, included erythrocyte sedimentation rate, C-reactive protein, complement C3, C4, and SLE-specific autoantibodies. Statistical analysis was performed using the chi-square test and Mann-Whitney test.
Results: Osteoporosis, defined according to WHO criteria, was identified in 34.7% of pts (postmenopausal women in 33.3% of cases). Fragility fractures were observed in 9.9% of pts. Osteoporosis was associated with longer SLE disease duration (11 [6-15] vs 6 [3-10] years, p<0.001), higher SLICC/ACR Damage Index (1 [1-2] vs 1 [0-2] points, p=0.049), greater cumulative GC dose (25 [11-32] vs 13 [6-22] g, p=0.003) and longer GC exposure (10 [6-14] vs 5 [1-10] years, p<0.001). Pts with osteoporosis had higher prevalence of nephritis (64% vs 43%, p=0.048), cardiac manifestations (59% vs 28%, p=0.003), and avascular necrosis (27% vs 4%, p=0.002). No differences were observed regarding age, sex, menopausal status, disease activity, inflammatory markers, or complement levels. Notably, anti-Sm (8% vs 33%, p=0.045) and anti-RNP (9% vs 50%, p=0.031) antibodies were less frequently detected in pts with osteoporosis.
Conclusion: In this Ukrainian SLE cohort, osteoporosis affects approximately one-third of pts and is associated with disease duration, cumulative organ damage, renal and cardiac involvement, avascular necrosis, and GC burden, whereas anti-Sm and anti-RNP positivity appears less frequent. These findings support the need for proactive bone health assessment in SLE pts.

P455

BONE HEALTH AND RISK OF FRACTURES IN FEMALES WITH OSTEOSARCOPENIA

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Objective: The study aimed to assess bone mineral density (BMD), trabecular bone score (TBS), and the 10-year probability of major osteoporotic fractures (MOF) in postmenopausal women with osteosarcopenia (OSP).
Methods: A total of 264 postmenopausal women (mean age 67.8±8.6 years) were examined and divided into three groups: the control group (without OSP or OP), the main group (with OSP), and the comparison group (with OP).
OSP was defined as a combination of sarcopenia (EWGSOP2 criteria) and 1 of the following criteria: 1) confirmed OP (BMD T-score ≤−2.5 SD) or 2) low BMD (T-score ≤−1.0 SD) plus a history of low-trauma fracture. BMD of the lumbar spine, total hip, and femoral neck, TBS, and appendicular lean mass were measured by DXA (Hologic). The 10-year probability of MOF and hip fractures (HF) was calculated using the Ukrainian FRAX® model with BMD.
Results. Regardless of the OSP criteria, the total hip and femoral neck BMDs were lower in subjects with OSP compared to OP (total hip: OSP - 0.66±0.13 g/cm² and OP - 0.73±0.09 g/cm² (criterion 1) and 0.68±0.15 vs. 0.77±0.11 g/cm² (criterion 2), respectively, p<0.0001 for both indices). TBS was significantly lower in patients with OSP than in the control group (p<0.005), without any differences compared to subjects with OP. The 10-year probability of MOF did not differ between subjects with OSP and OP, regardless of the OSP criterion, and was higher than in the control group (p<0.005 for both indices). The 10-year probability of HF in patients with OSP was higher than the similar index in subjects with OP and the control group for criterion 2, but not for criterion 1.
Conclusion. In patients with OSP, hip BMD, but not lumbar spine BMD, and TBS are significantly lower than those with OP and those in the control group. The risk of HF does not always differ between the OSP and OP groups, and this depends on the OSP criteria, which should be accounted for in clinical practice.

P456

LONG-TERM PERSISTENCE WITH DENOSUMAB – REAL-WORLD DATA

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Objectives The objectives of this study were to investigate persistence with denosumab 60 mg in a real-world clinical setting.
Material and Methods Patients initiating denosumab treatment at the Endocrinology clinic Linköping University Hospital between 2011 - 2020 were included. Patients were followed until 2021. Data were extracted from the local hospital database and recorded dates were assumed to represent injection dates. Persistence was defined as receiving denosumab within the recommended 6-month interval, allowing a maximum gap of 8 months between doses. Patients were classified as non-persistent at the first interval exceeding 8 months, regardless of later treatment resumption. We also calculated the proportion of doses administered within the appropriate interval.
Results 253 patients initiated denosumab treatment 2011-2020. Mean-age was 75±10 years (range 35-93 years) and 87% were women.

Across all initiation years, the 3- and 5-year persistence rates were 58% and 45% respectively. When initiation years were grouped into 2011-2016 and 2017-2020, persistence was significantly higher in the later initiation cohort (p=0.016), with 3- and 5-year persistence rates of 69% and 69%, compared with 51% and 36% in the earlier cohort. No significant differences were observed by sex or age at treatment initiation (<76 vs ≥76 years).

In total, 300, 666 and 367 injections were administered during 2011-2016, 2017-2019 and 2020-2021, respectively, with 93%, 94% and 91% administered within the defined interval of 6 + 2 months.
Conclusion A significant increase in treatment persistence was observed after 2016. This improvement is likely attributable to increased awareness of rebound effects following treatment discontinuation. In the early post-marketing period, denosumab 60 mg was more frequently discontinued after 3-5 years. More than 90% of all administered injections were given within the recommended dosing interval across all three periods.

P457

FAHR SYNDROME SECONDARY TO HYPOPARATHYROIDISM IN A PATIENT WITH CREST SYNDROME

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Objective
To study the association between Fahr syndrome and CREST syndrome .
Case Presentation

We report the case of a patient diagnosed with Fahr syndrome based on clinical manifestations and brain imaging findings revealing bilateral intracranial calcifications. The patient was also followed for CREST syndrome, confirmed by clinical features (subcutaneous calcinosis, sclerodactyly, Raynaud's phenomenon) and immunological findings.
The patient was a 58-year-old woman.
Past Medical History

- Menopause at the age of 50
- Post-thyroidectomy hypothyroidism since 2008, treated with levothyroxine 150 µg/day
- Follow-up for stable CREST syndrome treated with hydroxychloroquine 400 mg/day, Diltiazem 300 mg/day, colchicine 1 mg/day, and hydrocortisone 30 mg/day
- Follow-up in cardiology for aortic stenosis treated with IEC 20 mg/day and aspirin 100 mg/day
- Surgical resection of subcutaneous calcinosis of the foot in 2021

Family History

- Type 2 diabetes mellitus in one brother and two sisters
- Mother deceased from breast cancer at the age of 52

The patient had a history of total thyroidectomy in 2008 for multinodular goiter, complicated by chronic hypoparathyroidism, discovered following a tetany crisis preceded by progressive cognitive impairment, including memory and concentration difficulties.
Clinical Examination

- Conscious, cooperative patient with preserved general condition
- Able to stand and walk
- Memory and concentration impairment
- Finger paresthesia
- Muscle cramps
- Carpopedal spasm ("obstetrician's hand")
- Firm, painless subcutaneous nodules of the fingers and toes (calcinosis cutis)
- Sclerodactyly
- No other abnormalities on systemic examination

Laboratory Findings

- Severe hypocalcemia: 58 mg/L
- Hyperphosphatemia: 62 mg/L
- Parathyroid hormone (PTH): 1.2 pg/mL
- Vitamin D: 28.3 ng/mL
- TSH: 0.52 µIU/mL

Immunological tests:

- Positive ANA, speckled pattern (1:1000)
- Positive anti-TRIM21 antibodies
- Negative anti-Scl-70 antibodies
- Negative anti-centromere antibodies

Imaging Studies

- **Brain MRI**: dense, symmetrical calcifications of the basal ganglia
- **Pelvic X-ray**: multiple calcifications at tendon insertions, diffuse osteosclerosis, medial calcification

• **Hand and foot X-rays**: multiple dense nodular extra-osseous periarticular subcutaneous calcifications consistent with calcinosis cutis, with resorption of the distal phalanx of the left great toe

Discussion

The pathogenesis is primarily related to post-surgical hypoparathyroidism. The absence of PTH leads to chronic hyperphosphatemia, which, in association with hypocalcemia, promotes calcium phosphate deposition in cerebral vascular walls.

The originality of this case lies in its association with CREST syndrome. The microangiopathy characteristic of systemic sclerosis may act as an aggravating or triggering factor for both cutaneous and neurological calcifications.

This case highlights the importance of strict metabolic monitoring after thyroidectomy in patients with CREST syndrome. The occurrence of neurological symptoms should prompt evaluation for Fahr syndrome. Management is based on correction of calcium–phosphate imbalance through calcium supplementation and the use of teriparatide to stabilize lesions, as well as the crucial role of brain imaging in the presence of atypical neurological signs in patients with CREST syndrome.

Conclusion

This case report highlights a rare association between Fahr syndrome and CREST syndrome, emphasizing the importance of considering associated autoimmune diseases in the presence of atypical neurological manifestations and intracranial calcifications.

P458

METABOLIC FOOTPRINTS IN HIP FRACTURES: BIOMARKER PROFILES IN INTRA- VS. EXTRACAPSULAR INJURIES

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Objective:

To analyze the potential correlation between bone metabolism biomarkers and the type of hip fracture, distinguishing between intracapsular and extracapsular fractures.

Material and Methods:

A retrospective observational study was conducted using data from patients treated at our center between 2022 and 2023. The study included 131 patients with hip fractures who underwent blood analysis to determine levels of Vitamin D, parathyroid hormone (PTH), N-terminal propeptide of type I collagen (PINP), and beta-crosslaps (β-CTX). Fractures were classified as intracapsular or extracapsular (pertrochanteric and subtrochanteric).

Results:

Of the total patient cohort, 74 presented with intracapsular fractures and 57 with extracapsular fractures. Patients with extracapsular fractures showed significantly lower Vitamin D levels ($p<0.005$) and significantly higher β-CTX levels ($p<0.005$) compared to patients with intracapsular fractures.

Regarding PTH, higher values were observed in extracapsular fractures, although statistical significance was not reached ($p=0.108$). PINP levels were lower in intracapsular fractures, without statistically significant differences ($p=0.089$).

Conclusions:

Vitamin D and β-CTX were the biomarkers that showed significant differences between intra- and extracapsular fractures, with lower Vitamin D and higher β-CTX levels found in extracapsular injuries. PTH and PINP might reach statistical significance in studies with a larger sample size.

P459

SPECIFIC BIOMARKERS IN ANKYLOSING SPONDYLITIS RELATED WITH FUNCTIONAL STATUS

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Objective. There are many biomarkers described in the literature that can have an altered value in ankylosing spondylitis (AS), a chronic inflammatory rheumatic disease of unknown aetiology, but few one of these, such as IGF-1, are not as intensively studied. The main objective of this study is to monitor the therapeutic effects of a complex rehabilitation protocol on functional scales (ASDAS, BASDAI, BASMI, BASFI, SF-36) related to disease activity, pain, mobility, functionality and quality of life of these patients, as well as on serum markers such as platelets, lymphocytes, RDW, PLR, blood glucose, ESR, CRP and IGF-1.

Methods. The study was carried out in rehabilitation department from Techirghiol Balneal Rehabilitation Hospital, on 25 patients suffering from ankylosing spondylitis during a 2 week course of treatment. The patients were assessed at two time intervals, at the beginning and at the end of the treatment.

Results. The study showed statistically significant changes for BASFI score and in a limited number subscales of the SF-36 questionnaire. The analysed serum biomarkers, although some of them showed positive changes, overall there were no statistically significant changes. This study shows objectively measured improvements in patients' health status, which shows the impact of combined rehabilitation treatment.

Conclusions. More studies are needed on the effects of balneotherapy on patients with ankylosing spondylitis, on larger groups of patients, with longer follow-up periods and better validity. The effects of different types of therapeutic waters and different types of mud could also be studied to form a broader perspective.

Keywords: ankylosing spondylitis; serum biomarkers; balneotherapy

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P460

PERSONALIZED MANAGEMENT OF AXIAL SPONDYLOARTHRITIS: ALIGNING TREATMENT WITH PATIENT EXPECTATIONS – A CASE REPORT

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Introduction

Axial spondyloarthritis is a chronic inflammatory disease with a major impact on mobility and quality of life. The introduction of Janus kinase (JAK) inhibitors has expanded treatment options for patients with active disease who respond inadequately to conventional therapies.

Material and Method

We report the case of a 55 year old male, diagnosed with HLA B27 positive nonradiographic axial spondyloarthritis, manifesting bilateral Achilles enthesitis and high disease activity. Clinical evaluation included BASDAI and VAS scoring, spinal mobility assessment, and laboratory markers (ESR, CRP). Imaging comprised calcaneal radiography and musculoskeletal ultrasound of joints and entheses.

After an inadequate response to NSAIDs and sulfasalazine, a JAK inhibitor was initiated. Concomitantly, the patient underwent a comprehensive rehabilitation program at the Techirghiol Balneary and Rehabilitation Sanatorium, including electrotherapy, therapeutic massage and hydrokinetotherapy in saline water pools.

Results

After six months of combined pharmacologic and rehabilitation therapy, a marked clinical improvement was noted and inflammatory markers normalized. The patient regained spinal mobility and functional autonomy, reporting improved daily activity and professional performance. Oral drug administration and the integrated approach increased adherence, satisfaction and self-management awareness.

Conclusions

This case highlights the efficacy of combined JAK inhibitor therapy and personalized balneary rehabilitation in controlling inflammation, improving pain and function, and restoring quality of life in nraxSpA. The results support an interdisciplinary strategy integrating pharmacologic, physical, and educational components, underlining the importance of individualized care and patient engagement for long-term control and satisfaction.

P461

QUALITY AND RELIABILITY OF YOUTUBE VIDEOS ON SARCOPENIA EXERCISES: A CROSS-SECTIONAL EVALUATION OF ONLINE EXERCISE CONTENT FOR OLDER ADULTS

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Objective

This study aimed to evaluate the quality and reliability of YouTube videos on sarcopenia exercises and to compare content characteristics according to accreditation status and target audience.

Materials and Methods

In this cross-sectional study, 50 YouTube videos identified using the keyword "sarcopenia exercise" were evaluated by three independent geriatricians using the DISCERN instrument, Global Quality Scale (GQS), and JAMA benchmark criteria. Inter-rater reliability was assessed using the intraclass correlation coefficient (ICC[2,k]). Comparisons were performed between accredited and non-accredited sources and between videos explicitly targeting older adults versus non-targeted content.

Results

The mean DISCERN score was 45.9 ± 12.0, indicating moderate overall quality. Mean GQS and JAMA scores were 3.4 ± 0.9 and 1.4 ± 0.7, respectively. Videos from accredited sources demonstrated significantly higher quality across all assessment tools (DISCERN: 53.4 vs. 42.7; GQS: 3.95 vs. 3.20; JAMA: 1.83 vs. 1.20; all $p < 0.05$). Inter-rater reliability was excellent for DISCERN (ICC = 0.965) and good for GQS (ICC = 0.88). No significant associations were observed between video duration or popularity metrics and quality scores.

Conclusion

Although exercise is fundamental to sarcopenia management, many older adults lack access to structured or supervised programs. Online platforms may therefore represent a complementary approach for delivering exercise guidance; however, the inconsistent quality of existing content highlights the need for health professional–guided, evidence-based digital exercise resources to support safe and effective geriatric care.

P462

AN EXTREMELY RARE CASE OF RIBBING DISEASE AND A PIONEERING TREATMENT SUGGESTION

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Background
Ribbing disease is a rare benign sclerosing bone dysplasia. It presents with an increased bone density at the diaphysis with cortical endosteal/periosteal thickening and affects predominantly the lower extremities. The aim of this paper is to present a case of Ribbing disease and its treatment.

Case Presentation
A female 60-year-old came to our outpatient clinic presenting constant pain in the left femur and knee over the previous 3 years, with a feeling of tiredness and gradually increased heaviness. She presented limitations in walking normally; analgesic and anti-inflammatory drugs gave her little to no relief. She had been examined elsewhere and had performed xrays, CT and biopsy with no certain diagnosis. A bone scan had an increased uptake at the metaphysis of the femur. A year after she did a new bone scan with increased uptake in a larger area of the femur and was diagnosed with a benign bone lesion. Due to the persistence of her symptoms she did a Lumbar spine and left knee MRI with no findings.

At our institution new x-rays, CT and MRI were ordered.

The x-rays of her left femur presented increased bone density (sclerosis) at the metaphysis with cortical endosteal and periosteal thickening just below the lesser trochanter at medial and lateral cortex at a larger area compared to the first xrays 3 years ago. The CT scan was performed, which showed periosteal and endosteal thickening with narrowing of the intramedullary canal. In addition to the CT scan the MRI which was performed showed endosteal marrow edema and no soft tissue involvement of the lesion.

A bone biopsy was then performed from multiple spots of the sclerosis. The doctor who examined the bipsy samples concluded that the histopathological features are not specific, but in combination with the patient's history and the imaging findings, they are compatible with sclerosing diaphyseal dysplasia, of the Ribbing disease type.

A few cases have been described in which surgical reaming to remake the intramedullary canal was very effective in relieving intense pain. Suspecting Ribbing disease, we decided to apply this treatment. In addition a prophylactic nailing of the femur with a long gamma nail was decided. The main problem is performing it in a centered fashion to avoid taking a false route, fracturing the femur and making the surgical objective more complicated. As the canal was entirely occupied, it was not possible to pass a standard knotted reamer guide. The lesion area was penetrated using a sufficiently long steinmann pin to make a route under fluoroscopy. After removing the pin, a manual reamer of a larger diameter were passed sequentially on a simple guide wire until it was possible to introduce the knotted guide; this was then used to perform a standard progressive reaming, widening the canal to fit the nail.

Clinical Outcomes
One week after surgery, the patient reported no pain and she remained totally asymptomatic 6 months following the intervention.

Discussion
Ribbing disease is a rare benign pathology, characterized by endosteal/periosteal intramedullary sclerosis, principally in the lower limbs. If pain is intense, intramedullary reaming has shown to be effective in relieving symptoms. In order to avoid its recurrence we performed a nailing of the femur which will stop the disease from blocking the intramedullary canal again and cause pain. This would be considered as a permanent treatment.

P463

EFFECTS OF NEUROMUSCULAR ELECTRICAL STIMULATION ON SYSTEMIC INFLAMMATION AND MUSCLE METABOLISM MARKERS IN HOSPITALIZED OLDER ADULTS WITH CANCER: A PILOT BEFORE–AFTER STUDY

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Objective
To evaluate whether a 5-day NMES protocol alters the neutrophil-to-lymphocyte ratio and the urea-to-creatinine ratio in hospitalized older adults with gastric or intestinal cancer.

Methods
This pilot, single-arm before–after intervention study was conducted in a public hospital in Brazil. Hospitalized older adults with gastric or intestinal cancer were evaluated according to standard hospital routines, following typical daily clinical assessments and international clinical nutrition guidelines. Patients received NMES for five consecutive days during admission to a medical ward. The NMES protocol consisted of a 5-minute warm-up at 5 Hz (pulse width 250 µs), followed by 30 minutes of stimulation at 100 Hz (pulse width 400 µs; 5 s on/10 s off). Sessions were performed twice daily with a 3-hour interval, in accordance with previously published protocols. NLR and urea-to-creatinine ratio were obtained from medical records before and after the intervention.

Results
The study included 26 patients (12 men), with a mean age of 64.28 ± 9.70 years. No significant differences were observed between pre- and post-intervention measurements. NLR values were 5.58 ± 4.86 at baseline and 6.26 ± 5.36 after NMES ($p = 0.32$). The urea-to-creatinine ratio was 37.27 ± 13.70 before the intervention and 36.38 ± 18.71 after the intervention ($p = 0.42$).

Conclusion
In this pilot before–after study, five days of NMES during hospitalization did not significantly modify systemic inflammation, as assessed by NLR, nor markers related to muscle breakdown and protein metabolism, as assessed by the urea-to-creatinine ratio, in older adults with gastric or intestinal cancer. These findings suggest that short-term NMES may be insufficient to induce measurable changes in these systemic biomarkers, supporting the need for larger controlled studies and/or longer intervention periods to clarify NMES effects during hospitalization.
Support: This study was supported by CNPq (GDP received scholarship PQ2/CNPQ).

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FUNCTIONAL OUTCOME OF SUBVASTUS VERSUS MEDIAL PARAPATELLAR APPROACHES FOR TOTAL KNEE REPLACEMENT IN PATIENTS WITH KNEE OSTEOARTHRITIS: A PROSPECTIVE COHORT STUDY

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Background: Subvastus approach and medial parapatellar approach are two major approaches for total knee replacement (TKR). There is no global consensus on the superiority of either approach in terms of functional outcomes.

Objective: The present study aimed to evaluate the functional outcome of TKR through subvastus approach and medial parapatellar approach by using patient-reported scores at 3-, 6-, and 12-month post-operative follow-ups.

Methods: This prospective cohort follow-up study included patients with knee osteoarthritis who underwent elective primary TKR either through the subvastus or medial parapatellar approaches at King Abdullah Medical City, Makkah city, Kingdom of Saudi Arabia, from January 2019 to December 2022. Scores from the self-reported Oxford Knee Score (OKS) and the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) were compared in the two groups of patients at 3-, 6-, and 12-month post-operative follow-ups.

Results: A total of 98 patients were included, of which 37 underwent TKR through the subvastus approach and 61 through the medial parapatellar approach. There was an overall significant change over time in both WOMAC and OKS scores ($P < 0.001$). Patients who underwent the subvastus approach had significantly higher mean of WOMAC and OKS than patients with the medial parapatellar approach at the 3- and 6-month follow-ups ($P < 0.05$), but not at the 12-month follow-up.

Conclusions: For TKR, the medial parapatellar approach results in better functional outcomes at the 3- and 6- month follow-up periods compared with the subvastus approach.

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THE CRITICAL ROLE OF FOLLOW-UP IN FRACTURE LIAISON SERVICES FOR GERIATRIC HIP FRACTURE PATIENTS: A RETROSPECTIVE COHORT STUDY

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Purpose: This study aims to evaluate the impact of coordinator based FLS on medical treatment compliance and mortality in patients following hip fracture. Specifically, it seeks to evaluate the impact of routine follow-up post discharge on these outcomes.

Methods: Comparative retrospective cohort of following hip fracture patients for one year after surgery. First group with the complete FLS treatment and protocol and second group with partial FLS protocol without the routine clinical follow-up after discharge. Main clinical outcomes were osteoporosis medication compliance and morality rates.

Results: 347 participants, 182 (52.4%) without a coordinator follow-up and 165 (47.6%) with a coordinator follow-up. Patients with coordinator follow-up had better medication compliance 1 year following hip fracture (77% vs 39%). First year mortality rate was 11% and 13% accordingly without statistical significance.

Conclusion: This study found that patients in an FLS with coordinator follow-up had better clinical outcomes, receiving more timely medication recommendations and showing higher treatment adherence, highlighting the value of coordinated follow-up in long-term care

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DELIRIUM FOLLOWING HIP SURGERY IN COGNITIVELY INTACT POPULATION: RISK FACTORS AND IMPACT- A COHORT STUDY

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Purpose: Postoperative delirium (POD) is a clinically significant complication following hip fracture surgery, yet most studies include patients with baseline cognitive impairment, making it difficult to isolate risk factors for true incident delirium. This study aimed to identify independent predictors of POD in cognitively intact older adults and to evaluate its impact on one-year mortality.
Methods: A retrospective cohort study was conducted including 674 cognitively intact patients aged ≥60 years who underwent surgical treatment for hip fractures between 2021 and 2023. Clinical, biochemical, and perioperative variables were extracted from electronic medical records. Delirium events were identified via documented diagnoses, use of delirium-directed medications, or referral for outpatient delirium evaluation. Independent predictors of delirium were determined using multivariable logistic regression. One-year mortality was assessed with Kaplan–Meier survival analysis and Cox proportional hazards modeling.
Results: Independent predictors included advanced age (OR 1.04 per year, p = 0.034), hypophosphatemia (OR 2.02, p = 0.026), hyperphosphatemia (OR 2.43, p = 0.043), chronic corticosteroid use (OR 3.38, p = 0.007), pneumonia (OR 2.43, p = 0.043), and urinary tract infection (OR 3.40, p = 0.022). Several factors, including the intensity of opioid-based pain management, affected the univariable results but were not independently associated with delirium. Delirium was associated with significantly higher one-year mortality (HR 2.38, p <0.001).
Conclusion: In cognitively intact older adults undergoing hip fracture surgery, several established and novel factors independently predicted postoperative delirium, including phosphate disturbances and chronic corticosteroid therapy. Delirium was strongly associated with increased one-year mortality, underscoring the importance of early identification and targeted prevention strategies in this population.

P467

ISOLATED ATYPICAL PEDICLE STRESS FRACTURES IN PATIENTS ON PROLONGED BISPHOSPHONATE THERAPY: REPORT OF TWO CASES AND A LITERATURE-BASED PROPOSAL FOR DIAGNOSTIC CRITERIA

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Background/Objectives: This study reports two rare cases of isolated bilateral lumbar pedicle stress fractures in patients on prolonged BP therapy. Along with a structured literature review, the objective was to evaluate whether diagnostic criteria derived from those used for AFFs may apply to these atypical vertebral fractures.

Methods: Two patients with osteoporosis and on long-term BP therapy diagnosed with isolated lumbar pedicle stress fractures were retrospectively analyzed. A structured literature review identified similar reported cases. All cases were evaluated using the 2010 American Society for Bone and Mineral Research AFF criteria to assess applicability to isolated pedicle stress fractures.

Results: Both patients demonstrated
bilateral lumbar pedicle fractures without vertebral body involvement. One was treated conservatively; the other underwent robotic-assisted percutaneous pedicle screw fixation with documented fracture healing at six months. The literature review identified eight similar cases of isolated pedicle fractures in patients on prolonged BP therapy. Clinical course and imaging findings demonstrated stress-type features analogous to AFFs. The proposed AFF-based diagnostic criteria for pedicular insufficiency fractures were found to be applicable to all ten patients.

Conclusions: Isolated bilateral pedicle stress fractures may represent a spinal analog of AFFs. Based on shared clinical and imaging features, we propose preliminary diagnostic criteria for atypical pedicular insufficiency fractures. In creased awareness and standardized criteria may aid in early diagnosis and reporting, encouraging further studies on this rare spinal entity.

P468

BONE STRUCTURE AND MUSCULOSKELETAL DEVELOPMENT IN YOUTH ATHLETES

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Introduction and Purpose. In DEXA-based analyses, the use of athlete-specific reference data is essential for accurately assessing bone development in child and adolescent athletes. Our research group established new reference values for bone mineral parameters in youth athletes. The aim of the present study was to develop sport-specific reference standards for bone mineral density (BMD) and bone mineral content (BMC) across different types of athletic disciplines.
Material and Methods. Bone parameters were evaluated using DEXA in a cohort of 2,793 athletes aged 11–20 years. The bone structural parameters of each athlete were converted to z-scores relative to age- and sex-specific reference values specified by the DEXA software. Z-profile analysis and principal component analysis were used to identify body structural components in young athletes and to evaluate the associations between the identified component and the type of sport.
Results. The total BMD of male athletes is considerably higher than the age-specific references for males ($p<0.001$ in each age-group). An outstanding skeleto-muscular robusticity of male wrestlers, pentathletes and cyclers could be observed in the studied sports: wrestlers had significantly more developed skeleto-muscular robusticity and BMD than the age-group average among elite athletes, while pentathletes and cyclers had worse bone structural parameters than the reference level for their age-group among elite athletes. The corresponding trends in the BMC of female athletes are significantly higher than the references ($p<0.001$ in every age-group, with the exception of 13 years, $p= 0.04$). In case of female athletes, the rhythmic gymnasts' and pentathletes' bone structural parameters differed significantly from the players' average parameters of the studied elite athletes: their average skeletal robusticity both in the trunk and the extremities lagged behind the age-group mean values for elite athletes.
Conclusion. Youth athletes exhibited higher BMD and BMC values compared with reference values from the general population. The skeletal development of cyclers, pentathletes and rhythmic gymnasts should be monitored more frequently, since their bone development lags behind not only their age-peer elite athletes' bone development but also the population-based reference values.

P469

EARLY LUMBAR BONE LOSS IN AN ACTIVE MIDDLE-AGED MALE WITH SPINAL CORD

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Objective:
To assess the degree of bone demineralization using dual-energy X-ray absorptiometry (DEXA) in a relatively young and physically active male with spinal cord injury (SCI) who benefited from early and continuous rehabilitation.
Methods:
We present the case of a 53-year-old male with SCI following a hunting accident that resulted in a penetrating injury at the T5 level. The projectile was surgically extracted, and the patient was admitted to the "Băile Felix" Medical Rehabilitation Clinical Hospital three weeks postoperatively. Functional status was assessed using manual muscle testing (MMT), the Functional Independence Measure (FIM), and the Barthel Index at initial admission and at latest evaluation seven months later. Bone mineral density was evaluated at the last admission using a DEXA scan.
Results:
DEXA assessment revealed a lumbar spine T-score of −1.7 and Z-score -1.3(-18%) and a right hip T-score of −0.4 and Z score -0.1(-2%) consistent with osteopenia. Despite early mobilization and significant functional recovery, the lumbar T-score and Z score indicated significant bone loss. Functional outcomes improved substantially over the seven-month

period: the FIM score increased from 90 to 107 points, and the Barthel Index from 55 to 85 points. MMT of the right lower limb (most affected side) important strength gains: hip flexors improved from 2/5 to 4/5, hamstrings from 1/5 to 4/5, and knee extensors from 3/5 to 4/5. These improvements translated into enhanced ambulation, progressing from assisted walking with a rollator to independent short-distance walking and long-distance walking with a cane. Despite early rehabilitation, significant strength recovery and an active lifestyle, reduced mechanical loading following SCI in a 53-year-old male was associated with early bone loss, as evidenced by a low lumbar spine Z-score.

Conclusion: This case highlights the importance of early bone density assessment and monitoring in patients with SCI, even in those who achieve good functional recovery.

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SARCOPENIA IN RHEUMATOID ARTHRITIS

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Objective: To evaluate the presence of sarcopenia in patients with rheumatoid arthritis (RA).

Method: We conducted a study including 100 patients with RA and 100 gender-matched healthy individuals. The study aims to investigate sarcopenia prevalence in patients with rheumatoid arthritis (RA) and to detect factors associated with low muscle mass and strength. Sarcopenia was assessed using performing tests such as handgrip strength, short physical performance battery and also by determining skeletal mass index using dual photon X-ray absorptiometry (DXA).

Results: The participants comprised of 65 females and 35 males. The frequency of sarcopenia was 40% in the RA group and 8% in the control group. The prevalence was significantly different between juvenile idiopathic arthritis (JIA), spondyloarthritis (SpA), and rheumatoid arthritis (RA) groups. Results of handgrip and gait speed tests were lower in the RA group than in the healthy control group ($P = .002$ and $P < .001$, respectively). Disease activity scores were higher in patients with sarcopenia than in patients without sarcopenia. A statistically significant association was found between handgrip test results and age, gender, and disease activity.

Conclusions: Patients with rheumatoid arthritis have not only bone tissue, but also skeletal muscle tissue disorders, resulting in a significant deterioration of functional capacity and quality of life. Longer disease duration and higher disease activity may provoke the development of sarcopenia due to chronic inflammation in patients with RA. Therefore, physicians should take into account the preservative and preventive methods against sarcopenia by encouraging patients about exercise along with controlling disease activity.

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THE CLINICAL IMPACT OF OSTEOARTHRITIS ON THE MULTIDISCIPLINARY MANAGEMENT OF PATIENTS IN INTENSIVE CARE UNITS

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Background:

Osteoarthritis (OA) is the most common degenerative joint disease, characterized by progressive cartilage deterioration and functional motor impairment. Although OA itself is not a direct cause for intensive care unit (ICU) admission, it represents a relevant comorbidity that significantly influences the treatment, mobilization, and recovery of critically ill patients. The aim of this study is to highlight the clinical interaction between osteoarthritis and intensive care management through the presentation of selected clinical cases.

Methods:

Three clinical cases of patients with confirmed advanced osteoarthritis admitted to the ICU for different medical and surgical reasons were analyzed. The study focused on factors complicating ICU management, including analgesia, patient positioning, mobilization, the use of anti-inflammatory medications, and recovery outcomes.

Case Reports:

Case 1: A 72-year-old woman with bilateral knee OA and obesity admitted to the ICU for severe bacterial pneumonia. Prolonged immobilization during mechanical ventilation exacerbated joint pain and stiffness, requiring early physiotherapy after respiratory stabilization and careful prevention of pressure ulcers.

Case 2: A 68-year-old man with advanced hip OA underwent total hip replacement and was transferred to the ICU due to postoperative respiratory failure. Balanced analgesia with mild opioids and early physiotherapy proved essential in minimizing postoperative complications and optimizing recovery.

Case 3: A 76-year-old woman with shoulder OA and hand deformities admitted to the ICU for acute renal failure. Difficulties in vascular access and limited upper-limb mobility complicated technical procedures, requiring close cooperation between the intensive care and orthopedic teams.

Results:

All three cases demonstrated that the presence of osteoarthritis significantly affects intensive care management, adding challenges related to positioning, pain control, and mobilization. Patients with OA showed longer ICU stays and required more extensive multidisciplinary support.

Conclusion:

Osteoarthritis should be considered an important comorbidity in critically ill patients. Pre-assessment of functional limitations, tailored analgesic therapy, and early mobilization are essential components for improving clinical outcomes in the ICU. Close collaboration among intensivists, orthopedic surgeons, and physiotherapists plays a crucial role in ensuring optimal management and recovery of patients with OA during intensive care.

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UNUSUAL CASE OF RECCURENT HYPERCALCEMIA

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Objective - Parathyroid hormone (PTH)–independent hypercalcemia represents an important diagnostic subgroup when evaluating for hypercalcemic disorders. Granulomatous disorders cause hypercalcemia through macrophage-mediated conversion of 25-hydroxyvitamin D (25-OH-D) to 1,25-dihydroxyvitamin D (1,25-OH-D). Isolated extrapulmonary sarcoidosis presenting primarily with recurrent hypercalcemia and neurological manifestations is rare.

Material and Methods - We report a case of a 77-year-old woman with a history of type 2 diabetes mellitus, prior cerebrovascular accident, surgically induced menopause, and osteoporosis with prior fragility fractures. She had two hospital admissions within one year for headache, confusion, and gait disturbance secondary to severe hypercalcemia. Contrast-enhanced MRI of the brain showed chronic lacunar infarcts and small calcified dural-based lesions consistent with meningiomas, with no acute pathology. She was lost to follow-up after the first admission.

Results- On her second presentation, the corrected serum calcium peaked at 14.3 mg/dL (8.5-10.5 mg/dl) with elevated ionized calcium and acute kidney injury. Intact PTH was suppressed, with normal serum 25-OH-D (37.85 ng/mL [30-50 ng/mL]), and mildly elevated serum 1,25-OH-D (220 pmol/L [59-159 pmol/L]). Serum phosphate, PTHrp and protein electrophoresis were normal. Inflammatory markers were elevated. Whole body FDG PET-CT showed similar FDG uptake involving the left gluteal and adjacent skeletal muscles, on both occasions, suggestive of an inflammatory process. Muscle biopsy from the gluteus maximus revealed non-caseating granulomatous inflammation with no evidence of malignancy or infection; acid-fast bacilli staining was negative. In the absence of pulmonary or systemic involvement, findings were most consistent with isolated muscular sarcoidosis causing PTH-independent hypercalcemia. After stabilisation, she was discharged on oral prednisolone 40 mg daily, and remains stable on follow up.

Conclusion - This case highlights that isolated muscular sarcoidosis can be a cause of recurrent PTH-independent hypercalcemia and emphasizes the importance of considering targeted biopsy of persistent skeletal muscle FDG uptake to establish the diagnosis.

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REDUCING THE TREATMENT GAP AFTER FRACTURES: HOME REHABILITATION WITHIN A FRACTURE LIAISON SERVICE (FLS)

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OBJECTIVE

To analyse functional outcomes and treatment efficiency of fracture patients receiving home-based rehabilitation within a fracture liaison service (FLS) implemented in 2024.

MATERIAL AND METHODS

Prospective descriptive study including patients treated at home for fractures during 2024 within a newly implemented FLS. From January to December 2025, 207 fracture patients were treated at home. Variables analysed were age, sex, fracture type, Barthel Index (pre-fracture, rehabilitation admission and discharge), functional improvement (Barthel increase), and number of rehabilitation sessions. Descriptive statistical analysis was performed. Qualitative variables are presented as absolute frequency and percentage, and quantitative variables as mean and standard deviation (SD).

RESULTS

Among 1,041 patients receiving home rehabilitation, 207 (19.9%) were treated for fractures. The population consisted of 78.3% women (mean age 81.12 years; SD 9.18) and 21.7% men (mean age 74.3 years; SD 11.01). Fracture distribution was 65.2% femur, 19.3% humerus, 9,67% pelvic and 5.8% ankle fractures. Multiple fractures were present in 8,21% of patients. Mean Barthel Index was 79.05 pre-fracture, 57.90 at rehabilitation admission and 73.06 at discharge. Mean functional improvement was 15.16 Barthel points (SD 5.32), with a mean of 11.92 home rehabilitation sessions (SD 4.01).

CONCLUSIONS

Home-based rehabilitation within a fracture liaison service achieves relevant functional recovery with an efficient use of rehabilitation sessions. Integrating home rehabilitation into an FLS model contributes to closing the post-fracture treatment gap in routine clinical practice.

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DOES OSTEOSARCOPENIA SYNERGISTICALLY INCREASE RISK FOR INCIDENT FALLS AND FRACTURES IN OLDER ADULTS? A SYSTEMATIC REVIEW AND META-ANALYSIS

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Objective: Osteosarcopenia represents the combination of low bone mineral density (BMD) and sarcopenia and has been proposed to increase the risk of falls and fractures among older adults. This systematic review and meta-analysis aimed to identify whether osteosarcopenia confers a greater risk for incident falls and fractures compared to low BMD or sarcopenia alone.

Material and Methods: MEDLINE, Embase, Web of Science, CINAHL and AgeLine were searched from their inception to 2025 for eligible records. We included prospective studies of populations aged ≥50 years where individuals with osteosarcopenia were compared to individuals with low BMD (T-scores <-1.0) or sarcopenia alone. Random effects meta-analyses calculated risk ratios (RR) with 95% confidence intervals (95%CI) for incident falls and fractures. We also calculated interaction on additive (relative excess risk due to interaction; RERI) and multiplicative (multiplicative interaction ratio; MR) scales. RERI values >0 (with 95%CIs excluding 0) indicate that the absolute risk of combined low BMD and sarcopenia is greater than expected from adding their individual risks, whereas MR values >1 (with 95%CIs excluding 1) indicate a positive departure from multiplicativity on the RR scale, rather than excess absolute risk.

Results: Eight records (n=17,015) were included. Osteosarcopenia was associated with similar fracture risk to low BMD (RR: 1.00; 95%CI: 0.77, 1.30; k=7, I^2=53.7%), but higher risk than sarcopenia (RR: 1.68; 95%CI: 1.11, 2.55; k=6; I^2=51.1%). Falls risk did not differ for osteosarcopenia compared to low BMD (RR: 1.15; 95%CI: 0.44, 2.97; k=3; I^2=72.9%) or sarcopenia (RR: 1.06; 95%CI: 0.70, 1.59; k=3; I^2=1.1%). Synergy analyses showed pooled RERI estimates of 0.02 (95%CI: −0.71, 0.75; k=6) for fractures and −0.16 (95%CI: −0.60, 0.28; k=3) for falls, and MR estimates of 0.93 (95%CI: 0.58, 1.47; k=6) and 0.83 (95%CI, 0.64, 1.09; k=3), respectively.

Conclusions: The risk of incident fracture in osteosarcopenia is not significantly different to low BMD alone, but is increased compared with sarcopenia alone. Falls risk does not appear to differ between conditions. Given the lack of evidence that having both low BMD and sarcopenia increases risk beyond low BMD alone, current data do not support using osteosarcopenia as a separate diagnostic category.

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INTRINSIC CAPACITY REFLECTS MUSCULOSKELETAL VULNERABILITY: ASSOCIATION WITH OSTEOSARCOPENIA BUT NOT SARCOPENIA OR OSTEOPOROSIS

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Objectives Intrinsic capacity (IC) reflects the physical and mental capacities underlying functional ability in older adults. Although IC has been linked to sarcopenia, its association with osteosarcopenia remains unclear. This study aimed to investigate the relationship between intrinsic capacity and osteosarcopenia.

Materials and Methods This retrospective cross-sectional study included patients aged 65 years and older who visited a tertiary geriatric outpatient clinic between November 2012 and December 2025 and underwent comprehensive geriatric assessment. Intrinsic capacity was assessed using the WHO Integrated Care for Older People (ICOPE) framework, covering cognitive, locomotor, vitality, psychological, and sensory domains. Sarcopenia and osteoporosis were defined according to established criteria, and osteosarcopenia was defined as the coexistence of both conditions. Participants were classified into mutually exclusive phenotypic groups of sarcopenia alone, osteoporosis alone, and osteosarcopenia. For each analysis, intrinsic capacity score was modeled as the independent variable, and sarcopenia, osteoporosis, and osteosarcopenia were analyzed separately as binary outcomes using multivariable-adjusted logistic regression models.

Results A total of 810 participants were included in the analysis. The mean age of the study population was 74.6 ± 6.6 years, and 69.8% were female. The prevalence of sarcopenia, osteoporosis, and osteosarcopenia was 11.1%, 17.2%, and 5.1%, respectively. Total IC scores differed significantly across phenotypic groups ($p < 0.001$), with the lowest scores observed in individuals with osteosarcopenia. In unadjusted analyses, higher IC scores were associated with lower odds of sarcopenia (OR = 0.83, 95% CI 0.73–0.95) and osteosarcopenia (OR = 0.69, 95% CI 0.58–0.82), but not osteoporosis. After full adjustment for age, sex, smoking status, and polypharmacy, total IC scores remained independently associated with osteosarcopenia (OR = 0.79, 95% CI 0.65–0.95), whereas no independent associations were observed for sarcopenia or osteoporosis alone.

Conclusions Lower IC score is independently associated with osteosarcopenia but not with sarcopenia or osteoporosis alone. These findings suggest that intrinsic capacity captures the combined burden of muscle and bone impairment and may serve as a functional marker to identify older adults at increased musculoskeletal vulnerability.

Table 2. Logistic regression results for the association between total intrinsic capacity score and musculoskeletal phenotypes

	Sarcopenia OR (95% CI)	p-value	Osteoporosis OR (95% CI)	p-value	Osteosarcopenia OR (95% CI)	p-value
Total IC score						
Model 1	0.838 (0.738-0.951)	**0.006**	0.922 (0.827-1.028)	0.145	0.692 (0.583-0.822)	**<0.001**
Model 2	0.883 (0.771-1.012)	0.073	1.030 (0.914-1.161)	0.624	0.785 (0.652-0.946)	**0.011**

*Model 1: unadjusted

*Model 2: age, sex, smoking, polypharmacy adjusted

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NORDIC WALKING AS AN ACCESSIBLE METHOD OF PRIMARY PREVENTION OF SENILE ASTHENIA IN THE CHUVASH REPUBLIC

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Objective. To analyze the effectiveness of systematic Nordic walking classes and assess their impact on the quality of life of the elderly.
Materials and methods. 76 patients (30 men, 46 women) were examined using the SF-36 questionnaire. The average age of the patients was 65.6 [53.9; 77;3]
Results. For 5 months (from January to May 2025), the regional office of medical volunteers for the elderly conducted master classes in Nordic walking on the territory of public spaces. Classes were held 2-3 times a week for 30-40 minutes. The exclusion criteria were: patients with acute cardiovascular diseases, severe forms of arterial hypertension, decompensated diabetes mellitus, acute inflammatory diseases, severe osteoporosis with a risk of fractures, as well as postoperative conditions. Before the training, joint exercises were performed, the correct Nordic walking technique was taught, and sticks were selected. The quality of life was assessed at the first master class and at the lesson 5 months later using the SF-36 questionnaire.
According to the PF scale of physical functioning, the baseline level was 50.3 [39.2; 61.4], and after 5 months of regular training – 61.4 [52.9; 69.9]. In the category of "Role-playing physical functioning" (RP), the baseline level was 47.8 [38.5; 57.1], and after 5 months it was 56.2 [42.5; 69.9]. The intensity of pain (Body pain — BP) decreased from 58.4 [55.1; 61.7] to 49.4 [46.8; 52.0]. Overall health (GH) improved from 59.3 [51.2; 67.4] to 67.2 [60.4; 74.0]. Viability (VT) increased from the initial 57.2 [44.8; 69.6] to 65.9 [57.6; 74.2]. The indicator of social functioning (SF) increased from 45.8 [36.2; 55.4] to 59.3 [53.1; 65.5]; role-emotional — from 54.2 [40.4; 68.0] to 67.3 [55.9; 78.7]; mental health (MH) - from 61.7 [52.2; 71.2] to 70.1 [64.5; 75.7].
Conclusions. Regular Nordic walking improved all indicators of quality of life according to the SF-36 questionnaire after 5 months of regular Nordic walking. The greatest changes were observed in the categories of physical functioning (FF) and social functioning (SF). Thus, regular aerobic training in the fresh air helps to improve the overall physical and psycho-emotional state.

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EFFECTS OF PERIODIC REHABILITATION ON FUNCTIONAL INDEPENDENCE AND PREVENTION OF OSTEOPOROTIC FRACTURES IN STIFF-PERSON SYNDROME

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Stiff-Person syndrome is a rare autoimmune disorder characterized by progressive muscle stiffness and painful muscle spasms. It has been linked to antibodies against GAD65, disrupting inhibitory neurotransmission in the central nervous system. We report a female patient, 54 years old, diagnosed with Stiff-Person syndrome 17 years ago. She also has autoimmune thyroiditis and other comorbidities: stage 1 hypertension with moderate cardiovascular risk, migraine, anxiety–depressive disorder. She was admitted in the Medical Rehabilitation Clinical Hospital Baile Felix, for back pain, bilateral knee and ankle pain, headache. Clinical examination revealed lumbar hyperlordosis, orthostatism with a wide base of support, difficult and unbalanced gait, sensitive on the toes and impossible on the heels, muscle contractures, significant muscle spasticity, painful shoulder mobility, positive Babinski sign on the right side, vivid deep tendon reflexes, more pronounced on the left side. The Johns Hopkins Fall Risk Assessment Tool established a high risk of falling, with a score of 15 points. The patient's functional independence and functional ambulatory category were assessed using the FIM (Functional Independence Measure) and FAC (Functional Ambulation Classification) scale, respectively. FIM score was 94 out of 126, 74.60%. FAC score assessing walking ability was 5, indicating the patient was fully independent. BMD determined by DXA showed lumbar spine T-score: -1.2, indicating osteopenia. Objectives of rehabilitation treatment: decreasing pain; maintaining joint mobility, trunk stability, coordination, prevention of falls / osteoporotic fractures, increase in bone and muscle mass. Complex medical rehabilitation focused on personalized therapy was performed every 3 months in our hospital. Physical therapy, hydrokinetotherapy (36°C oligomineral thermal water pool), underwater shower, virtual reality therapy, analgesic electrotherapy, occupational therapy and medication led to a favorable evolution with maintenance of functionality. Conclusion: Management of high fall risk, including inpatient periodic medical rehabilitation and monitoring bone mineral density, prevents osteoporotic fractures.

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ASSOCIATION BETWEEN LONG-TERM AIR POLLUTION EXPOSURE AND NON-TRAUMATIC OSTEONECROSIS OF THE FEMORAL HEAD

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Objectives
Although air pollution is linked to bone disorders, its association with non-traumatic osteonecrosis of the femoral head (ONFH) is unclear. We examined whether long-term ambient pollutant exposure increases ONFH risk.

Materials and Methods
A nationwide Taiwanese cohort of 585,334 adults was evaluated using 10-year cumulative exposure to SO2, CO, PM2.5, PM10, NOX, NO, NO2, THC, NMHC, and CH4. Pollutant levels were assigned by residential postal codes and time-weighted averages from monitoring stations. ONFH (ICD-9-CM 733.42) was identified from claims. Cox models adjusted for demographics, comorbidities, medications, urbanization, temperature, and season. Exposure–response relationships were assessed continuously and by tertiles.

Results
Over 10.8 years, 1,549 individuals developed ONFH. Higher long-term exposure to most pollutants correlated with increased risk. Adjusted hazard ratios (per SD) were: SO2 1.31, CO 1.78, PM2.5 1.76, PM10 1.44, NOX 1.56, NO 1.40, NO2 1.59, THC 1.64, NMHC 1.18, and CH4 2.15. Tertile analyses showed stepwise increases in ONFH incidence, and multi-pollutant models yielded similar findings. Cumulative incidence curves showed higher rates in the highest exposure groups.

Conclusions
Chronic exposure to multiple ambient pollutants is associated with increased ONFH risk. The dose–response trend and biological plausibility suggest air quality as a modifiable environmental contributor. Integrating exposure assessment into future mechanistic and population studies may support prevention and early detection.

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SERUM LIPID ABNORMALITIES AND RISK OF OSTEONECROSIS OF THE FEMORAL HEAD: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Objective:
To determine whether alterations in serum lipid profiles are associated with osteonecrosis of the femoral head (ONFH) by synthesizing evidence from observational studies.

Material and Methods:
A systematic search of PubMed, Embase, and Scopus was conducted up to July 2025 following PRISMA 2020 guidelines. Case–control and cohort studies reporting lipid parameters in ONFH and control groups were eligible. Mean differences (mmol/L) were pooled using random-effects models. Heterogeneity, subgroup analyses according to etiology, and leave-one-out sensitivity tests were performed. Small-study effects were assessed using Egger's regression.

Results:
Fourteen studies encompassing 24,331 participants were included. Patients with ONFH exhibited significantly higher triglyceride concentrations (MD 0.28; 95% CI 0.13 to 0.43; p=0.0002). Total cholesterol and LDL-cholesterol showed modest, non-significant increases, while HDL-cholesterol displayed a downward trend. Sensitivity analyses revealed that exclusion of specific outlier datasets reduced heterogeneity and yielded statistically significant differences for LDL-cholesterol and HDL-cholesterol without altering the direction of effects. The elevation in triglycerides was most evident in idiopathic and glucocorticoid-related ONFH. No evidence of publication bias was detected across outcomes (all p>0.05).

Conclusion:
Abnormalities in serum lipids, particularly elevated triglycerides, are consistently linked with ONFH, supporting the contribution of metabolic disturbances to disrupted femoral head perfusion. Early detection and management of dyslipidemia may provide an opportunity to reduce ONFH risk in populations exposed to corticosteroids or other predisposing factors.

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ASSOCIATION OF BMD AND FRAX SCORE WITH FRACTURE RISK IN ADULTS WITH TYPE 2 DIABETES IN AN ASIAN COHORT – THE HONG KONG OSTEOPOROSIS STUDY

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Objective: Type 2 diabetes is associated with higher bone mineral density (BMD) yet increased fracture risk. The recommendation of reducing femoral neck (FN) BMD T-score by 0.5 for better estimation of fracture risk in type 2 diabetes is primarily derived from Caucasian cohorts. Given different epidemiology of diabetes and osteoporosis among Asians, it is necessary to evaluate associations of BMD and FRAX score with fracture risk in type 2 diabetes among Asians.

Material and Methods: We analysed data from the prospective community-based Hong Kong Osteoporosis Study (comprising Chinese individuals recruited from 1995–2010 for comprehensive bone health assessments including DXA). Participants aged ≥40 years were included in this analysis. Their baseline diabetes status was ascertained by self-report, ICD-9 code 250, fasting glucose ≥7.0 mmol/L or use of anti-diabetic medications. Fractures were ascertained by detailed review of electronic medical records. Adjusted hazard ratio (aHR) with 95% confidence interval (CI) for fracture was computed with adjustment for age and sex.

Results: In total, 4175 women and 1708 men were included. 10.8% (n=629) had diabetes (all type 2 diabetes) and with FRAX. Mean age was 69.6±9.8 years, BMI 23.8±3.6 kg/m^2, FN BMD 0.63±0.14 g/cm^2, and FRAX score was 6.1±7.9% for hip and 12.9±11.6% for major osteoporotic fractures (MOF). Of the 629 people with diabetes, 107 experienced hip and 152 experienced MOF during mean follow-up of 12.8±7.2 years and 12.1±7.2 years. aHR for one unit decrease in FN BMD T-score in people with diabetes were 1.32 (95% CI 1.06–1.64) for hip and 1.33 (95% CI, 1.12–1.59) for MOF. FRAX score was also associated with fracture risk in people with diabetes. For a given FN BMD T-score and age or FRAX score, people with diabetes had a higher fracture risk than those without diabetes. For a similar hip fracture risk, people with diabetes had a higher T-score than people without diabetes. The difference in T-score was 0.99 (95% CI 0.71–1.26) for women and 0.57 (95% CI 0.26–0.89) for men.

Conclusion: FN BMD T-score and FRAX score were associated with risk of hip and MOF in Asian adults with type 2 diabetes. The magnitude of adjustment in FN BMD T-score to account for diabetes-related fracture risk in Asians may be more than the 0.5 unit suggested for Caucasians.

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DEVELOPMENT AND VALIDATION OF DIABETES HIP FRACTURE SCORE (D-HFS) IN PATIENTS WITH TYPE 2 DIABETES: A POPULATION-BASED COHORT STUDY OF HONG KONG

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Objective: Type 2 diabetes (T2D) is associated with increased risk of hip fracture and post-fracture morbidity. We developed and validated a Diabetes Hip Fracture Score (D-HFS) using population-based electronic health record (EHR) with well-characterised patients with T2D.

Material and Methods: We identified Chinese T2D patients aged ≥40 years who underwent comprehensive diabetes complication assessment during 2008 – 2012 (defined as the index date) in Hong Kong from population-based EHR. Hip fractures were identified by validated ICD-9 code 820. Patients were followed from index date till hip fractures, death, or end of 2023. The cohort was randomly divided 7:3 into development and validation cohorts. D-HFS was build using Fine and Gray model incorporating variables with univariate significance, considering death as competing risk, with model selection based on lowest AIC. Performance of D-HFS was evaluated in validation cohort, and compared with FRAX and other published diabetes-specific hip fracture prediction tools (derived from FDS-I and SIDIAP) using DeLong test.

Results: In total, 254,791 T2D patients were included (age 63.8±11.0 years, 49.1% men, BMI 25.7±3.8 kg/m^2). Upon median follow-up of 12.7 years (IQR: 11.1 – 14.3), 11,368 patients had hip fractures (incidence: 3.8 per 1000 person-years). D-HFS consisted of 11 variables: age, sex, BMI, smoking, history of major osteoporotic fractures, history of fall, diabetes duration, HbA1c, eGFR, statin and anti-diabetic medication use. D-HFS performed well in the validation cohort (5-year prediction at optimal threshold 1.51%: AUC 0.838 [95% CI 0.835–0.841], sensitivity 76.5%, specificity 76.4%, PPV 4.0%, NPV 99.6%; 10-year prediction at optimal threshold 3.63%: AUC was 0.822 [95% CI 0.820–0.824], sensitivity 75.2%, specificity 75.2%, PPV 9.0%, NPV 98.9%). Brier score was 0.012 for 5-year and 0.028 for 10-year prediction, suggesting good calibration. D-HFS performed better than FRAX (AUC 0.79), FDS-1 (0.77) and SIDIAP (0.78) hip fracture risk prediction tools (all p<0.001 vs D-HFS).

Conclusion: We developed and validated D-HFS from the largest database of Chinese T2D patients, applicable to electronic clinical management system to facilitate timely fracture risk stratification and preventive strategies to optimize bone health in T2D.

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COMPARATIVE EFFECTS BETWEEN RENIN-ANGIOTENSIN-ALDOSTERONE SYSTEM INHIBITORS AND CALCIUM-CHANNEL BLOCKERS ON THE RISK OF MAJOR OSTEOPOROTIC FRACTURES IN PATIENTS TYPE 2 DIABETES: A TERRITORY-WIDE COHORT STUDY OF HONG KONG

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Objective: We compared risks of major osteoporotic fractures (MOF) among users of renin-angiotensin-aldosterone system (RAAS) inhibitors (angiotensin converting enzyme inhibitors [ACEi] and angiotensin receptor blockers [ARB]) with users of calcium channel blockers (CCB), two most common anti-hypertensive classes, in people with type 2 diabetes (T2D).

Materials and Methods: We identified patients with T2D aged ≥40 years who underwent comprehensive diabetes complication evaluation during 2008–2012 (defined as the index date) from territory-wide electronic health records of Hong Kong. Individuals were classified as ACEi/ARB and CCB users based on their prescriptions at index date. Outcomes of interest were hip fracture (ICD-9 code 820) and MOF (ICD-9 805, 812–814, 820). They were followed from index date till outcomes, death or end of 2023, whichever earlier. Propensity-score (PS) weighting with inverse probability of treatment weighting was applied to balance baseline characteristics between ACEi/ARB and CCB users. Hazard ratios (HR) were computed using Cox proportional hazards models.

Results: 107,099 patients were included (51,863 RAASi users; 55,236 CCB users): mean age 64.9 years; 52.3% female. Upon median follow-up of 12.8 years, 4950 hip fractures and 5163 MOF occurred. Characteristics were balanced after PS weighting. RAASi use was associated with reduced risk of hip (HR 0.72 [95% CI 0.68–0.76], p<0.001) and MOF (HR 0.77 [0.73–0.82], p<0.001) compared to CCB use. Subgroup analyses were consistent across age, sex, comorbidity burden, BMI, HbA1c and diabetes duration, whereas protective effect was more prominent among those with preserved eGFR (p interaction<0.001). Sensitivity analyses by time-varying exposure, 1:1 PS matching and new-user design were consistent. There was no difference in risk of peptic ulcer disease (falsification endpoint) between both groups (p=0.77). Further stratification of RAASi use showed that both ACEi and ARB use was associated with lower hip fracture risk than CCB use (HR for ACEi 0.60 [0.54–0.66], HR for ARB 0.56 [0.41–0.76], p<0.001 vs CCB) with no difference between ACEi and ARB (p=0.66).

Conclusion: RAASi initiation was associated with lower fracture risk in people with T2D compared with CCB, supporting its role as the preferred anti-hypertensive in T2D.

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PREDIABETES IS ASSOCIATED WITH INCREASED RISK OF SARCOPENIA IN MEN AND POSTMENOPAUSAL WOMEN AGED ≥50 YEARS – A COMMUNITY-BASED COHORT STUDY OF HONG KONG

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Objective: While ample evidence shows diabetes increases risk of sarcopenia, less is known about association between prediabetes and sarcopenia. We evaluated risk of sarcopenia across glycemic status in a community-based cohort.

Materials and Methods: Participants aged 50–74 years (postmenopausal for women) were invited as part of the prospective New Hong Kong Cardiovascular Risk Factor Prevalence Study (N-CRISPS) during 2019 – 2024. Each participant received DXA (Hologic Discovery A) for appendicular skeletal muscle mass (ASM), Jamar hand dynamometer for handgrip strength (HGS) and 5-time chair-stand test for physical performance. Sarcopenia is defined by low muscle mass (BMI-adjusted ASM) and strength (HGS) according to Asian Working Group for Sarcopenia 2025 criteria with age-specific thresholds for 50–64 and ≥65 years respectively. Participants were classified into normoglycemia (NG), prediabetes and diabetes according to HbA1c and 75-gram oral glucose tolerance test. Characteristics were compared across glycemic status. Multivariable regression analyses were performed to examine the independent associations between glycemic status and sarcopenia.

Results: In total, 588 participants were recruited (mean age 63±7 years; 46.6% female; BMI 24.0±3.2 kg/m^2): NG in 52.0%, prediabetes in 29.3%, and diabetes in 18.7%. Overall prevalence of sarcopenia was 13.6%. In both sexes, prevalence of sarcopenia increased with worsening glycemic status (men: 9.3% in NG, 16.8% in prediabetes, 18.8% in diabetes [p=0.04]; women: 9.0% in NG, 18.2% in prediabetes, 22.0% in diabetes [p=0.01]). Risk of sarcopenia started to increase from prediabetes (vs NG - men: age-adjusted OR [aOR] 2.23 [95% CI 1.02-4.88], p=0.045; women: aOR 2.64 [1.16–6.01], p=0.02), and further in diabetes (vs NG - men: aOR 2.69 [1.16–6.24], p=0.021; women: aOR 3.55 [1.36–9.27], p=0.010). This was driven by progressively lower BMI-adjusted ASM with worsening glycemic status (p<0.001 in both sexes). Although HGS did not differ across glycemic status, physical performance tended to be worse with worsening glycemic status (p=0.04 in men; p=0.14 in women).

Conclusion: Prediabetes is independently associated with increased risk of sarcopenia in both men and women, related to lower muscle mass and associated with poorer physical performance.

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CLINICAL EFFICACY OF NUCLEAR MAGNETIC RESONANCE THERAPY IN THE EARLY STAGES OF GONARTHROSIS: RESULTS OF A COMPARATIVE ANALYSIS

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A prospective clinical and experimental study was conducted to evaluate the efficacy of nuclear magnetic resonance therapy (NMRT) in patients with early-stage gonarthrosis. The objective was to determine whether the addition of NMRT to standard therapy enhances clinical outcomes compared with standard therapy alone.

The study included 47 patients diagnosed with early-stage gonarthrosis. All participants received a standard treatment protocol consisting of intra-articular hyaluronic acid injections, physiotherapeutic procedures, and spa-based rehabilitation. The main group additionally underwent NMRT sessions, while the control group continued on standard therapy only. Clinical outcomes were assessed using the Visual Analogue Scale (VAS) for pain intensity and the Lequesne Index to evaluate functional status of the knee joint.

The results demonstrated a significant improvement in the group receiving NMRT. Pain severity measured by VAS decreased by an average of 3.2 points, compared with 1.7 points in the control group. Functional outcomes, as assessed by the Lequesne Index, showed a 38% improvement in the NMRT group, compared with 21% in the control group. Importantly, NMRT was well tolerated by patients, with no systemic adverse effects reported, indicating its safety for use in individuals with chronic comorbidities.

The findings confirm the therapeutic potential of NMRT in managing early-stage gonarthrosis. Its beneficial effects are likely associated with stimulation of reparative processes in cartilage, reduction of inflammatory responses, and improvement of microcirculation in the affected joint. Integration of NMRT into comprehensive treatment protocols appears to provide superior outcomes compared with standard therapy alone. These data support the consideration of NMRT as a promising modality in multimodal management strategies for knee osteoarthritis. Further large-scale investigations are warranted to establish optimal treatment parameters and to confirm its long-term efficacy.

P485

THE ROLE OF PREVENTIVE PLASMAPHERESIS DURING RITUXIMAB TREATMENT IN RHEUMATIC DISEASES

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Objective: The aim of this study was to evaluate the outcomes of plasmapheresis initiated before or during rituximab treatment as a strategy for flare prevention.

Materials and methods: This study was conducted at our tertiary referral center between 2023 and 2024. We included 34 patients (32 women and 2 men), mean age of 47 [17; 71] years, with a diagnosis of Sjogren's disease in 20 patients, Sjogren's disease in combination with rheumatoid arthritis or systemic lupus erythematosus in 5 and 9 patients, respectively. All patients received prednisone at a dose of 11.7±4.4 mg . To reduce hypergammaglobulinemia and minimize the risk of vasculitis flare after rituximab infusion, patients underwent 1 to 3 sessions of membrane plasmapheresis. The volume of treated plasma ranged from 600 to 2000 mL per session. Following plasmapheresis, rituximab infusion was administered.

Results: The treatment resulted in significant improvements in laboratory parameters: immunoglobulin G (IgG) level decreased from 27.94±16.62 g/L to 25.62±23.82 g/L (p=0.001); erythrocyte sedimentation rate decreased from 61.96±37.90 to 28.41±23.82 mm/h (p=0.001); total protein level decreased from 86.26±10.62 to 75.62±9.68 g/L. A positive statistical correlation was found between the total protein level and IgG (r=0.403). Subsequently, all patients received rituximab infusion with no adverse events reported. A complete clinical response was achieved in all patients.

Conclusions: Our results showed that plasmapheresis was an effective and well tolerated intervention for hypergammaglobulinemia control to prevent rituximab-associated flares .

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EFFECTIVE TREATMENT OF DIFFICULT-TO-TREAT RHEUMATOID ARTHRITIS VIA SELECTIVE CFDNA/NETS APHERESIS

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Objective. Evaluation of efficacy and safety of therapeutic apheresis using new adsorption column for selective cfDNA/NETs apheresis in patients with difficult-to-treat RA.

Materials and methods. Three patients with active, difficult-to-treat RA underwent three sessions of selective cfDNA/NETs apheresis with a one-day interval between procedures. All patients were treated with 6-methylprednisolone (10 mg/day) and previously shown insufficient response to disease-modifying antirheumatic drugs. Therapeutic apheresis procedures were conducted using new medical device for selective cfDNA/NETs apheresis to decrease the disease activity before initiating rituximab as main treatment. The volume of treated plasma per procedure was approximately 2 volumes of circulating plasma. Disease activity (DAS28-CRP, DAS28-ESR) and laboratory parameters were assessed before and after treatment.

Results. All three sessions of selective cfDNA/NETs apheresis were well tolerated by all patients, with no significant adverse effects reported during or after the procedure. All patients showed improvement in disease activity as measured by both the DAS28-ESR and DAS28-CRP scores after treatment. The average reduction in DAS28-ESR was 2.5, and the average reduction in DAS28-CRP was 1.77. Selective cfDNA/NETs apheresis significantly reduced CRP and ESR levels in two out of three patients, indicating a positive treatment response. The changes in RF and ACPA levels were more variable compared to CRP and ESR, with two patients showing either minimal or no reduction in these autoantibodies, while one patient showed a significant decrease.

Conclusion. The first results with selective cfDNA/NETs apheresis

column demonstrated significant clinical and laboratory results in the treatment of difficult-to-treat RA.

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SELECTIVE CFDNA/NETS APHERESIS AS A THERAPEUTIC APPROACH IN SEVERE SYSTEMIC LUPUS ERYTHEMATOSUS

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Objective: To evaluate the efficacy and safety of a novel therapeutic apheresis approach using an adsorption column for selective removal of circulating free DNA (cfDNA) and NETs in patients with severe SLE.
Materials and Methods: Three patients with severe SLE, high disease activity, skin involvement (vasculitis), and elevated immunological markers underwent three sessions of selective cfDNA/NETs apheresis at one-day intervals. Disease-modifying antirheumatic drugs, 6-methylprednisolone and previous rituximab therapy had shown limited effectiveness. Selective apheresis procedures were conducted using a novel medical device, followed by pulse therapy with methylprednisolone. Each procedure processed approximately two volumes of circulating plasma. Complete blood count, immunological markers, and disease activity (SLEDAI-2K score) were assessed before treatment and after the third apheresis session.
Results: All three patients tolerated the apheresis sessions well, with no major adverse effects. In the first clinical case (68-year-old male), SLEDAI-2K decreased from 12 to 4, with reductions in anti-dsDNA and anti-Sm levels. In the second case (56-year-old female), SLEDAI-2K improved from 32 to 12, with decreases in anti-dsDNA and anti-Sm. In the third case (51-year-old female), SLEDAI-2K declined from 17 to 8, with reductions in anti-dsDNA and anti-C1q. Vasculitis resolved in two patients, while C3 and C4 remained low in all. ESR and leukocyte counts improved across cases.
Conclusion: The selective cfDNA/NETs apheresis column demonstrated significant clinical and laboratory improvements in severe SLE treatment.

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CLINICAL RELEVANCE OF REPEATED KIDNEY BIOPSIES IN LUPUS NEPHRITIS

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Objective: To demonstrate the clinical value of kidney biopsy for patients with lupus nephritis in order to select personalized therapy.
Methods: Patient K., 30 years old, has been followed since 2012 with a confirmed SLE diagnosis (SLICC ACR 2012). Disease onset included articular and skin syndromes, leukopenia. Immunological tests showed anti-DNA, ANF, anti-Sm. Treatment included hydroxychloroquine 400□200 mg/day and glucocorticosteroids 16□4 mg/day, stopped in 2019 after remission. In 12.2020, arthritis of hands and feet and lupus nephritis developed. In 02.2021, hospitalization revealed elevated anti-dsDNA, ANF, RNP-70, aCL, aBeta-2-GP-1, decreased C3, C4, leukopenia, leukocyturia, erythrocyturia, proteinuria 0.8 g/day. Kidney biopsy showed diffuse proliferative GN with 11% segmental fibrocellular crescents (activity index 5, chronicity 1). Given young age, high disease activity (SLEDAI 2K=20), rapid progression, and life-threatening renal involvement (class IV LN), pulse methylprednisolone (6 doses, total 4 g), Rituximab, mycophenolate mofetil 2000 mg/day, increased corticosteroids (25 mg/day), hydroxychloroquine 400 mg/day, and anticoagulants were initiated. Rituximab was infused every 6 months (total 4000 mg), corticosteroids tapered to 5 mg/day, and mycophenolate and hydroxychloroquine continued. This led to remission (SLEDAI 2K=0). After 24 months, repeat kidney biopsy showed class II mesangioproliferative GN (activity 0, chronicity 0). Pharmacological therapy was discontinued, and mycophenolate and corticosteroids were reduced.
Results: since there are no markers that reliably reflect the histopathology of the kidneys in SLE, a repeat kidney biopsy makes it possible to assess the activity of LN, the initial phase of immunosuppressive therapy, and to make decisions about its further correction.
Conclusions: Kidney biopsy remains the gold standard for establishing the diagnosis of LN and guiding clinical management. It allows for differential diagnosis in clinically complex cases, selecting adequate therapy based on the morphological form of kidney damage and avoiding the unreasonable prescription of glucocorticosteroids and cytostatics.

P489

UNIVERSAL ALOPECIA IN PATIENTS WITH ANKYLOSING SPONDYLITIS DURING GENETIC ENGINEERING THERAPY

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Case Study 1
Patient A., 22, suffers from AS. The disease onset was in 2010 with peripheral arthritis. He received therapy with disease-modifying antirheumatic drugs (DMARDs) – sulfasalazine (SS), methotrexate (MTX), and, due to coxitis progression, etanercept (2011–2014) – with insufficient effectiveness. In December 2014, he was prescribed adalimumab (ADA) 40 mg in combination with SS 1.5 g/day. In 2016, AU developed while on ADA therapy. In 2019, due to secondary ineffectiveness, the drug was replaced with tofacitinib 10 mg/day in combination with MTX 20 mg/week. During this therapy, the patient experienced hair regrowth. In 2020, due to persistently high clinical disease activity, the patient was prescribed an interleukin 17 (IL-17) inhibitor. Four months later, the patient experienced a relapse of UVA.
Case Study 2
Patient N., 33, diagnosed with AS. The disease onset was in 2006 with polyarthritis. He received therapy with MTX 10 mg/week and various nonsteroidal bDMARDs. In December 2011, high disease activity persisted, leading to initiation of treatment with infliximab (INF) 5 mg/kg in combination with MTX 12.5 mg/week, with a positive effect. In December 2012, patches of alopecia appeared on the body. INF was discontinued and prednisolone 10 mg/day was prescribed, after which hair growth resumed. However, given the exacerbation of joint syndrome and the juvenile onset of the disease, treatment with tocilizumab was initiated, and in 2019, prednisolone was resumed at 10 mg/day. During this therapy, relief of joint syndrome and gradual regrowth of hair were

observed.

Case Study 3

Patient B., 38, was diagnosed with AS in 2008. Due to the ineffectiveness of standard therapy, ADA therapy was initiated in February 2018, but was discontinued due to the development of allergic vasculitis. In November 2018, certolizumab pegol (CZP) therapy was initiated, with good results in relieving arthritis and reducing back pain. In March 2019, increased hair loss began. The drug was discontinued, but hair loss continued, and by July 2019, the development of AU was diagnosed. Due to exacerbation of the joint syndrome, CZP therapy was resumed.

Conclusion. The described cases of the development of AU during treatment with bDMARDs raise the question of further study of the pathogenesis of alopecia, the role of proinflammatory cytokines in its development, especially TNFα and IL17, as well as their influence on the occurrence of the disease.

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THE FREQUENCY OF COXITIS DETECTED BY X-RAY IN PATIENTS WITH AXIAL FORMS OF SPONDYLOARTHRITIS

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Introduction. According to epidemiological research conducted in Russia, damage to the hip joints (HJ) was observed in 46% of patients with ankylosing spondylitis (AS), while data on the incidence of coxitis in patients with psoriatic arthritis are lacking.

Objective. To determine the frequency of hip joint (HJ) damage in patients with axial spondyloarthritis (axSpA)/AS and psoriatic arthritis (PsA) with spinal involvement.

Materials and methods. A total of 222 patients (mean age 35.7 ± 12.7 years) were examined. The first group comprised 108 patients who met the ASAS (Assessment of Spondyloarthritis International Society) criteria for axSpA in 2009 or the AS criteria from 1984 [16]; the second group included 114 patients with axPsA who met the CASPAR criteria. Signs of axial involvement in PsA were determined using instrumental imaging techniques. The mean age of disease onset was 26.3 ± 20.3 years, and HLA-B27 was detected in 54% of patients. The diagnosis of coxitis was established based on pelvic X-ray examination and determination of the BASRI hip index for each joint.

Results: Among the 222 patients included in the study, 52 had X-ray signs of coxitis, including 22 patients with AS and 30 patients with axPsA. Patients were divided into two groups based on their diagnosis (Table 1).

Table 1

Parameters	axSpA (n=108)	axPsA n=114	p
Gender (m/f), n	62/46	58/56	>0,05
BMI (kg/m²),	24,7 [21,6; 28,1]	27,15[24,6;32,07]	<0,05
BASMI, Me [25th; 75th percentile]	2 [1;3]	3[2;4]	<0,05
Age, years	36,0 [26,5; 42]	45,5 [38;55]	<0,05
HLA-B27 presence, n (%)	91 (84,2%)	30 (24,5%)	<0,05
Uveitis, n (%)	18 (16,6%)	1 (1,22%)	<0,05
Peripheral joint arthritis, n (%)	76 (70,3%)	110 (90,1%)	<0,05
BASDAI, Me [25th; 75th percentile]	4,35 [2,8; 5,6]	5,8 [4,4; 7,0]	<0,05
ASDAS (CRP), Me [25th; 75th percentile]	2,19 [1,40; 2,74]	3,27[2,70; 3,24]	<0,05
ESR, mm/hour, Me [25th; 75th percentile]	11 [5; 30]	17 [7; 35,5]	<0,05
CRP, mg/ml, Me [25th; 75th percentile]	11,28 [1,1; 9,1]	16,7 [3,0; 20,1]	<0,05
BASFI, Me [25th; 75th percentile]	2,65 [0,85; 4,75]	3,9 [2,0; 6,0]	<0,05
X-ray coxitis, n%	22 (20,37%)	30 (26,3%)	>0,05

Conclusion: X-ray coxitis was detected in 20% of patients with axSpA and 26% in patients with axPsA. In previous global studies, the incidence of X-ray coxitis among patients with psoriatic arthritis and spondylitis did not exceed 10%. According to our study, patients with axPsA had higher clinical and laboratory activity of the disease compared to patients with axSpA, and they also exhibited pronounced functional impairments.

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CAPABILITIES OF FULL-BODY MRI IN RHEUMATOLOGY. CLINICAL CASE DESCRIPTION

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Today, the assessment of the muscular and skeletal systems, blood vessels, heart, and even the intestines has become possible through a single examination — magnetic resonance imaging (MRI) of the entire body, which has also found application in rheumatology. This paper presents a clinical observation using whole-body MRI. Patient R., aged 28, was admitted to the clinic of the Nasonova Research Institute of Rheumatology with a referral diagnosis of spondyloarthritis, HLA B 27 negative with extra-axial manifestations (arthritis, coxitis). From the medical history, it is known that lower back pain first appeared during the third trimester of pregnancy in 2015 and resolved on its own after childbirth. Three months after delivery, pain in the spine resumed, primarily in the sacrum and lower back, with a constant nature that did not change

throughout the day and did not subside at rest or with physical activity. Over the course of four months, pain in the spine increased with radiation along the back of the thigh, and pain in the groin appeared. According to the examination conducted in July 2016 at the place of residence: C-reactive protein (CRP) negative, rheumatoid factor (RF) positive, antibodies to cyclic citrullinated peptide (ACCP) negative. There were no signs of sacroiliitis on the pelvic X-ray, leading to a diagnosis of probable rheumatoid arthritis. Therapy with nonsteroidal anti-inflammatory drugs (NSAIDs) and methotrexate (10 mg/week, later increased to 15 mg/week) was administered for three months without effect, with a worsening of the condition observed. Additional examinations revealed bilateral chronic sacroiliitis on MRI of the sacroiliac joints. Computed tomography of the lumbar spine showed degenerative and dystrophic changes, as well as a posterior hernia at L5-S1. Blood tests from September 2016 showed RF negative, CRP negative, ESR 12 mm/hour, leukocytes 12.6 × 10^9/L. Upon admission, the patient complained of mixed-type pain in the lumbar spine, hip, and knee joints, gait disturbances, and muscle weakness in the lower extremities. Examination revealed a "duck-like" gait with cane support. The patient could not remain in a static position for long periods. Spine movements were not limited, while hip joint movements were painful and restricted. Other joints had full, painless movement. Laboratory findings: hemoglobin 143 g/L, erythrocytes 4.43 × 10^{12}/L, leukocytes 8.6 × 10^9/L, platelets 406 × 10^9/L, ESR 8 mm/hr (Punch), CRP 0.7 mg/L, RF < 9.5 IU/ml, Anti-MCV 10.6 U/ml, parathyroid hormone 43.6 pg/ml, alkaline phosphatase 392 U/l, calcium 2.69 mmol/l, ionized calcium 1.26 mmol/l, phosphorus 0.63 mmol/l. Pelvic X-ray showed no signs of sacroiliitis but raised suspicion of femoral neck integrity disruption on the right side. To clarify the diagnosis, a whole-body MRI was performed, revealing bilateral fractures of the lateral sacral masses, bilateral fractures of the femoral heads, and areas of ischemic necrosis in the tibias bilaterally. Densitometry results showed a decrease in the Z-score to -3.0 in the lumbar spine and -3.1 in the left femoral neck. Daily urine analysis revealed calcium 2.44 mmol/l and phosphorus 10 mmol/l. Scintigraphy detected metabolic changes in the bone system. Based on these findings, the patient was diagnosed with hypophosphatemic osteomalacia and secondary systemic osteoporosis (Z-score -3.0 in the lumbar spine, -3.1 in the left femoral neck, -2.1 in the proximal left femur), with a progressive course. The patient underwent skeletal scintigraphy and a stromal tumor was detected in the upper third of the thigh.

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THE ROLE OF THE SINGLE NUCLEOTIDE POLYMORPHISM ARG25PRO OF TGFB1 GENE ON CLINICAL AND LAPORATORY PARAMETRES AND COMORBIDITY FORMATION IN PATIENTS WITH ANKYLOSING APONDYLITIS

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Objective: to evaluate the effect of the SNP Arg25Pro of the TGFB1 gene on clinical and laboratory parameters and the formation of comorbidity associated with CVR in AS.

Materials and methods: The study included 176 patients diagnosed with AS. Genotyping was carried out according to the polymorphism of the Arg25Pro of the TGFB1 gene by the polymerase chain reaction method (PCR). The statistical analysis was carried out using the Kruskal-Wallis criterion.

Results: Patients with AS with the AP had a statistically significantly higher BMI (AA 24.9 [24.5; 28.1] kg/m2 vs. PP 25.4 [21.6; 30.8] kg/m2 vs. AP 28.3 [25.7; 32.7] kg/m2, p=0.012). In the presence of the A allele, higher glucose levels were detected at a statistically significant level (AA 5.4 [5.1; 6.0] mmol/l vs. PP 4.8 [4.4; 5.4] mmol/l vs. AP 5.2 [4.6; 5.8] mmol/l, p=0.027). Identification of the P allele resulted in higher creatinine values (AA 65.7 [57.0; 90.6] mmol/l vs. PP 79.1 [67.0; 90.0] mmol/l vs. AP 83.0 [77.0; 95.0] mmol/L, p=0.02), urea (AA 4.4 [4.0; 4.9] mmol/l vs. PP 5.0 [4.3; 5.8] mmol/l vs. AP 5.3 [4.4; 6.5] mmol/l, p=0.031) and uric acid (AA 272.0 [257.0; 346.5 mmol/l vs. PP 304.0 [218.8; 433.8] mmol/l vs. AP 344.5 [221.5; 442.5] mmol/l, p<0.05), especially in the state of heterozygotes with the AP genotype. Detection of the AP genotype was associated with high serum iron values (AA 12.2 [8.8; 14.8] mmol/L, PP 14.3 [11.1; 21.0] mmol/L, AP 17.0 [11.9; 21.8] mmol/L, p=0.03).

Extraskeletal manifestations were more frequently develop in patients with AP genotype at a statistically significant level (AA 4 (20.0%) vs. PP 18 (18.4%) vs. AP 18 (31.0), p=0.036).

Conclusion: The results of the study demonstrated for the first time the role of Arg25Pro SNP of the TGFB1 gene in the development of extraaxial and extraskeletal manifestations of AS, at the same time the impact in formation of comorbidities.

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PREDICTIVE VALUE OF TIMED UP AND GO AND USUAL GAIT SPEED FOR INCIDENT FRAILTY IN COMMUNITY-DWELLING OLDER ADULTS: A RETROSPECTIVE COHORT STUDY

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Objective: Frailty is a geriatric syndrome associated with adverse health outcomes. Simple physical performance tests such as the Timed Up and Go (TUG) and usual gait speed (UGS) may help identify older adults at risk of developing frailty; however, their predictive value for frailty development and optimal cut-off points have not yet been clearly defined. This study aimed to evaluate the associations between TUG, UGS, and frailty development in older adults.
Methods: This retrospective cohort study included 211 community-dwelling adults aged ≥65 years who were non-frail at baseline and underwent at least two comprehensive geriatric assessments in a university geriatrics outpatient clinic. Frailty was assessed using the FRAIL scale. Baseline clinical, functional, and physical performance measures were evaluated. Incident frailty during follow-up was the primary outcome. Receiver operating characteristic analyses(ROC) were performed to assess predictive performance and identify optimal cut-off values. Multivariable logistic regression models were used to examine factors associated with frailty development. Due to the high correlation between TUG and UGS, these measures were evaluated in separate models.
Results: The mean age of was 74 years, and 71.1% were female. Over a mean follow-up period of 34 months, frailty developed in 32 participants

(15.2%). Frailty incidence was significantly higher among individuals who were prefrail at baseline compared with those who were robust (33.7% vs. 1.6%).(table 1). ROC analysis demonstrated a moderate discriminative ability for TUG test (AUC = 0.648) and a good discriminative ability for UGS (AUC = 0.736). The optimal cut-off value was ≥9.3 seconds for TUG and ≤0.97 m/s for UGS. In minimally adjusted models, both prolonged TUG (OR 4.50, 1.17–11.85; p = 0.002) and reduced UGS (OR 15.46, 4.18–57.10; p < 0.001) were significantly associated with incident frailty. In fully adjusted models (adjusted for age, sex, malnutrition, baseline frailty status, chronic pain, impaired instrumental activities of daily living, and follow-up time), both prolonged TUG (OR 4.178) and reduced UGS (OR 9.11) remained independently associated with frailty development(table 2).

Conclusion :In this study, both prolonged TUG and reduced UGS were independently associated with incident frailty in community-dwelling older adults. Although UGS demonstrated a higher discriminative ability in ROC analysis, TUG showed a robust association with frailty development after comprehensive adjustment for clinical and functional covariates. These findings suggest that simple physical performance tests can be useful tools for identifying older adults at increased risk of frailty.

Table 1: Baseline Characteristics of Participants According to Incident Frailty Status

Variable	Participants With Incident Frailty (n=32, 15.2%)	Participants Without Incident Frailty (n=179, 84.8%)	p-value
Study population (n, %) 211			
Age (mean ± SD)	75.72 (6.1)	74.27 (6.19)	0.223
Female sex (n, %)	21 (65.6%)	129 (72%)	0.459
Baseline frailty status Robust Prefrail	2 (1.6%) 30(33.7%)	120 (%98.4) 59(66.3%)	0.000*
Probable sarcopenia (n, %)	21 (67%)	106 (60%)	0.428
Malnutrition (MNA-SF ≤ 11)	11 (34%)	27 (15%)	0.010*
TUG (median, scc)	10.20	9	0.007*
Prolonged TUG (≥ 9.3 sec)	22 (68.8%)	70 (39.5%)	0.002*
Gait speed (mean ± SD, m/s)	0.81 (0.16)	0.98 (0.23)	0.000*
Reduced gait speed (≤ 0.97 m/s)	29 (90%)	81 (46%)	0.000*
Impaired ADL (n, %)	15 (46.9%)	61 (34.5%)	0.179
Impaired IADL (n, %)	13 (40.6%)	41 (23.2%)	0.038*
Chronic pain (n, %)	23 (71.9%)	85 (48.3%)	0.014*
BMI (mean ± SD)	29.91 (5.57)	29.01 (5.32)	0.381
Urinary incontinence (n, %)	19 (59.4%)	75 (42.4%)	0.750
Constipation (n, %)	8 (25%)	35 (19%)	0.511

MNA-SF: Mini Nutritional Assessment-Short Form **TUG**: Timed Up and Go test **ADL**: Activities of Daily Living **IADL**: Instrumental Activities of Daily Living **BMI**: Body Mass Index*p < 0.05 considered statistically significant

Table 2:

	Prolonged TUG (≥9.3 s)		Reduced GYH (≤0.97 m/s)		
	OR	P value	OR	P Value	
Model 1	4.5(1.17-11.85)	0.002	Model 1	15.46(4.18-57.10)	0.000
Model 2	4.166(1.27-13.6)	0.018	Model 2	9.11(2.25-36.88)	0.002

Model 1 is adjusted for age and gender model 2 is adjusted for age, gender, malnutrition, baseline frailty state, chronic pain, impaired IADL, and follow up time.

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ABILITY OF ANTHROPOMETRIC MEASURES TO DISTINGUISH SARCOPENIC OBESITY FROM OBESITY WITHOUT SARCOPENIA

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Objectives: This study aimed to evaluate the discriminative performance of selected anthropometric measures of adiposity in distinguishing between obesity subgroups to better capture SO cases in routine practice.
Methods: Older adults aged ≥60 years who attended the geriatrics outpatient clinic of a university hospital were included in the study. Participants were categorized into four body composition phenotypes: non-sarcopenic non-obese, obesity alone, sarcopenia alone, and SO. Anthropometric indices including body mass index (BMI), weight-adjusted waist index (WWI), waist-to-hip ratio (WHR), waist-to-height ratio (WHtR), abdominal volume index (AVI), A Body Shape Index (ABSI) and Body Adiposity Index (BAI) were calculated. SO was defined in line with the definition proposed by ESPEN/EASO consensus (i.e., altered muscle function + altered body composition). Receiver operating characteristic (ROC) curve analyses were conducted to evaluate the diagnostic accuracy of each index to discriminate *SO* from *obesity alone*. Logistic regression was performed to identify the association between anthropometric measures and *SO* vs *obesity alone*. Continuous indices were standardized using z-scores to allow comparability across models.
Results: A total of 1767 older adults, 68.5% female with a mean age 74 years were included in the analysis. Specifically, WWI, WHR, ABSI, and BAI values differed significantly between the obesity-alone and SO groups, whereas WHtR and AVI did not show significant differences(**Table 1**). Among the evaluated indices, WWI demonstrated the highest discriminative performance (AUC = 0.650), followed by ABSI (AUC = 0.642), WHR (AUC = 0.621) and BAI (AUC=0.591). Compared to reference group (*obesity alone*), only WWI, ABSI, and WHR values were independently associated with SO (OR = 1.77, 1.32, and 1.30; respectively) (**Table 2**).
Conclusion: In older adults, indices reflecting body shape and fat distribution outperformed adiposity-based measures in distinguishing sarcopenic obesity from obesity alone. Among these, WWI showed the strongest and most consistent association with sarcopenic obesity, supporting its potential utility as a practical screening tool in routine clinical practice.

Table 1: Comparison of clinical and body composition characteristics across sarcopenic obesity phenotypes

	Non-sarcopenic-non obese n: 860	Obesity alone n: 515	Sarcopenia alone n: 201	Sarcopenic obese n: 191	P value
Age(years)	74±6.7[b]	71±5.6[a]	79±6.2[d]	76±6.4[c]	<0.001
Female sex, n(%)	587(%68)	365(%70)	166(%82)	93(%48)	<0.001
WC (cm)					<0.001
Male	94[a]	107[b]	94[a]	108[b]	
Female	90[a]	107[c]	95[a]	107[c]	
HC (cm)					<0.001
Male	99[a]	107[c]	98[a]	106[c]	
Female	103[a]	118[d]	105[a]	115[b]	
Body Fat Percentage (%)					<0.001
Male	22.3[a]	31.2[c]	23.8[b]	33.8[c]	
Female	33.4[a]	44.7[d]	35.9[b]	43.9[c]	
SMMI					<0.001
Male	1.17[a]	1.05[b]	1.00[c]	0.92[d]	
Female	0.83[a]	0.70[b]	0.74[a]	0.68[c]	
BMI (kg/m²)	26.7[a]	33.7[b]	28.6[c]	32.5[b]	<0.001
WHtR(cm/cm)	0.58[a]	0.68[c]	0.63[b]	0.69[c]	<0.001
WWI (cm/√kg)	11.3[a]	11.7[b]	11.9[c]	12.1[d]	<0.001
WHR (cm/cm)	0.89[a]	0.93[c]	0.91[b]	0.97[d]	<0.001
ABSI	0.082[a]	0.082[a]	0.083[b]	0.085[c]	<0.001
BAI	63.7[a]	73.7[d]	67.4[b]	70.9[c]	<0.001
AVI	17.2[a]	23.4[b]	18.3[a]	23.5[b]	<0.001
TUG (sn)	9.8[a]	9.3[a]	13.1[c]	11.9[b]	<0.001
UGS (m/sN)	0.95[a]	0.99[a]	0.75[c]	0.82[b]	<0.001

*values are presented as number (%), meant standard deviation
**different superscript letters indicate statistically significant differences between groups according to post-hoc analyses (p < 0.05)
Abbreviations: WC (Waist Circumference), HC (Hip circumference),SMMI (Spinal Muscle Mass Index), BMI (body mass index),WHtR (weight-to-height ratio), WWI (weight-adjusted waist index) , WHR(w aist-to-hip ratio), ABSI(A Body Shape Index), BAI(the body adiposity index), AVI (A bdominal Volume Index) , TUG(Time Up and Go), UGS(Usual Gait Speed)

Table 2. Multinomial logistic regression analysis of obesity-related indices according to body composition phenotypes

Index (z-score)	Outcome group vs Obesity alone	OR (95% CI)	P value
WWI (z)	Normal	**0.51 (0.45–0.58)**	<0.001
	Sarcopenia alone	0.95 (0.79–1.15)	0.607
	Sarcopenic obesity	**1.77 (1.45–2.18)**	<0.001
WHR (z)	Normal	**0.51 (0.45–0.59)**	<0.001
	Sarcopenia alone	**0.72 (0.59–0.88)**	0.001
	Sarcopenic obesity	**1.30 (1.07–1.58)**	0.008
ABSI (z)	Normal	**0.86 (0.77–0.98)**	0.019
	Sarcopenia alone	0.98 (0.82–1.18)	0.841
	Sarcopenic obesity	**1.32 (1.09–1.60)**	0.005
BAI (z)	Normal	**0.79 (0.77–0.81)**	<0.001
	Sarcopenia alone	**0.86 (0.83–0.88)**	<0.001
	Sarcopenic obesity	1.00 (0.98–1.03)	0.929

All models were adjusted for age and sex. Obesity alone was used as the reference category in multinomial logistic regression analyses. Continuous indices were standardized using z-scores to allow comparability across models. Odds ratios represent the change per 1 standard deviation increase in each index

Abbreviations: WWI (weight-adjusted waist Index) , WHR(weist-to-hip ratio), ABSI(A Body Shape Index), BAI(the body adiposity index)

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LOW SKELETAL MUSCLE–TO–FAT MASS RATIO IDENTIFIES SARCOPENIC OBESITY BUT DOES NOT PREDICT MORTALITY IN OLDER ADULTS

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Objective: This study aimed to investigate the associations of the skeletal muscle–to–fat mass ratio (SMM/FM) with sarcopenic obesity and all-cause mortality in community-dwelling older adults.
Methods: This retrospective cohort study included 1,247 community-dwelling adults aged ≥60 years who underwent comprehensive geriatric assessment. SO was defined in accordance with the ESPEN/EASO consensus criteria (i.e., impaired muscle function combined with altered body composition). Sex-specific quintiles of the SMM/FM ratio (SS-Q1) were generated, and individuals in the lowest quintile were classified as having low SMM/FM. Logistic regression analyses were performed to identify factors associated with sarcopenic obesity, while Cox proportional hazards models were used to examine the association between SMM/FM and all-cause mortality.
Results: The mean age of the participants was 74 years, and 70% were women (n = 873). A total of 141 participants (11.3%) have SO and these were predominantly male, significantly older, frail, dependent in both basic and instrumental activities of daily living, and belonged to the lowest SMM/FM ratio (SS-Q1). In logistic regression analyses, belonging to SS-Q1 was independently associated with SO after adjustment for age and sex (Model 1; OR=7.09, 95% CI 4.76-10.56) and remained independently associated after further adjustment for frailty and functional dependency (Model 2; OR = 7.69, 95% CI 5.07–11.66). In Cox proportional hazards analysis, older age (HR = 1.11 per year, 95% CI 1.09–1.12) and male sex (HR = 1.95, 95% CI 1.55–2.45) were independently associated with all-cause mortality, whereas neither low SMM/FM (SS-Q1) nor sarcopenic obesity remained independently associated after adjustment for age and sex.
Conclusion: Low SMM/FM, particularly when defined using sex-specific quintiles, is a strong and independent determinant of sarcopenic obesity in community-dwelling older adults. However, neither low SMM/FM nor sarcopenic obesity independently predicted all-cause mortality after adjustment for age and sex, highlighting the dominant role of demographic factors in mortality risk.

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THE EFFECTIVENESS OF THE USE OF HARDWARE MECHANOTHERAPY IN THE PREVENTION OF KNEE JOINT CONTRACTURES IN PATIENTS AFTER INJURIES

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The purpose of the study. To analyze the effectiveness of the use of hardware mechanotherapy in the prevention of knee joint contractures in patients after injuries.
Materials and methods. The retrospective study included 80 patients who were admitted for rehabilitation after consolidated fractures of the lower extremities at the State Clinical Hospital No.1. The main group consisted of 40 patients who received a comprehensive program of medical rehabilitation in the round–the-clock hospital, including

therapeutic gymnastics in the physical therapy room, massage of the lower extremity and lower back, amplipulstherapy, and electrical stimulation of the quadriceps femoris. All patients in the main group also underwent 20 minutes of hardware mechanotherapy of the lower extremities robotic devices daily during the rehabilitation course. The comparison group also included 40 patients who underwent a similar comprehensive medical rehabilitation program, but without hardware mechanotherapy.

Results. Initially, the patients of the two groups were comparable in age, height, body weight and BMI, as well as the frequency of contractures and joint stiffness.

After applying a comprehensive technique, we see an improvement in the results of angulometry in the main group. The use of hardware mechanotherapy had a 1.8-fold more effective effect on the angulometry of the main group of patients. All patients tolerated the procedure of hardware mechanotherapy well. Already from the 2nd day of the procedures, patients noted a decrease in pain, which had a positive effect on their level of activity and physical activity. Before treatment, patients could walk for an average of no more than 15-20 minutes a day, then after treatment they were able to walk for about 1 hour without stopping to rest.

Conclusions. The early use of hardware mechanotherapy in patients after lower limb injuries has increased the effectiveness of the rehabilitation complex in the main group of patients compared to the comparison group. This has led to a reduction in the recovery time after the injury, an increase in the functional range of motion, an increase in motor activity, and an improvement in the quality of life for patients.

The positive results provide a basis for the wider use of the proposed rehabilitation complex in practice for the prevention of knee joint contractures in patients after injuries. The use of robotic devices promotes fluid drainage and reduces swelling not only in the injured joint but also in the surrounding areas.

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HOW DOES LIFESTYLE AFFECT THE COURSE OF RHEUMATOID ARTHRITIS?

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It involves a comprehensive approach that includes a balanced diet, regular physical activity, and other lifestyle changes. Although pharmacotherapy has achieved significant success, doctors set themselves a larger task: not only to suppress inflammation, but also to preserve the patient's functional independence as much as possible. In this context, physical therapy becomes an integral component of preventive and therapeutic programs. [1-5] Goal. To evaluate the effect of physical activity and nutrition on the frequency of rheumatoid arthritis attacks. Materials and methods. An observational prospective study was conducted on the basis of outpatient medical institutions in Kyrgyzstan in the period from October 2023 to October 2024. The study included a cohort of 80 patients with a verified diagnosis of rheumatoid arthritis (RA) that meets modern ACR/EULAR classification criteria and has a disease duration of more than 7 years. The criteria for non–inclusion were the presence of acute infectious diseases, severe uncontrolled somatic pathology (decompensated diabetes mellitus, heart failure of type III-IV), as well as contraindications to physical activity or refusal to participate. All patients were randomly assigned to two comparable groups: an experimental and a control group of 40 people each. The patients of the experimental group, in addition to the standard basic anti-inflammatory therapy (HDL), received a comprehensive non-drug intervention, which included: 1) swimming lessons (free swimming) 2 times a week for 40 minutes; 2) structured physical therapy sessions under the guidance of an instructor 2 times a week for 30 minutes (the exercise program has been adapted for the joints of the upper and lower extremities); 3) dietary correction with a daily calorie restriction of up to 1900 kcal and recommendations for limiting the consumption of red meat. Patients in the control group received only standard pharmacotherapy and were instructed to lead a normal lifestyle without additional interventions. The duration of the observation period and the use of non-medicinal methods was 12 months. To assess the impact of the intervention on the dynamics of the disease, a standardized questionnaire focused on assessing the frequency of RA exacerbations was conducted in all patients at the end of the study. The questionnaire included three dichotomous questions (yes/no answers): 1. Have you had an attack (exacerbation) of rheumatoid arthritis in the last two years? 2. Have you had an attack (exacerbation) of rheumatoid arthritis during the last year? 3. Has there been a deterioration in the course of this disease (have the attacks become more frequent) during the follow-up period? Statistical processing of the obtained categorical data was carried out in Statistical Analysis Software 17.0 using Analysis of Variance (ANOVA) to compare the proportions between groups. The level of statistical significance was set at $p<0.05$. Results. The gender distribution in the general sample (n=80) confirmed the predominance of women characteristic of RA: 52 patients (65%, 52/80) versus 28 male patients (35%, 28/80). The average age of the patients was 62 ± 2 years. The groups were representative and comparable in basic demographic and clinical parameters. According to the results of the 12-month follow-up, a statistically significant difference in the frequency of exacerbations between the groups was revealed. In the experimental group receiving complex non-drug therapy, 30 patients (75%, 30/40) had no exacerbations of RA during the last two years, which indirectly indicates stabilization of the condition during the intervention period. No exacerbations were observed in 8 patients (20%, 8/40) during the last year of the study. Only 2 patients (5%, 2/40) showed a subjective deterioration in the course of the disease with increased seizures (positive response to the 3rd question of the questionnaire). The opposite trend was observed in the control group, which received only standard therapy. An increase in RA attacks (positive response to question 3) was noted by 32 patients (80%, 32/40). At the same time, the presence of at least one exacerbation during the last year was confirmed by 8 patients (20%, 8/40), which indirectly indicates a higher overall frequency of exacerbations in this group compared with the experimental one. The intergroup differences in the distribution of responses to all three questionnaire questions were statistically significant ($p<0.001$). Conclusions. Comprehensive lifestyle modification, including regular physical therapy (2 times a week for 30 minutes), aerobic water exercise (pool access 2 times a week) and a calorie-restricted diet (up to 1,900 kcal / day) and red meat, significantly reduces the frequency of clinical exacerbations in patients with long-term rheumatoid arthritis. The results of the 12-month study demonstrate a statistically significant positive trend in the experimental group: 75% of patients did not have exacerbations during two years of follow-up, while 80% of patients in the control group experienced an increase in seizures.

The data confirm the expediency of non-drug programs in the standard treatment process to improve long-term disease control.

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UNDERREPORTING OF VERTEBRAL FRACTURES: PREVALENCE AND PREDICTIVE FACTORS FROM THE VERTAIDO STUDY

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Objectives: This study aimed to identify clinical and radiology-related factors associated with the likelihood of VFs being reported in routine radiological reports compared with VFs detected using the FLAMINGO AI tool.
Materials and Methods: This observational study analyzed outcomes following clinical implementation of the FLAMINGO AI algorithm. The study cohort included patients aged >50 years who underwent CT examinations over a four-month period, and compared data from clinical routine reporting with the AI based and radiologist reevaluated data.
Results: During the study period, 3,971 unique individuals underwent CT examinations. The AI algorithm identified VFs in 566 patients (14%), all of which were subsequently confirmed by a radiologist. Among these 566 cases, VFs were documented in 229 radiology reports, corresponding to an overall reporting rate of 40.5%. Female patients were significantly more likely to be reported in radiology reports ($p = 0.008$), with a reporting rate of 45% among female patients compared with 33% among male patients. A significant association was also observed between referral unit and VF reporting. Reporting rates were highest for referrals from Primary Health Care (OR 3.59, $p < 0.001$), followed by Medicine (OR 2.67, $p = 0.001$) and the Emergency Department (OR 2.54, $p < 0.001$), compared with referrals from Surgery. Patients aged over 90 years had VFs reported more frequently than patients in younger age groups. Furthermore, if VFs had been described in previous radiology reports, they were more likely to be reported again in subsequent CT examinations ($p<0.001$).
Conclusions: Despite suboptimal overall reporting rates, this study identified several clinical factors significantly associated with increased reporting of VFs. Referral unit, advanced age, and prior documentation of VFs in earlier CT reports were all associated with higher reporting rates. These findings may increase physician awareness of factors contributing to VF underreporting.

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TIMED UP AND GO TEST AND BONE MINERAL DENSITY MEASUREMENT WITH RADIOFREQUNCY ECHOGRAPHIC MULTISPECTROMETRY (REMS) IN OLDER FEMALES

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Objective: The Timed Up and Go (TUG) test assesses mobility and fall risk, while bone mineral density (BMD) measurement is essential for osteoporosis evaluation. Traditional BMD assessment with DXA involves radiation, whereas radiofrequency echographic multi-spectrometry (REMS) provides a non-invasive, radiation-free alternative. This study aimed to examine the relationship between TUG performance and BMD using REMS.
Material and Methods: 120 women completed the TUG test, rising from a chair, walking three meters, turning, returning and sitting down. Times were recorded and participants classified into four groups: <10 s, 11–20 s, 21–29 s, and ≥30 s. REMS scans of the spine and hip were performed, and age, BMI, BMD and T-scores were compared across TUG groups using ANOVA. Data collection utilized a JAVA tool developed by Kirilov et al [1,2].
Results: 71 women (59.2%) completed TUG <10 s, 25 (20.8%) 11–20 s, 15 (12.5%) 21–29 s, and 9 (7.5%) ≥30 s. Women with TUG ≥30 s were older (85 y) and had lower BMI (24.4 kg/m²) than other groups ($p <0.001$). Spine BMD and T-scores decreased with longer TUG times: ≥30 s group had mean BMD 0.628 g/cm², T-score -3.3 SD versus <10 s group 0.842 g/cm², -1 SD ($p <0.001$). Hip BMD showed similar trends: ≥30 s group 0.445 g/cm², -3.6 SD versus <10 s 0.692 g/cm², -1.6 SD ($p <0.001$).
Conclusion: Slower TUG performance, particularly ≥30 s, is associated with lower spine and hip BMD and T-scores. Mobility assessment may help identify women at higher risk for osteoporosis and fractures, supporting early intervention.
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P500

IMPAIRED ORAL HEALTH PREDICTS FRACTURES AND FALLS IN OLDER ADULTS: A PROSPECTIVE COHORT STUDY

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Objective
The interplay between age-related declines in oral and musculoskeletal health, nutrition, and lifestyle in older adults remains poorly understood. The associations between oral health, fractures, falls, and lifestyle factors were investigated in a prospective cohort of older adults.
Methods
A total of 747 participants from the Geneva Retirees Cohort (mean age 67.9 ± 1.5 years; 80% women) were included with a mean follow up of 5.5 ± 1.8 years. Subjective oral health was assessed using the Geriatric Oral Health Assessment Index (GOHAI), a self-reported questionnaire covering functional, psychosocial, and pain/discomfort dimensions. In addition, number of teeth, presence of dental prostheses and/or implants and xerostomia were documented. Incident low-trauma fractures and non-traumatic falls were recorded. Bone density and body composition were assessed by DXA, bone microarchitecture and estimated bone strength by HR-pQCT with finite element analyses, and dietary intake using a food frequency questionnaire. All analyses were adjusted for age and sex.
Results
A total of 85 incident fractures and 230 individuals with at least one fall were recorded. Oral pain/discomfort and oral function impairment were associated with a higher risk of incident fractures (HR 95% CI per one-point decrease in GOHAI score, 1.18 (1.03, 1.35) and 1.09 (1.01, 1.18), respectively). The association of oral pain/discomfort was independent of hip BMD and FRAX. Teeth loss (<24 remaining teeth) and xerostomia were associated with an increased risk of falls (HR 1.53 (1.08, 2.16) and 1.69 (1.06, 2.7), respectively). Participants with teeth loss had lower trabecular density and reduced bone strength at the tibia. Participants with oral functional impairment and/or teeth loss had lower calcium and/or protein intakes, a higher BMI, lower physical activity levels, and a higher prevalence of smoking, without differences in muscle parameters.
Conclusion
Oral health may reflect musculoskeletal fragility beyond bone density measures and FRAX. Perceived pain and functional limitations were associated with an increased risk of fractures, while teeth loss and xerostomia were associated with falls. These associations appear partly related to nutrition and lifestyle factors, suggesting that maintaining a healthy lifestyle could improve both oral and musculoskeletal health. Supporting oral health in older adults may also contribute to support nutrition and a better musculoskeletal health.

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CIRCULATING DIPEPTIDYL PEPTIDASE-4 (DPP4): A NEW MARKER OF BONE FRAGILITY ASSOCIATED WITH INSULIN-RESISTANCE?

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Objective
We investigated whether circulating DPP4 is associated with prevalent and incident fractures in older adults, according to insulin resistance (IR).
Methods
We studied 384 participants from the Geneva Retirees Cohort (mean age 67.9 ± 1.5 years, 80% women, 4% type 2 diabetes). IR was defined as HOMA ≥2.5 (27% of participants). A new ELISA was developed to quantify soluble DPP4 (Pro-axis Ltd, IR). Bone mineral density, turnover markers, and prevalent and incident low-trauma fractures (mean follow-up 6.1 ± 1.4 years) were assessed.
Results
DPP4 was higher in women (P = 0.003) and participants with osteoporosis (p = 0.015), but did not differ by diabetes, or IR. DPP4 correlated negatively with BMI (r = -0.22, p<0.001), spine and hip BMD (r = -0.17/-0.15, P=0.001/0.004), and positively with CTX and P1NP (r = 0.22/0.19; p < 0.001). IR participants were less often osteoporotic (9% vs 18%, P = 0.024) than non-IR participants, yet fracture prevalence (25% vs 23%, P = 0.652) and incidence (31 vs 22 per 1000 person-years, p = 0.164) were similar between groups. In age- and sex-adjusted models in IR participants, higher DPP4 was associated with a lower prevalence of fractures (OR per SD 0.59 [0.36–0.99]), notably in non-osteoporotic participants (OR 0.54 [0.32, 0.93]). However, DPP4 did not predict incident fractures. In non-IR participants, the highest compared with the middle DPP4 tertile was associated with a lower risk of prevalent (OR 0.20 [0.05, 0.87]) and incident fractures (HR 0.19 [0.04–0.96]) in osteoporotic participants.
Conclusion
Low circulating DPP4 is associated with higher BMI and BMD and lower bone turnover, -i.e. typical features of T2D, and with fractures in IR and osteoporotic non-IR participants. These data suggest that DPP4 could link metabolic disturbances with bone fragility. Whether DPP4 could serve as a predictor of fractures in diabetes requires further investigation.

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ASSOCIATION OF FRAILTY AND SARCOPENIA WITH AMYLOID POSITIVITY

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Objective: The statistical association between multidimensional geriatric syndromes and amyloid positivity is not currently Yet, a better understanding of this clinical association could enable general practitioners to use easy-to-use tools to help with screening for cognitive decline. Using the Sarcopenia and Physical Impairment with advancing Age (SarcoPhAge) study, a Belgian cohort study including older adults, this study aims to evaluate if an association between the blood concentration of phosphorylated tau at position 217 (pTau217), a biomarker of amyloid positivity, and components of sarcopenia and frailty may exist.

Material and Methods: The concentration of pTau217 was measured in 218 plasma samples on Lumipulse platform at the second year of follow-up of the cohort. pTau217 was categorised according to recent literature in pTau 217 <0.13 pg/mL= amyloid-negative, pTau217= 0.13-0.39 pg/mL= possibly amyloid-positive, pTau217 >0.39 pg/mL= amyloid-positive. Sarcopenia and frailty components were evaluated and categorised according to the European Working Group on Sarcopenia in Older People (EWGSOP2) and Fried criteria, respectively.

Results: The 218 participants from the SarcoPhAge study had a median age of 73.96 years (interquartile range (IQR)= 69.57-78.49), 51% were women and the median concentration of pTau217 was 0.09 pg/mL (IQR=0.06-0.18). Based on predefined cut-offs, 140 participants were classified as amyloid-negative, 65 as possibly amyloid-positive, and 13 as amyloid-positive. Regarding geriatric status, 13 participants were sarcopenic, 9 were severely sarcopenic, 17 were frail, and 97 were pre-frail.

When all variables were analysed continuously, no significant correlations between pTau217 and handgrip strength, short physical performance battery (SPPB), gait speed, chair stand speed, appendicular lean mass and lean mass When categorised, sarcopenia and frailty, low gait speed, low SPPB, low muscle strength and low muscle mass in women were not significantly associated with pTau217 concentration (p>0.05). Additionally, the number of participants with amyloid positivity was not significantly higher in participants diagnosed with sarcopenia or frailty nor with participants with lower gait speed, lower SPPB, lower muscle mass or lower muscle strength (p>0.05).

Nonetheless, in addition to a significant association of pTau217 with Body Mass Index (BMI) (p=0.02), this study demonstrated a significantly correlation of pTau217 with fat mass (p<0.01). Moreover, low muscle mass was associated with higher concentrations of pTau217, but exclusively in men (p=0.006).

Conclusion(s): The clinical components of frailty and sarcopenia did not demonstrate an association with pTau217 in this study, suggesting that geriatric syndromes are not associated with cognitive decline. Nevertheless, it would be worthwhile investigating this association in a longitudinal study involving clinical evaluations of cognitive decline.

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FRACTURE RISK ASSESSMENT IN A COHORT OF 112 MALE PATIENTS UNDERGOING RADICAL CYSTECTOMY AND ILEAL URINARY DIVERSION

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Objectives

Radical cystectomy (RC) with ileal urinary diversion (UD) is the standard treatment for muscle-invasive bladder cancer. Although it improves oncological survival, metabolic acidosis and kidney failure, among other factors, may contribute to the loss of bone mineral density (BMD) and increase fracture risk. The aim of this study was to evaluate bone health and identify key risk factors associated with skeletal deterioration in these patients.

Matherial and Methods

This was a single-center, cross-sectional observational study. From January 2018 to April 2024, male patients over the age of 50 who underwent RC with ileal UD were consecutively enrolled, with a median follow-up of 35 months. Anthropometric data and biochemical parameters related to bone metabolism were collected. BMD was measured using a GE-Lunar iDXA densitometer. Vertebral fractures were assessed by VFA, and trabecular bone microarchitecture using TBS. The 10-year fracture risk was assessed using FRAX, adjusted for BMD and TBS.

Results

A total of 112 patients were included, with a median age of 71 years (IQR 64–77). The prevalence of osteoporosis and osteopenia was 32.1% and 43.8%, respectively. A total of 29.5% had a prior fragility fracture. Vertebral fractures were identified in 9.8% of the patients. A degraded TBS was observed in 40.2% of cases and partially degraded in 20.5%. The median FRAX score for osteoporotic major fracture and hip fracture was 3.9% and 1.35%, respectively. Patients with osteoporosis were older (OR = 1.11, 95% CI: 1.02–1.20; p = 0.012) and had a lower BMI (OR = 0.73, 95% CI: 0.62–0.86; p ≤ 0.001). Patients with degraded TBS had a higher BMI (OR = 5.23, 95% CI: 0.83–0.99; p = 0.041), higher creatinine levels (OR = 2.11, 95% CI: 1.08–4.11; p = 0.028), and more previous osteoporotic fractures (OR = 5.23, 95% CI: 2.08–13.13; p ≤ 0.001). Metabolic acidosis (16 patients) was not a risk factor for osteoporosis or degraded TBS.

Conclusions

Men undergoing UD after RC show a high prevalence of osteoporosis, deterioration of bone microarchitecture, and fragility fractures. Early

bone assessment using DXA and TBS is needed in these patients, along with preventive measures to reduce fracture risk.

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PERFORMANCE OF FRAX® TO GUIDE DXA USE AND ANTI-OSTEOPOROTIC TREATMENT IN MEN WITH ILEAL URINARY DIVERSION AFTER RADICAL CYSTECTOMY: UNDERESTIMATION OF FRACTURE RISK AND THE ADDED VALUE OF BMD AND TBS ADJUSTMENTS

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Objectives

Patients undergoing radical cystectomy (RC) with ileal urinary diversion (UD) have a fracture risk higher than the general population. This study aimed to determine whether FRAX® can reliably identify patients at risk of osteoporosis and help to guide treatment decisions in this population.

Material and Methods

We conducted a single-centre cross-sectional study including male patients aged >50 years who underwent RC with ileal UD between January 2018 and April 2024. BMD was measured using a GE-Lunar iDXA densitometer, TBS was derived to evaluate trabecular microarchitecture, and 10-year fracture risk was calculated using FRAX® (with and without BMD and TBS adjustment).

Results

A total of 112 men (median age: 71 years, IQR 64–77) with a median median follow-up of 34.8 months (IQR 14.2–85.6) were included. Osteoporosis and degraded TBS were found in 32.1% and 40.2% of patients, respectively. Median FRAX-MOF (major osteoporotic fracture) was 3.9% (IQR 2.7–6.05) without BMD, 5.3% (2.98–7.82) with BMD, and 5.8% (3.4–9.5) when adjusted for TBS. Median FRAX-Hip was 1.35% (0.7–2.78), 1.8% (0.9–4.55), and 2% (1–5.2), respectively. Receiver operating characteristic (ROC) analysis showed moderate discriminatory ability of FRAX without BMD to detect DXA-defined osteoporosis (AUC 0.716 for FRAX-MOF and 0.757 for FRAX-Hip) Optimal cut-offs were FRAX-MOF ≥4.6% (Sens 69.4%, Spe 72.4%, NPV 83.3%, PPV 54.3%) and FRAX-Hip ≥1.6% (Sens 77.8%, Spe 72.4%, NPV 87.3%, PPV 57.1%). Using these cut-offs, FRAX could potentially reduce the need for DXA screening up to 52.7%. Using the treatment thresholds recommended for the Spanish population (FRAX-MOF ≥10% or FRAX-Hip ≥3%, without BMD), 25% of patients would qualify for antiresorptive therapy. When incorporating TBS-adjusted FRAX® values (FRAX-MOF ≥7.5% or FRAX-Hip ≥3%), this proportion increased to 43.8%.

Conclusions

FRAX without BMD can be useful for identifying men with ileal UD after RC at risk of osteoporosis, potentially avoiding a substantial proportion of DXA. However, its moderate accuracy and tendency to underestimate the proportion of patients requiring antiresorptive therapy compared with DXA or BMD- and TBS-adjusted models highlight the need for a tailored fracture risk assessment strategy to enhance early detection and optimise bone-targeted treatment decisions.

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EGE FRACTURE LIAISON SERVICE: 3-YEAR FOLLOW-UP, PATIENT CLINICAL PROFILE AND SYSTEM EFFECTIVENESS

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This study was conducted to evaluate the clinical profiles of patients followed at the Ege University Fracture Liaison Service and the effectiveness of the system. Osteoporotic fractures are known to cause significant mortality and morbidity in the elderly population. Therefore, the aim was to demonstrate the outcomes of the multidisciplinary approache in post-fracture management. A retrospective evaluation of 500 patients followed at the service between January 2021 and January 2025 was performed. Patient demographics, fracture locations, comorbidities, treatment methods, and mortality and morbidity rates were analyzed. Post-fracture functional status, use of assistive devices, and receipt of osteoporosis treatment were examined. 71.5% of the patients were female, 28.5% were male, and the mean age was 78.5 years. The most common fracture type was intertrochanteric (48.7%), and 95.8% of the fractures were due to falls. Surgical treatment was performed in 94.2% of patients, with intramedullary nailing being the most common method (63%). The mortality rate was 28.4%, and most deaths occurred within the first year after discharge. Significant deterioration in functional status was observed in patients after the fracture, with 53.4% becoming bedridden or having limited ambulation at home. Pharmacological treatment for osteoporosis was initiated in 40.2% after the fracture, with denosumab (60%) and zoledronic acid (27%) being particularly prominent. The findings indicate that osteoporotic fractures cause high mortality and morbidity in the elderly population and significantly reduce quality of life after the fracture. While the implementation of the liaison service has standardized patient evaluation, there is still room for improvement, particularly in initiating osteoporosis treatment and improving adherence. Disseminating fall prevention strategies, osteoporosis treatment, and patient-family education programs are critical to reducing post-fracture mortality and morbidity.

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DEFINING POPULATION AND SEX-SPECIFIC DXA-BASED THRESHOLDS FOR SARCOPENIC OBESITY IN AFRICAN ADULTS

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Objectives
To derive population- and sex-specific DXA-based thresholds for sarcopenic obesity in African adults and examine their associations with physical function and metabolic outcomes, given that application of non-African thresholds is limited due to race and ethnic variation in body composition.
Methods
A population-based, cross-sectional study of adults aged ≥40 years from The Gambia, South Africa, and Zimbabwe, conducted as part of the MUFASSA study, with whole-body DXA available for The Gambia and Zimbabwe (n=3,160). Sex-specific reference distributions among adults aged 40–49 years defined high adiposity relative to muscle (trunk fat mass/appendicular lean mass [ALM] ≥+1 SD) and low muscle relative to body size (ALM/BMI ≤−2 SD; ALM/weight ≤−2 SD). Outcomes included low grip strength, slow gait speed, impaired chair rise, sarcopenia using population-specific thresholds (AFRO-SARC), and diabetes status (self-report, medication use, or elevated glucose). Logistic regression models were adjusted for age, sex, and study-sites; BMI was additionally included for trunk fat mass/ALM models. Sensitivity analyses confirmed consistency across study-sites.
Results
Thresholds were 0.52 in males (M) and 0.98 in females (F) for trunk fat mass/ALM; 0.82 (M) and 0.52 (F) for ALM/BMI; and 0.36 (M) and 0.27 (F) for ALM/weight. Overall prevalence of sarcopenic obesity was 15.6% for trunk fat mass/ALM, 6.2% for ALM/BMI, and 5.1% for ALM/weight, highest in Zimbabwe and lowest in rural Gambia. ALM/BMI showed the strongest and most consistent associations with low grip strength (OR 2.47, 95% CI 1.64–3.73), slow gait speed (OR 2.09, 95% CI 1.39–3.16), and AFRO-SARC sarcopenia (OR 2.03, 95% CI 1.03–4.00). For ALM/weight, adjusted ORs were 2.13 (95% CI 1.30–3.48) for low grip strength, 2.35 (95% CI 1.46–3.77) for slow gait speed, and 1.92 (95% CI 1.22–3.02) for diabetes status, whereas associations for trunk fat mass/ALM were attenuated after adjustment, except for diabetes status (OR 1.43, 95% CI 1.01–2.0).
Conclusions
Low muscle mass relative to body size identifies adverse physical function outcomes in African adults, with ALM/weight most strongly associated with diabetes status. The use of these sex-specific, population-derived thresholds enables accurate classification of sarcopenic obesity and supports improved identification of African adults with impaired physical function outcomes and adverse metabolic status.

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BARRIERS AND FACILITATORS TO WEIGHT BEARING SPORTING ACTIVITY IN YOUNG PEOPLE: CAN WE LEVER SOCIAL MEDIA TO HARNESS THE BENEFITS OF SPORT FOR OPTIMAL PEAK BONE MASS ACQUISITION?

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Objective
Participation in weight bearing sporting activity is a modifiable lifestyle factor that can be harnessed to improve peak bone mass during childhood and young adulthood. This study investigates the barriers and facilitators reported by young people regarding participation in such sporting activities.
Material and methods
Secondary school pupils in Aotearoa New Zealand were approached to participate using a convenience sampling approach. School principals and/or site co-ordinators gave verbal and written approval to conduct the study. There was no exclusion criteria. The main research question was: *"What are the barriers and enablers that you experience when engaging in sporting activity that is linked with bone health?* Focus groups were conducted using a semi-structured approach with open-ended questions and prompts. Transcripts were thematically coded by two coders in Nvivo using an inductive content analysis approach.
Results
Eight focus group discussions were held between March 2021 and November 2023, with 2 to 4 participants attending each group. The total sample size was 26 individuals (22 female, 4 male) ranging from 11 to 17 years of age, with a mean age of 14.46 (± 1.7). Ethnicity was reported as 13 European, 8 mixed Māori & Pacific people, 5 Asian and Indian origin The main barriers to sporting activity participation included transport constraints, fear of injury, long term impacts of the COVID-19 pandemic, financial restrictions, time management, negative perceptions relating to social media, gender disparity and stereotypes, family influences, and personal and cultural preferences. By contrast the facilitators cited were access to sporting activities, perception of furthering career pathways, encouragement and practical support, building and retaining friendships, benefits of social media, enjoyment, maintaining routines, keeping fit, feeling accomplished, and mental health benefits.
Conclusion
We found participation in weight bearing high impact sporting activity in school aged young people is influenced by many factors. The internet/social media was commonly mentioned as both a positive and negative factor regarding sporting participation. Educational interventions and positive role modelling using this medium might therefore improve sports participation in young people.

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METABOLIC–INFLAMMATORY LINKS TO BONE REMODELLING IN RHEUMATOID ARTHRITIS: HOMOCYSTEINE AND ADIPONECTIN RELATE TO THE RANKL/OPG AXIS

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Objective: To explore relationships between systemic inflammatory activity, homocysteine and adiponectin with DXA-derived bone density parameters and bone metabolism markers in RA.
Methods: Cross-sectional analysis of 170 RA patients. DXA was performed at the femoral neck, lumbar spine and distal radius. Serum cytokines (IL6, TNFα), homocysteine, adiponectin, RANKL and OPG were measured and the RANKL/OPG ratio was calculated. Associations were tested using Spearman's correlations (ρ); partial Spearman's correlations (rank-residual approach) adjusted for age and BMI were used for key metabolic mediator–bone marker relationships.
Results: Osteoporosis (any site) was present in 88.2%. Higher DAS28ESR correlated with lower femoral neck Tscore (ρ=−0.273, p=0.022) and radius Tscore (ρ=−0.290, p=0.016), BMD at the femoral neck, lumbar spine and radius (all p<0.05). In the biomarker subset, inflammatory cytokines were associated with a more osteoclastogenic profile: IL6 correlated positively with RANKL/OPG ratio (ρ=0.323, p=0.006) and inversely with OPG (ρ=−0.355, p=0.0026); similar patterns were observed for TNFα (all p<0.05). Adiponectin and homocysteine showed strong positive associations with RANKL and OPG (adiponectin–OPG ρ=0.682; homocysteine–OPG ρ=0.602; p<10⁻⁶) and inverse associations with the RANKL/OPG ratio (adiponectin ρ=−0.370, p=0.0016 and homocysteine). These associations remained significant after adjustment for age and BMI (adiponectin–OPG partial ρ=0.702, p<0.001; homocysteine–OPG partial ρ=0.628, p<0.001).
Conclusion: In RA, higher inflammatory disease activity is associated with lower DXA-derived bone density, while cytokine profiles relate to a higher RANKL/OPG ratio. Homocysteine and adiponectin are strongly linked to the RANKL/OPG system after adjustment for age and BMI, supporting a metabolic–inflammatory contribution to altered bone remodeling that may be only partly captured by DXA.

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ENDOCRINE CORRELATES OF BONE FRAGILITY IN RHEUMATOID ARTHRITIS: LINKS BETWEEN SEX HORMONES, RANKL/OPG AND FRAX

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Objective: To evaluate associations between sex hormones, RA duration and classical osteoporosis risk factors with DXA-derived T-scores, FRAX probability and bone metabolism markers.
Methods: Cross-sectional analysis of 170 RA patients. Variables included age, osteoporosis risk factors, serum 25(OH)vitamin D, FRAX and DXA T-scores. Serum FSH, LH, estradiol, progesterone, RANKL and OPG were measured and the RANKL/OPG ratio was calculated. The patients with any chronic conditions that may influence the results were excluded from the study. Associations were assessed using Spearman correlations. Severe osteoporosis was defined as a minimum T-score ≤ −3.5 at any site.
Results: Osteoporosis (any site T-score ≤ −2.5) was present in 88.2% and severe osteoporosis in 64.5%. Vitamin D deficiency was observed in 46.7%, lifetime glucocorticoid exposure - in 86.3%. RA duration correlated with higher FRAX hip probability (Spearman's ρ=0.293, p=0.00022) and lower femoral neck and lumbar spine T-scores (ρ=−0.326, p=0.00495; ρ=−0.317, p=0.0056). In the biomarker subset, RA duration correlated with higher RANKL (ρ=0.323, p=0.0064) and OPG (ρ=0.425, p=0.00025) and with a lower RANKL/OPG ratio (ρ=−0.322, p=0.0066). Higher FSH correlated with higher FRAX hip probability (ρ=0.488, p<0.001) and lower lumbar spine T-score (ρ=−0.376, p=0.0030). Estradiol correlated inversely with FRAX hip probability (ρ=−0.410, p=0.00051). Progesterone correlated inversely with RANKL (ρ=−0.385, p=0.0010) and positively with 25(OH)D (ρ=0.279, p=0.020). Severe osteoporosis was associated with older age (median 60 vs 52 years; p=0.00084) and longer glucocorticoid exposure (median 48 vs 12 months; p=0.0069).
Conclusion: In RA, disease duration and sex-hormone profiles correlate with osteoporosis severity, FRAX probability and modulation of the RANKL/OPG pathway, supporting a potential endocrine contribution to skeletal fragility alongside established risk factors such as age and glucocorticoid exposure.

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THE RELATIONSHIP BETWEEN XANTHIN OXIDOREDUCTASE COMPLEX ENZYMES ACTIVITIES AND ACTIVITY OF IMMUNOINFLAMMATORY RHEUMATIC DISEASES

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Objective: Immune inflammation activity is one of the key characteristics of immunoinflammatory rheumatic diseases (IIRD). Xanthine oxidoreductase (XOR) is an important component of innate immunity which involved in IIRD pathogenesis. We aimed to study the dependence of XOR interconvertible forms (xanthine oxidase ((XO), EC 1.17.3.2) and xanthine dehydrogenase ((XDG), EC 1.17.1.4)) activities in plasma and lysed blood cells (WBC and RBC) on the disease activity of systemic lupus erythematosus (SLE), rheumatoid arthritis (RA) and systemic scleroderma (SSc) patients.

Methods: Diagnosis of RA was verified using the ACR/EULAR criteria (2010), SLE – EULAR/ACR criteria (2019), SSc – ACR/EULAR criteria (2013). Activities of XO and XDG were measured by spectrophotometric methods [1]. The enzymatic activities were expressed as nmol/min/ml and normalized to 1×10^7 cells/ml in WBC, to 1×10^9 cells/ml in RBC. The statistical relationships between variables were assessed using the Spearman rank correlation method (ρ). Differences were considered significant when p<0.05.

Results: 77 adult RA patients, 56 adult SLE patients and 51 SSc patients were enrolled in the study. The values of enzyme indicators depended

on the activity of the pathological process in all included in the study diseases: in RA (XO_{pl} (ρ=0.83, p<0.001); XDG_{pl} (ρ=-0.43, p<0.001); XO_{RBG} (ρ=0.81, p<0.001); XDG_{RBC} (ρ=-0.80, p<0.001); XO_{WBC} (ρ=-0.81, p<0.001); XDG_{WBC} (ρ=-0.80, p<0.001)); in SLE (XO_{pl} (ρ=0.88, p<0.001); XDG_{pl} (ρ=-0.88, p<0.001); XO_{RBG} (ρ=-0.81, p<0.001); XDG_{RBC} (ρ=0.75, p<0.001); XO_{WBC} (ρ=-0.83, p<0.001); XDG_{WBC} (ρ=-0.90, p<0.001)); in SSc (XO_{pl} (ρ=0.50, p<0.001); XDG_{pl} (ρ=0.74, p<0.001); XO_{RBG} (ρ=-0.84, p<0.001); XDG_{RBC} (ρ=-0.76, p<0.001); XO_{WBC} (ρ=-0.84, p<0.001); XDG_{WBC} (ρ=-0.83, p<0.001)). Unidirectional relationships were observed in plasma of RA and SLE patients; in lysed WBC of RA, SLE, and SSc patients.

Conclusion: The obtained results indicate the involvement of XOR in immune inflammation. The identified relationships suggest that XOR and XDG may be further studied as markers of immune inflammation activity.

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URIC ACID LEVEL IN IMMUNOINFLAMMATORY RHEUMATIC DISEASES

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Objective: We aimed to study assess the uric acid level in plasma of rheumatoid arthritis (RA), systemic lupus erythematosus (SLE) and systemic scleroderma (SSc) patients.
Methods: Diagnosis of RA was verified using the ACR/EULAR criteria (2010), SLE – EULAR/ACR criteria (2019), SSc – ACR/EULAR criteria (2013). The UA level was determined in plasma using the Müller-Seifert method and expressed in mmol/l. Data are presented as Me [Q25–Q75]. Differences in UA levels between groups were assessed using Mann-Whitney test and were considered significant when p<0.05.
Results: 77 adult RA patients (mean age 45 [37; 49] years); 56 adult SLE patients (mean age 35 [31; 42] years); 51 SSc patients (mean age 43 [38; 48] years) and 35 healthy volunteers (mean age 39 [34; 46] years) were enrolled in the study. UA level in group of healthy individuals was 0,30 [0,27–0,33]; in RA group - 0,34 [0,25–0,38]; in SLE group 0,34 [0,31–0,37]; in SSc group - 0,35 [0,33–0,36]. In contrast to the healthy individuals, UA levels were higher in plasma of all patient groups (all p<0.001). There were no significant differences in UA levels between all included in the study diseases (all p>0.05).
Conclusion: We have previously published the results of studies confirming an increase in the prooxidant potential of plasma due to the implementation of all XOR activities in RA, SLE and SSc [1,2]. According to literature data, UA accounts for approximately half of the human plasma antioxidant activity [3]. Increasing UA levels may help protect cellular structures from the damaging effects of free radicals in RA, SLE and SSc.
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AGE-RELATED VARIATIONS IN WHOLE-BODY AND REGIONAL BODY COMPOSITION WITHIN HEALTHY, OVERWEIGHT AND OBESE BMI CATEGORIES IN ADULT MALES

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Objective
This study aimed to investigate whether absolute (g) whole-body and regional body composition differ with age in adult males.
Material and Methods
This cross-sectional study harvested data from 1065 individuals using dual-energy X-ray absorptiometry (DEXA) which accurately measured whole-body fat mass (WBFM), whole-body lean mass (WBLM), leg fat mass (LFM), leg lean mass (LLM), android (abdominal) fat mass (AFM), and whole-body bone mineral density (WBBMD). Age groups were younger (18-40), middle-aged (41-64), and older (65+). Data for 381 males were matched according to their BMI group: healthy, overweight, and obese. Each BMI group was analysed separately. Statistical analysis was performed using Two-way Analysis of Variants (ANOVA) and the Kruskal-Wallis test.
Results
LFM in the obese weight BMI category and AFM in the overweight BMI category showed that LFM was lower, and AFM was higher in the older and middle-aged group compared to the younger group. There was no difference observed in WBFM across the age groups. The healthy weight BMI category showed that WBLM and LLM were lower in the older age group compared to the younger group. No significant difference in WBBMD was found across the age groups.
Conclusions
Fat mass demonstrated region-specific changes with age, with increases and decreases observed across the android and leg regions, respectively. This suggested that fat mass may increase and decrease within different regions of the body simultaneously as we age. Lean mass showed a decline with age, particularly in the later stages of ageing. In contrast, whole-body bone mineral density (WBBMD) remained relatively stable across age groups, suggesting that lifestyle and environmental factors may play a more influential role than age alone in determining bone mineral outcomes.
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P513

FIBROMYALGIA IN REAL CLINICAL PRACTICE

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Fibromyalgia (FM) is a chronic syndrome characterized by pain, fatigue, and other somatic symptoms. Not only does it significantly impact the quality of life of patients with rheumatic diseases, but it also often prevents them from achieving remission.

Objective: to assess the frequency of FM in real clinical practice among patients with confirmed rheumatoid arthritis (RA), ankylosing spondylitis (AS) and psoriatic arthritis (PsA) and its impact on key indicators.

Material and Methods: the study included 30 patients with RA, 33 with AS, and 23 patients with PsA. The diagnostic criteria for FM, as formulated by the American College of Rheumatology in 2016 (ACR2016), were uniformly applied to all patients enrolled in the study. To be diagnosed, pain lasting more than 3 months, generalized pain syndrome, a widespread pain index (WPI) WPI ≥ 7 or WPI 4–6, and a symptom severity scale (SSS) WPS ≥ 5 or SSS ≥ 9 were required.

Result: The main characteristics of the patients included in the study are presented in the table 1.

Table 1. Characteristics of patients included in the study

Parameters	RA (n=30)	AS (n=33)	PsA (n=23)
Gender	M –6; W - 24	M-19; W-14	M – 14; W - 9
Age	53.0[47.5;59.0]	42.0[38.0;51.0]	46.0[38.0;5.5]
Height	68.9[60.5;83.0]	78.0[63.0;90.0]	85.2[71.9;99.0]
Weight	164.0[160.5;171.5]	174.0[164.0;180.0]	171.0[163.5;180]
BMI	26.5[22.67;28.8]	26.2[22.3;29.3]	27.9[24.7;29.5]
Duration of illness	6.5[4.0;15.0]	5.0[3.0;10.0]	5.0[3.0;10.0]

Using the 2016 FM diagnostic criteria, FM was found to be present in 26.6% of patients with RA, 23.5% with AS, and 17.4% with PsA. Moreover, its presence is characteristic of patients with more severe pain according to the VAS scale, a significantly higher number of painful joints, anxiety disorders, and more severe functional impairments.

Conclusion. Given the high prevalence of FM in patients with RA, AS and PsA, individuals presenting with severe pain, a high number of tender joints, emotional disturbances, and a suboptimal response to therapy should be evaluated for the presence of FM.

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PORTRAIT OF A PATIENT WITH FIBROMYALGIA

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Objective: To study the characteristics of patients suffering from fibromyalgia.

Methods: the study encompassed 86 patients diagnosed with confirmed rheumatological diseases, including rheumatoid arthritis (RA), ankylosing spondylitis (AS) and psoriatic arthritis (PsA). All patients were examined using the FM criteria of the American College of Rheumatology (ACR 2016), and additional parameters such as educational attainment, marital status, employment status, and the presence of an association between disease onset and a self-reported stressful event were documented. Additionally, the study incorporated 39 patients without a rheumatological diagnosis who met the ACR 2016 FM criteria.

Result: FM was identified in one-third of patients with rheumatological diseases, with prevalence rates of 26.6% in RA, 23.5% in AS and 17.4% in PsA. In addition to significantly higher Visual Analog Scale (VAS) pain scores, a greater number of tender joints, and correspondingly elevated rheumatological diseases disease activity indices, patients with FM were more frequently single or divorced, had a general or incomplete higher education level, and experienced partial, remote employment, or job termination. Over 60% of patients with FM reported associating disease onset with prior stress exposure. The same clinical profile was observed in patients with FM without rheumatological diseases.

Conclusion. The clinical features of a patient with fibromyalgia encompass not only the presence of chronic generalized pain syndrome, elevated rheumatic disease activity indices, and diminished quality of life but also potentially a distinct clinical profile. A patient with FM is more frequently a single individual with an average educational attainment, prone to occupational shifts toward part-time employment, and exhibiting heightened anxiety levels.

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FIBROMYALGIA IN RHEUMATIC DISEASES: INFLUENCE ON THE ASSESSMENT OF DISEASE ACTIVITY

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Objective: to determine the effect of FM on disease activity and treatment choice in patients with rheumatoid arthritis (RA), ankylosing spondylitis (AS) and psoriatic arthritis (PsA).

Material and methods: the study included patients with reliable diagnoses of RA, AS and PsA. FM was diagnosed according to the criteria of the American College of Rheumatology in 2016 (ACR2016). The main characteristics of patients, indicators of disease activity (DAS28, BASDAI) were recorded and compared, and patient treatment tactics were analyzed.
Results: The study enrolled 86 patients with rheumatoid arthritis (RA, n=30), ankylosing spondylitis (AS, n=33), and psoriatic arthritis (PsA, n=23). Fibromyalgia (FM) was identified in 26.6% of RA patients, 23.5% of AS patients, and 17.4% of PsA patients. Demographic characteristics were comparable across groups, except for sex distribution, with a predominance of women in the FM group. Disease activity scores were significantly higher in FM patients within the RA group (DAS28 index: 5.2 [4.38; 6.9] vs. 3.5 [2.8; 5.4], p=0.03) and the PsA group (BASDAI: 7.2 [6.3; 8.3] vs. 4.3 [2.8; 6.2], p=0.02). In the AS group, scores differed but did not reach statistical significance (BASDAI: 5.4 [4.75; 6.45] vs. 4.8 [3.0; 5.8], p=0.2), potentially due to the small sample size. No differences in inflammatory markers were observed based on FM presence or absence. Analysis of treatment regimens revealed a higher percentage of patients receiving bDMARDs in the FM groups.
Conclusion: Fibromyalgia is a common comorbid condition in patients with RA, AS, and PsA. The presence of FM may affect disease activity index scores, which can lead to incorrect treatment strategies and unwarranted intensification of therapy.

P516

REAL-WORD USE OF ABALOPARATIDE IN WOMEN WITH SEVERE OSTEOPOROSIS: PATIENT PROFILE, TREATMENT PERSISTENCE AND EARLY DENSITOMETRIC OUTCOMES FROM A SPANISH TERTIARY HOSPITAL

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Objectives
To describe the clinical characteristics, treatment persistence, safety profile and early densitometric changes in a single-centre cohort of Spanish patients with osteoporosis initiating treatment with ABL.

Methods
A retrospective single-centre descriptive study was conducted between May 2024 and December 2025 including patients treated with ABL in a tertiary Spanish hospital. Statistical analysis was performed using SPSS version 21.0.

Results
A total of 43 women were included in the study. The median age was 66 years [IQR 60–74]. At least one previous fracture was present in 68,3% of patients, with a mean number of 1,76 fractures per patient (SD 2,00). Regarding fracture type, vertebral fractures were the most frequent (60,5%), followed by wrist fractures (11,6%) and hip fractures (9,3%). Several patients presented with fractures at more than one site. Regarding previous osteoporosis treatments, oral bisphosphonates were the most frequently used (31%), followed by denosumab (19%) and teriparatide (12%). Baseline densitometry showed severe osteoporosis, with a mean T-score of −3,35 ± 0,82 SD at the lumbar spine, −2,34 ± 0,74 SD at the femoral neck and −2,25 ± 0,88 SD at the total hip. The median treatment duration was 272 days [IQR 92–344]. During follow-up, 12 patients (27,9%) discontinued treatment, predominantly early after treatment initiation. Discontinuations were attributed to mild adverse events in 8 patients and to the patient's own decision in 4 patients. No serious treatment-related adverse events were observed. In the small subgroup of patients with follow-up densitometry available (n=3), a trend towards improvement in T score was observed, with a mean relative increase of 12,9% at the femoral neck and 89,7% at the total hip compared with baseline, while changes at the lumbar spine were minimal. However, the very limited sample size precludes definitive conclusions.

Conclusions
This single-centre real-world study shows that ABL is mainly initiated in women with severe osteoporosis and high fracture burden. No fractures were recorded during follow-up. Discontinuations were mostly driven by patient decision or mild adverse events, and early densitometric improvements were observed in a small subgroup of patients specially in femoral neck and total hip.

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USE OF CINACALCET IN SECONDARY HYPERPARATHYROIDISM IN HEREDITARY HYPOPHOSPHATEMIC RICKETS

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Introduction: X-linked hypophosphatemic rickets (XLH) is a rare disease caused by variants in the PHEX gene.Secondary and tertiary hyperparathyroidism have been described in these patients; among the possible causes are treatment with phosphate salts, deficient calcitriol production due to excess FGF23, and parathyroid resistance to the action of FGF23.

We present the case of a patient treated with burosumab plus calcitriol for the management of hyperparathyroidism secondary to XLH.

A 20-year-old patient has been under follow-up since birth for X-linked hypophosphatemic rickets. His mother, grandmother, and maternal aunt all have the same condition. He began conventional treatment with phosphate salts and calcitriol until age 11. From birth, the patient presented with elevated PTH levels and calcium levels at the upper limit of normal. He started burosumab 0.8 mg/kg subcutaneously every 14 days with clinical success, correction of bone deformities, improvement in pain, and school attendance appropriate for his age. He began participating in sports. At age 17, he began the transition process, during which an increase in calcium and PTH levels was observed. He weighed 66 kg, was 154.7 cm tall, and a renal ultrasound revealed mild nephrocalcinosis. The burosumab dose was reduced to 50 mg/kg every 28 days. Calcium levels stabilized until age 20, at which point they began to rise again. Initiate cinacalcet 30 mg orally every 12 hours.

	Birth (4 months)	3 years old	16	17	18	19	20
Calcium (8.2 a 10.3 mg/Dl)	10.1	10.5	11.2	10.4	9.5	10.7	9.7
Fosfato (2.5-4.5 mg/Dl)	3.1	2.6	2.3	3.7	2.5	2.1	2.9
PTH (15-65 pg/ml)	70	140	218	156	153	209	103
Vitamina D ng/ml	19		43	25			32

Conclusion:

The prevalence of secondary and tertiary hyperparathyroidism was 25% and 10% respectively in XLH[2]. Evaluation of the parathyroid axis is necessary from the time of diagnosis of the disease, as well as its treatment, to avoid associated complications.

Treatment with cinacalcet in combination with burosumab minimized the risk of hypercalcemia and nephrocalcinosis and prolonged the time on medical treatment until parathyroid surgery.

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SEVERE EARLY-ONSET OSTEOPOROSIS IN A YOUNG MALE WITH ANKYLOSING SPONDYLITIS TREATED WITH SECUKINUMAB AND GLUCOCORTICOIDS

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Objective: To describe severe secondary osteoporosis in a young male with ankylosing spondylitis (AS) and to emphasize the importance of early bone density assessment in patients with inflammatory spondyloarthritis receiving long-term immunomodulatory and glucocorticoid therapy.
Methods: A 31 year old HLA-B27–positive male with ankylosing spondylitis underwent longitudinal laboratory assessment and dual-energy X-ray absorptiometry (DEXA). Inflammatory markers, complete blood count, liver enzymes, ferritin, coagulation markers, autoimmune serology, and procalcitonin were evaluated. Bone mineral density (BMD) was measured at the lumbar spine (L1–L4) and right femur. Fracture risk was assessed using FRAX. Anthropometric data were recorded. Current treatment included secukinumab; previous exposure to systemic glucocorticoids was documented.
Results: Marked systemic inflammation was observed with C-reactive protein up to 119.3 mg/L, erythrocyte sedimentation rate up to 112 mm/h, leukocytosis up to 22.9 K/μL with neutrophilia and immature granulocytes, and ferritin up to 518.5 ng/mL. Mild transaminase elevation was present. Procalcitonin remained low, excluding bacterial infection. Rheumatoid factor and anti–cyclic citrullinated peptide antibodies were negative. DEXA demonstrated severe osteoporosis: lumbar spine BMD 0.815 g/cm² (T-score −3.4) and right femoral neck BMD 0.633 g/cm² (T-score −3.4; Z-score −2.8). Ward's region T-score reached −3.6. Multiple fracture risk factors were identified, including inflammatory disease, smoking, alcohol intake, family history of hip fracture, prior glucocorticoid exposure. The patient received systemic corticosteroid therapy (prednisone) and disease-modifying treatment with clinical improvement.. Alendronate plus cholecalciferol 70mg/5600IU 1 capsule a week was added to the therapy considering the high risk of fracture. As the inflammatory markers lowered the prednisone dose was reduced to a minimum in ordered to establish minimum disease activity.
Conclusions: Young patients with ankylosing spondylitis may develop severe early osteoporosis due to chronic inflammation and cumulative risk factors. Early DEXA screening and aggressive bone-protective strategies should be integrated into the management of high-risk patients.

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NEUROPROTECTIVE EFFECTS OF ESTROGEN REPLACEMENT THERAPY IN AN ALZHEIMER'S DISEASE MOUSE MODEL ACROSS DIFFERENT LIFE STAGES

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Objective(s)
To compare the neuroprotective effects of estrogen replacement therapy (ERT) on Alzheimer's disease (AD) pathology and cognition when initiated at different life stages in a mutant mouse model.
Material and Methods
Randomized controlled longitudinal experiment in 20 female APP-mutant C57BL/6 mice, aged 4–14 months. Animals will be allocated to four groups (n=5): control (no ERT), early ERT starting at 4–6 months (premenopausal equivalent), intermediate ERT starting at 8–10 months after ovariectomy (early postmenopause), and late ERT starting at 12–14 months after ovariectomy (late postmenopause). 17β-estradiol or vehicle will be administered for two weeks. Primary outcomes are amyloid plaque load and neurofibrillary pathology (immunohistochemistry), neuronal density in hippocampus and cortex, and cognitive performance in the Morris water maze. Group differences will be analysed with ANOVA (SPSS).
Results
As this is an ongoing protocol, no experimental data are yet available. We hypothesize that early ERT will reduce amyloid plaque burden, neuronal loss and cognitive decline compared with control, whereas late initiation will show attenuated or absent neuroprotective effects.
Conclusion(s)
As this is a protocol-based submission, no data-driven conclusions can yet be drawn. However, the proposed experimental design is expected to determine whether the timing of estrogen replacement therapy initiation influences amyloid burden, neuronal loss and cognitive decline in an Alzheimer's disease mouse model, thereby providing mechanistic support for or against the "critical window" hypothesis.

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IS ORAL HEALTH ASSESSMENT TOOL BETTER THAN HAND GRIP STRENGTH TO PREDICT COMPLICATIONS AFTER HIP FRACTURE? PRELIMINARY RESULTS

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Objective.
The primary objective is to compare the effectiveness of OHAT vs HGS to identify complications after hip fracture.
Material and methods
This is a prospective cohort study, in patients with hip fracture in the Hospital Aranda de la Parra, in Leòn, Mèxico. They are invited to participate, previous informed consent (either provided by the patient or, in case of dementia, the caregiver), once the diagnosis is confirmed by the orthopedic surgeon, they are included in the study; besides of regular medical history and sociodemographic approach, clinimetric variables were evaluated as well as physical exam, HGS was measured with a hydraulic Jamar dynamometer, and OHAT is applied to each patient, both by a trained physician, all laboratory results prior surgery are recorded, they will be followed up at 1 and 12 months after surgery. The study was evaluated and approved by the local Ethics and Research Committee.
Results
Currently 6 patients are included, all women, average age is 87, 1 with previous diagnosis of osteoporosis, Charlson index 4.2 Barthel Index 79.2, FRAIL 3.2. HGS 11 OHAT 5.7, 25HO Vitamin D 18.8 ng/ml, 3.2 length in hospital, only 1 has required transfusion (2 units) none of them has had delirium.
Conclusion
These are preliminary results, we can see that the HGS is very low, and the OHAT is high among these patients, only 1 patient has had complications, these results will change once the work is complete.

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CARDIOVASCULAR SAFETY OF ROMOSOZUMAB IN POSTMENOPAUSAL WOMEN WITH SEVERE OSTEOPOROSIS: INTERIM RESULTS FROM A EUROPEAN MULTI-DATABASE POST-AUTHORISATION SAFETY STUDY

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Objective(s): Romosozumab is approved for treatment of severe osteoporosis (OP) in postmenopausal women at high risk of fracture. A European post-authorization safety study has been implemented within the Risk Minimization Plan to evaluate the risk of serious cardiovascular (CV) events under real-world conditions. This interim analysis evaluates the safety of romosozumab compared to other OP treatments (including alendronate as main comparator) for outcomes of serious CV events (myocardial infarction [MI], stroke), cardiac arrhythmias, all-cause mortality, and CV death.
Materials and Methods: This European multi-database, new user active comparator cohort study used routinely collected healthcare data (Jan 2018–Jan 2025 for this interim analysis) from Denmark, Germany, the Netherlands, Spain, and the UK. The primary outcome was a composite of major adverse CV events (MACE-2: MI, stroke, all-cause mortality) within 12 months of treatment initiation. Propensity score matching (1:3) was applied to control confounding between romosozumab and alendronate users. Hazard ratios (HRs) and 95% confidence intervals (CIs) for MACE-2 and secondary outcomes were estimated using Cox regression and random-effects meta-analysed across databases. Sensitivity analyses included negative control outcomes, self-controlled case series, and instrumental variable analyses.
Results: This interim analysis contains 1,900 eligible romosozumab and 312,410 alendronate users. Too few MACE-2 and secondary events (i.e. 0 or <5) occurred among romosozumab users in four databases to estimate incidence rates. In Germany, MACE-2 incidence for romosozumab was 15.7 (95% CI: 6.3–32.4) vs. 28.2 (26.7–29.8) per 1,000 person-years for alendronate. In matched cohorts (1,763 romosozumab vs. 4,671 alendronate users), meta-analysis showed HR of 0.57 (95% CI: 0.31–1.03) for MACE-2. Majority of MACE-2 composite outcomes were all-cause mortality, and secondary outcomes (MI and stroke) could not be compared due to low numbers in romosozumab users.
Conclusions: Current interim data has not identified any clear difference in MACE-2 events between romosozumab and alendronate in European practice, though low number of events limit certainty. Final results with more data are expected next year for definitive conclusions.
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TRM: None to declare.
MTSS: Received consultancy fees from Theramex, but none were related to this study.
EHT: None to declare.
CR: Medical consultant for Lilly.
MFR: None to declare.
JR: JR is working at an independent, non-profit research institute, the Leibniz Institute for Prevention Research and Epidemiology – BIPS.

This post-authorization safety study (PASS) was requested by EMA who required that UCB financed the study. Unrelated to this study, BIPS occasionally conducts studies financed by the pharmaceutical industry. These are post-authorization safety studies (PASS) requested by health authorities. The design and conduct of these studies as well as the interpretation and publication are not influenced by the pharmaceutical industry and performed in line with the ENCePP Code of Conduct.
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PB: Employee of UCB.
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CLINICAL ASPECTS OF DYSMORPHOGENETIC SYNDROMES: THE RESEARCH OF PHENOTYPES OF STUDENTS

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Purpose: Genetic variations in the process of morphogenesis and development of connective tissue (CT) entail functional and structural abnormalities, namely connective tissue dysplasia (CTD), which necessitates the study of phenotypic markers of CTD.
Methods: The phenotypic marker of CTD is hypermobility syndrome (HMS) caused by an autosomal dominant type of inheritance. The HMS assessment was carried out on the Beighton score (9 points). The degree of hypermobility was classified as generalized (GHM, 9 points), severe (SHM, 5–8 points) or mild (MHM, 3–4 points). Joint hypermobility syndrome (JHS) itself was diagnosed in the presence of one or more of the following clinical markers: passive little finger bending backward >90°, thumb touching the forearm, elbows/knees bending backward>10°, and the ability to reach the floor with the palms of the hands when bending with straight legs. The obtained results were processed using mathematical statistics methods in the Excel program. The Student's t-test was used to assess the reliability of the data obtained.
Results: The results of the observations showed that signs of CTD were detected in 60% (n=63) of the participants, while the average number of signs observed in one person was 3.17±0.52.
63 students participated in the survey. 39 different types of CTD were identified, localized in various anatomical and topographic areas of the body. The identified symptoms were classified into two groups: major (joint hypermobility (JHM), skin hyperelasticity, chest deformity, and others) and minor (microanomalia). The analysis showed that of the students with CTD (n=63), the major signs were found in only 25 participants, 38 had only minor signs.
Conclusion: The results obtained emphasize the wide polymorphism of the phenotypic manifestations of CTD. A combination of various malformations, such as malformations of the heart, deformities of the chest and back, curvature, long trunk, arachnodactylia, striae and platypodia, with joint hypermobility (JHM), was revealed.

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DENOSUMAB FOR THE TREATMENT OF OSTEOPOROSIS IN HONG KONG CHINESE WOMEN: COMPLIANCE, EFFICACY AND ADVERSE EVENTS

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Objectives
To study the followings for denosumab in treating Chinese women with osteoporosis:

- Efficacy in increasing bone mineral density
- Compliance to treatment
- Adverse events

Material and methods
Six hundred and fifty-five postmenopausal women with osteoporosis or osteopenia with major risk factors, or fracture history were recruited. Subjects were treated by Denosumab injection every 6 months. Bone mineral density (BMD) was measured by Dual X-Ray densitometry (DEXA). Subjects were followed up for 5 years.

Results
A total of 655 subjects were recruited in the whole study for compliance, and 283 subjects participated in the DEXA study. The BMD increase is shown in the table. The percentage increase was comparable to international trials e.g. The Freedom Study. The compliance dropped quite rapidly and was 49% for the fifth injection; and 15% for the 11 injections.
No osteoporosis of the jaw nor atypical femoral fracture were observed. One patient developed skin reaction which led to discontinuation of treatment.

Conclusion
Denosumab is a safe and efficacious drug for treating osteoporosis in Chinese women. Efforts should be made to increase long term compliance.
Percentage change (mean±SD) in BMD at the total hip and total spine

	1st year 6 months after 2nd injection (N=283)	3rd year 6 months after 6th injection (N=144)	5th year 6 months after 10th injection (N=63)
Total hip BMD (gm/cm^2)	0.730±0.094	0.738±0.098	0.736±0.096
Percentage change from baseline	2.69±2.55	4.90±3.20	6.99±3.68
Total spine BMD (gm/cm^2)	0.832±0.100	0.838±0.091	0.860±0.091
Percentage change from baseline	4.33±4.18	7.20±5.31	10.08±7.09

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FROM MORTALITY TO DISABILITY: THREE DECADES OF CHANGING BURDEN OF RHEUMATOID ARTHRITIS IN ECUADOR

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Rheumatoid arthritis (RA) is a significant cause of chronic disability and global health burden. In Ecuador, longitudinal information on the evolution of the burden of RA is limited, which hinders the planning of specialized services and evidence-based health policies.

Objectives

Describe temporal changes in mortality, incidence, prevalence, and disability-adjusted life years (DALYs) due to RA in adults ≥35 years of age in Ecuador between 1990 and 2021, evaluating age-standardized rates and trends using Joinpoint models.

Materials and methods

Data from the Global Burden of Disease 2021 for Ecuador were analyzed. Absolute numbers and age-standardized rates of mortality (ASDR), incidence (ASIR), prevalence (ASPR), and DALYs (ASYR) were estimated, stratified by sex. Temporal trends were evaluated using Joinpoint models.

Results

Between 1990 and 2021, in Ecuador, the incidence increased from 507.1 to 2,277.2 per 100,000 inhabitants, and the prevalence from 9,151.3 to 43,294.2 per 100,000. DALYs increased from 2,040.4 to 7,323.4 per 100,000, while absolute mortality doubled from 45.5 to 101.0 per 100,000. In contrast, the ASDR decreased from 1.2 to 0.8 per 100,000. The ASIR and ASPR increased from 12.5 to 19.4 and from 199.9 to 328.6 per 100,000, respectively.

The Joinpoint models showed a significant increase in incidence (AAPC 1.33%) and prevalence (AAPC 1.48%), a decrease in mortality (AAPC −3.21%), and a slight reduction in ASYR (AAPC −0.77%).

Table 1. Age-standardized rate* of mortality, incidence, prevalence, and DALYs for rheumatoid arthritis (≥35 years) 1990–2021)

Year	1990				2021			
	ASDR	ASIR	ASPR	ASYR	ASDR	ASIR	ASPR	ASYR
Both	1.2 (1.3–1.1)	12.5 (13.7–11.3)	199.9 (226.9–176.8)	47.0 (57.4–38.3)	0.8 (0.9–0.6)	19.4 (21.4–17.7)	328.6 (368.9–290.4)	55.8 (72.5–41.1)
Men	1.0 (1.0–0.9)	6.24 (6.95–5.57)	94.7 (110.7–80.7)	29.3 (34.6–24.9)	0.4 (0.5–0.3)	9.38 (10.50–8.31)	148.7 (174.0–126.9)	25.4 (34.7–18.7)
Women	1.4 (1.5–1.2)	18.4 (20.3–16.7)	301.3 (340.9–264.6)	64.1 (79.5–50.4)	1.1 (1.3–0.9)	28.9 (31.9–26.2)	495.7 (556.2–439.1)	83.6 (108.3–61.4)

*per 100,000 persons (95% CI); ASDR, age-standardized mortality rate; ASIR, age-standardized incidence rate; ASPR, age-standardized prevalence rate; ASYR, age-standardized DALY rate.

Conclusions

In Ecuador, between 1990 and 2021, RA showed an epidemiological transition characterized by a sustained decrease in ASDR, a persistent increase in incidence and prevalence, and a relative stabilization of the burden of disability, with a disproportionately greater impact on women.

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SEX- AND DISTRIBUTION-SPECIFIC PROSPECTIVE MUSCLE-FAT-FRACTURE RELATIONSHIPS IN UK BIOBANK

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Objectives

We aimed to quantify the prospective associations between site-specific MRIderived fat and muscle volumes and incident fracture in the UK Biobank Imaging Study.

Materials and Methods

We analysed data from UK Biobank Imaging Study participants with MRIderived visceral adipose tissue volume (VAT), abdominal subcutaneous adipose tissue volume (ASAT) and thigh muscle volume (TMV) as exposures. The primary outcome was first osteoporotic fracture, ascertained via hospital record linkage. Cox proportional hazards models were used to estimate hazard ratios (HRs) per standard deviation (SD) increase in each exposure, adjusting for age, socioeconomic deprivation, smoking, exercise, diabetes, and prior fracture. Femoral neck bone mineral density (BMD) adjustments were applied in sensitivity analyses. Participants were followed until first osteoporotic fracture, death, loss to followup or 31 March 2023.

Results

The dataset comprised 50,151 participants (mean age: women 63.7 years; men 65.1 years) with MRI data. 806 incident osteoporotic fractures occurred during a total 223,069 person-years follow-up time. In fully adjusted models, higher ASAT was consistently associated with lower fracture risk in both sexes [women HR/SD(95%CI): 0.67(0.60–0.74); men 0.79(0.67–0.93)], with similar findings for VAT [women 0.67(0.59-0.75); men 0.82(0.71-0.95)]. These associations remained robust after adjustment for BMD, except for VAT in men. Greater TMV was associated with lower fracture risk in women [0.74(0.64-0.86)] but this relationship was substantially attenuated by adjustment for BMD [0.92(0.78-1.08)], and there was no evidence of an association in men [1.03(0.83-1.28)].

Conclusions

Greater fat volume in subcutaneous or visceral compartments was protective against incident osteoporotic fracture in both sexes, as was

greater thigh muscle volume in women, but not men. Associations between incident fracture and visceral adipose tissue (men) or thigh muscle (women) volume appeared BMD-dependent. These findings inform fracture risk assessment and biological understanding of body composition in skeletal health. (UK Biobank access application 3593).

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OSTEOPOROSIS AND QUALITY OF LIFE

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Objective Describe the impact on quality of life in a patient with a recent diagnosis of osteoporosis.

Materials and Methods Description of a clinical case

Results
An 85-year-old patient, with a single personal history of high blood pressure, with a very good quality of life, who attended a rehabilitation consultation for low back pain with irradiation to the left hip for 3 days, sudden onset when getting up. On physical examination, the spine stands out: no pain on palpation of the spinous processes, no palpable trigger points. Limited joint balance from the beginning of all routes. In the left hip there are no inflammatory signs, pain on palpation in the inguinal ligament, limited joint balance in all areas due to pain. Impossibility to walk.In the plain radiograph, degenerative changes with spondylosis deformans, osteophytes and syndesmophytes were observed in the lumbar spine, without apparent signs of fracture. The MRI also shows a L1 fracture that affects the superior plate with extension to both the anterior and posterior walls, without significant displacement with minimal decrease in the height of the vertebral body. Associated bone edema. Bone densitometry shows T-score 1.1 in the spine and T-score 3.0 in the femoral neck. Given the results of the analgesic treatment regimen with Tramadol, treatment with Denosumab and Calcium was initiated. After a month of rest and treatment, the patient has gone from pain of 10 points on the VAS to 2 and has been able to restart walking without assistance.

Conclusion
Osteoporosis can cause fractures without requiring impact, so it can seriously affect the quality of life of patients.

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IMPORTANCE OF USING FRAX IN DAILY CONSULTATION

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Objective Describe the importance of using the Frax Scale in daily consultation in patients with previous fractures.

Materials and Methods
Description of a clinical case.

Results
2-year-old patient who came for evaluation for osteoporosis screening derived from the Traumatology Service after a D8, L1-L4 fracture after an accidental fall. The patient reports that more than 10 years ago she had a fracture of the left ulna and radius after a fall from her own height, which followed orthopedic treatment with a cast. He has never had a diagnosis or previous treatment for osteoporpsis. During the consultation, a DEXA was requested with femoral T-score -3.0 and right forearm T-score -2.9. The fracture risk (FRAX) is calculated. Weighing 80Kg, height 160cm, BMI 31.2. Previous osteoporotic fracture, tobacco consumption 30 cig/day. Total Frax after fracture with DEXA 25.

Conclusion The patient is at high risk of fracture. The parameters of the FRAX calculation have not changed in recent years, so if it had been calculated from the first fracture, osteoporosis would have been diagnosed and with appropriate treatment, the following could have been reduced or avoided.

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MENTAL HEALTH IN HIGHER EDUCATIONAL STUDENTS

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Introduction: Despite the perception that Health related students [Medical - Physiotherapy and Nursing students] should be "stealth" in mental health, challenges are common in this population. These students have low levels of help seeking their own psychiatric problems often only presenting to mental health services once a crisis arises.

Material and Methods: We set out to investigate "Health students" mental health. The questionnaire consisted of the Hospital Anxiety and Depression scale (HADS) and the Sense of Coherence scale (SOC-3) questionnaires, evaluation of suicidal risk, self-rated health status (SRHS).

Results: Among 145 students who completed the survey, the prevalence of clinically relevant anxiety was high (42.5%) and contrasted with the lower prevalence of depression (10.33%). 17.5% of all students admitted that they had thought about suicide at least once during their lifetime and a similar number of students thought about suicide during the previous year. High levels of anxiety and depression were statistically significant predictors of suicidal ideation and planning during the past year in binary regression models.

Conclusions: Fear of exposure to stigmatisation is a crucial factor contributing to symptom concealment and is a barrier to accessing mental health services. Our study highlights anxiety and suicidality to be burdensome mental health issues among higher education students [Medical - Physiotherapy and Nursing students] in Greece.

Keywords: Mental health, Anxiety and Depression, Medical students, Physiotherapy students

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PREVALENCE OF PATIENT SELF-REPORTED FRACTURE RISK FACTORS – PRELIMINARY ANALYSIS OF A DIGITAL STUDY IN THE PRIMARY CARE SETTING (THE SELF-FRAX STUDY)

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Objective: The SELF-FRAX study aims to explore the concordance between patient self-reported risk factors and risk factor documentation within the GP electronic patient record (EPR) with the hope of enhancing and automating fracture risk assessments in primary care to improve treatment access. The aim of the current analysis is to describe recruitment and present the prevalence of self-reported risk factors.
Materials and Methods: Across England, a total of 181 GP practices using SystmOne EPR software were recruited through the NIHR Research Delivery Network. Eligible patients within each GP practices were identified and 500 were randomly approached comprising 125 in each of four groups (men: 50-65 years, >65 years; women 50-65 years, >65 years). Patients were invited to participate via a GP practice-generated SMS message containing a URL directing them to study information, an e-consent form and an online questionnaire including the FRAX risk factors. Paper forms were available to patients without an active mobile phone number or by request.
Results: Approximately 90,500 patients were approached and 5707 questionnaire responses (99% digital) collected (response rate 6.3%). Participation rate was greater in women than in men (8.1% vs 4.5%) with a lower mean age in women than in men (64.3 vs. 67.4 years, p<0.001). Risk factor prevalence was highest for previous fracture (similar in women 39.1% and men 40.6%) and lowest for current smoking (similar in women 5.6% and men 4.7%). The prevalence of most FRAX risk factors was similar in men and women, but women reported a slightly higher prevalence of parental hip fracture (16.5% vs 12.7%, p<0.001) but a lower prevalence of alcohol intake of 3 or more units daily (6.6% vs. 16.4%, p<0.001).
Conclusions: Despite a relatively low response rate, SELF-FRAX is one of the few studies to compare self-reported rates of risk factors in men and women in UK primary care. The prevalences are comparable to those reported in other studies in women. Further analysis will determine the concordance with risk factors in the EPR and determine whether a combination of patient self-reported and EHR data may permit enhanced risk assessment and intervention to mitigate future fracture risk.

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IMPACT OF POST-HIP FRACTURE ANTI-OSTEOPOROTIC THERAPY ON MORTALITY: A REAL-WORLD STUDY

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Objectives:

• To evaluate the impact of post-hip fracture anti-osteoporotic therapy and calcium/vitamin D supplementation on mortality.

• To assess the association between the type of anti-osteoporotic agent and mortality.

• To assess whether the implementation of a fracture unit coordinated by a bone metabolism expert would be beneficial.

Methods:
A retrospective observational study was conducted at Hospital Santa Lucía, including patients with osteoporotic hip fractures between January 2017 and January 2023. Statistical analysis was performed using SPSSv21.
Results:
1068 patients were included. 22.2% had a previous osteoporotic fracture. Only 2.6% had received osteoporosis-specific treatment before the fracture. Post-hip fracture, osteoporosis treatment was prescribed in 20.4% of patients and 41.3% received calcium/vitamin D supplementation.
A significant association was found between post-hip fracture osteoporosis treatment and reduced mortality ($p = 0.04$). Patients not receiving anti-osteoporotic therapy had a mortality rate of 49.1%, while those treated had a significantly lower rate of 23.85% ($p = 0.04$).
Stratified by anti-osteoporotic regimen, mortality were 24.8% for denosumab, 22.7% for bisphosphonates, and 14.28% for teriparatide. Standardized residual analysis revealed that survival was significantly higher in patients treated with bisphosphonates (residual = 2.2) and, particularly, denosumab (residual = 4.8), ($p = 0.004$). Calcium/vitamin D supplementation post-fracture also showed a significant association with lower mortality ($p = 0.033$). Patients followed by a bone metabolism expert had a significantly lower mortality rate compared to those without follow-up ($p < 0.005$).
Conclusions:
Our data shows a significant reduction in mortality in patients receiving anti-osteoporotic treatment and calcium/vitamin D supplementation. Denosumab showed the lowest mortality. Despite these findings, fewer than 25% of patients received post-fracture osteoporosis treatment. Mortality was also lower in patients followed by a bone metabolism expert, showing the benefits of specialized osteoporosis management. These results support the potential advantages of implementing a fracture unit coordinated by a bone metabolism expert.

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MEDICATION-RELATED OSTEONECROSIS OF THE JAW: THE IMPACT OF THERAPY INDICATION

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OBJECTIVE
To analyse which drugs are associated with the development of medication-related osteonecrosis of the jaw (MRONJ).
METHODS
A retrospective observational study was conducted at Hospital Santa Lucía, including diagnosed of MRONJ between 2015 to 2025.
RESULTS
We recollected 34 individuals with MRONJ. 55,9% were women. The average age was 69 +- 13.2 years. Of these patients 52,9% were hypertensive, 23,5% diabetic and 8,8% had stage 3-4 chronic kidney disease. 58,8% of the individuals had an underlying oncological disease and 5,9% had a rheumatological disease. Of all people, 26,5% had previously had an invasive dental procedure.
At the time of MRONJ diagnosis, 100% of the individuals were being treated with antiresorptive drugs: 64,7% with bisphosphonates (BF) and 35,3% with denosumab. Of those on BF therapy, 59,1% were on intravenous bisphosphonates. These treatments were indicated as oncological treatment in 57,1% of cases, while only 39,3% were used as anti-osteoporotic treatment.
In the oncology indication group, 57,8% of the MRONJ cases were due to the use of zoledronate, while in the anti-osteoporotic indication group only 8,3% of the MRONJ. In patients treated for osteoporosis, zoledronic acid showed a significant negative standardized residual (−3.1), indicating a lower than expected frequency of MRONJ. In oncological indications, zoledronic acid exhibited a significant positive standardized residual (+3.5), reflecting a higher than expected frequency ($p=0.01$).
In the anti-osteoporotic indication group the 57,8% of the patients with MRONJ were on oral BF therapy and 28,57% with denosumab.
CONCLUSIONS
The drug most associated with the development of MRONJ in our sample of patients was zoledronic acid, being the development of this entity much more frequent when it is administered as an oncological treatment. Therefore, it could be hypothesised that the risk of MRONJ does not depend so much on the drug as on the indication and administration schedule, but more studies are needed to clarify the association.
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ARTHROSCOPIC SYNOVECTOMY IN DIFFUSE-TYPE TENOSYNOVIAL GIANT CELL TUMOR OF THE KNEE USING MODIFIED POSTERIOR PORTALS

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Introduction: Diffuse-type tenosynovial giant cell tumor (DT-TGCT) of the knee is a locally aggressive disease associated with pain, functional limitation, and a high risk of recurrence. Complete synovectomy is technically demanding, especially in the posterior compartments and in cases with extra-articular extension.
The aim of this study was to evaluate mid-term clinical outcomes, recurrence rate, and complications of arthroscopic synovectomy for diffuse-type TGCT of the knee using a system of modified posterior arthroscopic portals as part of a combined treatment strategy.
Methods: Twenty-seven patients with histologically confirmed DT-TGCT of the knee underwent arthroscopic synovectomy. A systematic arthroscopic technique was applied, including resection of pathological synovium from anterior and posterior compartments. Modified posterior portals were used: upper and lower posterolateral portals, upper and lower posteromedial portals, and an additional portal in the projection of a popliteal cyst when present. Pain was assessed using the Visual Analog Scale (VAS). All patients were referred for adjuvant radiotherapy. The follow-up period ranged from 1 to 4 years. Recurrence, complications, and revision surgeries were analyzed.
Results: Mean VAS pain score decreased from 7.0 preoperatively to 2.2

postoperatively. Local recurrence occurred in two patients (7.4%) and required revision surgery; both revisions were successfully performed arthroscopically. In both cases, recurrence was associated with insufficient preoperative assessment, resulting in residual tumor nodules within a popliteal cyst in one patient and beneath the lateral meniscus in the other. One patient developed a postoperative popliteal artery aneurysm requiring surgical treatment in a vascular surgery department. Conclusion: Arthroscopic synovectomy using modified posterior portals combined with adjuvant radiotherapy provides significant pain relief and satisfactory mid-term outcomes in patients with diffuse-type TGCT of the knee. Careful preoperative planning and thorough assessment of posterior and extra-articular tumor involvement are essential to minimize recurrence and vascular complications.

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A NOVEL COMBINED DOUBLE-BUNDLE ACL RECONSTRUCTION USING A MODIFIED QUADRICEPS TENDON GRAFT

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Introduction: Despite numerous techniques for anterior cruciate ligament (ACL) reconstruction, achieving optimal rotational stability while preserving synergistic structures remains challenging. Double-bundle reconstruction improves knee kinematics, while combined ACL and anterolateral procedures enhance rotational control. However, most techniques rely on hamstring grafts, potentially compromising important dynamic stabilizers of the knee.

The aim of this study was to describe a novel combined ACL reconstruction technique that integrates a double-bundle concept, a modified quadriceps tendon graft, and an anterolateral stabilization component while preserving hamstring integrity.

Methods: The technique is based on harvesting a quadriceps tendon graft with a bone block and an extended superficial tendon flap using a minimally invasive approach. The graft is prepared to form two functional bundles suitable for double-bundle reconstruction. A single tibial tunnel is created, and the bone block is fixed with an interference screw. On the femoral side, two independent tunnels are drilled for the anteromedial and posterolateral bundles. The anteromedial bundle is fixed using a cortical suspension device, while the posterolateral bundle is passed transosseously and fixed with an interference screw. The free graft end is then routed along the lateral aspect of the knee toward Gerdy's tubercle and fixed to the tibia, providing additional anterolateral stabilization.

Results: This technique allows preservation of all hamstring tendons, maintaining the integrity of ACL synergists. The combined approach provides enhanced anterior and rotational knee stability while minimizing donor-site morbidity.

Conclusion: The proposed method is reproducible and anatomically, combining several established surgical principles into a single comprehensive reconstruction strategy. Further clinical studies are required to evaluate long-term outcomes and biomechanical advantages

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COMPLICATIONS AND STABILITY AFTER BONY INCREASED OFFSET REVERSE SHOULDER ARTHROPLASTY: RHEUMATOID ARTHRITIS VERSUS OSTEOARTHRITIS

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Background. Reverse shoulder arthroplasty with bony increased offset (BIO-RSA) is widely used to improve shoulder stability and range of motion. However, the influence of underlying joint pathology on postoperative complications and implant stability remains unclear, particularly in patients with inflammatory diseases and compromised bone quality.

Purpose. To compare complication rates and postoperative stability after BIO-RSA in patients with rheumatoid arthritis (RA) and osteoarthritis (OA).

Methods. A retrospective cohort study included 50 patients who underwent BIO-RSA. Thirty-two patients were diagnosed with rheumatoid arthritis, and eighteen patients had primary osteoarthritis. Osteoporosis was present in all patients. In both groups, BIO-RSA with glenoid bone grafting was performed according to standard technique. All patients received preoperative subacromial glucocorticosteroid injections. Postoperative assessment focused on complications, including dislocation and periprosthetic humeral fractures, as well as radiographic evaluation of graft integration.

Results. Bone graft integration was achieved in all patients, regardless of diagnosis. Postoperative dislocation occurred more frequently in the osteoarthritis group (three cases) compared to the rheumatoid arthritis group (one case). Periprosthetic humeral fractures were observed in two patients in each group. No cases of graft resorption or loosening were identified during follow-up. Despite the presence of systemic inflammatory disease and osteoporosis, patients with rheumatoid arthritis did not demonstrate a higher risk of instability.

Conclusion. BIO-RSA provides reliable stability and acceptable complication rates in both rheumatoid arthritis and osteoarthritis. Rheumatoid arthritis was not associated with an increased risk of postoperative instability compared to osteoarthritis. These findings suggest that underlying inflammatory pathology alone should not be considered a negative prognostic factor for BIO-RSA outcomes.

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OPERATIVE TREATMENT OF HAND AND WRIST OSTEOARTHRITIS: A SYSTEMATISED REVIEW

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OBJECTIVES: This study aimed to the collection and critical appraisal of representative data on the surgical management of hand and wrist osteoarthritis (OA) to accentuate the paucity of evidence supporting the underlying decision-making process.**MATERIAL AND METHODS:**A meticulous literature survey from inception to 26/01/2026 was conducted in PubMed,Cochrane Library,PubMed Central (PMC),UpToDate and Google Scholar using the search terms:"hand";"1st CMC";"finger joint";and "wrist",each coupled with:"osteoarthritis";"operative treatment";and "surgical management".Screening of Titles and Abstracts,subsequent screening of entire Articles, and duplicate removal were performed by the Author.All accessible full-text articles in English,German and French regarding the operative treatment of hand and wrist OA were included.**RESULTS:**Depending on disease stage;physician training,professional experience and preferences;individual-patient requirements and expectations;and healthcare-system limitations,hand and wrist OA can be surgically managed by means of arthroscopic debridement;reconstruction,interposition,haematoma and distraction,or excision arthroplasty;partial or complete arthrodesis;and finger and wrist denervation.Arthroscopic debridement is presumably reserved for mildly to moderately symptomatic patients,whereas arthroplasty,arthrodesis,and denervation are generally employed in more advanced cases of hand and wrist OA;however,in practice this rule is not always adhered to.Moreover,the aforesaid procedures are often used in combination.In addition,patient satisfaction from the operative treatment of hand and wrist OA is influenced by many factors besides the outcome of the surgery per se.Lastly,disease- and/or procedure-specific patient reported outcome measures (PROMs) for the postoperative evaluation of such patients are currently lacking.**CONCLUSIONS:**Arthroscopic debridement;arthroplasty;arthrodesis;denervation of the finger and wrist joints;and combinations thereof are reportedly used in the surgical management of hand and wrist OA.High-quality clinical trials and appropriate PROMs are required to establish evidence-based guidelines for a standardised application of the aforementioned methods by the treating physicians.

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OBESITY PARADOX REVISITED: THE ROLE OF MUSCLE IN THE LINK BETWEEN BODY COMPOSITION AND DEPRESSION IN AGING

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Introduction:
Depression is a common geriatric syndrome associated with negative outcomes such as lower quality of life and cognitive decline. Current evidence suggests associations between depression and both sarcopenia and obesity, yet the body composition phenotype most strongly linked to depression remains unclear. This study aimed to examine the relationship between different body composition phenotypes and depression in older adults.

Methodology:
This cross-sectional study included outpatients aged ≥60 years who underwent comprehensive geriatric assessment between 2012–2024 at a university hospital. Depression was defined as a score ≥14 on the Yesavage Geriatric Depression Scale. Handgrip strength was measured using a hydraulic dynamometer. Body composition was evaluated via bioelectrical impedance analysis. Sarcopenia was defined according to EWGSOP2 criteria (low muscle strength and mass), and obesity as increased fat percentage. Sarcopenic obesity was defined per ESPEN/EASO consensus as low strength + low muscle mass + high fat percentage. Cut-offs were adjusted for sex and population(1,2). Participants were categorized into four phenotypes: non-sarcopenia non-obesity (reference), sarcopenia-only, sarcopenic obesity, and obesity-only. Univariable and multivariable analyses were used to assess associations with depression.

Results:
A total of 590 patients(median age 74, 68.6% female) were included. Depressive mood was present in 201 (34.1%) of them. Among them, phenotype distribution was: reference 50.5%, sarcopenia-only 16.0%, sarcopenic obesity 14.0%, and obesity-only 19.5% (p = 0.007). The significant difference arose from obesity-only group, where depression was less common. After adjusting for confounders, obesity-only (non-sarcopenic) group had significantly lower odds of depression (OR = 0.483, 95% CI: 0.299–0.780, p = 0.003)(Table 1).

Table-1: Results of multivariable regression analysis: Association of body composition phenotypes with depressive mood.

	Depressive mood present OR (%95 CI)	*p* value
Body phenotypes		
Non-sarcopenic non-obese	Reference	
Sarcopenia-only	0.757 (0.414-1.384)	0.757
Sarcopenic obesity	0.700 (0.372-1.319)	0.270
Obesity-only	0.483 (0.299-0.780)	0.003

Note: Model was adjusted for *age, sex, education level, cognitive impairment, frailty, history of falls,* and *polypharmacy.*

Discussion:
Our study expands the scope of the obesity paradox in older adults, suggesting that this entity may only be valid in the presence of adequate muscle reserves. Large-scale longitudinal studies are needed to confirm these findings.

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P540

CUMULATIVE RISK OF MALNUTRITION, FRAILTY AND PROBABLE SARCOPENIA AS AN INDEPENDENT PREDICTOR OF FALLS IN OLDER ADULTS

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Background: Malnutrition, frailty, and probable sarcopenia are closely interrelated and individually associated with falls, however, they are generally assessed as separate entities in routine geriatric practice. The extent to which their coexistence confers an incremental risk beyond single-condition assessment remains unclear. Evaluating their cumulative burden may therefore provide clinically relevant information for fall risk stratification, particularly in outpatient settings where early identification of high-risk individuals is crucial.

Methods:

Patients who admitted to a geriatric outpatient clinic of a university hospital, aged 65 years and older, were recruited to this cross-sectional study. They were evaluated for the presence of geriatric syndromes such as malnutrition, frailty, sarcopenia, cognitive impairment (MMSE < 24), depression (GDS-full form ≥ 11), polypharmacy (≥5 medications), urinary incontinence, visual problems. Malnutrition risk was assessed using the Mini Nutritional Assessment–Short Form (MNA-SF ≤ 11), frailty using the FRAIL Scale (≥3), and probable sarcopenia according to EWGSOP2 criteria (low muscle strength). Population and sex-specific thresholds were used for sarcopenia (F<20, M<35). A cumulative score (range 0–3) was constructed by assigning one point for each condition. Additionally 0, 1 points were defined as low risk and 2, 3 points were defined as high risk. The primary outcome was self-reported fall within the past year. Logistic regression models were adjusted for age, sex, and body mass index (BMI), and subsequently for all other geriatric syndromes.

Results:

This study included 1,219 adults aged ≥65 years (mean age 75.5 ± 6.8 years; 68.3% female). Fall incidence was found as 40.3%. Frailty, malnutrition, probable sarcopenia were found to be in 19.8%, 26.9% and 42.2% of the study population, respectively. Despite conceptual overlap, no significant multicollinearity was established between the three conditions. Presence of each of frailty, sarcopenia and malnutrition increased the risk of falls with OR 1.785 (95% CI, 1.33-2.395; p=<0.001), OR 1.503 (95% CI, 1.16-1.948; p=0.002), OR 1.943 (95% CL, 1.484-2.545; p=<0.001), respectively (adjusted for age, sex and BMI). High cumulative risk (2–3 points) was independently associated with a significantly increased risk of falling (OR 1.61, 95% CI 1.00–2.57; p=0.049) after adjustment for cognitive impairment, depressive symptoms, polypharmacy, urinary incontinence, visual problems, age, sex, and BMI. A dose–response pattern persisted: compared with 0 point, the odds of falling increased stepwise (1 point: OR 1.35; 2 points: OR 1.71; 3 points: OR 2.47), although full adjustment attenuated statistical significance.

Conclusions:

The cumulative burden of malnutrition, frailty, and probable sarcopenia is an independent predictor of falls. Simple integrated geriatric assessment may enhance fall and fracture risk identification in routine outpatient care.

P541

MUCOPOLYSACCHARIDOSIS AS A RISK FACTOR FOR OSTEOPOROSIS

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Object: To evaluate Mucopolysaccharidosis as a risk factor for osteoporosis.

Mucopolysaccharidosis (MPS) are a group of metabolic disorders caused by the lack or dysfunction of lysosomal enzymes, necessary to break down molecules called glycosaminoglycans (GAGs). These long chains of sugar carbohydrates are found inside cells that help form bones, cartilage, tendons, cornea, skin and connective tissue. The incidence of the disease is very rare.

Material and methods: In total, 23 individuals diagnosed with MPS were included in the study, a retrospective study. All individuals diagnosed through clinical examination, urinalysis (mucopolysaccharides excreted in urine), enzyme levels and genetic analysis. Based on clinical, laboratory and genetic examinations in the study group, the results were: MPS I (Hurler syndrome) 2 patients, MPS III (Sanphilippo syndrome) 2 patients, MPS IV (Morquio syndrome) 10 patients, MPS VI (Maroteaux-Lamu syndrome) 6 patients, MPS VII (Sly syndrome) 2 patients, MPS IX (Natowicz syndrome) 1 patient. All patients had their bone density (DXA) assessed using the T-score value in the lumbar and coxofemoral regions.

Results: The mean age of the study group was 18±5.4 years. The highest incidence of MPS was in groups IV and VI. DXA in the lumbar spine T-score was -2.3±1.9 and T-score in coxofemoral region was 2.5±1.6. From the DXA data, bone density resulted low in both regions, but the lowest density is in the coxofemoral region. DXA in the group with the highest incidence (IV, VI) resulted in a lumbar T-score of -2.5±1.2 and in the coxofemoral region, with a T-score of -2.8±0.9.

Conclusion: From the study data, it has resulted that the density is low in all patients with MPS. This shows that MPS as a metabolic disorder is a risk factor for low bone density. Despite the small number of patients studied, due to the low incidence of this disorder, it is noticed that bone density is lower in patients in groups IV and VI, who also present more advanced skeletal dysplasias.

P542

DEFINING REMISSION IN CHRONIC INFLAMMATORY RHEUMATISM: INSIGHTS FROM PATIENTS

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Introduction:

Differences between patient and physician perspectives on the definition of disease remission have been documented in chronic inflammatory rheumatism (CIR) (1). Such discrepancies may contribute to patient dissatisfaction and adversely affect treatment outcomes.

The objective of our survey was to explore patient perceptions of the comprehensive factors that determine remission of their disease.

Methods:
A crosssectional study was conducted among patients diagnosed with chronic inflammatory rheumatism (CIR), specifically rheumatoid arthritis (RA) or spondyloarthritis (SpA). A fivequestion questionnaire encompassing clinical, biological, and radiological determinants of remission was designed and administered to participants by telephone.
Results:
Our study included 56 patients with a mean age of 50.8 ± 13.5 years. The maletofemale ratio was 0.65. Sixtyeight percent of patients had rheumatoid arthritis (RA) and 35.7% had spondyloarthritis (SpA). The mean disease duration was 10.5 ± 7.4 years. Treatments at the time of the survey were: methotrexate monotherapy in 23.6%, methotrexate combined with a biologic in 27.3%, while 27.3% of patients were on biologic monotherapy.
In response to the questionnaire, only 32.1% of patients indicated awareness of the method their physician uses to evaluate disease activity, while 25.9% reported that their physician had previously explained this assessment approach. Most patients defined remission based on the following criteria: absence of pain or physical symptoms (84%), ability to resume all daily physical activities (93%), regained autonomy and absence of limitations (94.7%), normalization of biological and radiographic tests (69.6%), and reduction or discontinuation of current medication (64%).
Comparison of responses between the RA and SpA patient groups revealed a statistically significant difference in defining remission as the normalization of biological and radiographic tests (p=0.014). In contrast, no significant differences were noted for the remaining criteria: absence of pain or physical symptoms (p=0.105), ability to resume all daily physical activities (p=0.598), regained autonomy and absence of limitations (p=0.263), and reduction or discontinuation of medication (p=0.250).
Conclusion:
Remission was predominantly defined by patients based on the absence of pain, restoration of autonomy, and resumption of daily activities. In contrast, biological and radiological criteria were regarded as secondary in their perception. These findings underscore the need to incorporate patient perspectives to enable more patientcentered and satisfactory management.
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P543
CLINICAL PROFILES OF GERIATRICONSET SPONDYLOARTHRITIS

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Introduction:
Spondyloarthritis (SpA) predominantly affects younger individuals. However, cases in the geriatric population are increasingly reported, likely due to increased life expectancy. Lateonset SpA may present differently than early-onset forms. The objective of our study was to investigate the characteristics of this disease.
Methods:
A retrospective descriptive study spanning four years (20212024) was carried out, enrolling cases of geriatriconset spondyloarthritis (SpA) diagnosed at a Tunisian rheumatology unit. Patient sociodemographic, clinical, biological, and radiological data were systematically collected.
Results:
We recruited 22 patients with a mean age of 64.8 ± 9.2 years. The maletofemale ratio was 1.44. Sixtytwo percent of patients were illiterate, and 12.5% had attained secondarylevel education. Fortythree percent lived in rural areas. More than half (54.5%) had axial SpA, while 45.5% had both axial and peripheral involvement. Among the latter, 20% presented with axial onset, 40% with peripheral onset, and 40% with combined axial and peripheral onset at presentation. The mean age at diagnosis was 62 ± 10 years, with a diagnostic delay of 1.7 ± 2.8 years. Only one patient had associated inflammatory bowel disease, and one had cutaneous psoriasis. Uveitis was observed in two patients. Comorbidities including diabetes, hypertension, dyslipidemia, and osteoporosis were present in 18.2%, 31.8%, 22.7%, and 28.6% of cases, respectively. Only 4.5% reported a family history of SpA, and similarly 4.5% had a family history of psoriasis. Fortyone percent were smokers. Impaired general health was noted in 39% of patients. On clinical examination, sacroiliac pain was present in 68% of patients, while cervical and lumbar stiffness were reported in 71.4% and 86.4%, respectively. The mean BASDAI (Bath Ankylosing Spondylitis Disease Activity Index) score was 4.44 ± 2.12. Four patients (19%) had unilateral hip involvement on radiography, and one patient had bilateral hip involvement. The mean Creactive protein (CRP) level was 47.3 ± 46 mg/L. Regarding diseasemodifying treatment, 77.3% used nonsteroidal antiinflammatory drugs, 27% required a first biologic therapy, and 13.6% a second biologic therapy.
Conclusion:
The diagnosis of lateonset spondyloarthritis (SpA) can be difficult given the common occurrence of systemic features. Ensuring a correct diagnosis enables optimal patient care and therapeutic intervention.

P544
IMAGING-BASED EARLY DETECTION OF INFLAMMATORY BONE AND ENTHESEAL CHANGES IN PSORIATIC ARTHRITIS: IMPLICATIONS FOR OSTEOPOROSIS RISK

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Objectives:

To evaluate the diagnostic performance of musculoskeletal ultrasound (US) and magnetic resonance imaging (MRI) in detecting subclinical synovio-entheseal and inflammatory bone changes in patients with psoriasis and early psoriatic arthritis (PsA), and to explore their implications for early bone loss and secondary osteoporosis risk.
Material and Methods:

This prospective observational study included 214 patients with early PsA (≤24 months) and 136 psoriasis patients without arthritis (total n=350). The PsA group comprised 63.6% males, mean age 36.2±8.9 years, and the psoriasis-only group 60.3% males, mean age 35.1±9.4 years (p=0.42). All participants underwent standardized musculoskeletal US (gray-scale

and power Doppler) and MRI of peripheral and sacroiliac joints (STIR, T1-weighted), focusing on entheseal and bone marrow involvement. Imaging was compared with clinical assessment. Psoriasis-only patients were followed for 24 months. Statistical analyses included diagnostic accuracy measures, correlation analysis, multivariate logistic regression and ROC curves.

Results:

Imaging detected subclinical synovial, entheseal and inflammatory bone changes in 52.8% of psoriasis patients without clinical arthritis, compared with 18.6% identified by clinical examination alone (p<0.001). US showed high diagnostic accuracy for peripheral enthesitis (sensitivity 88.4%, specificity 82.1%), while MRI demonstrated superior detection of early axial and bone involvement, identifying active sacroiliitis and bone marrow edema in 31.7% of patients with normal radiographs. Power Doppler-positive enthesitis independently predicted progression to PsA (OR 4.62, 95% CI 2.01-10.63, p<0.001). MASEI correlated with clinical enthesitis scores (r=0.61, p<0.001), disease activity (DAPSA: r=0.58, p<0.001) and bone marrow edema. Combined US+MRI assessment showed excellent diagnostic performance (AUC 0.91, 95% CI 0.86-0.95).

Conclusions:

Advanced imaging reveals clinically occult inflammatory and bone-related changes in over half of psoriatic patients at risk for PsA. US reliably detects peripheral enthesitis, while MRI is crucial for identifying early axial disease and inflammatory bone involvement undetectable by conventional radiography. These findings support a link between inflammation-driven bone remodeling and increased risk of secondary osteoporosis and highlight the value of integrating US and MRI into early PsA diagnostic pathways.

P545

SEROLOGICAL AND GENETIC BIOMARKERS IN EARLY PSORIATIC ARTHRITIS: IMPLICATIONS FOR INFLAMMATORY BONE LOSS AND OSTEOPOROSIS RISK

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Objectives:

To evaluate the diagnostic and prognostic value of serological inflammatory markers and HLA class I genetic variants in early psoriatic arthritis (PsA), with particular emphasis on their associations with inflammatory bone involvement, early structural progression and potential risk of secondary osteoporosis.

Material and Methods:

A prospective observational study included 214 patients with early PsA (disease duration ≤24 months). The cohort comprised 136 males (63.6%) and 78 females (36.4%), with a mean age of 36.2±8.9 years. All patients underwent baseline assessment of serological inflammatory markers, including C-reactive protein (CRP), erythrocyte sedimentation rate (ESR) and serum calprotectin. Genetic profiling focused on HLA class I (HLA-B locus). Clinical phenotype and disease activity were evaluated using DAPSA, ASDAS-CRP, and validated enthesitis scores. Early structural damage and bone-related progression were assessed by conventional radiography at baseline and after 12 months. Statistical analysis included correlation analysis, multivariate logistic regression and receiver operating characteristic (ROC) curve analysis to evaluate diagnostic and prognostic performance of biomarkers.

Results:

HLA-B27 was present in 11.2% of patients and was independently associated with axial involvement (OR 3.74, 95% CI 1.62-8.64, p=0.002) and a higher enthesitis burden (MASES 8.3±2.1 vs 6.4±1.9, p<0.001), suggesting increased inflammatory stress at the bone-enthesis interface. In contrast, non-B27 HLA-B alleles (B*08, B*38, B*39) were significantly associated with peripheral and digital phenotypes, including dactylitis (OR 2.89, 95% CI 1.41-5.92, p=0.004).

Elevated CRP (>5 mg/L) was observed in 61.5% of patients and correlated with higher disease activity (DAPSA: r=0.62, p<0.001); however, 38.5% of patients with clinically active disease had normal CRP values. ESR demonstrated weaker correlations with activity (r=0.34, p=0.018).

Serum calprotectin was elevated in 68.4% of patients, particularly in polyarticular PsA, and showed strong correlations with swollen joint count (r=0.69, p<0.001), DAPSA (r=0.71, p<0.001) and radiographic progression at 12 months (β=0.48, p=0.003). Calprotectin demonstrated superior predictive accuracy for active disease and early structural progression (AUC 0.88, 95% CI 0.83-0.93) compared with CRP (AUC 0.74) and ESR (AUC 0.66).

Conclusions:

In early PsA, genetic background and inflammatory biomarkers are closely linked to disease phenotype, structural progression and inflammatory bone involvement. HLA-B27 is associated with axial disease and severe enthesitis, while non-B27 alleles favor peripheral phenotypes. Among serological markers, calprotectin outperforms conventional acute-phase reactants in reflecting disease activity and predicting early structural damage, supporting its role as a biomarker of inflammation-driven bone remodeling. These findings highlight the relevance of serological and genetic profiling for early identification of PsA patients at increased risk of secondary osteoporosis and skeletal fragility.

P546

EARLY CLINICAL MANIFESTATIONS AND COMPOSITE SCORES IN PSORIATIC ARTHRITIS: CLINICAL–IMAGING CORRELATES OF INFLAMMATORY BONE INVOLVEMENT AND OSTEOPOROSIS RISK

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Objectives:

To analyze the relationships between early clinical manifestations of psoriatic arthritis (PsA) and validated composite disease activity scores, with particular focus on entheseal and axial involvement as markers of inflammation-driven bone remodeling and potential risk of secondary osteoporosis.

Material and Methods:
This prospective observational study included 214 patients with early PsA (disease duration ≤24 months) and a control group of 126 patients with rheumatoid arthritis (RA). The PsA cohort comprised 136 males (63.6%) and 78 females (36.4%), with a mean age of 36.2±8.9 years, while the RA group included 79 females (62.7%) and 47 males (37.3%), mean age 38.1±9.6 years (p=0.18).
Key clinical manifestations assessed in PsA included dactylitis, enthesitis and inflammatory back pain. Disease activity was quantified using validated composite indices for peripheral and axial inflammation (DAPSA, ASDAS-CRP), clinical enthesitis scores (MASES, LEI) and ultrasound-based entheseal assessment (MASEI), reflecting inflammation at the bone–enthesis interface. Statistical analyses included group comparisons, correlation analysis, multivariate regression models and receiver operating characteristic (ROC) curve analysis.
Results:
Dactylitis was identified in 35.2% of early PsA patients and in 0% of RA controls (p<0.001), yielding a specificity of 100% and a positive likelihood ratio >10 for early PsA diagnosis. Clinical enthesitis was present in 92.6% of PsA patients compared with 18.4% of RA controls (OR 8.71, p<0.001), indicating a marked predominance of bone-enthesis involvement in PsA. Mean MASES scores were significantly higher in PsA (7.2±2.4) than in RA (0.9±0.6, p<0.001), while ultrasound-derived MASEI values demonstrated substantial separation between groups (51.3±5.1 vs 17.6±4.8, p<0.001). Peripheral and axial inflammatory activity showed strong interdependence, with robust correlations between DAPSA and ASDAS-CRP (r=0.74, p<0.001), suggesting parallel activation of inflammatory pathways affecting both joints and bone-related structures.
MASEI correlated significantly with MASES (r=0.61, p<0.001), DAPSA (r=0.58, p<0.001) and ASDAS-CRP (r=0.55, p<0.001), supporting the concept that entheseal inflammation reflects a systemic process influencing bone remodeling. Multivariate regression identified dactylitis (β=0.41, p<0.001) and MASEI ≥18 (β=0.46, p<0.001) as independent predictors of high disease activity. ROC analysis confirmed excellent discriminative performance for combined clinical–ultrasound criteria (AUC 0.92, 95% CI 0.88–0.96).
Conclusions:
Early PsA is characterized by a distinctive pattern of dactylitis and widespread entheseal involvement that closely correlates with composite measures of peripheral and axial disease activity. Given the central role of the enthesis-bone interface in PsA, these clinical-imaging correlations likely reflect inflammation-driven bone remodeling, potentially contributing to secondary osteoporosis. Integrating targeted clinical features with quantitative ultrasound-based entheseal assessment may improve early diagnosis of PsA while simultaneously identifying patients at increased risk of skeletal fragility.

P547
SARCOPENIA, SARCOPENIC OBESITY AND OSTEOPOROSIS IN PSORIATIC AND RHEUMATOID ARTHRITIS: BEYOND BODY MASS INDEX

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Objectives:
To assess the prevalence and clinical impact of sarcopenia and sarcopenic obesity on bone mineral density (BMD), disease activity and fracture risk in patients with psoriatic arthritis (PsA) and rheumatoid arthritis (RA).
Material and Methods:
A cross-sectional study included 86 patients with inflammatory arthritis, divided into PsA (n=44) and RA (n=42). The cohort comprised 57 women (66.3%) and 29 men (33.7%), with a mean age of 54.1±9.7 years and mean disease duration of 9.2±4.8 years.
Body composition was assessed using DXA, including appendicular lean mass index (ALMI) and fat mass index. Sarcopenia was defined according to EWGSOP2 criteria, while sarcopenic obesity was defined as low muscle mass combined with excess fat mass. BMD was measured at the lumbar spine and femoral neck. Disease activity was assessed using DAPSA (PsA) and DAS28-CRP (RA). Multivariate regression, mediation analysis and ROC curve analysis were applied.
Results:
Sarcopenia was identified in 24.4% of patients, while sarcopenic obesity was present in 19.8%, with higher prevalence in RA than PsA (26.2% vs 13.6%, p=0.04). Patients with sarcopenic obesity exhibited significantly lower femoral neck BMD compared with non-sarcopenic obese patients (-2.01±0.38 vs −1.28±0.31 T-score, p<0.001).
Appendicular lean mass correlated positively with lumbar spine BMD (r=0.52, p<0.001), whereas fat mass showed no protective effect after adjustment for inflammation. High disease activity was independently associated with reduced muscle mass (β=-0.41, p=0.002).
Multivariate models demonstrated that sarcopenic obesity was a stronger predictor of osteoporosis than BMI alone (OR 3.76, 95% CI 1.61-8.77, p=0.002). Mediation analysis revealed that muscle mass mediated 38% of the effect of inflammation on bone loss. ROC analysis showed superior predictive accuracy of combined ALMI and disease activity for osteoporosis (AUC 0.87, 95% CI 0.79-0.94) compared with BMI-based models (AUC 0.69).
Conclusions:
In psoriatic and rheumatoid arthritis, sarcopenia and sarcopenic obesity are prevalent and strongly associated with reduced bone mineral density, independent of body mass index. Loss of muscle mass represents a key mediator linking inflammation to osteoporosis. These findings emphasize the need to move beyond BMI and incorporate body composition assessment into routine evaluation of skeletal risk in inflammatory arthritis, supporting integrated strategies targeting inflammation, muscle preservation and bone health.

P548
ANTI-TNF–ASSOCIATED SEVERE HEART FAILURE IN ANKYLOSING SPONDYLITIS SUCCESSFULLY MANAGED BY SWITCHING TO SECUKINUMAB: A CASE REPORT

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Background
Tumor necrosis factor inhibitors (TNFi) are widely used in ankylosing spondylitis (AS); however, concerns remain regarding their potential association with new-onset or worsening heart failure. Evidence guiding optimal biologic switching strategies in this context is limited.
Case Presentation
A 48-year-old man was diagnosed with ankylosing spondylitis in December 2023 and was initiated on adalimumab therapy in May 2024. In October 2024, he presented with acute dyspnea and generalized edema

and was hospitalized. Evaluation revealed newly diagnosed severe heart failure with reduced ejection fraction (EF 22%) and concomitant acute kidney injury. There was no prior history of cardiac disease.

Adalimumab was discontinued due to concern for TNFi-associated cardiomyopathy, and the patient was treated with guideline-directed medical therapy for heart failure. Cardiac function gradually improved, with follow-up echocardiography in March 2025 demonstrating recovery of left ventricular systolic function (EF 53%). Given the need for continued control of inflammatory spinal disease, secukinumab was initiated as an alternative biologic agent. Following the switch, the patient remained clinically stable without recurrence of heart failure symptoms, and ankylosing spondylitis disease activity was well controlled.

Discussion

TNF inhibitors have been implicated in the development or exacerbation of heart failure, particularly in patients with reduced ejection fraction. This case highlights the importance of recognizing potential cardiac adverse events associated with TNFi therapy and supports the role of IL-17 inhibition as a safer alternative in patients with AS and heart failure. Careful cardiovascular monitoring and interdisciplinary management are essential in such cases.

Conclusion

This case underscores the potential risk of severe heart failure associated with adalimumab in ankylosing spondylitis and suggests that switching to secukinumab may be an effective and safer therapeutic strategy, with potential reversibility of TNFi-associated cardiomyopathy.

Figure 1. Anteroposterior pelvic radiograph demonstrating bilateral sacroiliitis, consistent with ankylosing spondylitis.



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POLYMYOSITIS PRESENTING AS ILIOPSOAS MUSCLE INFLAMMATION MIMICKING RHABDOMYOLYSIS AND INFECTION: A CASE REPORT

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Background

Inflammatory myopathies may present with atypical manifestations, occasionally mimicking infectious or metabolic muscle disorders. Imaging plays a crucial role in early diagnosis, particularly when conventional diagnostic tests are inconclusive.

Case Presentation

A 24-year-old man presented to the emergency department with acute abdominal pain and fever on April 18 and was admitted to the infectious disease service with suspicion of iliopsoas muscle rhabdomyolysis. Initial evaluation focused on infectious and metabolic causes.

Pelvic magnetic resonance imaging performed on April 29 revealed diffuse swelling and enhancement of the bilateral iliopsoas muscles, along with multiple patchy, cotton ball–like enhancing lesions in the bilateral gluteus, adductor, and paraspinal muscles. Diffuse peritoneal and retroperitoneal infiltration with fascial thickening was also observed. These findings raised suspicion for inflammatory myopathy, including polymyositis or dermatomyositis. No significant joint lesions were identified.

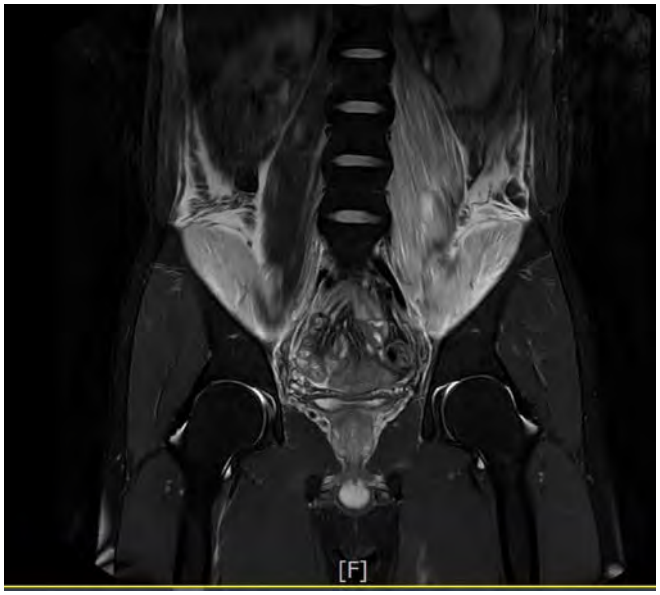
An iliopsoas muscle biopsy was performed on May 3, and the patient was subsequently transferred to the rheumatology service for further evaluation and management. Electromyography performed on May 4 showed no definitive evidence of myopathy. However, based on characteristic MRI findings, clinical features, and exclusion of infection, polymyositis was diagnosed.

Treatment was initiated with oral glucocorticoids at a dose of 0.5 mg/kg/day, followed by gradual tapering. Methotrexate was introduced as a steroid-sparing agent. The patient showed marked clinical improvement, and disease activity has remained well controlled on methotrexate monotherapy.

Conclusion

This case illustrates that polymyositis can present with acute systemic symptoms and imaging findings suggestive of rhabdomyolysis or infection. MRI can provide critical diagnostic clues even when electromyography is negative, enabling timely initiation of immunosuppressive therapy and favorable outcomes.

Figure 1. Coronal pelvic MRI demonstrating diffuse high signal intensity and swelling of the bilateral iliopsoas muscles with involvement of adjacent pelvic musculature, consistent with inflammatory myopathy.



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JUSTIFICATION OF THE EFFECTIVENESS OF SODIUM SELENITE FOR CORRECTING CHANGES IN THE MORPHOMETRIC PARAMETERS OF BONE REGENERATE CAUSED BY PROLONGED ADMINISTRATION OF TARTRAZINE

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Introduction: Tartrazine is a synthetic dye that is widely used in the food and pharmaceutical industries. It is known that tartrazine can cause DNA damage, induce the development of oxidative stress in cells, and lead to their apoptosis, but the issue of pharmacological correction of this effect remains poorly studied.

The aim of the study is to justify the effectiveness of sodium selenite as a corrector of adverse changes in the histological structure bone regenerate caused by prolonged administration of tartrazine.

Methods: In group I, white sexually mature male rats received a physiological solution intragastrically for 60 days, and on the 61st day, a fracture of the tibia was modeled by creating a through defect in the proximal metaphysis. In group II, under similar conditions, a tartrazine solution was administered at a dose of 750 mg/kg body weight, and in group III, sodium selenite was additionally administered intramuscularly at a dose of 40 mcg/kg body weight. Measurements of the morphometric parameters of the bone regenerate forming in the tibia were conducted on days 3, 10, 15, 24, and 45 after the operation using the computer program NDP.view2. Statistical processing of the data from the control and experimental groups was carried out in the «JASP» program.

Results: In animals of group II, a decrease in the area of woven bone and lamellar bone was observed by 36.69% and 53.72% on day 10, by 28.79% and 24.56% on day 15, by 24.13% and 22.00% on day 24 ($p<0.05$ in call cases), and by 9.92% ($p>0.05$) and 13.95% ($p<0.05$) on day 45. In group III, the corrective effect of sodium selenite was recorded on day 24: an increase in the area of woven bone and lamellar bone of the bone regenerate by 23.34% and 19.07% ($p<0.05$).

Conclusion: The introduction of sodium selenite at a dose of 40 mcg/kg against the background of 60 days of exposure to tartrazine at a dose of 750 mg/kg reduces the severity of changes in the morphometric parameters of bone regenerate the areas of woven and lamellar bones on the 24th day of the experiment.

P551

DIFFERENTIAL EFFECTS OF OSTEOPOROSIS THERAPIES ON TRABECULAR BONE SCORE: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Background: Bone mineral density (BMD) measured by DXA is widely used for fracture risk assessment and for monitoring response to osteoporosis therapy. BMD is also an accepted imaging endpoint in osteoporosis clinical trials, supported by recent regulatory decisions recognising DXA-derived BMD as a valid surrogate for fracture outcomes. Trabecular bone score (TBS), derived from the same DXA image, independently predicts fracture and provides complementary information on bone microarchitecture. As imaging-based endpoints continue to play a central role in the evaluation of osteoporosis therapies, a clearer understanding of how different pharmacological treatments influence TBS is increasingly important. In this context, TBS may offer additional insight into treatment effects on bone quality beyond changes in BMD alone

Methods: A systematic review and meta-analysis were conducted according to a protocol registered in PROSPERO. PubMed, Embase, Web of Science, CENTRAL, publisher platforms, and clinical trial registries were searched. Eligible studies included men or women aged ≥40 years with TBS assessed by DXA, evaluating pharmacological osteoporosis therapies compared with no treatment or an active comparator. The primary outcome was mean percentage change in TBS from baseline. Study selection, data extraction, and risk-of-bias assessment were performed independently by two reviewers. Randomised and non-randomised studies were analysed separately using random-effects inverse-variance models. Heterogeneity was assessed using the I^2 statistic.

Results: Sixty studies published up to October 2025 were included (17 RCTs, 43 non-randomised). In placebo-controlled trials, bisphosphonates were associated with small, non-significant changes in TBS at 12m (mean difference [MD]0.52%, 95% CI −0.58 to 1.63; I^2=0%), with similar findings at 24m. Denosumab significantly increased TBS at 12 months (MD 1.41%, 95% CI 0.29 to 2.54; I^2=0%) and up to 10y. Anabolic therapies showed larger effects: teriparatide significantly increased TBS at 24m (MD 2.53%, 95% CI 1.74 to 3.32; I^2=0%), while romosozumab produced a marked increase at 12m (MD 4.16%, 95% CI 3.68 to 4.64; I^2=60.5%). Romosozumab also resulted in greater TBS gains than alendronate and denosumab at 12m.

Conclusions: Anti-osteoporotic therapies demonstrate distinct, treatment-specific patterns of change in TBS. Antiresorptive agents primarily stabilise trabecular microarchitecture, whereas anabolic

therapies induce earlier and more pronounced improvements. These findings reflect the molecule mechanisms of action and support the use of TBS as a complementary DXA-derived imaging outcome alongside BMD to characterise treatment response and inform treatment selection and sequencing in osteoporosis management.

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COMPARATIVE EFFECTIVENESS OF HIGH-MOLECULAR-WEIGHT HYALURONIC ACID VERSUS LOW-MOLECULAR-WEIGHT HYALURONIC ACID COMBINED WITH AMINO ACID–PEPTIDE SUPPLEMENTATION IN KNEE OSTEOARTHRITIS

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Objective(s)
Previous studies comparing hyaluronic acid preparations with different molecular weights have shown inconsistent effects on pain and function in knee osteoarthritis. Recently, combination approaches using low-molecular-weight hyaluronic acid with amino acid–peptide supplementation have been introduced; however, direct comparative evidence with conventional high-molecular-weight hyaluronic acid remains limited. This study aimed to retrospectively compare these two approaches on pain and functional outcomes in knee osteoarthritis.

Materials and Methods
This retrospective comparative study included 50 patients with symptomatic knee osteoarthritis treated with a **single-dose intra-articular injection** of either high-molecular-weight hyaluronic acid (Group 1, n=25) or low-molecular-weight hyaluronic acid combined with amino acid–peptide supplementation (Group 2, n=25). Pain was assessed using the Visual Analog Scale (VAS), and functional outcomes were evaluated with the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC). Assessments were performed at baseline and at 1-month follow-up. Between-group differences in the magnitude of change were analyzed.

Results
Both groups demonstrated significant improvements in WOMAC stiffness, function, and total scores after treatment (all $p<0.05$). A significant reduction in VAS pain was observed in Group 2 ($p=0.005$), while the reduction in Group 1 was not statistically significant ($p=0.083$). Group 1 showed significantly greater improvements than Group 2 in WOMAC pain ($p=0.035$), stiffness ($p=0.006$), function ($p=0.007$), and total scores ($p=0.008$). No significant between-group difference was found for VAS change ($p=0.186$).

Conclusion(s)
Both treatments were effective in improving symptoms and function in knee osteoarthritis. While VAS pain reduction was more pronounced in the combination group, high-molecular-weight hyaluronic acid provided greater overall improvement in WOMAC outcomes. Given the limited number of direct comparative studies, these findings suggest that different viscosupplementation strategies may result in distinct short-term clinical responses.

P553

EFFECT OF A NEW DIETARY SUPPLEMENT (AVOCADO/SOYBEAN UNSAPONIFIABLES 1:2, ROSEHIP EXTRACT, RESVERATROL, ZINC CITRATE) ON CLINICAL MANIFESTATIONS OF KNEE OSTEOARTHRITIS

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OBJECTIVE: To evaluate the effect of a new dietary supplement containing avocado and soybean unsaponifiables (300 mg), rosehip fruit extract (300 mg), resveratrol (70 mg), and zinc citrate (12 mg) on clinical manifestations of knee osteoarthritis (OA).

MATERIALS AND METHODS: This 3-month prospective study included 50 women aged 40–75 years (mean age 58.3±10.1 years) with knee osteoarthritis (ACR criteria), Kellgren–Lawrence grade II–III, and walking pain ≥40 mm on the visual analogue scale (VAS). Median disease duration was 5 [3; 8] years. All patients provided written informed consent.

Patients received the dietary supplement (two capsules once daily). Nonsteroidal anti-inflammatory drugs (NSAIDs) were allowed on demand. Three study visits were scheduled. Treatment efficacy was assessed by changes in walking pain VAS, WOMAC, KOOS, EQ-5D, patient global assessment of health (VAS), physician- and patient-rated treatment efficacy, and NSAID use.

RESULTS: After 1 month of therapy, significant improvement was observed in all assessed parameters ($p<0.05$), except for WOMAC stiffness (Table 1). By month 3, WOMAC stiffness also significantly decreased, while improvement of other outcomes was maintained.

At visit 3, a good treatment response (≥50% pain reduction) was achieved in 60% of patients, and walking pain ≤40 mm VAS was observed in 88%. NSAID dose reduction or discontinuation occurred in 40% of patients at visit 2 and in 48% at visit 3.

Table 1. Dynamics of clinical parameters during therapy, Me [25th; 75th percentiles]

Parameters	V1	V2	V3	p
Pain, VAS (mm)	51 [48; 56]	43 [30; 51]	24 [12; 33]	**<0,001*** **<0,001****
WOMAC pain (mm)	196,5 [154; 222]	145 [85; 199]	81,5 [45; 163]	**<0,001*** **<0,001****
WOMAC stiffness (mm)	82 [57; 97]	69,5 [32; 90]	42,5 [17; 67]	**0,086*** **<0,001****
WOMAC physical function (mm)	646 [564; 775]	529,5 [358; 720]	371 [162; 575]	**<0,001*** **<0,001****
WOMAC total score (mm)	924,5 [814; 1067]	775 [485; 1010]	501,5[232; 775]	**<0,001*** **<0,001****
KOOS total score (%)	51,5 [43; 60]	54 [47; 65]	62 [54; 75]	**<0,001*** **<0,001****
EQ-5D score	0,59 [0,52; 0,62]	0,59 [0,47; 0,65]	0,69 [0,59; 0,73]	**0,005*** **<0,001****
Patient global assessment of health, VAS (mm)	50 [46; 60]	60 [50; 75]	70 [60; 80]	**<0,001*** **<0,001****

* Differences between V2 and V1

** Differences between V3 and V1

CONCLUSIONS: The results of this study demonstrate a rapid and clinically meaningful effect of the new dietary supplement in patients with knee osteoarthritis.

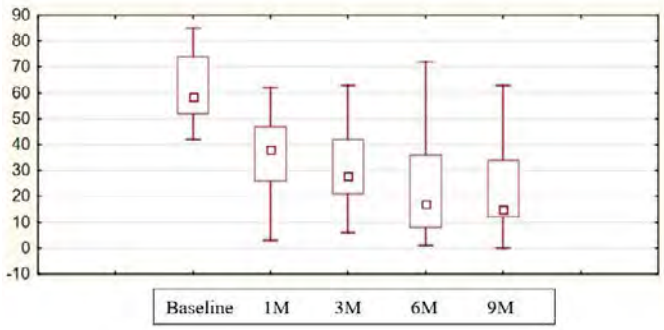
P554

EFFICACY OF A COMBINATION OF GLUCOSAMINE AND CHONDROITIN SULFATE SUPPLEMENTED WITH UNDENATURED TYPE II COLLAGEN, B VITAMINS, GINGER EXTRACT, AND ASCORBIC ACID IN PATIENTS WITH KNEE OSTEOARTHRITIS

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Objective. To evaluate the efficacy of a dietary supplement containing glucosamine (1500 mg), chondroitin sulfate (1000 mg), undenatured type II collagen (UC-II, 40 mg), a B-vitamin complex, vitamin C (100 mg), and ginger root extract (300 mg) in patients with knee osteoarthritis (OA).
Material and Methods. This prospective randomized study included 40 women aged 40–75 years with confirmed knee OA (ACR criteria), Kellgren–Lawrence grade I–III, and walking pain ≥40 mm on the visual analogue scale (VAS). Median age was 61.5 [57.5;69] years. All participants received oral dietary supplement therapy with the above combination for 6 months, followed by a 3-month observation period to assess the aftereffect. Total study duration was 9 months.
Results. The dietary supplement demonstrated a significant clinical effect during treatment and follow-up. After 1 month, walking pain VAS decreased significantly ($p<0.01$; Fig. 1) and remained reduced throughout therapy and 3 months after discontinuation. Pain <40 mm VAS was achieved in 52.5% of patients at 1 month, 67.5% at 3 months, and 80% at 6 months; during follow-up, 75% of patients-maintained pain <40 mm. Significant improvement was observed in all WOMAC domains ($p<0.01$ vs baseline): pain decreased from 221 [150;303] mm to 149 [114;199], 104 [57;172], 74.5 [40;152], and 66.5 [39;106] mm at 1, 3, 6, and 9 months, respectively; stiffness from 93.5 [58;128] to 68 [35;90], 42.5 [18;79], 32 [14;74], and 24.5 [15;51] mm; physical function from 904 [563;1075.5] to 658 [399;755], 432 [271;674], 288.5 [181;585], and 252 [148;440] mm. All patients demonstrated significant improvement in KOOS and patient global assessment of health VAS throughout treatment and follow-up ($p<0.01$).
Conclusion. The dietary supplement provided a sustained analgesic effect and significantly improved stiffness, physical function, and quality of life in patients with knee OA over the long term.
Figure 1. Dynamics of knee pain intensity (VAS) during treatment with the dietary supplement containing UC-II, glucosamine, chondroitin sulfate, B vitamins, vitamin C, and ginger root extract



P555

COMPARATIVE CHARACTERISTICS OF PATIENTS WITH DIFFERENT OSTEOARTHRITIS PHENOTYPES: INTEGRATION OF CLINICAL AND LABORATORY PARAMETERS

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Objective. To compare clinical and laboratory characteristics in patients with osteoporotic (OP-OA) and metabolic (Met-OA) phenotypes of knee osteoarthritis (OA).

Material and Methods. This prospective study included 122 patients with knee OA (ACR criteria), Kellgren–Lawrence grade II–III. 46 patients had the OP-OA phenotype (osteoporosis and/or osteopenia based on axial skeleton densitometry) and 76 had the Met-OA phenotype. Clinical and laboratory assessments were performed in all patients.

Results. Compared with OP-OA, patients with Met-OA were older, had longer disease duration, higher body mass index, and worse clinical outcomes, including knee pain (VAS), WOMAC (total score and subscales), KOOS, and patient global assessment of health (Table 1). Met-OA was associated with higher levels of systemic inflammation and cartilage degradation markers: CRP (1.9 [1.0; 3.5] vs 1.2 [0.7; 1.8]

mg/L; p=0.009) and COMP (23.4 [15.3; 32.7] vs 15.0 [10.5; 25.1] pg/mL; p=0.004). MMP-9 levels tended to be higher in Met-OA (3.9 [1.6; 6.8] vs 1.8 [0.8; 4.0] ng/mL; p=0.077). Positive correlations were observed between Met-OA and CRP (r=0.33; p<0.01), COMP (r=0.37; p<0.01), and MMP-9 (r=0.25; p=0.02).

Table 1. Comparative clinical characteristics of patients with different knee OA phenotypes

Parameters	OP-OA	Met-OA	p
Age, years, M±SD	55.4 ± 10.2	59.9 ± 8.6	**p=0.02**
OA duration, years, Me [25th-75th percentiles]	3 [1;10]	9 [3;15]	**p<0.01**
BMI, kg/m², M±SD	26.7 ± 5.1	34.2 ± 6.1	**p<0.01**
Pain (VAS), mm, Me [25th-75th percentiles]	40 [10;50]	53 [43;70]	**p<0.01**
WOMAC pain, мм, Me [25th-75th percentiles]	128.5 [40;160]	195 [130;270]	**p<0.01**
WOMAC stiffness, mm, Me [25th-75th percentiles]	50 [20;70]	80 [50;116]	**p<0.01**
WOMAC physical function, mm, Me [25th-75th percentiles]	342.5 [110;695]	696 [470;924]	**p<0.01**
WOMAC total, mm, Me [25th-75th percentiles]	507.5 [210;870]	1030 [680;1280]	**p<0.01**
KOOS, %, Me [25th-75th percentiles]	57 [48; 85]	47 [35;60]	**p<0.01**
Global assessment of health (VAS), mm, Me [25th-75th percentiles]	30 [15;50]	50 [40;60]	**p<0.01**

Conclusion. Met-OA is associated with more severe clinical manifestations and increased systemic inflammation and cartilage degradation compared with OP-OA. Integration of clinical and immunological markers may improve OA phenotyping and support personalized treatment strategies.

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ASSOCIATION BETWEEN VITAMIN D3 AND COMORBID CONDITIONS IN PATIENTS WITH KNEE OSTEOARTHRITIS

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PURPOSE: To evaluate the association between vitamin D3 status and comorbid conditions in patients with knee osteoarthritis (OA).

METHODS: The study included 171 women with knee OA (Kellgren–Lawrence grade I–III) who provided informed consent. Mean age was 53.5±9.9 years, body mass index (BMI) 29.8±6.4 kg/m², and disease duration 3 [1;7] years. Data on anthropometry, medical history, clinical examination, and comorbidities were collected.

The prevalence of comorbidities was: ischemic heart disease (IHD) 8.2%, metabolic syndrome 29.2%, arterial hypertension (AH) 36.2%, diabetes mellitus 8.7%, cardiac arrhythmias 14.0%, previous myocardial infarction 0.6%, hypertriglyceridemia (HTG) 34.5%, liver steatosis 10.5%, and hyperuricemia 21.6%.

RESULTS: Normal vitamin D levels (≥30 ng/mL) were found in 62 patients (36.3%, Group 1), insufficiency (20–30 ng/mL) in 66 (38.6%, Group 2), and deficiency (<20 ng/mL) in 43 (25.1%, Group 3). Groups were comparable in age (52 [43;62] vs 54 [46;62] vs 54 [45;61] years) and disease duration (2 [1;5] vs 3 [2;8] vs 4 [2;6] years; p>0.05).

Patients with vitamin D insufficiency or deficiency had significantly higher body weight (69.0 [60.0;82.0] vs 82.0 [68.0;96.0] vs 81.0 [72.0;91.5] kg), BMI (24.6 [22.5;28.1] vs 30.4 [26.2;35.7] vs 31.0 [27.6;31.0] kg/m²), and waist circumference (82.0 [72.0;93.0] vs 91.0 [82.0;100.0] vs 90.0 [85.0;106.0] cm; p<0.05).

Higher frequencies of IHD (3.85% vs 9.43% vs 21.8%), HTG (8.0% vs 22.0% vs 12.5%), and AH (31.4% vs 60.4% vs 53.7%) were also observed in groups with reduced vitamin D levels (p<0.05). Spearman correlation analysis confirmed associations between vitamin D insufficiency/deficiency and body weight, BMI, waist circumference, IHD, HTG, and AH (Table 1).

Table 1. Correlation coefficients between vitamin D insufficiency/deficiency and osteoarthritis-related factors.

Parameter	r	p
Body weight	-0.29	0.03
Body mass index	-0.35	0.002
Waist circumference	-0.27	0.001
Ischemic heart disease	-0.26	0.001
Hypertriglyceridemia	-0.28	0.008
Arterial hypertension	-0.24	0.01

CONCLUSIONS: Vitamin D deficiency and insufficiency in patients with knee OA may be associated with increased cardiovascular risk, supporting hypovitaminosis D as a potentially modifiable risk factor for cardiovascular comorbidity.

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PERSPECTIVES OF MULTIMODAL THERAPY FOR OSTEOARTHRITIS IN PATIENTS WITH MODERATE AND/OR SEVERE KNEE PAIN: FOCUS ON THE COMBINATION OF DMOADS AND VISCOSUPPLEMENTATION

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Objective. To assess the efficacy of multimodal therapy combining disease-modifying osteoarthritis drugs (DMOADs: chondroitin sulfate (CS) and glucosamine (G)) with intra-articular injection of a synthetic

viscoprosthesis (IA-SV) versus monotherapy in knee osteoarthritis (OA).

Material and Methods. This randomized comparative study included 63 patients aged 40–75 years with knee OA, Kellgren–Lawrence grade II–III, and pain >40 mm (VAS). Mean age was 65.1±8.1 years. Patients were assigned to three groups: Group 1 (n=22) received DMOADs (CS 800 mg/day and G 1000 mg/day for 6 months) combined with a single IA-SV; Group 2 (n=20) - single IA-SV; Group 3 (n=21) - DMOADs monotherapy for 6 months. Total follow-up duration was 9 months.

Results. All groups demonstrated significant reductions in knee pain VAS and improvements in all WOMAC subscales. After 1-month, significant pain reduction (p<0.05) was observed in Groups 1 and 2 (Table 1). In Group 1, patient global assessment of health improved after 1 month (50 [40;55] vs 60 [50;65] mm; p=0.008), whereas in Groups 2 (53 [50;65] vs 75 [55;80] mm; p=0.013) and 3 (50 [49;55] vs 68.5 [60;75] mm; p=0.013) significant improvement was observed only after 3 months. In the multimodal therapy group, CRP levels decreased after 3 months and remained reduced (1.3 [0.6;3.1] vs 1.2 [0.6;2.2] mg/L; p=0.02); in the other groups, significant changes were observed only at the end of follow-up. All treatments were well tolerated.

Table 1. The dynamics of knee pain (VAS)

Parameter	M	Group 1	Group 2	Group 3	p*	p^1	p^2	p^3
Pain VAS, mm, Me [25th-75th percentiles]	Baseline 1 6 9	58.5[53; 62] 36 [24;47] 23.5 [11;39] 25 [13;39]	55 [52;65] 27.5 [19;38] 17.5[8;22] 11 [5;30]	52 [48;60] 44 [37;48] 21 [15;35] 15 [8;25]	0.32 0.06 0.61 0.49	**0.003** **0.016** **0.003**	**<0.001** **<0.001** **<0.001**	**0.096** **<0.005** **<0.001**

M, month; p, between-group comparison (Kruskal–Wallis test; p<0.05 significant); p1, within-group change vs baseline (V1) in Group 1; p2, within-group change vs baseline (V1) in Group 2; p3, within-group change vs baseline (V1) in Group 3 (p<0.05 significant).*

Conclusion. Multimodal therapy demonstrated significant efficacy and safety in knee OA. Combination of viscosupplementation with DMOADs was associated with rapid analgesic effect, improved quality of life, and reduction in CRP levels.

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FREE LEPTIN INDEX AND HYPERLEPTINEMIA AS POTENTIAL MARKERS OF METABOLIC OSTEOARTHRITIS

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Objective. Obesity is an important factor in the development and progression of osteoarthritis (OA). To compare adipose tissue–related metabolic markers in patients with different OA phenotypes.

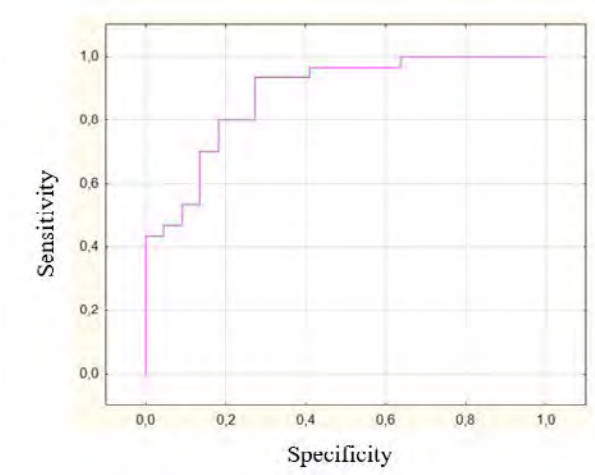
Material and Methods. This single-center cross-sectional study included 122 patients with knee OA (ACR criteria), Kellgren–Lawrence grade II–III, who provided informed consent. According to phenotype, 76 patients (62.3%) had metabolic OA (Met-OA) and 46 (37.7%) had osteoporotic OA (OP-OA; osteoporosis and/or osteopenia based on axial skeleton densitometry). Blood immunological assessment included adipokines (leptin, resistin, visfatin) and soluble leptin receptors (sOB-R).

Results. Compared with OP-OA, Met-OA patients were older (59.9±8.6 vs 55.4±10.2 years; p=0.02), had longer disease duration (9.0 [3.0;15.0] vs 3.0 [1.0;10.0] years; p=0.002), higher body mass index (34.2±6.1 vs 26.7±5.1 kg/m²; p<0.0001), and greater knee pain by VAS (53.0 [43.0;70.0] vs 40.0 [10.0;50.0] mm; p=0.001). Hyperleptinemia (leptin ≥11.1 ng/mL in women and ≥5.6 ng/mL in men) was detected in 76.08% of OP-OA and 97.37% of Met-OA patients. Met-OA was associated with higher leptin levels, higher free leptin index (leptin/sOB-R ×100), and lower sOB-R levels compared with OP-OA (p<0.05; Table 1). No between-group differences were found for visfatin or resistin (p>0.05). Regression analysis confirmed associations between Met-OA and hyperleptinemia (β=0.32; p<0.0001), leptin levels (β=0.44; p<0.0001), and inverse association with sOB-R (β=−0.28; p=0.017). The strongest association was observed for the free leptin index (β=0.55; p<0.0001), which was also supported by ROC analysis (AUC=0.88).

Table 1. Comparative analysis of adipose tissue–related markers in patients with different OA phenotypes

Parameters	OP-OA	Met-OA	p
Leptin, ng/ml, Me [25th-75th percentiles]	19.21 [11.9;32.9]	43.8 [25.5;71.4]	**<0.0001**
sOB-R, ng/ml, [25th-75th percentiles]	16.33 [13.4;18.7]	13.3 [12.08;15.13]	**0.009**
Free leptin index	131.2 [66.5;259.2]	414.5 [223.8;692.6]	**<0.0001**
Visfatin, ng/ml, Me [25th-75th percentiles]	30.2 [24.4;45.8]	33.1 [26.8;43.8]	0.68
Resistin, ng/ml, [25th-75th percentiles]	7.1 [6;10.2]	8 [7;10.2]	0.51

Figure 1. ROC curve for prediction of Met-OA based on a high free leptin index (AUC=0.88)



Conclusion. Hyperleptinemia and the free leptin index may be considered potential biomarkers of the metabolic phenotype of knee OA.

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EFFICACY OF BIOACTIVE CONCENTRATE OF SMALL MARINE FISH IN ELDERLY PATIENTS WITH NONSPECIFIC LOW BACK PAIN

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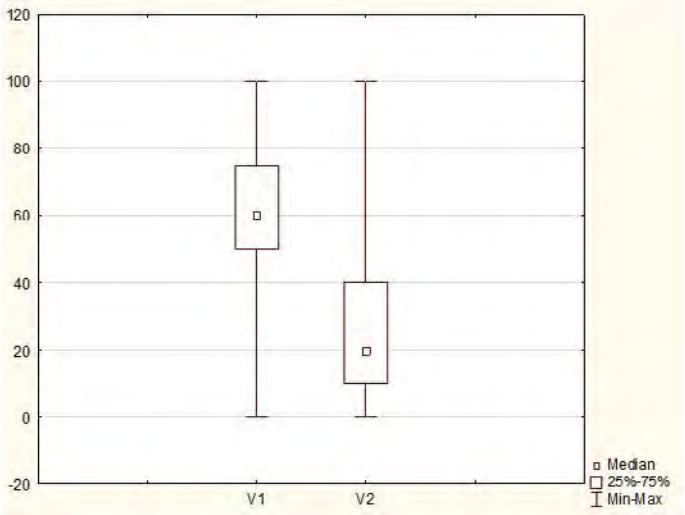
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Objective. To evaluate the efficacy of SYSADOA (bioactive concentrate of small marine fish (BCSMF) containing chondroitin sulfate, amino acids, peptides, sodium, potassium, calcium, magnesium, iron, copper and zinc ions) therapy in elderly patients (over 60 years old) with nonspecific low back pain (LBP) in a multicenter observational study.

Materials and methods. The study included 5 135 patients with nonspecific LBP. The average age was 68.3±6.3 y.o, the body mass index was 28.7±4.7 kg/m2. The duration of the study is from 20 to 31 days, the number of visits is 2: visit 1 (V1)– the beginning of therapy, visit 2 (V2) – within 10 days after the completion of the 1st course of treatment. BCSMF was prescribed 1 ml intramuscular daily No. 20 or 2 ml intramuscular every other day No. 10.

Results. During the course of treatment, there was a significant pain on VAS decreased from 60 [50; 75] to 20 [10; 40] mm; p<0.0001 (Fig. 1); an improvement in the quality of life according to EQ-5D from 0.52 [-0.02; 0.59] to 0.76 [0.69; 1] points (p<0.0001) and an increase in patient global assessment of health VAS from 50 [30; 60] to 70 [60; 90] mm (p<0.0001). Accordingly, the median reduction in pain (according to VAS) was 57.1 [37.5; 75] %, and the median improvement in patient global assessment of health VAS - 50 [14.3; 100] %. A good response to therapy (pain reduction by ≥50%) was detected in 65.1% of cases; a decrease in pain on VAS to <40 mm was detected in 83.2%. The marked improvement observed in most patients led to a decrease in the need for NSAIDs: 75.1% of patients received them at the beginning of therapy, and 68.9% at the end of treatment (OR=1.36; 95% CI 1.24–1.49; p<0.0001). Attention was drawn to the high adherence to treatment (96.6±11.6%), which was >80% in 93.7% of cases.

Fig. 1. Dynamics of pain on VAS in non-specific LBP during therapy



Conclusion. The confirmed symptomatic effect of BCSMF justifies the rationality of its use in geriatric practice in nonspecific LBP

P560

EFFICACY OF BIOACTIVE CONCENTRATE OF SMALL MARINE FISH IN ELDERLY PATIENTS WITH HIP OSTEOARTHRITIS

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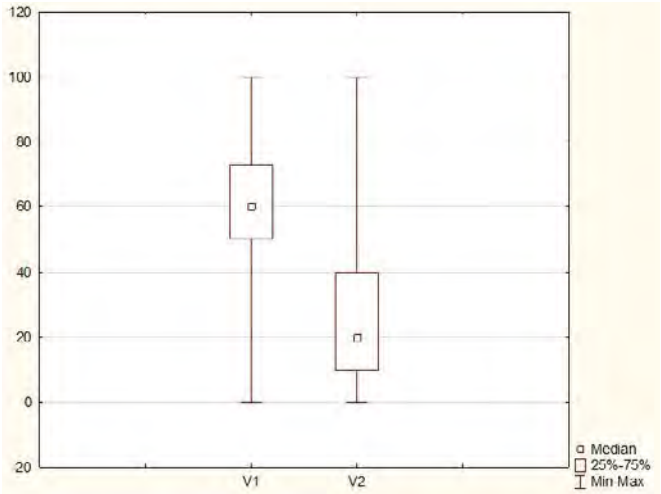
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Objective. To evaluate the efficacy of SYSADOA (bioactive concentrate of small marine fish (BCSMF) containing chondroitin sulfate, amino acids, peptides, sodium, potassium, calcium, magnesium, iron, copper and zinc ions) therapy in elderly patients with hip osteoarthritis (OA) in a multicenter observational study.

Materials and methods. The study included 4 377 patients with hip OA (ACR criteria). The average age was 68.6 ± 6.4 y.o, the body mass index was 28.9 ± 4.9 kg/m2, the median duration of hip OA was 84 (48-120) months. The duration of the study is from 20 to 31 days, the number of visits is 2: visit 1 (V1) – the beginning of therapy, visit 2 (V2) – within 10 days after the completion of the 1st course of treatment. BCSMF was prescribed 1 ml intramuscular daily No. 20 or 2 ml intramuscular every other day No. 10.

Results. During the course of treatment, there was a significant pain on VAS decreased from 60 (50-73) to 20 (10-40) mm, p<0.001 (Fig.1); improved quality of life according to EQ-5D from 0.52 (-0.02-0.62) to 0.76 (0.62-1) points (p<0.05) and an increase in patient global assessment of health VAS from 50 (30-62) to 80 (60-90) mm (p<0.0001). Accordingly, the median reduction in pain (according to VAS) was 50 (33.3-75) % and the median improvement in patient global assessment of health VAS – 40 (14.3 – 100)%. More than half of the patients (60.8%) demonstrated a good response to therapy (reduction of pain during movement ≥50% compared to baseline). In 66.1% of patients, the intensity of hip pain decreased <40 mm by VAS.

Fig. 1. Dynamics of hip pain (according to VAS) during drug treatment



Conclusion. The results of an observational study confirm the symptomatic effect of BCSMF and the expediency of its use in patients over 60 years of age with hip OA.

P561

METABOLIC CHANGES IN ENERGY METABOLISM AND INFLAMMATION IN THE PERIPHERAL BLOOD MONONUCLEAR CELLS CULTURED WITH CAPSAICIN FROM PATIENTS WITH END-STAGE OSTEOARTHRITIS

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Objectives: To examine metabolic changes in the expression of genes associated with energy metabolism in the **peripheral blood mononuclear cells** (PBMCs) obtained from patients with end-stage osteoarthritis (OA) prior to arthroplasty and cultured with capsaicin.
Methods: Twenty six patients with end-stage OA (median age 60 years) were examined. PBMCs were isolated prior to arthroplasty using Ficoll density gradient and cultured with 0.1 μM **capsaicin** during 24h. Cell viability was monitored with 0.2% Trypan blue staining. Total RNA isolated from these cells was used for gene expression studies performed with quantitative real-time RT-PCR.
Results:Capsaicin was capable of modifying gene expression in cultured PBMCs from the examined patients with OA compared with untreated cells. Expression of the Krebs cycle component succinate dehydrogenase, and electron transport chain element, uncoupling protein 1 was significantly upregulated in concert with ATP-synthase gene. Simultaneous upregulation of the autophagy-related ULK1 was observed along with downregulation of the inflammation-related tumour necrosis factor α and IL-1β genes expression compared with untreated counterparts.
Conclusion: The upregulation of genes associated with energy metabolism accompanied by downregulation of inflammation-related TNFα and IL-1β in PBMCs obtained from patients with end-stage osteoarthritis prior to arthroplasty, indicates the involvement of whole cell metabolism in the manifestations of OA disease.

P562

CAPSAICIN EFFECTS ON THE EXPRESSION OF TYPE II COLLAGEN AND GENES ASSOCIATED WITH ENERGY METABOLISM AND INFLAMMATION IN THE ARTICULAR CARTILAGE EXPLANTS FROM PATIENTS WITH END-STAGE OSTEOARTHRITIS

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Objectives: To examine metabolic changes in the expression of genes associated with energy metabolism in the articular cartilage explants obtained from patients with end-stage osteoarthritis (OA) prior to arthroplasty and cultured with capsaicin.
Methods: Seventeen patients with end-stage OA (median age 62 years) were examined. Full-depth explants of human OA knee articular cartilage from arthroplasty were cultured with 0.1 μM capsaicin during 24h. Total RNA isolated from these cells was used for gene expression studies performed with quantitative real-time RT-PCR.
Results: Capsaicin was capable of modifying gene expression in cultured articular cartilage explants from the examined patients with OA compared with untreated counterparts. Gene expression of glycolysis –related pyruvate kinase, the Krebs cycle component succinate dehydrogenase, and electron transport chain element, uncoupling protein 1 was significantly upregulated compared with untreated controls. Simultaneous upregulation of the autophagy-related ULK1 was observed along with downregulation of the inflammation-related tumour necrosis factor α gene expression. Type II collagen gene expression was also upregulated. No significant changes in the expression IL-1β gene were noted in cartilage explants from the examined patients with OA cultured with capsaicin compared with untreated counterparts.
Conclusion: The upregulation of genes associated with energy metabolism and type II collagen accompanied by downregulation of inflammation-related TNFα in articular cartilage explants obtained from patients with end-stage osteoarthritis from arthroplasty in the presence of capsaicin, indicates the involvement of whole cell metabolism in the manifestations of OA disease.

P563

DISTURBANCES IN CENTRAL SENSITIZATION ARE ASSOCIATED WITH PAIN AND ALTERATIONS IN GENE EXPRESSION IN THE PERIPHERAL BLOOD OF PATIENTS WITH RHEUMATOID ARTHRITIS

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Objective: To determine the effect of CS severity score on the expression of genes associated with inflammation, tissue destruction, and central metabolic processes in the peripheral mononuclear blood cells (PBMCs).
Methods: The blood of 59 patients with RA (11 men and 48 women, average age 52.0 years, ranged from 19 to 75 years) was examined. Clinical status was assessed using the DAS28 index, serum levels of CRP, ASPA, and RF. To assess the CS score, the severity of pain,

anxiety, depression, fatigue and signs of fibromyalgia, the CSI, VAS, BPI, Pain DETECT, HADS, FSS, FIRST, FACIT-F questionnaires were used, respectively. Protein expressions in PBMCs were quantified by ELISA. Gene expression was determined using reverse transcriptase and quantitative real-time RT-PCR (qRT-PCR) for expression of genes related to carbohydrate and fatty acid metabolism.

Results: All examined patients with RA had high disease activity. Patients were divided into 4 subgroups according to the severity of CS. Significantly higher expression of genes associated with the functioning of the pentose phosphate pathway, antioxidant protection, electron transport chain, fatty acid metabolism, and tissue destruction was found with increasing severity of RA compared to the healthy subjects. In contrast, the expression of the proinflammatory cytokine (IL-1β) did not differ from the control while the expression of the TNFα gene increased only in patients with severe and extreme CS scores compared to control individuals.

Conclusions: Disturbances caused by CS lead to a significantly higher severity of RA in patients, despite active antirheumatic therapy. The severity of the disease at the cellular level may be explained by dysregulated expression of genes associated with central metabolic processes, despite low levels of proinflammatory cytokine gene expression.

P564

CALCANEAL ULTRASOUND PARAMETERS IN ADULT MALES: NORMATIVE DATA IN A TURKISH POPULATION SAMPLE

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Objective: Quantitative ultrasound (QUS) of the calcaneus is a practical, radiation-free method for evaluating bone quality and fracture risk. Although QUS is increasingly used in clinical and epidemiological settings, age- and population-specific normative data for adult men remain limited. This study aimed to establish age-stratified normative reference values for calcaneal QUS parameters in healthy Turkish men.

Methods: This cross-sectional study included 909 healthy men aged 17–93 years. Broadband ultrasound attenuation (BUA) and speed of sound (SOS) were measured at the left calcaneus using the Sahara® Clinical Bone Sonometer. Quantitative Ultrasound Index (QUI) and estimated bone mineral density (eBMD) were calculated using manufacturer-provided formulas. Participants were stratified into six age groups by decades. Normative means and lower and upper reference limits were determined using the Golden Ratio in Statistics (GRiS) method to account for skewed distributions.

Results: Age-related variations were observed across all QUS parameters. BUA, QUI, and eBMD reached their highest normative mean values in the 30–39 age group (77.85 dB/MHz, 95.76, and 0.529 g/cm², respectively), while SOS peaked earlier, in the 17–29 age group (1551.78 m/s), and remained relatively stable thereafter. Following peak values, all parameters demonstrated a gradual age-related decline, which was more pronounced for BUA, QUI, and eBMD than for SOS. The lowest mean values were generally observed in the older age groups, particularly among men aged ≥70 years. No statistically significant differences were detected between consecutive age groups, indicating a progressive rather than abrupt deterioration in bone-related ultrasound parameters. Normative reference ranges showed considerable width across all ages, highlighting substantial inter-individual variability.

Conclusion: This study provides the first comprehensive, age-specific normative calcaneal QUS reference data for adult Turkish men. The findings demonstrate a gradual decline in bone ultrasound parameters after early adulthood and support the use of age-adjusted QUS reference values in clinical screening and epidemiological studies of male bone health.

P565

ISOLATED MUSCULOCUTANEOUS NERVE NEUROPATHY FOLLOWING CARDIAC SURGERY ANESTHESIA: A CASE REPORT

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Introduction

Isolated musculocutaneous nerve neuropathy is a rare condition and an uncommon postoperative complication. The musculocutaneous nerve arises from the lateral cord of the brachial plexus and innervates the biceps brachii and brachialis muscles, playing a major role in elbow flexion. Injury to this nerve typically causes weakness of elbow flexion, biceps muscle atrophy, decreased biceps reflex, and sensory disturbance over the anterolateral forearm.

Reported etiologies include trauma, strenuous exercise, improper positioning, shoulder surgery, and nerve compression at the level of the coracobrachialis muscle. Postoperative isolated musculocutaneous nerve injury related to anesthesia is extremely rare. We present a case of isolated musculocutaneous neuropathy following cardiac surgery anesthesia.

Case Report

A 22-year-old woman presented to the Physical Medicine and Rehabilitation clinic four weeks after elective cardiac valve surgery because of weakness in right elbow flexion. She had no history of trauma, neuromuscular disease, or upper extremity surgery.

On examination, muscle strength of the right biceps brachii was 3/5 and forearm supination was 4/5. Visible atrophy of the right biceps muscle was present. The right biceps deep tendon reflex was decreased. Sensory examination revealed paresthesia over the anterolateral aspect of the right forearm, and Tinel's sign was positive at the mid-upper arm. Cervical radiculopathy tests were negative.

Electromyography performed in the fourth postoperative week demonstrated severe partial axonal injury of the right musculocutaneous nerve. Conservative treatment including vitamin B12, alpha-lipoic acid, neuromuscular electrical stimulation, and strengthening exercises was initiated. At the three-month follow-up, muscle strength had fully recovered.

Discussion

Isolated musculocutaneous nerve neuropathy is rare and may be overlooked in postoperative patients. Possible mechanisms include prolonged compression, traction, or improper arm positioning during anesthesia. The absence of neuropathic pain and the presence of isolated motor weakness are consistent with previous reports.

Electromyography is essential for diagnosis, and most cases show excellent recovery with conservative treatment. Awareness of this rare complication is important for early diagnosis and prevention of long-term functional impairment.

P567

THE MEAN VALUES OF TRAIL IN PATIENTS WITH SYSTEMIC LUPUS ERYTHEMATOSUS AND HEALTHY CONTROLS

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Background. Overproduction of type I interferons (IFNs) is observed in patients with systemic lupus erythematosus (SLE). These cytokines activate various immune cells and contribute to disease progression. However, type I IFNs also play a crucial role in the immune response to viral infections by inducing the production of diverse proteins. One such protein is TNF-related apoptosis-inducing ligand (TRAIL), a member of the TNF superfamily that induces apoptosis via death receptors. Given its association with IFNs and immune cell activation, it is of interest to study serum TRAIL levels in patients with SLE compared with healthy controls.
Aim. To compare mean serum TRAIL levels in patients with SLE and healthy controls.
Materials and methods. Serum levels of TRAIL were measured in 29 patients with SLE (28 women and 1 man) and 9 conditionally healthy individuals (5 women and 4 men) using a commercial test system (Cloud-Clone Inc., Cat. No. SEA139Hu). All patients with SLE fulfilled the 2019 EULAR/ACR classification criteria and were ANA-positive. The median disease duration was 6.0 [2.5–12.0] years. Statistical analysis was performed using «*Statistica 10.0*» software. Results were considered statistically significant at $p < 0.05$.
Results. Patients with SLE and healthy controls were comparable in age (43.1 ± 12.9 years vs 23 [23.0–62.0] years; U = 124.0, $p = 0.726$), weight (70.0 [60.0–81.0] kg vs 80.2 ± 13.3 kg; U = 88.5, $p = 0.125$), and BMI (25.7 [23.3–30.1] kg/m² vs 27.1 ± 3.1 kg/m²; U = 114.5, $p = 0.505$). Median serum TRAIL levels did not differ significantly between patients with SLE and healthy controls (8.65 [8.17–9.63] pg/mL vs 8.30 [8.04–8.77] pg/mL; U = 96.5, $p = 0.205$). Additionally, no significant differences were observed in TRAIL levels among patients with low, moderate, high, or very high disease activity according to the SELENA-SLEDAI score.
Conclusions. Serum TRAIL levels were comparable between patients with SLE and healthy controls. No significant association was found between SLE disease activity measured by SELENA-SLEDAI and serum TRAIL levels.

P568

TRAIL IN PATIENTS WITH RHEUMATOID ARTHRITIS AND ANKYLOSING SPONDYLITIS

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Objective. TNF-related apoptosis-inducing ligand (TRAIL) is an interferon-γ–induced protein, a death-receptor ligand capable of activating the extrinsic apoptotic pathway. Synovial cells from patients with rheumatoid arthritis (RA) express a functional TRAIL death receptor 5 and undergo TRAIL-mediated apoptosis. However, information on the role of TRAIL in the diagnosis of ankylosing spondylitis (AS) – another rheumatic disease with relatively high population prevalence – is limited. Therefore, it is of interest to compare serum TRAIL levels in patients with RA, AS, and healthy controls.
Aim. To compare mean serum TRAIL levels in patients with RA and AS with those in healthy controls.
Materials and methods. Serum TRAIL levels were measured in 18 patients with RA (15 women and 3 men), 16 patients with AS (5 women and 11 men), and 9 conditionally healthy individuals (5 women and 4 men) using a commercial test system (Cloud-Clone Inc., Cat. No. SEA139Hu). All patients with RA fulfilled the 2010 ACR/EULAR classification criteria, and patients with AS fulfilled the ASAS classification criteria. The median disease duration was 5.0 [2.8–14.0] years for RA and 13.5 [9.0–29.0] years for AS. Statistical analysis was performed using «*Statistica 10.0*» software. Results were considered statistically significant at $p < 0.05$.
Results. Patients with AS were younger than those with RA (46.8 ± 10.9 years vs 55.7 ± 12.1 years; $t = 2.25$, $p = 0.032$). However, serum TRAIL levels did not correlate with age in patients with RA ($\rho = 0.003$; $p = 0.990$) or AS ($\rho = -0.09$; $p = 0.735$). Median TRAIL levels were comparable between women and men in both the RA group (12.9 ± 7.63 pg/mL vs 14.7 [10.6–30.1] pg/mL; U = 15.5, $p = 0.441$) and the AS group (8.29 [8.04–8.53] pg/mL vs 8.53 [8.04–8.77] pg/mL; U = 20.5, $p = 0.461$). Serum TRAIL levels were significantly higher in patients with RA (13.8 ± 8.06 [9.82–17.8] pg/mL) than in patients with AS (8.41 [8.04–8.65] pg/mL; Z = 3.55, $p = 0.0004$) and healthy controls (8.30 [8.04–8.77] pg/mL; Z = 2.73, $p = 0.006$).
Conclusions. Serum TRAIL levels were not associated with age or sex in patients with RA or AS. Patients with RA had significantly higher serum TRAIL levels than patients with AS and healthy controls.

P569

TRANSITION BETWEEN 2019 AND 2025 SARCOPENIA DEFINITIONS BY THE ASIAN WORKING GROUP FOR SARCOPENIA IN COMMUNITY-DWELLING OLDER ADULTS

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Objective

The Asian Working Group for Sarcopenia (AWGS) has revised its diagnostic criteria over time, most recently in 2025. The impact of these updates on sarcopenia classification in real-world Asian populations has not been fully established. This study compared the characteristics and diagnostic transitions of community-dwelling older adults between the 2019 and 2025 definitions.

Material and Methods

We conducted a secondary analysis of a nationwide epidemiological study of community-dwelling Thai adults aged ≥60 years (n = 2,456). Muscle mass was measured using bioelectrical impedance analysis, handgrip strength with a digital dynamometer and physical performance using gait speed, five-times sit-to-stand and timed up-and-go tests. Sarcopenia was classified according to AWGS 2019 and 2025 definitions. Diagnostic transitions between the 2019 and 2025 criteria were visualized using a Sankey diagram. Characteristics and functional measures were then compared between concordant and reclassified groups.

Results

Sarcopenia prevalence increased following the AWGS definition update (18.1% in 2019 vs 28.3% in 2025). The AWGS 2025 definition identified more individuals with higher BMI and those aged <65 years, while functional profiles remained comparable to those identified by earlier definitions. For possible sarcopenia, prevalence decreased substantially under AWGS 2025 compared with AWGS 2019 (51.2% vs 93.7%). However, a greater proportion of individuals classified as possible sarcopenia under AWGS 2025 were subsequently confirmed as true sarcopenia (55.4% vs 19.3%). Diagnostic transition analysis showed that 14.9% of participants were newly classified as sarcopenic under AWGS 2025. Characteristics and functional deficits of the reclassified sarcopenia group were similar to the concordant sarcopenia group. Participants reclassified to non-sarcopenia showed no clear distinction from either concordant group.

Conclusions

The AWGS 2025 criteria capture a broader population with sarcopenia, including younger and higher-BMI individuals, while maintaining diagnostic consistency with earlier definitions. The updated approach improves practical applicability and enhances identification of individuals with meaningful sarcopenic characteristics. Further longitudinal studies are needed to refine age-specific cut-offs and clarify the clinical significance of borderline group.

P570

CHEMERIN AND RESISTIN RATIOS IN SERUM AND SYNOVIAL FLUID OF OSTEOARTHRITIS PATIENTS: A POSSIBILITY OF INTERRELATED INFLAMMATORY AND METABOLIC PATHWAYS

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Objective: To evaluate chemerin and resistin ratios in serum and synovial fluid of patients with osteoarthritis and to investigate their associations with inflammatory markers and ultrasonographic disease severity.

Material and Methods: This pilot study was conducted at the Clinic of Rheumatology, "Kaspela" University Hospital, Plovdiv, between January 2020 and January 2023. A total of 28 patients with knee osteoarthritis (KOA) were included (7 males, 21 females; mean age 66 ± 8.7 years). Inclusion criteria were knee joint pain accompanied by at least three of the following: age ≥40 years, morning stiffness ≤30 minutes, knee joint edema, and absence of palpable warmth in the affected joint. Serum samples were obtained from all patients, while synovial fluid was collected from 16 patients after ultrasonographic confirmation of joint effusion. Concentrations of chemerin, resistin, interleukin-6 (IL-6), and tumor necrosis factor-α (TNF-α) in serum and synovial fluid were measured using enzyme-linked immunosorbent assay (ELISA). Erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), and serum uric acid (UA) were also assessed. All participants underwent ultrasonographic evaluation of the knee joint, with disease activity scored according to Outcome Measures in Rheumatology (OMERACT) definitions. Written informed consent was obtained from all participants in accordance with the Declaration of Helsinki.

Results: The serum chemerin-to-resistin ratio was 28.2 ± 15.3 (median 25.8), while the synovial fluid chemerin-to-resistin ratio was higher at 44.8 ± 32.0 (median 39.3, IQR 27.7–61.8). The serum-to-synovial fluid chemerin ratio was 6.3 ± 3.1 (median 6.1, IQR 4.7–7.9), and the serum-to-synovial fluid resistin ratio was 8.3 ± 6.1 (median 8.0, IQR 5.0–11.5). Correlation analyses demonstrated a significant positive association between the serum chemerin/resistin ratio and ESR (rs = 0.522, p = 0.004) as well as UA (rs = 0.501, p = 0.007). The synovial fluid chemerin/resistin ratio was negatively correlated with CRP (rs = −0.695, p = 0.003). Additionally, the serum-to-synovial fluid chemerin ratio correlated positively with CRP (rs = 0.534, p = 0.033). No other statistically significant associations were observed.

Conclusion: The observed relationships between chemerin/resistin ratios and inflammatory biomarkers support a potential role for interconnected inflammatory–metabolic pathways in knee osteoarthritis. Further longitudinal studies with larger patient cohorts are required to clarify these complex interactions.

P571

EVALUATION OF BONE TURNOVER MARKERS (CTX, PINP, AND OSTEOCALCIN) IN OSTEOPOROTIC WOMEN TREATED WITH DENOSUMAB: A RETROSPECTIVE ANALYSIS

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Objective: To evaluate changes in biochemical bone turnover markers (BTMs), specifically C-terminal telopeptide (CTX), procollagen type 1 N-terminal propeptide (PINP), and osteocalcin in female patients with osteoporosis undergoing denosumab therapy, while providing demographic and therapeutic clinical data.
Methods: This retrospective study included 50 female patients (mean age 69.1 ± 8.5 years) diagnosed with osteoporosis and treated with denosumab (60 mg subcutaneous injection every 6 months), accompanied according to the protocol with daily supplementation of Calcium (1000 mg) and Vitamin D3 (min. 800 IU).The mean treatment duration was 25 ± 8 months. Serum levels of CTX, PINP, and osteocalcin were collected from medical records at baseline and during follow-up. Relative percentage changes from baseline were analyzed.
Results: Denosumab treatment was associated with a rapid and profound suppression of bone resorption, evidenced by a mean reduction in CTX of 73% ($p < 0.001$). Bone formation markers PINP and osteocalcin showed a more gradual decline, with mean reductions of 40% and 34%, respectively ($p < 0.01$). These biochemical changes remained stable throughout the follow-up period in the majority of the cohort.
Conclusion: In this retrospective analysis, denosumab demonstrated a potent inhibition of bone resorption followed by a secondary reduction in bone formation, reflected by characteristic shifts in CTX, PINP, and osteocalcin. Monitoring these markers serves as a valuable clinical tool for assessing treatment efficacy and guiding the management of denosumab therapy.

P572

REMISSION AND LOW DISEASE ACTIVITY WITH RAPID DOSE ESCALATION OF METHOTREXATE IN RHEUMATOID ARTHRITIS: PHYSICIAN AND PATIENT ASSESSMENT

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Objective: To determine the frequency of remission and low disease activity (LDA) achieved with rapid dose escalation of subcutaneous methotrexate (sc MTX) in patients with rheumatoid arthritis (RA), as assessed by both physician and patient.
Methods: The study included 107 RA patients over 18 years old with high disease activity (DAS-28 ≥5.1), who had failed prior oral MTX therapy for at least 6 months or who had not received MTX. MTX therapy was started at a dose of 15 mg/week. During the first month of therapy, the dose of sc MTX was rapidly escalated from 2.5 mg/week once a week to 22.5 mg/week and then, if the response was inadequate, the dose of sc MTX could be increased to 25 mg/week. Disease activity was assessed at 4, 12, and 24 weeks by the physician using the DAS28-CRP (Disease Activity Score 28 C-reactive protein) and by the patient using the RAPID-3 (Routine Assessment of Patient Index Data 3).
Results: Following rapid sc MTX dose escalation, a reduction in disease activity was observed as early as the first month: DAS28 decreased from 5.8±0.75 to 4.96±0.83 (p=0.001), and the patient-assessed RAPID-3 index decreased from 16.2±4.6 to 12.3±4.2 (p=0.01). By weeks 12 and 24, DAS28 activity decreased to 4.00±1.0 and 2.93±1.05, respectively; RAPID-3 scores decreased to 7.32±4.52 and 5.56±4.66, respectively. According to DAS28, LDA was achieved in 1.1% of patients at 4 weeks, 5.6% at 12 weeks, and 27.8% at 24 weeks. DAS28 remission was observed in 12.2% of patients at 12 weeks and 36.7% at 24 weeks. According to RAPID-3, LDA at 4, 12, and 24 weeks was noted in 2.8%, 23.8%, and 22.9% of patients, respectively, while remission was observed in 1.9%, 6.7%, and 35.2% of patients, respectively.
Conclusion: In patients with high RA activity, the therapeutic strategy of initiating treatment with subcutaneous MTX at 15 mg/week and rapidly escalating the dose by 2.5 mg weekly up to 22.5–25 mg/week enables the achievement of treatment targets (remission and LDA according to DAS28) in 17.8% of patients by month 3 and in 64.5% by month 6. Patient assessment (RAPID-3) at month 3 was higher, amounting to 30.5%, while at month 6 it was similar, amounting to 58.1%.

P573

TOLERABILITY OF RAPID DOSE ESCALATION OF METHOTREXATE IN RHEUMATOID ARTHRITIS PATIENTS IN REAL-WORLD CLINICAL PRACTICE

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Objective: To analyse the tolerability of rapid dose escalation subcutaneous methotrexate (sc MTX) in patients with rheumatoid arthritis (RA) with high disease activity in real-world clinical practice.
Methods: The study included 107 RA patients over 18 years old with high disease activity (DAS-28 ≥5.1), who had failed prior oral MTX therapy for at least 6 months or who had not received MTX. MTX therapy was started at a dose of 15 mg/week. During the first month of therapy, the dose of sc MTX was rapidly escalated from 2.5 mg/week once a week to 22.5 mg/week and then, if the response was inadequate, the dose of sc MTX could be increased to 25 mg/week. Tolerability was assessed at each visit (weeks 4, 8, 12, 18, and 24). In cases of poor drug tolerability or the occurrence of adverse events (AEs), the medication was either discontinued or its dose was reduced.
Results: Prior to the initiation of sc MTX, 43.5% of patients were receiving oral MTX at doses ranging from 10 to 20 mg/week (13% - 10 mg/week, 25% - 15 mg/week, 2.2% - 17.5 mg/week, 3.3% - 20 mg/week). Systemic glucocorticoids (GCs) were used by 26.1% of patients at doses not exceeding 10 mg/day (1.1% - 2.5 mg/day; 16.3% - 5.0 mg/day; 1.1% - 7.5 mg/day; 7.6% - 10.0 mg/day); 7.6% of patients required intra-articular GC injections. Patients receiving and not receiving GCs had a similar number of AEs (p>0.05); however, the number of infections was significantly higher in patients on GC therapy (9.5% vs. 0.0%, respectively, p=0.009). With rapid dose escalation sc MTX up to 22.5 mg/week by week 4, nausea appeared in 27.2% of patients and persisted until week 24 of therapy but did not necessitate discontinuation. Vomiting and diarrhea occurred in

2 patients; these symptoms resolved spontaneously by the end of the study. Dyspepsia persisted in 7.6% of patients. 2 patients experienced respiratory tract infections. Anemia and thrombocytopenia were noted in 3 patients at weeks 4 and 12, which resolved spontaneously by week 18. One patient developed a skin rash at week 12. No patient exhibited elevated transaminase levels. There were no serious AEs requiring discontinuation of sc MTX, allowing 92.2% of patients to continue treatment at a dose of 22.5 mg/week by week 24. After 4 weeks, the sc MTX dose was increased to 25 mg/week in 28.3% of patients who did not achieve a 50% improvement according to ACR criteria, provided the drug was well-tolerated. The dose was reduced to 20 mg/week in 6.5% of patients due to gastrointestinal AEs.
Conclusion: The safety profile with rapid dose escalation of sc MTX was acceptable. Early initiation of sc MTX in patients with high disease activity can be considered as the basis for an effective treatment strategy for RA.

P574

THE QUALITY OF LIFE IN PATIENTS WITH RHEUMATOID ARTHRITIS DURING RAPID ESCALATION OF SUBCUTANEOUS METHOTREXATE DOSE

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Objective: To assess the quality of life (QoL) in patients with rheumatoid arthritis (RA) during rapid escalation of the subcutaneous methotrexate (sc MTX) dose in real-world clinical practice.
Methods: The study included 107 RA patients over 18 years of age with high disease activity (DAS-28 ≥5.1), who had failed prior oral MTX therapy for at least 6 months or were MTX-naïve. MTX therapy was initiated at a dose of 15 mg/week. During the first month, the sc MTX dose was rapidly escalated weekly by 2.5 mg/week up to 22.5 mg/week and, in case of an inadequate response, could be further increased to 25 mg/week. QoL was assessed using the EQ-5D (European Quality of Life Questionnaire 5 Dimensions) questionnaire. Anxiety and depression levels were evaluated using the HADS (Hospital Anxiety and Depression Scale), and pain and fatigue levels were measured on a visual analog scale (VAS) from 0 to 100 mm. Assessments were performed at 4, 12, and 24 weeks of the study.
Results: At baseline, patients had low QoL (mean EQ-5D index 0.34±0.29), pronounced joint pain (65.5±13.0 mm on VAS), and fatigue (56.1±20.6 mm on VAS). The mean HADS anxiety score was 7.5±3.1, and the depression score was 7.8±3.8. Following rapid dose escalation of sc MTX, the EQ-5D QoL index improved rapidly to 0.54±0.20 at 4 weeks, 0.64±0.17 at 12 weeks, and 0.78±0.23 at 24 weeks ($p < 0.001$), driven by reduced difficulties in walking and self-care, improvements in usual daily activities, decreased pain, and reduced anxiety and depression symptoms. QoL levels close to average values (EQ-5D index ≥0.52) were recorded in 88.8%, 94.4%, 95.3%, and 97.2% of patients at 4, 12, and 24 weeks, respectively. Population-level QoL (EQ-5D =1.0) was achieved by 45% of patients by week 24. Pain levels decreased to 46.8±15.3 mm within the first month and continued to decline to 35.2±12.4 mm at 12 weeks and 20.5±9.7 mm at 24 weeks. Positive dynamics in fatigue were also noted: 40.2±16.8 mm at 4 weeks, 28.9±12.2 mm at 12 weeks, and 18.1±7.1 mm at 24 weeks. Anxiety levels decreased to 5.1±2.3 at 4 weeks, 3.5±1.5 at 12 weeks, and 2.4±1.1 at 24 weeks. Depression scores also showed a steady decline to 5.8±3.2, 4.1±2.8, and 2.5±1.3 points on the HADS scale, respectively.
Conclusion: Following rapid escalation of the sc MTX dose, patients' QoL according to the EQ-5D index improved rapidly from very low (mean 0.34) to satisfactory (0.78, population norm =1.0). This improvement was due to reduced difficulties in walking and self-care, enhanced performance of usual daily activities, and decreased pain, fatigue, anxiety, and depression symptoms.

P575

COMPARISON OF FOOT ALIGNMENT AFTER TOTAL ANKLE ARTHROPLASTY AND ANKLE ARTHRODESIS : INTERMEDIATE-TERM OUTCOMES

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Background: After ankle arthrodesis(AA), it is increased range of motion in adjacent joints. In this study we sought to comparison of foot alignment after total ankle arthroplasty(TAA) and ankle arthdrodesis(AA).
Methods: The study included 74 patients of TAA(30 patients) and AA(44 patients) performed between June 2010 and March 2016. We assessed clinical outcomes with the American Orthopaedic Foot and Ankle Society(AOFAS)hindfoot score and visual analog scale(VAS), and foot alignment with tibial anterior surface angle(TAS), talar tilt angle(TT), hindfoot alignment angle(HAA), calcaneal pitch angle(CPA), meary;s angle(MA) at preoperative and last follow up.
Results: Both TAA and AA groups, clinical outcomes significantly improved. In the TAA, TT and HAA significantly declined(p=0.00, p=0.00 respectively) ,but TAS and CPA, MA did not differ significantly(p=0,072, p=0.42, p=0.45 respectively). In the AA, TT and HAA, MA significantly declined (p=0.00, p=0.00,p=0.00 respectively), but TAS and CPA did not differ significantly(p=0,36, p=0.76 respectively). In comparison of TAA and AA, TT, HAA, MA was statistically significant (p=0.00, p= 0.008, p=0.00 respectively)
Conclusions: Both TAA and AA groups were improved pain scores and functional outcomes. We were able to detect statistically significant differences in TT and HAA, MA in comparison of TAA and AA. MA showed significant changes only in the AA. We suspect that changes of MA are responsible for the higher rates of talonavicular arthritis.

P576

ASSOCIATION BETWEEN CUSHING'S SYNDROME AND HYPEROSTOSIS FRONTALIS INTERNA WITH INCREASED CRANIAL BONE THICKNESS

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Objective(s):
To investigate the prevalence of hyperostosis frontalis interna (HFI) and its association with cranial bone thickness in patients with endogenous Cushing syndrome.

Material and Methods:
This retrospective cross-sectional study included adult patients with endogenous Cushing syndrome followed at a tertiary endocrinology

center between January 2010 and December 2025 who had available cranial magnetic resonance imaging. Patients were classified according to the presence of HFI on cranial MRI. Frontal, parietal, and occipital bone thicknesses were measured on T1-weighted axial images. Clinical characteristics and biochemical parameters were compared between HFI-positive and HFI-negative groups.

Results:
Among 26 patients with Cushing syndrome, HFI was identified in 9 patients, corresponding to a prevalence of 34.6%. No significant differences were observed between HFI-positive and HFI-negative groups regarding age, disease duration, cortisol, insulin-like growth factor-1, prolactin, fasting plasma glucose, or HbA1c levels. Frontal bone thickness was significantly greater in HFI-positive patients ($p < 0.001$). Parietal and occipital bone thicknesses were also significantly increased in the HFI-positive group ($p = 0.002$ and $p = 0.013$, respectively). Sex distribution, presence of diabetes or hypothyroidism, Cushing etiology, and menopause or Cushing-related hypogonadism did not differ between groups.

Conclusion(s):
Despite the well-known catabolic effects of chronic hypercortisolism on bone, this study demonstrates that HFI is highly prevalent in patients with Cushing syndrome and is accompanied by increased cranial bone thickness. The overlap between the endocrine and metabolic disturbances associated with Cushing syndrome including hypogonadism, androgen suppression, relative estrogenic activity, central obesity, and hyperleptinemia and the hormonal and vascular mechanisms implicated in the pathogenesis of hyperostosis frontalis interna suggests that Cushing syndrome may constitute a distinct biological risk milieu favoring selective cranial bone remodeling. These findings indicate that bone involvement in Cushing syndrome is not limited to systemic osteoporosis but may also include regional osteogenic responses in cranial bones.

P577

LIVING LABS AS INNOVATIVE PLATFORMS FOR FUNCTIONAL ASSESSMENT AND FALL PREVENTION IN OSTEOPOROSIS AND SARCOPENIA CARE

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Background
Living Labs, integrating digital technologies into real-world clinical environments, offer a novel opportunity for ecological, continuous, and objective functional assessment embedded in routine care. Traditional fall risk assessment relies largely on episodic clinical evaluations, which may fail to capture real-life functional performance and early functional decline.
Objective
To evaluate, within the framework of the RAISE project (Robotics and AI for Socio-Economic Empowerment), the role of an intra-hospital Living Lab equipped with non-invasive sensor technologies as a functional laboratory for fall risk assessment and prevention in geriatric patients with osteoporosis and sarcopenia.
Materials and Methods
An integrated non-invasive sensor network was implemented within a hospital-based Living Lab, including sensing textiles embedded in beds and chairs, a sensorised floor, and AI-enabled cameras.
Participants aged ≥65 years referred to the outpatient clinic of our department underwent a multidimensional functional assessment, including sarcopenia screening (SARC-F, bioimpedance analysis, handgrip strength).
Functional parameters such as gait speed, sit-to-stand transitions, spatial trajectories, and sedentary behaviour were continuously collected and compared with standard clinician-based evaluations.
Results
The Living Lab system proved to be reliable, secure, and well accepted by users. Preliminary data showed a high concordance (>80%) between technology-based functional measures and clinician-based assessments. Mobility-related parameters, particularly walking speed and time spent in sedentary positions, emerged as the most discriminative features in identifying subjects at higher functional vulnerability, consistent with known predictors of falls and fractures.
Conclusion
By enabling ecological, continuous, and objective functional evaluation, living labs offer a promising tool to enhance personalised interventions, support real-world evidence generation, and ultimately reduce fall-related fractures in routine care settings.

P578

SARCOPENIA IN TRANSFUSION-DEPENDENT THALASSEMIA: EVIDENCE OF ACCELERATED MUSCULOSKELETAL AGING

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Objective
Sarcopenia is a complex deterioration of muscle mass and function, typically associated with aging. However, its prevalence in younger populations, particularly those with chronic diseases, remains poorly documented. The effect of iron overload on osteoporosis is well-documented, and ferroptosis can impact muscle deleteriously. Thus, individuals with Transfusion-Dependent Thalassemia (TDT) may be at increased risk.
The aim is to assess the prevalence of sarcopenia in TDT patients referring to the Galliera Hospital in Genoa (Italy).
Material and Methods
This retrospective observational study included patients with major/intermediate β-thalassemia. Demographic data and nutritional status (Mini-Nutritional Assessment, MNA) were collected. Participants underwent DEXA to measure femoral neck and lumbar spine (L1–L4) bone mineral density (BMD), and muscle mass with the Relative Skeletal Muscle Index (RSMI). Muscle strength was assessed with Hand Grip (HG). Dynapenia was defined as HG <16 kg in females and <27 kg in males; sarcopenia as RSMI <5.5 kg/m² in females and <7 kg/m² in males. Osteoporosis was classified by a BMD T-score <−2.5.
Results
The sample included 87 participants (mean age 46.5±12.72; 35.6% males). While age did not differ between genders, significant differences were found in HG (F:13.2±2.85 Vs. M:21.9±8.7; p<.001), RSMI (F:5.77±0.95 Vs. M:6.89±0.99; p<.001), and MNA scores (F:25.1±2.9 Vs. M:26.6±2.7; p=0.028). Dynapenia was found in 65/87 patients (74.7%), and sarcopenia in 30/87 (34.5%). Osteoporosis was identified in 49/87

patients (56.3%) based on either femoral neck or lumbar spine BMD. Eighteen patients (20.7%) had both sarcopenia and osteoporosis.

Conclusions

These findings indicate that patients with thalassemia represent a population at increased risk for early-onset muscle and bone impairment. The presence of sarcopenia and osteoporosis at substantially younger ages than expected in the general population suggests an accelerated aging process in individuals with TDT.

P579

PREGNANCY- AND LACTATION-ASSOCIATED OSTEOPOROSIS WITH VERTEBRAL HEIGHT LOSS/FRAGILITY FRACTURES TREATED WITH TERIPARATIDE: TWO CASES

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Background: Pregnancy- and lactation-associated osteoporosis (PLO) is an uncommon cause of severe skeletal fragility in otherwise healthy young women, typically presenting in late pregnancy or early postpartum with disabling back pain and, frequently, multiple vertebral fragility fractures. Although physiological bone loss during lactation is usually transient and reversible, a small subset of women develop clinically significant osteoporosis and fractures, most often involving the thoracolumbar spine. Proposed susceptibility factors include low pre-pregnancy bone mass, low body mass index, family history of osteoporosis, and other unrecognized contributors. Given the rarity of PLO and the limited evidence base, diagnosis relies on careful exclusion of secondary causes and confirmation with imaging and DXA. Therapeutic strategies are individualized, and anabolic therapy has been increasingly reported in severe vertebral fracture presentations.

Objective: To describe the clinical presentation, imaging findings, and bone mineral density profile of two postpartum women with PLO-related vertebral fractures treated with teriparatide.

Materials and Methods: Two postpartum women who presented to the Physical Medicine and Rehabilitation outpatient clinic with acute back pain and were diagnosed with PLO were evaluated. Demographic and clinical characteristics, neurological examination findings, and laboratory tests assessing calcium–phosphate metabolism and potential secondary causes of osteoporosis were reviewed. Spine MRI was assessed to document vertebral levels with height loss and associated imaging features, and DXA was used to measure bone mineral density at the lumbar spine (L1–L4) and left hip (femoral neck and total hip). Both patients received individualized treatment plans including initiation of teriparatide and supplementation with calcium and vitamin D. A thoracolumbosacral orthosis with steel stays was recommended for stabilization, and medical therapy for pain palliation was prescribed. Follow-up was recorded; repeat DXA at 6 months was available for Case 1, while Case 2 remained under ongoing treatment.

Case 1: A 28-year-old primiparous woman (height 165 cm, weight 50 kg; BMI 18.4 kg/m²) presented 3 months postpartum after 12 weeks of lactation with acute thoracolumbar pain and reported height loss. There was no neurological deficit. MRI of the thoracic spine demonstrated acute compression fractures at T10–T11 with mild central height loss and associated bone marrow edema. Lumbar MRI revealed mild height loss at the inferior endplate of L2 and the superior endplates of L4 and L5. She had low BMI and a maternal history of osteoporosis; there was no smoking, alcohol use, secondary medication exposure, or known endocrine disease. Laboratory evaluation showed 25(OH)D 40.2 ng/mL, calcium 9.8 mg/dL, phosphate 3.1 mg/dL, PTH 44 pg/mL, ALP 112 U/L, creatinine 0.6 mg/dL, ESR 2 mm/h, and CRP 1.5 mg/L. Baseline DXA demonstrated severe lumbar osteoporosis (L1–L4 T/Z −4.0/−4.2) with less severe hip involvement (femoral neck T/Z −2.2/−2.2; total hip T/Z −1.9/−2.0). After 6 months of teriparatide, lumbar spine T/Z improved to −3.0/−3.0; femoral neck remained stable (T/Z −2.2/−2.0), and total hip was similar (T/Z −2.0/−1.9).

Case 2:

A 29-year-old primiparous woman (height 152 cm, weight 53 kg; BMI 22.9 kg/m²) developed back pain one month postpartum and breastfed for 6 months. No neurological deficit was present. MRI reported mild concave vertebral height loss at T12, L4, and L5. She had no family history of osteoporosis and no smoking, alcohol use, secondary medication exposure, or known endocrine disease. Laboratory tests were not suggestive of secondary osteoporosis or systemic inflammation (ESR 5 mm/h, CRP 1.7 mg/L, calcium 9.7 mg/dL, phosphate 4.01 mg/dL, 25[OH]D 49.2 ng/mL, PTH 40 pg/mL, ALP 108 U/L, TSH 3.5 mIU/L, Hb 12.2 g/dL, WBC 5.58×10⁹/L). Baseline DXA demonstrated severe lumbar osteoporosis (L1–L4 T/Z −4.1/−3.8) and osteopenic hip measurements (femoral neck T/Z −2.4/−2.1; total hip T/Z −1.9/−1.6). Teriparatide with calcium and vitamin D supplementation was initiated, and follow-up is ongoing.

Table 1. Clinical characteristics and DXA findings

Variable	Case 1	Case 2
Age (years)	28	29
Height / weight	165 cm / 50 kg	152 cm / 53 kg
BMI (kg/m²)	18.4	22.9
Parity	G1P1	G1P1
Postpartum timing at presentation	3 months	1 month
Lactation duration	12 weeks	6 months
Neurological deficit	No	No
Main MRI levels with height loss	T10–T11 (acute, edema); L2, L4–L5	T12, L4–L5
DXA baseline L1–L4 (T / Z)	−4.0 / −4.2	−4.1 / −3.8
DXA baseline femoral neck (T / Z)	−2.2 / −2.2	−2.4 / −2.1
DXA baseline total hip (T / Z)	−1.9 / −2.0	−1.9 / −1.6
DXA at 6 months (T / Z)	L1–L4: −3.0 / −3.0; neck: −2.2 / −2.0; total: −2.0 / −1.9	Ongoing

Discussion

Both patients presented in the early postpartum period with significant back pain and radiological vertebral height loss, accompanied by markedly reduced lumbar spine BMD (baseline L1–L4 T-scores around −4), while hip involvement was comparatively less severe. This pattern aligns with published cohorts in which PLO most commonly affects the trabecular-rich spine and manifests with thoracolumbar vertebral fractures and height loss. In Case 1, low BMI and a maternal history of osteoporosis may have represented predisposing factors, whereas Case 2 illustrates that severe lumbar osteoporosis can occur even without

an obvious risk profile, consistent with reports that many women have no clear secondary cause at presentation. A structured evaluation to exclude secondary osteoporosis is essential and was supported by largely unremarkable calcium–phosphate and endocrine markers in both cases. Management in PLO is not standardized; however, conservative measures (pain control, bracing, and calcium/vitamin D supplementation) are widely used, and recent systematic evidence suggests that active pharmacologic intervention may be considered in severe cases. Notably, Case 1 demonstrated a substantial lumbar spine improvement after 6 months of teriparatide (T/Z from −4.0/−4.2 to −3.0/−3.0), consistent with published case-based evidence and pooled analyses indicating meaningful spine BMD gains with anabolic therapy.

Conclusion: Pregnancy- and lactation-associated osteoporosis should be considered in the differential diagnosis of severe postpartum back pain, particularly when accompanied by height loss or imaging abnormalities. Early recognition with MRI and DXA, exclusion of secondary osteoporosis, and timely supportive management are critical. In severe presentations, anabolic therapy such as teriparatide may be a reasonable option; in our series, lumbar spine BMD improved after 6 months in one patient, while treatment and follow-up remain ongoing in the second case.

Disclosures: The authors declare no conflicts of interest.

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FIGURE 1. CASE 1 – MRI (THORACIC/LUMBAR) AND DXA

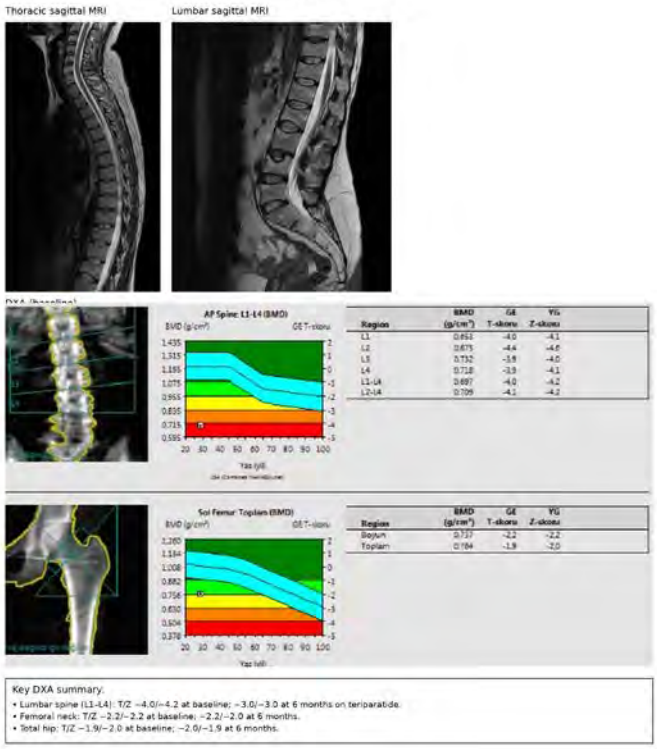
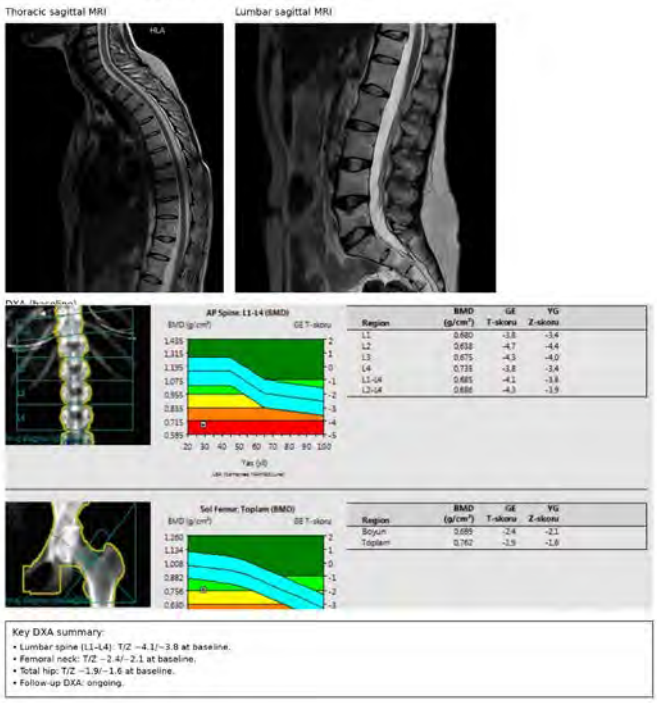


FIGURE 2. CASE 2 – MRI (THORACIC/LUMBAR) AND DXA



P580

EARLY DETECTION OF SKELETAL FRAGILITY IN BREAST CANCER PATIENTS WITH RADIOFREQUENCY ECHOGRAPHIC MULTI SPECTROMETRY (REMS)

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Objective(s): Patients with cancer are particularly prone to skeletal deterioration and fragility fractures as a result of the disease itself and/or its treatment. Alterations in sex hormone levels, including testosterone and oestradiol which are key regulators of bone metabolism, play a central role in hormone-dependent cancers, such as breast cancer, contributing to bone loss and structural deterioration. This condition may be further exacerbated by aromatase inhibitors, including letrozole, which are generally associated to a significant decrease in bone mineral density (BMD).

Therefore, the present study aimed to evaluate the impact of letrozole therapy on fracture risk in breast cancer patients using Radiofrequency Echographic Multi-Spectrometry (REMS) technology.

Materials and Methods: Caucasian women with a diagnosis of breast cancer underwent REMS scans of lumbar spine (L1-L4). The technology integrates quantitative indicators of bone mass, namely BMD, T-score and Z-score, with a quantitative parameter of bone quality expressed by the Fragility Score (FS), to automatically classify patients into one of the seven risk classes (R1–R7), along with a corresponding probability to experience a short-term (within 5 years) major osteoporotic fracture.

Results: A total of 42 women were enrolled and included in the study with the following anthropometric characteristics: mean age = 63.78 ± 7.79 years and mean BMI = 27.94 ± 4.18 kg/m². The densitometric examinations showed reduced bone density (mean T-score -1.9 ± 0.8) and microarchitecture deterioration (mean FS = 55.34 ± 3.03). The fracture risk analysis classified patients in high-risk classes. Notably, 40% of patients treated with letrozole were classified in the highest risk classes (R5-R7).

Conclusion(s): Overall, the findings of this study highlight the significant skeletal fragility experienced by women affected by breast cancer. REMS has been shown to be a reliable, non-invasive technique for the early detection of fracture risk, providing a valuable alternative to conventional assessment methods. Therefore, REMS could be an important tool in managing osteoporosis in oncology patients, helping to reduce skeletal complications and preserve quality of life.

P581

INTEGRATED REMS AND MICRORNA-BASED EVALUATION OF MUSCULOSKELETAL IMPAIRMENT IN TYPE 2 DIABETES MELLITUS (T2DM)

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Objective(s): Type 2 diabetes mellitus (T2DM) is frequently associated with an increased risk of fragility fractures despite patients showing normal bone mineral density (BMD), a condition known as "diabetic bone paradox". This phenomenon is driven by bone alterations related to chronic hyperglycaemia, advanced glycation end products (AGEs) and impaired collagen-cross linking and it is often accompanied by muscle conditions such as sarcopenia. The aim of this study was to explore the relationship between T2DM and locomotory system using Radiofrequency Echographic Multi Spectrometry (REMS) technology integrated to an *in silico* analysis of circulating microRNAs (miRNAs).

Materials and Methods: Individuals with (patient group) or without (healthy control group) T2DM condition were enrolled. Bone health status was evaluated by REMS-derived T-score and Fragility Score (FS) at both lumbar spine and femoral neck, whereas muscle health status was evaluated by REMS muscle quality index (MQI) at forearm and thigh. In parallel, an *in silico* analysis was performed using the HMDD v4.0, InteractiVenn, miRDB, WebGestalt and STRING databases to identify common miRNAs between T2DM, sarcopenia and osteoporosis, along with their target genes and hub proteins.

Results: The study included 48 subjects (24 per group), aged 60–80 years and with a BMI of 21–33 kg/m². MQI values were significantly higher in T2DM patients than in the control group at both thigh (84.13 ± 12.27 *vs*. 67.35 ± 17.60; $p < 0.0001$) and forearm (59.84 ± 9.71 *vs*. 36.22 ± 3.57; $p < 0.0001$). Bone assessment showed REMS-derived T-scores = −1.6 ± 0.64 and −1.6 ± 0.58, with reduced FS values (54.2 ± 14 and 49.3 ± 12) at lumbar spine and femoral neck, indicating increased skeletal fragility. Bioinformatic analysis identified 6 common miRNAs associated to T2DM, sarcopenia, and osteoporosis, targeting genes mainly involved in collagen organisation, bone remodelling, and muscle metabolism.

Conclusion(s): Patients with T2DM show concomitant impairment of bone quality and muscle status that cannot be fully captured by BMD alone. Integrating REMS-derived musculoskeletal assessment with miRNA bioinformatic analysis is a promising, non-invasive strategy for early detection of T2DM-related musculoskeletal deterioration and improved fracture risk stratification.

P582

REMS-BASED EVALUATION OF FRACTURE RISK IN KIDNEY TRANSPLANT RECIPIENTS

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FRC, GDV, GP, FAL and CS equal contributors in alphabetic order

Objective(s): Kidney transplantation is an invasive procedure often associated with long-term musculoskeletal complications, including reduced bone mineral density (BMD) and altered trabecular microarchitecture, resulting in an increased fracture risk. Immunosuppressive therapy and disruption of the parathyroid hormone–vitamin D–FGF23 axis further contribute to bone damage. This study aimed to evaluate short-term fracture risk in kidney transplant recipients using Radiofrequency Echographic Multi Spectrometry (REMS).

Materials and Methods: Inclusion criteria were as follows: men and women who had previously undergone a kidney transplant. All participants underwent REMS evaluation of the lumbar spine (L1–L4). This ultrasound-based technique analyses native radiofrequency signals by comparing them with a reference database, allowing the assessment of bone quantity (BMD, T-score, Z-score) and bone quality through the Fragility Score (FS), an index that indicating microarchitectural deterioration and skeletal fragility. By integrating REMS T-score and REMS FS, patients were automatically classified into one of the seven risk classes (R1–R7) along with a probability to experience a short-term(within 5 years) major osteoporotic fracture.

Results: At the end of the enrolment, *n* = 50 individuals were included in the analysis (mean age = 55–85 years and mean BMI = 18–26 kg/m²). The analysis of the short-term fracture risk revealed that all the participants were categorised into high-risk classes, and predominantly within R5 and R6. The corresponding estimated five-year probability of major osteoporotic fractures was found to range from 3.5% to 6% in R5, increasing to 6% - 10% in R6.

Conclusion(s): These findings demonstrate that kidney transplant recipients are at substantial risk of fragility fractures, emphasising the importance of regular bone health monitoring. REMS is a valuable non-invasive approach for evaluating bone density and microarchitecture. These findings support the implementation of early, individualised preventive strategies to reduce fracture occurrence and improve long-term patient management.

P583

BONE PROFILE IN PATIENTS AFTER LIVER TRANSPLANTATION: A CROSS-SECTIONAL ANALYSIS

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Background:
Osteoporosis is a well-recognized complication in patients following liver transplantation (LT). Data on bone health in post-LT populations from the Middle East remain limited.

Objectives:
To determine the prevalence of osteoporosis and fragility fractures and to assess bone mineral density (BMD) and trabecular bone score (TBS) in patients after liver transplantation.

Methods:
This cross-sectional study included 80 post-liver transplant patients. Demographic data, etiology of liver disease, comorbidities, and fracture history were collected. Bone mineral density (BMD) was assessed using dual-energy X-ray absorptiometry (DXA), and trabecular bone score (TBS) was evaluated where available. Osteoporosis and osteopenia were defined according to World Health Organization criteria.

Results:
The mean age was 57.3 ± 13.5 years, with 58.8% males. Qatari nationals comprised 38.8% of the cohort. The most common cause of chronic liver disease leading to LT was hepatitis C virus infection (43.8%), followed by cryptogenic cirrhosis (12.5%), alcohol-related liver disease (11.3%), non-alcoholic steatohepatitis (10%), hepatitis B virus infection (8.8%) and autoimmune hepatitis (8.8%).
DXA data were available for 74 patients. Osteoporosis was present in 37.8%, osteopenia in 36.5%, and normal BMD in 25.7%. TBS assessment (n = 32) showed degraded or partially degraded bone microarchitecture in 37.6%, while 62.5% had normal TBS.
Fragility fractures were documented in 13.8% of patients, with vertebral fractures being the most frequent (45.5%), followed by proximal humerus (45.5%), distal radius (27.3%), distal fibula (9.1%). Multiple fractures were observed in 3.8% of patients. Osteoporosis and osteopenia was observed in 63.6% and 27.3% of patients with fragility fracture. Common comorbidities included diabetes mellitus (61.3%), chronic kidney disease (33.8%).

Conclusion:
Bone disease is highly prevalent among post-liver transplant patients, with a substantial burden of osteoporosis, impaired bone microarchitecture, and fragility fractures. These findings highlight the importance of routine bone health assessment and early intervention strategies in the post-transplant population to reduce fracture risk and improve long-term outcomes.

P584

OSTEOSARCOPENIA AND MUSCULOSKELETAL PHENOTYPES IN DIFFERENT IDIOPATHIC INFLAMMATORY MYOPATHIES: A CROSS-SECTIONAL DXA STUDY

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Objectives

To assess osteosarcopenia prevalence in IIM and characterize dual-energy X-ray absorptiometry (DXA)-derived musculoskeletal phenotypes.

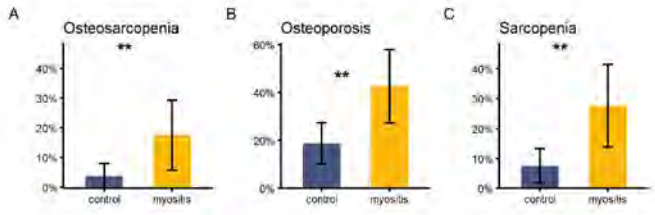
Material and Methods

Patients fulfilling the 2017 EULAR/ACR criteria for IIM were compared with age- and sex-matched controls (1:2). DXA assessed body composition and bone mineral density. Sarcopenia and osteoporosis were defined by EWGSOP2 and WHO criteria, and osteosarcopenia as their coexistence. Lower limb lean mass percentage was calculated as a ratio of lower limb lean to total lower limb mass. Univariable logistic regression analyses were used to screen predictors of osteosarcopenia, followed by multivariable models adjusted for age and sex.

Results

Forty patients with IIM (median age 61 years, 75% female) and 80 matched controls were included. Osteosarcopenia was more prevalent in IIM than in controls (17.5% vs 3.7%, p=0.026). Osteoporosis (42.5% vs 18.8%, p=0.011) and sarcopenia (27.5% vs 7.5%, p=0.007) were also more frequent in the IIM group (**figure 1**).

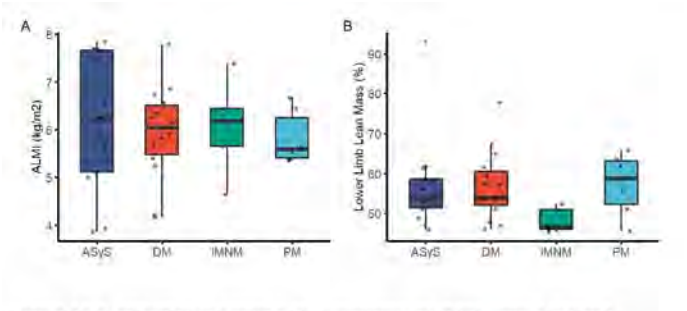
Figure 1. Prevalence of osteosarcopenia (A), osteoporosis (B), and sarcopenia (C) in myositis and controls (%, 95% CI).



Legend: control and myositis groups are shown in blue and yellow bars, respectively. Error bars represent 95% confidence intervals. Asterisk (*) indicates a statistically significant difference between groups (p < 0.05).

Appendicular Lean Mass Index (ALMI) did not differ across subtypes, while immune-mediated necrotizing myopathy showed a numerically lower lower limb lean mass percentage (p = 0.057, **figure 2**).

Figure 2. Prevalence of osteosarcopenia (A), osteoporosis (B), and sarcopenia (C) in myositis and controls (%, 95% CI).



Legend: ASyS, antisynthetase syndrome; DM, dermatomyositis; IMNM, immune-mediated necrotizing myopathy; PM, polymyositis. ALMI was calculated as appendicular lean mass divided by height squared. Lower limb lean mass is expressed as percentage of total lean mass.

In univariable analyses, BMI was associated with osteosarcopenia and remained the only independent predictor in multivariable models (OR 0.50 per kg/m², 95% CI 0.29–0.87). No association was observed for disease duration or cumulative glucocorticoid exposure.

Conclusions

Osteosarcopenia is a frequent condition in IIM, substantially more prevalent than in healthy controls and not explained by disease duration or cumulative glucocorticoid exposure, suggesting a disease-related musculoskeletal phenotype. DXA-derived phenotypes highlight heterogeneity in muscle distribution across IIM subtypes and may support a phenotype-based approach to clinical assessment.

P585

REAL-WORLD REBOUND PATTERN OF SERUM COLLAGEN TYPE I C-TELOPEPTIDE AFTER DENOSUMAB DISCONTINUATION AND ZOLEDRONATE RESCUE IN POSTMENOPAUSAL OSTEOPOROSIS AND CANCER TREATMENT-INDUCED BONE LOSS

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Background. Denosumab (Dmab) discontinuation induces rebound bone resorption, only partially prevented by zoledronate (ZOL). However, both the continuous temporal pattern of rebound under real-world conditions and the biological determinants of rebound magnitude remain insufficiently characterized.

Methods. We retrospectively studied 65 women discontinuing Dmab who received a single 5-mg ZOL infusion 6 months later (30 postmenopausal osteoporosis (PMO), 35 cancer treatment–induced bone loss (CTIBL). Serial serum CTX measurements (190 observations) from −30 to +360 days relative to ZOL were analyzed using linear mixed-effects models with patient-level random intercepts and natural cubic splines for time, adjusted for age and Dmab duration. Rebound magnitude was defined as the absolute increase in CTX from on-Dmab levels. Linear regression models evaluated the independent associations of prior BMD gain, duration of Dmab exposure, and depth of CTX suppression during Dmab (CTX drop from pre-Dmab to nadir) with rebound magnitude.

Results. CTX exhibited a reproducible non-linear trajectory, with a rapid

rise and peak at 6–9 months after ZOL followed by partial decline by 12 months; spline models substantially outperformed linear specifications (ΔAIC >20). Rebound trajectories were similar between PMO and CTIBL (time×group p>0.3). Rebound magnitude was not associated with BMD gain at any skeletal site (all p>0.12), whereas greater CTX suppression during Dmab and longer Dmab exposure independently predicted higher rebound levels (CTX drop p=0.022). Only one vertebral fracture occurred during follow-up.

Figure 1. s-CTX-I trajectories following Dmab discontinuation and zoledronate infusion: overall cohort (panel A), PMO and CTIBL subgroups (panel B). No significant between group were observed

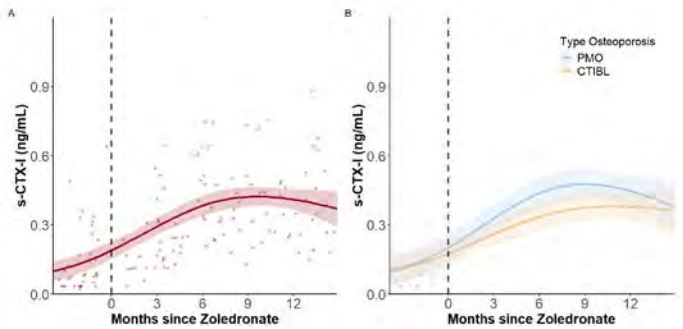


Table 1. Baseline characteristic of the included subjects. Data are expressed as mean (SD).

	All (n= 66)	PMO (n= 30)	CTIBL (n= 36)	p-value
Age (years)	69.09 (9.92)	72.17 (7.56)	66.53 (10.98)	0.0167
BMI (kg/m²)	24.16 (3.56)	24.08 (3.65)	24.22 (3.54)	0.8748
Menopause age (years)	47.56 (5.86)	47.37 (6.94)	47.72 (4.89)	0.8142
eGFR (mL/min)	70.99 (17.44)	67.45 (12.95)	73.93 (20.15)	0.1197
Dmab duration (years)	5.00 (2.35)	6.57 (2.27)	3.69 (1.47)	< 0.001
s-CTX-I under Dmab (ng/mL)	0.12 (0.12)	0.11 (0.13)	0.12 (0.12)	0.7342
T score LS	-1.61 (1.04)	-1.81 (1.07)	-1.41 (1.07)	0.0816
T score FN	-1.60 (0.82)	-1.86 (0.69)	-1.54 (0.89)	0.1010
T score TH	-1.04 (0.88)	-1.23 (0.85)	-0.89 (0.89)	0.1138
BMD LS (g/cm²)	0.84 (0.12)	0.82 (0.12)	0.85 (0.12)	0.1092
BMD FN (g/cm²)	0.65 (0.09)	0.63 (0.08)	0.67 (0.10)	0.1144
BMD TH (g/cm²)	0.85 (0.10)	0.83 (0.10)	0.87 (0.10)	0.0835
% BMD gain during Dmab – LS	17.3 (14.5)	22.5 (15.0)	12.8 (11.7)	0.0097
% BMD gain during Dmab – FN	6.1 (11.2)	9.87 (12.4)	2.87 (8.95)	0.0151
% BMD gain during Dmab – TH	2.7 (8.9)	3.81 (10.0)	1.71 (7.44)	0.3099

Legend: PMO = Postmenopausal Osteoporosis, CTIBL = Cancer Treatment Induced Bone Loss, BMI = Bone Mass Index, eGFR = estimated Glomerular Filtration Rate, Dmab = Denosumab, s-CTX-I = serum C-terminal telopeptide of type I collagen, LS = Lumbar Spine, TH = Total Hip, FN = Femoral Neck

Conclusions. This real-world study provides a dual contribution: it defines the non-linear temporal signature of post-Dmab rebound despite ZOL rescue and demonstrates that rebound magnitude is driven by the depth of prior turnover suppression rather than densitometric response. These findings support turnover-guided, biologically informed strategies for post-Dmab management.

P586

DEVELOPMENT AND EXPERT VALIDATION OF AN INTERNATIONAL POSTMENOPAUSAL OSTEOPOROSIS RISK ASSESSMENT AND LIFESTYLE (IPORL) QUESTIONNAIRE

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Background: Osteoporosis affects over 200 million women globally, contributing to significant morbidity and socioeconomic burden. Despite the availability of standardized tools such as FRAX and OKAT, few instruments comprehensively assess both biomedical and lifestyle risk factors while remaining adaptable for Postmenopausal women internationally.

Objective: To develop and establish the content validity of an internationally adaptable osteoporosis risk and lifestyle questionnaire for postmenopausal women.

Methods: A 60-item questionnaire was constructed from four validated frameworks: The Menopause Rating Scale (MRS), The Osteoporosis Knowledge Assessment Tool (OKAT), WHO FRAX clinical risk factors, and WHO STEPwise (STEPS) approach. Sociodemographic data were incorporated as the first section of the instrument. Twenty-two multidisciplinary experts in endocrinology, gynecology, family medicine, orthopedics, and public health independently rated each item for relevance, clarity, and necessity on a 4-point scale. The Item-level Content Validity Index (I-CVI) for relevance and modified kappa (k*) were calculated as well as comment burden for each item. Qualitative feedback underwent further content analysis. Decisions to retain, revise, or remove items were based on integrated quantitative and qualitative analysis of experts' recommendations.

Results: Quantitative analysis showed relevance I-CVI values ranging from 0.68–1.00 (S-CVI = 0.92); k* values 0.67–1.00, indicating good to excellent agreement. Comment burdens per item were predominantly low, with 36 items (60%) receiving 0–2 comments, 17 items (28%) receiving 3–5 comments, and only 7 items (12%) receiving six or more comments. Therefore, 32 items retained, 27 revised, and 1 removed. Following further qualitative analysis of the experts' comments, 26 were retained, 32 revised, and 2 removed (household income and menstrual irregularity). Overall, 98% of expert-endorsed items were retained or refined, yielding a 58-item final version.

Conclusion: The International Postmenopausal Osteoporosis Risk assessment and Lifestyle Questionnaire (IPORL-Q) comprising 58 items across five sections 1) Sociodemographic, 2) The Menopause Rating Scale (MRS), 3) Osteoporosis Knowledge Assessment Tool (OKAT), 4) WHO FRAX clinical risk factors, and 5) The WHO STEPwise (STEPS) approach. The IPORL-Q demonstrates excellent content validity, linguistic clarity, and adaptability for global use. It provides a robust foundation for psychometric validation and cross-cultural research in postmenopausal osteoporosis assessment and prevention.

P587

PERSISTENTLY LOW SERUM ALKALINE PHOSPHATASE IN ADULTS: PREVALENCE AND CLINICAL CHARACTERISTICS AT A TERTIARY CARE HOSPITAL

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Background: Alkaline phosphatase (ALP) is an essential enzyme in skeletal and mineral metabolism. While elevated ALP levels are routinely investigated, persistently low ALP values are often overlooked, despite their potential link to hypophosphatasia (HPP). This study aimed to assess the prevalence and clinical characteristics of adults with persistently low ALP.

Methods: We conducted a retrospective review of adult patients with serum ALP testing at King Abdulaziz Medical City, Riyadh, from January 2017 to December 2024. Among 243,362 adult patients with 928,403 ALP measurements, individuals with +≥2 low ALP results (<40 IU/L) were identified and secondary causes of low ALP were excluded. Clinical, biochemical, imaging, and family data were analyzed.

Results: 7,307 patients (3.0%) had at least one ALP measurement <40 IU/L. Of these, 179 had ≥2 low ALP results. After excluding 154 patients with secondary causes or incomplete data, 25 patients (0.07%) were identified as having persistently low ALP. The mean age was 52.2 years (range: 18–92), with a female predominance (68%). The mean nadir ALP was 30.2 IU/L, and the mean ALP across all measurements was 34.9 IU/L. Musculoskeletal pain (92%) and fatigue (79%) were the most frequent symptoms, followed by dental abnormalities (50%)., anxiety (33%), and depression (29%). Nearly half of the cohort (46%) reported fractures, predominantly vertebral, hip, and metatarsal. DXA scans (n =10) showed osteopenia or osteoporosis in half of the patients. Subgroup analysis demonstrated significant negative correlations between ALP levels and musculoskeletal symptoms (p = 0.021). Familial clustering was observed in 25% of index patients. Notably, persistently low ALP values were consistently under-recognized in clinical documentation.

Conclusion: Persistently low ALP is uncommon but clinically significant. Most affected patients exhibited symptoms overlapping with HPP, and familial clustering suggests a genetic predisposition. Recognition of this biochemical marker is essential to prevent misdiagnosis and avoid inappropriate therapies such as bisphosphonates. Systematic screening and incorporation of genetic testing and family evaluation may improve early identification of HPP and refine diagnostic algorithms.

Keywords: Alkaline phosphatase, Hypophosphatasia, Rare bone disease, Musculoskeletal pain, Biochemical marker

P588

SUSTAINED INCREASES IN LUMBAR SPINE AND HIP BMD AFTER 10 YEARS OF DENOSUMAB THERAPY

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Introduction: Denosumab treatment over 10 years results in sustained increases in BMD at the lumbar spine and hip and lower fracture rates. In the FREEDOM trial, this BMD rise was greatest in the earlier years of therapy with the rate of increase declining over time. However, data on efficacy and safety is lacking beyond 10 years. We present the case of female who demonstrated large and continued rises in BMD beyond 10 years of treatment

Case: An 80-year-old woman was referred to our Bone Health Clinic in 2012 for advice regarding osteoporosis diagnosed one year earlier after routine DXA revealed a lumbar spine T-score of -4.2 (0.585 g/cm²) and total hip T-score of -4.0 (0.503 g/cm²). Her GP commenced alendronate 70 mg once weekly. She had no prior fragility fractures and aside from menopause, the only osteoporosis risk factor was previous smoking. Based on her preference, we switched her treatment to denosumab and she was discharged back to her GP.

She continued denosumab over the next decade but in her 10th year of treatment she fell and sustained a left hip fracture. Repeat DXA revealed a T-score of -2.7 (0.754 g/cm²) in lumbar spine and -3.0 (0.572 g/cm²) in total hip and with a suppressed C-telopeptide cross-link type 1 collagen (CTX) of 0.078 ng/ml. Our orthogeriatric service advised her to continue denosumab for another 3 years. Follow up DXA three years later revealed a significant improvement in BMD at lumbar spine and total hip with respective T-scores of -2.1 (0.814 g/cm²) and -2.7 (0.610 g/cm²) representing a BMD increase of 8.0% and 6.6%. Denosumab was continued with a plan for review in two years and advice given that therapy may need to be lifelong.

Discussion: This case illustrates that continued denosumab therapy beyond 10 years can be associated with further clinically significant increases in BMD at both the lumbar spine (8.0%) and total hip (6.6%) over a subsequent 3 years. Most guidelines do not address longer-term use (>10 years) though the Endocrine Society advises it in patients at high risk of fracture. Further increases in BMD may allow some patients to achieve a desirable treatment target though studies on safety and efficacy are needed.

P589

RECURRENT ANTERIOR UVEITIS SECONDARY TO DENOSUMAB

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Presentation: Bisphosphonates including zoledronic acid have been associated with the development of uveitis. However, to our knowledge acute uveitis has never been described in association with denosumab therapy. We report on a female who was diagnosed with acute uveitis within hours of receiving her denosumab injection on two separate occasions.

Case report:
A woman in her 50s attending our bone health clinic in 2012 was started on denosumab for the treatment of osteoporosis. Medical history included COPD, hypertension and hereditary optic atrophy. After 5 hours of receiving her second injection of denosumab she developed bilateral painful red eyes. Slit lamp examination demonstrated conjunctival injection and inflammatory cells in the anterior chamber and there was normal intraocular pressure. Fundoscopy revealed no acute changes, and no macular oedema. She was diagnosed with acute uveitis and was treated with steroid antibiotic eye drops for 4 weeks with symptoms and signs fully resolving. Six months later, within 3 hours of her third denosumab injection she developed a painful red eye. Urgent ophthalmology assessment again confirmed a diagnosis of anterior uveitis with symptoms rapidly resolving with steroid drops. Her denosumab was stopped and investigation for idiopathic causes of uveitis including syphilis, sarcoidosis and TB were negative. HLA-B27 was positive, though there were no clinical manifestations of autoimmune disease at any point. Furthermore, on follow up over 13 years there has been no recurrence of uveitis.

Discussion/Conclusion:
To our knowledge, this is the first described case of an association of denosumab therapy with uveitis and meets the Naranjo criteria for probable causation. The occurrence of uveitis within hours of denosumab administration on two occasions combined with the long term absence of recurrence on stopping suggests it may be a precipitating factor. Drug associated anterior uveitis in predisposed patients with HLA B27 positivity is reported as have drug reactions in association with HLA-B27 and other HLA genotypes. This suggests that denosumab may have been a precipitant of uveitis in our patient who had an underlying predisposition due to HLA-B27 positivity.

P590

LARGE INCREASE IN HIP AND SPINE BMD AFTER COMBINATION THERAPY WITH DENOSUMAB AND TERIPARATIDE: REAL WORLD EXPERIENCE

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Introduction: Combination therapy with denosumab and teriparatide results in greater gains in bone mineral density (BMD) than either therapy alone. This has been demonstrated in the DATA study and some clinical case series. We report on changes in BMD and bone turnover markers (BTMs) resulting from combination therapy with teriparatide and denosumab in a specialist bone health clinic.
Materials and Methods: We retrospectively identified patients at our osteoporosis clinic who had completed two years of combined teriparatide and denosumab therapy (started concurrently). All patients had densitometric (DXA) measured areal BMD at the hip and lumbar spine within the 12 months before starting and after 24 months of combined therapy. We examined for changes in BTM and BMD due to treatment.
Results: 13 patients were identified and the mean age was 79 years (range 68-89). Mean T score at the lumbar spine was -3.8 and at total hip -2.8. The mean change in BMD at the lumbar spine (excluding 3 patients where it could not be assessed) was 0.103g/cm 2 ($p<0.0001$) representing an 18.0% increase. Of eleven patients where changes in hip BMD were assessed (excluding one interval hip replacement and another hip fracture 5 months after starting treatment), the mean increase was 0.051g/cm 2 ($p=0.002$) representing a 9.3% improvement. After 6 months of treatment there was a decline in mean C-terminal telopeptide (CTx) from 0.247ng/ml at baseline to 0.169 ($P=0.367$) and an increase in Procollagen type 1 N-terminal propeptide (P1NP) from 44.7ng/mL to 54.5 ($P=0.274$), though these differences were not statistically significant.
Conclusion: Combination therapy with teriparatide and denosumab resulted in significant gains in BMD at the spine (18.0%) and hip (9.3%). The lack of significance in bone turnover markers is likely due to the small sample size. While only a small patient sample, this compares more favourably than teriparatide monotherapy in trials. A limitation is that some patients had a DXA up to 12 months prior to starting the combination which may account for a small component of the BMD rise. Results confirm the real-world effectiveness therapy in clinical practice.

P591

ROBOTIC TRANSTHORACIC EXCISION OF MEDIASTINAL PARATHYROID ADENOMA

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Introduction: Primary hyperparathyroidism results from a parathyroid adenoma in 80% of cases. However, 10-20% of patients have an ectopic gland which can be more difficult to locate on imaging and to remove surgically. We present the case of female with a mediastinal parathyroid adenoma which was surgically resected under robotic assisted thoracoscopy.

Case Report: A 46-year-old female was referred to our Bone Health Clinic with a diagnosis of osteoporosis on a background of early menopause. Screening blood tests revealed a mild hypercalcaemia (serum calcium 2.51mmol/L) and elevated parathyroid hormone (PTH) of 115.4 pg/mL consistent with primary hyperparathyroidism. A sestamibi scan identified a focus of intense uptake in the superior mediastinum consistent with a retrosternal parathyroid adenoma. Ultrasound also demonstrated a hypoechoic nodule in the left lobe of thyroid suggesting an additional left superior parathyroid adenoma. MRI imaging of neck and thorax revealed only an enhancing 4 mm parathyroid adenoma in the superior mediastinum. Minimally invasive explorative surgery was initially done via a transcervical approach and the left superior parathyroid gland was removed. However, her serum PTH and calcium remained elevated and she was referred to the cardiothoracic surgeons. To re-examine the location of mediastinal adenoma, a multiphase CT and sestamibi scan was done, which identified a sub centimetre nodule anterior to the descending aorta. Under robotic assisted thoracoscopy, no parathyroid adenoma was visualised but a 6mm nodule of mediastinal thymus tissue was removed which corresponded to the location on imaging. This was confirmed histologically as parathyroid tissue within fatty thymus. Her calcium and PTH normalised postoperatively to a respective 2.19 nmol/l and 40 pg/ml and have remained normal.

Discussion: Mediastinal parathyroid adenomas may be difficult to localise intraoperatively highlighting the value of prior imaging with MRI or multiphase CT. When surgical resection is not possible via the transcervical approach, robotic assisted thoracoscopy can be used to remove adenomas, avoiding the morbidity associated with sternotomy or thoracotomy.

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SAPHO SYNDROME TREATED WITH ZOLEDRONIC ACID AND ANTI-TNFA (INFLIXIMAB) THERAPY: A CASE REPORT

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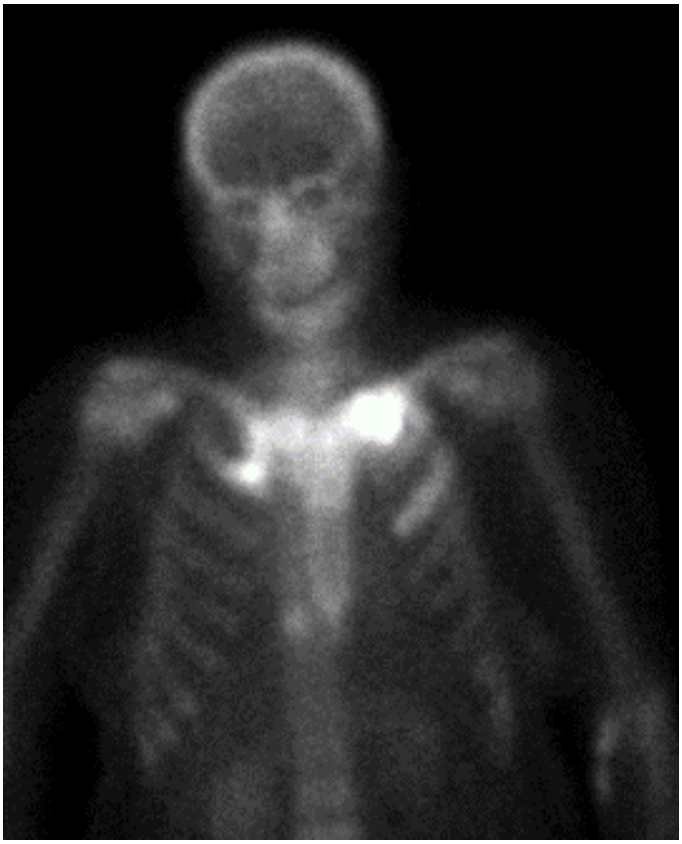
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Introduction: SAPHO syndrome (Synovitis, Acne, Pustulosis, Hyperostosis, Osteitis) describes a spectrum of rare inflammatory osteoarticular and dermatological diseases. Case reports and observational data suggest that anti-TNFα and bisphosphonate treatment improves disease activity and symptoms. We present the case, clinical course and treatment of a female diagnosed with SAPHO syndrome and osteoporosis.

Case: A 55-year-old female presented with a 2-year history of sternal and shoulder pain to her GP. X-ray showed sternoclavicular hyperostosis with subsequent CT demonstrating diffuse sclerotic and lytic changes in the sternum, clavicles and ribs. A routine screening DXA also demonstrated osteoporosis (lowest T score -2.5 lumbar spine) and she was referred to our bone health clinic. Serum alkaline phosphatase (ALP) was mildy elevated at 127 IU/L as was serum Procollagen type 1 N-terminal propeptide (PINP) at 80.1ng/m. Due to potential GI intolerance of oral bisphosphonates, treatment with zoledronic acid was planned and she was further investigated with an isotope bone scan. This showed a classic "bulls head appearance' due to avid uptake in sternum, medial clavicles and first ribs (see below). Serum electrophoresis, viral and connective tissue disease screen were all unremarkable. Several months later she developed a pustular skin rash and diffuse polyarthralgia associated with raised inflammatory markers and normal rheumatoid factor, anti CCP and HLAB27. After review by rheumatology, and dermatology SAPHO syndrome was considered the likely diagnosis and she was started on infliximab with a view to longer term adalimumab. After reassessment by our bone health service, she promptly received zoledronic acid (5mg). Six months later, her bone formation marker (PINP) decreased to 38.6 pg/ml and ALP to 95 IU/L . By 18 months, she had near complete resolution of her clinical symptoms.

Discussion: This case demonstrates the challenges in diagnosing SAPHO syndrome given its rarity. Currently, there are no randomised trials as regards treatment though improvement in disease activity and symptoms is described with infliximab as we found in our patient. Bisphosphonates including zoledronic acid have also been associated with improvement in pain, bone marrow odoema and osteoarticular function. The decline in PINP supports the recent suggestion that bisphosphonates may be a necessary 'bone remodelling therapy' in this syndrome.

The image (below) of the classic "bull's head" pattern seen on isotope bone imaging in SAPHO syndrome.



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PUSH TOOL: MAINTAINING FUNCTIONAL CAPACITY AND WELL-BEING IN NURSING HOME RESIDENTS

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Background: Physical activity benefits frail older adults in nursing homes, yet numerous barriers hinder the safe and effective prescription of exercise. To address these challenges, the PUSH tool (Promoting aUtonomy through exerciSe in nursing Home) was developed, facilitating the prescription of tailored, autonomous exercise programs. This pilot interventional study evaluated the impact of the PUSH tool over six months on functional capacities, well-being, and usability in nursing home residents.

Methods: The study was conducted in two nursing homes in the province of Québec, Canada (Saguenay and Montréal). Residents were assigned to a control group receiving usual care (n=12) or an intervention group receiving usual care plus PUSH (≥2 sessions/week, n=15). The PUSH tool uses a decision tree based on validated physical tests to assess muscle strength, balance, and endurance in ambulatory and wheelchair-bound residents, and provides individualized strength, balance, and walking or wheelchair-propulsion exercises. Assessments were conducted at baseline and after six months, including lower-limb strength (30-second sit-to-stand [30s-STS]), functional performance (Short Physical Performance Battery [SPPB] and handgrip strength [HS]), mobility (Timed Up and Go [TUG], 5-times sit-to-stand [5×STS], and gait speed), balance (Berg Balance Scale [BBS]), perceived health, well-being, and usability (System Usability Scale [SUS]) of the PUSH tool.

Results: The 30s-STS, gait speed, and SPPB scores were maintained in the PUSH group at six months, whereas the control group showed a significant deterioration ($p<0.05$); between-group differences were not statistically significant, except for the 30s-STS and SPPB scores. Both groups declined in TUG and 5×STS, but deterioration was 2–3 times greater in the control group. Participants in the intervention group reported improvements in perceived health and overall well-being. The SUS score of the PUSH tool was rated 74% by residents and 88% by healthcare professionals.

Conclusion: The PUSH tool is feasible, easy to use, and well accepted by both staff and residents. While physical performance decline was largely mitigated rather than reversed, the program improved residents' perceived health and well-being, supporting its potential to promote autonomy in long-term care settings.

P594

FALLS AMONG COMMUNITY-DWELLING OLDER ADULTS: PREVALENCE, CIRCUMSTANCES, RISK PROFILES, AND IMPLICATIONS FOR PREVENTION

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Objective: Falls are a major public health concern among older adults worldwide, leading to injuries, hospitalizations, and mortality. Falls arise from complex interactions between individual (age-related changes, comorbidities), behavioral (previous falls, sedentary lifestyle), environmental (home hazards, uneven surfaces), and socio-economic (social isolation, limited access to care) factors. Despite over two decades of fall prevention initiatives in Quebec, adverse outcomes persist. This narrative review summarizes the latest evidence on the prevalence, circumstances, outcomes, and risk profiles of falls among community-dwelling adults aged ≥50 years with the aim of informing

targeted prevention strategies.
Methods: Scientific databases (Medline, Embase, CINAHL, Web of Science) and grey literature were searched. Studies describing fall prevalence, circumstances, outcomes and risk factors were included; those focusing on institutionalized populations were excluded. Data extraction focused on demographics, health status, fall circumstances, injuries, recurrence, and post-fall care.
Results: 48 documents were retained. Fall prevalence ranged from 23–75% over 12 months, increasing with age and among women, and varying by functional status. Falls occurred indoors (42–53%) and outdoors (47–58%), mainly during walking, stair use, or daily activities. Peaks occurred during winter and daytime. Injuries affected 8–66% of falls and included contusions, fractures, and sprains. Post-fall care included medical consultations (45–73%), emergency visits (20–37%), and hospitalization (21–42%). Faller profiles varied: active, healthy older adults mostly fell outdoors with minor injuries, while frail or dependent adults fell indoors during low-intensity activities with higher injury rates. Environmental hazards, social cohesion, and neighbourhood design influence risk, and predictive tools such as the Canadian 1stFall algorithm help identify high-risk individuals.
Conclusion: Falls among community-dwelling older adults are common and multifactorial. Effective fall prevention requires tailored, multicomponent strategies addressing physical, behavioral, social, and environmental factors, involving both older adults and their caregivers.

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EFFECTS OF PREHABILITATION PROGRAMMES ON POSTOPERATIVE OUTCOMES IN OLDER ADULTS UNDERGOING MAJOR ABDOMINAL, CARDIAC OR VASCULAR SURGERY: A SYSTEMATIC REVIEW

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Objective: Older adults undergoing major abdominal, cardiac, or vascular surgery are highly vulnerable to postoperative complications, prolonged hospitalisation, functional decline, and mortality. Sarcopenia and frailty reduce physiological reserve, underscoring the potential role of prehabilitation in improving resilience to surgical stress and postoperative outcomes. The objective of this systematic review was to evaluate the effects of exercise-based prehabilitation, alone or combined with nutritional, psychological, or educational components, on postoperative outcomes, including complications, length of stay, readmissions, mortality, quality of life, and economic indicators, as well as on body composition, functional reserve, and biological markers, in adults aged ≥65 years undergoing major abdominal, cardiac, or vascular surgery.
Material and Methods: Medline, Scopus and EMBASE were searched for Randomised Controlled trials assessing prehabilitation programmes in older adults undergoing major abdominal, cardiac or vascular surgery. Data on study characteristics, interventions, outcomes, and methodological quality were extracted and synthesized narratively.
Results: Nine studies (n = 36–182; mean/median age 68–82) were included. Interventions lasted 2–6 weeks and involved exercise alone or multimodal programmes, delivered in-person, remotely, or via hybrid approaches. Vascular surgery studies showed modest reductions in complications and hospital stay, whereas abdominal surgery studies generally reported no significant improvements, except for isolated reductions in severe complications or gains in functional reserve. No studies involving cardiac surgery were identified.
Conclusion: Prehabilitation in older adults remains understudied, especially in frail patients, the oldest old, and cardiac surgery. Robust trials are needed to assess individualized, multimodal, sarcopenia-targeted interventions and to integrate biological markers to clarify underlying mechanisms.

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EFFECT OF A MULTIMODAL PREHABILITATION PROGRAM ON MUSCLE STRENGTH, RECOVERY, AND BIOLOGICAL RESPONSES IN OLDER ADULTS UNDERGOING MAJOR SURGERY: A RANDOMIZED CONTROLLED TRIAL PROTOCOL

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Objective: Older adults undergoing major surgery are at high risk of postoperative complications and incomplete recovery, largely driven by sarcopenia and impaired muscle strength. While multimodal prehabilitation improves outcomes in younger populations, evidence in

older adults remains limited, and the biological mechanisms underlying interindividual response to prehabilitation remain poorly understood. This randomised controlled trial (RCT) aims to evaluate the effect of a 4-week multimodal prehabilitation program on muscle strength and postoperative recovery in older adults, and to explore genomic, proteomic, and lipidomic profiles associated with response to prehabilitation.

Methods: This RCT will include 178 adults aged ≥65 years scheduled for major abdominal, cardiac, or thoracic surgery. Participants will be randomized (1:1), stratified by ASA score and type of surgery, to either a multimodal prehabilitation program or usual care. The intervention combines online adapted resistance exercise, tailored nutritional counselling, and integrated physical and nutritional health literacy support delivered over four weeks preoperatively. The primary outcome is lower-limb muscle strength (30-second chair-stand test). Secondary outcomes include functional capacity (SPPB, TUG), muscle power (5-times sit-to-stand test), postoperative complications (Clavien–Dindo), length of stay, readmissions, quality of life (SF-12, EQ-5D), recovery (QoR-15), health literacy, and cost–benefit outcomes. Assessments will be conducted at baseline, post-intervention, and three months post-surgery. Baseline blood samples will be collected to perform genomic (MTHFR, ACTN3, NRF2 variants, and polygenic risk score for muscle strength), proteomic (Olink®), and lipidomic (targeted and untargeted LC–MS/MS) analyses. These biological markers will be integrated as covariates to identify profiles associated with response or non-response to prehabilitation.

Conclusion: This study will generate high-quality evidence on the clinical effectiveness and cost-benefit of multimodal prehabilitation in older surgical patients, while providing novel insights into biological determinants of prehabilitation response. These findings may support the development of personalised perioperative care strategies in ageing surgical populations.

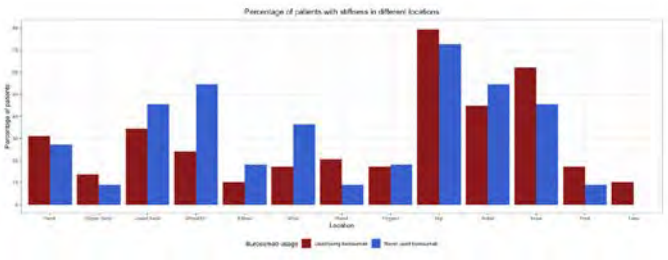
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PATTERNS OF SELF-REPORTED STIFFNESS PATTERNS IN ADULTS WITH X- LINKED HYPOPHOSPHATAEMIA (XLH): HIGH PREVALENCE OF UPPER LIMB INVOLVEMENT

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Objective:
Adults reported that stiffness is often not included in clinicians' assessment of XLH. Clinical trials have demonstrated that burosumab significantly reduces stiffness in adults with XLH. Our objective was to further characterise stiffness in adults living with XLH.
Methods
Adults participating in the Rare and UnDiagnosed studY (RUDY) with a self-reported diagnosis of XLH were included if they completed the painDETECT, an assessment of stiffness that included a body map, and a current medication form. Hierarchical clustering was used to identify clusters of joint stiffness locations that were reported as stiff or painful. The number of clusters selected was based on the Silhouette score, the Gap statistic, and a visual inspection of the dendrogram.
Results
33 adults with XLH had complete stiffness data. The proportion of adults reporting stiffness is shown in Figure 1 and shows a higher prevalence of stiffness in the shoulders (55%), wrist (35%) and ankles (55%) in adults not on burosumab. Of the patients with reported stiffness, 100% of non-burosumab users reported severe and extreme stiffness compared with approximately 38.5% of burosumab users (p<0.01). Stiffness of ≥2 hours was also more common in non-burosumab users overall. Four distinct stiffness clusters were identified with a low Silhouette score of 0.21, and a specific cluster for spine and shoulder stiffness.
Conclusion.
Stiffness was commonly reported in the upper limbs and ankles as well as the back, hips and knees and was commonly severe/ extreme in non-burosumab users in 4 clusters. These findings suggest the aetiology of stiffness could differ between joints and may respond differentially to therapies.
FIGURE 1: Percentage of adults with XLH with stiffness in different joints by burosumab use.



Declerations
MKJ has received paid consultancy or sponsorship for external talks from Amgen, UCB, Sanofi, Kyowa Kirin, Nanox-AI, Native Technologies, Thornton Ross, and Theramex. RPV has received paid consultancy from UCB. The study was supported by a grant from Kyowa Kirin.

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ASSESSMENT OF EFFECTIVENESS IN MEDICATION COMBINED WITH EXCERCISE AIMED AT PREVENTION OF BOTH OSTEOPOROSIS AND FRAILTY IN ELDERLY PATIENTS AFFECTED BY BREAST CANCER

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Objective: prevention of Osteoporosis is a major objective in the management of patients treated for breast cancer with aromatase inhibitors. Denosumab proved effective in prevention of fractures in subjects whose breast cancer was treated with aromatase inhibitors. We evaluated the effectiveness of combined medical treament with a self sufficient occupational therapy project to be carried out at home.
Methods: 18 elderly patients affected by breast cancer were followed for 12 months. A post surgery preventative treatment with aromatase inhibitors combined with Denosumab was prescribed in order to prevent fractures. From T0 to T24 the design of the study included: 1) blood tests; 2) spine and femur bone density scan DEXA; 3) lumbar dorsal spine morphometry; 4)short physical performance battery (SPPB). SPPB evaluates physical performance whose level scores between 0 and 12. In 10 patients (Group A) we evaluated the effectiveness of Denosumab treament on osteoporosis prevention, while in group B 8 patients were treated with a combination of Denosumab and occupational therapy for effectiveness. Subjects were instructed on how to perform specific excercises at home.
Results: Group A patients (mean age 73 ± 4 years) had an average SPPB

score 7 (p 0.05) at T0. Group B patients (mean age 72±3 years) had an average SPPB score 7 (p 0.05). At T 24 group A patients average SPPB score was 9 (p 0.05) showing an improvement in gait rate. At T24 group B patients had a an average SPPB score 10 (p 0.05) showing improvement in balance & gait rates.

Conclusion: This study proved the effectiveness of combined treatment with Denosumab and occupational therapy in elderly patiens affected by breast cancer in post surgery treatment with aromatase inhibitors. The focus was on keep in check severity markers, preventing fracture risk and improving physical performance.

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DOES TIMING MATTER? REAL-WORLD COST-EFFECTIVENESS OF EARLY ULTRASOUND-GUIDED CORTICOSTEROID INJECTION IN SHOULDER PAIN

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Objective(s)

To compare the clinical effectiveness and cost-effectiveness of physiotherapy with or without ultrasound-guided corticosteroid injection in patients with shoulder pain, and to explore the potential economic impact of an early injection strategy.

Material and Methods

A retrospective real-world observational study was conducted in a rehabilitation service. A total of 162 patients with shoulder pain were included: 126 received physiotherapy alone and 36 received physiotherapy combined with ultrasound-guided corticosteroid injection. Pain intensity was assessed using the visual analogue scale (VAS) and upper limb function using the disability of the arm, shoulder and hand (DASH) questionnaire. Healthcare costs, sick leave and total costs were recorded. Clinical response was defined as an improvement of at least 2 points in VAS and 10 points in DASH. Cost-effectiveness was evaluated using the incremental cost-effectiveness ratio (ICER), expressed as euros per DASH point gained. An exploratory post hoc simulated scenario assuming early injection at treatment onset was performed to estimate its potential economic impact.

Results

Both treatment strategies resulted in significant improvements in pain and function. No statistically significant differences were observed between groups in final VAS or DASH scores. The combined treatment group showed higher healthcare costs, mainly related to the cost of injection and a higher number of physiotherapy sessions. Total costs, including sick leave, showed high variability and did not differ significantly between groups. In the simulated early injection scenario, mean healthcare and total costs were reduced while maintaining similar functional improvement, resulting in a negative ICER and suggesting a potentially dominant strategy.

Conclusion(s)

In real-world practice, adding ultrasound-guided corticosteroid injection to physiotherapy does not improve final clinical outcomes and increases healthcare costs. However, an early injection strategy may reduce costs without compromising effectiveness, indicating that treatment timing could be a relevant factor in optimizing the management of shoulder pain. Prospective studies are needed to confirm these findings.

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ASSOCIATION BETWEEN PHQ-9 SCORE AND DXA-MEASURED BONE MINERAL DENSITY IN POSTMENOPAUSAL WOMEN IN NORTH MACEDONIA

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Objective

Osteoporosis is the most common metabolic bone disease and its association with depression has been described in recent investigations. This study provides the first population-based data exploring the relationship between depressive symptoms and bone mineral density in postmenopausal women in North Macedonia, a region currently absent from international osteoporosis–mental health literature. This study aimed to evaluate the association between depressive symptom severity and bone mineral density in postmenopausal women without malignancy.

Material and Methods

This is a cross-sectional study of 100 patients referred for Dual-Energy X-ray Absorptiometry. Depressive symptoms were assessed using Patient Health Questionnaire-9 (PHQ-9). Bone mineral density was measured at the lumbar spine (L1-L4), femoral neck, and total hip, and expressed as T-scores. All patients were postmenopausal women, with no malignancies.

Result

Patients were divided into groups of normal bone density (n=13), osteopenia (n=57) and osteoporosis (n=30). Significant correlations were seen only in participants with osteopenia, where PHQ-9 scores correlated with Neck mean (r=0.029, p=0.027) and Total mean (r=0.35, p=.008). No significant associations were found in the other two groups. These findings suggest a worse mental effect on patients with lower bone density on their hips, as against lumbar spine.

Conclusion

Depressive symptoms were associated with lower bone mineral density only among patients with osteopenia, which was not seen in the group with osteoporosis. It is worth noting that the group of participants was small, making statistical significance more difficult. We are planning to expand this research in the future. Depression may play a role in early bone loss but does not appear to influence bone density once osteoporosis is established. Mental health takes a great toll on individuals which in turn impedes work, addressing it early on is extremely important.

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DEPRESSIVE SYMPTOMS AND OSTEOPENIA: IS MENTAL HEALTH ALREADY RELEVANT BEFORE OSTEOPOROSIS DEVELOPS?

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OBJECTIVE

Osteoporosis and depression are chronic diseases that affect large populations with notable impact on morbidity, mortality and quality of life. The potential association between osteoporosis and depression has been noted in recent studies. Our goal is to examine the relationship between depressive symptoms and bone mineral density (BMD) across individuals with normal bone density, osteopenia and osteoporosis.

MATERIAL AND METHODS

A cross-sectional analysis was conducted in 100 post-menopausal female patients. Bone mineral density was carried out with Dual-Energy X-ray Absorptiometry, while depressive symptoms were scored based on Patient Health Questionnaire-9 (PHQ-9). Correlations between PHQ-9 scores and BMD T-scores at lumbar spine (L1-L4), femoral neck, and total hip were calculated. All patients were postmenopausal women with no malignancies or hip replacement surgeries.

RESULTS

PHQ-9 scores showed a weak but significant correlation with total hip T-scores (r=0.226, p=0.024), while associations with lumbar spine and femoral neck T-scores were not significant. Depressive symptoms were significantly associated with lower bone mineral density only in patients with osteopenia (Neck mean: r=0.29, p=0.027, Total Mean: r=0.35, p=0.008). No significant correlations were found in individuals with normal bone density or osteoporosis.

CONCLUSIONS

Depressive symptoms are linked to reduced bone mineral density in individuals. These findings suggest that mental health may be relevant early in the trajectory of bone loss, highlighting potential value of identifying and addressing depressive symptoms before osteoporosis develops.

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EVIDENCE-BASED STRATEGIES FOR IMPROVING BONE HEALTH IN OLDER ADULTS THROUGH ORTHOGERIATRIC CARE AND RISK COMMUNICATION

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Objective: The objective of this study was to assess risk perception, chronic pain patterns, and bone health–related behaviors among elderly patients with chronic conditions in primary health care settings, and to identify key barriers and facilitators for orthogeriatric success. Particular emphasis was placed on the role of risk communication and a patient–family–healthcare practitioner–centered approach in optimizing osteoporosis prevention, fracture reduction, and engagement with health services.

Materials and Methods: This research integrates findings from several cross-sectional and observational studies conducted in Albania between 2017 and 2024, including primary health care centers and a regional hospital. Data were collected from healthcare professionals and elderly patients with chronic conditions (mean age ≥65 years) using structured questionnaires, focus group discussions, and retrospective clinical record reviews. Variables included socio-demographic characteristics, professional backgrounds of healthcare staff, and types of chronic non-oncological pain, osteoporosis risk factors, fracture patterns, patient education strategies, and perceptions of risk communication during health emergencies. Screening tools, such as the IOF One-Minute Osteoporosis Risk Test, were applied in community settings. Statistical analyses were performed using SPSS, with significance set at $p < 0.05$.

Results: Healthcare providers were predominantly female (86.7%), with a mean age of approximately 30 years, and over half (57.5%) had ≤5 years of professional experience. Most were based in urban centers (85%). Chronic non-oncological pain was highly prevalent, with chronic back pain (70.8%) and joint pain (61.7%) being the most frequently reported conditions.

Among elderly patients, frequent falls (22%), low-impact fractures (15%), thyroid disorders (50%), diabetes (40%), low body mass index, smoking, and family history were common osteoporosis-related risk factors. Fractures were more frequent in men, particularly hip fractures in those aged ≥60 years, and were predominantly caused by falls and visual impairment.

Patient education relied mainly on individual counseling (68.3%) and family involvement (50.8%), while formal educational seminars were limited (9.2%). Identified barriers included low trust in health authorities, fragmented risk communication, insufficient clinical documentation, and limited access to specialized resources (51.7%). Facilitators included physiotherapy involvement (48.3%) and cost-effective community screening tools.

Conclusions: Optimizing bone health behaviors in older adults requires strengthened risk communication, interdisciplinary orthogeriatric collaboration, and active engagement of patients and families. Addressing communication gaps, improving professional training, enhancing documentation quality, and expanding access to preventive screening and rehabilitation services are essential to reducing fractures and improving outcomes in aging populations.

P604

MULTIMORBIDITY AND PROGRESSION OF RADIOGRAPHIC KNEE OSTEOARTHRITIS: DOES SEX MATTER?

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Objective
To examine morbidity burden in relation to progression of knee osteoarthritis (OA) and whether this association differs by sex using longitudinal data from the Hertfordshire Cohort Study.
Material and Methods
Participants (192 men and 183 women) were community-dwelling UK residents born, and continuing to live, in Hertfordshire. At baseline (1998–2004) and follow-up (2011), health questionnaires were completed, and knee radiographs were taken and graded using the Kellgren and Lawrence (K&L) system. Medical history, including medication use, was recorded at baseline and follow-up; number of body systems medicated was derived and used as a marker of morbidity level. Longitudinal change in K&L score was assessed at four sites (the tibiofemoral and patellofemoral compartments of each knee) and categorised as 0, 1 or 2/3. The site showing the greatest deterioration for each individual was used in the analysis.
Results
Mean (SD) age at baseline was 64.8 (2.7) years; mean (SD) BMI was 26.7 (4.1). Baseline radiographic knee OA (K&L ≥ 2 at the worst site) was present in 36% of men and 34% of women. No radiographic progression was observed in 34% of men and 19% of women during follow-up, while 23% of men and 31% of women progressed by at least two grades. The median number of systems medicated at baseline was one in both sexes, and two at follow-up, with all derivations exclusive of musculoskeletal and joint disease medications. Among women, number of systems medicated was associated with OA progression after adjustment for age and follow-up time (odds ratio [95% CI] for being in a higher progression category: 1.36 [1.05, 1.74] per additional system medicated), but no association was found in men 1.13 [0.84, 1.52]). This association in women remained similar after additionally adjusting for BMI (1.33 [1.03, 1.72]).
Conclusion
Radiographic knee OA progression was common in both sexes, with higher rates among women who had greater comorbidity. Further research into this apparent sex difference is warranted, as it may provide insights into the pathogenesis of OA.

P605

REPRODUCTIVE FACTORS AND OSTEOARTHRITIS: CAN OBSERVATION INFORM INTERVENTION IN FUTURE WORK?

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Objective
To determine if there are associations between reproductive factors and the development or worsening of osteoarthritis (OA) in women using data from the longitudinal Hertfordshire Cohort Study (HCS).
Methods and Materials
Data were analysed from 196 female participants in HCS with median age at baseline (1998–2004) of 65.8 years, and median age at follow-up (2011) of 75.6 years. The following potential exposures were ascertained at baseline: intermenstrual period from menarche to menopause (years), number of pregnancies, and use of oral contraceptives (OCP) and hormone replacement therapy (HRT). The following outcomes were considered: presence of clinical OA at the knee, hip, or hand at follow-up; radiographic OA at the knee or hip at follow-up; and worsening of knee Kellgren and Lawrence (K&L) grade over follow-up (yes/no). Associations were examined using logistic regression. Initial models were adjusted for age; mutually-adjusted models included all exposures along with age and BMI.
Results
Ever use of HRT was associated with reduced odds of radiographic knee/hip OA at follow-up after age adjustment (odds ratio (95% CI): 0.46 (0.24, 0.89), p=0.020) and in the mutually-adjusted model (0.43 (0.19, 0.96), p=0.040). Ever use of OCP was linked to lower odds of worsening knee K&L grade over follow-up after age adjustment (0.42 (0.20, 0.91), p=0.027) and in the mutually adjusted model (0.26 (0.10, 0.68), p=0.006). No other associations were statistically significant (p>0.05).
Conclusion
HRT and OCP use were associated with reduced risk of radiographic knee/hip OA and OA progression respectively, suggesting that these factors may impact development of OA. These results point to a possible effect of exogenous sex hormones in the pathogenesis of OA; further work is now indicated.

P606

RISK FACTORS FOR RECURRENT FALLS IN MIDLIFE: FINDINGS FROM THE HEALTH AND EMPLOYMENT AFTER FIFTY (HEAF) STUDY

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Objectives
Recurrent falls are associated with significant morbidity. Although most research focuses on older adults, falls have also been reported under the age of 65. This study aimed to quantify the prevalence of falls and recurrent falls among late middle-aged community-dwelling adults, and to identify the sociodemographic, lifestyle, and health-related factors

associated with recurrent falls.

Material and Methods

The Health and Employment After Fifty (HEAF) study is a longitudinal cohort of men and women recruited when aged 50-64 years from across England. At baseline and each of 5 follow-ups, participants reported falls in the preceding year. Participants were categorised as *recurrent fallers* if they experienced more than one fall on at least two occasions, non-fallers if they never reported a fall, or intermediate fallers if they reported at least a fall but not recurrent. Multinomial logistic regression was used to examine associations between fall category and potential risk factors, with estimates presented as relative risk ratios (RRR) with 95%CI.

Results

Of the 8,134 participants recruited, 7,051 were included in the analysis. The prevalence of any falls ranged from 14-18% at each follow-up. 437 (6%) participants were classified as recurrent fallers, 2,738 (39%) as intermediate and 3,876 (55%) as non-fallers. Independent predictors of being a recurrent faller (vs non-faller) included: being a woman, not-married, unemployed or retired, and having a mortgage (vs owning one's home outright). Several health-related factors were also significant ($p<0.05$), such as being obese, fair/poor self-rated health, depression, poor sleep, slow walking speed, and memory problems. Effect sizes ranged between 1.3 (1.0-1.7) (obesity) and 4.7 (3.3-6.8) (slow walking speed). Most of these factors were also significant for the intermediate fallers category, although associations were generally weaker. The final model correctly classified 60% of participants into their fall category.

Conclusions

Recurrent falls in mid-life were relatively common in this cohort of unselected community- dwelling UK adults. Several demographic and health-related factors were identified as predictors of recurrent falls, suggesting potential targets for early identification and risk mitigation in this age group.

P607

SOCIODEMOGRAPHIC DETERMINANTS OF TREATMENT ADHERENCE FOLLOWING HIP FRACTURE: DATA FROM A PORTUGUESE FLS

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Objective: To evaluate the association between medication adherence, objectively assessed through the Portuguese Medical Electronic Prescription platform (PEM) and sociodemographic variables, and therefore to identify patient profiles at increased risk of suboptimal treatment adherence.

Material and Methods: A prospective cohort was established within an FLS, consecutively enrolling patients with hip fractures between October 2019 and December 2025. Medication adherence was assessed using records from the PEM platform and categorized as complete, partial, or none. Sociodemographic variables included age (<75 vs ≥75 years), sex, marital status (partnered vs non-partnered), place of residence (community-dwelling vs institutionalised), and economic insufficiency. Associations between adherence and sociodemographic variables were analysed using chi-square tests, with statistical significance defined as $p < 0.05$.

Results A total of 168 patients were included, with medication dispensing data available for 151 patients (89.9%). The cohort was predominantly female (76.2%) and representative of an older hip fracture population (mean age 77.2 ± 8.6 years). Among patients with available data, 71.3% were partnered, 35.1% had economic insufficiency, and most lived independently in the community (82.7%). Complete medication dispensing was observed in 76.2% of patients, while 11.3% demonstrated partial dispensing and 12.6% did not dispense any prescribed medication, resulting in an overall non-adherence rate of 24.0%. Medication adherence did not differ significantly according to sex (76.4% in women vs 73.9% in men, $p = 0.827$), marital status (76.4% in partnered vs 74.4% in non-partnered patients, $p=0.796$), place of residence (77.0% in community-dwelling vs 63.6% in institutionalized, $p=0.518$), or economic insufficiency (72.4% vs 78.3%, $p = 0.611$). Patients aged ≥75 years demonstrated lower adherence compared with younger patients (71.1% vs 84.9%), although statistical significance ($p = 0.059$) was not reached.

Conclusion: Despite structured follow-up within an FLS, nearly one quarter of hip fracture patients did not fully adhere to prescribed osteoporosis treatment. While most sociodemographic factors were not significantly associated with adherence, increasing age and economic vulnerability showed clinically relevant trends towards lower medication uptake. Objective monitoring through electronic prescription platforms may facilitate early identification of patients at risk of non-adherence and support targeted strategies to optimise secondary fracture prevention.

P608

DENSE BONES, FRAGILE OUTCOMES: THE PARADOX OF OBESITY IN HIP FRACTURE

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Objective: To evaluate the association between body mass index (BMI) and bone mineral density (BMD) assessed by dual-energy X-ray absorptiometry (DXA) in patients with hip fracture followed in a Fracture Liaison Service (FLS).

Materials and Methods: A prospective observational cohort was established within an FLS, consecutively enrolling patients with hip fracture between October 2019 and December 2025. Analyses were restricted to patients with available femoral neck T-score and BMI data. BMI was analysed as a continuous variable and categorised as underweight (<18.5 kg/m²), normal weight (18.5-24.9 kg/m²), overweight (25.0-29.9 kg/m²), obesity class I (30.0-34.9 kg/m²) and obesity class II (≥35.0 kg/m²). BMD and T-scores were obtained at the femoral neck, total hip and lumbar spine. Serum calcium, phosphate, 25-hydroxyvitamin D and parathyroid hormone (PTH) were recorded. Group comparisons were performed using one-way ANOVA, and multivariable linear regression was used to assess independent associations with femoral neck T-score. Statistical significance was defined as $p < 0.05$.

Results: Among 168 patients included in the FLS cohort, 101 patients with available DXA and BMI data were analysed. The mean age was 76.3 ± 9.0 years, and the population was predominantly female (82.2%). Within the analysed cohort, 6.9% of patients were underweight, 48.5% had normal weight, 32.7% were overweight, and 11.9% were obese (class I and II combined). Mean T-scores differed significantly across BMI categories at all skeletal sites, showing a progressive increase from underweight to obese individuals. At the lumbar spine (L1-L4), mean T-scores increased from -3.47 (underweight) to -2.13 (normal weight), -1.39 (overweight), and -0.44 (obese), with a similar pattern observed at the total hip (-3.52, -2.40, -1.51, and -1.18, respectively; all $p < 0.001$). BMI

explained approximately 19%, 25% and 28% of the variability in lumbar spine, femoral neck and total hip T-scores, respectively. In multivariable linear regression analysis, BMI remained independently associated with femoral neck T-score ($\beta = 0.45$, $p < 0.001$) after adjustment for age, vitamin D, PTH and serum calcium. Increasing age and higher PTH levels were independently associated with lower femoral neck T-scores. No significant differences in serum calcium, vitamin D or PTH levels were observed across BMI categories.

Conclusion: In patients with hip fracture followed in an FLS, increasing BMI was associated with a marked and progressive increase in BMD across clinically relevant skeletal sites. However, this apparent densitometric advantage did not translate into fracture protection, supporting a dissociation between bone density and fracture risk in obese patients. These findings suggest that reliance on DXA-derived BMD alone may underestimate fracture risk in this population.

P609

REDUCING THE BURDEN OF BONE HEALTH MONITORING IN WOMEN WITH BREAST CANCER; A PILOT STUDY OF ACCEPTABILITY

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Objective(s)

A pilot study of a new intervention, IBEX BH, which measures bone density from wrist X-rays undertaken on mammography equipment was undertaken. The study investigated experience and acceptability of the intervention with female patients.

Material and Methods

Women with breast cancer awaiting DXA were recruited to undertake an additional wrist X-ray as part of their mammography follow-up. They were surveyed on their experience and invited to attend a follow-up focus group.

Thematic qualitative analysis was undertaken using the theoretical framework of acceptability (TFA) as a guide.

Results

Surveys were received from all 15 women who completed the pilot, and 5 participated in the follow up focus group.

Codes related to all 7 themes of the TFA. Highlights include 'Affective Attitude'- participants were generally positive about the intervention feeling 'none' (n=13) or 'positive' (n=2) impact of the additional scan on their mammography appointment, with one FG participant stating '*if it's that quick, it's amazing*'. One of the main positives seen was the potential to reduce hospital visits, travel and burden (perceived effort).

'*The main issue for me was just the travel time to and from the hospital and trying to find parking.*'

Whilst the intervention was received well, 'Intervention Coherence' was mixed, with some not understanding the link between their breast cancer treatment and bone health indicating a wider issue. Participants also provided feedback that could improve experience of the intervention e.g. having the opportunity to cover up after the breast scan for the wrist X-ray.

Conclusion(s)

The high acceptability of the intervention and indications for improvement support the justification for a larger clinical study to further develop clinical validity of the IBEX BH mammography method, and the suitability of the adapted clinical pathway.

This intervention provides an exciting opportunity to improve the care of women with breast cancer and reduce burden on the patient and healthcare service.

P610

DEVELOPMENT AND VALIDATION OF A DXA-BASED RADIOMICS MODEL FOR FRAGILITY FRACTURE RISK PREDICTION IN OBESE ELDERLY INDIVIDUALS

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Objective: To develop and validate a radiomics model based on dual-energy X-ray absorptiometry (DXA) lumbar spine and hip images for predicting fragility fractures in obese elderly individuals.

Methods: In this cross-sectional study, 506 patients aged ≥ 60 years admitted between July 2024 and March 2025 were enrolled and categorized by prior fragility fracture history. Participants were randomly assigned to a training set (n=353) and validation set (n=153). Regions of interest on DXA images (lumbar spine, femoral neck, total hip) were delineated in 3D Slicer, and radiomics features were extracted. Features with high reproducibility underwent least absolute shrinkage and selection operator (LASSO) reduction, and a logistic regression model was built. Predictive performance was assessed using receiver operating characteristic (ROC) curves, calibration, and decision curve analysis, compared with bone mineral density (BMD).

Results: Of the included participants, 101 (19.96%) had a prior fragility fracture. A total of 2,553 radiomics features were extracted, of which 1,853 demonstrated high intra- and inter-observer reproducibility. After LASSO feature reduction, 14 features were retained to construct the radiomics model. In the training and validation sets, the model achieved AUCs of 0.776 and 0.787, respectively, both significantly higher than those of conventional BMD. The radiomics model also demonstrated superior calibration and clinical utility compared to BMD.

Conclusions: This DXA-based radiomics model provides a non-invasive, low-cost, and effective tool for stratifying fragility fracture risk in obese elderly individuals, with better performance than conventional BMD.

P611

VERTEBROPLASTY IN FRAGILITY VERTEBRAL FRACTURES: WHEN NORMAL BONE MINERAL DENSITY IS A WARNING SIGN. A CASE OF IGG-KAPPA MULTIPLE MYELOMA.

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Objective(s)

Vertebroplasty is widely used for pain control in osteoporotic vertebral fractures. However, secondary causes of bone fragility such as multiple myeloma may mimic primary osteoporosis and lead to therapeutic failure and diagnostic delay.

Material and Methods

We report the clinical, radiological, densitometric and laboratory findings of a 73-year-old male with progressive dorsolumbar pain and multiple atraumatic vertebral fractures treated with vertebroplasty.

Results

Vertebroplasty was performed at D8 and D11 in 2023 and at L2 in 2025. Despite these procedures and stepwise analgesic treatment, severe refractory pain persisted with marked functional impairment. Dual-energy X-ray absorptiometry showed normal bone mineral density at the lumbar spine, hip and forearm, discordant with the number and severity of fractures. Imaging revealed multiple vertebral compression fractures, new acute/subacute fractures at D12 and L3, and signs of previous cementoplasty. Laboratory tests showed an erythrocyte sedimentation rate of 89 mm/h with normal C-reactive protein, normal calcium-phosphate metabolism and bone turnover markers, and an IgG-kappa monoclonal spike, leading to the diagnosis of multiple myeloma.

Conclusion(s)

The coexistence of multiple vertebral fractures with normal bone mineral density should raise suspicion of secondary bone fragility. Vertebroplasty without a comprehensive etiological work-up may result in poor clinical response and delayed diagnosis. Multiple myeloma should be systematically ruled out in patients with refractory pain and recurrent vertebral fractures despite normal densitometry.

Figure 1. Spine MRI. (A) Compression fracture at D8 and cemented fracture at D11 (22-11-2023). (B) Acute/subacute fractures at D12 and L3 with sequelae of previous fractures at D8, D11 and L2 (08-08-2025).



P612

PAGET'S DISEASE OF BONE IN CLINICAL PRACTICE: CHARACTERIZATION OF A POLYOSTOTIC CASE SERIES AND CLINICAL IMPLICATIONS

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Objective(s)
To analyze the clinical, biochemical and radiological characteristics, skeletal involvement patterns and treatment of a series of patients with Paget's disease of bone (PDB), highlighting clinically relevant findings in real-world practice.

Material and Methods
A descriptive study including seven patients diagnosed with PDB was conducted. Demographic data, personal and family history, clinical presentation, extent and localization of skeletal involvement, biochemical parameters, imaging findings, disease phase, complications and treatment were collected. Diagnosis was confirmed by bone scintigraphy, and disease activity was assessed using serum alkaline phosphatase (ALP) levels.

Results
The mean age at diagnosis was 62 years; four patients were female and three were male. No family history of PDB was identified. Associated comorbidities included rheumatoid arthritis, erosive osteoarthritis, chondrocalcinosis and post-polio syndrome. All patients presented with polyostotic involvement. The pelvis and femur were the most frequently affected sites, while lumbar spine involvement was observed in two cases. Mechanical hip pain was the most common presenting symptom, and one patient presented with knee monoarthritis. Serum ALP levels were elevated in all patients, and hypercalcemia was detected in three cases. Five patients were in the active phase of disease at diagnosis. During follow-up, two patients developed long bone fractures involving the humerus and femur. All patients were treated with bisphosphonates: oral risedronate (n=4) or intravenous zoledronic acid (n=3).

Conclusion(s)
This series shows that Paget's disease of bone may predominantly present as a polyostotic condition with preferential involvement of the pelvis and long bones, which is associated with a relevant risk of fractures. Persistent elevation of serum ALP proved to be a reliable marker of disease activity. The coexistence of Paget's disease with inflammatory and erosive joint disorders observed in our series supports current concepts of PDB as a disorder with osteoimmunological involvement, and warrants further investigation into shared pathogenic mechanisms.

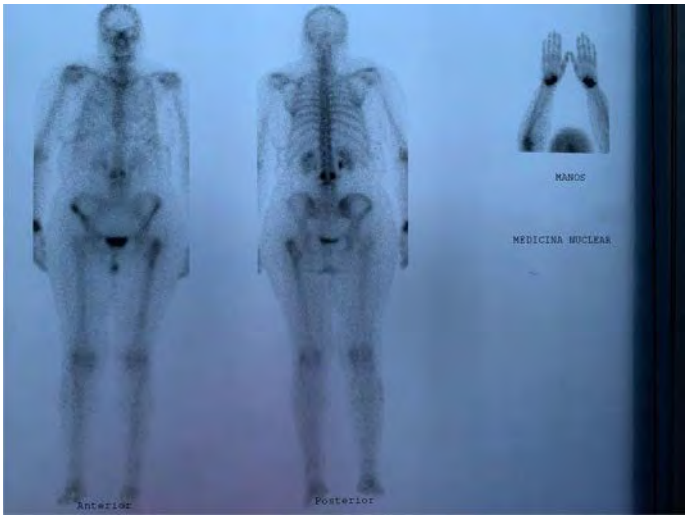


Figure 1. Bone scintigraphy with 99mTc in a 61-year-old woman with rheumatoid arthritis and polyostotic Paget's disease of bone. The metabolic phase shows pathological tracer hyperfixation at L3–L4, right iliac spine, right sacroiliac joint and the proximal third of the left femur, as well as increased uptake in both shoulders and knees, with significant pathological deposits in the wrists.

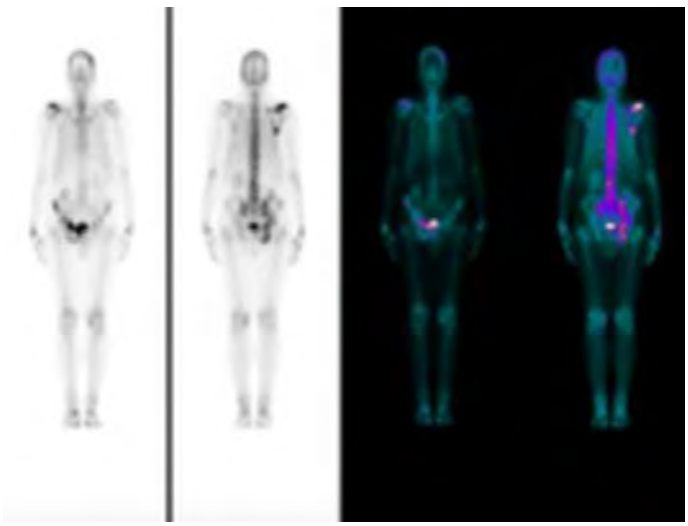


Figure 2. Bone scintigraphy with 99mTc-HDP in a 63-year-old man with erosive osteoarthritis and polyostotic Paget's disease of bone, demonstrating increased tracer uptake in the metacarpophalangeal joint of the first digit, bilateral interphalangeal and carpal joints, as well as in the left parietal bone, right scapula, L3 vertebra and right hemipelvis.



Figure 3. Plain radiograph of the knee in a 75-year-old man who presented with knee monoarthritis. The image shows bone changes consistent with Paget's disease affecting the femur and tibia, together with radiographic evidence of chondrocalcinosis.



Figure 4. Three-dimensional computed tomography (CT) reconstruction of the pelvis in a 63-year-old woman. The image shows altered bone density involving the iliac bone, ischium and pubis, with irregularity of the pubic symphysis. Compensatory pelvic tilt secondary to limb length discrepancy due to neurological deficit of the left lower limb is observed. The patient has a history of post-polio syndrome, with bone and muscle atrophy of the left lower limb and hypoplasia of the left femur. A large uterine fibroid is also identified.

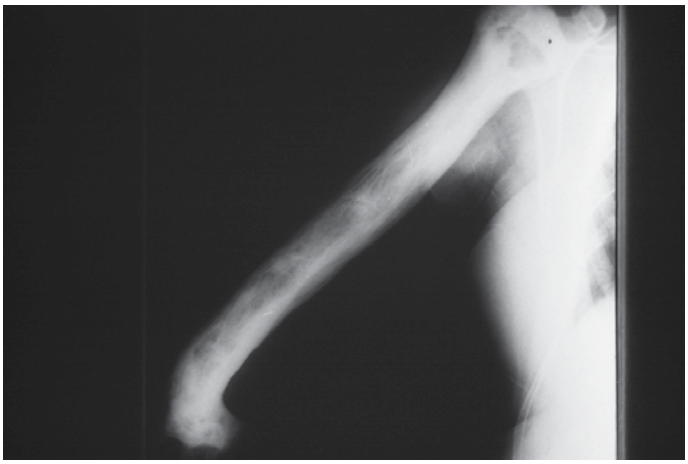


Figure 5. Plain radiograph of the right humerus in a 67-year-old woman with polyostotic Paget's disease of bone, demonstrating a pathological diaphyseal fracture through abnormal bone characterized by diffuse cortical thickening, osseous expansion, coarse trabecular pattern and patchy heterogeneous sclerosis, radiographic features typical of Paget's disease.

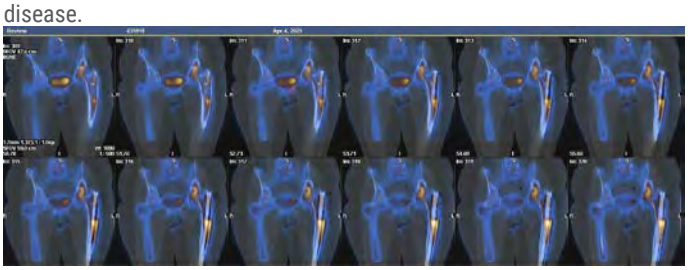


Figure 6. 99mTc-HDP SPECT-CT study in a 77-year-old woman with polyostotic Paget's disease of bone and a pathological femoral diaphyseal fracture treated with osteosynthesis. Markedly increased osteogenic activity is observed in the left iliac wing and along the diaphysis of the left femur, involving the outer cortex and bone marrow, findings consistent with active Paget's disease.

P613

REDEFINING ELIGIBILITY FOR OSTEOANABOLIC TREATMENT: IDENTIFYING VERY HIGH FRACTURE RISK GROUPS AMONGST OLDER SWEDISH WOMEN

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Aims

This study aimed to identify specific subgroups of older women whose fracture incidence equals or exceeds that of populations currently eligible for osteoanabolic therapy under Swedish guidelines (modelled on the ARCH and VERO trials), thereby informing proposals to broaden treatment eligibility.

Material and Methods

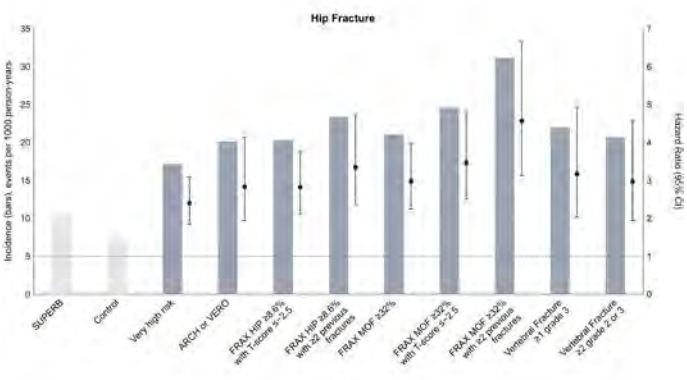
We analyzed data from the SUPERB cohort, a population-based study comprising 3,028 women aged 75–80 years living in Gothenburg, Sweden. Participants were stratified into risk categories based on the inclusion criteria of the ARCH and VERO trials, alongside groups defined by vertebral fracture status and other very high fracture risk (VHFR) categories defined by FRAX® probabilities (Major Osteoporotic Fracture [MOF] ≥32% or Hip Fracture ≥8.6%) and specific clinical determinants, including low bone mineral density (BMD). Incidence rates for hip and any clinical fracture were calculated over a mean follow-up of approximately 7 years. Cox proportional hazards regression was used to estimate hazard ratios (HR) and 95% confidence intervals (CI) comparing VHFR groups with the non-VHFR group.

Results

The analysis demonstrated that several groups identified via FRAX-based VHFR thresholds, with or without the addition of other clinical risk factors such as osteoporosis prevalence (T-score ≤−2.5) or multiple prior fractures, exhibited fracture incidence rates and HRs comparable to, and in certain instances exceeding, those observed in the 'ARCH or VERO' characteristics reference group. In total, 1,028 (34%) women belonged to any VHFR group (Figure). Notably, a solitary prevalent grade 3 vertebral fracture was associated with hip fracture incidence of 22.0 per 1,000 person-years and any clinical fracture incidence of 135.3 per 1,000 person-years, exceeding rates observed in the composite trial-eligible population. Furthermore, participants classified as VHFR by FRAX (MOF ≥32%) with multiple prior fractures exhibited the highest hip fracture incidence (31.2 per 1,000 person-years).

Conclusion

Over a third of the older women in the SUPERB cohort had VHFR. Current reimbursement criteria for osteoanabolic therapy appear unduly restrictive, excluding a substantial cohort of women whose risk of fragility fracture is equivalent to that of patients included in the ARCH-Vero trials.



P614

ENDURANCE EXERCISE INDUCED SKELETAL MUSCLE-DERIVED SIRT3-ENRICHED SMALL EXTRACELLULAR VESICLES ALLEVIATE OSTEOPOROSIS BY SUPPRESSING FERROPTOSIS

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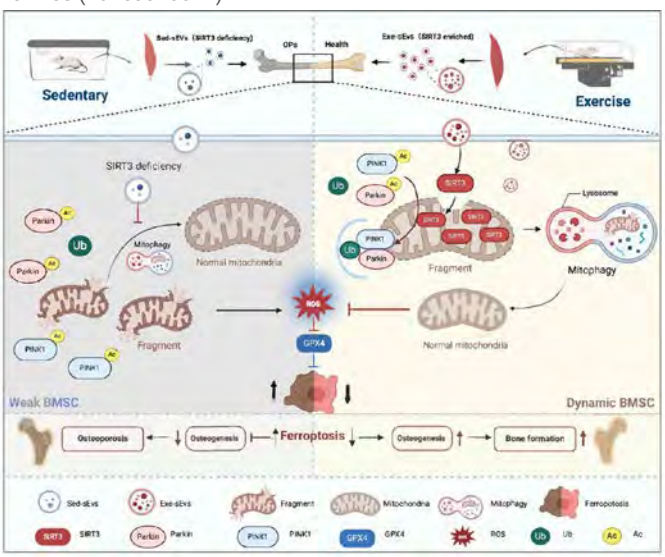
Objectives: Endurance exercise (Exe) demonstrates reliable beneficial effects in maintaining bone health and alleviating osteoporosis progression. However, the precise mechanisms underlying Exe-mediated muscle-bone crosstalk remain to be fully elucidated. Here, we identified that Exe-enhanced secretion of skeletal muscle-derived small extracellular vesicles (Mus-sEVs) as a critical inter-tissue communication modality.

Material and Methods: Eight-week male mice in the Exe group were forced to run and then Mus-sEVs were isolated and injected to ovariectomy (OVX)-induced and age-related mouse. μCT, immunohistochemical analysis, and Immunofluorescence were used to measure bone biomarkers. The AAV9 containing EGFP reporter, a muscle-specific promoter MHCK7, and a specific shSIRT3 fragment (AAV9-shSIRT3) were constructed to knockdown the expression of SIRT3 in muscle. BMSC-specific aptamers connected SIRT3-sEVs were used to deliver SIRT3 efficiently into the bone.

Results: Exe-induced Mus-sEVs (Exe-sEVs) ameliorated bone loss in both OVX-induced and age-related mouse models by enhancing the osteogenic differentiation of bone marrow mesenchymal stem cells (BMSCs). Mechanistically, proteomic profiling demonstrated predominant enrichment of Exe-sEV cargo in ferroptosis-related pathway, while pharmacological activation of ferroptosis conversely abolished their bone-protective effects in OVX-induced murine models. Subsequent investigations elucidated that SIRT3 accumulation in Exe-sEVs suppressed ferroptosis, thereby facilitating BMSCs osteogenesis and counteracting OVX-induced osteoporosis. Furthermore, targeted delivery of SIRT3-overexpressing sEVs to bone tissue via a BMSC-specific aptamer significantly alleviated bone loss in OVX mice.

Conclusion: Our study delineates endurance exercise-mediated muscle-bone crosstalk and establishes Exe-induced muscle-derived sEVs as a promising therapeutic alternative for osteoporosis prevention.

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P615

STATISTICAL SHAPE MODELING OF THE PROXIMAL FEMUR IN MEXICAN WOMEN AND ITS ASSOCIATION WITH REGIONAL BONE MINERAL DENSITY

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Objective(s): To characterize proximal femur morphology in Mexican women using statistical shape modeling (SSM) and examine its relationship with site-specific bone mineral density (BMD), focusing on structural configurations potentially linked to fracture vulnerability.

Material and Methods: A cross-sectional analysis of 284 DXA hip scans was performed using BoneFinder software to generate statistical shape models. Active Shape Models identified modes of morphological variation after automated placement of 65 landmarks. Shape modes were summarized using BoneFinder (1), and regional BMD (neck, upper/lower neck, Ward's triangle, trochanter, diaphysis, total hip) was extracted from DXA reports. Descriptive statistics and 95% CIs were calculated by shape mode. No multivariable models were used given the exploratory design.

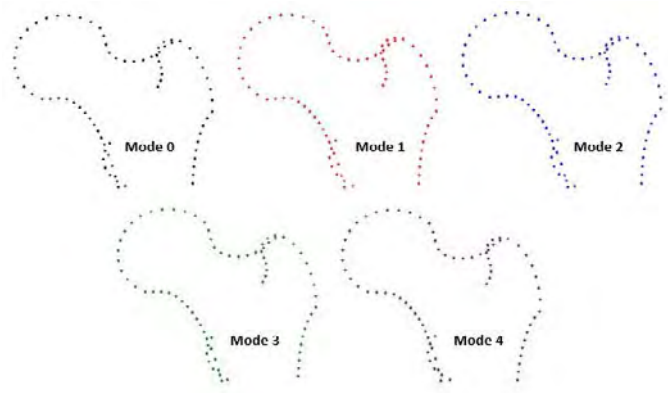
Results: Seventeen morphotypes were identified. The first five modes captured 80% of morphological variability (Figure 1). Three dominant configurations emerged: (1) long, narrow necks with valgus alignment (Mode 2); (2) short, wide necks (Mode 3); and (3) intermediate shapes (Mode 0). Mode 2 showed the lowest BMD across fracture-prone regions—superior neck (0.735 g/cm²) and Ward's triangle (0.721 g/cm²)—while Mode 0 exhibited the highest regional BMD. Morphologies with long, slender necks, flattened heads, and valgus angles corresponded to biomechanical disadvantage consistent with patterns reported internationally.

Conclusion(s): This is the first study to apply SSM to characterize proximal femur morphology in Latin American women. Distinct morphotypes—particularly those with long, narrow, valgus-oriented necks—were associated with low regional BMD, suggesting increased structural vulnerability. Integrating morphometric and densitometric information may enhance fracture-risk assessment and support development of population-specific prediction models.

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Figure 1. Proximal femur morphometry. This image only shows the first 5 modes (mode 0–mode 4) capture 80% of the variability in bone morphology observed in the sample.



P616

EMERGING APPROACHES FOR FRACTURE RISK PREDICTION: A SCOPING REVIEW OF MULTIDOMAIN MODELS AND NOVEL TOOLS

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Objective(s): To map and characterize tools, algorithms, and models proposed to predict fragility fracture risk in adults without external validation, identifying predictor domains, methodological trends, and gaps in real-world applicability.

Material and Methods: A scoping review was conducted following Arksey

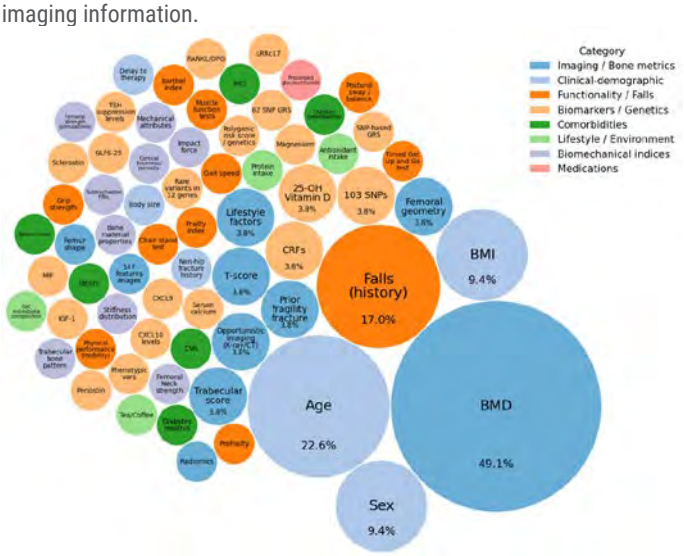
& O'Malley and PRISMA-ScR guidance. Searches in MEDLINE, Cochrane Library and Healthevidence (updated June 2025) identified studies proposing prediction tools or assessing novel predictors of incident osteoporotic fractures. Two reviewers performed independent screening and data extraction. Predictors were grouped into clinical, functional, imaging-based, biomechanical, biochemical, and genomic domains.

Results: Fifty-three studies (2016–2024) were included. Traditional regression-based models (e.g., POL-RISK, HKOS, CFracture, FREM) relied mainly on age, sex, prior fracture, BMI, comorbidities, falls, and medication exposures. Emerging approaches expanded into functional measures (grip strength, gait speed, timed up-and-go, postural sway), advanced imaging (finite-element DXA/CT, radiomics, deep learning from radiographs), biochemical markers (e.g., CXCL9, sclerostin, periostin), and polygenic scores. Machine-learning tools often improved discrimination, particularly for short-term risk prediction, but external validation was rare. Predictors clustered into eight domains, as illustrated in **Figure 1**, showing the increasing multidimensionality of fracture-risk modeling.

Conclusion: Fracture-risk prediction is rapidly evolving beyond BMD and FRAX toward multidomain models integrating functional performance, imaging-derived biomechanics, AI-based features, and molecular signals. However, the absence of robust external validation, calibration reporting, and real-world feasibility limits clinical translation. Future development should prioritize multicohort validation, integration across predictor domains, transparency for AI-based tools, and applicability in diverse global populations.

Figure 1. Distribution of variables included in unvalidated fracture risk prediction models according to predictor domain.

Bubble sizes represent the relative frequency of each predictor among the 53 studies included in this scoping review. Predictors are grouped into eight domains: larger bubbles indicate variables most frequently incorporated in fracture prediction models, whereas smaller bubbles correspond to exploratory or emerging predictors (e.g., gut microbiota composition, splenectomy, or ulcers). The figure illustrates the progressive expansion of fracture risk modeling beyond bone density toward multidomain approaches that integrate functional, biological, and imaging information.



P617

INFRASTRUCTURE AND PSYCHOLOGICAL FACTORS AS FRACTURE RISK IN INSTITUTIONALIZED ELDERLY: A PROSPECTIVE OBSERVATIONAL STUDY

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Objective(s)

To investigate relationships between environmental infrastructure, psychological factors, and fracture risk in institutionalized elderly residents, and to identify modifiable risk factors for comprehensive fall prevention interventions.

Material and Methods

A 12-week prospective observational qualitative study was conducted in a public nursing home with weekly assessments. Sixteen elderly residents (mean age 78 years) were recruited through purposive sampling. Data collection included: structured interviews (covering sociodemographic characteristics, fall history, physical activity patterns, assistive device use), environmental observations using a standardized facility assessment checklist, and institutional medical records analysis. Psychological assessment included validated instruments for fear of falling and perceived loneliness. Thematic analysis identified patterns linking environmental and psychological factors to fall/fracture risk. Data saturation was confirmed after 14 interviews.

Results

Physical activity participation was high (81% regular practitioners), correlating with reduced falls. However, 25% reported prior fracture-related hospitalizations. Adapted infrastructure (non-slip flooring, grab bars) significantly reduced fall incidents in compliant users. Environmental hazards identified included suboptimal handrail utilization and water infiltration during precipitation. Psychological barriers were significant: fear of falling (68%) and social isolation (56%) independently predicted reduced mobility, paradoxically increasing fall risk through deconditioning. Low assistive device adoption reflected psychological reluctance rather than availability. Calcium supplementation and glucocorticoid monitoring demonstrated clinical importance in fracture prevention.

Conclusion(s)

Environmental infrastructure alone is insufficient for fall prevention; concurrent psychological support addressing fear and isolation is essential. A comprehensive approach integrating architectural modifications, mental health interventions, and medication optimization represents the most effective fall/fracture prevention strategy. Findings support development of integrated institutional protocols addressing physical-psychological-pharmacological domains.

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P618

IMPORTANCE OF PHYSICAL ACTIVITY IN FALL PREVENTION IN ELDERLY: A SYSTEMATIC LITERATURE REVIEW

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Objective(s)

To identify populations susceptible to osteoporosis, elucidate pathophysiological mechanisms, and evaluate the role of physical activity in fall prevention and bone health among elderly.

Material and Methods

A systematic literature review was conducted using PubMed, SciELO, and Google Scholar databases. Studies published between 2001 and 2024 were included, focusing on elderly with osteoporosis, physical activity interventions, and fall prevention outcomes. Selection criteria prioritized clinical trials, experimental studies, and systematic reviews. Analysis focused on musculoskeletal physiology, bone remodeling, and exercise mechanisms in aging populations.

Results

Aging impairs physiological adaptation to physical stress, promoting osteoporosis and sarcopenia. Osteoporosis reduces bone mass, increasing fracture risk particularly in postmenopausal women and low-weight individuals. Sarcopenia, characterized by progressive loss of muscle mass and strength, increases fall risk. After age 30, muscle fiber quantity and functionality decline significantly, contributing to frailty. Combined with sedentary lifestyle, polypharmacy, and chronic diseases, sarcopenia and osteoporosis affect 30% of elderly over 65 years and 50% of those over 80 years. Falls have both physical and psychological impacts, including fear, insecurity, and social isolation. Regular physical activity, including resistance and balance exercises, reduces osteoporosis and sarcopenia effects, promoting functional independence. Evidence demonstrates that muscle strengthening programs and postural balance training are effective fall prevention strategies.

Conclusion(s)

Regular physical activity, encompassing resistance training and balance exercises, is essential for fall prevention and improved quality of life in elderly. These interventions reduce osteoporosis and sarcopenia effects while promoting functional independence. Additionally, a safe adapted environment is fundamental to minimize fall risk. Physical activity combined with environmental modifications represents an effective strategy for maintaining health and quality of life in aging populations. Multifactorial approaches integrating exercise, environmental safety, and medical monitoring are recommended for comprehensive fall prevention.

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P619

CLINICAL PROFILE AND FRACTURE RISK FACTORS IN COMMUNITY-DWELLING ELDERLY: A PRIMARY CARE STUDY

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Objective(s)

To assess clinical profile and fracture risk factors in elderly patients registered in primary health centers (UBSs), evaluating comorbidities, assistive device use, home environmental hazards, and bone health screening gaps.

Material and Methods

Cross-sectional observational study conducted in 14 elderly residents (mean age 76 years) registered in community-based primary health centers (UBSs) between September-December 2024. Data collection included home visits with standardized questionnaires addressing: clinical conditions, medication use, fall history, mobility device utilization, and domiciliary environment assessment. Fracture risk was evaluated using FRAX Brazil tool. Ethical approval and informed consent (TCLE) were obtained for all participants.

Results

Home environmental hazards were prevalent: loose rugs (61.5%), stairs without handrails (62.9%), irregular flooring (62.5%). Safety adaptations were limited: bathroom grab bars (38.5%), slip-resistant flooring (23.1%), but adequate night lighting present (69.2%). Mobility device use (canes/walkers) was reported by 57.1% of participants, while 50% of residences had access difficulties. Regarding bone health status: 50% demonstrated intermediate fracture risk, 2 participants with elevated risk (14.3%), but zero participants had undergone bone density testing. Home-based fall risk factors (inadequate lighting, poor stair condition, absence of assistive devices) were identified as modifiable intervention targets.

Conclusion(s)

Despite presence of selective safety elements, substantial fracture

risk factors persist in domiciliary environments of community-dwelling elderly. Critical gap exists in preventive bone health screening (zero densitometry testing). Combined environmental adaptation, clinical evaluation, and safety education are essential for fracture prevention and healthy aging. Findings underscore necessity for integrated public health policies addressing environmental modification, bone health assessment, and fall prevention in primary care settings.

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P620

MEDICAL STUDENT COMPETENCY DEVELOPMENT THROUGH FALL PREVENTION EXTENSION PROJECT IN ELDERLY: OUTCOMES ON PRACTICAL AND THEORETICAL SKILLS

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Objective(s):
To evaluate impact of a fall prevention extension project on medical student competency development in geriatric care, environmental safety assessment, and evidence-based fracture prevention strategies.

Material and Methods:
Pre-post intervention study of 31 medical students (14 female, 17 male; various academic years) participating in fall prevention extension project approved by Ethics Committee (CAAE 83246224.8.0000.5514). Data collection via validated questionnaires administered via Google Forms before and after project participation, assessing knowledge gains, clinical skills, and confidence in geriatric patient management.

Results:
Post-intervention: 87.1% students reported increased capacity for elderly patient care; 96.8% demonstrated competency in environmental safety assessment. All participants (100%) rated project activities as effective for academic development, highlighting exposure to underrepresented patient demographics, enhanced understanding of elderly vulnerability, and ability to identify fall-fracture risk factors. Students developed practical skills in FRAX application, environmental hazard identification, and preventive counseling strategies.

Conclusion(s):
Extension projects integrating theory with clinical practice effectively enhance medical student competency in geriatric medicine and fracture prevention. Direct elderly patient engagement develops holistic understanding of aging-related vulnerabilities and enables evidence-based preventive intervention skills. Such initiatives strengthen medical training while simultaneously benefiting community through applied knowledge and improved elderly care practices.

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P621

CLINICAL PROFILE AND FRAGILITY FRACTURES IN OUTPATIENTS: AN ORTHOPEDIC DEPARTMENT ANALYSIS

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Objective(s): To characterize demographic, clinical, and environmental risk factors associated with fragility fractures in a population attending an orthopedic clinic.

Material and Methods: This cross-sectional study evaluated 33 orthopedic outpatients (age 12–93 years) approved by Ethics Committee (CAAE 83246224.8.0000.5514). Data collection included demographics, fracture history, anthropometric measures, comorbidities, and home safety assessment via structured Google Forms questionnaires.

Results: Among participants, 57.6% had sustained fractures (87.9% female; predominantly age 66–75 years). Bone density evaluation confirmed secondary osteoporosis in 63.6%. Mobility difficulties requiring assistive devices were reported by 78.8%. Environmental risks (loose rugs, slippery floors) were present in 24.2% of homes. Fear of falls impacted quality of life despite relatively safe residences. Only 48.5% engaged in regular social activities.

Conclusion(s): Advanced age, female sex, and mobility limitations are primary fracture risk factors in this population. Multifactorial interventions addressing environmental safety, mobility promotion, psychological support regarding fall anxiety, and bone health optimization are essential to reduce fragility fracture incidence and enhance healthy aging.

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P622

OSTEOSARCOPENIA IN AGING: NONPHARMACOLOGICAL INTERVENTIONS THROUGH RESISTANCE TRAINING AND TARGETED NUTRITIONAL SUPPLEMENTATION

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Objective(s): To synthesize evidence regarding osteosarcopenia syndrome combining osteoporosis and sarcopenia, and evaluate efficacy of resistance training and nutritional supplementation as nonpharmacological management strategies.

Material and Methods: Systematic literature review of PubMed database (2014–2024) using terms: "osteoporosis," "sarcopenia," "osteosarcopenia," "supplementation," "exercise training." Inclusion criteria: clinical trials, systematic reviews, meta-analyses evaluating resistance/weight-bearing exercise and nutritional interventions in elderly populations. DEXA, muscle mass assessment, and functional capacity measures were primary outcome variables.

Results: High-intensity resistance and weight-bearing exercise programs (2–3 sessions/week) demonstrated significant improvements in bone density and muscle strength in elderly. Resistance training reduced fracture-fall risk while increasing functional capacity. Nutritional interventions—calcium, vitamin D, vitamin K, magnesium from food sources preferred over isolated supplements—combined with adequate protein intake (including whey protein) and essential amino acids (creatine, branched-chain amino acids) enhanced muscle mass and strength gains. Multimodal interventions combining exercise plus nutrition showed superior outcomes versus monotherapy.

Conclusion(s): Osteosarcopenia represents prevalent, debilitating condition in aging populations amenable to evidence-based nonpharmacological management. Combining regular resistance training with optimized nutrition targeting bone and muscle health reduces falls, fractures, and functional decline, improving quality of life and independence in elderly. Lifestyle modifications constitute foundational strategy for prevention and disease mitigation.

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COMORBIDITY OF OSTEOPOROSIS AND DEPRESSION IN INSTITUTIONALIZED ELDERLY: THERAPEUTIC ROLE OF STRUCTURED ACTIVITIES

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Objective(s):
To examine the bidirectional relationship between osteoporosis and depression in institutionalized elderly and evaluate physical activities as therapeutic intervention for both conditions.
Material and Methods:
Systematic literature review conducted via PubMed using descriptors: "osteoporosis," "depression," "comorbidity," "elderly," "risk factors." Analysis focused on articles published within past 10 years examining pathophysiological mechanisms linking both conditions and therapeutic interventions in institutional settings.
Results:
Strong evidence supports significant association between osteoporosis and depression. Shared mechanisms include hormonal alterations (elevated cortisol, reduced estrogen/testosterone), systemic inflammation, and side effects of selective serotonin reuptake inhibitors (SSRIs) on bone metabolism. Physical activity emerged as key protective factor, improving bone density, mood, self-esteem, and social integration. Regular exercise programs combining resistance training and weight-bearing activities demonstrated efficacy in reducing depression symptoms while enhancing bone health outcomes.
Conclusion(s):
Depression and osteoporosis represent interconnected conditions in elderly populations that mutually exacerbate outcomes. Implementing structured physical activity programs (exercise, dance, painting, recreational activities) in long-term care facilities demonstrates potential to prevent and manage both conditions simultaneously, improving residents' quality of life and functional independence.
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FRACTURE RISK ASSESSMENT IN INSTITUTIONALIZED ELDERLY USING FRAX: AN OBSERVATIONAL STUDY IN A PUBLIC NURSING HOME

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Objective(s):
To evaluate 10-year fracture risk using the FRAX tool in institutionalized elderly residents and identify clinical factors associated with increased fracture vulnerability.
Material and Methods:
Observational, analytical field study in 16 residents (age 61–89 years) of a public long-term care facility. FRAX data collected for 10-year fracture risk prediction. Inclusion criteria: cognitive capacity and communicative ability. Exclusion: non-institutionalized elderly, age <40 or >90 years, incomplete medical records. Ethics approval: CAAE 83246224.8.0000.5514. Descriptive statistics calculated; variables correlated.
Results:
Mean age 74.68±7.2 years; female predominance (68.75%). Residents >80 years demonstrated higher fracture probability, particularly those with age >80 years, previous fractures, corticosteroid use, and positive family history. Limited osteoporosis knowledge: 43.75% unaware of condition. Majority (56.3%) classified as intermediate fracture risk. Risk stratification using FRAX effectively identified vulnerable individuals independent of bone mineral density availability.
Conclusion(s):
FRAX represents accessible, practical tool for fracture risk stratification in institutionalized elderly. Implementation of FRAX assessment combined with complementary bone density evaluation facilitates early therapeutic intervention, preventing fragility fractures, reducing morbidity, and decreasing healthcare costs in this vulnerable population.
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ENVIRONMENTAL AND BEHAVIORAL RISK FACTORS FOR FRACTURES IN DEMENTIA: A HOME SAFETY EVALUATION STUDY

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Objective(s):
To identify environmental and behavioral factors associated with falls and fractures in community-dwelling elderly with dementia and develop targeted prevention strategies.
Material and Methods:
This observational study conducted home safety evaluations in Bragança Paulista municipality (n=16 elderly with dementia). Assessments evaluated demographic data, anthropometric measures, fracture history (post-age 60), presence of osteoporosis, tobacco/alcohol use, sedentarism, and home hazards (loose rugs, bathroom supports, handrails on stairs, floor regularity/adherence, carpet presence, light switch location). Ethics Committee approval (CAAE 83246224.8.0000.5514).

Results:
Female predominance among fall victims (62.5%). Majority of falls occurred during daytime; primary location was home. Significant risk factors included low body weight (BMI <18.5), active smoking status, and osteoporosis diagnosis. These conditions increased probability of major fractures and hip fractures. Dementia significantly increased fall-fracture risk independent of age, sex, marital status, health conditions, alcohol use, and medication consumption.
Conclusion(s):
Dementia substantially elevates fall-fracture risk in elderly, even when controlling for traditional variables. Multifactorial interventions addressing both home modification and cognitive-behavioral support are essential for preventing fractures in this vulnerable population.
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FRACTURE RISK ASSESSMENT TOOL (FRAX) IN ORTHOPEDIC PRACTICE: STRATIFICATION OF FRAGILITY FRACTURE RISK IN ELDERLY PATIENTS

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Objective(s):
To apply the Fracture Risk Assessment Tool (FRAX) for evaluating 10-year fracture risk in elderly orthopedic clinic patients and stratify fracture risk profiles.
Material and Methods:
Observational study of 33 orthopedic clinic patients (age 40–93 years; 88% female; 82% elderly). FRAX data were collected via structured online questionnaires (CAAE 83246224.8.0000.5514). Clinical variables extracted included age, gender, body mass index, fragility fracture history, parental hip fracture history, corticosteroid use, rheumatoid arthritis status, and alcohol consumption. Bone mineral density (femoral neck) was available in 15 patients (DEXA).
Results:
FRAX stratification revealed: very high major fracture risk (39.4%, n=13), high risk (15.2%, n=5), intermediate risk (15.2%, n=5), and low risk (21.2%, n=7). Mean major fracture probability was 10% over 10 years; hip fracture probability approximately 6%. Among 15 patients with femoral neck BMD: eight classified as very high hip fracture risk, two high, five low.
Conclusion(s):
FRAX effectively identifies high-risk elderly patients requiring therapeutic intervention. This accessible tool enables fracture risk stratification regardless of BMD availability, facilitating early preventive management and reducing fragility fracture burden and associated healthcare costs.
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LOWER EXTREMITY FRACTURES IN PATIENTS WITH SPINAL CORD INJURY SEQUELAE: COMPARATIVE ANALYSIS OF CONSERVATIVE AND SURGICAL MANAGEMENT

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Objective(s)
To report three cases of spinal cord injury (SCI) patients who sustained lower extremity fractures (4 total fractures), and to compare clinical outcomes, morbidity, and mortality between conservative and surgical management approaches.
Material and Methods
Retrospective case series review of three patients with spinal cord injury who sustained lower extremity fractures, with analysis of post-operative results and complications. Comparison included conservative treatment (immobilization) versus surgical management (intramedullary nailing, Girdlestone procedure, external fixation). Literature review was performed for comparative and supplementary data. Institutional Ethics Committee approval was obtained (CEP # 3.543.715, Universidade São Francisco).
Results
Case 1: Paraplegic male (L2 level, 10-year post-injury) presenting with two tibial fractures secondary to wheelchair fall. Right tibial fracture treated with intramedullary nailing; left tibial fracture managed conservatively with immobilization. Both fractures achieved consolidation. Case 2: Tetraplegic male (C4/C5 level, 28-year post-injury) presenting with subtrochanteric fracture treated surgically with Girdlestone procedure. Fracture healed without complications. Case 3: Paraplegic male (T10/T11 level, 5-year post-injury) presenting with proximal tibial fracture treated with Ilizarov external fixation. Fracture achieved complete consolidation. All three patients demonstrated low-energy trauma mechanisms. None had prior osteoporosis screening or prevention strategies. Surgical fixation (particularly internal fixation) demonstrated superior rehabilitation outcomes, shorter hospitalization, and improved patient mobilization compared to conservative management, despite equivalent union rates.
Conclusion(s)
Spinal cord injury patients demonstrate significantly elevated risk for lower extremity fractures, particularly in paraplegic individuals. While no difference in mortality and morbidity was observed between conservative and surgical approaches, surgical fixation (especially internal fixation)

provided superior functional outcomes during rehabilitation, including reduced immobilization periods, shorter hospital stay, and improved mobilization. Early osteoporosis detection and prevention represents critical opportunity for reducing fragility fracture risk in SCI population. Further prospective studies are warranted to optimize fracture management protocols in this vulnerable population.

Acknowledgments

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P628

SERUM LEVELS OF 25-VITAMIN D AND CALCIUM IN PATIENTS WITH DISTAL RADIUS FRACTURES: AN EMERGENCY DEPARTMENT STUDY

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Objective(s)

To evaluate serum levels of 25-vitamin D and calcium in patients with distal radius fractures presenting to the emergency department of a university hospital.

Material and Methods

This was a prospective, descriptive, quantitative observational study conducted over three months (April-June 2018) at the Emergency Department of Hospital Universitário São Francisco (HUSF), Bragança Paulista, SP, Brazil. Patients with distal radius fractures admitted to emergency services were enrolled. Data collected included: age, sex, profession, weight, height (BMI calculation), physical activity level, comorbidities, fracture type and classification, trauma mechanism, dominant versus non-dominant hand involvement, and reduction outcomes. Single blood sample was obtained by nursing staff at presentation for serum calcium and 25-vitamin D measurement. Ethics Committee approval was obtained (CEP # 2.602.136, April 16, 2018, Hospital Universitário São Francisco).

Results

Ten patients met inclusion criteria (mean age 61.8 years; 80% female, 20% male). Fractures included 6 comminuted and 4 simple types. All fractures resulted from low-energy trauma (falls from standing height). Serum calcium levels ranged from 8.1-9.8 mg/dL: 7 patients normocalcemic, 3 hypocalcemic. Serum vitamin D levels ranged from 16.6-38.1 ng/mL, with mean below normal range: 5 patients insufficient (21-29 ng/mL), 3 deficient (<20 ng/mL), 2 normal (≥30 ng/mL). Comorbidities included hypertension (60% of sample), smoking (10%), and diabetes (10%). BMI >25 in 60% of patients. Successful reduction achieved in 100% of cases. Analysis demonstrates reduced serum vitamin D levels are common in distal radius fracture patients presenting to emergency care, particularly in elderly population with low-energy trauma mechanisms.

Conclusion(s)

Reduced serum vitamin D levels appear associated with increased frequency of distal radius fractures in the emergency department population. The majority of patients presented with insufficient or deficient vitamin D status. These findings suggest vitamin D assessment at acute fracture presentation may identify at-risk populations for prevention interventions. Vitamin D deficiency may contribute to poor

bone quality and increased fracture susceptibility. Further prospective studies with larger samples, extended follow-up, multicenter design, and assessment of potential confounding variables are needed to confirm the association between vitamin D status and distal radius fracture risk in acute care settings. Screening for and correction of vitamin D deficiency may represent an important prevention strategy for reducing fracture recurrence.

Acknowledgments

This study was approved by the Research Ethics Committee of Hospital Universitário São Francisco (CEP # 2.602.136, approved April 16, 2018). We acknowledge the support of nursing and orthopedic staff at Hospital Universitário São Francisco.

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P629

THE IMPACT OF DELAYED DRUG THERAPY ON OSTEOGENESIS IMPERFECTA DUE TO PUBLIC HEALTH SYSTEM

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INTRODUCTION: Osteogenesis imperfect (OI) is a genetic disorder with heterogeneous manifestations, characterized mainly by fragility in the bones due to defects in the structure or quantity of type 1 collagen (1). The main clinical manifestations of this disorder are: skeletal deformities, blueish scleras, imperfect dentinogenesis and deafness. The diagnosis can be done *in utero* by the ultrasounds. After birth, the diagnosis becomes prominently clinical, with supplementary lab work and imaging scans (2). Treatment should be precocious and multidisciplinary, using drug therapy with Pamidronate Disodium in patients under 18 years old, with the intention of diminishing the risk of fractures (3).

DESCRIPTION OF CASE

M.V.S.C., 1 year and 3 months old, female, born at 40 weeks of gestation, no family history of OI. The hypothesis of OI came up with the 30 week ultrasound, that showed long bones dysplasia (femur=4,45cm consistent with a 24 week fetus; ulna=4,47cm consistent with a 28 week fetus), and the suspicion of a fracture in the right femur. At birth, radiological exams highlighted bone thinning, including in the skull (Picture 03), as well as a fracture in the right femur. The case was forwarded to a reference service where the patient was diagnosed with OI Type III in the Sillence Classification.

Due to the lack of availability of the medication through the public health system, the start of treatment with Pamidronate Disodium was delayed. In the mean time the patient had various fractures throughout her first year of life.

At 1 year of age, the patient received her first dose of Pamidronate Disodium, wich is an inhibitor of bone reabsorption mediated by osteoclasts (1st day: 0,25mg/kg, 2nd and 3rd days: 0,5mg/kg). And also takes Cholecalciferol, 4 drops/day, and calcium carbonate, 500mg/day. In addition to the drug treatment, the patient also is also being monitored by a multidisciplinary team.

After beginning medication, the patient hasn't had any more fractures until now, which supports the importance of the drug therapy at the prognosis.

CONCLUSION

This report is a classic example of how drug therapy benefits the prognosis, with the caveat of an early intervention being needed. However, the late start to the therapy due to the lack of availability of the medication through the public health system at first, leads to the worsening of the clinical presentation during the waiting time for the medication, resulting in various fractures during this period.

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P630

REMS-BASED EVALUATION OF SKELETAL FRAGILITY IN PATIENTS WITH TYPE 2 DIABETES MELLITUS (T2DM)

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Objective(s): Type 2 diabetes mellitus (T2DM) has emerged as a relevant risk factor for skeletal fragility despite exhibiting normal or even increased bone mineral density (BMD) when assessed by standard densitometric technologies such as dual-energy X-ray absorptiometry (DXA). This phenomenon is known as the "diabetic bone paradox," suggests an impairment of bone quality. In this context, this study aimed to evaluate BMD in patients with T2DM using Radiofrequency Echographic Multi Spectrometry (REMS) in comparison with DXA. In addition, bone quality was explored through the REMS Fragility Score (FS).

Materials and Methods: Inclusion criteria were: Caucasian individuals, both genders, with a diagnosis of T2DM that underwent both DXA and REMS scans at the same axial reference sites (lumbar spine and femur). Bone quantity was assessed by DXA- and REMS-BMD, whereas bone quality was evaluated using REMS-FS, a non-dimensional parameter ranging from 0 to 100, where higher values indicate a higher compromised microarchitectural framework. Comparisons between DXA- and REMS-BMD were analysed using paired *t*-test.

Results: A total of n = 99 patients (mean age = 73.1 ± 7.9 years) were included in the analysis. REMS-BMD values were significantly lower than DXA-BMD at the total hip (0.776 ± 0.116 *vs*. 0.834 ± 0.146 g/cm²) and femoral neck (0.630 ± 0.110 *vs*. 0.717 ± 0.133 g/cm²; $p < 0.0001$ for both). The mean REMS-FS was 45.4 ± 9.4, indicating compromised bone microarchitecture. Similar findings were observed at the lumbar spine.

Conclusion(s): This study demonstrated significant differences between REMS and DXA in the assessment of BMD in patients with T2DM, with REMS-BMD showing lower values, and thus revealing a higher prevalence of osteopenic/osteoporotic condition, as expected. Furthermore, the inclusion of bone quality analysis through REMS-FS enables the evaluation of skeletal microarchitectural and fragility, providing additional insights into the effects of T2DM on bone health. Overall, these findings support the potential role of REMS as a valuable tool to improve osteoporosis diagnosis and fracture risk assessment in patients with T2DM.

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PREVIOUS FRACTURES AS A DETERMINANT OF FRAGILITY RISK IN SYSTEMIC SCLEROSIS

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Objective(s): Patients affected by systemic sclerosis, a rare connective tissue disease characterized by progressive fibrosis of the skin and other internal organs, are at increased risk of osteoporosis due to chronic inflammation, reduced mobility and glucocorticoid therapy. In addition, comorbidities, including rheumatoid arthritis, thyroid disorders, hypercholesterolemia and previous fragility fractures, may further exacerbated the risk. This study aimed to assess skeletal fragility in patients with systemic sclerosis using Radiofrequency Ecographic Multi Spectrometry (REMS) technology, with a focus on the impact of previous fractures.

Materials and Methods: REMS femoral scans were performed on Caucasian men and women diagnosed with systemic sclerosis. REMS provides information on both bone quantity (BMD, T-score and Z-score) and bone quality (through the Fragility Score, FS). By combining T-score and FS, REMS also classify patients into 7 risk classes (named from R1–R7), each with a progressive probability to develop a short-term (within five-years) hip fracture.

Results: The study included 85 patients (mean age 65.13 ± 11.57 years; mean BMI 25.89 ± 3.75 kg/m²). REMS assessment revealed an average T-score of −2.2 ± 0.8 and an average FS of 66.43 ± 20.45, thus indicating a deterioration of both bone quantity and quality parameters. The fracture risk stratification showed that the 81% of the patients was classified in the high-risk categories (R5–R7). Specifically, individuals with a history of previous fractures were more frequently represented in the high-risk classes: the 30.8% of these patients, for example, was classified in R7.

Conclusion(s): Patients with systemic sclerosis exhibit a markedly elevated susceptibility to fragility with more than 80% classified in the high-risk classes. Moreover, a history of previous fractures was found to further exacerbate the risk, suggesting an additive effect of multiple predisposing factors. These findings highlight the importance of early bone assessment in this high-risk population. In this context, REMS technology emerges as a valuable, non-invasive tool for identifying individuals at increased fracture risk and supporting targeted prevention strategies.

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MUSCULOSKELETAL ASSESSMENT BY RADIOFREQUENCY ECHOGRAPHIC MULTI SPECTROMETRY (REMS) IN WOMEN WITH OVARIAN CANCER

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Objective(s): Cancer and related treatments are commonly associated with functional impairment and reduced physical activity, which together represent major determinants of health-related quality of life. These alterations often lead to progressive musculoskeletal deterioration, increasing the risk of frailty, falls, and fractures, particularly in oncological populations. This study aimed to evaluate the musculoskeletal system in women with ovarian cancer by using the Radiofrequency Echographic Multi Spectrometry (REMS) technology.

Materials and Methods: Inclusion criteria encompassed Caucasian women with a diagnosis of ovarian cancer who underwent REMS-based assessment of bone and muscle status at femur and thigh, respectively. REMS is a non-invasive and ultrasound-based technology that enables an integrated evaluation of the musculoskeletal system. Bone health is assessed by both bone quantity (BMD, T-score and Z-score) and bone quality (Fragility Score, FS) parameters. FS is a dimensionless and BMD-independent score ranging from 0 to 100, with higher values indicating greater compromised microarchitectural structure and increased skeletal fragility. Likewise, muscle health status is evaluated by a quantitative parameter strictly related to qualitative (muscle quality index, MQI) features.

Results: A total of n = 20 women were included in the analysis (mean age = 59.7 ± 12.5 years). Ovarian cancer patients showed a lower mean total femoral BMD compared with controls (0.770 ± 0.150 *vs*. 0.790 ± 0.120; p = 0.447). Bone quality analysis revealed higher FS values in comparison to controls (40.03 ± 7.46 *vs*. 34.79 ± 18.11; p = 0.46). Likewise, muscle assessment impaired thigh muscle quality (MQI = 62.57 ± 10.7).

Conclusion(s): These findings highlight the impairment of the musculoskeletal system in ovarian cancer women. Early and targeting intervention may be crucial to prevent progression towards osteoporotic and/or sarcopenic conditions, which can significantly impair mobility and quality of life and increase the rate of disability, fractures, hospitalization and mortality. In this context, REMS technology may represent a valuable tool for the integrated assessment of the musculoskeletal fragility, with potential implications for clinical practice and preventive strategies.

P633

SUSTAINED EFFECTIVENESS OF CR500 TOPICAL HYDROGEL IN MILD TO MODERATE KNEE OSTEOARTHRITIS: EVIDENCE FROM A RETROSPECTIVE FOLLOW-UP STUDY

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Introduction
Hyaluronic acid is widely used for symptomatic osteoarthritis, and its benefit typically lasts six months, requiring repeated treatments. Well tolerated and non-invasive alternatives capable of symptom control and delaying further medical interventions for osteoarthritis remain a clinical need.

Objectives
To assess the long-term clinical effectiveness and satisfaction in patients treated with CR500 hydrogel for mild to moderate knee osteoarthritis.

Material and Methods
A retrospective follow-up study was conducted in 35 out of 38 patients enrolled in the CR500 trial (NCT05661162). Participants were contacted at least 24 months after the last study visit. The primary endpoint was the change in Lequesne Knee Index (LKI) between the last study visit (V4) and the follow-up visit (V5). Secondary endpoints included recurrence of pain for the same condition, need and timing of additional therapies and long-term patient satisfaction with CR500. Paired non-parametric analyses and descriptive statistics were performed.

Results
29 out of 35 eligible patients were successfully contacted and included in the follow-up analysis. In the overall population, mean LKI decreased from 5.88 ± 2.1 at V4 to 4.98 ± 3.1 at V5, corresponding to a 15.3% improvement, showing a trend toward statistical significance (p=0.084). Excluding patients who underwent knee replacement (n=27), LKI improvement became significant, reaching 23.6% (p=0.009). Excluding patients who underwent or were scheduled for knee replacement (n=22), the LKI improvement increased to 30.9% and remained statistically significant (p=0.0019).
Although most patients reported recurrence of knee pain at the follow up visit, 55.6% described lower pain intensity compared to baseline, while 6.9% reported no recurrence. The mean interval between CR500 treatment and the first subsequent therapy for symptom recurrence was 9.6 ± 10.6 months.
Long-term satisfaction was high, with 82.8% of patients willing to repeat CR500 treatment and no negative responses reported.

Conclusions
These follow-up data suggest sustained algofunctional benefit, delayed need for additional interventions, exceeding the average effect reported for viscosupplementation cycles, and high patient satisfaction beyond 24 months, supporting the role of CR500 therapy as a non-invasive option for mild to moderate knee osteoarthritis, with a clinically meaningful duration of effect of at least nine months.

Disclosures
Dr. Luca Forte is an employee of Contrad Swiss SA. The other authors do not have competing interest.

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POST-COVID-19–ASSOCIATED UNILATERAL LOWER LIMB LYMPHEDEMA: A CASE REPORT

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Introduction
Lymphedema is a chronic disorder caused by impaired lymphatic drainage, resulting in progressive tissue swelling, fibrosis, and functional limitation. Secondary lymphedema is most commonly associated with malignancy, oncologic surgery, radiotherapy, infection, trauma, or venous pathology. Coronavirus disease 2019 (COVID-19) is characterized by systemic inflammation, endothelial dysfunction, and microvascular injury. While vascular and thrombotic complications of COVID-19 have been extensively reported, potential involvement of the lymphatic system remains poorly understood. Recently, isolated case reports have suggested that COVID-19 infection or vaccination may trigger lymphatic dysfunction, leading to secondary lymphedema. These observations raise awareness of COVID-19 as a possible novel risk factor for lymphatic failure.

Case Report
A 75-year-old woman presented with progressive swelling of the left lower extremity that had developed approximately one month prior to admission. Her medical history was unremarkable for malignancy, previous surgery, radiotherapy, trauma, or known venous disease. She had been hospitalized two months earlier for COVID-19 infection due to respiratory symptoms and received inpatient treatment without requiring intensive care unit admission or mechanical ventilation. One month after discharge, she noticed gradual, painless swelling of her left leg. She denied erythema, fever, skin lesions, or symptoms suggestive of cardiac, renal, or hepatic disease.
Physical examination revealed non-erythematous swelling extending from the ankle to the thigh, consistent with early-stage lymphedema. There were no signs of infection or skin breakdown. Duplex Doppler ultrasonography demonstrated normal venous flow, with no evidence of deep vein thrombosis or venous insufficiency. Cross-sectional imaging excluded pelvic or abdominal masses and malignancy, and laboratory findings were unremarkable. After exclusion of alternative etiologies, a diagnosis of secondary unilateral lower limb lymphedema associated with prior COVID-19 infection was established. Conservative management, including compression therapy, skin care, and therapeutic exercises, resulted in partial improvement during follow-up.

Discussion
This case illustrates the development of unilateral lower limb lymphedema following COVID-19 infection in an elderly patient without classical risk factors for secondary lymphedema. COVID-19–related endothelial dysfunction, inflammatory cytokine release, and microvascular injury may also affect lymphatic vessels due to shared structural and functional characteristics with the vascular endothelium. Proposed mechanisms include inflammatory obstruction of lymphatic channels, lymphatic endothelial damage, and reduced lymphatic contractility. Advanced age, reduced lymphatic reserve, hospitalization, and decreased mobility during acute illness may further predispose patients to post-COVID lymphatic dysfunction. Although rare, similar cases reported in the literature support a possible association. Recognition of post-COVID lymphedema is essential for early diagnosis and prevention of long-term morbidity.

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A YOUNG MALE OSTEOPOROSIS PATIENT PRESENTING WITH BILATERAL ASEPTIC NECROSIS OF THE FEMORAL HEAD

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INTRODUCTION

Osteoporosis is frequently associated with postmenopausal women and advanced age, leading to delays in diagnosis and treatment in young men. The SFR-GRIO (French Society of Rheumatology- Group for Research and Information on Osteoporosis) approach recommends treatment for men with a T-score <−1 in men with severe osteoporotic fractures, <−2 in those with any fracture, and all men with a T-score <−3. Bisphosphonates are among the basic treatment options in male osteoporosis.

CASE REPORT

A 26-year-old male patient was consulted due to suspected sacroiliitis and fasciculations in the left leg. The patient had been receiving hyperbaric oxygen therapy for 9 days with a diagnosis of early-stage femoral head avascular necrosis (AVN) and had bilateral hip-groin pain for 3 months. The pain was mechanical in nature and persisted at night (VAS: right 4, left 10). Physical examination revealed limited movement of the left hip due to pain; FABERE and FADIR tests showed bilateral pain. Laboratory investigations revealed no pathology except for a slight elevation of CRP. A plain pelvic X-ray was normal. Magnetic resonance imaging showed subchondral bone marrow edema in the left femoral head consistent with Stage 1 AVN. Bone scintigraphy showed minimally increased activity in the left femoral head. Rheumatological disease was ruled out. BMD measurements showed T and Z scores between -2.6 and -3.2 in the lumbar spine and femur, leading to a diagnosis of osteoporosis. The patient received zoledronic acid infusion. Endocrinological evaluation revealed low total testosterone and high prolactin and cortisol levels; further investigation into secondary causes of osteoporosis was planned.

DISCUSSION

This case is noteworthy because it is a young male osteoporosis patient presenting with AVN clinical presentation, exhibiting inflammatory and mechanical hip pain without significant systemic findings. Although osteoporosis is not frequently associated with pain, it should definitely be considered in the differential diagnosis even in young male patients when appropriate clinical clues are present.

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MICRORNAS AS INTEGRATORS OF BONE REMODELING AND SYSTEMIC METABOLISM IN OSTEOPOROSIS

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Objectives

The objective of this study is to provide a critical analysis of the most recent scientific evidence identifying microRNAs which are involved in the interaction between osteoblasts and osteoclasts, as well as in regulating body metabolism in osteoporosis. These results will identify how a decreased level of bone strength may be influenced by disturbances in metabolic processes in addition to disturbances in the inflammatory process and hormonal levels.

Materials and Methods

Using a structured literature review of studies indexed in PubMed from 2020 to 2026, we identified both experimental and translational studies using a systematic search strategy related to the role of miR-21, miR-29, miR-133a and miR-214 in controlling bone remodeling, the intercellular communication between different cell types involved in bone remodeling and metabolic signaling pathways. The research studies were chosen based upon the ability of each study to provide a mechanistic explanation of how the microRNAs studied interact with other cells within the bone environment including an evaluation of the use of extracellular vesicles for delivering miR-21, miR-29, miR-133a and miR-214 to osteoblasts.

Results

Research conducted during the past five years provides strong evidence demonstrating that the four microRNAs described above play important roles in regulating the three components of bone remodeling i.e., osteoblast differentiation, osteoclast activity and osteocyte signaling. miR-214 was demonstrated to be one of the most significant osteoclast derived extracellular vesicle cargoes that inhibit osteoblast differentiation thereby negatively coupling osteoblasts and osteoclasts. In contrast, miR-21 and miR-29 exhibit context dependent regulation of bone formation and resorption and their effect on bone turnover varies depending on whether there are inflammatory or metabolic conditions present. miR-133a is consistently associated with low BMD and therefore may represent a potential circulating biomarker for assessing risk of developing osteoporosis.

Conclusion

Collectively, the findings of this study suggest that the four microRNAs discussed above serve as central regulators of both bone remodeling and systemic metabolism in osteoporosis. Understanding the context dependent and pleiotropic action of these microRNAs is necessary to develop biomarkers for detecting individuals at increased risk for developing osteoporosis and to design microRNA-targeting therapeutic approaches that can selectively target specific tissues involved in bone remodeling.

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SEASONAL VARIATION IN RECRUITMENT IN LONG-TERM CARE RESEARCH: INSIGHTS FROM THE PREVENT TRIAL

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Objective(s) In Canada, despite challenges, long term care (LTC) research is critical to improving practice and addressing outcomes such as falls and fractures. The objective of this analysis was to examine seasonal variation in recruitment in LTC research using preliminary data from the PREVENT trial.

Material and Methods LTC homes across Ontario, Canada were invited to participate in the PREVENT trial between 2024–2025. Recruitment engagement was defined as any response (yes/no) by the home (≥50 beds) to the invitation to participate in the trial. Response rates were summarized descriptively overall and by season (winter (Jan-Mar), spring (Apr-Jun), summer (Jul-Sep), and fall (Oct-Dec)), and examined by home size (50–99 beds, ≥100 beds), profit status (for-profit, not-for-profit), and rurality (census metropolitan area (CMA), census agglomeration (CA), rural).

Results Between 2024 and 2025, 576 homes were contacted and 348 (60%) LTC homes responded to the PREVENT trial invitation, including 104 (30%) small (50-99) and 238 (70%) large homes (≥100 beds), 189 (55%) for-profit and 157 (45%) not-for-profit homes and 224 (65%) CMA, 53 (15%) CA and 69 (20%) rural homes. Recruitment varied by season, with the highest engagement in spring (51%), followed by summer (25%), winter (20%), and fall (3%). Engagement was highest in spring across all categories, including home size (small (51%), large (53%)), profit status (for-profit (58%), not-for-profit (44%)), and rurality (CMA (51%), CA (62%), and rural (45%)). The lowest engagement rates were observed in the fall (small (3%), large (2%), for-profit (3%), not-for-profit (4%), CMA (3%), CA (2%), and rural (4%)).

Conclusion(s) Recruitment to LTC research in PREVENT, showed clear seasonal variation, with higher engagement in spring across home size, profit status, and rurality. This variation likely reflects fluctuations in organizational capacity, staff availability, and planning cycles. Higher spring engagement aligns with new fiscal year planning, government regulations and fewer competing demands. Lower fall and winter engagement may coincide with accreditation, infectious outbreaks and vaccine campaigns. Strategically aligning recruitment with seasonal variation can improve efficiency by concentrating resources during high-yield periods and reducing operational barriers to LTC research participation.

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THE SILENT EPIDEMIC: IDENTIFYING AND MANAGING UNDIAGNOSED OSTEOPOROSIS IN SPINE FRACTURE PATIENTS

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Background: Osteoporosis is a major public health concern, yet it remains profoundly underdiagnosed, particularly in patients who have already experienced a fragility fracture. Vertebral compression fractures (VCFs) are frequently the first clinical manifestation but often go unrecognized or untreated, contributing to a high risk of subsequent, debilitating fractures. This care gap highlights the failure of secondary fracture prevention efforts.

Objective: This study aimed to determine the prevalence of previously undiagnosed osteoporosis in patients presenting with acute vertebral fractures and to evaluate the feasibility and effectiveness of implementing a standardized, inpatient-initiated fracture risk assessment and management protocol in this high-risk population.

Methods: A prospective study was conducted on 150 patients (mean age 72, 78% female) admitted with a new symptomatic VCF. All patients underwent bone mineral density (BMD) measurement via dual-energy X-ray absorptiometry (DEXA) and a comprehensive medical history review to ascertain prior diagnosis and treatment status. Patients diagnosed with osteoporosis (T-score ≤ -2.5) or osteopenia were initiated on a guideline-based treatment plan before discharge.

Results: Of the 150 patients, 105 (70.0%) were diagnosed with osteoporosis, and 30 (20.0%) with osteopenia, totaling 90% who required pharmacological intervention. Crucially, 95% of these patients had no prior formal diagnosis or anti-osteoporotic treatment initiated by their primary care provider. The implementation of the systematic management protocol resulted in a 98% rate of appropriate treatment initiation and patient education at discharge.

Conclusion: Undiagnosed osteoporosis is rampant among patients with vertebral fractures, confirming the "silent epidemic" status. Systematic screening using DEXA and immediate initiation of secondary fracture prevention protocols are critical interventions required within the acute care setting to address this significant public health failure and reduce the burden of recurrent fragility fractures.

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RISK ASSESSMENT FOR SECONDARY FRACTURES FOLLOWING INITIAL VERTEBRAL COMPRESSION: A PREDICTIVE MODELS

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Objective: Secondary vertebral compression fractures (sVCFs) represent a common and debilitating complication following an initial VCF, leading to increased morbidity, mortality, and healthcare costs. This study aimed to develop and validate robust predictive models capable of accurately assessing an individual patient's risk of developing sVCFs.
Methods: A retrospective cohort of 850 patients with a history of initial VCF was analyzed. Data encompassing demographic, clinical (e.g., age, sex, BMI), pharmacologic (e.g., anti-osteoporosis treatment history), and radiographic parameters (e.g., T-score, initial fracture severity via Genant classification, sagittal balance metrics such as Sagittal Vertical Axis (SVA)) were collected. We employed several machine learning methodologies, including Logistic Regression, Random Forests, and Gradient Boosting Machines (GBM), to identify the optimal model for predicting sVCF incidence within a 2-year follow-up period.
Results: The Gradient Boosting Machine (GBM) model exhibited the superior predictive performance, achieving an Area Under the Curve (AUC) of 0.88 (95% CI: 0.85–0.91) on the validation set. Feature importance analysis revealed that low Bone Mineral Density (T-score), advanced age, and pre-existing sagittal malalignment (increased SVA) were the most significant predictors of secondary fracture risk. The model stratified patients into three distinct risk groups (low, moderate, high), with the high-risk group demonstrating a 5.4-fold increased hazard ratio compared to the low-risk group.
Conclusion: Predictive models, particularly the GBM approach, offer a powerful and non-invasive tool for personalized risk stratification of sVCFs. Implementing this model in clinical practice can facilitate the early identification of high-risk patients who would benefit most from aggressive prophylactic measures, such as immediate anti-osteoporosis therapy, targeted exercise, or tailored bracing, thereby potentially improving outcomes and reducing the burden of recurrent fractures.

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HIGH-RESOLUTION PERIPHERAL QUANTITATIVE CT (HR-PQCT) ANALYSIS OF TRABECULAR BONE MICROARCHITECTURE IN THE LUMBAR SPINE

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Introduction: High-resolution peripheral quantitative computed tomography (HR-pQCT) provides exquisite detail of bone microarchitecture *in vivo*, but its application has been historically limited to peripheral appendicular sites. The lumbar spine (LS) is a critical site for osteoporotic fracture, and standard dual-energy X-ray absorptiometry (DXA) often fails to capture crucial microarchitectural deterioration. This study aimed to investigate the feasibility of adapting and utilizing HR-pQCT technology to non-invasively analyze the trabecular microarchitecture of the L3 vertebral body and to characterize its relationship with clinical bone mineral density (BMD) measures.
Methods: A custom, high-resolution scanning protocol was developed using a standard HR-pQCT system to acquire axial images of the L3 vertebral body in a cohort of 50 older adults (25 male, 25 female, mean age 72 ± 8 years). Images were processed using dedicated registration and segmentation algorithms to isolate the central trabecular compartment, free from cortical shell artifacts. Key microarchitectural parameters were calculated, including trabecular bone number (Tb.N), trabecular thickness (Tb.Th), trabecular separation (Tb.Sp), bone volume fraction (BV/TV), and volumetric BMD (vBMD). These parameters were correlated with standard LS DXA T-scores and fracture history.
Results: The HR-pQCT protocol successfully generated high-quality, three-dimensional images of the L3 trabecular architecture, demonstrating clear differences between subjects with and without a history of fragility fracture. LS vBMD derived from HR-pQCT showed a strong correlation with DXA T-scores ($r=0.78, p<0.001$). Crucially, microarchitectural parameters—particularly reduced Tb.N and increased Structure Model Index (SMI), indicating a shift towards rod-like structures—provided discriminatory power independent of DXA T-score (Odds Ratio for fracture per standard deviation reduction in Tb.N: 2.5, 95% CI: 1.3–4.9, $p=0.005$).
Conclusion: The non-invasive HR-pQCT technique is feasible for detailed *in vivo* assessment of trabecular microarchitecture within the lumbar spine. This innovative application offers a potent research tool for characterizing age-related and disease-related structural decline at a critical fracture site, potentially enabling superior fracture risk stratification beyond current clinical standards.

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METFORMIN AS PART OF THE PROTOCOL IN THE TREATMENT OF KNEE OSTEOARTHRITIS?

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Background. Osteoarthritis and type 2 diabetes mellitus often occur together as a consequence of risk factors such as age and obesity. High blood sugar levels enable the production of elements that damage cartilage and bone, while diabetes-related inflammation and impaired metabolism damage joint health, worsening the clinical course of OA and the pain of patients.
Objective. This study aims to evaluate the effects of metformin on knee pain in patients diagnosed with OA and DM.
Methods. The study included patients presenting to the rheumatology clinic with the main complaint of knee pain. Patients were divided into 2 groups. The first group included 50 patients (mean age 58.6) diagnosed with knee osteoarthritis according to EULAR criteria (presence of pain, morning stiffness, limitation of range of motion in one or 2 joints, narrowing of the joint space on radiographs). The second group included 48 patients (mean age 60.2) diagnosed with knee osteoarthritis and type 2 diabetes mellitus treated with metformin 500 mg twice a day. Exclusion criteria were the presence of other diseases such as diabetes mellitus treated with insulin, cardiovascular diseases and other inflammatory rheumatic diseases. Patients in both groups were evaluated at the beginning of the study, after 3 months and at the end of 6 months through clinical assessment (WOMAC, VAS scale) and laboratory examinations (ERS, CRP, fasting and 2-hour postprandial glucose levels). Both groups, which had similar characteristics regarding age, gender, BMI and severity of osteoarthritis, were treated for osteoarthritis according to established protocols.

Results. In the group of patients with osteoarthritis and diabetes mellitus, a greater reduction in pain, morning stiffness and improvement in functional activity (according to WOMAC and VAS scale) was evidenced compared to the group of patients with osteoarthritis alone in both control phases ($p < 0.05$). The values of acute phase tests of inflammation were lower in the group treated with metformin, measured after 3 months and 6 months compared to the beginning of the study ($p < 0.005$).
Conclusion. These results show that the presence of metformin use during osteoarthritis disease has influenced the alleviation of symptoms and clinical signs as well as inflammation indicators. Further studies are needed to determine a more important role for the use of metformin in the treatment of osteoarthritis even in patients without diabetes mellitus.
Keywords. Osteoarthritis, diabetes mellitus, VAS scale

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MCCUNE–ALBRIGHT SYNDROME IN CLINICAL PRACTICE: THREE-CASE SERIES FROM ARGENTINA.

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Introduction: McCune–Albright syndrome (MAS) is a rare sporadic disorder characterized by fibrous dysplasia, café-au-lait skin pigmentation, and endocrine hyperfunction. Skeletal involvement may progress leading to deformities, fractures, chronic pain, and significant morbidity in adulthood.
Herein, we report three adult cases from Argentina illustrating the clinical heterogeneity and longterm burden of MAS.

Objective: report clinical cases highlighting skeletal involvement and disease-related complications.
Case 1. A 44-year-old woman with MAS, diagnosed in the presence of café-au-lait skin pigmentation, fibrous dysplasia, and a history of precocious puberty and hyperthyroidism. She showed radiological progression of fibrous dysplasia. At evaluation, she presented inflammatory polyarthritis and was diagnosed with seropositive rheumatoid arthritis. Imaging revealed extensive craniofacial fibrous dysplasia with middle and inner ear involvement. Laboratory evaluation showed increased FGF23 levels. Treatment with intravenous zoledronic acid was initiated.

Case 2. A 21-year-old woman with polyostotic MAS, diagnosed in early childhood due to peripheral precocious puberty treated with GnRH analogs. She sustained rib fractures requiring surgical resection and prosthetic reconstruction, with histological confirmation of fibrous dysplasia. Imaging showed extensive skeletal involvement, including ribs, spine, pelvis, and hips, with an expansive lytic iliac lesion and soft tissue extension. She is currently managed with intravenous pamidronate, and analgesics for chronic pain, under multidisciplinary follow-up with significant impact on quality of life.

Case 3. A 40-year-old woman with long-standing polyostotic MAS, diagnosed after precocious puberty and confirmed by bone biopsy in adolescence. She presents extensive skeletal involvement, chronic disabling bone pain without history of fractures. Imaging revealed marked craniofacial involvement and widespread uptake on bone scintigraphy. She has associated endocrinopathies, including hypothyroidism. Despite prolonged intermittent oral bisphosphonate therapy, pain and biochemical activity persist, with limited access to advanced antiresorptive treatments, resulting in significant impairment of quality of life.

Conclusion: These three cases illustrate the marked clinical heterogeneity of McCune–Albright syndrome in adults, with variable skeletal burden, endocrine involvement, and impact on quality of life. A multidisciplinary approach and individualized long-term follow-up are essential to optimize outcomes in this rare disorder.

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HODGKIN LYMPHOMA WITH INITIAL BONE INVOLVEMENT: ANALYSIS OF A CLINICAL CASE

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Bone lymphomas are rare (3–8% of primary bone cancers), with B-cell lymphoma being the most common. Hodgkin lymphoma (HL) accounts for only 3%. A distinction must be made between primary bone lymphoma, where bone is the only affected site, and initial bone involvement by HL, where simultaneous lymphadenopathy is frequent. This entity typically presents between the second and fifth decades of life and shows a marked male predominance (4:1). Pain is often the sole symptom and is frequently misinterpreted as other conditions such as osteomyelitis or arthritis. The most commonly affected sites are the pelvis, spine, and proximal femur. Radiologically lesions may appear lytic, sclerotic, or mixed lesions. Combined chemotherapy and radiotherapy have demonstrated high response rates, with 10-year survival ranging from 60% to 84%.
Objective:
To analyze a case of Hodgkin lymphoma with bone involvement, highlighting the clinical features and diagnostic approach to facilitate early identification of this entity arising from an uncommon location. To analyze a case of Hodgkin lymphoma with bone involvement, highlighting its clinical presentation and diagnostic approach in order to facilitate early recognition of this rare manifestation.
Clinical Case:
A 22-year-old female patient presented in 2025 with progressive, incapacitating pain in the left hip. It was initially interpreted as osteoarthritis, and she received nonsteroidal anti-inflammatory drugs without improvement. Four months later, she developed fever. A CT scan of the chest, abdomen, and pelvis revealed multiple mediastinal and pulmonary lymphadenopathies, as well as lytic lesions in the left iliac crest. Subsequent PET/CT and biopsy of a mediastinal mass confirmed the diagnosis of classic Hodgkin lymphoma (CD30+/CD15+). She completed chemotherapy and is currently under interdisciplinary follow-up by hematology-oncology, traumatology, and endocrinology. The

mediastinal disease is in remission, with residual bone lesion sequelae. Bone biopsy results are pending. She received two doses of zoledronic acid due to low bone mass and severe pain in the affected region.
Conclusion:
This case highlights the need to approach patients with bone pain unresponsive to analgesics from a broader perspective, incorporating more specific complementary diagnostic methods to identify less frequent but more severe conditions.

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ANALYSIS OF ADVERSE EFFECTS OF ZOLEDRONIC ACID IN THE TREATMENT OF OSTEOPOROSIS

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Introduction. Zoledronic acid (ZA) belongs to the latest, third-generation bisphosphonates (BPs), which have a selective effect on bone tissue. Along with therapeutic effects, ZA can cause some adverse effects (AEs). The main side effects (SE) of ZA are temporary, minor in severity.
Objective. To analyze the occurrence of AEs associated with the use of ZA in patients undergoing treatment for osteoporosis (OP).
Materials and methods. 32 patients (29 women and 3 men), mean age 54.23±7.12 years, with a diagnosis of Osteoporosis. The occurrence of AEs during the IV infusion of ZA 5 mg in 12 months with a therapy duration of 1 to 3 years was evaluated. The AEs were divided into acute phase reactions (APRs) – occurring directly during the period of the drug administration and postinfusion reactions (PIR): early (up to 14 days after the infusion) and late (after 14 days). The follow-up period was 12 months (n=32), 24 months (n=21), and 36 months (n=15).
Results. In general, patients showed good tolerance to IV infusion of ZA - 31.3% of patients did not note any AEs. APRs were recorded in 4 patients (12.5%) in the form of arterial hypertension (n=2), headache (n=1) and hyperthermia (n=1). All AEs were regarded as moderate intensity, not requiring infusion interruption. Most of the AEs occurred in the early post-infusion period – 62.5% (n=20). Among the early APRs, hyperthermia (56.3%) prevailed, with a duration of 1 to 8 days. Arthralgia (53.1%), myalgia (46.9%), and influenza-like syndrome (34.3%) were also observed with high frequency. Less common (1-10%) symptoms included palpitations, dizziness, hypotension, transient facial flushing, hyperhidrosis, and nausea. Among the late-onset APRs, muscle cramps (31.3%), asthenia (25.0%), and jaw osteonecrosis (9.4%) were prevalent, with 2 out of 3 patients with jaw osteonecrosis having a malignant neoplasm.
Conclusions: The side effects were mild and short-lived, and similar to other side effects. Early adverse events, such as hyperthermia, arthralgia/myalgia, and flu-like symptoms, were observed with the highest frequency,and they were effectively managed with the use of NSAIDs.

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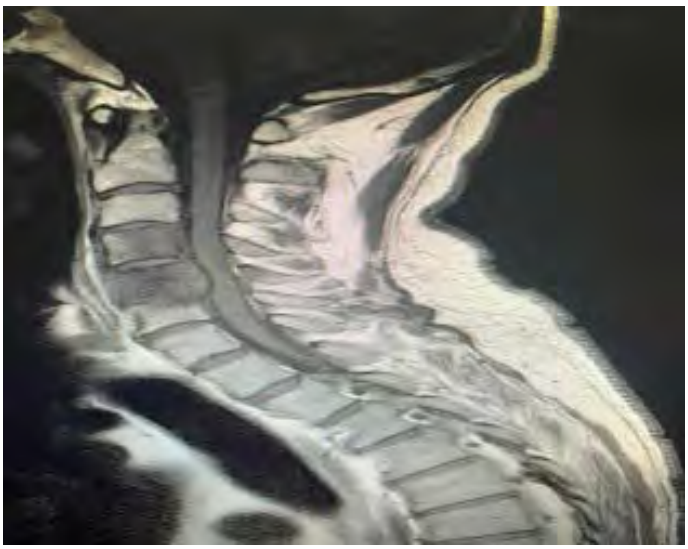
CERVICAL PAIN REVEALING LUNG CANCER: A CASE REPORT

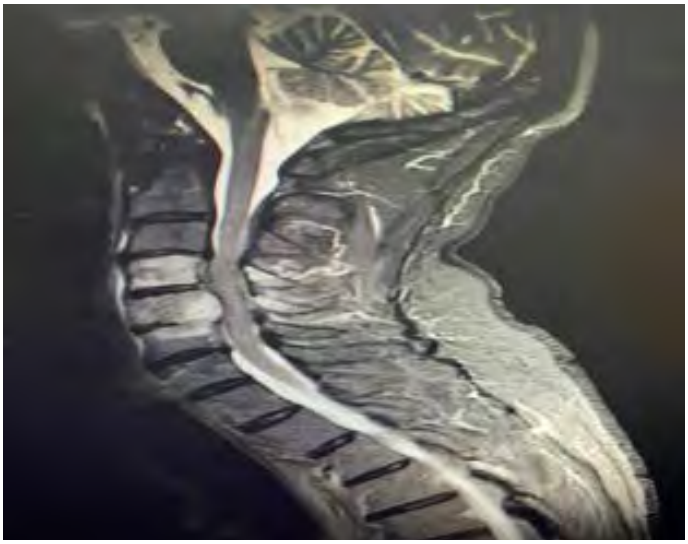
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Introduction
Cervical pain is a common complaint and is most often benign. However, persistent cervicalgia associated with general condition deterioration or neurological signs should raise suspicion of an underlying malignant disease. We report a case of cervical pain revealing metastatic lung cancer, highlighting the importance of early recognition of red flags.

Case Presentation
A 58-year-old man with a past medical history of resolved hepatitis B and treated pulmonary tuberculosis, presented with chronic cervical pain evolving over five months. He did not report morning stiffness nor nocturnal awakenings. However, he complained of an unintentional weight loss of 10 kg over one year.
Physical examination revealed painful and restricted cervical spine mobility, associated with pyramidal signs, including brisk deep tendon reflexes in all four limbs and bilateral motor weakness of the gluteus maximus muscles. Laboratory investigations were strictly normal.
Computed tomography (CT) of the cervical spine demonstrated multiple lytic lesions involving C4 to C6 with epidural extension. Spinal magnetic resonance imaging confirmed a multifocal infiltrative lesion responsible for cervical spinal cord compression, maximal at the level of C5. (Figures 1 and 2)





Figures 1 and 2: Infiltrative lesion of the C4–C6 vertebral bodies, hypointense on T1

(Figure 1) and intermediate signal on T2 (figure 2).
Thoraco-abdomino-pelvic computed tomography revealed a left apical lung mass associated with bilateral pulmonary nodules.
A CT-guided percutaneous lung biopsy confirmed a moderately differentiated pulmonary adenocarcinoma. The patient was transferred to the neurosurgery department for cervical spine stabilization and subsequently referred to oncology for further management.

Discussion
Spinal involvement is a frequent manifestation of metastatic lung cancer and may be the first clinical presentation. Cervical localization, although less common than thoracic or lumbar involvement, is particularly severe because of the high risk of spinal cord compression and neurological complications.
This case illustrates that normal laboratory findings do not exclude a neoplastic cause in the presence of persistent pain and neurological signs. Imaging is therefore decisive.

Conclusion
Inflammatory cervical pain may reveal metastatic lung cancer. Early identification of warning signs is essential to improve neurological and functional outcomes.

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CALCIFIC LIGAMENTITIS OF THE LATERAL COLLATERAL LIGAMENT: A RARE CAUSE OF ACUTE KNEE PAIN

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Introduction

Calcification of the ligaments and tendons is a heterogeneous disease characterized by the storage of calcium hydroxyapatite crystals in various shapes and sizes on or between the collagen fibrils. It's a well-known pathology involving the shoulder joint. However, there are few reports on the lateral collateral ligament (LCL) calcification.

Case Presentation

We present a case of a 60-year-old woman with insulin-dependent diabetes, with no prior history of knee pain, who presented with an acute left knee pain associated with complete functional impairment. Pain intensity was rated at 9/10 on the visual analogue scale. There was no history of trauma, fever, or general condition deterioration. Osteoarticular examination was unremarkable except for the left knee, which was swollen, with a positive patellar tap and reduced range of motion due to pain. The diagnosis of septic arthritis was suspected. Laboratory investigations revealed leukocytosis of 11,000/mm³, associated with an elevated C-reactive protein level of 20 mg/L. Arthrocentesis of the left knee revealed inflammatory synovial fluid containing 3500 white blood cells/mm³, predominantly neutrophils. Standard radiography of the left knee revealed a well-defined calcific deposit in the soft tissue adjacent to the lateral femoral condyle (Figure 1)



Figure 1: Anteroposterior radiograph of the knee joint shows a well-defined
calcific deposit in the soft tissue adjacent to the lateral femoral condyle

A primary bone tumor, benign or malignant, was suspected, and septic arthritis was ruled out after negative synovial fluid cultures.
After 48 hours, the patient experienced spontaneous resolution of pain with normalization of CRP levels.
A repeat radiograph showed a marked reduction in the size of the calcified lesion. Hydroxyapatite crystal arthropathy was suspected and subsequently confirmed by knee computed tomography, which showed a thickened, irregular, and partially calcified lateral collateral ligament at its femoral condylar insertion, with a calcific deposits within the synovial recess associated with reactive synovitis.

Discussion
Calcific ligamentitis of the LCL is an extremely rare cause of lateral knee Pain (1). Only 16 cases were reported in the literature (1,2)

Conclusion
Calcification of the LCL should be considered in case of acute knee pain, particularly in elderly and diabetic patients. Recognition of this entity allows avoidance of inappropriate treatment and unnecessary invasive investigations.

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EFFECT OF SMOKING ON DISEASE ACTIVITY IN ANKYLOSING SPONDYLITIS: A RETROSPECTIVE STUDY

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Introduction

Ankylosing spondylitis (AS) is a chronic inflammatory rheumatic disease primarily affecting the axial skeleton. Its clinical course may be influenced by environmental factors, among which smoking has been identified as a potential aggravating factor. However, the precise impact of smoking status and cumulative tobacco exposure on AS disease activity remains controversial.

Objective

To evaluate the effect of smoking on the clinical and biological activity of ankylosing spondylitis.

Methods

A retrospective descriptive study was conducted over a 12-month period (January–December 2024) in the Rheumatology Department of the Principal Military Instruction Hospital of Tunis. Patients fulfilling the ASAS 2009 classification criteria for ankylosing spondylitis were included.

Clinical and paraclinical data were collected from patients' medical records. Participants were divided into two groups according to smoking status:

Group 1 (G1): non-smokers or former smokers who had quit smoking for more than 12 months

Group 2 (G2): current smokers or recent quitters (≤ 12 months)

Disease activity was assessed using validated indices, including the Bath Ankylosing Spondylitis Disease Activity Index (BASDAI) and the Ankylosing Spondylitis Disease Activity Score with C-reactive protein (ASDAS-CRP). Patient-reported outcomes and inflammatory biomarkers were also analyzed.

Results

The study population was predominantly male (86%, n = 44), with a mean age of 42 ± 11 years and a mean disease duration of 10 ± 8 years. Group 1 included 32 patients, while Group 2 included 23 patients. Among smokers, the mean cumulative tobacco exposure was 19.2 ± 11.5 pack-years (PY).

Smoking patients exhibited significantly higher disease activity compared to non-smokers. ASDAS-CRP was significantly higher in smokers than in non-smokers (2.74 ± 1.1 vs. 2.04 ± 0.72; p = 0.03). BASDAI was also higher in smokers (3.21 ± 1.78 vs. 2.34 ± 1.22), showing a trend toward statistical significance (p = 0.051).

Significant positive correlations were observed between smoking status and ASDAS-CRP (r = 0.270; p = 0.048), as well as between smoking status and patient global assessment (r = 0.281; p = 0.045), reflecting a greater perceived disease burden among smokers. In contrast, cumulative tobacco exposure expressed in pack-years was not significantly associated with any disease activity parameter. No significant association was found between smoking status and inflammatory biomarkers.

Conclusion

Smoking is associated with increased disease activity in ankylosing spondylitis. The absence of a relationship with cumulative tobacco exposure suggests that the detrimental effect is primarily related to current smoking status. These findings support the role of smoking as a modifiable risk factor and emphasize the importance of smoking cessation as an integral component of the comprehensive management of patients with ankylosing spondylitis.

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THERAPEUTIC MAINTENANCE OF METHOTREXATE IN RHEUMATOID ARTHRITIS

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Introduction: Methotrexate (MTX) remains the cornerstone of conventional disease-modifying therapy in rheumatoid arthritis (RA). Evaluating its long-term therapeutic maintenance provides key insights into both its effectiveness and tolerability in real life clinical practice.

Objective: To assess the maintenance rate of MTX in patients with RA and to identify clinical and immunological factors associated with treatment discontinuation.

Methods: We conducted a retrospective study including patients meeting the 2010
ACR/EULAR classification criteria for RA. Demographic, clinical, immunological, and therapeutic data were extracted from medical records. Statistical analyses were performed using SPSS version 25, with a significance threshold set at $p < 0.05$.

Results: Seventy patients (55 women and 15 men) with a mean age of 55.2 ± 13 years and a mean disease duration of 8.66 ± 5.5 years, were included . Immunological assessment showed positivity for rheumatoid factor (RF) in 68.2%, anti-cyclic citrullinated peptide antibodies (ACPA) in 87%, and antinuclear antibodies (ANA) in 32% of patients. The mean baseline disease activity assessed by the DAS28-ESR was 3.5 ± 1.45. MTX was prescribed to 64 patients (91.4%). Mean treatment duration was 52.1 ± 50.9 months, with extremes of 1 month and 240 months. MTX retention rates were 77.1% at 1 year, 68.6% at 2 years, and 37.1% at 5 years.

The main reasons for MTX discontinuation were secondary inefficacy (n = 14), primary inefficacy (n = 2), desire for pregnancy (n = 3), gastrointestinal intolerance (n= 1), hematotoxicity (n = 2), and development of rheumatoid nodules (n = 2).

Statistical analysis revealed a significant negative correlation between MTX treatment duration and ANA positivity (r = -0.248, p = 0.015), as well as with the duration of symptoms before MTX initiation (r = -0.48, p = 0.01).

Conclusion:
This study confirms the central role of MTX in RA, with satisfactory short- and medium-term retention rates that decline markedly by 5 years. ANA positivity and longer symptom duration before treatment initiation appear to predict shorter MTX maintenance. These findings highlight the importance of early MTX initiation and suggest that ANA status may influence therapeutic response, warranting tailored monitoring.

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EFFECT OF SMOKING ON RESPIRATORY FUNCTION IN PATIENTS WITH ANKYLOSING SPONDYLITIS: A RETROSPECTIVE STUDY

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Introduction Ankylosing spondylitis (AS) is a chronic inflammatory rheumatic disease primarily affecting the axial skeleton. It may lead to respiratory impairment due to thoracic ankylosis and, occasionally, parenchymal or pleural involvement. Smoking, a well-known risk factor for pulmonary disease and systemic inflammation, may exacerbate these respiratory complications.

Objective To assess the effect of active smoking and cumulative tobacco exposure on respiratory parameters in patients with ankylosing spondylitis.

Methods A retrospective descriptive study was conducted including patients with AS fulfilling the ASAS 2009 classification criteria. All patients underwent a comprehensive respiratory evaluation, including clinical assessment, chest radiography, spirometry with measurement of forced vital capacity (FVC) in upright and supine positions, and thoracic ultrasonography assessing diaphragmatic excursion, thickness, and the presence of B-lines.
Patients were divided into two groups: non-smokers or former smokers abstinent for more than 12 months, and active smokers or recent quitters (≤ 12 months). Cumulative tobacco exposure was quantified in pack-years (PY).

Results Fifty-five patients were included, predominantly male (86%), with a mean age of 42 ± 11 years. Active smokers (n = 32) had a mean cumulative tobacco exposure of 19.2 ± 11.5 PY.
FVC in both upright and supine positions was significantly lower in smokers (p = 0.022 and p = 0.013, respectively), with a significant negative correlation between smoking status and supine FVC (r = −0.297; p = 0.034). No significant differences were observed in forced expiratory volume (FEV_1), FEV_1/FVC ratio (Tiffeneau index), or the prevalence of restrictive ventilatory defects between groups.
Ultrasonographic assessment revealed reduced inspiratory thickness of the right hemidiaphragm in smokers compared to non-smokers (3.07 ± 0.64 mm vs. 3.38 ± 0.40 mm; p = 0.04). In contrast, diaphragmatic excursion, thickening fraction, and the presence of B-lines did not differ significantly. Clinical respiratory symptoms, auscultatory findings, and radiographic abnormalities were comparable between groups.
Multivariate analysis showed that reduced FVC was independently associated with higher BMI, increased BASMI score, and absence of biologic therapy, whereas smoking status was not an independent predictor.

Conclusion In patients with ankylosing spondylitis, smoking is associated with reduced forced vital capacity and decreased diaphragmatic thickness. However, these effects appear to be indirect, likely mediated by thoracic ankylosis and suboptimal inflammatory control. These findings highlight the importance of smoking cessation in conjunction with optimal rheumatologic management to preserve respiratory function in this population.

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IMPACT OF METABOLIC SYNDROME ON CLINICAL AND THERAPEUTIC FEATURES OF KNEE OSTEOARTHRITIS

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Background: Knee osteoarthritis (KOA) is a leading cause of pain and disability. Beyond mechanical factors, metabolic syndrome (MetS) is increasingly recognized as a contributor through metabolic and inflammatory pathways. Data from North African populations remain limited.
Objective: To compare clinical features and therapeutic management of KOA in patients with and without MetS.
Methods: This cross-sectional study included 100 patients with KOA followed in our rheumatology department. Patients were classified as MetS+ or MetS− according to IDF 2009 criteria. Demographic, clinical, and therapeutic data were collected. Pain was assessed using the visual analog scale (VAS). Statistical comparisons were performed with significance set at $p < 0.05$.
Results: Among 100 patients (79 women, 21 men; mean age 62.9 ± 9.8 years), disease duration averaged 4 years. Fifty-two percent had MetS. MetS+ patients had older age at disease onset (59.6 ± 9.9 vs. 55.1 ± 8.3 years; p = 0.017). They more frequently reported joint instability, with higher rates of knee crepitus (69.2% vs. 43.7%; p = 0.009), joint locking (48.1% vs. 8.3%; p < 0.001), and giving way (67.3% vs. 43.8%; p = 0.026). VAS scores were significantly higher in MetS+ (65 ± 12.9 vs. 45.8 ± 11.8; p < 0.001). Patellar grind test was more often positive (98.1% vs. 81.3%; p = 0.006), as was tibiofemoral joint line tenderness (25.0% vs. 4.2%; p = 0.004). No significant differences were found regarding disease duration, gait disturbance, use of analgesics, NSAIDs, symptomatic slow-acting drugs, knee brace, or rehabilitation.
Conclusion: MetS was associated with a more painful and symptomatic phenotype of KOA, supporting the concept of a metabolic form of the disease. Systematic screening and integrated management of MetS may be essential in these patients.
Keywords: Knee osteoarthritis; Metabolic syndrome; Clinical features; Rheumatology

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INFLUENCE OF DEMOGRAPHIC CHARACTERISTICS ON THE PRESENCE OF METABOLIC SYNDROME IN PATIENTS WITH KNEE OSTEOARTHRITIS

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Introduction Metabolic syndrome (MS)—defined by abdominal obesity, hypertension, dyslipidemia, and insulin resistance—is increasingly recognized as a contributor to chronic diseases, including osteoarthritis [1]. Sociodemographic characteristics may influence its prevalence, but few studies have examined their role in knee osteoarthritis (KOS).

Objective To evaluate the impact of sociodemographic characteristics on the presence of MS in patients with KOS.

Methods This cross-sectional study was conducted at the Rheumatology outpatient clinic of our hospital over six months (April–October 2025). Patients were classified according to the presence or absence of MS using International Diabetes Federation (IDF 2009) criteria. Variables included age, sex, occupation, physical activity, smoking, education, residential environment, and clinical parameters. Comparisons between MS+ and MS− groups were performed with significance set at $p < 0.05$.

Results One hundred patients (79 women, 21 men) were included, mean age 62.9 ± 9.8 years, mean disease duration 4 years. Fifty-two percent had MS. Patients with MS were significantly older than those without (64.9 ± 9.7 vs 60.7 ± 9.7 years; $p = 0.026$). The age of symptom onset was also higher in the MS+ group (59.6 ± 9.9 vs 55.1 ± 8.3 years; $p = 0.017$). Occupational distribution differed ($p = 0.006$): in MS+, 71.2% were housewives, 21.2% retirees, and 7.7% employed, compared to 33.3% employed, 52.1% housewives, and 14.6% retirees in MS−. No significant differences were observed for sex ($p = 0.97$), physical activity ($p = 0.48$), smoking status ($p = 0.431$), educational level ($p = 0.97$), or residential environment ($p = 0.71$).

Conclusion In patients with KOS, advanced age, later age of symptom onset, and certain occupations—particularly being a housewife—are associated with MS. These findings highlight the importance of considering sociodemographic and clinical factors when assessing metabolic risk, to improve prevention and management strategies.

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ASSOCIATION BETWEEN PRE-FRACTURE CARE ADHERENCE AND POST-FRACTURE OUTCOMES: A RETROSPECTIVE ITALIAN COHORT STUDY

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Objectives Osteoporotic fractures represent a major contributor to global morbidity, disability, and excess mortality. While international societies recommend broad approach to improve patient management, existing evidence focuses predominantly on pharmacological interventions rather than the overall pre-fracture care pathway. Therefore, this study investigated the association between pre-fracture patient management and the subsequent risk of re-fracture and mortality in fractured individuals.

Material and Methods We first conducted a review of national and international osteoporosis guidelines published since 2015 to identify best-practice indicators. Subsequently, we performed a retrospective cohort study using healthcare administrative databases from the Local Health Protection Agency of Bergamo, Italy. We included individuals aged 65 years or older with a diagnosis of osteoporotic hip/femur fracture between January 1, 2012, and December 31, 2023 (Index Date, ID). Patients with less than 5 years of data availability were excluded. Adherence to identified indicators in the year preceding the ID was categorized as low (0–1 indicators), medium (2–3), or high (4+). We assessed the likelihood of initiating anti-fracture therapy post-ID using logistic regression. The association between indicators' adherence and both mortality (Cox regression) and re-fracture risk (Fine-Gray model) after adjusting for confounding via inverse probability of treatment weighting was investigated.

Results Seven indicators were identified: pharmacologic treatment, vitamin D/calcium optimization, laboratory assessment of bone dysfunction, testing for secondary osteoporosis causes, bone mineral density evaluation, specialist consultation, and physical therapy. The study included 8,741 subjects: 5,441 low, 2,776 medium, and 524 high adherent. Most individuals demonstrated low adherence to these indicators in the year preceding the index date. High pre-fracture indicators' adherence significantly increased the likelihood of post-fracture therapy uptake, ranging from an OR of 1.27 (95% CI 1.04–1.54) for those with 1 indicator to 8.61 (5.09–14.55) for those with 5+ indicators. Furthermore, high indicators' adherence was associated with reduced mortality risk in patients aged 85+ years (HR: 0.80; 0.73-0.86), and a significantly lower risk of re-fracture in the overall population (HR: 0.74; 95% CI 0.64–0.86).

Conclusions This study highlights that early engagement of patients at risk of fracture significantly improves management trajectories even after a fracture event. Public health interventions aiming to increase awareness among patients and clinicians are warranted to optimize patient management and reduce the overall burden of osteoporosis.

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SACRAL CHORDOMA DEMYSTIFIED: FROM NOTOCHORDAL ORIGINS TO MULTIMODAL MANAGEMENT

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Objective:
To provide radiologists and clinicians with a concise, educational overview of sacral chordomas, emphasizing their pathophysiology, imaging hallmarks, surgical challenges, and current limitations of adjuvant therapy. The aim is to enhance recognition, guide multidisciplinary management, and highlight areas for future research.

Methods:
Sacral chordomas are rare malignant tumors originating from notochordal remnants. Despite low-grade histology, they are locally aggressive, growing adjacent to critical structures such as the rectum, bladder, and sacral nerve roots. **CT and MRI** are essential: CT evaluates bony destruction and central calcifications, while MRI delineates soft tissue extension, neural involvement, and helps in preoperative planning. Histopathology confirms diagnosis via physaliferous cells. Literature and institutional experience were integrated to provide a comprehensive educational perspective.

Results:
CT commonly demonstrates lobulated, destructive masses with intralesional calcifications. MRI clearly defines soft tissue and neural involvement, crucial for surgical strategy. **Wide en bloc resection** is the standard approach, yet achieving clear margins is often challenging. Radiotherapy can reduce recurrence risk but is not curative. Imaging remains pivotal for diagnosis, operative planning, and follow-up, allowing early detection of recurrence and aiding long-term surveillance. Figures illustrate typical imaging features (Fig 1).

Conclusion:
Sacral chordomas are a diagnostic and therapeutic challenge due to their invasive behavior and anatomical constraints. Radiologists play a central role in early identification, characterization, and guidance of multidisciplinary care. Awareness of imaging hallmarks, combined with precise radiologic evaluation, supports optimized surgical planning and follow-up. Continued research into targeted molecular therapies is urgently needed to improve long-term outcomes.

Limitations:
Findings are based on literature and institutional experience; patient-specific variability may limit generalizability.

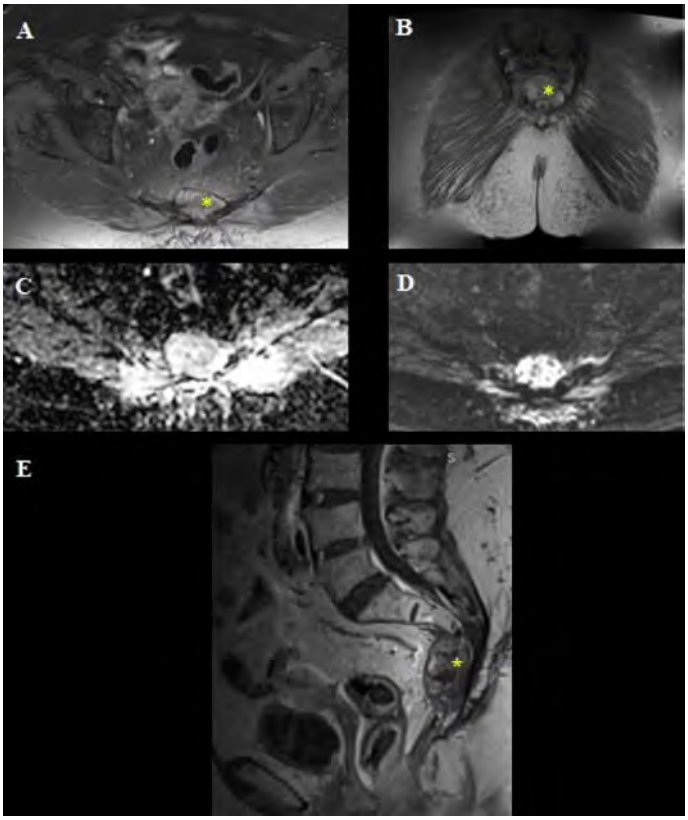


Fig 1:*MRI images of a sacral cordoma: A) Axial image in proton density (PD) sequence showing the chordoma (indicated with a yellow asterisk), which appears well-circumscribed with irregular margins, typical of chordomas, reflecting their heterogeneous composition, including mucinous, cartilaginous, and necrotic elements. B) Coronal image in PD, showing the same lesion with variable signal intensity due to its mixed tissue composition. C) Diffusion-weighted imaging (DWI) at b=50 s/mm², demonstrating no signal restriction, suggesting low cellularity, which is characteristic of chordomas. The use of b=50 is appropriate for low-cellularity tumors, where diffusion is less restricted. D) Apparent Diffusion Coefficient (ADC) map, confirming the lack of signal restriction and supporting the low cellularity of the chordoma, with higher ADC values due to reduced cellularity. E) Sagittal image in T1-weighted sequence, where the lesion appears heterogeneously iso- to hypointense compared to surrounding muscle, with a less dense central region, consistent with the typical appearance of chordomas due to their mucinous and cartilaginous components.*

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LIPOMA ARBORESCENS OF THE SHOULDER: A RARE CASE ASSOCIATED WITH ROTATOR CUFF TEAR

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Introduction: Lipoma arborescens is a rare, benign synovial disorder characterized by villous lipomatous proliferation of the synovial membrane. It most commonly affects the knee joint, while shoulder involvement is uncommon and has been reported as isolated case reports. This report presents a rare case of shoulder lipoma arborescens associated with rotator cuff tear, shoulder pain and subacromial impingement symptoms.

Clinical case: A 62-year-old male patient presented with left shoulder pain for over one year with progressive worsening in recent months. He denied any history of trauma. Physical examination revealed full shoulder range of motion with pain during abduction and internal rotation. Neer, Hawkins and Jobe tests were positive. Drop arm test was negative. Magnetic resonance imaging (MRI) revealed full-thickness tear of the supraspinatus tendon, subacromial-subdeltoid bursal effusion and a lobulated, villous proliferative mass within the subdeltoid bursa showing hyperintense signal on T1-weighted images with signal suppression on fat-saturated sequences (Figure). The lesion was diagnosed as lipoma arborescens based on MRI findings. Surgical intervention was recommended; however the patient declined surgery. Conservative treatment including physical therapy and non-steroidal anti-inflammatory drugs resulted in symptomatic and functional improvement.

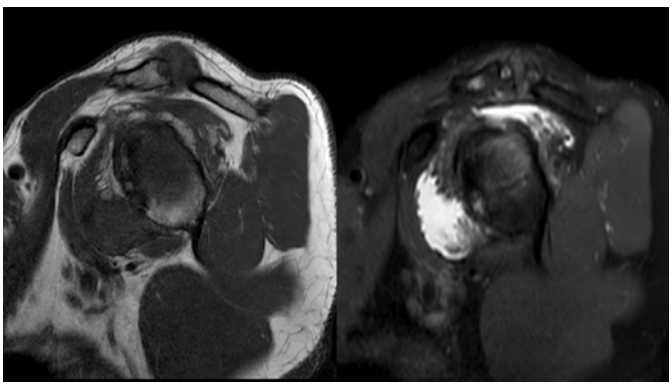


Figure: T1-weighted and fat-suppressed T2-weighted shoulder MRI images show villous fatty synovial proliferation consistent with lipoma arborescens.

Discussion: The etiology of lipoma arborescens remains unclear and has been associated with mechanical irritation, degenerative and inflammatory joint diseases. It typically presents as monoarticular involvement of the knee; however, rare cases affecting the shoulder, elbow and wrist have been reported. Early recognition is important, as prolonged synovial proliferation may contribute to persistent inflammation. MRI is the key modality for diagnosis with distinctive features.

Conclusion: This case contributes to the limited literature on shoulder involvement and emphasizes the need for awareness in musculoskeletal practice.

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NATIONAL TRENDS IN THE INCIDENCE OF HIP FRACTURES IN PORTUGAL, 2013-2023

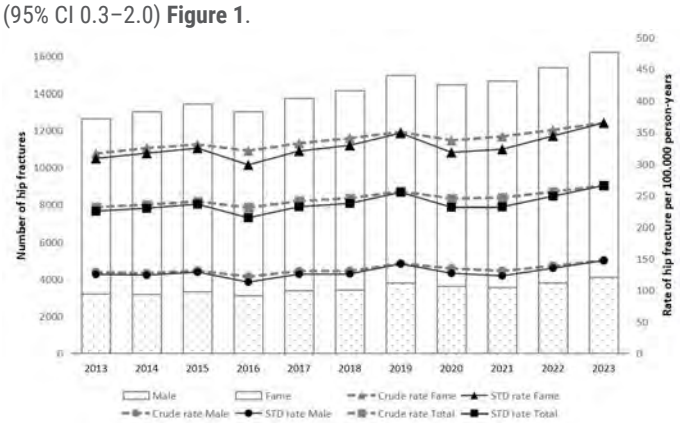
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Objective(s):
To describe temporal trends in the incidence and hospital burden of proximal femoral fractures (PFF) in Portugal between 2013 and 2023 and to compare incidence patterns in 2019-2023 versus 2006-2010[1].

Materials and methods: We conducted a nationwide retrospective cross-sectional study including all adults aged 40 years or older admitted with PFF to public hospitals in mainland Portugal (2013-2023). Episodes were identified in the National Hospital Discharge Register using ICD-9-CM code 820 (until 2016) and ICD-10-CM code S720 (from 2017 onwards). Demographic data, length of stay, surgery within 48 hours, and in-hospital mortality were extracted. Crude and age-standardized incidence rates per 100.000 inhabitants were calculated using population estimates and the age structure of 2023 as a reference. Time trends were analyzed using generalized linear models (Poisson/negative binomial), and the results were compared with published data for 2006-2010.

Results: Between 2013 and 2023, 159.725 admissions for PFF were recorded. In mainland Portugal, annual cases increased from 12.663 in 2013 to 16.200 in 2023 (+27.9%), corresponding to an average of 322 additional fractures per year. Over the same period, the total resident population in mainland Portugal increased by 2.1% (9.937.008 *vs* 10.142.079), whereas the population aged ≥40 years increased by 11.4% (approximately 5.5 to 6.1 million). The average age at admission for PFF was 81.6 years (women 82.7; men 78.4). Among surgically treated patients, 44% underwent surgery within 48 hours The average length of stay was 15.2 days and in-hospital mortality was 5.6%, being higher in men than in women (9.3% vs. 4.4%; p<0.001). In the population aged ≥40 years, the crude incidence increased from 231 to 266 per 100.000 inhabitants, while the age-standardized incidence increased from 225 to 266 per 100.000 inhabitants, with an average annual increase of 1.2% (95% CI 0.3–2.0) **Figure 1**.



Compared with 2006–2010, admissions in 2019–2023 increased by 46.4%, driven mainly by men aged 55–69 and women aged 50–69, while incidence stabilized or decreased slightly in older age groups. **Figure 2**.

Grupo etário (anos)	Male					Female				
	2006-2010		2018-2022			2006-2010		2018-2022		
	Crude Rate	IC95%	Crude Rate	IC95%		Crude Rate	IC95%	Crude Rate	IC95%	
40-44	14,1	(12.2-14.9)	15,3	(13.9-17.0)	+9%	4,0	(3.2-5.0)	3,5	(2.7-4.4)	-13%
45-49	18,4	(15.4-21.4)	19,8	(17.8-21.9)	+8%	5,8	(4.3-7.7)	5,8	(5.3-6.2)	0
50-54	22,3	(19.5-25.7)	27,7	(25.4-30.3)	+24%	15,4	(14.7-16.3)	16,4	(14.7-18.4)	+7%
55-59	31,5	(29.0-34.1)	**41,8***	(39.6-44.0)	+32%	29,8	(27.3-32.2)	31,5	(29-34.1)	+6%
60-64	45,1	(37.6-46.9)	**55,7***	(52.1-59.5)	+23%	60,8	(57.3-63.1)	59,2	(56.7-63.9)	-3%
65-69	75,9	(67.3-81.3)	**86,5***	(81.5-91.6)	+14%	117	(110-128)	121	(116-126)	+4%
70-74	129	(122-134)	139	(129-142)	+9%	274	(270-281)	273	(265-281)	-1%
75-79	264	(230-291)	234	(224-243)	-12%	609	(572-625)	580	(575-601)	-5%
80-84	535	(502-570)	491	(475-507)	-8%	1190	(1147-1210)	1210	(1197-1229)	2%
85-89	1006	(900-1099)	973	(944-1004)	-3%	2291	(2204-2395)	2090	(2056-2123)	-9%
90-94	1663	(1502-1772)	1680	(1623-1755)	+1%	2909	(2704-3095)	2877	(2820-2935)	-1%
95-99	2578	(2310-2998)	2480	(2263-2650)	-5%	3552	(3196-3958)	3318	(3200-3439)	-7%

Conclusion: From 2006 to 2023, hip fracture admissions increased in Portugal, alongside a rise in age-standardized incidence that cannot be explained by population ageing alone. This increase is concentrated among younger men, whereas incidence has stabilized or decreased in older age groups, supporting targeted prevention strategies and wider implementation of Fracture Liaison Services.

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NURSES' PERCEIVED COMPETENCIES AND ORGANISATIONAL BARRIERS IN FRACTURE LIAISON SERVICES IN PORTUGAL: A CROSS-SECTIONAL SURVEY

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Objective: To characterise Portuguese nurses' perceived clinical competencies for secondary prevention of fragility fractures and to identify key organisational barriers reported by nurses working in Fracture Liaison Services (FLS).

Methods: A cross-sectional, anonymous online survey was conducted among Portuguese nurses involved in secondary prevention care for patients with fragility fractures in acute hospital settings. Participants included nurses from 11 of the 16 nationally registered FLS, as well as nurses providing equivalent care in hospitals without an established FLS. The questionnaire was informed by the Global Fragility Fracture Network (FFN) Secondary Fragility Fracture Prevention Competency Framework and included: sociodemographic and professional characteristics; FLS status (existing/implementation stage); perceived clinical competencies across six domains (15 items; Likert scale 1–5); and organisational barriers and service conditions for FLS delivery. Descriptive statistics were used to summarise responses. Internal consistency of the competency scale was assessed using Cronbach's alpha. Differences in perceived competency by FLS status (with vs without FLS) were explored using Mann–Whitney U tests.

Results: A total of 46 nurses participated (80.4% female). Most held a nursing degree (69.6%) or a master's degree in nursing (30.4%). Participants were geographically diverse. The perceived competency scale demonstrated good internal consistency (Cronbach's alpha = 0.83). Overall perceived competency was moderate-to-high (mean 3.55/5), with the lowest scores observed in the Monitoring domain (mean 2.99/5). Nurses working in settings with an FLS reported higher overall competency scores than those without an FLS (3.78 *vs* 3.43; p = 0.032), particularly in Patient & Public Support (4.00 *vs* 3.33; p = 0.005) and Osteoporosis & Bone Health Management (4.20 *vs* 3.54; p = 0.001). **Table 1**

Competency domain (FFN framework)	Mean ± SD
Competency 1 – Patient & Public Support	3.55 ± 0.74
Explaining fragility fractures and osteoporosis	3.76 ± 0.85
Knowledge of support resources and referral pathways	3.26 ± 0.98
Developing or improving educational materials	3.20 ± 1.17
Competency 2 – Identification & Fracture Risk Assessment	3.27 ± 0.80
Using fracture risk assessment tools	2.70 ± 1.26
Interpreting DXA and other diagnostic tests	**2.17 ± 0.95**
Discussing fracture risk factors with patients	3.91 ± 0.81
Competency 3 – Osteoporosis & Bone Health Management	3.75 ± 0.63
Advising on bone-healthy lifestyle changes	3.98 ± 0.77
Knowledge of pharmacological osteoporosis treatments	3.48 ± 0.94
Identifying and addressing barriers to treatment adherence	3.67 ± 0.82
Competency 4 – Falls Prevention	3.78 ± 0.65
Performing basic falls risk assessment	**4.30 ± 0.63**
Knowledge of falls prevention services and programmes	3.20 ± 0.96
Competency 5 – Monitoring	**2.99 ± 1.01**
Monitoring treatment adherence	2.87 ± 1.33
Assessing side effects and adjusting care plans	2.52 ± 1.01
Competency 6 Service Development, Improvement & Leadership	**3.93 ± 0.53**
Basic knowledge of quality improvement	3.33 ± 0.90
Contributing to clinical pathways and peer education	**4.37 ± 0.68**
Overall competency score	**3.55 ± 0.50**

Organisational barriers were rated high overall (mean 3.90/5), with the strongest barriers being lack of dedicated time for FLS activities (mean 4.30/5), lack of specific training (mean 4.06/5) and limited management support (mean 4.03/5). Perceived adequacy of FLS resources/conditions was also high (mean 3.92/5), particularly physical space (mean 4.18±0.68), while staffing, protected time, information systems and leadership support clustered around 3.88–3.91. **Table 2**

Domain	Mean ± SD
B1 – Overall organisational barriers score	**3.90 ± 0.52**
Insufficient human resources	3.55 ± 1.12
Lack of dedicated time for FLS activities	**4.30 ± 0.64**
Lack of specific training	4.06 ± 0.83
Poor coordination between services	3.85 ± 0.80
Lack of management support	4.03 ± 0.85
Inadequate information systems	3.88 ± 0.82
Low patient adherence	3.61 ± 0.79
B2 – Overall adequacy of FLS resources/conditions	**3.92 ± 0.47**
Resources to perform expected activities	3.76 ± 0.71
Sufficient human resources	3.91 ± 0.81
Sufficient time allocated for FLS activities	3.91 ± 0.88
Adequate physical space	4.18 ± 0.68
Information systems that facilitate case identification and follow-up	3.88 ± 0.86
Support from leadership/management	3.88 ± 0.70

Conclusion: Portuguese nurses reported moderate-to-high perceived competencies, higher in established FLS settings; however, monitoring gaps and organisational constraints (limited time, training and management support) may hinder optimal delivery, highlighting the need for structured education and protected resources.

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CANNABINOIDS AND OSTEOBLASTOGENESIS: NATURAL MOLECULES INVOLVED IN PROMOTING OSTEOBLASTOGENESIS

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Objectives: In recent years, several studies have demonstrated the direct involvement of the endocannabinoid system (SE) in the modulation of various physiological processes, including bone remodeling, with particular attention to the mineralization process. Therefore, the aim of the study presented here was to evaluate the effects of anandamide (AEA), the main endogenous cannabinoid, and cannabidiol (CBD) and cannabigerol (CBG), two of the main phytocannabinoids present in Cannabis sativa, on the osteogenic differentiation process in primary human pre-osteoblast lines.
Materials and methods: The study used a cell pool with three adipose-derived mesenchymal stem cell lines (PA) as a bioassay to examine the role of SE in pre-osteoblast differentiation and maturation. After confirming mesenchymal stemness markers via confocal laser microscopy and assessing the cell pool's differentiation potential, the gene expression levels of SE components (e.g., *CBR1*, *CBR2*, *DAGLa*, *FAAH*, *TRPV1*, *GPR55*) were evaluated. The effects of AEA, CBD, and CBG at various concentrations (1 nM to 10 µM) on osteogenic differentiation were then investigated through enzymatic activity of alkaline phosphatase (ALP), hydroxyapatite (HA) deposit analysis, and marker gene expression (i.e. *ALPL*, *OPG*, *OCN*, *RUNX2* and *COL1A1*).
Results: The data obtained confirmed the presence of SE in the prepared bioassay, and the analyses evaluating the effects of AEA, CBD, and CBG at different concentrations over time showed that both CBD and CBG promote osteogenic differentiation, increasing ALP activity and the amount of HA produced under treatment, as observed for AEA. Similarly, data on the gene expression of markers of pre-osteoblast maturation into mature osteoblasts showed an extremely positive effect of treatment with CBD and CBG.
Conclusions: The results show endogenous cannabinoids positively affect mineralization, along with two key phytocannabinoids from Cannabis sativa. These findings encourage further research into other phytocannabinoids and therapeutic Cannabis preparations by Stabilimento Chimico Farmaceutico Militare for bone mineralization. Future results could lead to new Cannabis sativa treatments for bone diseases involving loss and mineralization issues.
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PRELIMINARY MIRNA CODES IN SMALL CELL OSTEOSARCOMA TO IDENTIFY NEW BIOMARKERS FOR A NEW AND SPECIFIC DIAGNOSTIC AND THERAPEUTIC METHODOLOGY

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Objectives: Human Small Cell Osteosarcoma (SCO) is a rare, aggressive form of Osteosarcoma (OS), with small, spindle-shaped cells producing an altered bone matrix called "osteoid". Despite aggressive treatments, SCO has a poor prognosis. The discovery of microRNAs (miRNAs) opened a new research field to study cellular processes, especially in cancer. Recent studies show their role in tumorigenesis through oncogene and tumor-suppressor pathways. This study presents preliminary results on "miRNA codes" that may characterize SCO cancer stem cells (CSCs), aiming to identify new molecular targets for more effective therapies against SCO CSCs.
Materials and methods: The human SCO sample was collected after informed consent was obtained, approved by the local Ethical Committee. First, the primary cancer cell line SCO was established. The CSC subpopulation was then isolated. Several cellular assays and stainings, as well as molecular analyses, were performed to demonstrate the CSC phenotype. In addition, we evaluated the expression of a group of miRNAs in SCO-CSCs (i.e., miR-1, miR-9, miR-18a, miR-200, miR-141, miR-199, miR-25, miR-423, miR-25, miR-744, miR-500, miR-654, miR-221, miR-296, miR-184, miR-365, Let-7e, Let-7f, and miR-320d). We also evaluated the expression of a group of miRNAs in exosomes released by SCO-CSCs (i.e., miR-1125-5p, miR-2861, miR-299-5p, miR-106b-5p, miR-195-5p, miR-320d, miR374a, miR-4295, miR-375-5p, miR-138-5p, and miR-506-5p).
Results: The miRNA expression analyses revealed that miR-744, miR-654, miR-221, miR-296, miR-184, miR-365, Let-7f, Let-7g, Let-7c, Let-7e, and miR-320d are all upregulated in SCO-CSCs compared with the SCO primary cell line. At the same time, the analysis of exosomal miRNA revealed that miR-1125-5p, miR-2861, miR-299-5p, miR-106b-5p, miR-195-5p, miR-320d, miR-4295, miR-375-5p, miR-138-5p, and miR-506-5p are all highly expressed in exosomes released by SCO-CSCs.
Conclusions: These findings identify, for the first time, a miRNA signature of the cancer stem cell subpopulation in this highly aggressive OS form. The initial analysis of exosomal miRNAs from these cells suggests which miRNAs may influence SCO progression, relapse, and metastasis. These results pave the way for the discovery of new biomarkers for rapid diagnosis and the development of more effective precision therapies.
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MEDICAL AND BIOLOGICAL ASPECTS OF CORRECTION OF THE CONSEQUENCES OF SCOLIOTIC DEFORMITY IN STUDENTS

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Introduction: The increase in diseases of the organs of support and movement is facilitated by an increase in genetic developmental abnormalities, as well as factors related to urbanization, physical inactivity and environmental disturbances. A steady increase in the prevalence of musculoskeletal disorders among students is associated with prolonged static stress that is typical for the educational process. Disorders of musculoskeletal system (MSS) in girls can have long-term consequences that negatively affect reproductive health. Therefore, it is necessary to monitor the condition of the spine and timely corrective intervention (kinesitherapy) to minimize destructive changes in the biomechanics of the MSS.

Methods: The assessment and detection of spinal column deformity in students was carried out by physical methods.

Results: Disorder of the spring function of the spine provokes early fatigue, decreased cognitive performance and headaches. The progression of spinal deformity entails visceral migration. To stabilize the static component, it is necessary to strengthen the muscular corset. Patients with MSS disorders have a decreased spinal mobility in all planes due to hypofunction of the back and abdominal muscles. Scoliosis reduces respiratory reserves, deformity of vertebrae and intervertebral discs is accompanied by compromise of the ligamentous-muscular system and is an etiological factor for abdominal organ dysfunction.

Conclusion: Correction of idiopathic scoliosis in students assigned to special medical groups requires using of scientifically based and individualized approaches within the framework of recreational physical education. The main directions should be aimed at eliminating muscle imbalance, improving postural control and preventing further progression of deformity. It is important to perform exercises with a metered asymmetric load, including specific strengthening of weakened muscles (concave side of the arch) and stretching excessively tense ones (convex side) based on the principles of a neutral pelvic position.

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OSTEOSARCOPENIA AND RISK OF ALL-CAUSE MORTALITY FOR COMMUNITY-DWELLING OLDER ADULTS: THE BUSHEHR ELDERLY HEALTH (BEH) PROGRAM

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Background Osteosarcopenia is an increasingly recognized geriatric syndrome with a considerable prevalence which increases morbidity and mortality. This study assessed osteosarcopenia as risk factors for all-cause mortality during 7-year follow-up.

Methods: The Bushehr Elderly Health (BEH) Program is a prospective population-based cohort study, which aims to investigate the incidence of non-communicable diseases and their risk factors among people over 60 years old in Bushehr, Iran. Osteopenia/ osteoporosis was defined as a T-score ≤ -1.0 standard deviation below the mean values of a young healthy adult. We defined sarcopenia as reduced skeletal muscle mass index plus low muscle strength and/or low physical performance. Osteosarcopenia was considered as the presence of both osteopenia/osteoporosis and sarcopenia. Participants were categorized in three groups: reference group with no sarcopenia and no osteopenia, sarcopenia or osteopenia group and osteosarcopenia (sarcopenia + osteopenia) group. Hazards ratios (HR) for mortality were calculated with Cox proportional hazards models.

Results Among 2426 participants, 532 (22.2%) had osteosarcopenia. Over a median follow-up of 7.4 years, 558 (23%) died. Individuals with osteosarcopenia had a significantly higher mortality rate of 52.8 per 100 person-years (95% CI: 45.7-61.0) compared to those without osteosarcopenia, who had a mortality rate of 17.8 per 100 person-years (95% CI: 12.8-24.7). The risk of all- cause mortality among older adults based on osteosarcopenia status, with hazard ratios (HRs) presented across three models. In Model 1 (crude), older adults with osteopenia/ sarcopenia had a significantly increased mortality risk (HR: 1.63, 95% CI: 1.15–2.30), while those with osteosarcopenia exhibited the highest risk (HR: 3.07, 95% CI: 2.15–4.39). After adjusting for age and sex in Model 2, the mortality risk remained elevated in osteopenia/sarcopenia and also osteosarcopenia groups. In Model 3, adjusted for age, sex, body mass index, physical activity, current smoking, protein intake and high fat mass; the highest mortality risk remained in individuals with osteosarcopenia (HR: 1.94, 95% CI: 1.29–2.93), followed by those with osteopenia/sarcopenia group (HR: 1.74, 95% CI: 1.20–2.53).

Conclusion While sarcopenia or osteopenia increase mortality risk, their combination as osteosarcopenia, is a significant predictor of all-cause mortality among older adults. Therefore, it is important to diagnose and treatment of osteosarcopenia to reduce mortality rate among community-dwelling older adults.

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IMPACT OF ROMOSOZUMAB ON QUALITY OF LIFE IN WOMEN WITH OSTEOPOROSIS: A PROSPECTIVE PILOT STUDY

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Background: Romosozumab is a monoclonal anti-sclerostin antibody with a dual anabolic and antiresorptive mechanism of action and currently represents the most effective therapy in terms of bone mineral density (BMD) increase and fracture risk reduction in patients with osteoporosis. While its skeletal efficacy is well established, data on its impact on patient-reported outcomes, particularly quality of life (QoL), are currently lacking. The aim of this study was to evaluate the effect of Romosozumab on QoL in women treated for osteoporosis.

Methods: This was a prospective, single-center study including 59 postmenopausal women with osteoporosis treated with Romosozumab according to national reimbursement criteria. Quality of life was assessed using the validated ECOS-16 questionnaire at baseline, 6 months and 12 months. Biochemical parameters were collected at baseline, 6 and 12 months, while BMD at the lumbar spine and femoral sites was evaluated by DXA at baseline and after 12 months of treatment.

Results: At the time of analysis, 14 patients had completed the full 12-month course of romosozumab. After 12 months of therapy, a significant increase in BMD was observed at both the lumbar spine (0.744 vs 0.619 g/cm², p=0.029) and the femoral site (0.623 vs 0.585 g/cm², p=0.001). Quality of life significantly improved as early as 6 months of treatment, with a reduction in ECOS-16 score (50.0 vs 54.33, p=0.013), which was maintained at 12 months (47.17 vs 54.33, p=0.041). Notably, the percentage increase in BMD was inversely correlated with ECOS-16 score at 12 months (Spearman's rho = −0.709, p=0.022), indicating that greater skeletal gains were associated with better patient-reported quality of life.

Conclusions: Romosozumab confirms its efficacy as a highly effective treatment for osteoporosis and is associated with a clinically meaningful improvement in quality of life. Given that lower ECOS-16 scores reflect better QoL, the observed inverse correlation between BMD gain and QoL score suggests that skeletal improvement translates into tangible clinical benefits for patients. This pilot study provides the first prospective evidence that romosozumab therapy positively impacts quality of life in addition to its well-established effects on bone mass, supporting the inclusion of patient-reported outcomes in future osteoporosis trials.

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MANAGEMENT PATTERNS, QUALITY OF CARE AND ECONOMIC BURDEN OF HIP FRAGILITY FRACTURES IN A TERTIARY TRAUMA CENTRE: A PHARMACIST-LED PRE-FLS ANALYSIS

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Objective(s) To describe the demographic, clinical, pharmacological, and economic profile of patients admitted for hip fragility fractures at a tertiary trauma centre (Montreal, Canada) prior to the implementation of a Fracture Liaison Service (FLS).

Material and Methods This retrospective study included patients ≥50 years admitted for hip fragility fractures (April 2019-March 2023). A pharmacist reviewed medical records to assess outcomes including fracture history, osteoporosis (OP) therapy at admission and discharge, discharge destination, and acute hospitalization costs. Reasons for non-management at discharge were assessed based on documented clinical justifications.

Results A total of 272 patients were included (mean age: 80 years). A prior fragility fracture was documented in 23% of patients. At admission, 22% were receiving OP therapy (77% bisphosphonates). At discharge, 34% had an OP prescription. Across the total cohort, new treatments were initiated in 14.6% of patients (mainly bisphosphonates and denosumab). While 66% of patients were discharged without therapy, 83% of them (54.8% of the total cohort) lacked documented clinical justification. The primary identified barriers to management reflected professional, patient-related, and systemic factors. Importantly, 14% of untreated patients (9% of the total cohort) had a prior fragility fracture history. Overall, 70.1% of patients experienced suboptimal management. Mean acute hospitalization costs averaged $21,079 CAD per patient. Furthermore, 48% of patients were discharged to rehabilitation centres and 8% to long-term care facilities.

Conclusion(s) This pharmacist-led assessment reveals critical care gaps in the care continuum, with 70% of patients receiving suboptimal management without justification. These findings, and the underlying professional and systemic barriers, concur with existing literature on post-fracture management deficiencies. The high hospitalization costs and frequent discharge to rehabilitation facilities highlight a significant economic burden. Integrating a pharmacist within an FLS framework is essential to assess systematically treatment eligibility and address these barriers, offering a high-value opportunity to reduce avoidable expenditures and improve secondary prevention.

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THE RELATIONSHIP BETWEEN SARCOPENIC OBESITY AND FALLS IN OLDER ADULTS: A CROSS-SECTIONAL STUDY

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Objective: Falls represent a leading cause of morbidity and disability in the geriatric population. While sarcopenia is a well-established risk factor for falls due to loss of muscle mass and function, the impact of sarcopenic obesity remains controversial. This study aimed to evaluate the relationship between different body composition phenotypes (sarcopenia, obesity, and sarcopenic obesity) and the risk of falls in community-dwelling older adults.

Methods: Comprehensive geriatric assessment was performed for all participants. Sarcopenia and sarcopenic obesity are defined based on population-based validated SMMI and Handgrip results. The history of falls in the last 12 months was recorded. Participants were divided into four phenotypes (non-sarcopenic-non-obese, obese only, sarcopenic only, and sarcopenic-obese). Univariate logistic regression analyses were conducted to identify potential risk factors associated with falls.

Results: This cross-sectional study included 1625 community-dwelling older adults (mean age 75.9±6.5 years) and population was predominantly female (67.3%). A total of 630 (38.8%) participants reported at least one fall in the previous year. Univariate analysis revealed that age (OR: 1.02, p=0.004), female gender (OR: 1.62, p<0.001), low physical activity (OR: 4.67, p=0.004), frailty (OR: 2.20, p<0.001), and fear of falling (OR: 2.42, p<0.001) were significant predictors of falls. Regarding body composition phenotypes, patients with "Sarcopenia Only" had a significantly increased risk of falls (OR: 1.67, 95% CI: 1.17–2.39, p=0.005). However, "Sarcopenic Obesity" was not significantly associated with fall risk (OR: 1.35, 95% CI: 0.98–1.85, p=0.066). Obesity alone also didn't have a significant association (OR: 089, CI: 0.79-1.15, p=0.408)

Conclusion: In our study, while sarcopenia was identified as a strong and independent risk factor for falls, sarcopenic obesity was not. The absence of this strong association in the presence of obesity suggests that increased body mass may play a neutralizing or modifying role against sarcopenia-related instability. Considering these findings, when planning weight loss strategies for sarcopenic obese older adults, priority must be given to preserving muscle mass to avoid disrupting this existing protective balance

Table.2 Univariate Logistic Regression Analysis of Risk Factors for Falls

Variables	Missing n (%)	OR	95% CI	p-value
Age	0 (0.0)	1.023	1.007 – 1.039	0.004
Gender: Female (Ref: Male)	0 (0.0)	1.619	1.301 – 2.016	<0.001
Marital Status: Not Married (Ref: Married)	303 (19.0)	1.300	1.042 – 1.623	0.020
Education: Low (Ref: High)	251 (15.4)	1.483	1.089 – 2.020	0.012
Living Status: Alone (Ref: With Others)	0 (0.0)	1.355	1.030 – 1.779	0.029
Physical Activity: Low (Ref: High)	334 (20.6)	4.672	1.620 – 13.513	0.004
Number of Drugs	259 (16.6)	1.050	1.017 – 1.084	0.003
Number of Diseases	309 (19.0)	1.112	1.055 – 1.173	<0.001
Katz ADL: Dependent	4 (0.2)	1.635	1.318 – 2.029	<0.001
Lawton IADL: Dependent	4 (0.2)	1.770	1.442 – 2.173	<0.001
Fear of Falling	3(0.2)	2.420	1.922-2.969	<0.001
Frail	67(4.1)	2.200	1.720 – 2.814	<0.001
Urinary Incontinence	2(0.1)	1.709	1.396 – 2.093	<0.001
Romberg	90(5.5)	1.707	1.155 – 2.522	0.007
Postural Instability	74(4.6)	2.336	1.761 – 3.098	<0.001
Body Phenotypes				
Non-sarcopenic Non-obese	0	0.876	0.716-1.072	0.198
Obese Only	0	0.889	0.798-1.157	0.408
Sarcopenic Only	0	1.671	1.167-2.393	0.005
Sarcopenic Obese	0	1.347	0.980-1.851	0.066

n: number, OR: Odd Ratio, CI: Confidence Interval, Ref: Reference, ADL: Activity of Daily Living, IADL: Instrumental Activity of Daily Living,

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IMPACT OF VITAMIN D STATUS ON FRAILTY AND FALL RISK IN INTERNAL MEDICINE PATIENTS: A REAL-WORLD CROSS-SECTIONAL ANALYSIS

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Background:
Frailty and falls are major contributors to morbidity in older adults and internal medicine patients. Vitamin D deficiency is highly prevalent and may accelerate musculoskeletal decline by impairing muscle strength, balance, and bone metabolism. Real-world data evaluating this association in routine internal medicine practice are limited.
Objectives:
To assess the relationship between serum vitamin D levels, frailty severity, and fall risk in adult internal medicine patients, and to identify clinical predictors of high-risk frailty profiles.
Methods:
We performed a cross-sectional analysis of adult patients admitted to an internal medicine department over six months. Demographic characteristics, comorbidities, medication use, and laboratory parameters were recorded. Frailty was assessed using the Clinical Frailty Scale (CFS), and fall risk using the Morse Fall Scale (MFS). Serum 25(OH)D levels were categorized as sufficient (>30 ng/mL), insufficient (20–30 ng/mL), or deficient (<20 ng/mL). Multivariable regression was performed to explore independent associations.
Results:
Among evaluated patients, vitamin D deficiency was highly prevalent. Lower 25(OH)D levels were significantly associated with higher CFS

scores, increased fall risk, reduced functional status, and greater multimorbidity burden. Patients with deficiency demonstrated a disproportionate frequency of previous falls and markedly impaired mobility. Vitamin D status remained an independent predictor of frailty after adjusting for age, sex, anemia, renal function, and polypharmacy.
Conclusions:
Vitamin D deficiency is strongly linked to frailty severity and elevated fall risk in real-world internal medicine patients. Early identification and corrective supplementation may offer a simple, cost-effective intervention to reduce adverse outcomes. Routine vitamin D screening should be considered in risk-stratification strategies in internal medicine practice.

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CORRELATION OF DREISER FUNCTIONAL SCORE WITH RADIOGRAPHIC AND ULTRASOUND HAND ABNORMALITIES IN DIGITAL OSTEOARTHRITIS

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Background: Digital osteoarthritis (OA) is a prevalent condition that often leads to significant functional impairment. Clinical evaluation alone may underestimate structural changes in hand joints. Conventional radiography is widely used to detect osteophytes, joint space narrowing, and subchondral sclerosis, while ultrasound can provide additional detail on synovitis, small osteophytes, and enthesitis.
This study aimed to investigate the correlation between the Dreiser functional score and structural abnormalities detected by both radiography and ultrasound in patients with digital OA.
Methods: We conducted a cross-sectional study including patients fulfilling the 2023 classification criteria for hand OA. Functional impairment was assessed using the Dreiser score. All patients underwent standard radiography and ultrasound examination of both hands. Radiographs were evaluated for osteophytes, joint space narrowing, subchondral sclerosis, and cysts. Ultrasound was used to detect osteophytes, erosions, synovitis, and distal enthesitis of the extensor digitorum tendon. The dorsal aspect of metacarpal-phalangeal, proximal inter-phalangeal and distal inter-phalangeal joints were systematically assessed. The relationship between Dreiser scores and ultrasound findings was analyzed using Spearman correlation coefficients, with $p<0.05$ considered statistically significant.
Results: We evaluated 600 joints in 20 patients (mean age 65±9 years; 90% female). The mean disease duration was 3 years [2-4.75]. Dreiser scores ranged from 2 to 17 (median 8.5).
Radiographic analysis showed that all patients presented with at least one joint space narrowing, with a mean number of 5.1±3.6 [1–13]. Osteophytes were observed in 75% of patients, with a mean number of 3.2±2.9 [0–9]. Subchondral sclerosis and cysts were found in 8 patients (40%), with a mean number of 1.4±2.5 [0–8] and 1±2.3 [0-10], respectively. Ultrasound detected osteophytes in 16% of joints, synovitis in 2%, erosions in 1%, and enthesitis in 34%.
A moderate positive correlation was observed between the Dreiser functional score and the total number of ultrasound-detected osteophytes ($r = 0.661$, $p = 0.05$) and synovitis ($r = 0.588$, $p = 0.047$), whereas erosions and enthesitis showed weaker associations. No significant correlations were found between the Dreiser functional score and radiographic abnormalities.
Conclusion: The Dreiser functional score correlates with structural changes detected by ultrasound in patients with digital OA, particularly osteophytes and synovitis. Ultrasound may complement functional assessment, providing a more comprehensive evaluation of hand involvement. Integrating imaging into routine assessment could improve monitoring and individualized management of digital OA.

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HAND ULTRASOUND ASSESSMENT OF TENDON INVOLVEMENT IN PSORIATIC ARTHRITIS VERSUS DIGITAL OSTEOARTHRITIS

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Background: Tendon involvement is a hallmark of psoriatic arthritis (PsA), while its presence in digital osteoarthritis (OA) is less well characterized. Ultrasound (US) allows sensitive detection of tendinopathy, tenosynovitis, and enthesopathy, providing insights into structural differences between inflammatory and degenerative hand disorders.
This study aimed to compare the prevalence and patterns of tendon abnormalities on US in patients with PsA versus digital OA.
Methods: We conducted a cross-sectional study including patients with peripheral PsA and digital OA fulfilling CASPAR and 2023 EULAR classification criteria, respectively. Each patient underwent a clinical examination followed by a standardized US assessment. The wrists, metacarpophalangeal (MCP), proximal (PIP) and distal interphalangeal (DIP) joints were systematically examined in gray scale (GS) and power Doppler (PD). The following elementary lesions were assessed: tenosynovitis of extensor digitorum and flexor tendons, extensor peritendon inflammation, and distal extensor tendon enthesitis. A binary scoring system was applied (0 = absent, 1 = present) for all evaluated lesions. Statistical analyses compared lesion prevalence between groups, using chi-square and Fisher's exact tests as appropriate, with $p<0.05$ considered significant.
Results: A total of 1200 joints in 20 patients with PsA (mean age 55 ± 12 years; 65% female) and 20 patients with digital OA (mean age 65 ± 9 years; 90% female) were assessed. Tenosynovitis of flexor tendons was significantly more frequent in PsA in GS (30% vs 5%, $p=0.003$) and PD (15% vs 0%, $p=0.025$). No significant differences were noted between the two groups for the extensor carpi ulnaris and the extensor digitorum tendons. GS extensor peritendon inflammation at MCP joints was exclusively observed in PsA patients (13% vs 0%, $p<0.001$). Distal enthesitis of extensor tendon was more frequent in PsA patients (39% vs 34%), but the difference was not statistically significant ($p=0.35$). Regarding elementary lesions of enthesitis, erosions were significantly more frequent in PsA patients (9% vs 1%, $p<0.001$). No significant differences were noted for calcifications, enthesophytes, and thickness and/or hypoechogenicity of the tendon insertion.
Conclusion: US reveals distinct tendon involvement patterns in PsA versus digital OA. Flexor tenosynovitis and extensor peritendon inflammation predominate in PsA. Ultrasound can therefore aid in differentiating inflammatory versus degenerative hand disease and guide personalized management.

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ASSESSMENT OF CARDIOVASCULAR RISK IN PATIENTS WITH HAND OSTEOARTHRITIS

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Background

Hand osteoarthritis (OA) is the second most common form of the disease, affecting approximately 10% of the population. Hand OA patients appear to have a pro-atherogenic profile. Nevertheless, its possible link with cardiovascular risk has been little investigated.

The aim of this study was to assess the cardiovascular risk using European Society of Cardiology (ESC) risk scores in patients with hand OA.

Methods

Patients fulfilling the 2023 EULAR classification criteria for hand OA were included. Demographic characteristics, body mass index (BMI), cardiovascular risk factors (CVRFs), and clinical and functional data of hand OA were recorded. Cardiovascular risk was assessed using ESC-recommended SCORE2-based tools (SCORE2, SCORE2-Diabetes, or SCORE2-OP), according to age and diabetes status, and classified into low–moderate, high, and very high-risk categories based on estimated 10-year cardiovascular risk. Associations between SCORE2 and clinical variables were explored using Spearman's correlation. A p value inferior to 0.05 was considered statistically significant.

Results

Twenty patients were included (18 women, 2 men), with a mean age of 65±9 years [46–87]. The mean disease duration was 3 years [2-4.75]. The mean VAS pain was 40±16 mm [0-70]. The mean Dreiser functional index was 8.5 ±5.25 [2-17]. The median number of tender joints was 1 (IQR 25-75%; 0-3.75). Bouchard's and Heberden's nodes were observed in 65% and 90% of patients, respectively. Radiographic analysis showed that all patients had at least one joint space narrowing, with a mean number of 5.15 ± 3.66 [1–13]. Osteophytes were observed in 15 of 20 patients (75%), with a mean number of 3.2 ± 2.91 [0–9]. Subchondral bone sclerosis was identified in 8 patients (40%), with a mean number of 1.45 ± 2.52 [0–8]. Subchondral cysts were detected in 8 patients (40%).

Seventy-five percent of participants were aged 60 years and above. Mean BMI was 28 ± 5 kg/m2 [22–44], with 50% overweight, 30% obese, and 20% normal weight. Seven patients had hypertension (35%), six had diabetes (30%), four had dyslipidemia (20%), and three were smokers (15%). Four patients (20%) presented a combination of hypertension, diabetes, and dyslipidemia. Sixteen patients had 0–1 CVRF, while four had ≥2 CVRFs. Seven patients had a complete lipid profile allowing cardiovascular risk estimation. All evaluable patients were classified as having very high cardiovascular risk, with estimated 10-year risk ranging from 12% to 32% (mean SCORE2: 19.85 ± 7.15).

A strong positive correlation was observed between age and SCORE2 ($r = 0.875$, $p = 0.014$). No significant correlations were found between SCORE2 and disease duration ($r = -0.08$, $p = 0.865$), pain VAS ($r = -0.03$, $p = 0.935$), number of affected joints ($r = 0.187$, $p = 0.688$), Dreiser functional index ($r = 0.180$, $p = 0.699$), joint space narrowing ($r = 0.234$, $p = 0.613$), osteophytes ($r = 0.357$, $p = 0.432$), subchondral sclerosis ($r = 0.474$, $p = 0.282$), or subchondral cysts ($r = 0.128$, $p = 0.784$).

Conclusion

Hand OA may represent an underrecognized marker of heightened cardiovascular risk. The consistent identification of very high cardiovascular risk in all evaluable patients underscores the need for systematic cardiovascular risk assessment and early preventive interventions in this population. Large-scale case–control studies are needed to further clarify and confirm the association between hand OA and cardiovascular risk.

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MINIMUM FIVE-YEAR RESULTS OF ARTHROSCOPIC MANAGEMENT WITH LABRAL PRESERVATION IN BORDERLINE HIP DYSPLASIA

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Purpose: This study examined the patient-reported outcome scores at mid-term follow-up after arthroscopic labral preservation in patients with borderline hip dysplasia.

Materials and Methods: Data were collected retrospectively from patients who underwent arthroscopic labral preservation. Among the 61 patients classified with hip dysplasia, patients with arthritis beyond Tönnis grade II were excluded, Patients with subchondral bony exposure were excluded even if they had arthritis of Tönnis grade I. Forty-two patients with borderline hip dysplasia were enrolled among patients whose lateral center edge angle (LCEA) was between 18° and 25°. The PRO scores including the modified Harris hip score (mHHS), hip outcome score activities of daily living (HOS-ADL), hip outcome score sport-specific subscale (HOS-SSS) and visual analog scale (VAS), were collected and compared preoperatively, and then at one year and a minimum of five years after surgery.

Results: The mean preoperative LCEA and Tönnis angle were 20.9° (range, 18° to 25°) and 6.3° (range, 0° to 18°), respectively. The mean follow-up was 64.8 (range, 60 to 84) months. The mean mHHS increased from 73.5 before surgery to 86.2 in the fifth year after surgery ($p<0.01$), the mean HOS-ADL from 70.5% before surgery to 84.9% in the fifth year after surgery ($p<0.01$), and the mean HOS-SSS from 51.4 before surgery to 69.4 in the fifth year after surgery ($p<0.01$). The mean VAS score improved from 6.3 before surgery to 1.5 in the fifth year after surgery ($p<0.01$).

Conclusion: Arthroscopic labral preservation performed in appropriately selected patients with borderline dysplasia showed good results at mid-term follow-up. In borderline hip dysplasia without the progress of osteoarthritis and subchondral bone exposure, arthroscopic labral preservation may be considered a good and less invasive option.

Key words: hip, labrum, acetabular dysplasia, arthroscopy

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PATIENT-REPORTED OUTCOME MEASURES OF STAGED DIRECT ANTERIOR APPROACH AND DIRECT LATERAL APPROACH FOR TOTAL HIP ARTHROPLASTY PERFORMED ON THE SAME PATIENT

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Purpose: Total hip arthroplasty (THA) is performed using various approaches, including posterior, lateral, and direct anterior approaches.

The most beneficial method is controversial. Each approach has its advantages and disadvantages. This study compared patient satisfaction after bilateral THA using the direct anterior and lateral approaches on the same patient, considering the advantages and disadvantages of each approach.

Materials and Methods: This study examined 30 patients who underwent bilateral THA: two with femoral neck fractures, 18 with osteonecrosis of the femoral head, six with borderline dysplasia-induced hip osteoarthritis, and four with degenerative hip osteoarthritis.

Without distinguishing between the left and right sides, THA was performed randomly using the direct anterior approach on one side and the lateral approach on the other. The results of THA were compared using different approaches on the same patient, and patient satisfaction was evaluated.

Results: Surgery using the direct anterior approach for THA showed favorable results in terms of the initial postoperative pain compared to surgery using the lateral approach. On the other hand, there was no significant difference observed after one month post-surgery. Among the participants, three preferred the direct anterior approach; four preferred the lateral approach, and 23 reported no preference.

Conclusion: In THA, the direct anterior approach may offer advantages in terms of initial postoperative pain and rehabilitation compared to the lateral approach. Nevertheless, the pain and joint function one month after surgery were similar between the two approaches.

Therefore, the choice of approach should be determined by the surgeon's preference or experience, as both methods appear rational.

Key words: total hip arthroplasty, direct anterior approach, lateral approach

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HEAD INJURY AND THE RISK OF HIP FRACTURE IN OLDER ADULTS AGED 65–84 YEARS

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Objectives: Head injury is common in older adults, but its association with hip fracture is understudied. We therefore examined the association between head injury and subsequent hip fracture in the general elderly population.

Material and Methods: We linked registry data for all residents of Oslo aged 65–84 years in 2012 (n = 60,357) and followed them for the first hip fracture through 2022 using the Norwegian Patient Registry. To reduce the influence of competing mortality, followup was censored at age 85. We defined head injuries as accidental falls accompanied by ICD-10 codes S01–S09. The large majority were treated at the emergency outpatient clinic of Oslo University Hospital. We estimated age-adjusted hazard ratios (HR) with 95% confidence intervals (CI) for hip fracture in Cox proportional hazards regression in men and women separately, using the first incident fall as a time-varying exposure. In a supplementary analysis, we split follow-up time after the injury into less than one year and one year or more.

Results: During follow-up, a first fall injury was recorded in 21.3% of men (n = 5,762) and 28.0% of women (n = 9,352); among these, 1,781 men and 1,818 women sustained a head injury in the fall. There were 1,194 incident hip fractures in men and 2,192 in women. Fallers with a head injury had an increased risk of hip fracture: HR 2.28 (95% CI 1.82–2.85) in men and 1.59 (95% CI 1.30–1.95) in women compared to non-fallers. The risk was greatest during the first year after the head injury (HR=3.78 in men and HR=2.33 in women) but remained significantly elevated thereafter.

Conclusion: Head injury is common among older adults and is associated with a markedly increased risk of hip fracture, especially during the first year after the injury. This information may be useful when considering follow-up and preventive measures for older adults after a fall with head injury.

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THE ROLE OF THE CYP1A1 GENE IN LONG-TERM GLUCOCORTICOID-RELATED ADVERSE EFFECTS

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Long-term glucocorticoid (GC) use can produce adverse effects (AE) including obesity, diabetes, osteoporosis and fractures. The variability in AE severity suggests a genetic influence. *CYP1A1*, a cytochrome P450 family enzyme involved in GC metabolism may play a role.

Objective

This study aimed to genotype *CYP1A1* variants in patients on chronic GC treatment and analyze their relationship with long-term AE.

Material and Methods

Seventy patients (56±16.6 years; 71.4% female; 47.1% postmenopausal) receiving chronic GC treatment (≥5 mg/day/>3 months) were included. Clinical data were collected at baseline and at 5 years of follow-up, including OP risk factors, previous and incidental fractures, GC-dose and duration, disease activity, anthropometric data, bone metabolism parameters, bone mineral density (BMD) and trabecular bone score (TBS) (by DXA), and vertebral fractures (X-ray). *CYP1A1* gene sequencing was performed by NGS using Amplicon Deep Sequencing on an Ion Torrent platform as described in Mensa-Vilaró et al.[1]

Results

Four *CYP1A1* polymorphisms were identified: rs41279188, rs1048943, rs1799814 and rs4646422. Nine patients had rs1048943, nine rs1799814, one rs4646422 and one rs12086634 polymorphisms, respectively. Patients with rs1799814 polymorphism (13%) had higher BMI (29.3 *vs.* 25.5; p=0.019) and greater BMI change over 5 years (ΔBMI: 1.7 *vs.* -0.32;p=0.03; adjusted for cumulative GC dose). Additionally, they presented lower bone turnover markers (NTx: 21 vs. 40 nMol/mMol, p=0.003, CTx: 0.16 vs. 0.29 ng/mL, p=0.068, OC: 16.6 vs. 19.3 ng/mL, p=0.059). No associations were found between *CYP1A1* polymorphisms and the presence of osteoporosis and/or fractures, BMD or TBS values.

Conclusion

The *CYP1A1* rs1799814 polymorphism is associated with more severe GC-related AE, suggesting reduced GC metabolism.

References

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Funding

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BILATERAL AMYLOID ARTHROPATHY OF THE HIP JOINT PRESENTED WITH PATHOLOGIC FRACTURE IN A HEMODIALYSIS PATIENT -A CASE REPORT-

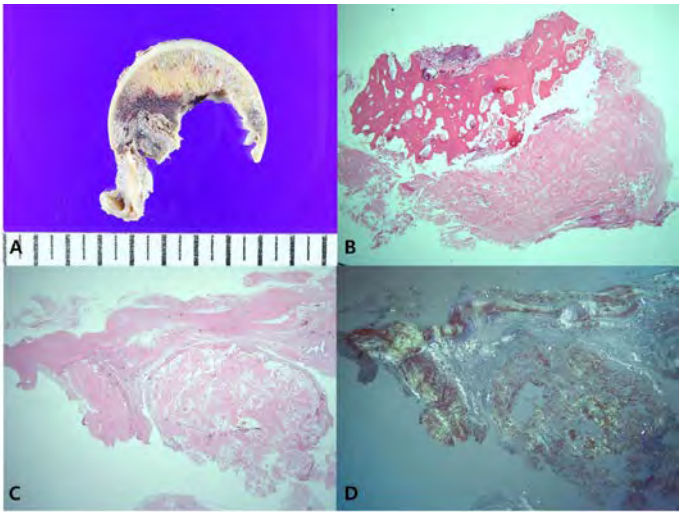
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CASE REPORT: Pathological fractures occur when bones are weakened by disease, and hip fractures in particular are of great significance because they impact morbidity, survival, and quality of life. This case involves a patient undergoing long-term dialysis who developed amyloidosis in both hip joints, leading to a pathological fracture of the right femoral neck and an impending fracture of the left femoral neck. Bilateral total hip arthroplasty was performed with a favorable short-term prognosis. A 48-year-old male patient, previously ambulatory without assistance, presented to the hospital with pain in the right hip joint, despite having no history of trauma. Imaging revealed a subcapital fracture of the right femoral neck, accompanied by extensive osteolysis and bone erosion involving both femoral necks. Hip MRI demonstrated heterogeneous deposits with low signal intensity on T1-weighted images and high signal intensity on T2-weighted images, characteristic of amyloid deposition in both hip joints, leading to pathological fracture of the right femoral neck. Severe bone erosion in the left femoral neck suggested an impending fracture, leading to the decision to perform bilateral total hip arthroplasty. No evidence of amyloid accumulation was found in other organs, and no systemic diseases such as multiple myeloma were detected. This case reports a localized form of amyloidosis related to long-term hemodialysis in both hip joints, a condition not previously reported in Korea. At the one-year follow-up, the patient demonstrated no surgical complications, including aseptic loosening, dislocation, infection, periprosthetic fracture, or implant failure. He was able to walk independently without a limp.

Key words: amyloidosis, pathologic fracture, total hip arthroplasty





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EPIDEMIOLOGY OF HIP FRACTURE IN IRAQ AND DEVELOPMENT OF A COUNTRY SPECIFIC FRAX MODEL

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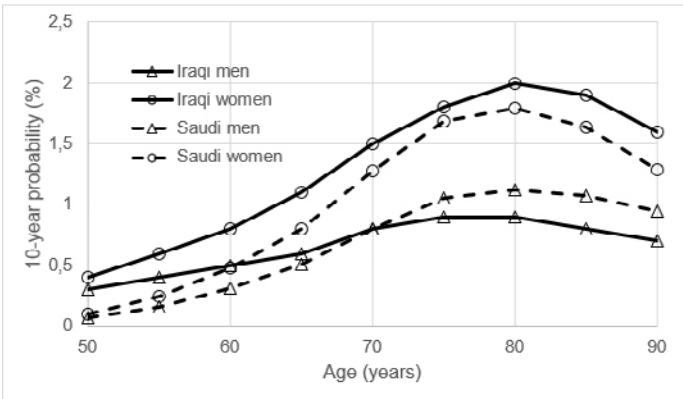
Introduction The aim of this study was to describe the epidemiology of femoral fractures in the Republic of Iraq, and to develop a corresponding country-specific FRAX® tool for the prediction of fracture.

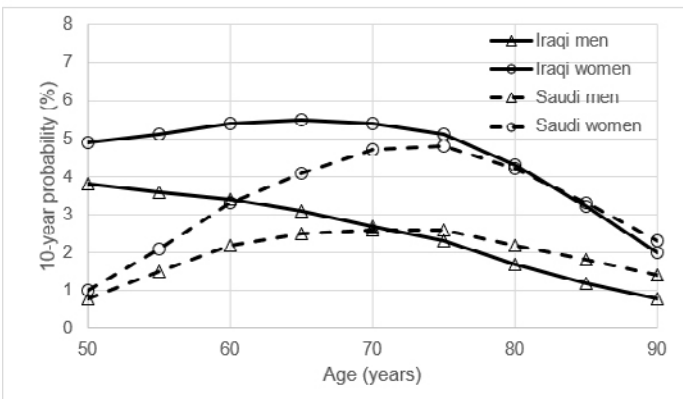
Methods Femoral fracture data were retrieved from the Iraqi government's Ministry of Health and the Kurdistan region's Ministry of Health for the years 2022-2023 in the Republic of Iraq. The age- and sex-specific incidence of hip fracture in Iraqi residents and national mortality rates were used to create a FRAX® model. Fracture probabilities were compared with those from neighbouring countries' existing FRAX models. In order to compare Iraqi hip fracture probabilities with those in other regions of the world, the remaining lifetime probability of hip fracture from the age of 50 years was calculated for men and women.

Results Fracture rates were low but comparable to neighbouring countries and, for hip fracture, closest to estimates from Saudi Arabia at older ages. Ten-year fracture probabilities, of a major osteoporotic fracture or hip fracture were slightly lower in Iraq than in neighbouring countries (Saudi Arabia shown in Figure). For hip fracture at younger ages, the difference was more pronounced. Lifetime probabilities for hip fracture at the age of 50 years Iraq were approximately 1 in 18 for women and 1 in 24 for men.

Conclusion This new FRAX model will enhance accuracy of determining fracture probability among the Iraqi population and help guide decisions about treatment

Figure. 10-year probability of hip fracture (upper panel) and major osteoporotic fracture (lower panel) in women with no risk factors by age from Iraq and Saudi Arabia. Body mass index set to 25kg/m^2.





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CHANGES IN HIP FRACTURE INCIDENCE IN CZECHIA AND IMPLICATIONS FOR FRAX

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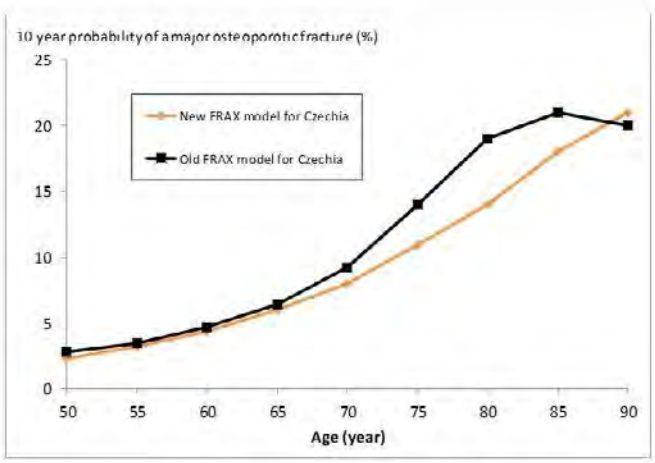
Objectives The construct for FRAX model outputs depends on country specific fracture incidence and mortality. The current FRAX model for Czechia is based on hip fracture data from 2008-2009. New data are available for years 2011-2022. The aim of the present study was to examine the impact of these more recent data on the FRAX probability outputs for Czechia.

Material and Methods Hip fracture incidence for Czechia from 2011-2022 were investigated and years chosen, with concurrent Czechia mortality data from the UN, to build a new FRAX model for Czechia. The new FRAX model for Czechia was compared to the old model derived using hip fracture and mortality data from 2008-2009. For both the old and new models, a ratio from Malmö was used to calculate the incidence of clinical spine, forearm, humerus fractures. The 10-year probability of major osteoporotic fracture (MOF) was used when comparing old and new FRAX model.

Results Given that hip fracture incidence declined significantly by 0.7% per year in men between 2011 and 2022 and by 1.8% per year in women, it was determined that the most recent years should be used as the reference period for the FRAX model. However, as the COVID-19 pandemic affected both fracture incidence and mortality during 2020–2022, data from 2017–2019 were chosen instead. The new 10-year probability of major osteoporotic fracture was lower than the old model, except for the age 90 years. For younger women the difference between the old and new FRAX model was minor up to the age of 65 years (Figure). From the age of 70 years the difference between the old and new model was greater, with the new model having lower probabilities. The largest difference between old and new model was seen for age 80 where the difference was 5% points (19% vs 14%).

Conclusion Use of the more recent hip fracture incidence data impacts on the outputs from FRAX, leading to lower probabilities than the old model. These findings support the need for an updated FRAX model for calculating fracture probabilities in Czechia.

Figure The 10 year probability of a major osteoporotic fracture (%) for a woman with BMI 25 kg/m^2 where the BMD was not known.

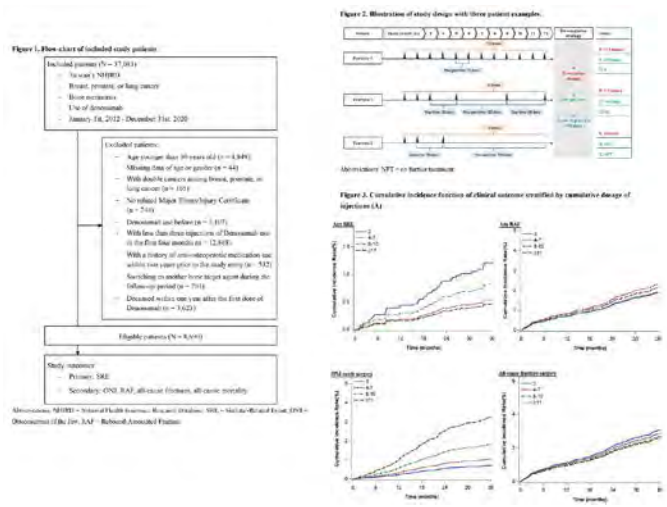


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DENOSUMAB DE-ESCALATION STRATEGIES AND CLINICAL OUTCOMES IN PATIENTS WITH BONE METASTASES: A NATIONWIDE COHORT STUDY

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OBJECTIVE(S): Long-term denosumab therapy requires balancing skeletal protection against cumulative toxicities, such as osteonecrosis of the jaw (ONJ), and the potential risk of rebound fractures upon discontinuation. This study evaluated the real-world impact of different de-escalation strategies on the risks of skeletal-related events (SREs), ONJ, and rebound-associated fractures (RAFs) in patients with bone metastases.

MATERIAL AND METHODS: This nationwide, retrospective cohort

study utilized data from Taiwan's National Health Insurance Research Database. We identified 8,690 patients with breast, prostate, or lung cancer and confirmed skeletal metastases who initiated denosumab therapy between 2012 and 2020. Patients were categorized based on treatment patterns within the first year using three strategies: cumulative dosage (3, 4-7, 8-10, or≥11 injections), maximum injection interval (≤60, 61-90, >90 days, or no further treatment), and frequency of gaps >60 days. The primary outcome was any SRE requiring surgery, and secondary outcomes included surgically treated ONJ and RAFs.

RESULTS: Compared with patients receiving ≥11 doses, those receiving only 3 doses had a significantly increased risk of SREs (adjusted hazard ratio [aHR], 3.20; p = 0.03), but a markedly lower risk of ONJ (aHR, 0.21; p < 0.001). Intervals of 61–90 days did not significantly elevate SRE risk compared to intervals ≤60 days. However, it is crucial to note that extending the maximum injection interval beyond 90 days was associated with a significantly higher SRE risk (aHR, 2.50; p = 0.003). Across all strategies, de-escalation approaches consistently reduced the risk of ONJ but were not associated with an increased risk of surgically treated RAFs.

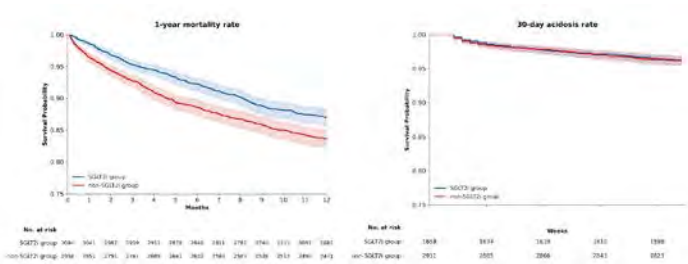
CONCLUSION(S): Extending the denosumab dosing interval up to 90 days appears to be a safe strategy that maintains protection against SREs while reducing the risk of ONJ. However, extending intervals beyond 90 days or administering very low cumulative dosages is associated with a loss of skeletal protection. While the risk of severe rebound fractures appears low, these findings support the feasibility of modest de-escalation in clinical practice, pending confirmation by randomized controlled trials.

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PRIORITIZING EARLY SURGICAL INTERVENTION FOR HIP FRACTURE IN SGLT2 INHIBITOR USERS: A REAL-WORLD STUDY ON SURVIVAL AND METABOLIC SAFETY

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Background: Current guidelines recommending a 3- to 4-day preoperative washout for sodium-glucose cotransporter 2 inhibitors (SGLT2i) to prevent diabetic ketoacidosis (DKA) conflict with the urgent need for hip fracture surgery (including fixation and arthroplasty). This study evaluated whether the survival benefits of early surgical intervention (SI; ≤2 days) outweigh the risks of insufficient medication washout.

Methods: We utilized a global real-world database (TriNetX) to conduct a retrospective cohort study of patients with type 2 diabetes who sustained hip fractures. Two propensity score-matched analyses were performed (1) SGLT2i users versus non-users, both receiving early surgery; and (2) SGLT2i users stratified by surgical timing into early (≤2 days) versus delayed (>2 days) cohorts. The primary endpoint was 1-year all-cause mortality. Secondary endpoints included 30-day DKA and complications.

Results: SGLT2i use was associated with higher 1-year and 30-day survival compared with non-use (hazard ratio [HR], 0.74; 95% confidence interval [CI], 0.64-0.86), without increasing the 30-day risk of DKA. Among SGLT2i users, early SI was associated with significantly better 1-year survival compared with delayed surgery (HR, 0.69; 95% CI, 0.53 to 0.88). The 30-day risks of DKA (1.4% vs. 1.2%) and all-cause mortality did not differ significantly between the early and delayed groups.

Conclusions: Early SI for hip fractures in SGLT2i users confers a significant survival benefit without a measurable increase in metabolic complications. Strict adherence to prolonged washout protocols may be counterproductive; multidisciplinary management facilitating early surgery should be prioritized over medication discontinuation.

P679

EVALUATION OF FRAX FOR PREDICTING OSTEOPOROTIC FRACTURES IN PATIENTS WITH CANCER

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Background

Patients with cancer are at increased risk of osteoporosis and osteoporotic fractures due to the effects of chemotherapy, radiotherapy, hormonal therapy, and steroid treatment. In the general population, the Fracture Risk Assessment Tool (FRAX) is widely used to estimate fracture risk; however, its usefulness in patients with cancer has not been sufficiently validated.

Objective

To evaluate whether the FRAX score is useful for predicting osteoporotic fractures in patients with cancer and to examine its limitations.

Methods

This retrospective cohort study included 215 patients with cancer who received osteoporosis treatment at our outpatient clinic between January 2022 and December 2024. Patients with multiple myeloma, bone metastases, pathological fractures, age ≤40 years, or a follow-up period of less than 6 months were excluded. The primary outcome was the occurrence of major osteoporotic fractures (vertebral, hip, humeral, or forearm fractures) during the follow-up period. FRAX scores were compared between patients with and without fractures. The predictive ability of FRAX was evaluated using receiver operating characteristic (ROC) curve analysis.

Results

There was no significant difference in FRAX scores between the fracture and non-fracture groups. ROC analysis demonstrated a low predictive performance of FRAX for osteoporotic fractures, with an area under the curve (AUC) of 0.52. Kaplan–Meier analysis also showed that FRAX was not a significant risk factor for fracture occurrence.

Discussion

The present study suggests that FRAX may have limited ability to predict osteoporotic fractures in patients with cancer. Possible reasons include: (1) FRAX is designed to estimate 10-year fracture risk, whereas the observation period in this study was relatively short; (2) early initiation

of osteoporosis treatment in patients at high fracture risk may have introduced confounding effects due to treatment intervention; and (3) cancer-specific risk factors, such as cancer type, treatment modality, and cancer-related alterations in bone metabolism, are not sufficiently reflected in FRAX. Although FRAX cannot be considered ineffective in patients with cancer, its application should be interpreted with caution.

Conclusion

The usefulness of FRAX for predicting osteoporotic fractures in patients with cancer appears to be limited. Comprehensive fracture risk assessment that incorporates cancer-specific risk factors, rather than reliance on FRAX alone, is required in this population.

P680

ROMOSOZUMAB FOLLOWING DENOSUMAB: A CASE OF NEW VERTEBRAL FRACTURE DESPITE BMD IMPROVEMENT

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Background

The effectiveness of Romosozumab in postmenopausal women previously treated with antiresorptive agents remains controversial. Evidence suggests that its efficacy may be diminished when used as second-line therapy following prior antiresorptive treatment. We report a case of vertebral fracture progression in a patient initiated on Romosozumab after prolonged denosumab therapy.

Case Summary

A 68-year-old woman with a known diagnosis of osteoporosis since 2016 was treated with denosumab for six years. The last injection was administered in March 2023, followed by the initiation of oral alendronate in September 2023. In January 2024, she presented with acute lower back pain. A CT scan revealed recent vertebral compression fractures at D11 and D12, along with older fractures at D3, D6, and D9. Given the occurrence of multiple fractures, monthly treatment with Romosozumab, 210 mg was initiated in March 2024. In January 2025, during the 10th dose of Romosozumab , the patient reported a recurrence and worsening of lumbar pain. A repeat CT scan revealed new vertebral fractures at D8 and D10. Laboratory investigations showed normal calcium and phosphate levels, a supratherapeutic vitamin D level at 120 nmol/l, and preserved renal function. The C-terminal telopeptide (CTX) level was at 300 ng/l (N< 643). Secondary causes of osteoporosis were rule out: thyroid function was normal, there was no evidence of monoclonal gammopathy, tryptase level was within normal range, and celiac disease serology was negative. Bone densitometry after 12 months of romosozumab treatment revealed a 30% improvement in spinal bone mineral density (BMD), with stable BMD at the hip.

Conclusion

Despite a significant increase in spinal BMD, romosozumab was insufficient to prevent further vertebral fractures in this patient. This case highlights the potential limitations of romosozumab when used after denosumab, possibly due to the rebound effect associated with denosumab discontinuation. It underscores the importance of careful planning in sequential osteoporosis therapy, particularly after long-term use of potent antiresorptive.

P681

HYPEROSTOSIS FRONTALIS INTERNA MIMICKING RECURRENT CRANIAL TUMOR: A DIAGNOSTIC CHALLENGE

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Background:

Hyperostosis Frontalis Interna (HFI) is a benign, usually asymptomatic condition characterized by irregular thickening of the inner table of the frontal bone. It is most commonly identified incidentally on skull radiographs or CT/MRI scans, particularly in postmenopausal women. Diagnosis can be challenging due to overlapping radiological features with metabolic, neoplastic, and sclerosing bone disorders.

Case Presentation:

We report the case of a 56-year-old woman with a history of surgical excision of an intraosseous and intracranial meningioma in 2019, initially revealed by frontal swelling. Postoperative complications included compressive pneumocephalus and hematoma requiring re-intervention, followed by a favorable outcome with transient speech disturbances.

She presented with a firm frontal swelling contralateral to the initial surgical site, without increased cranial circumference or neurological symptoms. The patient reported no bone pain, headaches, or hearing impairment. Laboratory investigations showed normal phosphocalcium balance, normal parathyroid hormone and thyroid-stimulating hormone levels, and supratherapeutic vitamin D levels. Bone mineral density was normal.

Imaging revealed diffuse thickening of the cranial bones. A recurrent intraosseous meningioma was considered unlikely due to the diffuse rather than focal involvement. Paget's disease was excluded based on the absence of bone pain, deformity, increased cranial circumference, and normal alkaline phosphatase levels. Metabolic disorders such as hyperparathyroidism, hypoparathyroidism, and acromegaly were ruled out by clinical and laboratory findings. Hemoglobinopathies, myeloproliferative disorders, mastocytosis, autosomal dominant osteopetrosis, and Van Buchem disease were also excluded based on normal blood counts, tryptase levels, bone densitometry, and scintigraphic findings.

Hyperostosis Frontalis Interna was ultimately retained as the most consistent diagnosis.

Conclusion:

This case highlights the diagnostic challenge posed by Hyperostosis Frontalis Interna in patients with a history of cranial tumors. In the absence of clinical, metabolic, or radiological features supporting alternative etiologies, HFI should be considered to avoid unnecessary investigations and interventions.

P682

CORYLIFOL A SUPPRESSES OSTEOCLASTOGENESIS AND ALLEVIATES OVARIECTOMY-INDUCED BONE LOSS VIA ATTENUATING ROS PRODUCTION AND IMPAIRING MITOCHONDRIAL FUNCTION

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Osteoporosis is a systemic disease characterized by an imbalance in bone homeostasis, where osteoblasts fail to fully compensate for the bone resorption induced by osteoclasts. Corylifol A, a flavonoid extracted from Fructus psoraleae, has been identified as a potential treatment for this condition. Predictions from network pharmacology and molecular docking studies suggest that Corylifol A exhibits strong binding affinity with NFATc1, Nrf2, PI3K, and AKT1. Empirical evidence from in vivo experiments indicates that Corylifol A significantly mitigates systemic bone loss induced by ovariectomy by suppressing both the generation and activation of osteoclasts. In vitro studies further showed that Corylifol A inhibited the activation of PI3K-AKT and MAPK pathways and calcium channels induced by RANKL in a time gradient manner, and specifically inhibited the phosphorylation of PI3K, AKT, GSK3 β, ERK, CaMKII, CaMKIV, and Calmodulin. It also diminishes ROS production through Nrf2 activation, leading to a decrease in the expression of key regulators such as NFATcl, C-Fos, Acp5, Mmp9, and CTSK that are involved in osteoclastogenesis. Notably, our RNA-seq analysis suggests that Corylifol A primarily impacts mitochondrial energy metabolism by suppressing oxidative phosphorylation. Collectively, these findings demonstrate that Corylifol A is a novel inhibitor of osteoclastogenesis, offering potential therapeutic applications for diseases associated with excessive bone resorption.

P683

ISOIMPERATORIN ATTENUATES BONE LOSS BY INHIBITING THE BINDING OF RANKL TO RANK

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Osteoporosis, an immune disease characterized by bone mass loss and microstructure destruction, is often seen in postmenopausal women. Isoimperatorin (ISO), a bioactive, natural furanocoumarin isolated from many traditional Chinese herbal medicines, has therapeutic effects against various diseases; however, its effect on bone homeostasis remains unclear. In this study, we investigated the effect of ISO on the differentiation and activation of osteoclast and its molecular mechanism in vitro, and evaluated the effect of ISO on bone metabolism by ovariectomized (OVX) rat model. In *vitro* experiments showed that ISO affected RANKL-induced MAPK, NFAT, NFATc1 trafficking and expression, osteoclast F-actin banding, osteoclast-characteristic gene expression, ROS inhibitory activity, and calcium oscillations, NF-κB signaling pathway. *In vivo* experiments showed that oral administration of ISO effectively reduced bone loss caused by ovariectomy and retained bone mass. Collectively, ISO inhibits RANK/RANKL binding, thereby reducing the activity of NFATc1, calcium, and ROS and inhibiting osteoclast generation. In addition, ISO protects bone mass by slowing osteoclast production and downregulating NFATc1 gene and protein expression in the bone tissue microenvironment and inhibits OVX-induced bone loss *in vivo*.

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EPIMEDIN B ATTENUATES OVARIECTOMY-INDUCED BONE LOSS BY SUPPRESSING OSTEOCLASTOGENESIS THROUGH DECREASING ROS PRODUCTION AND TARGETING ESR1

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Excessive activation of osteoclasts plays a pivotal role in the pathophysiology of osteoporosis, which is predominantly characterized by bone resorption. However, therapeutic strategies targeting osteoclasts remain limited. In this study, we investigated the inhibitory effects of Epimedin B (EB) on osteoclastogenesis and its potential anti-osteoporotic properties. An ex vivo osteoclast differentiation model was established using BMMs. Osteoclastogenesis was assessed via TRAP staining and F-actin ring formation. Hydroxyapatite bone plates were employed to evaluate the impact of EB on bone resorption function. Network pharmacology predictions combined with transcriptomic analysis were employed to untangle the signaling pathways and targets regulated by EB. Cellular thermal shift assays were performed to validate EB-interacting proteins. The expression levels of osteoclast-specific and ROS-related proteins/genes, as well as phosphorylation changes in signaling pathways, were quantified by Western blot and RT-PCR. Protein expression and mitochondrial ROS levels were detected by fluorescence staining, while intracellular ROS generation was measured via flow cytometry. An ovariectomized (OVX) mouse model of osteoporosis was established to evaluate the bone-protective effects and in vivo mechanisms of EB. The results demonstrated that EB significantly suppressed RANKL-induced osteoclast differentiation, particularly during the early phase and cytoskeletal organization stage, while also inhibiting bone resorption activity in mature osteoclasts. Mechanistic studies revealed that EB directly binds to ESR1 and protects it from degradation. Furthermore, EB was found to downregulate the expression of osteoclast-specific genes/ proteins and inhibit the phosphorylation of MAPK and PI3K-AKT pathways. Furthermore, EB activated the AMPK pathway, subsequently initiating the Nrf2-mediated antioxidant system, leading to reduced ROS levels. Notably, EB markedly rescued ovariectomy-induced bone loss, with efficacy comparable to estrogen therapy, an effect associated with suppressed osteoclast activity and AMPK pathway activation. These findings provide, for the first time, novel theoretical evidence and a potential therapeutic strategy for EB in the

prevention and treatment of osteoporosis.

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ASSOCIATION BETWEEN METABOLIC MARKERS AND SYMPTOM SEVERITY IN PATIENTS WITH HAND OSTEOARTHRITIS: A REAL-WORLD DATA ANALYSIS

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Background:
Osteoarthritis (OA) is increasingly recognized as a metabolic disorder, often termed Metabolic OA.While the association between metabolic factors and OA is well-established in weight-bearing joints like the knee, research specifically targeting hand OA—a non-weight-bearing joint—remains limited. This study aimed to validate the hypothesis that hand OA represents a metabolic phenotype by analyzing the impact of obesity on symptom severity using real-world data from a hospital-based clinical cohort.

Methods:
We analyzed cross-sectional data from a hospital-based cohort of patients with hand OA (N=655). Body Mass Index (BMI) was analyzed as the primary indicator of metabolic status. The clinical outcomes were hand pain intensity and functional disability (AUSCAN score). Multivariate linear regression analyses were performed to determine independent associations, adjusting for potential confounders including age, sex, socioeconomic status, lifestyle factors, comorbidities, and radiographic OA severity.

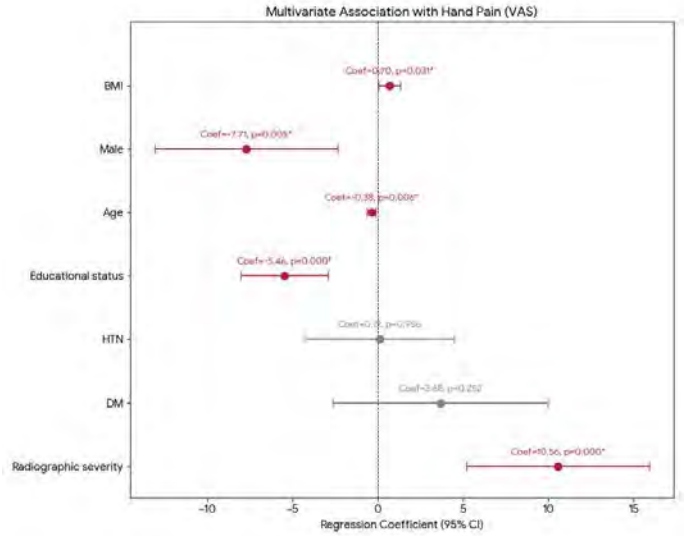
Results:
In the multivariate model, BMI was identified as an independent risk factor for aggravated hand pain (estimate:0.695, 95% CI: 0.063–1.328, P=0.031), confirming that higher systemic adiposity contributes to worse pain outcomes even in non-weight-bearing joints. While BMI was not significantly associated with functional disability (AUSCAN score, P=0.715) (Table 1), Diabetes Mellitus emerged as a significant predictor for worse function (P=0.025) (Figure 1).

Conclusion:
Using clinical cohort data, this study provides empirical evidence supporting the Metabolic OA phenotype in the hand, demonstrating that systemic metabolic burden independently exacerbates pain severity. These findings suggest that the mechanism of pain in hand OA involves systemic inflammation driven by adiposity rather than mechanical loading alone. Consequently, weight management and metabolic control should be emphasized as integral components of therapeutic strategies for patients with hand OA.

Table 1. Multivariate Linear Regression Analysis of BMI on Hand Pain and Function (Adjusted for Sex, Age, Education, Smoking, Alcohol, Hypertension, Diabetes, and OA Severity)

Predictor (BMI)	3.676 (-0.63 – 8.98)	0.025	1.63 (-1.01 – 4.28)	0.252
OA Severity	10.888 (2.55 – 19.23)	<0.001	4.08 (-1.31 – 10.36)	0.13
Education	-2.468 (-5.05 – 0.11)	<0.001	-4.4 (-7.52 – -1.28)	0.001
Age (years)	-0.376 (-0.444 – -0.307)	0.000	-0.116 (-0.168 – -0.063)	0.515
Sex (M/F)	-1.701 (-5.63 – 2.23)	0.002	-1.76 (-6.31 – 2.79)	0.001
BMI (kg/m²)	0.695 (0.063 – 1.328)	0.031	0.143 (-0.824 – 0.824)	0.712
Variable	Hand Pain (VAS) Coef (95% CI)	p-value	Function (AUSCAN) Coef (95% CI)	p-value

Figure 1. Multivariate linear regression analysis of factors associated with hand pain severity (VAS).



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EFFICACY OF TNF INHIBITORS IN COXITIS ASSOCIATED WITH SPONDYLOARTHRITIS

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Objective : Coxitis has always been considered a marker of severity in chronic inflammatory rheumatic diseases. It compromises functional prognosis and represents a turning point in the course of the disease. The aim of this study was to evaluate the effectiveness of anti–TNF-alpha therapy in the treatment of coxitis in patients with spondyloarthritis (SpA).

Material and Methods: This was a retrospective study including 25 patients followed for SpA according to the ASAS 2009 criteria, complicated by coxitis. All patients were treated with anti–TNF-alpha agents after failure of first-line therapy with nonsteroidal anti-inflammatory drugs (NSAIDs).

Results: The study included 5 women and 20 men with a mean age of 31.9 years. Patients were diagnosed with radiographic spondyloarthritis in 72% of cases, psoriatic arthritis in 20%, and inflammatory bowel disease–associated SpA in 8%. All patients presented with coxitis, which was bilateral in 80% of cases. Etanercept was the most commonly used anti–TNF-alpha agent (9 cases, 36%), followed by infliximab (7 cases, 28%), certolizumab (5 cases, 20%), and adalimumab (4 cases, 16%). Evaluation performed at a mean of 12 months after initiation of anti–

TNF-alpha therapy showed a reduction in BASDAI of at least 42.8%, with improvement in hip mobility in 15 cases (60%), and a decrease in the Lequesne functional index to less than 11 points in 5 patients (20%). Follow-up pelvic radiographs showed stabilization of lesions in the majority of cases (21 patients, 84%), without the need for surgical intervention.

Conclusion: Coxitis is a marker of disease severity and a major source of functional disability in SpA. Its assessment should be systematic from the time of diagnosis. Our study suggests that biological therapy with anti–TNF-alpha agents may allow stabilization of lesions and prevent progression of coxitis.

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EFFICACY AND SAFETY OF RITUXIMAB IN RHEUMATOLOGY

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Objectiv : Biologic therapies play an increasingly important role in the management of autoimmune diseases, and rituximab is no exception. Rituximab is a chimeric anti-CD20 monoclonal antibody. In rheumatology, it is approved for the treatment of rheumatoid arthritis (RA) and is also used in several other autoimmune diseases. The aim of this study was to evaluate the indications, efficacy, and safety of rituximab in patients followed in a rheumatology setting.

Material and Methods: This was a retrospective study including 40 patients followed in the Rheumatology Department who received rituximab between 1999 and 2025. Each treatment course consisted of two intravenous infusions of 1 g administered 15 days apart.

Results: The study population included 35 women and 5 men, with a mean age of 50.37 years (range 23–73). Rituximab was prescribed for RA in 26 cases (65%). The main indications in RA were interstitial lung disease in 10 cases (38.5%), failure of methotrexate combined with sulfasalazine in 9 cases (34.6%), failure of anti-TNF therapy in 6 cases (23.1%), and contraindication to anti-TNF agents in 1 case (3.8%). Rituximab was also used in overlap syndromes in 6 patients (15%), predominantly RA–systemic lupus erythematosus overlap in 3 cases. In these patients, treatment was initiated after failure of methotrexate in 2 cases and failure of both anti-TNF and anti–IL-6 therapy in 1 case. Rituximab was prescribed in systemic sclerosis in 3 cases (7.5%) due to persistent active disease despite corticosteroids, colchicine, and nifedipine; in systemic lupus erythematosus in 3 cases (7.5%) following failure of corticosteroids combined with hydroxychloroquine in 2 cases and hydroxychloroquine plus an immunosuppressive agent in 1 case; in polymyositis in 1 case (2.5%) after failure of corticosteroids and azathioprine; and in Still's disease in 1 case (2.5%) due to persistent disease activity despite corticosteroids and methotrexate. Twenty-six patients (65%) received one treatment course, 8 patients (20%) received two courses, 4 patients (10%) received three courses, and 2 patients (5%) received seven courses. The mean interval between courses was one year. Clinical outcome under rituximab was favorable in 77.5% of cases (31 patients), with a mean follow-up of 6 months. Rituximab was well tolerated overall. Mild immediate infusion-related allergic reactions were observed in 4 cases and were rapidly controlled. One case of recurrent infectious pneumonia was reported.

Conclusion: In our series, rituximab demonstrated significant therapeutic efficacy, particularly in rheumatoid arthritis. Its safety profile was satisfactory, with a low incidence of adverse events. These findings support the use of rituximab as an effective therapeutic option, especially in severe disease refractory to conventional treatments and anti–TNF-alpha agents.

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KNOWLEDGE AND MANAGEMENT OF GOUT IN GENERAL PRACTICE

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Objective :
Gout, the leading chronic metabolic arthropathy, results from the deposition of monosodium urate crystals. Management by general practitioners is common, highlighting the importance of this study in Tunisia. The aim of this study was to assess the diagnostic and therapeutic management of gout by primary care physicians in Tunisia.
Material and Methods :
This was a cross-sectional study of primary care physicians, using an online questionnaire to assess the diagnostic and therapeutic management of gout
Results :
Forty doctors completed the questionnaire; the average age was 28.6 years, with a standard deviation of 3.6. Eleven doctors (27.5%) indicated that they had received training in rheumatology. Fifty-two point five percent of general practitioners estimated the frequency of consultations for gout attacks to be between 1 and 10 per year.
The main diagnostic criteria were hyperuricemia (82.5%) and the presence of arthritis (77.5%). After a first gout attack, 37 doctors (92.5%) recommended a systematic biological work-up. Regarding the type of tests, 35 doctors (89.7%) recommended a uric acid blood test, followed by creatinine (61.5%), an inflammatory panel (51.3%), and a lipid panel (28.2%).
For crisis management, 80% prescribed monotherapy, primarily colchicine (90%) and NSAIDs (22.5%). No doctor reported prescribing oral corticosteroids. In the event of colchicine side effects, 42.5% suggested allopurinol as a replacement, 37.5% discontinued colchicine, 22.5% recommended an analgesic, and 17.5% suggested reducing the dose. In the case of severe attacks or ineffective treatment, 50% of doctors referred gout patients to rheumatologists.
Fifty-five percent of general practitioners considered hypouricemic treatment after several gout attacks, 50% after a first gout attack, 47.5% in the presence of nephropathy or renal colic, 45% in the presence of tophus, 30% in the presence of asymptomatic chronic hyperuricemia, and 30% in the presence of radiological signs.
In terms of therapeutic objectives, 17% of practitioners aimed to lower uricemia to below 50 mg/L, 37.5% to below 60 mg/L, and 20% to below 70 mg/L. The maximum dose of allopurinol not to be exceeded was 600 mg, as noted by 52.5% of practitioners; 300 mg, 900 mg, and 1200 mg were indicated by 32.5%, 12.5%, and 2.5%, respectively.
Regarding patient education, the majority of doctors advised proper monitoring of treatment for comorbidities (82.5%) and restriction of red meat and blue fish (77.5%).
Conclusion :

This study highlights the gout management practices of general practitioners in Tunisia, revealing gaps in the management of acute attacks and the prescription of treatments. It suggests the need for continued medical education for general practitioners.

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DIAGNOSTIC YIELD OF CT-GUIDED DISCO-VERTEBRAL BIOPSY IN INFECTIOUS SPONDYLODISCITIS

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Objective: Infectious spondylodiscitis is a severe and potentially life-threatening condition that may compromise both vital and functional prognosis. Diagnosis is primarily based on imaging, particularly spinal magnetic resonance imaging (MRI), which allows early suspicion of the disease. However, identification of the causative pathogen remains a major challenge for optimizing antimicrobial therapy. In this context, computed tomography (CT)-guided disco-vertebral biopsy (DVB) represents a key diagnostic tool.

The aim of this study was to assess the diagnostic value of CT-guided disco-vertebral biopsy in establishing the etiological diagnosis of infectious spondylodiscitis.

Patients and Methods This retrospective study included patients diagnosed with infectious spondylodiscitis between 1998 and 2025. All patients had a clinical and radiological suspicion of infectious spondylodiscitis. Most of them underwent CT-guided disco-vertebral biopsy. Demographic characteristics and clinical data were analyzed. Comparisons were performed between patients with positive microbiological and/or histological findings and those with negative results.

Results The study population consisted of 54 men and 47 women, with a male-to-female ratio of 1.15. The mean age was 58.41 years (range: 15–95). The median duration of symptoms was 60 days (range: 10–365). Back pain was present in all cases, while fever was observed in 44.8%. The mean erythrocyte sedimentation rate (ESR) was 79.01 mm/h (range: 1–185). Lumbar spine involvement was the most frequent (62.2%). Associated epiduritis was observed in 60.4% of cases. CT-guided disco-vertebral biopsy was performed in 46.9% of patients and yielded a diagnostic rate of 17.6% (8/46). Pathogen identification was achieved in 61.1% of pyogenic spondylodiscitis cases, 33.3% of tuberculous cases, and 5.5% of brucellar cases. Histopathological examination proved to be the most sensitive diagnostic modality. In our series, the only factor significantly associated with successful microbial isolation was the presence of positive blood cultures (p = 0.02). No statistically significant association was found with symptom duration (p = 0.7), fever (p = 0.3), associated epiduritis (p = 0.2), spondylodiscitis localization (p = 0.5), ESR (p = 0.7), or C-reactive protein levels (p = 0.08).

Conclusion CT-guided disco-vertebral biopsy demonstrated a modest diagnostic yield (17.6%), with better pathogen identification in pyogenic spondylodiscitis. Histopathological examination remains the most sensitive diagnostic tool. In our cohort, only positive blood cultures were significantly associated with microbial isolation, while no other clinical, biological, or radiological factors showed a significant correlation.

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EPIDURAL INVOLVEMENT IN INFECTIOUS SPONDYLODISCITIS: FREQUENCY AND ASSOCIATED FACTORS

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Objective: Infectious spondylodiscitis is a severe condition frequently complicated by epidural involvement. Epidural extension represents a feared complication, associated with significant morbidity and mortality. Early diagnosis and prompt initiation of appropriate treatment are crucial to improve both functional and vital outcomes. The aim of this study was to assess the incidence of epidural involvement in infectious spondylodiscitis, describe its clinical characteristics, and identify factors associated with its occurrence.

Material and Methods: This retrospective study included patients with infectious spondylodiscitis confirmed by imaging over a 27-year period. Clinical, biological, and radiological data were analyzed to determine the prevalence of epidural involvement, its characteristics, and factors associated with its development.

Results The study population consisted of 54 men and 47 women, with a male-to-female ratio of 1.15. The mean age was 58.41 years (range: 15–95). The median duration of symptoms was 60 days (range: 10–365). Back pain was present in all patients, while fever was observed in 44.8%. Neurological deficits were reported in 25 patients (26.6%).

The mean erythrocyte sedimentation rate (ESR) was 79.01 mm/h (range: 1–185). Lumbar spine involvement was the most common localization (62.2%). Associated epidural involvement was identified in 60.4% of cases. Among these patients, 22 cases (37.9%) were related to tuberculosis, 17 cases (29.3%) to pyogenic organisms, and 12 cases (20.7%) to brucellosis, while no pathogen was identified in 12.1% of cases.

No statistically significant association was found between epidural involvement and the isolated pathogen (p = 0.08) or the localization of infectious spondylodiscitis (p = 0.7). Among the factors analyzed, no significant association was observed between epidural involvement and diabetes mellitus (n = 12; p = 0.4), chronic kidney disease (n = 3; p = 0.4), history of malignancy (n = 1; p = 0.3), long-term corticosteroid therapy (n = 1; p = 0.1), degenerative spine disease (n = 11; p = 0.2), prior infection (n = 10; p = 0.3), previous spinal surgery (n = 3; p = 0.2), or prior epidural injection (n = 1; p = 0.1).

Conclusion Epidural involvement is a frequent complication of infectious spondylodiscitis, occurring in more than half of the cases in our series. However, no specific clinical, biological, or radiological factors were significantly associated with its occurrence.

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ASSOCIATION BETWEEN MMP-3 LEVELS AND STRUCTURAL DAMAGE IN SPONDYLOARTHRITIS

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Objective :
The objective of this study was to evaluate the association between MMP-3 levels and structural damage in patients with spondyloarthritis, and to assess the potential role of MMP-3 as a biomarker of structural involvement.
Methods :
A 6-month cross-sectional study was conducted including patients who met 2009 ASAS Criteria of spondyloarthritis. Clinical, paraclinical and therapeutic data were collected. Structural damage was quantified using the Modified Stoke Ankylosing Spondylitis Spinal Score (mSASSS). MMP3 levels were measured in all patients using an ELISA technique.
Results:
The study involved 73 patients with SpA with a sex ratio (M/F) of 2.04. The mean age of patients was 41,6 ± 12,3 [18–75] years and the mean disease duration was about 12,6 ± 8,4 [0 – 36] years. In this work, 97.3% of patients presented with axial SpA and 86.3% had radiographic axial SpA. Furthermore, 57.5% of patients had peripheral involvement, including 39.7% with joint involvement and 28.8% with enthesitis. The median C-reactive Protein (CRP) level was 5 mg/L IQR [25;75] [2; 10.3]. The mean ASDAS-CRP was 2.34 ± 1.19. The median mSASSS score was 4 IQR [25;75] [1.25; 7]. Forty-four patients were treated with anti-TNF alpha. The mean MMP-3 levels were 25.15 ng/mL ± 12.27 [4,4-61,2]. Correlation analysis between serum MMP-3 levels and the mSASSS radiographic score revealed no statistically significant association (p=0.460).
Conclusion:
In our study, no significant association was found between structural damage and MMP-3 levels in patients with SpA. Further longitudinal studies are needed to better characterize this link.

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A STUDY OF SPONDYLOARTHRITIS PROFILES IN THE ELDERLY

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Objective:
The objective of this study was to examine the characteristics of this condition.
Methods:
We conducted a retrospective descriptive study collecting cases of spondyloarthritis in elderly patients diagnosed in a Tunisian rheumatology department. Sociodemographic, clinical, biological, and radiological data were collected.
Results:
We enrolled 22 patients with a mean age of 64.8 ± 9.2 years. The sex ratio (M/F) was 1.44. Sixty-two percent of the patients were illiterate, and 12.5% had attained a secondary education level. Forty-three percent of the patients lived in rural areas. More than half of the patients (54.5%) had axial spondyloarthritis, while 45.5% had both axial and peripheral spondyloarthritis. Among the latter, 20% had axial onset, 40% peripheral onset, and 40% both axial and peripheral onset. The mean age at diagnosis was 62 ± 10 years, with a diagnostic delay of 1.7 ± 2.8 years. One patient had associated inflammatory bowel disease, and one patient had cutaneous psoriasis. Uveitis was observed in two patients. Comorbidities including diabetes mellitus, arterial hypertension, dyslipidemia, and osteoporosis were present in 18.2%, 31.8%, 22.7%, and 28.6% of cases, respectively. Only 4.5% of patients had a family history of spondyloarthritis, and similarly, 4.5% had a family history of psoriasis. Forty-one percent of patients were smokers. General health deterioration was noted in 39% of patients. Regarding clinical examination findings, sacroiliac joint pain was present in 68% of patients, while cervical and lumbar stiffness were reported in 71.4% and 86.4% of patients, respectively. The mean Bath Ankylosing Spondylitis Disease Activity Index (BASDAI) score was 4.44 ± 2.12. Four patients (19%) had unilateral coxitis on X-ray, and one patient had bilateral coxitis. The mean C-reactive protein (CRP) level was 47.3 ± 46 mg/L. With respect to disease-modifying treatment, 77.3% of patients were treated with nonsteroidal anti-inflammatory drugs, 27% required initiation of a first biologic therapy, and 13.6% required a second biologic therapy.
Conclusion:
The diagnosis of late-onset spondyloarthritis can be challenging due to the high frequency of systemic manifestations. Establishing an accurate diagnosis allows for optimal patient management.

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SERUM 25(OH)D LEVELS AFTER THE COVID-19 ERA: A LARGE COHORT ANALYSIS

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Background/Aim: Vitamin D deficiency affects approximately 60% of the Turkish population, largely due to limited access to vitamin D–fortified foods and inadequate supplementation practices. Following the COVID-19 pandemic, an increase in vitamin D use and prescribing has been observed in clinical practice. This study aimed to evaluate serum 25-hydroxyvitamin D (25(OH)D) concentrations in hospitalized adults during the post-COVID era and to assess whether increased supplementation translated into improved population-level vitamin D status.
Methods: Serum 25(OH)D measurements from adult inpatients admitted to a tertiary-care university hospital between January 2022 and December 2024 were retrospectively analyzed. Patient age at sampling, sex, serum 25(OH)D, parathyroid hormone (PTH), and calcium levels were extracted from hospital records; individuals aged <18 years were excluded. Serum 25(OH)D was measured using a chemiluminescence immunoassay (CLIA). Vitamin D deficiency was defined as 25(OH)D <20 ng/mL and severe deficiency as <10 ng/mL.
Results: A total of **124,067** measurements were included. The median 25(OH)D level was **17.4ng/mL** (25th–75th percentile:**10.2–24.3**) in the overall cohort. Median 25(OH)D levels were **16.9ng/mL(10.4–25.6)**

in females and **18.0ng/mL(12.7–24.5)** in males, with a statistically significant difference (**p<0.001**). Serum 25(OH)D levels increased with advancing age, and differences across age groups were significant (**p<0.001**). (Table-1) Seasonal variation was consistent across 2022–2024, with higher levels in summer and lower levels in winter (**p<0.001**). (Figure-1) Vitamin D deficiency was present in **59.3%** (n=73,551), and severe deficiency (<10 ng/mL), a threshold associated with increased osteomalacia risk, occurred in **20.1%** (n=24,962). Vitamin D toxicity was rare, detected in **15 individuals** (<0.001%). Compared with our 2016 cohort (deficiency **57.8%**, severe deficiency **25%**), overall deficiency remained similar (59.3%), while severe deficiency declined (20.1%) in the post-COVID era.

Conclusion: Despite an apparent rise in vitamin D supplementation following the COVID-19 pandemic, the overall prevalence of vitamin D deficiency in hospitalized adults remained persistently high and comparable to pre-pandemic data. Although severe deficiency decreased, the ongoing burden of deficiency suggests that individual supplementation alone is insufficient at the population level. Strengthened public health strategies, including targeted screening of high-risk groups and expanded vitamin D food fortification policies may be required to achieve meaningful improvements in vitamin D status in Türkiye.

Variable	Category	Median (25th–75th percentile)	p-value
Sex	Female	16.90 (10.40–25.60)	<0.001
	Male	18.00 (12.70–24.50)	
Age Group (years)	18–29	14.40 (9.65–20.80)	<0.001
	30–39	15.60 (10.30–22.57)	
	40–49	16.90 (10.99–24.38)	
	50–59	18.51 (12.00–26.50)	
	60–69	20.10 (12.80–28.30)	
	70–79	20.76 (12.66–29.90)	
	≥80	19.80 (11.10–30.30)	

Table-1 Serum 25-OH Vitamin D Levels by Sex, Age Group, and Season

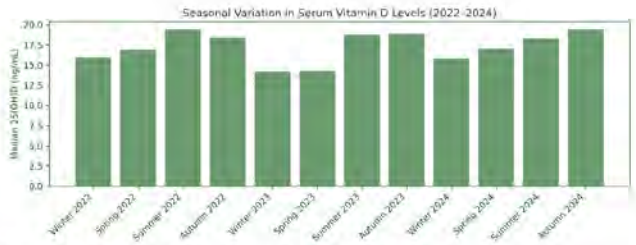


Figure-1: Seasonal Variation in Serum Vitamin D Levels (2022-2024)

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IDENTIFICATION OF A 25(OH)D THRESHOLD FOR PARATHYROID HORMONE ELEVATION IN VITAMIN D DEFICIENCY

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Aim: Vitamin D (25(OH)D) deficiency is a common cause of secondary hyperparathyroidism and may adversely affect bone health. Although 25(OH)D levels <20 ng/mL are frequently associated with elevated parathyroid hormone (PTH), the magnitude of PTH response varies substantially between individuals. We aimed to characterize the relationship between 25(OH)D and PTH and to identify a potential threshold for PTH elevation in a large Turkish population.

Method: A total of 20,245 individuals who presented to Marmara University were included in the study. All patients had serum 25(OH) D levels ≤30 ng/mL and an estimated glomerular filtration rate (eGFR) ≥90 mL/min/1.73 m². All patients were older than 18 years of age. Elevated parathyroid hormone levels were defined as concentrations exceeding the upper limit of the laboratory reference range (60 pg/mL). Demographic variables (age and sex) and biochemical measurements including serum calcium, phosphorus, and 25(OH)D levels were obtained from the hospital electronic medical records.

Results: 20,245 patients included in the study, 16,538 (81.7%) had parathyroid hormone levels <60 pg/mL, while 3,707 (18.3%) had levels ≥60 pg/mL. The median 25(OH)D level was 16.73 (3.04-30.00) ng/mL in patients with PTH <60 pg/mL and 12.60 (3.01–30.00) ng/mL in those with PTH ≥60 pg/mL (p<0.001). (Table-1)

A modest inverse correlation was observed between 25(OH)D and PTH levels (r = −0.20). Piecewise linear regression identified a breakpoint at approximately **11.4 ng/mL** of 25(OH)D, beyond which the slope of the relationship between vitamin D and PTH changed. (Figure-1) Below this threshold, decreasing 25(OH)D levels were associated with a steeper rise in PTH (slope ≈ −2.26), whereas above the breakpoint PTH values showed a much flatter pattern with respect to 25(OH)D (slope ≈−0.30).

Conclusion: These findings indicate that PTH elevation becomes more pronounced when 25(OH)D concentrations fall below approximately 11.4 ng/mL in this CKD-free population. Previous studies have reported PTH plateaus or inflection points between 10–30 ng/mL. Additional studies incorporating skeletal endpoints and longitudinal clinical outcomes are warranted to determine the clinical relevance of this biochemical threshold.

Parathyroid Hormone Levels	<60 pg/mL	≥60 pg/mL	p-value
25-OH Vitamin D ng/mL (n=20,250)) Median (Min–Max)	16.73 (3.04-30.00)	12.60 (3.01–30.00)	<0.001
Age (n=20,250) Median(Min-Max)	50 (18-98)	54 (18-98)	<0.001
Calcium mg/dl (n=20,250) Median(Min-Max)	9.6 (5-10.6)	9.5 (6.5-10.6)	<0.001
Phosphorus mg/dl (n=18,842) Median(Min-Max)	3.5 (0.6-8.7)	3.4 (1.1-6.4)	<0.001

Table-1: Results of All Patients

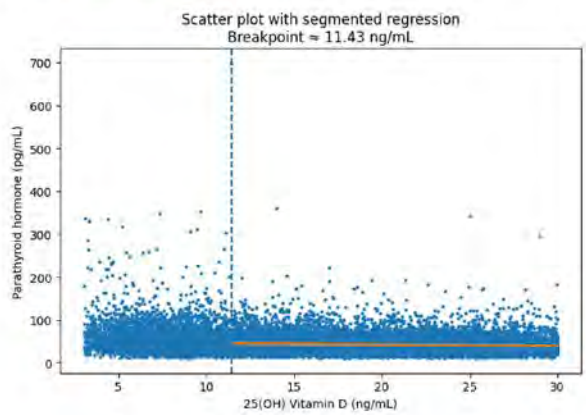


Figure-1: 25(OH)D–PTH segmented regression (Breakpoint ≈ 11.4 ng/mL)

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OSTEOPOROSIS IN NURSING HOME RESIDENTS: PREVALENCE, RISK FACTORS, AND EFFECTIVENESS OF SCREENING STRATEGIES COMPARED TO COMMUNITY-DWELLING ELDERLY

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Objectives: This study investigated the prevalence and severity of osteoporosis in nursing home residents compared to community-dwelling elderly, evaluated multiple screening strategies, and identified risk factors to improve diagnostic approaches in this high-risk population.
Methods: This cross-sectional study examined 148 nursing home residents from Guo-Xin Nursing Home and compared findings with 148 age- and sex-matched controls from the community. Data collection included demographic variables, medical history, fracture history, biochemical markers (vitamin D, PTH, albumin), sarcopenia measurements, osteoporosis screening tools (OSTAi/MOSTAi), and dual-energy X-ray absorptiometry (DXA). Multiple diagnostic strategies were compared for effectiveness.
Results: Osteoporosis prevalence reached 72.3% by DEXA among nursing home residents versus 50% in controls (p<0.001), with significantly higher rates in women (86.8%) than men (49.1%). Nursing home residents demonstrated significantly lower bone mineral density at all sites compared to matched controls (femoral neck: 0.552 vs 0.664, p<0.001). Combined screening using fracture history, plain radiography, OSTAi/MOSTAi, and DXA identified 89.2% of cases. Female gender, lower body weight, reduced mobility, and lower grip strength emerged as significant risk factors. OSTAi/MOSTAi showed moderate screening utility.
Conclusions: Nursing home residents exhibit exceptionally high osteoporosis prevalence and severity compared to community-dwelling elderly. Multi-modal screening approaches provide optimal screening power. These findings support the need for proactive and systematic osteoporosis screening in nursing home residents to facilitate timely diagnosis and management.

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ASSOCIATION BETWEEN DIETARY PROTEIN INTAKE AND FRAILTY IN IRANIAN OLDER ADULTS: A CROSS-SECTIONAL ANALYSIS FROM THE BIRJAND LONGITUDINAL AGING STUDY

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Objective: Frailty is a geriatric syndrome associated with adverse health outcomes, and nutrition has been identified as a modifiable risk factor. However, evidence remains inconsistent regarding the impact of proteins with various sources on frailty. We aim to examine the association between animal- and plant-based protein intake and frailty, with the goal of informing future nutritional recommendations for the elderly.
Materials and Methods: This cross-sectional study utilized data from 1,265 community-dwelling adults aged ≥60 years enrolled in the second phase of the Birjand Longitudinal Aging Study (BLAS). Frailty status was assessed using a 50-item Frailty Index and categorized as robust, prefrail, and frail. Dietary protein intake was estimated via a validated food frequency questionnaire. The main sources of animal proteins include chicken, eggs, fish, and red meat, while the sources of plant proteins include soybeans, legumes, and nuts. Associations were examined using regression models, adjusted for demographic, clinical, nutritional, lifestyle, and biochemical factors.
Results: A total of 1,265 older adults (mean age = 72.5 ± 6.7 years; 51.2% female) were included, comprising 47.0% robust, 47.5% pre-frail, and 5.5% frail participants. Frailty was associated with older age, female sex, obesity, lower education, physical inactivity, diabetes, and lower hemoglobin levels (all p < 0.001). Mean total protein intake decreased progressively from robust (65.6 ± 34.6 g/day) to frail (48.8 ± 26.9 g/day; p < 0.001). In multinomial regression, animal protein intake was associated with frailty. This association lost significance after adjusting for covariates. Vegetable protein intake showed no significant relationship with either pre-frailty or frailty in any model. However, in the energy decomposition model, higher protein energy percentage showed an inverse association with frailty (RRR = 0.600; 95% CI: 0.364–0.989; p = 0.045), suggesting protective effects of protein density.
Conclusions: Higher total protein intake was associated with reduced odds of frailty in older Iranian adults, independent of protein source. These findings highlight the importance of achieving adequate daily protein intake as a primary nutritional strategy for frailty prevention. Longitudinal and interventional studies are warranted to establish causality.

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INVESTIGATING THE ASSOCIATION BETWEEN GUT MICROBIOTA AND SARCOPENIA IN OLDER ADULTS

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Objective: Investigating the gut microbiota has become a promising avenue for understanding the gut-muscle axis and its role in age-related conditions like sarcopenia. Although numerous studies reported altered gut microbial communities in individuals with sarcopenia—pointing to

gut dysbiosis as a potential driver of chronic inflammation and muscle deterioration—findings vary across geographical and ethnic backgrounds. This study examines the association between gut microbiota and sarcopenia in a sample of older adults from Iran.

Materials and Methods: Fecal samples were obtained from 293 participants (aged 60 years and above) enrolled in the Birjand Longitudinal Aging Study. The gut microbiota was analyzed using quantitative PCR with genus-specific primers targeting 12 bacterial genera. Sarcopenia was diagnosed based on anthropometric measures, body composition (assessed by bioelectric impedance analysis), handgrip strength, and gait speed. Participants were classified into sarcopenic and non-sarcopenic groups according to the European Working Group on Sarcopenia in Older People (EWGSOP). Associations between bacterial abundance and sarcopenia—as well as its individual components—were evaluated.

Results: Of the 293 elderly subjects, 112 (38.2%) were identified with sarcopenia. Higher levels of Akkermansia were significantly associated with increased likelihood of sarcopenia. Furthermore, Akkermansia abundance negatively correlated with handgrip strength, skeletal muscle index (SMI), and gait speed ($p < 0.05$). Each unit increase in Akkermansia was linked to a 9% rise in the odds of low SMI and an 8% increase in the odds of slow gait speed. Both Akkermansia and Lactobacillus were associated with elevated odds of sarcopenia (7% and 8%, respectively). In contrast, Roseburia exhibited a protective effect, with each unit increase reducing the odds of sarcopenia by 11.5%. Roseburia was also positively correlated with gait speed ($p < 0.05$).

Conclusions: This research highlights significant relationships between specific gut bacteria and sarcopenia. While Akkermansia and Lactobacillus were associated with higher sarcopenia risk, higher levels of Roseburia appeared beneficial. These results support the potential of targeting gut microbiota as an innovative strategy for preventing and managing sarcopenia.

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THREE-YEAR REAL-WORLD EFFECTS OF DENOSUMAB ON BONE MINERAL DENSITY ACCORDING TO PRIOR OSTEOPOROSIS TREATMENT IN KOREAN POSTMENOPAUSAL WOMEN

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Objective: This study aimed to evaluate the 3-year effectiveness of denosumab stratified by previous osteoporosis treatment status in routine clinical practice in Korea.

Materials and Methods: We retrospectively reviewed the medical records of postmenopausal women with osteoporosis who received denosumab at a tertiary medical center between 2017 and 2023. Participants were categorized into three groups based on treatment prior to denosumab initiation: treatment-naïve, prior bisphosphonate users, and prior selective estrogen receptor modulator (SERM) users. Longitudinal changes in BMD at the lumbar spine, femoral neck, and total femur were analyzed over a 3-year period using linear mixed-effects models adjusted for age and body mass index at index bone densitometry.

Results: Among 365 postmenopausal women, 250 (68.5%) were treatment-naïve, 81 (22.2%) had previously received bisphosphonates, and 34 (9.3%) had been treated with SERMs. At the lumbar spine, BMD increased over 3 years in all treatment groups, from 0.819 g/cm² at baseline to 0.950 g/cm² in treatment-naïve patients, 0.911 g/cm² in prior bisphosphonate users, and 0.912 g/cm² in prior SERM users. Differences in lumbar spine BMD by prior treatment status were significant at year 1 ($P = 0.001$) and year 2 ($P = 0.01$), but not at year 3 ($P = 0.09$). At the femoral neck, BMD remained relatively stable in treatment-naïve patients (0.690 to 0.703 g/cm² at year 3), whereas a decline was observed at year 3 among prior bisphosphonate and SERM users (to 0.675 and 0.674 g/cm², respectively); however, no significant differences between treatment groups were detected at any time point. At the total femur, BMD increased from 0.709–0.710 g/cm² at baseline to 0.730–0.769 g/cm² at year 3, with significant differences by prior treatment status observed at year 1 ($P = 0.0003$), but not at later time points.

Conclusions: In this real-world cohort of Korean postmenopausal women with osteoporosis, denosumab was associated with sustained increases in BMD at the lumbar spine and total femur over 3 years across different prior treatment groups.

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Conflicts of Interest: Hoon Kim has received honoraria for participating on the advisory board of Bayer and Abbott, consulting for Merck, LG Chemical, Hyundai Pharm, and Dalim Biotech, and lecturing for Amgen, Organon, Pfizer, and Bayer, all of which are unrelated to the subjects addressed in this paper. Other authors report no financial or commercial conflicts of interest.

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FEATURES OF MUSCULOSKELETAL MASS AND METABOLIC RISKS IN PATIENTS WITH OSTEOARTHRITIS OF LARGE JOINTS: DATA FROM DENSITOMETRIC AND BIOIMPEDANCE ASSESSMENT OF BODY COMPOSITION

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The aim of the study was to analyze the assessment of body composition in patients with osteoarthritis (OA) of large joints of the lower extremities in need of arthroplasty using bioimpedance analysis (BIA) and dual–energy X-ray absorptiometry (DXA).

Materials and methods. The study included 39 patients divided into 2 groups, comparable in age and gender composition. The main group included 21 patients with knee joint OA of the III radiological stage, the control group included 18 patients with traumatic knee injury with minimal clinical manifestations. Body composition was assessed using bioimpedance analysis (ABC-01 "MEDASS") and DXA (GE Lunar Prodigy Advance) using the "Whole Body" software.

Results. When comparing the results of BIA in patients of the main group, significantly higher% of fat mass (52.6 [50.1; 54.7]% vs. 43.5 [39.5; 50.9]%, $p<0.001$), extracellular fluid content (17.8 [17.0; 19.4] kg vs. 14.9 [13.5; 17.2] kg, $p=0.020$), the mineral part of bone tissue (2.76

[2.70; 3.03] kg versus 2.29 [2.07; 2.66] kg, p=0.009), but lower values of specific basal metabolism (735.6 [695.9; 761.5] kcal/sq.m/day. against 778.2 [761.2; 808.1] kcal/sq.m.m/day, p=0.020). In patients with OA of large joints, the proportion of musculoskeletal tissue was significantly lower (42.2 [37.1; 44.0]% versus 43.9 [43.3; 45.9]%, p=0.033), there was a tendency to decrease the proportion of active cell mass (p=0.071) and phase angle (p=0.060).

Densitometric assessment of body composition revealed a statistically significant increase in the body fat index in patients of the main group (20.8 [17.7; 25.2] kg/sq.m versus 12.5 [9.6; 20.2] kg/sq.m, p=0.002), % of body fat (54.3 [52.2; 57.6]% versus 45.4 [39.2; 53.3]%, p<0.001), the ratio of body fat to limb fat (0.59 [0.53; 0.63] vs. 0.51 [0.45; 0.58], p=0.028), lean mass index (19.78 [17.55; 22.57] vs. 17.66 [14.58; 19.82], p=0.035). At the same time, the ratio of lean mass to fat mass turned out to be statistically significantly better in patients without OA (1.30 [0.97; 1.59] versus 0.90 [0.83; 1.0], p<0.001). Indexed appendicular skeletal muscle mass (AMSM) was significantly higher in patients of the main group (13.9 [11.4; 15.2] kg/sq.m versus 12.0 [9.9; 12.9] kg/sq.m, p=0.014), however, the ratio of AMSM to BMI in this group of patients was significantly lower (0.72 [0.67; 0.93] versus 1.03 [0.83; 1.10], p=0.003). There was a tendency to increase BMD in the spine (p=0.159) and decrease in the pelvic bones (p=0.517) in patients of the main group.

Conclusion. In patients with knee OA undergoing arthroplasty, the phenotype of sarcopenic obesity was revealed, characterized by abdominal fat distribution (p<0.001) and a decrease in the proportion of musculoskeletal tissue (p=0.033) with an increased absolute mass of the mineral part of the bone (p=0.009). The low ratio of muscle mass to BMI (p=0.003) and the abdominal type of fat distribution define this category of patients as a metabolic risk group requiring a comprehensive assessment of body composition (including DXA and BIA) when planning orthopedic treatment.

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CLINICAL AND ANAMNESTIC PREDICTORS OF OSTEOPOROSIS IN YOUNG WOMEN: IMPORTANCE FOR EARLY DIAGNOSIS AND PREVENTION OF FRACTURES

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The aim of the study was to retrospectively study the risk factors for osteoporosis (OP) and osteoporotic fractures in women of reproductive age.

Materials and methods. The study included 70 women of reproductive age with preserved menstrual function who applied to the OP Prevention Center during the calendar year. Risk factors for OP and osteoporotic fractures were assessed, concomitant diseases were analyzed, pharmacological history was clarified, and serum levels of total calcium, phosphorus, alkaline phosphatase, creatinine, and total 25-hydroxyvitamin D (25(OH)D) were determined. Dual-energy X-ray absorptiometry (DXA) of the central skeletal regions (Lunar Prodigy Advance) was performed in 60 patients.

Results. The median age of the patients was 41 [35; 45] years (hereinafter referred to as Me [Q1; Q3]). The median body mass index (BMI) was 21.7 [19.8; 23.1] kg/m^2, 25.7% of women had a BMI of less than 20 kg/m^2, and 14.3% of women had grade 1-2 obesity. According to the results of the DXA, the median Z-criterion in the lumbar spine (LS) was -1.0 [-1.9; -0.3] SD, in the proximal thigh (PT) -1.0 [-2.0; -0.6] SD. In 21.7% of cases, a decrease in bone mineral density (BMD) was found below the age-related population norm (Z-criterion below -2.0 SD). 17 women (24.3%) had a history of having suffered a low-energy fracture, while 4 patients had a history of 2 pathological fractures. In the structure of low–energy fractures: fractures of the femoral neck in 8 people (2 of them on both sides), compression fractures of the vertebral bodies in 5 people, distal third of the forearm bones in 3 people, neck of the humerus in 2 people. Every 3rd patient with a pathological fracture had a BMI of less than 20 kg/m^2. 7 patients with a history of DXA fractures showed a decrease in BMD below the age norm, while only 2 suffered from rheumatic disease, for which they took glucocorticoids (GC). The other 15 patients did not receive GC. In patients with pathological fractures, compared with women without a history of fractures, BMD per LS (0.752 [0.712; 0.883] g/cm^2 vs. 0.840 [0.731; 0.943] g/cm^2, p=0.29) and PT (0.926 [0.883; 1.170] g/cm^2 vs. 1,072 [0.927; 1.180] g/cm^2, p=0.041) was lower. The BMI in women with pathological fractures was slightly lower than in women without a history of fractures (20.6 [18.8; 22.5] kg/m^2 versus 21.8 [20.1; 25.2] kg/m^2, p=0.066).

The indicators characterizing the activity of mineral metabolism: the content of total calcium, inorganic phosphorus, and alkaline phosphatase in the blood were within the values of the reference intervals. The median serum level is 25(OH)D was 20.4 [15.2; 33.8] ng/ml. Vitamin D deficiency was found in 19.3% of women, vitamin D deficiency in 45.6%. When analyzing concomitant diseases that can lead to the development of secondary OP, it turned out that 21 patients (30%) had immuno–inflammatory rheumatic disease (rheumatoid arthritis in 15 people, systemic lupus erythematosus in 3 people, ankylosing spondylitis in 2 people, nonspecific aortoarteritis in 1 person). Other patients also had a history of chronic obstructive pulmonary disease (3 people), oncohematological diseases (3 people), epilepsy (1 person), primary biliary cirrhosis of the liver (1 person), diffuse toxic goiter (1 person), Vogt-Koyanagi-Harada syndrome (1 person). 17 women (24.3%) took systemic GC. Smoking was detected in only 2 cases. There were no other bad habits.

Correlation analysis revealed positive correlations between BMI and BMD in LS (r=+0.39, p=0.019), and BMD in PT (r=+0.30, p=0.039). There were no statistically significant correlations between serum vitamin D levels and BMD, BMI.

Conclusion. The study revealed a high prevalence of OP risk factors in women of reproductive age. Every 4th patient had a history of a low-energy fracture, and every 5th had a reduced BMD. The key associated factors were low body mass index (BMI < 20 kg/m^2) and vitamin D deficiency (found in 45.6% of women). Concomitant rheumatic diseases and GC intake also played a significant role. The results obtained emphasize the need for targeted screening for OP, vitamin D level control, and body weight correction in young women at risk for the prevention of pathological fractures.

P702

EXPERIMENTAL STUDY OF THE EFFECT OF TIBIAL BONE DEFECT ON ORGANOMETRIC PARAMETERS OF THE IMMUNE SYSTEM UNDER THE INFLUENCE OF SODIUM BENZOATE

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Objective of the study was to examine the effect of tibial bone defect on organometric parameters of the immune system under the influence of sodium benzoate. In the modern world, scientific and technological progress and accelerated rhythm of life contribute to the growth of traumatism, including severe fractures, which are often accompanied by complications and decreased immunity. This requires studying the role of the immune system in the process of bone repair. Also relevant is the problem of environmental safety of food products that affect human health and are actively researched by scientists.
Material and methods. The study was conducted on 60 male white rats weighing 200-210 g, divided into control and study groups. The rats of the study group received 1 ml of sodium benzoate (500 mg/kg) through a probe for 60 days. Then a defect of 2.2 mm in diameter was applied under anesthesia. The animals were removed from the experiment on days 3, 10, 15, 24, and 45. All procedures were in accordance with the European Convention for the Protection of Vertebrate Animals.
Results. Against the background of 60-day administration of sodium benzoate (500 mg/kg) in rats with tibial bone defects, a decrease in the weight of thymus and spleen on the 3rd, 10th, 15th and 24th days compared to the control group was observed. On the 45th day the differences remain statistically significant. Linear indices of thymus and spleen (length, width, thickness) were also reduced on the 3rd day, further the values leveled off.
Conclusion. Application of metadiaphyseal defect in tibiae and sodium benzoate increased the duration of decrease in mass, length, width and thickness of spleen and thymus.

P703

CLINICAL CHARACTERISTICS, TREATMENT AND FOLLOW-UP OF PATIENTS WITH OSTEOGENESIS IMPERFECTA IN A TERTIARY HOSPITAL

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Objective:

To describe the clinical, densitometric (DXA) and therapeutic characteristics of patients with osteogenesis imperfecta (OI) followed at a tertiary care hospital.
Material and Methods:

A retrospective, observational and descriptive study was performed using electronic medical records of patients diagnosed with OI. Demographic variables, fracture history, DXA assessments performed and results obtained, prescribed treatments, and clinical follow-up were analyzed.
Results:

Twenty-one patients were included, with a mean age of 38.8±21.3 years; 52% were women. Genetic testing was performed in eight patients, all diagnosed with type I OI.

A history of fractures was present in 86% of patients, with a median of three fractures per patient. The most frequent fracture sites were the femur (n=11), wrist (n=5) and vertebrae (n=3), predominantly during childhood.
DXA was performed in 13 patients at the lumbar spine and in 4 at the hip (Table 1).
Bisphosphonates were the most frequently used treatments (n=9). Three patients received osteoanabolic therapy (two with teriparatide and one with romosozumab). Twelve patients had no history of antiresorptive or osteoanabolic treatment. Calcium and vitamin D supplementation were prescribed in seven and thirteen patients, respectively.
Sixty-two percent were followed in specialised clinics.
Conclusions:

This series shows a high fracture burden in patients with OI, together with limited use of DXA, suboptimal calcium and vitamin D supplementation, and low exposure to bone-targeted therapies.
These findings highlight the importance of specialized follow-up and optimization of diagnostic and therapeutic strategies, particularly in patients with OI who present risk factors for osteoporosis and low bone mineral density values on DXA.

Table 1. Bone densitometry results

Lumbar spine	
Patients with DXA, n (%)	**13** (61.19%)
T/Z-score, mean ± SD	−2.03 ± 1.76
T/Z-score, median and IQR	−2.0 [−3.2 a −0.8]
Minimum T/Z-score	-5.2
Maximum T/Z-score	+1.2
Patients with osteopenia (T/Z −1,0 to −2.5), n (%)	9 (69%)
Patients with osteoporosis (T/Z ≤ −2.5), n (%)	5 (38.5%)

Fémur total	
Patients with DXA, n (%)	**4** (19.0%)
T/Z-score, mean ± SD	−2.02 ± 1.15
T/Z-score, median and IQR	−2.05 [−3.4 a −0.5]
Minimum T/Z-score	−3.4
Maximum T/Z-score	−0.5
Patients with osteopenia (T/Z −1,0 to −2.5), n (%)	3 (75%)
Patients with osteoporosis (T/Z ≤ −2.5), n (%)	2 (50%)

DXA: densitometry; SD: standard deviation; IQR: interquartile range

P704

SEQUENTIAL TREATMENT AFTER ROMOSOZUMAB AND ANTIFRACTURE EFFECT IN REAL-WORLD CLINICAL PRACTICE

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Objective:
To analyse post-romosozumab (ROMO) sequential therapy, antifracture effectiveness and changes in bone mineral density (BMD) in real-world clinical practice.
Material and Methods:
A retrospective, observational and descriptive study was conducted

including patients who completed 12 months of ROMO treatment between November 2022 and December 2025 in a tertiary care hospital. Demographic characteristics were collected, as well as the occurrence of fragility fractures (FF) during treatment and follow-up, and previous anti-osteoporotic therapies and subsequent sequential treatment. In patients with bone densitometry (DEXA) performed before and after treatment, changes in BMD were analysed.

Results:

Thirty-two female patients were included, with a mean age of 71.0 ± 7.2 years and a high fracture burden (median of 2 FF per patient, IQR 1). Vertebral fractures were the most frequent, occurring in 31 patients (96.8%), often followed by wrist (21.8%), hip (12.5%), and humeral fractures (3.1%).

Prior to ROMO, most patients had received bisphosphonates (75%), while five patients (15.6%) were treatment-naïve. Vitamin D and calcium supplementation were prescribed to 87.5% and 65.6% of patients, respectively.

During ROMO treatment, one fracture (3.1%) occurred at the tibia and was therefore not considered osteoporotic. No new FF were observed during the subsequent follow-up (mean duration 9.7 ± 9.2 months).

After ROMO, denosumab was the most frequent sequential therapy (n=25), followed by bisphosphonates (n=7), mainly administered intravenously.

In the 20 patients with paired DXA measurements, BMD increased at all sites, predominantly at the lumbar spine (mean increase, 0.071 g/cm²), versus the femoral site (0.042 g/cm²) Table 1.

Conclusions:

In this real-world cohort of patients at very high fracture risk, ROMO followed by appropriate sequential therapy was associated with a very low incidence of FF and significant improvements in BMD.

These findings reinforce the importance of structured sequential treatment strategies after anabolic therapy and support the need for ongoing clinical follow-up to better characterise long-term antifracture outcomes after ROMO.

Table 1. Bone densitometry before and after romosozumab (n = 20)

Densitometric variable	Pre-ROMO (mean ± SD)	Post-ROMO (mean ± SD)	Mean change
Lumbar spine T-score	−3.39 ± 1.22	−2.87 ± 0.80	+0.52
Lumbar spine BMD (g/cm²)	0.764 ± 0.112	0.835 ± 0.097	+0.071
Total femur T-score	−2.54 ± 0.70	−2.34 ± 0.76	+0.20
Total femur BMD (g/cm²)	0.693 ± 0.084	0.735 ± 0.097	+0.042

ROMO: romosozumab; SD: standard deviation; BMD: bone mineral density

P705

DETERMINING INVOLUNTARY MOTOR RESPONSES AND VOLUNTARY MOTOR FUNCTIONS IN PATIENTS WITH POST-STROKE ATAXIA IN MEDICAL REHABILITATION PRACTICE

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The relevance of developing a method for determining involuntary motor responses and voluntary motor functions in patients with cerebrovascular accidents (CVA) stems from the need to improve the principles of assessing self-care and independent mobility in the context of planning and analyzing the effectiveness of rehabilitation care.

In the last decade, this has been driven by aspects of the practical implementation of the provisions of the International Classification of Functioning, Disabilities, and Health (ICF) in the medical rehabilitation (MR) (habilitation) of individuals with disabilities.

A clinical and functional assessment of the health status of 72 patients with ataxia caused by circulatory disorders in the vertebrobasilar system (VBS) was conducted: 58 (80.6%) men and 14 (19.4%) women.

By disease duration, the examined individuals were distributed as follows: up to one year – 10 people. (13.9%); 1 to 3 years old – 27 patients (37.5%); 3 to 10 years old – 23 patients (31.9%); over 10 years old – 12 patients (16.7%). Statodynamic disturbances in patients with CVA in the VBB manifested themselves as ataxia of varying severity (72 patients; 100.0%): mild ataxia in 34 patients (47.2%), moderate ataxia in 29 patients (40.3%), and severe ataxia in 9 patients (12.5%). Determination of involuntary motor response and voluntary motor functions (using the ICF) included assessment by categories: b755 (involuntary motor response functions), b760 (control of voluntary motor functions).

An assessment of involuntary motor response function (b755) was performed to determine the integrity of involuntary contractions of large and large muscles or the entire body, induced by body position, balance, and threatening stimuli.

The examination was conducted to check the function of postural reactions, alignment, equilibrium reactions, adaptive reactions, postural maintenance, and defensive reactions. A specialist performed a series of tests: Romberg, Stuart-Holmes, Babinski (to identify asynergy), and Orzechowski; stabilometry data were analyzed.

An assessment of voluntary motor control (b760) was performed to determine functions associated with the control and coordination of voluntary movements. The examination was conducted to check the coordination, smoothness, clarity, and coordination of movements and included tests for dynamic ataxia: finger-nose, heel-knee, and index ataxia; dysmetria and hypermetria; adiadochokinesis; and the Schilder test.

A rehabilitation assessment was conducted on 29 patients with moderate ataxia. Patients were characterized by unsteadiness in the simple Romberg test with stability and instability in the sensitized Romberg test. Stabilometry parameters: balance function quality 40-65%;

statokinesiogram area 350-1000 mm2, for the Romberg test with open eyes – 250-1000 mm2; There were moderate impairments in coordination tests: the degree of deviation in coordination tests (finger-nose, finger-fingers, index) was 5-7 cm. The patient changed body posture using additional muscle effort from the lower extremities and trunk, with additional support from the arms, at a slow pace and hesitantly. The ability to maintain stability when bending was moderately limited.

Maintaining body position while standing was difficult for most patients and required additional support. Maintaining an elevated upper body position while sitting was accomplished using trunk muscles and partial support from the arms. Prolonged maintenance of a standing posture during everyday activities was accomplished with the help of a cane.

The problems and limitations in controlling involuntary motor reactions and voluntary motor functions identified in the patients were used to formulate a rehabilitation diagnosis and to set MR tasks for specialists in the multidisciplinary rehabilitation team.

P706

NON-INVASIVE PREVENTION OF FRAGILITY FRACTURES: THE ROLE OF REMS IN THE SVOLTA PROJECT

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Objective(s): Osteoporotic fractures significantly impair quality of life and increase the risk of subsequent fractures. Continuous monitoring of patients with prior fragility fractures is essential for secondary prevention and fracture risk stratification. This study proposes an integrated follow-up model based on Radiofrequency Echographic Multi-Spectrometry (REMS) to assess fracture risk, monitor bone quality and prevent re-fractures in frail patients.
Materials and Methods: Clinical data were collected from a multicentre study involving Policlinico University Hospital in Bari, Tor Vergata University Hospital in Rome and Giuliano Isontina University Hospital in Trieste. Caucasian patients of both genders, aged between 50 and 75, with a history of primary fragility fractures, were enrolled in the study. All patients underwent a REMS scan of the spine, and the scan parameters (T-score, fragility score and fracture risk classification) were recorded to enable targeted monitoring.
The following work is part of the SVOLTA Project (Sviluppo di un Servizio per la preVenzione e riduziOne delLe fratTure da frAgilità) carried out with the technical and financial support of the Ministry of Health - CCM.
Results: A total of 38 patients (35 women and 3 men) were included. Wrist fractures were the most prevalent (45%), followed by vertebral (21%) and humeral fractures (13%). The analysed patient group showed reduced bone density values (mean T-score = -1.9 ± 0.9) and poor bone microarchitecture quality (mean fragility score = 38.18 ± 8.03). In particular, the 82% was classified into medium-high risk classes (R4-R7), each associated to a probability of imminent (within 5 years) risk of major fragility fractures. Each of them has been assigned to a specific therapy and monitoring programme on the base of their identified risk class, thus improving patient assignment and personalised management
Conclusion(s): In conclusion, the presented model suggests that using REMS technology to follow up with patients who have previously experienced fragility fractures would improve secondary prevention, optimise continuity of care, reduce fragility fractures and lower costs for the National Health Service.

P707

EVALUATION PAIN INTENSITY IN LUMBOSACRAL RADICULOPATHY BY INFRARED THERMOGRAPHY

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Objective: Lumbosacral radiculopathy is a pathological process characterized by spinal nerve root dysfunction that leads to abnormal changes in skin temperature of the affected lower extremity. The aim of this study is to examine the correlation between the values of the regional hyporthermia of the affected lower extremity and the intensity of pain in the patients with unilateral lumbosacral radiculopathy.
Material and Methods: The prospective randomized study included 75 outpatients with unilateral lumbosacral radiculopathy that were diagnosed by clinical and electromioneurographic examinations. The intensity of pain at rest as well as pain intensity during active movement of the lumbar spine was measured by visual analogue scale (VAS). Infrared thermovision camera (Varioscan high resolution 3021) recorded the symmetrical regions of interest in lower extremities (ROIs). Quantitative analysis of the obtained thermograms was calculated the values of the regional hyporthermia of the affected extremity (ΔT) as the temperature difference in mean value temperature ROI of unaffected and affected lower extremity. The correlation of the values of the regional hyporthermia with the intensity of pain was then determined.
Results: Significant and strong correlation was found between values of regional hyporthermia and pain intensity at rest (r=0,887; p<0.001), as well as pain intensity during active movement of the lumbar spine (r=0.890; p<0.001).
Conclusion: In patients with unilateral lumbosacral radiculopathy, the values of regional hyporthermia of the affected lower extremity are correlated with pain intensity.

P708

COMPARATIVE EFFECTIVENESS OF OSTEOPOROSIS TREATMENTS IN TYPE 2 DIABETES MELLITUS: POOR GLYCEMIC CONTROL ATTENUATES TREATMENT-RELATED BMD GAINS IN REAL-WORLD PRACTICE

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Objective: Type 2 Diabetes Mellitus (T2DM) is associated with an increased fracture risk independent of bone mineral density (BMD), and it is thought that its adverse effects on bone quality and microarchitecture

may influence the response to osteoporosis treatment. The aim of this study was to evaluate the effectiveness of anti-osteoporotic treatments on BMD in patients with T2DM and to compare treatment responses with non-diabetic patients and according to glycemic control levels.
Materials and Methods: In this single-center retrospective study, 420 patients with T2DM (68.4 ± 10.1 years; F/M: 376/44) and 438 non-diabetic patients (69.6 ± 9.2 years; F/M: 396/42) who were followed for osteoporosis were included. First- and second-year outcomes were analyzed for alendronate (A), zoledronic acid (ZA), and denosumab (Dmb), while first-year outcomes were analyzed for teriparatide (T) and romosozumab (Rb). Lumbar spine (L1–L4) and femoral neck BMD measured by dual-energy X-ray absorptiometry (DXA), as well as bone turnover markers, were evaluated. Patients with T2DM were further stratified into subgroups according to baseline HbA1c levels. Mann–Whitney U, Kruskal–Wallis, and Wilcoxon signed-rank tests were used for statistical analyses, and $p < 0.05$ was considered statistically significant.
Results: At the end of the first year, significant increases in L1–L4 and femoral neck BMD were observed under A, ZA, Dmb, and T treatments in both diabetic and non-diabetic groups compared with baseline. No significant difference was found between T2DM and non-diabetic groups in terms of treatment-related BMD percentage changes. In the T2DM group, increases in femoral neck BMD and T-scores were significantly lower in patients with HbA1c >8% compared with those with better glycemic control ($p = 0.033$ and $p = 0.007$, respectively). Among treatment-naive patients, vertebral BMD increase with ZA therapy was significantly higher than in those previously treated for osteoporosis ($p < 0.001$).
Conclusion: In this study, the presence of T2DM itself was not associated with a reduced response to osteoporosis treatment. However, poor glycemic control in patients with T2DM may negatively affect treatment response at the cortical bone level. These findings highlight the importance of considering glycemic control status, in addition to the presence of diabetes, when planning anti-osteoporotic treatment in patients with T2DM.

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RESPONSE TO OSTEOPOROSIS TREATMENT IN PATIENTS WITH CHRONIC KIDNEY DISEASE: A REAL-WORLD STUDY

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Objective : Chronic kidney disease (CKD) is associated with disturbances in bone metabolism and increased fracture risk, while evidence regarding the efficacy of osteoporosis treatments in this population is limited. This study aimed to evaluate the effects of alendronate, zoledronic acid, denosumab, and teriparatide on bone mineral density (BMD) in patients with and without CKD.
Materials and Methods: This retrospective study included 454 osteoporotic patients followed for at least one year. Of these, 170 had CKD (mean age 72.2 ± 11.1 years; female/male: 135/35) and 284 had normal renal function (mean age 71.0 ± 8.9 years; female/male: 258/26). CKD stages were classified according to estimated glomerular filtration rate as stage 1 (n=12), stage 2 (n=44), stage 3a (n=63), stage 3b (n=41), stage 4 (n=4), and stage 5 (n=8). In the CKD group, 44 patients received alendronate, 36 zoledronic acid, 82 denosumab, and 8 teriparatide; in the non-CKD group, 60 received alendronate, 64 zoledronic acid, 144 denosumab, and 24 teriparatide. Due to the limited number of patients with CKD stages 4–5, analyses by CKD stage were restricted to stages 1–3b; however, comparisons between treatment modalities were performed in the overall CKD cohort. Lumbar spine (L1–L4) and femoral neck BMD values at baseline and after one year were obtained from medical records. Appropriate parametric or non-parametric tests were used, and $p < 0.05$ was considered statistically significant.
Results: Baseline lumbar spine BMD was higher in the CKD group compared with controls (0.911 ± 0.143 vs. 0.857 ± 0.140; $p<0.001$), whereas baseline femoral neck BMD was lower in patients with CKD (0.726 ± 0.112 vs. 0.749 ± 0.119; $p=0.01$). After one year of treatment, changes in BMD at both the lumbar spine and femoral neck were similar between CKD and non-CKD groups. Treatment response did not differ significantly across CKD stages (1–3b). Among patients with CKD, no significant differences in BMD gains were observed between alendronate, zoledronic acid, denosumab, and teriparatide.
Conclusion : In this real-world cohort, patients with CKD showed comparable BMD responses to osteoporosis treatment as those with normal renal function. Treatment efficacy was not influenced by CKD stage, and commonly used anti-osteoporotic agents demonstrated similar effectiveness in the CKD population. These findings support the use of standard osteoporosis therapies in appropriately selected patients with CKD, although prospective studies with fracture outcomes are warranted.

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CALCIFEDIOL INFLUENCES THE PROLIFERATION AND MYOGENIC DIFFERENTIATION OF HUMAN SKELETAL MUSCLE SATELLITE CELLS: AN IN VITRO STUDY

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Introduction: Calcifediol is the primary circulating precursor to the biologically active form of Vitamin D (VitD). VitD has emerged as an important regulator of skeletal muscle physiology. However, the direct effects of calcifediol on human satellite cells (SCs) remain poorly characterized. The aim of this study was to investigate the effects of calcifediol on the proliferation and myogenic differentiation of human SCs.
Materials and methods: SCs were isolated from skeletal muscle biopsies obtained from three healthy adult volunteers after signing an informed consent form approved by the Local Ethics Committee. Primary SC lines were established and characterized through cellular and molecular biology analyses. Cells were treated with three concentrations of calcifediol (10^{-5}-10^{-7} M). Cell viability after 48 hours was evaluated using an MTS assay and acridine orange staining. Cell proliferation was analyzed after 3, 6, and 9 days of treatment. Myogenic differentiation was evaluated by quantifying myogenic marker expression using TaqMan technology. In addition, the effects of calcifediol on the expression of cell cycle–related genes (*PLK1* and *CCND1*) and on apoptosis were investigated.
Results: Three primary SC lines were established from muscle biopsies

and displayed a confirmed stem cell phenotype. Treatment with calcifediol did not significantly affect SCs' viability at any concentration tested. In contrast, calcifediol significantly reduced SCs proliferation compared with untreated controls. This antiproliferative effect was accompanied by a marked increase in the expression of *Myogenic Regulatory Factors*, *Desmin*, *Myosin Heavy Chain* (indicating enhanced myogenic differentiation), and the *VDR* during myogenic differentiation. To explore the molecular mechanisms underlying these effects, cell cycle regulation and apoptosis were assessed. Calcifediol treatment resulted in a significant downregulation of *PLK1* and *CCND1* expression, while no changes in apoptosis were observed.
Conclusions: These findings suggest that calcifediol directly influences human skeletal muscle cells. The reduction in SCs proliferation appears to be mediated by cell cycle regulation rather than apoptosis. These results support a role for calcifediol in skeletal muscle biology and provide a foundation for future studies aimed at elucidating the cellular and molecular mechanisms through which VitD metabolites regulate muscle regeneration.
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P711

EFFECT OF FIBROBLAST GROWTH FACTOR 23 ON THE PROLIFERATION AND MYOGENIC DIFFERENTIATION OF SATELLITE CELLS ISOLATED FROM HUMAN SKELETAL MUSCLE BIOPSIES

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Introduction: X-linked hypophosphataemia (XLH) is a rare inherited musculoskeletal disorder caused by inactivating mutations in the *PHEX* gene. These mutations lead to elevated circulating levels of Fibroblast Growth Factor 23 (FGF23), resulting in chronic hypophosphataemia and hypophosphataemic rickets, of which XLH represents the most common genetic form. In addition to its well-established effects on bone metabolism, XLH is frequently associated with muscle weakness and reduced physical performance. However, the direct effects of FGF23 on skeletal muscle cells remain poorly understood. The aim of this study was to evaluate the impact of different concentrations of FGF23 on proliferation and myogenic differentiation in an *in vitro* model of human skeletal muscle satellite cells (SCs).
Materials and methods: SCs were isolated from skeletal muscle biopsies obtained from three healthy adult volunteers. Primary SC lines were established and characterized for stem cell identity using molecular and cellular biology analysis. Cells were treated with FGF23 at three different concentrations (1, 10, and 100 ng/mL). Cell proliferation was evaluated by bromodeoxyuridine incorporation, and myogenic differentiation was assessed by TaqMan analysis of myogenic marker expression. The expression of *FGF23 receptors* and the co-receptor *α-KLOTHO* was investigated under the same experimental conditions.
Results: All primary SC lines displayed a confirmed stem cell phenotype. Treatment with FGF23 for 48 hours did not induce significant changes in SC proliferation compared with untreated controls, suggesting that FGF23 does not affect cell proliferation under these experimental conditions. In contrast, FGF23 treatment resulted in a significant reduction in the expression of *Myogenic Regulatory Factors*, *Desmin*, *Irisin*, *Myostatin*, and *Myosin Heavy Chain* at 24 and 48 hours. Notably, a concomitant downregulation of *FGF23 receptor* expression and *α-KLOTHO* was also observed compared with untreated SCs.
Conclusions: This study provides the first evidence that FGF23 negatively modulates myogenic differentiation in human skeletal muscle SCs without affecting their proliferative capacity. These findings suggest a direct role for FGF23 in impairing muscle differentiation and may help explain the muscle dysfunction commonly observed in patients with XLH.
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P712

EXPERIENCE OF A MULTIDISCIPLINARY CLINIC WITH ULTRASOUND SUPPORT IN HAND AND ELBOW MUSCULOSKELETAL PATHOLOGY

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Background
Musculoskeletal disorders of the hand and elbow represent a frequent reason for referral to Rheumatology, Orthopaedic Surgery and Rehabilitation, with often overlapping etiologies that complicate diagnosis and lead to multiple consultations, complementary tests, and treatments.
Objective: To evaluate the usefulness of a multidisciplinary clinic with ultrasound support aimed at optimizing diagnostic and therapeutic efficiency.
Materials and Methods
A prospective study was conducted including all patients referred to the multidisciplinary unit between April 2024 and November 2025. Ultrasound assessment was performed, and clinical data were collected, including age, sex, referring service, previous diagnosis, ultrasound findings, secondary diagnostic or therapeutic changes, follow-up by specialty and therapeutic decision.
Results
Seventy-eight patients were evaluated, of whom 62.82% were women. The mean age was 53.75 ± 14.22 years. The main reasons for consultation were: symptoms or clinical manifestations (pain/paresthesia/swelling/functional limitation) in 24 patients (30.76%); completion of diagnostic evaluation of previously diagnosed conditions (degenerative arthropathies, De Quervain tenosynovitis, post-traumatic lesions) in 28 patients (35.89%); neuropathies in 11 patients (13.92%); tendon injuries in 9 patients (11.39%) and miscellaneous conditions in 6 patients (7.79%). The specialty with the highest number of referrals was Orthopaedic Surgery, with 31 patients.
A diagnostic change was generated in 69.23% of patients after the multidisciplinary consultation. Eight patients were diagnosed with inflammatory arthropathy, including 2 with psoriatic arthritis, 3 with rheumatoid arthritis, 3 with calcium pyrophosphate deposition disease and 5 with other rheumatologic conditions.
Among the evaluated patients, 9 underwent surgical intervention, 11 received ultrasound-guided injections, 15 received rehabilitative treatment and additional diagnostic studies for rheumatologic pathology were requested in 15 patients.
Conclusion
The multidisciplinary hand and elbow clinic represents a highly efficient care model, particularly when supported by musculoskeletal ultrasound. It enhances diagnostic accuracy, optimizes clinical decision-making from

the perspective of each specialty and improves patient management by reducing reconsultations, duplication of diagnostic tests and unnecessary procedures. Future studies should assess its pharmaco-economic impact and its effect on reducing waiting times.

P713

REPEATED ROMOSOZUMAB TREATMENT IN SEVERE OSTEOPOROSIS: A 10-YEAR CASE HISTORY WITH MULTIPLE FRACTURES AND COMPLEX THERAPY SEQUENCING

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Objective(s):
Romosozumab is approved as an osteoanabolic therapy for high-risk patients with severe osteoporosis, but data on repeated cycles are limited. We report a patient with multiple vertebral fractures and a complex disease course who received two cycles of romosozumab.

Material and Methods:
A woman, born 1953, first presented in 2014 after spontanous L3 and L4 fractures occured. Before her first visit she received denosumab from 2011–2013, which was stopped without follow-up therapy. She had severe osteoporosis (lumbar spine T-score -3.8). Laboratory evaluation showed the typical constellation of primary hyperparathyroidism with elevated PTH, hypercalcemia and hypophosphatemia. After resection of parathyroid adenoma she received Zoledronate from 2014–2018, stabilizing bone density and preventing new fractures. After therapy pause in 2018, bone density decreased by 2020.

Results:
In 2020, the first 12-month romosozumab cycle was given, followed by alendronate. Lumbar spine T-score improved from -3.3 to -2.6, hip values remained stable, and bone microarchitecture improved. No fractures occurred. After two years of alendronate, bone density stabilized, but in 2024, a slight decrease was seen (lumbar spine T-score -2.6 to -2.7; left hip -2.2 to -2.5; right hip -2.4 to -2.8). Due to persistent osteoporosis and prior fractures, a second romosozumab cycle was started. 2 months after beginning a metatarsal stress fracture occurred, but the patient remained otherwise stable. Bone density improved again (lumbar spine T-score -2.7 to -2.0). Laboratory parameters remained normal.

Conclusion(s):
This case shows that repeated romosozumab cycles can be effective and safe in severe osteoporosis with multiple prior therapies. The patient benefited from both cycles with increased bone density. Without the consistent repeated administration of romosozumab, further, possibly more serious fractures would likely have occurred, given the continuing high-risk situation. Sequential therapy planning is essential, especially after denosumab discontinuation due to rebound risk. Further data on repeated romosozumab use are needed.

P714

REAL-WORLD USE, EFFECTIVENESS AND SAFETY OF OSTEOANABOLIC THERAPIES IN A TERTIARY HOSPITAL: EXPERIENCE WITH ROMOSOZUMAB AND ABALOPARATIDE

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Objective(s)
To describe clinical characteristics, densitometric outcomes, safety and treatment persistence in postmenopausal women treated with romosozumab or abaloparatide in real-world clinical practice.

Material and methods
Retrospective observational study in a tertiary hospital. Postmenopausal women with severe osteoporosis and very high fracture risk who initiated romosozumab or abaloparatide between May 2023 and December 2025 were included. Demographic data, prior osteoporosis treatments, densitometric changes assessed by standard dual-energy X-ray absorptiometry (DXA), fractures, major adverse cardiovascular events and reasons for treatment discontinuation were collected.

Results
Ninety-five patients were included (100% women): 62 received romosozumab and 33 abaloparatide. Mean age was 65 +/- 8.0 years in the romosozumab group and 69 +/- 9.6 years in the abaloparatide group; hypertension was more frequent in the abaloparatide group.
In the romosozumab group, 41/62 patients (66.1%) had available pre- and post-treatment DXA after 12 months. Mean change in T-score was +0.96 +/- 0.69 at the lumbar spine and +0.29 +/- 0.48 at the femoral neck, corresponding to mean bone mineral density increases of +0.17 ± 0,18 g/cm2 and +0.05 ± 0,08 g/cm2, respectively. Lumbar spine T-score improvement of at least 0.5 was achieved in 80.5% and of at least 1.0 in 39.0%. No fractures occurred during treatment; one traumatic fracture was recorded after treatment completion. No major cardiovascular events were observed. Treatment discontinuation occurred in 3.3%.
In the abaloparatide group, 3/33 patients (9.1%) completed the planned 18-month treatment. Post-treatment DXA was available in one patient only, precluding aggregated densitometric analysis. Treatment discontinuation occurred in 26.9%, mainly due to neurovegetative or cardioperceptive adverse effects. No major cardiovascular events were recorded.

Conclusion(s)
In real-world clinical practice, romosozumab and abaloparatide were prescribed to patients with different clinical profiles. Romosozumab was associated with clinically relevant densitometric improvements and high treatment persistence, whereas tolerability was the main limiting factor for abaloparatide.

P715

CASE REPORT WITH OSTEOPOROSIS IN A 35-YEAR-OLD FEMALE PATIENT WITH ARTIFICIALLY INDUCED MENOPAUSE

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Introduction:
Osteoporosis is a chronic metabolic bone disease characterized by reduced bone mineral density and impaired bone microarchitecture, leading to an increased risk of fractures. Although it is most commonly associated with the postmenopausal period, osteoporosis can also develop in younger women, particularly in cases of premature or surgically induced menopause. The abrupt loss of estrogen plays a key role in accelerated bone loss, which may result in the early onset of severe clinical manifestations of the disease.

Case Presentation:
We present a 35-year-old female patient who developed advanced osteoporosis following surgically induced menopause after bilateral oophorectomy. The patient presented with progressive thoracolumbar back pain, fatigue, and a subjective reduction in body height. Her medical history revealed no previous osteoporotic fractures and no positive family history of osteoporosis.
Dual-energy X-ray absorptiometry (DXA) revealed markedly reduced bone mineral density values at the lumbar spine and hip, with T-score values consistent with severe osteoporosis. Radiological examination of the spine confirmed the presence of vertebral compression fractures. Laboratory evaluation, including parameters of calcium metabolism, vitamin D levels, parathyroid hormone, and thyroid function tests, excluded secondary causes of osteoporosis.

Therapeutic Approach:
Following the diagnosis, intensive treatment was initiated, including the use of antiresorptive and/or osteoanabolic agents, along with mandatory supplementation with calcium and vitamin D. Non-pharmacological measures were also recommended, including tailored physical activity, modification of risk factors, and education on fall prevention. The option of hormone replacement therapy was considered in accordance with current clinical guidelines and the patient's individual risk profile.

Discussion:
This case highlights the severity and rapid progression of osteoporosis in patients with surgically induced menopause at a young age. Estrogen deficiency leads to an imbalance between bone resorption and formation, resulting in accelerated bone loss and an increased risk of fractures. Early identification of at-risk patients and a multidisciplinary therapeutic approach are essential to prevent serious complications.

Conclusion:
Surgically induced menopause at a young age represents a significant risk factor for the development of advanced osteoporosis. This case underscores the importance of timely screening, continuous monitoring, and individualized treatment strategies to reduce fracture risk and preserve quality of life.

P716

INFLUENCE OF MUSCLE STRENGTH AND BALANCE ON FUNCTIONAL PERFORMANCE IN POSTMENOPAUSAL OSTEOPOROSIS WOMEN

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Objective: The purpose of this study was to evaluate muscle strength and balance in postmenopausal osteoporosis women and to correlate them with the functional performance.
Methods: 53 postmenopausal women (58.2 ± 5.9 years) diagnosed with osteoporosis were included in this cross-sectional study. The weight, height, age at menopause were registered in all patients. Osteoporosis was established by bone mineral density measurement, performed at the lumbar spine (L2-L4) and at the femoral neck and total hip, by the dual-energy X-ray absorbtiometry method. Knee extensor strength was assessed by the isokinetic method at the angular velocity of 120°/s, using a Gymnex Iso 2 Dynamometer. Balance was evaluated by Berg Balance Scale (BBS). Timed up-and-go (TUG) test, chair rising test (CRT) and 6-minute walk (6MW) test were used to assess functional performance. The analyses of the relationship between muscle strength, balance and functional performance parameters was based on Pearson's correlation coefficients, with significance set at $p<0.05$.
Results: Knee extensor strength positively correlated with CRT ($r=0.392$, $p<0.05$) and 6MW test ($r=0.466$, $p<0.05$), and negatively with TUG score ($r=-0.389$, $p<0.05$). Balance (BBS) also positively correlated with CRT ($r=0.287$, $p<0.05$) and 6MW test ($r=0.325$, $p<0.05$), and negatively with TUG score ($r=-0.273$, $p<0.05$). BBS score positively correlated with knee extensor strength ($r=0.517$, $p<0.05$).
Conclusions: Muscle strength and balance significantly correlated with the functional performance in postmenopausal osteoporosis women. These results suggest the importance of physical exercise in these patients, in which the rehabilitation programs should emphasize balance training and muscle strengthening, in order to improve functionality.

P717

ARE THERE DIFFERENCES IN BONE MINERAL DENSITY BETWEEN THE USE OF UPADACITINIB AND ADALIMUMAB?

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Introduction: The aim was to demonstrate differences in bone mineral density (BMD) between patients treated with adalimumab (ADA) and upadacitinib (UPA).
Materials and Methods: A total of 28 patients with rheumatoid arthritis were included, with 14 treated with ADA and 14 with UPA. Demographic

and osteodensitometric data were collected. Parameters were compared between the two groups.
Results: The mean age in the UPA group was 59.57±10.02 years, while in the ADA group it was 59.71±7.92 years. In the UPA group, 10 patients (71.4%) were female, compared to 9 patients (64.3%) in the ADA group. The mean BMD at L1–L4 was 1.034 vs. 0.947 g/cm^2, with mean T-scores of −1.25 vs. −2.09, respectively. The mean BMD at the left hip was 1.016 vs. 0.971 g/cm^2, with T-scores of −1.29 vs. −1.96. The mean BMD at the right hip was 1.016 vs. 0.959, with T-scores of −1.286 vs. −2.07 g/cm^2. Comparison between groups revealed statistically significant differences in all parameters ($p<0.05$), except for BMD of the left hip.
Conclusion: Age and sex distribution were similar between the two groups. However, patients treated with UPA had higher BMD values and more favorable T-scores at the lumbar spine and hips compared to those treated with ADA. Statistically significant differences were confirmed in all parameters except for BMD of the left hip, where the difference was not significant. These findings suggest a potentially more favorable effect of UPA on bone mass preservation.

P718

VITAMIN D LEVELS AND HIP FRACTURE SEVERITY AMONG ELDERLY DIABETIC PATIENTS WITH HIP FRACTURES WITH AND WITHOUT ADEQUATE GLYCAEMIC CONTROL

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Objectives: The purpose of this study is to identify differences in vitamin D (VD) levels and hip fracture severity among elderly diabetic patients with hip fractures, comparing those with and without adequate glycemic control.
Material and Methods: We retrospectively studied 65 elderly patients (>65 years old) with osteoporotic hip fractures and either impaired glycaemic control or known type 2 diabetes mellitus, treated between January 2021 and January 2022. Serum 25-hydroxy vitamin D (25OH Vit D) was measured using an automated enzymatic immunoassay. Hip fractures were classified as extracapsular (intertrochanteric) or intracapsular (subcapital). Severe subcapital fractures were defined as grades 3 or 4 according to the Garden classification, while severe intertrochanteric fractures were defined as grades A2.2, A2.3, and all A3 fractures according to the AO/OTA classification.
Results: Among the participants in our study, 45 (69.2%) had inadequately controlled HbA1c levels, with values over 6.5%, and 20 (30.8%) had adequately controlled levels, with values at or below 6.4%. Patients with poorly controlled T2DM had higher VD levels of 10.09 ± 4.93 ng/mL, higher PTH levels of 58.9 ± 49.99 ng/mL, and more unstable hip fractures (77.7%). In comparison, diabetic patients with adequate glycemic control had lower VD levels of 9.82 ± 5.57 ng/mL, lower PTH levels of 50.73 ± 34.01 ng/mL, and 70% had unstable hip fractures. No statistically significant differences were observed in fracture severity, VD, and PTH between the two groups, as indicated by p-values of 0.502, 0.844, and 0.507, respectively.
Conclusions: There is consensus that VD deficiency is closely related to T2DM, and based on our study, the differences in VD levels among diabetic patients, whether well controlled or not, are minimal. Hypovitaminosis D was severe regardless of glycemic control status. More notable differences were observed in PTH levels and hip fracture severity. Poor glycemic control was associated with more severe hip fractures and higher PTH levels. However, PTH levels in diabetic groups (with or without adequate control) were significantly lower compared to their non-diabetic counterparts (as shown in our completed study). Clinicians should be aware of the paradox identified in our study: low VD levels are not associated with elevated PTH in diabetic patients, and relatively elevated PTH may indicate poorly controlled type 2 diabetes mellitus (T2DM). Finally, a severe comminuted hip fracture in an elderly diabetic patient should prompt suspicion of poor glycemic control.

P719

PARAMETERS AFFECTING VITAMIN D LEVELS AND HIP FRACTURE SEVERITY AMONG ELDERLY DIABETIC PATIENTS WITH HIP FRACTURES

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Objectives: The purpose of this study is to identify parameters that affect vitamin D (VD) levels and hip fracture severity among elderly diabetic patients with hip fractures.
Material and Methods: We retrospectively studied 65 elderly patients (>65 years old) with osteoporotic hip fractures and impaired glycemic control or previously diagnosed type 2 diabetes mellitus, who were treated between January 2021 and January 2022. The 25-hydroxy vitamin D (25OH Vit D) level was measured using an automated enzymatic immunoassay. Hip fractures were classified as extracapsular (intertrochanteric) or intracapsular (subcapital). Severe subcapital fractures were defined as grades 3 or 4 according to the Garden classification, while severe intertrochanteric fractures were defined as grades A2.2, A2.3, and all A3 fractures according to the AO/OTA classification. The duration of diabetes mellitus, type of antidiabetic pharmaceutical therapy, and number of antidiabetic agents were examined as possible parameters affecting VD levels and hip fracture severity.
Results: Among the participants in our study, 60% (39 patients) were treated with antidiabetic pills, 6.2% (four patients) with insulin alone, 16.9% (11 patients) with a combination of pills and insulin, and 16.9% (11 patients) were newly diagnosed, with treatment determined by endocrinologists. Forty percent (26 patients) of diabetic patients were treated with only one antidiabetic agent, 43.1% (28 patients) with more than one pharmaceutical agent, and 16.9% (11 patients) were newly diagnosed. Most diabetic patients had T2DM for more than five years (63.07%, 41 patients), while 20% (13 patients) had T2DM for less than five years. According to the statistical analysis, VD levels and hip fracture severity were not significantly different. However, lower VD levels were

observed in newly diagnosed patients (VD 8.05 ± 4.33) and those receiving insulin monotherapy (VD 7.6 ± 2.6). These subgroups may have the poorest glycemic regulation. Diabetic patients with T2DM duration of less than five years experienced more severe hip fracture patterns (84.6% unstable fractures). Finally, patients who received oral antidiabetic drugs combined with insulin (90.9% unstable fractures) also had more comminuted fractures. It is important to note that these findings had no statistical significance.
Conclusions: There is consensus that VD deficiency is closely related to T2 diabetes mellitus, particularly in elderly patients with poorly controlled diabetes. Lower vitamin D levels are often associated with more severe fractures. However, the literature on this topic is limited, and further research is required. To date, no study has linked the prevalence of hip fracture severity to glycemic control in elderly diabetic patients, although diabetics have an increased incidence of hip fractures and higher mortality. Clinicians should note that the lowest VD levels were observed in newly diagnosed patients with T2 diabetes mellitus and those receiving insulin monotherapy; these subgroups may also have the poorest glycemic regulation. Hip fracture severity was more prevalent in patients with T2DM duration of less than five years (including newly diagnosed patients) and in those who received oral antidiabetic drugs in combined with insulin.

P720

BIOCHEMICAL PROFILES AND SURGICAL FINDINGS OF PATIENTS WITH ASYMPTOMATIC AND SYMPTOMATIC PRIMARY HYPERPARATHYROIDISM AT RIGA EAST UNIVERSITY HOSPITAL: A THREE-YEAR ANALYSIS (PART III)

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Objectives. With the increasing prevalence of routine biochemical screening, asymptomatic primary hyperparathyroidism (APHPT) has become more common. However, the factors contributing to this asymptomatic presentation are still not well understood, and many patients qualify for surgical intervention. This study aims to compare the clinical, biochemical, and surgical pathology characteristics of patients with APHPT to those who are symptomatic.
Materials and methods. This retrospective study involved 177 adult patients diagnosed with primary hyperparathyroidism between January 2021 and January 2024. Patients were categorised as either asymptomatic or symptomatic based on their clinical presentation. Clinical characteristics, biochemical parameters, and histopathological data were extracted from medical records and analysed for differences between the two groups.
Results. Among the 177 patients studied, 85 (48.0%) were APHPT. Within this group, 48 patients (56.5%) met at least one surgical criterion, with elevated calcium levels being the most common criterion. Asymptomatic patients tended to be younger, whereas symptomatic patients exhibited higher median concentrations of intact parathyroid hormone (iPTH) (>212 pg/mL;p=0.004) and lower glomerular filtration rates (GFR) (p=0.047). No significant differences were found in serum calcium or vitamin D concentrations between the groups. Factors associated with the asymptomatic group included being under 65 years of age (OR=0.52, CI 0.28–0.94;p=0.030) and having lower iPTH levels (<212 pg/mL; OR=0.54, CI 0.29-0.99;p=0.046). Conversely, a reduced GFR (<60 ml/min) was associated with an increased likelihood of symptomatic disease (OR=2.70, CI 1.00-7.29;p=0.043). Postoperative histopathological data were available for 113 patients, with 45 being asymptomatic and 68 symptomatic. The predominant finding in both groups was a single adenoma, identified in 106 patients (94.0%). In contrast, double adenomas (n=2;1.7%) and parathyroid hyperplasia (n=3;2.6%) were observed exclusively among symptomatic patients. Parathyroid carcinoma was identified in one patient from each group.
Conclusions. Over fifty per cent of asymptomatic patients met the criteria for surgical intervention. The biochemical disease burden and surgical pathology were similar across both groups, suggesting that the presence of symptoms does not necessarily correspond with the severity of the disease. This underscores the importance of timely evaluation and management for APHPT.

P721

ENVIRONMENTAL IMPACT OF A FRACTURE LIAISON SERVICE: A CARBON FOOTPRINT ANALYSIS

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Objectives: Fracture Liaison Service (FLS) exemplifies a proactive, integrated approach to fracture prevention and management, enhancing patient outcomes while ensuring quality, sustainability, and efficiency in healthcare. The objective of this study was to quantify the environmental impact of FLS consultations by converting patient travel distance into carbon footprint.
Materials and Methods: We conducted a retrospective review of all patients assessed by the Aneurin Bevan FLS (AB-FLS) over a three-year period (2022–2024). Data collected included patient demographics and travel distance from place of residence to the Bone Health Unit. Patients admitted with fragility fractures were excluded. For outpatients managed through the AB-FLS model, travel distance using Google Maps was calculated for the first consultation only. Carbon footprint was estimated by applying an emission factor of 0.4 kg CO per mile, based on a typical petrol passenger vehicle.
Results: Over three years, 6,477 patients with fragility fractures were assessed (mean age 78±10 years, range 50–105); 77.2% were female (n=4,999). Of these, 53.3% (n=3,451) were managed as outpatients. 755 patients excluded for missing data. Consequently, travel analysis was based on 2,696 patients attending a first consultation, with an expected total of 87,176 miles.
Miles avoided included telephone assessments for oral bone therapy (n=863; 27,104 miles), virtual management via general practitioners (n=39; 1,818 miles), discharge after initial assessment with GP follow-up (n=448; 14,016 miles), and patients declining further treatment (n=398; 13,108 miles). Total miles avoided for the first consultation were 56,046. Miles used for in-person parenteral treatments were 13,616 for denosumab (n=398), 4,068 for zoledronic acid (n=412), and 1,720 for

anabolic therapy (n=68). An additional 11,726 miles were incurred by 334 patients attending in-person bone health clinics. Total miles used for consultations and parenteral treatments were 31,130.
Overall, net miles avoided were 24,916 over three years, corresponding to 9,966 kg of CO emissions avoided, demonstrating a net carbon-negative impact of the service
Conclusion: Over the past three years, the AB-FLS has consistently identified increasing numbers of patients while maintaining a net carbon-negative impact. By reducing unnecessary patient travel through telephone-based assessments, the service lowers the environmental burden associated with traditional hospital visits.

P722

CLINICAL OUTCOMES OF A FRACTURE LIAISON SERVICES: A COMPARISON OF PATIENTS AGED <80 AND ≥80 YEARS

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Objectives: Fracture Liaison Services (FLS) aim to prevent secondary fractures by ensuring quality care for patients over 50. This study assesses clinical outcomes in an existing FLS for patients above and below 80 years and evaluates re-fracture and mortality outcomes.
Methods and materials: We retrospectively reviewed 5320 patients seen by Aneurin Bevan FLS (AB-FLS) from January 2022 to June 2024 using national FLS Database (FLS-DB) data. Patients were categorized as: below 80 and above 80 years. Data on previous fractures, re-fractures were collected. Patients were followed until December 31, 2025, for re-fractures and mortality.
Results: The cohort's mean age was 78.4 years (range 50–105) with a marked female predominance (77.9%, p<0.0001). Nearly half of patients had a prior fracture history (49.1%, n=2,608), with a mean interval of 6 years (range 0–36). Most patients lived in the community (94.4%), while 5.6% resided in care homes.
The AB-FLS reviewed 2,797 patients aged 50–80 years (52.6%) and 2,523 patients aged over 80 years (47.4%). Female representation was significantly higher in the under-80 group (52.5%, n=2,177/4,145) and lower in those aged over 80 (47.5%, n=1,968/4,145; p<0.001). Osteoporosis treatment was initiated in 65.5% of patients (n=3,485/5,320).
Over a four-year follow-up period, 82.4% of patients (n=4,386/5,320) experienced no re-fractures. Overall, 17.6% (n=931/5,320) sustained a re-fracture, with a mean time to event of 301 days (range 2–1,088 days). Re-fracture rates were significantly higher in patients aged over 80 years compared with those under 80 (9.5%, n=498 vs 8.1%, n=433, p=0.01), and occurred earlier (mean 278 vs 328 days).
At 12 months, 11.1% of patients (n=593/5,320) had re-fractured, with higher rates in the over-80 group (6.2%, n=330; mean 137 days) compared with the under-80 group (4.9%, n=263; mean 152 days; p=0.004).
One-year mortality was significantly higher in patients aged over 80 years (11.9%, n=633) compared with those under 80 (4.5%, n=239; p<0.0001). By four years, 23.7% of the cohort had died (n=1,259), with mortality remaining significantly higher in the over-80 group (17.1%, n=909) than in the under-80 group (n=350; p<0.0001).
Conclusion: The AB-FLS has demonstrated equitable care over the consecutive 2.5 years; however, further assessment over a longer timeframe is needed for confirmation. Given the significantly higher risk of re-fracture and mortality in older patients, secondary fracture services should be tailored to better address the needs of this population, ensuring true equity in healthcare delivery.

P723

PRUDENT USE OF ANABOLIC TREATMENT FOR VERY-HIGH RISK FRAGILITY FRACTURE PATIENTS: SINGLE-CENTRE REAL-WORLD DATA.

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Objective**:** The objective of this study was to quantify imminent fracture risk before and after commencing anabolic agents.
Materials and Methods: We conducted a retrospective review of all patients who were commenced anabolic therapy between 2023 and 2025. The study was done at a single centre, the Aneurin Bevan Fracture Liaison Service (AB-FLS). Data collected included patient demographics, fracture type, bone mineral density (T-scores), biochemical markers (serum calcium, alkaline phosphatase (ALP), and 25-hydroxyvitamin D), and average duration of anabolic therapy received. Re-fracture events following the index fracture were recorded both before and after commencement of anabolic therapy.
Results: 168 patients received anabolic drugs (Abaloparatide=56; Romosozumab=60; Teriparatide=52), average age was 70±6.9 years. Nine patients received Abaloparatide for primary fracture prevention.
The average t-scores for spine and femur were -3.1 (-0.1 to −5.5) and -2.7 (-0.3 to −4.6) respectively. Mean Calcium=2.4 (1.31–2.67); ALP=94.2 (44–318); eGFR=70.6 (25–90); PTH=5.7 (1.8–13.1); and Vitamin D was 90.6 (15–281).
The average duration since treatment initiation was 97 days (10-249) for Abaloparatide, 383 days (49-802) for Romosozumab, and 141 days (7-271) for Teriparatide.
No imminent fractures occurred in patients receiving Abaloparatide either before or after treatment initiation. Prior to anabolic therapy, seven imminent fractures occurred in the Romosozumab group, with a mean time of 141 days before treatment initiation (07 to 277 days), and three imminent fractures occurred in the Teriparatide group, with a mean of 117 days before treatment initiation (55 to 231 days).
Following initiation of anabolic therapy, one imminent fracture occurred in the Romosozumab group at 160 days, and two occurred in the Teriparatide group at a mean of 130 days (70–189 days).
Conclusion: In this single-centre cohort of very high–risk patients, 5.9% sustained an imminent fracture while awaiting initiation of anabolic therapy, occurring at a mean of 129 days, and a further 1.8% experienced re-fracture after treatment commencement, at a mean of 145 days. These findings support prudent and timely identification of very high-risk patients and minimising delays in initiating anabolic therapy through targeted quality improvement initiatives.

P724

THE BURDEN OF RARE GENE VARIANTS ASSOCIATED WITH LOW BONE MASS AND DYSLIPIDEMIA IN THE DEVELOPMENT OF COMBINED PATHOLOGY OF THE BONE AND CARDIOVASCULAR SYSTEMS IN WOMEN

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Objective: To estimate the relationship of rare gene variants associated with low bone mineral density (BMD) and dyslipidemia with a combination of osteopenic syndrome (OPS) and subclinical atherosclerosis (AS) in women.

Methods: Targeted sequencing of whole blood samples from 308 peri- and postmenopausal women aged 45-82 years was performed. Rare gene variants associated with monogenic diseases with low BMD (*BMP1, COL1A1, COL1A2, ALPL, ENPP1, SLC34A1, LRP5, WNT1, FBN1, TGFBR2, LMNA, NOTCH2, PLS3*) and with monogenic dyslipidemia and AS (*LDLR, APOE*), were selected, which are combined and summarized according to the principle of entry into the gene's networks (integral genetic factors: E-ECM, E-MIN, E-WNT, E-TGFB, E-OTHER, E-ALL, E-ATHER). Carotid ultrasound, multispiral computed tomography, and dual-energy X-ray absorptiometry were performed.

Results: In the group of women with a combination of signs of subclinical AS and OPS (presence of at least one atherosclerotic plaques and/or Agatston calcium index ≥1 unit and low BMD) variants of the *SLC34A1* gene (0% vs 7.2%, p=0.008) and variants from three groups of genes E-ALL (9.7% vs 24.8%, p=0.047), E-MIN (0% vs 9.2%, p=0.003), E-TGFB (0% vs 4.6%, p=0.033) were significantly more frequent compared to the group without this combination of signs. In the single-factor analysis, E-ALL increased the chance of detecting a combined pathology by 3.2 times (95%CI, 1.04-9.07). The risk ratio for *SLC34A1* was 1.2 (95%CI, 1.12-1.28), for E-MIN – 1.2 (95%CI, 1.12-1.29), for E-TGFB – 1.2 (95%CI, 1.12-1.27). In the multivariate regression analysis (adjusted for age ≥55 years, body mass index <20 kg/m^2, intima-media complex thickness ≥0.9 mm, total cholesterol ≥5.0 mmol/l, bone resorption marker CTx >1,008 ng/ml, SCORE ≥1%, FRAX ≥7% for the main fractures and FRAX ≥0.3% for hip fracture), the independent role of none of the studied genetic integral factors in the development of combined pathology has not been confirmed.

Conclusion: A clear trend towards an increased frequency of integral genetic factors, representing the sum of rare gene variants associated with monogenic diseases with low BMD, was observed in patients with a combination of AS and OPS, but did not reach statistical significance, likely due to insufficient sample size or the predominance of clinical risk factors.

P725

JUVENILE IDIOPATHIC ARTHRITIS AND ORAL HEALTH: AN UNDERESTIMATED LINK ?

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Objective:
to evaluate the prevalence of poor oral health in patients with JIA and its associated factors
Methods:
We conducted a cross-sectional study involving patients diagnosed with JIA according to the 2001 criteria of the International League of Associations for Rheumatology (ILAR). For each patient, demographic and disease-related data were collected, including age, sex, disease duration, erythrocyte sedimentation rate (ESR), C-reactive protein (CRP) levels, and disease activity measured using the JADAS10-ESR score. Poor oral health was defined by a history of dental caries or the presence of dental plaques on examination.
Results:
Thirty-two patients were included in the study (15 boys and 17 girls), with a mean age of 12.7 ± 4.9 years. The mean disease duration was 4.3 ± 4.3 years. JIA most represented subtypes were as follows: Enthesitis-related arthritis (ERA): 31.3% (n = 10), Polyarticular JIA: 25% (n = 8), Systemic JIA and Oligoarticular JIA in 15% of cases each (n = 5). The mean ESR and CRP levels were 29.1±27.9 mm/h and 23.6±28.6 mg/L, respectively. The mean JADAS10-ESR score was 12.6 ± 6.7.
A history of dental caries was reported in 46.9% of patients (n = 15). On examination, 11 patients had dental plaque.
Patients with poor oral health had higher ESR and JADAS10-ESR scores (VS : 36.6±33.7 vs 19.8±11.9mm ; p=0.06 ;CRP : 29.5±33.8 vs 15.6±18.4mg/L ; p=0.2 ; JADAS-10 VS : 13.9±7 vs 10.8±6.3 ; p=0.27).
However, poor oral health was significantly associated with higher parental visual analog scale (VAS) for pain (6.54 ±1.36 vs 4.62 ± 1.99, p = 0.04).
No statistically significant associations were found between poor oral health and sex, age at disease onset, disease duration, JIA subtype, or CRP levels.
Conclusion:
In our cohort of children with JIA, we found that dental caries are common , affecting half of the patients in this cohort. This result is consistent with findings in the literature [1]. Although disease activity was found to be higher in patients with poor oral health, this was not statistically significant in our study. Grevich et al. have shown that gingival inflammation may occur independently of oral hygiene, suggesting a possible link between gingivitis and JIA [2]
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P726

HYPERTROPHIC OSTEOARTHROPATHY REVEALING AN UNDERLYING MEDIASTINAL TUMOR: A CASE REPORT

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Hypertrophic osteoarthropathy (HOA) is an entity characterized by periostitis of long bones and digital clubbing. HOA can be primary, or secondary, associated mainly with lung disease(1).

A 49-year-old-woman with a history of hypothyroidism (post total-thyroidectomy for goiter) presented with inflammatory arthralgia in the four limbs alongside non-dermatomal cervical radiculopathy, all evolving for three months prior to consultation. On examination, a hypertrophic and swelling aspect of limbs, with digital clubbing were found. She had no synovitis of small joints and no palpable lymph nodes. The rest of the examination was unremarkable.

Blood analysis found a high protein-C-reactive level of 187 (reference range (RR)<5mg/L), anemia with hemoglobin level of 8g/dL (RR :12g/dL), hypoalbuminemia of 19 (RR :40g/L), elevated liver enzymes levels: alanine-aminotransferase of 55 (RR <35UI/L), alkaline phosphatase of 395 (RR <104UI/L), gamma-glutamyl transferase of 138 (RR <40UI/L). kidney function, corrected calcium levels and white blood count were normal.

Cervical X-ray showed signs of degenerative cervical disease. Chest X-ray showed superior and anterior mediastinal enlargement. Hands and feet x-rays showed signs of periostitis with hair-on-end aspect(fig1,2).

Body scan showed three cervical masses and an irregular, heterogeneous retrosternal mediastinal mass in contact with the aorta and carotid artery, measuring 47×57×92mm suggestive of a germ cell tumor(fig3) and two hepatic nodules. The periosteal reaction was found in the sternum, clavicles and scapulae.

HOA secondary to a mediastinal tumor was suspected. A biopsy of the cervical masses came back inconclusive.

The patient was treated with Non-Steroidal Anti-Inflammatory Drugs (NSAID) and a dose of zoledronic acid (4mg) with no clinical improvement of the arthralgia nor of the swelling.

A CT-guided biopsy of the mediastinal mass was planned but the patient developed respiratory deterioration with acute multiorgan failure and died before further diagnostic procedures could be performed.

Conclusion :

HOA can have a rheumatological presentation with arthralgia or arthritis of the extremities and digital clubbing. HOA can be paraneoplastic and should be considered even in young patients, as it may be the revelation of a life-threatening underlying malignancy. Treatment consists mainly in that of the underlying condition. Symptomatic management includes NSAIDs, low steroid doses and bisphosphonate (2,3).

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fig2: feet x-ray showing signs of periostitis (hair-on-end) on small and long bones



fig1: hands x-ray showing periostitis (hair-on-end) on small and long bones

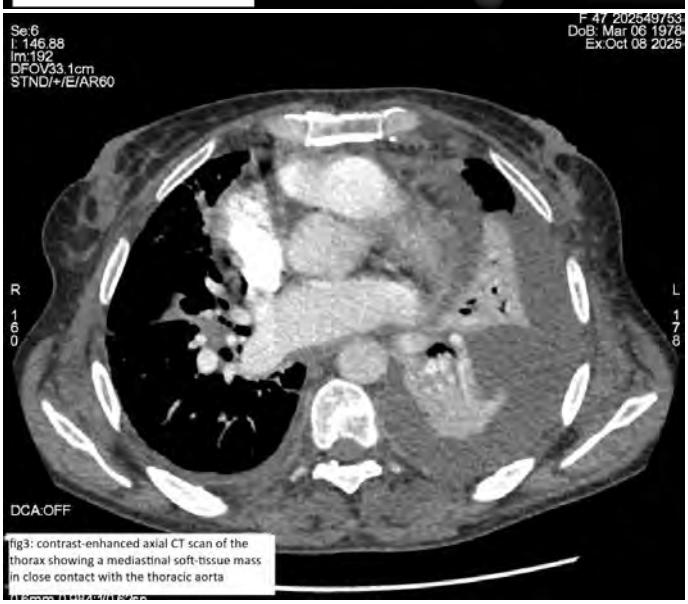


fig3: contrast-enhanced axial CT scan of the thorax showing a mediastinal soft-tissue mass in close contact with the thoracic aorta

P727

DECREASED BONE MINERAL DENSITY IN YOUNG MALE PATIENTS WITH SPONDYLOARTHRITIS: FOCUS ON THE ASSOCIATED FACTORS

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Objective
To evaluate bone mineral density (BMD) in young men patients with spondyloarthritis (SpA) and
identify the factors associated with its decrease.
Methods
A monocentric retrospective study was conducted, including male patients under 50 years of age
With SpA. Collected data: SpA phenotypes, ongoing treatments (non-steroidal anti-inflammatory drugs (NSAIDs) and/or biologics), erythrocyte sedimentation rate (ESR), C-reactive protein (CRP) levels, and disease activity scores: Ankylosing Spondylitis Disease Activity Score-ESR/CRP (ASDAS-ESR, ASDAS-CRP) and Bath Ankylosing Spondylitis Disease Activity Index (BASDAI).BMD was measured using dual-energy X-ray absorptiometry (DXA) at the anteroposterior lumbar spine (LS) and femoral necks (FN). Bone mass (BM) was expressed in g/cm², and Z-scores were expressed as standard deviations (SD). Decreased BMD was defined as a Z-score below -2 SD. A history of low-energy fractures was noted.
Results:
We included 30 male patients younger than 50 years with a mean age of 39.2 ± 8.7 years. SpA was axial and radiographic in 29 patients, and peripheral in 25 patients (articular and entheseal involvement were found in 23 and 8 patients, respectively). NSAIDs were used by 28 patients, and 11 patients were on biologics. The mean CRP level was 18.8 ± 16.6 mg/L, and the mean ESR was 30.6 ± 28.34 mm/h.
The mean ASDAS-CRP, ASDAS-ESR, and BASDAI scores were 3.3 ± 0.8, 2.8 ± 1.0, and 4.1 ± 2.1, respectively.
Eleven patients had a decreased BMD and none of them had a personal history of low-energy fractures. The mean LS Z-score and BM were -1.1 ± 1.3 SD ([-3.4,1.8]) and 1.0 ± 0.2 g/cm² ([0.5,1.4]), respectively. The mean FN Z-score and BM were -0.8 ± 1.0 SD ([-2.5,0.6]) and 0.9 ± 0.2 g/cm²([0.6,1.2]), respectively.
No association was observed between peripheral SpA and decreased Z-scores at the FN (-1±1 vs -0.2±0.5ds, p=0.1), nor with BM in the LS or FN (1.0 ± 0.2 g/cm² vs 1.1 ± 0.3 g/cm², p = 0.60, and 0.9 ±0.2 g/cm² vs 1.0 ± 0.1 g/cm², p = 0.22), respectively.
Decreased BMD was not associated with high ESR nor ASDAS-ESR levels (40.2 ± 32.1 mm/h vs. 25.6 ± 25.6 mm/h, p = 0.65 and 2.9 ± 1 vs. 2.7 ± 1, p = 0.73, respectively).
Patients on biologics had lower Z-score in both LS and FN, with no statistically significant association (-1.5±1.1SD vs -0.8±1.3SD, p=0.43 and -1.1±1SD vs -0.6±0.9SD, p=0.93).
Conclusion:
A decrease in BMD was frequent in young male patients with SpA, particularly in those with a peripheral phenotype. No associations were found between BMD decrease and disease activity score. Other factors associated with this decrease in BMD should be investigated in young men with
SpA.

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IS THERE A CAUSE-AND-EFFECT CORRELATION BETWEEN FAT MASS AND BONE MINERAL DENSITY AMONG YOUNG MEN WITH SPONDYLOARTHRITIS?

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Objective : To assess the impact of fat mass distribution on bone mineral density (BMD) among young male patients with spondyloarthritis (SpA).

Methods: A retrospective study was conducted including male patients younger than 50 years diagnosed with SpA. Anthropometric data included weight, size and body mass index (BMI). Lean Mass (LM), Fat Mass (FM) and its gynoid and android distribution were assessed using dual-energy X-ray absorptiometry (DXA). BMD was measured at the anteroposterior lumbar spine (LS) and femoral necks (FN). Bone mass (BM) and Z-Scores were expressed in g/cm² and standard deviations (SD) respectively. Decreased BMD was defined as a Z-score below -2 SD.

Results: Thirty male patients younger than 50 years were included. The mean age was 39.2 ± 8.7 years. SpA was axial and radiographic in 29 patients and peripheral in 25 patients. The mean body weight and BMI were 70.3 ± 18.5 kg and 23.8 ± 6.11 kg/m², respectively. The mean FM and LM were 24.4±11.2% and 75.6±11.2%, respectively. The means for android and gynoid fat mass were: 38.9±9.9% and 33.8±8.1%, respectively.

Eleven patients had decreased BMD: the mean LS Z-score and BM were -1.1 ± 1.3 SD ([-3.4,1.8]) and 1.0 ± 0.2 g/cm² ([0.5,1.4]), respectively. The mean FN Z-score and BM were -0.8 ± 1.0 SD ([-2.5,0.6]) and 0.9 ± 0.2 g/cm² ([0.6,1.2]), respectively.

Decreased BMD was observed among a decreased weight (68±19.3kg vs 71.6±18.5kg, p=0.52), BMI (23.2±6.9kg/m2 vs 24.2±5.8kg/m2, p=0.61) and the decrease in FM (23.9±12.4% vs 24.7±11%, p=0.43). FM was not significantly correlated to BM in LS and FN (ρ=0.15, p=0.47 and ρ=0.51, p=0.017; respectively). Gynoid fat mass was not significantly correlated to BM in FN (ρ=0.29, p=0.31).

Conclusion: The WHO Adult BMI Classifications categorizes our population as having average normal weight [1]. A decreased in FM was found among one-third of young male patients with SpA and BMD. FM percentage and its distribution were not correlated with BMD. Larger-scale studies in this population, investigating whether adiposity has a protective effect, remain to be conducted.

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P729

DOES BODY COMPOSITION HAVE AN IMPACT ON DISEASE ACTIVITY IN YOUNG MALE PATIENTS WITH SPONDYLOARTHRITIS?

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Objective :
To assess the impact of body composition in fat mass and lean mass on disease activity in young male patients with spondyloarthritis (SpA).

Methods
A monocentric retrospective study was conducted, including male patients under the age of 50 years old diagnosed with SpA. Collected data: SpA phenotypes, ongoing treatments (non- steroidal anti-inflammatory drugs (NSAIDs) and/or biologics), erythrocyte sedimentation rate (ESR), C-reactive protein (CRP) levels, and disease activity scores: Ankylosing Spondylitis Disease Activity Score-ESR/CRP (ASDAS-ESR, ASDAS-CRP) and Bath Ankylosing Spondylitis Disease Activity Index(BASDAI). Anthropometric data included weight, size, and body mass index (BMI). Lean Mass (LM) and Fat Mass (FM), as well as their gynoid and android distribution were assessed using dual-energy X-ray absorptiometry (DXA).

Results:
Thirty male patients under the age of 50 were included in the study. The mean age was 39.2 ± 8.7 years. SpA was axial and radiographic in 29 patients. SpA was peripheral in 25 patients. The mean weight and BMI were 70.3 ± 18.5 kg and 23.8 ± 6.1 kg/m², respectively.
The mean FM and LM percentages were 24.4 ± 11.2% and 75.6 ± 11.2%, respectively. The mean percentages for android and gynoid FM were: 38.9 ± 9.9% and 33.8 ± 8.1%, respectively. Twenty-eight patients were treated with NSAIDs, and 11 patients with biologic therapy. The mean CRP and ESR levels were 18.8 ± 16.6 mg/L and 30.6 ± 28.34 mm/h, respectively. The mean ASDAS-CRP, ASDAS-ESR and BASDAI scores were 3.3 ± 0.8, 2.8 ± 1.0, and 4.1 ± 2.1, respectively.
FM was correlated to ESR levels and activity scores: ASDAS-CRP, ASDAS-ESR and BASDAI (ρ=-0.38, p=0.08; ρ=-0.54, p=0.01; ρ=-0.54, p=0.04; and ρ=-0.62, p=0.005).
LM was positively correlated with activity scores: ASDAS-CRP, ASDAS-ESR and BASDAI (ρ = 0.54, p =0.01; ρ = 0.54, p = 0.04; and ρ = 0.62, p = 0.005, respectively). LM was not correlated to ESR levels(ρ=0.38, p=0.08).
A statistically significant association was found between hip involvement and decreased FM (22 ±11.6% vs. 32.7 ± 3.6%, (p = 0.004)). No associations were found between hip involvement and gynoid FM nor android FM (32.9±9.3% vs 36.2±3.06%, (p=0.14); 36.9±10.4% vs 43.3±8.2, (p=0.72)respectively).
Peripheral SpA phenotype was associated to increased LM (77.3 ± 11.6% vs. 67.8 ± 3.9%, p = 0.01).

Conclusion
In young male patients with SpA, LM was associated with disease activity scores [1] and peripheral phenotype. Decreased FM was associated with Hip involvement. While another study [1] showed that the axial phenotype of SpA was associated with higher LM, ours did not find a similar result. Further multicentric researches are needed to evaluate these associations and their potential impact on therapeutic approaches.
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P730

CAN HIP INVOLVEMENT AND SPINE SYNDESMOPHYTES AFFECT BONE MINERAL DENSITY IN SPONDYLOARTHRITIS?

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Objective
To evaluate the impact of hip involvement and spinal syndesmophytes associated with spondyloarthritis (SpA) on bone mineral density (BMD).

Methods
A monocentric retrospective study was conducted including male patients younger than 50 years old, who met the diagnostic criteria for SpA. The collected data included SpA phenotype, presence of hip involvement (coxitis) or spinal syndesmophytes. Bone mineral density (BMD) was measured using dual-energy X-ray absorptiometry (DXA) at the anteroposterior lumbar spine (LS) and femoral necks (FN). Bone mass (BM) was expressed in g/cm² and Z-scores expressed as standard deviations (SD). Decreased BMD was defined as a Z-score below -2 SD.

Results:
We included 30 patients. The mean age was 39.2 ± 8.7 years. SpA was radiographic in 29 patients. Peripheral articular involvement was observed in 23 patients, and enthesitic involvement in 8patients. Hip involvement (coxitis) was noted in 23 patients, and syndesmophytes were identified in 16 patients.
Eleven patients had a decreased BMD (Z-score < -2 SD). The mean LS Z-score and BM were -1.1 ± 1.3SD (range -3.4 to 1.8) and 1.0 ± 0.2 g/cm² (range 0.5-1.4), respectively. The mean FN Z-score and BM were -0.8 ± 1.0 SD (range -2.5 to 0.6) and 0.9 ± 0.2 g/cm² (range 0.6-1.2), respectively. None of the patients had a personal history of low-energy fractures.

Analytical findings:
No significant association was found between hip involvement and decreased BMD in either LS or FN(1.0±0.2 g/cm³ vs 1.0±0.3 g/cm³, p=0.34; and 0.9±0.2 g/cm³ vs 1.0±0.1 g/cm³, p=0.22), nor with Z-scores in either LS or FN (-1.1±1.2 SD vs -1.0±1.5 SD, p=0.78; and -1.0±1.0 SD vs -0.3±0.5 SD, p=0.07).
Similarly, no significant association was found between syndesmophytes and BM in LS and FN (1.1 ±0.2 g/cm² vs. 1 ± 0.2 g/cm², p = 0.5; and 0.9 ± 0.1 g/cm² vs. 0.9 ± 0.2 g/cm², p = 0.37), nor with Z-scores in LS and FN (-0.6 ± 1.3 SD vs. -1.3 ± 0.9 SD, p = 0.23; and -0.7 ± 0.8 SD vs. -0.9 ± 1.1 SD, p =0.19).

Conclusion:
Decreased BMD was observed in one third of young male patients with SpA. No associations were found between structural changes and bone

mineral density. Despite the structural changes observed, a larger-scale study among young men would be necessary to better assess the factors associated with decreased bone mineral density.

P731

FEAR OF FALLING AMONG OLDER WOMEN LIVING IN THE COMMUNITY

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Objective
This study aimed to evaluate fear of falling, as psychological consequence, among elderly women living in the community.
Material and Methods
Women aged ≥60 years attending the National Osteoporosis Center for diagnostic or treatment purposes were included in the study. Data were collected via structured telephone interviews assessing falls and related outcomes over the preceding 12 months. Demographic and fall data were obtained using a study-specific questionnaire, while fear of falling was evaluated using the Falls Efficacy Scale International (FES-I).
Results
The study included 940 community-dwelling older women (mean age 73.7±5.9 years). Falls were reported by 361 participants (37.1%), with approximately one-third experiencing two or more falls within one year. Most fallers reported injuries, including bone fractures in 23.3% of investigated individuals. Fear of falling was reported by 75.4% of fallen women, the score of FES-I was 20.43±6.43. Women with fall related fracture more often reported fear of falling (OR = 4.94, p <0.0001). Fear of falling was reported by all women with hip or vertebral fractures and by 90.2% of women with wrist fracture. The moderate correlations between the number of falls and fear of falling (r=0.376; p<0,001) and between the number of falls and risk of falling (r=-0.357; p<0,001) were found.
Conclusions
Fear of falling was reported by approximately one-third of respondents who were included in the study. Three-quarters of those who have experienced falls reported fear of falling and nearly half of fallen individuals reported limitations in their daily activities.

P732

ANALYTICAL PERFORMANCE EVALUATION OF THE NEW DOUBLE-ANTIBODY SANDWICH MINDRAY TOTAL VITAMIN D ASSAY AND COMPARISON VERSUS LIQUID CHROMATOGRAPHY TANDEM MASS SPECTROMETRY AND COMMERCIAL IMMUOASSAYS

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Objectives: Vitamin D plays an important role in maintaining calcium and phosphorus homeostasis. Vitamin D deficiency may lead to skeletal problems such as rickets, osteomalacia, progressive bone loss and osteoporosis. As it has recently been implicated also in several non-skeletal diseases, requests for its measurement have increased exponentially. Assessment of vitamin D status by measurement of 25-hydroxyvitamin-D in most clinical laboratories is performed by immunoassays.
In this study we provide analytical evaluation of the new non-competitive chemiluminescent immunoassay from Mindray (Mindray total-Vitamin D-II). Its clinical performance was compared with two commercial competitive and one non-competitive chemiluminescent immunoassays against a Vitamin D standardization Program Traceable liquid chromatography-tandem mass spectrometry (LC-MSMS) using clinical samples from Greek volunteer donors.
Materials and Methods: Mindray Vitamin D-II stability of calibration, precision, linearity, recovery limits of blank, detection and quantification were assessed by standard protocols. For the method comparison 163 (serum and K_3-EDTA plasma) samples were obtained from healthy Greek donors. Correlation between methods was evaluated using Passing-Bablok and Bland-Altman analysis. Concordance correlation coefficient was calculated in order to evaluate the agreement between methods.
Results: Calibration proved to be stable for at least 30 days, precision measured with kit controls as well as with in-lab prepared serum pools was excellent showing CV's at all levels <4.00%. The assay is linear at least up to 83 ng/mL. The limit of quantification was found to be 2.49 ng/mL and mean recovery was found to be 105.07% (95%CI 102.74-177.40) Comparisons between serum and K_3EDTA plasma exhibited excellent correlation K_3EDTA=0.983XSerum+0.248 proving that both media can be used interchangeably with this assay. Comparison with the LC-MSMS showed excellent linear correlation (Mindray=0.982XLC-MSMS-2.303) and there was only a small negative bias (-2.3 ng/mL) that could be corrected with calibration as no proportional bias was detected in our comparisons (slope includes 1).
Conclusions: The Mindray total-vitamin D-II assay demonstrated very good analytical performance correlated well with LC-MSMS and compared well with other immunoassays supporting its use in routine clinical practice

P734

CLINICAL AND LABORATORY CHARACTERISTICS OF GOUT PHENOTYPES: ASSOCIATION OF INTESTINAL PERMEABILITY MARKERS WITH TOPHUS FORM OF THE DISEASE

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Objective: To evaluate the features of the identified clinical and pathogenetic clusters in patients with gout and to determine the frequency of the tophus form in the phenotype with impaired intestinal barrier function.
Materials and methods: Based on cluster analysis, patients were divided into groups depending on the level of inflammatory and metabolic markers. The frequency of tophus occurrence in the selected clusters is analyzed.
Results: Three different phenotypes were identified during theanalysis. Cluster 1 ("Phenotype with a permeable intestine", n=18) attracts special attention. Patients in this group are characterized by the highest levels of markers of impaired barrier function: the level of lipopolysaccharide-binding protein (LBP) was 26.1 [22.6; 30.7] ng/ml, zonulin — 74.7 [58.9; 120.1] ng/ml. High BMI (31.38 [30.64; 35.06] kg/m^2) and elevated transforming growth factor levels (6.32 [3.33; 30.5] ng/ml) were also noted. When analyzing the severity of the course, it was found that the frequency of tophus gout in cluster 1 is 44.4% (8 out of 18 patients). This indicates a significant contribution of endotoxinemia to the chronization of the process and the formation of tofuses. For comparison, Cluster 2 ("Metabolic") was also characterized by a high BMI (39.79 kg/m^2) and markers of vascular dysfunction (nitric oxide synthase 3: 6.6 ng/ml) and the highest bactericidal permeability-increasing protein level of 298 pg/ml [249; 367.2], but the presence of the tophus form of gout in this cluster did not detected. Cluster 3 ("Hyporesponders") demonstrated minimal metabolic dysfunction and presumably the lowest intestinal permeability (LBP 11.65 ng/ml) and the lowest BMI, while 14 out of 36 patients had tophus gout, which corresponds to 28% within this cluster.
Conclusion: The "permeable intestine" phenotype is associated not only with high levels of LBP and zonulin, but also with a high incidence of tophus gout (44.4%). This allows us to consider intestinal permeability correction as a potential target for the prevention of severe forms of gout.

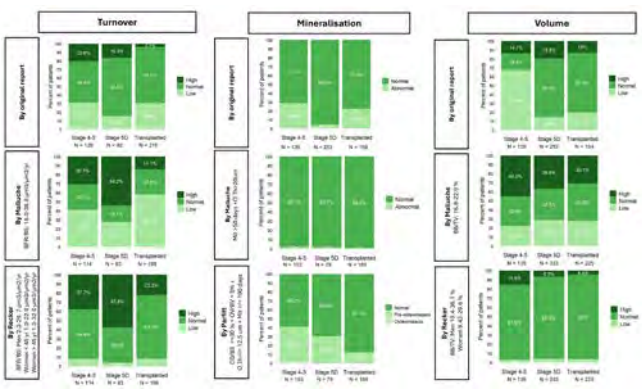
P735

THE LANDSCAPE OF RENAL OSTEODYSTROPHY IN EUROPE: A FIRST REPORT FROM THE EUROD BONE BIOPSY DATABASE

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Objective: Renal osteodystrophy (ROD) is a major complication of chronic kidney disease (CKD), yet its epidemiology is poorly defined due to the declining use of bone biopsy both in clinical practice and research. Earlier studies indicated a shift from high to low turnover bone disease in CKD[1], but the current spectrum of ROD is uncertain. This study reports from a multicenter bone biopsy database to address this knowledge gap.
Methods: Bone biopsies from 5 countries, collected between 1998 and 2025 were included. Biopsies were from patients across the spectrum of kidney dysfunction, including pre-dialysis, on dialysis, and after kidney transplantation. All centers reported the TMV classification for bone turnover (low, normal, high), mineralisation (normal, abnormal), and volume (low, normal, high). In addition, re-classification to common diagnostic definitions were performed using previously published cut-offs[2].
Results: A total of 851 bone biopsies were available. Of these, 155 were excluded (duplicates, incomplete registrations, or performed on clinical indication). The remaining 696 research-indication biopsies were stratified on CKD grade: Predialysis (CKDG4-5; n=135), on dialysis (CKDG5D, n=335), and post-transplant (TX, n=225). Median age at time of biopsy was 57 years, 32% were female, and 19% had diabetes mellitus. Antiosteoporosis medication was rarely used (CKDG4; 0%, CKDG5D: 2%, TX: 6%). TMV-classification showed high variation depending on cutoffs applied (**Fig** 1). By the original report, normal bone turnover was the most common presentation for all patients. For tetracycline-labeled biopsies (N=341) additional diagnostic definitions were applied. By the Malluche definition[1], the majority of patients in CKDG4-5 and CKDG5D had high bone turnover. This was also the case with the Recker definition[3,4], which labeled all patients as either high or normal bone turnover. Bone mineralization defects were reported for a notable proportion of patients in CKDG4-5, as well as TX
Conclusion: The presentation of ROD was mainly normal to high bone turnover in bone biopsies performed in research context over the past two decades in Europe. Contrary to previous reports, low bone turnover was not dominant. Classification was highly variable depending on diagnostic cutoffs applied, and further efforts should be directed at harmonizing diagnostic criteria. The presence of abnormal bone mineralisation in a sizeable number of patients deserves further attention.



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P736

THE IMPACT OF OSTEOPOROSIS AND COMORBIDITIES ON DISEASE SEVERITY AND FUNCTIONAL IMPAIRMENT IN PATIENTS WITH OSTEOARTHRITIS

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OBJECTIVES: Osteoarthritis (OA) is a chronic degenerative joint disease affecting cartilage, subchondral bone, and synovium. Osteoporosis (OP) frequently coexists with OA, and both conditions share common risk factors such as aging, obesity, and systemic inflammation. Their coexistence may adversely influence disease severity, functional capacity, and clinical outcomes, emphasizing the need for an integrated approach to musculoskeletal health.
AIM: To assess the prevalence of osteoporosis in patients with primary osteoarthritis and to evaluate the impact of osteoporosis and associated comorbidities on disease severity and functional impairment.
MATERIAL AND METHODS: This cross-sectional study included 135 patients of both sexes diagnosed with primary OA according to ACR criteria. Clinical evaluation was performed in all patients. Radiographic severity of OA was assessed using the Kellgren–Lawrence (KL) grading system. Bone mineral density (BMD) was measured by dual-energy X-ray absorptiometry (DXA) at central skeletal sites (lumbar spine and hip). Disease severity and functional status were evaluated using the WOMAC index. Comorbidities, including osteoporosis, were identified based on medical history, laboratory data, and imaging findings. Statistical analyses were conducted to assess associations between OA severity, BMD, and comorbid conditions.
RESULTS: The mean age of patients was 64.3 ± 7.8 years, with a predominance of women (77%). Osteoporosis was diagnosed in 39% of patients, particularly among postmenopausal women and individuals older than 65 years. The most prevalent comorbidities were hypertension (59%), obesity (47%), hyperlipoproteinemia (34%), and type 2 diabetes mellitus (29%). Patients with concomitant OA and OP had significantly higher WOMAC scores for pain ($p = 0.01$) and physical function impairment ($p < 0.01$). Advanced KL grades (III–IV) were associated with reduced BMD at the femoral neck ($p = 0.001$) and lumbar spine ($p = 0.003$). Obesity and metabolic syndrome were associated with greater disease severity and functional decline.
CONCLUSION: Osteoarthritis and osteoporosis frequently coexist and are associated with increased disease burden and functional impairment. Early identification of osteoporosis and comorbidities in patients with OA, along with integrated management strategies targeting both joint and bone health, may improve clinical outcomes and reduce disability.

P738

BONE STRUCTURE BEYOND MINERAL DENSITY: INTEGRATION OF QUANTITATIVE ULTRASOUND WITH DUAL-ENERGY X-RAY ABSORPTIOMETRY IN A LARGE CLINICAL COHORT

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Objectives

To evaluate the complementary contribution of quantitative ultrasound to the assessment of bone quality beyond bone mineral density measured by dual-energy x-ray absorptiometry in routine clinical practice.

Material and method

A descriptive observational study was conducted in 12,000 patients routinely evaluated in an outpatient setting for comprehensive bone health assessment. The cohort was predominantly female, aged 30 to 80 years, mainly over 60 years of age, and included patients with metabolic and systemic conditions such as diabetes mellitus, thyroid disorders, obesity, arterial hypertension, and renal transplantation. Bone mineral density was assessed by dual-energy x-ray absorptiometry at the lumbar spine, proximal femur, and forearm. Bone quality was additionally evaluated using quantitative ultrasound through speed of sound measurements performed at the forearm and tibia of the non-dominant limb. In a subgroup of patients, serial assessments were performed to evaluate longitudinal changes in densitometric and acoustic parameters.

Results

Quantitative ultrasound provided information not captured by bone mineral density alone. Speed of sound values reflected variations in bone elastic properties and structural integrity, even among patients with similar bone mineral density. These findings are consistent with previous evidence showing that quantitative ultrasound can assess aspects of bone quality partially independent of bone mineral density and discriminate fracture risk (1–3). In patients with metabolic disorders, particularly diabetes mellitus, discrepancies were observed between densitometric and acoustic measurements, consistent with reports describing preserved or increased bone mineral density associated with impaired bone mechanical properties and increased skeletal fragility (4). During follow-up, changes in acoustic parameters were detected that were not consistently paralleled by changes in bone mineral density.

Conclusion

• Bone strength is determined by the interaction between mineral content and organic matrix properties. While dual-energy x-ray absorptiometry quantifies bone mineral density at central and peripheral sites, quantitative ultrasound provides complementary information on bone elastic and microstructural characteristics. The integration of both techniques allows a more comprehensive assessment of bone quality and its evolution in heterogeneous clinical populations, with potential implications for skeletal fragility risk stratification.

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P739

TRANSLATING MOLECULAR INSIGHTS INTO CLINICAL PROGRESS: RJX-01 FOR MUSCLE RECOVERY AND OSTEOSARCOPENIA THERAPY

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Objective

A phase 1b trial using an immobilization (casted leg) model showed that 6-week treatment with RJx-01 improved muscle strength and fatigue resistance. The molecular mechanisms behind RJx-01's effects remained largely unexplored and warrant further study. A phase 2 trial evaluating RJx-01 in hospitalization-associated sarcopenia among COPD patients is currently ongoing. Moving forward, we propose a second phase 2 trial targeting osteosarcopenia.

Material and Methods

In a phase 1 sub-study (placebo versus RJx-01-treated healthy males), transcriptomic profiling (RNA-seq) was performed on muscle biopsies from the immobilized leg at baseline, after 2 weeks immobilization, and after 4 weeks recovery.

Results

Transcriptomic analysis revealed significant changes post-immobilization in both groups: reduced expression of genes linked to mitochondrial energy metabolism and increased expression of genes related to inflammation, immune activation, and collagen fibrosis. After 4 weeks recovery, gene set enrichment analysis showed normalization of these disrupted pathways in the RJx-01 group but not in the placebo group. Complementary hematoxylin & eosin staining confirmed sustained inflammation in placebo subjects during recovery, which was reversed in RJx-01-treated subjects.

Osteosarcopenia is characterized by dynamic crosstalk between bone and muscle, mediated by a range of bioactive factors including myokines, osteokines, and adipokines. Recent studies indicate osteosarcopenia increases risk of disability, frailty, falls, fractures, hospitalization, and mortality compared to either condition alone (osteoporosis, sarcopenia). While pharmacological treatments exist for bone loss, there is an unmet need for sarcopenia therapies. Based on our phase 1 findings, we propose a placebo-controlled phase 2 study to evaluate whether a 6-months RJx-01 treatment can preserve muscle strength and function in postmenopausal osteosarcopenia patients. We hypothesize that RJx-01, combined with standard bone-loss therapy, may improve functional outcomes.

Conclusion

RJx-01 enhances muscle strength and recovery, supported by molecular and histological evidence. The proposed phase 2 trial will determine if RJx-01 can address the unmet need for sarcopenia treatment in osteosarcopenia patients, aiming to improve clinical outcomes and reduce disability.

Disclosures: All co-authors were employed or funded by Rejuvenate Biomed nv.

P740

THE BONE–MUSCLE–FUNCTION UNIT AND FUNCTIONAL IMPAIRMENT ACROSS AGE GROUPS IN INDIVIDUALS WITH AND WITHOUT KNEE OSTEOARTHRITIS

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Objective(s)

To investigate the contribution of bone mineral density within the functional bone–muscle unit, and its associations with body composition, muscle strength, and physical function across age groups in individuals with knee osteoarthritis (OA).

Material and Methods

This cross-sectional study included 80 community-dwelling participants stratified by OA status and age (40–50 and 70–80 years; n = 20 per group): participants with and without knee OA. Areal bone mineral density at the femoral neck (BMD_FN) and appendicular lean mass (ALM) were assessed using dual-energy X-ray absorptiometry (DXA). Isometric knee extensor peak torque was measured using a Biodex dynamometer and normalized to ALM to define muscle quality. Pain and physical function were assessed using the WOMAC questionnaire and performance-based functional tests. Two-way ANOVA examined the effects of OA status and age group on bone mineral density, body composition, muscle strength, muscle quality, and functional outcomes. Multivariable linear regression models were applied to identify determinants of functional impairment, adjusting for age, body mass index, ALM, BMD_FN, and OA status, to explore the independent contribution of bone mineral density within the bone-muscle-function continuum.

Results

Femoral neck bone mineral density was preserved across OA status and age groups (all $p > 0.05$). Appendicular lean mass was significantly lower in older participants compared with younger participants, irrespective of OA status ($p = 0.016$). Knee extensor peak torque and muscle quality were significantly reduced in individuals with knee OA and in older adults (all $p \leq 0.023$). Functional impairment, assessed by WOMAC scores and performance-based tests, was markedly greater in individuals with knee OA compared with those without OA ($p < 0.001$). In adjusted regression models, knee OA status emerged as the strongest determinant of functional impairment ($\beta = 24.85$; 95% CI: 20.16–29.53; $p < 0.001$), whereas femoral neck bone mineral density and appendicular lean mass were not independently associated with physical function.

Conclusion(s)

Knee OA is associated with pronounced impairments in muscle strength, muscle quality, and physical function, despite preserved femoral neck bone mineral density. Although bone mineral density was not independently associated with functional outcomes, its preservation in the presence of marked muscle and functional deficits highlights the limitations of bone density alone as a marker of musculoskeletal health. These findings reinforce the importance of integrated assessment of the bone–muscle–function unit to characterize musculoskeletal aging and functional decline in knee OA.

Disclosures

The authors declare no conflicts of interest.

P741

AGE-RELATED ALTERATIONS IN MUSCLE ARCHITECTURE AND MUSCLE QUALITY WITHIN THE FUNCTIONAL MUSCLE–BONE UNIT PRECEDE FUNCTIONAL IMPAIRMENT IN KNEE OSTEOARTHRITIS

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Objective(s)
To investigate whether age-related alterations in quadriceps muscle architecture and muscle quality, as components of the functional muscle–bone unit, are associated with physical function across age groups in individuals with knee osteoarthritis (OA).

Material and Methods
This cross-sectional study included 80 community-dwelling participants stratified by OA status and age (40–50 and 70–80 years; n = 20 per group). Vastus lateralis muscle architecture, including muscle thickness (MT), pennation angle (PA), and fascicle length (FL) was assessed using two-dimensional B-mode ultrasonography. Isometric knee extensor peak torque was measured using a Biodex dynamometer. Body composition and appendicular lean mass (ALM) were assessed by dual-energy X-ray absorptiometry (DXA), and muscle quality was defined as knee extensor peak torque normalized to ALM. Pain and self-reported physical function were assessed using the WOMAC questionnaire, and functional performance was evaluated using the 30-second sit-to-stand test. Two-way ANOVA examined the effects of OA status and age group on muscle architecture, muscle quality, and functional outcomes. Multivariable linear regression models identified determinants of functional impairment, adjusting for age, sex, body mass index, ALM, and OA status.

Results
Participants with knee OA demonstrated reduced quadriceps MT, FL, PA, and muscle quality compared with age-matched individuals without knee OA (all $p \leq 0.001$). Significant main effects of OA status and age group were observed for muscle architecture parameters and muscle quality, with no interaction effects. Functional impairment, assessed by WOMAC scores and the sit-to-stand test, was significantly greater in individuals with knee OA than in those without OA ($p < 0.001$). In adjusted models, knee OA status was the strongest determinant of functional impairment ($\beta = 23.13$; 95% CI: 17.84–28.43; $p < 0.001$), while alterations in muscle architecture and muscle quality characterized musculoskeletal deficits across OA and age groups, suggesting compromised mechanical loading within the muscle-bone unit.

Conclusion(s)
Knee OA is associated with pronounced impairments in quadriceps muscle architecture and muscle quality, particularly in older adults. Notably, alterations in muscle architecture and muscle quality seem to occur before marked functional impairment, highlighting early deficits within the functional muscle–bone unit. Targeting muscle architecture and muscle quality may represent relevant strategies to support muscle–bone interactions, mechanical loading, and musculoskeletal health across aging in individuals with knee OA.

Disclosures
The authors declare no conflicts of interest.

P742

PHYSICAL ACTIVITY TRAJECTORIES OVER 8 MONTHS IN KNEE OSTEOARTHRITIS: THE ROLE OF BASELINE ACTIVITY LEVEL AND ADIPOSITY

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Objective(s)
To investigate whether baseline adiposity and physical activity predict 8-month changes in objectively measured physical activity in individuals with knee osteoarthritis (OA).

Material and Methods
Participants with knee OA were assessed at baseline and after 8 months in a longitudinal observational study. Physical activity was objectively measured using wearable monitors and expressed as average daily step count. Adiposity was assessed at baseline using fat mass index (FMI), derived from body composition measurements. Eight-month change in physical activity was calculated as follow-up (8 months) minus baseline step counts. Associations between baseline FMI, baseline physical activity, and changes in steps/day were examined using multivariable linear regression models. Models were adjusted for baseline step count to account for initial activity levels and regression to the mean, as well as for age and sex. Unstandardized regression coefficients and 95% confidence intervals were reported, and model fit was assessed using the coefficient of determination (R^2).

Results
A total of 68 participants were included in the analysis. Baseline physical activity and FMI varied across individuals. In adjusted regression models, baseline physical activity was a significant predictor of 8-month change in daily step count ($\beta = -0.45$, $p < 0.001$), indicating that individuals with higher activity levels at baseline experienced smaller increases or greater reductions in steps over time. Baseline FMI was not associated with changes in physical activity ($\beta = 58.1$, $p = 0.46$). Age and sex were not significantly associated with changes in physical activity. The final model explained approximately 31% of the variance in 8-month change in steps/day.

Conclusion(s)
In individuals with knee OA, baseline physical activity, but not adiposity, predicts short-term changes in objectively measured physical activity. These findings indicate that lower initial activity levels may be associated with less favorable activity trajectories, irrespective of adiposity status. From a clinical and behavioral perspective, interventions designed to increase physical activity in individuals with knee OA may be most effective when prioritizing patients with lower baseline activity levels, irrespective of adiposity status.

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Disclosures
The authors declare no conflicts of interest.

P743

REFRACTURE RISK AND LONG-TERM MORTALITY IN FRAGILITY FRACTURE PATIENTS: A 5-YEAR LONGITUDINAL ANALYSIS

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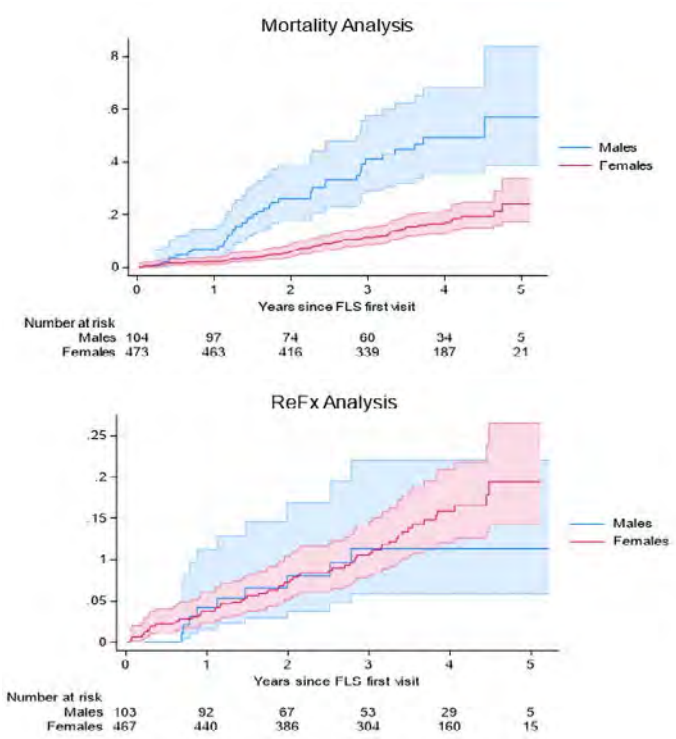
Introduction and Objectives: The high burden of fragility fractures (FF) necessitate robust secondary prevention. This study investigated subsequent fracture (Re-Fx) incidence and five-year mortality in patients aged ≥50 post-initial FF, identifying clinical determinants influencing these outcomes.

Materials and Methods: A prospective cohort study included 577 patients (recruited 2018–2021; mean follow-up 3.2 years) managed within a Fracture Liaison Service (FLS). The study was approved by the Regional Human Research Ethics Committee. Analysis involved univariate and multivariate regression models to identify independent predictors of Re-Fx and mortality.

Results: The cohort was 82% female (mean age 74). Index fractures were primarily hip (41.6%) and vertebral (29.1%). Notably, 67.8% lacked a prior osteoporosis diagnosis. Significant baseline vulnerabilities were identified: 12% moderate-to-severe dependency, 54% limited physical activity, 50% moderate-to-high fall risk, and 50% high FRAX risk. Comorbidities (32%), fall-risk-increasing drugs (36%), and medications associated with bone loss (25%) were prevalent. Only 36% had received prior anti-osteoporotic treatment.

During follow-up, 70 Re-Fx (12.1%) and 110 deaths (18.5%) were recorded. Mortality was significantly higher in men (37.5%) than women (14.5%), a disparity increasing over time (Figure 1). Multivariate analysis showed that optimal nutritional status and potent antiresorptives (zoledronic acid, denosumab) or anabolic agents—compared to oral bisphosphonates—were independent protective factors against Re-Fx (Figure 2). Regarding mortality, female sex and favorable nutritional status were associated with higher survival, while advanced age was the primary risk factor.

Conclusion: FLS patients represent a high-risk geriatric population with imminent threats of Re-Fx and mortality. While refracture rates align with international cohorts, the stark sex-based mortality disparity is a critical finding. Results underscore the need for personalized, sex-specific interventions and prioritizing potent pharmacological therapies and nutritional support in secondary prevention.



P744

IMPROVING UPTAKE OF ANABOLICS IN OLDER HIP FRACTURE PATIENTS

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Objective

Anabolics such as romosusomab have been shown to be a far more effective treatment than bisphosphonates for osteoporosis, with evidence in older patients[1] as well as young, yet uptake remains poor. Patients are often not considered for treatment due to frailty and physical ability to self inject medication and yet this is the group with highest risk of falls and further fractures. Our study looked at whether we should be involving families/carers at an early stage, patients at present can't be considered for treatment unless prepared to self inject.

Methods

We collected data from patients on Elm Unit, a 30 bedded purpose built post hip fracture assessment and rehabilitation unit in Trafford Hospital. These patients have already had a hip fracture and therefore very high risk of imminent future fracture.

We looked at patients who would have been excluded from anabolic treatment consideration due to frailty/physical ability to self administer or because patient had fear of needles.

Our method involved approaching families at the bedside and contacting by phone , with patients' permission to see if they would be willing to administer monthly romosusomab injections at home .

We also looked at number of patients who were happy to self inject

Results

10 patient families/carers were happy to administer romosusomab to the patient at home if this was the best medication. This was a significantly higher number than expected. These patients would typically have been

given zolendronic acid on the ward.
9 patients were happy to self administer romosusomab.

Conclusion

The study showed that more families/carers were willing to give injections for their relatives than we expected. Clinicians need to ensure discussions occur with families/carers before excluding patients from possible anabolic treatments due to frailty/ physical ability

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P746

REVISITING OSTEOARTHRITIS AS AN INFLAMMATORY DISEASE: CHARACTERIZATION OF SYNOVITIS GRADING AND SYNOVIAL PATHOTYPES IN SURGICAL SPECIMENS

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Objective

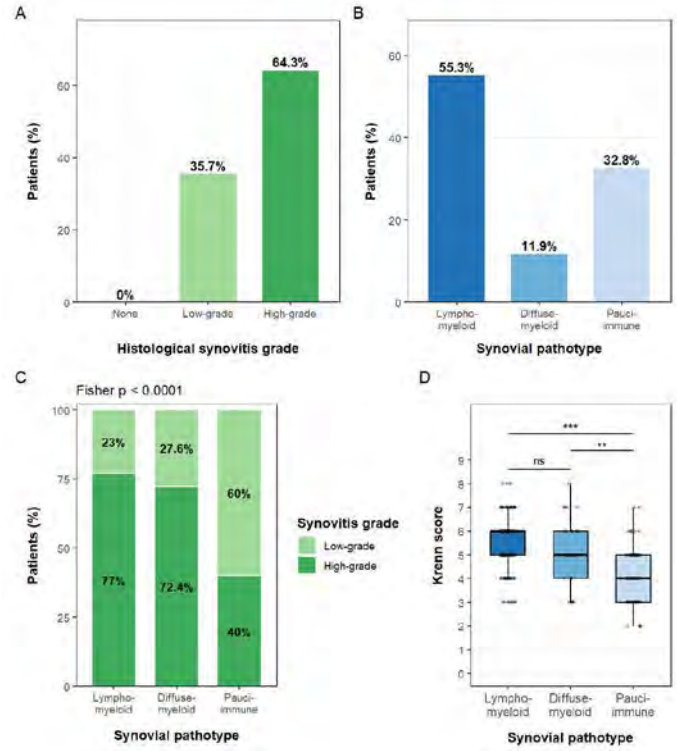
To quantify synovitis severity and define synovial inflammatory pathotypes in advanced osteoarthritis (OA) surgical specimens, and to examine their associations with clinical, laboratory, and radiographic features.

Methods

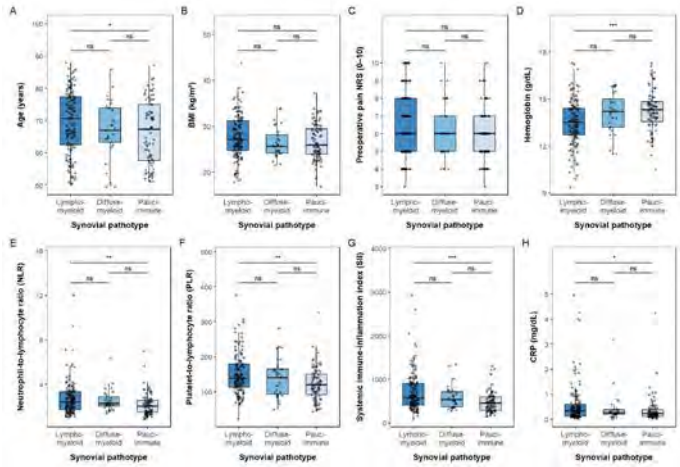
Synovial tissue samples were obtained intraoperatively from adult patients undergoing primary orthopedic surgery for OA at multiple joint sites (predominantly hip and knee). Synovitis was graded on H&E using the Krenn score and classified as none (0-1), low-grade (2–4) or high-grade (≥5). Immunohistochemistry for CD3, CD20, CD68, and CD138 was semi-quantitatively scored to assign synovial pathotypes (lympho-myeloid, diffuse-myeloid, pauci-immune). Continuous variables were compared using Kruskal–Wallis tests with Dunn post-hoc tests, and categorical variables using Fisher's exact test.

Results

A total of 244 synovial specimens were analyzed. The overall median Krenn score was 5 (IQR 4–6), with 64.3% classified as high-grade synovitis and 35.7% as low-grade (Figure 1A). The lympho-myeloid pathotype was most prevalent (55.3%), followed by pauci-immune (32.8%) and diffuse-myeloid (11.9%) (Figure 1B). Although all pathotypes included both low- and high-grade synovitis, the proportion of high-grade synovitis differed substantially (77.0% lympho-myeloid, 72.4% diffuse-myeloid, 40.0% pauci-immune; Figure 1C). Total Krenn scores showed a clear gradient across pathotypes: median 4 (IQR 3–5) in pauci-immune, 5 (IQR 4–6) in diffuse-myeloid, and 6 (IQR 5–6) in lympho-myeloid tissues (Kruskal–Wallis p<0.001), with higher scores in lympho-myeloid and diffuse-myeloid versus pauci-immune (p<0.001 and p=0.001, respectively) (Figure 1D).



Across clinical/laboratory parameters (Figure 2A–H), age varied modestly (p=0.038), BMI did not differ significantly (p=0.120), and preoperative pain was similar across pathotypes (p=0.059). Hemoglobin differed (p<0.001), with lower values in lympho-myeloid versus pauci-immune synovium (p<0.001). Systemic inflammatory indices displayed a consistent gradient: NLR (p=0.0026), PLR (p=0.0033), SII (p<0.001), and CRP (p=0.033) were higher in lympho-myeloid than pauci-immune tissues, with no significant differences between lympho-myeloid and diffuse-myeloid groups.



Conclusions

Advanced OA surgical synovium shows high inflammatory burden and reproducible immune pathotypes, with a marked histological and systemic inflammatory gradient from pauci-immune to lympho-/diffuse-myeloid profiles.

P747

RISK OF FRAGILITY FRACTURE IN PPI USERS: WHAT DOES THE EVIDENCE TELL US?

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Objective
The objective was to evaluate the association between use of proton pump inhibitors (PPIs) and fragility fractures risk.
Material and Methods
A systematic search for studies published from 2010 onwards was conducted in the PubMed, Scopus, Cochrane, and Web of Science databases, using terms related to osteoporosis, fragility fracture, and PPIs. Observational studies (cohorts and case-control studies) and meta-analyses were included. Unpublished/unavailable studies, cross-sectional studies, case reports/case series, basic research, and commentaries/editorials were excluded. The methodological quality was assessed using CASP checklists. Evidence was synthesized narratively, including meta-analyses heterogeneity (I2). The level of evidence and the strength of the recommendation were classified using the SORT scale.
Results
1,385 studies were identified of which 27 were included (11 cohorts, 7 case-control studies, 9 meta-analyses), evaluating more than 15,052,802 participants. Meta-analyses consistently indicated a significant increased risk of fragility fractures (RR 1.16–1.58), with higher risk for vertebral fractures (RR 1.50-1.58) compared to hip fractures (RR 1.20-1.30) and with variable heterogeneity (I2 2.38–89.7%). Case-control studies generally indicated a modest association (OR 1.09–1.44), and cohort studies indicate a modest but significant risk (HR 1.25–1.53).
Conclusions
Evidence suggests a modest yet robust association between PPI use and increased risk of fractures, particularly vertebral and hip fractures. However, the high heterogeneity and observational nature of the studies prevents a conclusion of causality. Based on Level 2 evidence, allowing for a moderate strength of recommendation (Grade B-SORT), caution is essential in the prescription of long-term PPI therapy, and periodic re-evaluation is advised, especially in patients with risk factors for fragility fractures.

P749

PHARMACOTHERAPY CHANGE PATTERNS AFTER FRAGILITY FRACTURE IN PATIENTS RECEIVING BONE-ACTIVE MEDICATION: A FRACTURE LIAISON SERVICE QUALITY IMPROVEMENT COHORT STUDY

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Objective: We examined pharmacotherapy change patterns in fragility fracture patients who fractured while taking bone active medication, and were screened by Ontario's Fracture Screening and Prevention Program (FSPP). A secondary objective was to identify baseline characteristics associated with receiving a pharmacotherapy change recommendation.
Material and Methods: The cohort included fragility fracture patients (50+ years), who fractured while taking bone active medication, were screened by the FSPP during 2017-2024, and subsequently evaluated by bone health specialists. Descriptive statistics were used to summarize baseline factors and pharmacotherapy patterns. Factors associated with receiving a recommendation to change medication were investigated using multivariable regression.
Results: Of 828 patients meeting eligibility criteria, 60.4% (n=500) were advised to change medication, 33.9% (n=281) to remain on the same medication, and 2.7% (n=22) to discontinue the medication. Data were unavailable for 3.0% (n=25). Of those advised to change medication, 83.6% (n=418) were changed to denosumab, 5.2% (n=26) to teriparatide, and 2.4% (n=12) to risedronate. Older age was associated with a higher likelihood of receiving a recommendation to change medication [1.84 (95% CI: 1.15-2.95)], while being on denosumab was associated with a lower likelihood [0.07 (95% CI: 0.05-0.11)].
Conclusions: Findings suggest that a fracture on treatment prompted re-evaluation and treatment escalation in many cases, while younger age and prior denosumab use were associated with lower likelihood of switching, likely reflecting a multitude of clinical considerations and jurisdiction-specific reimbursement constraints. This study provides real-world insights on pharmacotherapy change patterns in a high-risk, understudied patient cohort from a jurisdiction-wide Fracture Liaison Service, addressing a group with therapeutic uncertainty.
Acknowledgement
Study supported by funding from the Ontario Ministry of Health and Long-Term Care (MOHLTC) through the Ontario Osteoporosis Strategy. The views expressed are those of the researchers and do not necessarily reflect those of the MOHLTC. The authors acknowledge the 'Brookfield Chair in Fracture Prevention' for providing unrestricted research grants.

P750

"DON'T TELL ME I'M GOING TO FEEL JOY": THE EMOTIONAL BURDEN OF INFORMAL CAREGIVERS OF PATIENTS WITH A FRAGILITY FRACTURE DISCHARGED FROM A REHABILITATION HOSPITAL

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Objective: Few studies have examined the emotional experience of caregiving for individuals with a fragility fracture or the contextual factors that may influence this experience. Our objective was to explore the experience of caring for someone after a fragility fracture to understand the nuances of the emotional experience and identify ways to better support informal caregivers.

Material and Methods: Using a phenomenological approach, we recruited primary caregivers of fragility fracture patients who were discharged from a rehabilitation hospital in an urban setting in Canada. We conducted individual interviews with caregivers and analyzed the data according to Giorgi's procedures to describe the structure of caregivers' emotional experience.

Results: We interviewed 32 caregivers (19 female, 13 male) ranging in age from 37-95 years old. Most participants were caring for a parent (59%) or spouse (22%). "Don't tell me I'm going to feel joy" encapsulated the experience that caregiving was complex, comprised of tensions internally and with care recipients, and exacerbated by various pressures to adopt the caregiver role. As a result, caregivers often felt reluctant to voice displeasure or ask for help, exacerbating their burden and making them feel they must suffer in silence.

Conclusions: Our study demonstrates the multifaceted nature of caregivers' emotional burden and highlights the pressures caregivers of fragility fracture patients feel to take on caregiving roles without complaint or assistance. Our findings highlight the need to acknowledge the emotional complexity of caregiving, empower caregivers to ask for help, and develop meaningful supports and policies to alleviate caregiver burden.

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P751

THE EXPERIENCE OF PATIENTS SCREENED THROUGH AN ONTARIO FRACTURE LIAISON SERVICE DURING COVID

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Objective: We examined the health care experiences of patients screened through an Ontario Fracture Liaison Service during COVID.

Materials and methods: A phenomenological study was conducted. Eligible patients were English-speaking males and females, ≥50 years old, with a fragility fracture who presented as outpatients at one of six Fracture Screening and Prevention Program (FSPP) sites across Ontario during COVID (2020-2022). Patients were interviewed (60-90 minutes) by telephone. Analysis was guided by Giorgi's procedures.

Results: We interviewed 21 patients (12 females, 9 males) aged 63-85 years old. This sample size met sample size requirements for phenomenological studies*. Based on our analysis, we developed two themes: 1) Patients expressed minimal concern about COVID while attending fracture clinic appointments, or during hospital admission. They attributed this to extensive COVID protocols, such as masking and social distancing, which made them feel safe. Some participants reported that the health care providers with whom they interacted appeared anxious, which was perceived to affect the quality of care they received; 2) Patients perceived that services in the hospital and fracture clinic were well organised and efficient during COVID, noting short wait times, clear communication and ease of booking appointments. However, many participants suggested that their experience outside the FSPP setting was not as satisfactory. Participants described challenges in receiving timely follow-up care, arranging physiotherapy and contacting their family doctor.

Conclusions: Fracture patients reported satisfaction with the care they received in the hospital and FSPP setting during COVID. In contrast, access to health care outside the FSPP setting was challenging, highlighting gaps in continuity of care during this period.

Reference: *Giorgi. The theory, practice, and evaluation of the phenomenological method as a qualitative research procedure. J Phenomenol Psychol 1997;28:235-60

Acknowledgement: Study funded by the Canadian Institutes of Health Research (WI1 179881)

P752

INCREASED RISK OF ATRIAL FIBRILLATION IN YOUNG ADULTS WITH GOUT: A NATIONWIDE COHORT STUDY

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Objective: To investigate the association between gout and incident AF in a large nationwide cohort of Korean adults aged 20–39 years.
Methods: This retrospective cohort study analyzed 6,506,721 individuals from the Korean National Health Insurance Service (NHIS) database. Gout and AF were identified using ICD-10 codes M10 and I48, respectively. Cox proportional hazards regression models were used to estimate hazard ratios (HRs) and 95% confidence intervals (CIs) for incident AF after adjusting for demographic, lifestyle, and clinical factors.
Results: During a median follow-up of 11.49 years, gout was associated with a significantly increased risk of AF (fully adjusted HR, 1.44; 95% CI, 1.31–1.58). The cumulative incidence of AF was significantly higher in the gout group (log-rank P < .001). Subgroup analyses demonstrated stronger associations among non-obese individuals and those with chronic kidney disease (CKD).
Conclusions: Gout was associated with an increased risk of atrial fibrillation among young adults. These findings suggest that gout may serve as a clinically relevant risk marker for AF, underscoring the need for proactive cardiovascular risk assessment in this population.

P753

THE CORRELATION BETWEEN CHANGES IN RADIOLOGICAL CERVICAL PARAMETERS AND FACIAL ASYMMETRY

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Objectives: In my daily practice as a rheumatologist, one of the most frequent complaints I deal with is related to the cervical spine. When posture changes of the cervical spine occur, it is often obvious that facial asymmetry exists. The aim of this study is to identify changes in the cervical spine that correlate with facial (a)symmetry. Identifying a potential correlation would be of great clinical significance, as doctors who treat cervical spine pathologies would be more cautious about problems related to facial asymmetry.
Material and Methods: 32 patients aged 18-64 years were included in this prospective study who had complaints about their cervical spine. Cervical radiographs were used to assess parameters such as C2–C7 Lordosis (CL), T1 Slope (T1S), Thoracic Inlet Angle (TIA), Neck Tilt (NT), C2–C7 Sagittal Vertical Axis (C2–C7 SVA), cervical and cranial tilting for each patient. The assessment of facial asymmetry was done through inspection and P-A cephalometric.
Results: Changes in cervical radiographic parameters occurred in 53.13 % of patients. The parameters that were most altered were: C2–C7 Lordosis (CL), T1 Slope (T1S), C2–C7 Sagittal Vertical Axis (C2–C7 SVA), cervical and cranial tilting. Facial asymmetry was found in 64.71% of patients who experienced changes in these parameters, whereas only 20% of cases without cervical radiological parameters had facial asymmetry.
Conclusions: Facial asymmetry is more prevalent in patients with changes in cervical radiological parameters than in those without cervical radiological parameters changes.

P754

JUVENILE PAGET DISEASE WITH NOVEL COMPOUND HETEROZYGOUS SEQUENCE VARIANTS IN THE TNFRSF11B GENE: CASE REPORT FROM THE CZECH REPUBLIC AND OVERVIEW

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Objectives:
Juvenile Paget disease (JPD) is an extremely rare autosomal recessive skeletal disorder characterized by markedly increased bone turnover, resulting in skeletal deformities, increased fracture susceptibility, and various extraskeletal manifestations. The disease is caused by pathogenic variants in the **TNFRSF11B** gene encoding osteoprotegerin, a key regulator of osteoclast-mediated bone resorption. While most reported JPD cases have been found to carry homozygous *TNFRSF11B* variants, compound heterozygous variants are rare.

Methods and Results:
We report the first diagnosed case of juvenile Paget disease in the Czech Republic, presenting with a mild disease phenotype. The first fractures occurred at the age of three years. Additional clinical manifestations included characteristic skeletal deformities, macrocephaly, arched chest, valgus deformity of the lower extremities, lateral femoral bowing, and anterior bowing of the tibiae. Extraskeletal findings comprised mild mixed hearing impairment, angioid streaks of the choroidea, and transient immunodeficiency.
Molecular genetic analysis using Sanger sequencing was performed in the patient and both clinically unaffected parents. This revealed a unique compound heterozygous genotype in **TNFRSF11B**, consisting of a paternally inherited splice-site variant **c.30+5G>A, p.(?)** and a maternally inherited missense variant **c.329G>T, p.(Gly110Val)**, neither of which has been previously reported in association with JPD. We describe the diagnostic work-up, therapeutic management, and long-term follow-up of the patient.

Conclusion:
The identification of these novel *TNFRSF11B* variants extend knowledge of JPD. Early diagnosis and timely initiation of antiresorptive therapy effectively reduce fracture incidence, limit progression of skeletal

deformities, and significantly improve quality of life. This case of osteoprotegerin deficiency further contributes to the understanding of its role not only in skeletal homeostasis but also in extraskeletal systems.

P755

DECREASED BONE MINERAL DENSITY IS ASOCCIATED WITH SUBCLINICAL ATHEROSCLEROSIS IN ASYMPTOMATIC NONDIABETIC POSTMENOPAUSAL WOMEN

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Background/Objectives: Estrogen deficiency is strongly related to osteoporosis, but its role in the development of atherosclerotic cardiovascular disease (CVD), particularly in postmenopausal women, is unclear. The aim of this study was to assess the relationship between osteopenia and subclinical atherosclerosis in asymptomatic non-diabetic postmenopausal women.

Methods: This prospective study included 117 consecutive postmenopausal women (mean age 59 ± 7 years) referred from the outpatient Rheumatology Clinic of the University Clinical Centre of Kosovo, recruited between September 2021 and December 2022. Clinical, biochemical, bone mineral density (BMD), carotid ultrasound and coronary CT angiography data were analyzed. Subclinical atherosclerosis was diagnosed as the presence of carotid plaques and/or increased intima-media thickness (CIMT) > 1.0 mm.

Results: Of the 117 studied women, 83 (71%) had osteopenia or osteoporosis (T-score < −1 SD), who had higher prevalence of carotid artery plaques (27.7 vs. 8.8%, p = 0.019), compared to those with normal BMD. They were, also, older (p < 0.001), had a longer duration of menopause (p = 0.004) and higher CAC scores (p < 0.019), compared to those without plaques. In multivariate analysis [odds ratio 95% confidence interval], age [1.244 (1.052–1.470), p = 0.001], osteoporosis [0.197 (0.048–0.806), p = 0.024] and CAC score > 10 HU [0.174 (0.058–0.806), p = 0.006] were independently associated with the presence of carotid plaques. **Conclusions:** Reduced BMD is highly prevalent in asymptomatic non-diabetic postmenopausal women and is associated with a high prevalence of subclinical carotid atherosclerosis. Age, osteoporosis and CAC score > 10 HU were independently associated with atherosclerotic carotid plaque formation. These findings highlight the potential pathophysiological link between osteoporosis and subclinical atherosclerosis.

Keywords:

bone mineral density; osteoporosis; atherosclerosis; carotid ultrasound; menopauses

P756

A 10-YEAR LABORATORY DATA ANALYSIS OF TRENDS IN SERUM VITAMIN D CONCENTRATIONS AND DISTRIBUTION IN LATVIA (2015-2025)

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Objectives. This study aimed to compare serum 25-hydroxyvitamin D (25(OH)D) concentrations and vitamin D status distribution between 2015 and 2025; additionally, it sought to evaluate whether the population's vitamin D concentrations have improved over the ten years marked by increased awareness and recommendations for supplementation in Latvia.

Materials and Methods. A retrospective analysis was performed using routine serum 25-hydroxyvitamin D test results from adults aged ≥18 years in 2015 and 2025. Vitamin D concentrations were compared between years, seasons, and across age and sex using appropriate parametric and non-parametric statistical tests.

Results. A total of 348536 serum 25(OH)D analyses were included, with the number of tests increasing from 67088 in 2015 to 281448 in 2025. Mean vitamin D concentrations were significantly higher in 2025 compared with 2015 (36.31±0.03 vs 27.06±0.04 ng/mL, p<0.001). Females had higher mean vitamin D levels than males (35.13±0.03 vs 33.14±0.05 ng/mL, p<0.001). Vitamin D levels increased progressively with age, from 30.63 ng/mL in individuals <30 years to 38.08 ng/mL in those aged ≥70 years (all pairwise p<0.001). Seasonal variation was observed in both years, with lower median vitamin D levels in winter than in summer in 2015 (25.48 vs 27.07 ng/mL, p<0.001) and 2025 (30.10 vs 37.50 ng/mL, p<0.001). Winter vitamin D levels were significantly higher in 2025 compared with 2015 (p<0.001). The distribution of vitamin D status changed substantially over time, with deficiency decreasing from 23.9% in 2015 to 11.2% in 2025, insufficiency from 36.5% to 23.4%, and optimal vitamin D levels increasing from 4.5% to 13.0% (χ^2=20,713.09, p<0.001).

Conclusions. Over the past decade, vitamin D concentrations in the population have increased, with a higher proportion of individuals now achieving sufficient and optimal status. This trend may reflect improved awareness of the importance and pleiotropic effects of vitamin D and supports continued efforts to strengthen public health strategies.

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CELL CYCLE-MEDIATED BIDIRECTIONAL REGULATION OF OSTEOBLAST-OSTEOCLAST BALANCE BY BIOMODIFIED MAGNESIUM PHOSPHATE CEMENT FOR OSTEOPOROTIC BONE REGENERATION

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Objective: We developed a multifunctional modified magnesium phosphate cement incorporating ferulic acid-loaded nanoparticles to regulate osteoblast-osteoclast balance via AKT1/p21/CDK2 pathway for osteoporotic bone regeneration.
Methods: HMSNs were synthesized and modified with ferulic acid, polydopamine coating, and tannic acid to develop a multifunctional magnesium phosphate cement. The material was characterized for physicochemical properties and drug release behavior. In vitro studies evaluated cell viability, osteogenic differentiation, and osteoclast inhibition, focusing on the AKT1/p21/CDK2 pathway regulation. The therapeutic efficacy was assessed in an ovariectomy-induced osteoporotic rat model with femoral defects using micro-CT and histological analysis.
Results: The modified cement exhibited superior properties with 96.5% injectability, enhanced compressive strength (70.6±5.9 MPa), controlled degradation (5.19% at 28 days), and NIR-responsive drug release (96.37% over 7 days), while maintaining excellent biocompatibility (>95% cell viability). Network pharmacology and molecular docking confirmed ferulic acid's regulation of AKT1/p21/CDK2 pathway. The material significantly promoted G1/S phase transition, enhanced osteogenic differentiation (2.8-fold ALP activity, 3.2-fold mineralization), and improved bone microenvironment through regulating inflammatory and angiogenic factors (all $p<0.01$). In vivo studies demonstrated that the experimental group achieved 2.85-fold higher bone volume/total volume ratio (BV/TV) compared to the control group. Histological analysis confirmed significant enhancement in osteoporotic bone defect repair.
Conclusion: This responsive cement system shows promising potential for osteoporotic bone regeneration through cell cycle-mediated regulation, offering new strategies for bone tissue engineering applications.

P758

THE TRAJECTORY OF HEALTH DECLINE FOLLOWING SPINAL COMPRESSION FRACTURE IN GERIATRIC PATIENTS: A REVIEW ARTICLE

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Objectives:
This paper aims to overview the clinical implication and overall health consequences of spinal compression fractures in the geriatric population
Material and Methods:
This paper reflects a comprehensive review of publications from PubMed, orthopedic associations, online publications and relevant medical literature, focusing on the incidence, clinical presentation, and long-term complications of the "vertebral fracture cascade."
Results:
Spinal compression fractures are highly prevalent among elderly patients, often secondary to osteoporosis. In this vulnerable population, a single fracture can trigger a cascade of secondary complications across multiple organ systems, leading to progressive health decline. Acute back pain commonly results in reduced mobility and increased risk of subsequent falls. These events heighten the likelihood of pulmonary, pressure ulcers and urinary tract infections, which in turn may contribute to cardiovascular complications and elevated mortality risk. Preexisting comorbidities further exacerbate this downward trajectory. Long-term adverse health outcomes frequently include chronic pain, spinal deformity, diminished range of motion, and functional disability ultimately impairing quality of life and fostering dependency.
Conclusion:
Spinal compression fractures in geriatric patients often initiate a self-perpetuating cycle of declining health, driven by immobility, recurrent falls, and systemic complications. Effective management should emphasize prevention of primary fractures, early detection, and a multidisciplinary approach that integrates both the musculoskeletal and geriatric care. Early recognition and interruption of this "cascade to dependency" is crucial to improving functional outcomes and overall quality of life in this population.

P759

AWAKE PERCUTANEOUS FIXATION FOR UNSTABLE FRACTURES OF THE SPINE IN HIGH-RISK PATIENTS

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Objectives:
The incidence of unstable fractures in elderly or medically compromised patients is on the rise. This cohort population presenting for surgery poses a significant challenge for surgeons. The risks associated with general anesthesia and surgery may outweigh the potential benefits. For patients classified as ASA 3-4, the risk is even greater due to the higher likelihood of intraoperative complications. An alternative to general anesthesia is undergoing surgery awake under mild sedation. In this study we aimed to assess the perioperative outcomes of patients with osteoporosis undergoing an awake spinal percutaneous fixation with mild sedation and local anesthesia.
Methods:
This study included a prospective observational analysis evaluating patients with ASA 3-4 with osteoporosis who presented with unstable spinal fractures at a level one trauma center. These patients underwent awake spinal percutaneous fixation with mild sedation and local anesthesia. Data on demographics, radiology, and outcomes were collected.
Results:
A total of 64 patients underwent surgery between 2019 and 2023. The average follow-up duration was 12 months (range: 8-24 months), with 33 females and 31 males. The average age was 77.7 years, and all patients had an ASA score of 3-4. The injury types included 29 extension fractures, 254 unstable burst fractures, 7 Chance fractures, and 2 teardrop fractures. All patients received unilateral fixation, with one patient undergoing bilateral fixation. Cement augmentation was performed in 50

patients. There were no neurological complications, and only one case of infection was reported, occurring 4 months post-surgery. All patients were discharged ambulatory.
At the 2-week follow-up, the average VAS score decreased from a preoperative score of 9 (range: 8-10) to 2 (range: 0-4) (P<0.01). Postoperative X-rays taken at 6 and 12 weeks confirmed fracture healing. At the final follow-up, four cases of hardware loosening were identified, however those cases remained asymptomatic and did not require revision surgery.
Conclusions:
Our findings suggest that awake fixation is a safe and feasible alternative to undergoing the procedure under general anesthesia for extreme cases. This approach, however necessities a dedicated multidisciplinary team, including an anesthesiologist and a radiologist, to ensure the procedure is performed safely and efficiently.

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THE CONTRIBUTION OF FIBROMYALGIA TO NEUROPATHIC PAIN AND CENTRAL SENSITIZATION IN DIABETES

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Introduction :
While chronic pain in diabetes is commonly ascribed to peripheral neuropathy, diffuse and treatment-resistant pain patterns suggest an underlying central pain component, including central sensitization and fibromyalgia.
Objective :
To assess the contribution of central sensitization and fibromyalgia to the expression of chronic pain in diabetic patients presenting with neuropathic pain.
Methods :
This observational study included 100 diabetic patients with chronic pain, followed at the Department of Internal Medicine of the Internal Security Forces Hospital in La Marsa, Tunis, between February and June 2025. Neuropathic pain was assessed using the DN4 questionnaire, central sensitization was evaluated with the Central Sensitization Inventory (CSI), and fibromyalgia was diagnosed according to the 2016 American College of Rheumatology (ACR) criteria. Pain intensity, functional impact, and therapeutic response were subsequently analyzed.
Results :
One hundred diabetic patients (mean age 58 ± 10 years; 54% male; mean duration of diabetes 12 ± 6 years) with chronic pain lasting more than six months were included. Painful diabetic neuropathy was identified in 78% of patients (DN4 ≥ 4). Elevated central sensitization scores (CSI ≥ 40) were observed in 46% of patients, and 32 patients (32%) fulfilled the 2016 ACR criteria for fibromyalgia. Patients with associated fibromyalgia reported significantly higher pain intensity (mean VAS 7.6 ± 1.2 vs. 5.4 ± 1.5; p < 0.001), comparable DN4 scores to those without fibromyalgia (5.8 ± 1.3 vs. 5.6 ± 1.4; p = 0.48), but a markedly greater functional impact (mean FIQ 62 ± 14 vs. 34 ± 16; p < 0.001). Pain severity was not correlated with peripheral neuropathy parameters (p = 0.62), but showed a significant correlation with central sensitization scores (r = 0.61; p < 0.001). Patients presenting both painful diabetic neuropathy and fibromyalgia exhibited a poorer response to conventional neuropathic pain treatments, with only 28% reporting clinically meaningful improvement, compared with 57% of patients without fibromyalgia (p = 0.01). These findings suggest that pain in patients with diabetes is not solely driven by peripheral mechanisms, but frequently involves central sensitization, with a clinical phenotype closely resembling fibromyalgia.
This interaction between neuropathy and central sensitization may account for a subset of so-called "refractory" pain syndromes and underscores the need for a multidimensional approach to pain assessment and management.
Conclusion :
Central sensitization and fibromyalgia are highly prevalent among diabetic patients with chronic pain and substantially shape clinical manifestations and treatment outcomes. Identifying these conditions remains a major challenge for rheumatologists but is essential for achieving diagnostic precision, therapeutic optimization, and improved pain management in this population.

P761

GOUT IN PATIENTS WITH TYPE 2 DIABETES: A MORE SEVERE AND UNDERTREATED DISEASE? A REAL-WORLD STUDY

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Introduction :
Gout frequently coexists with type 2 diabetes mellitus (T2DM) and adds to the morbidity of a population already burdened by cardiometabolic comorbidities. However, data characterizing the severity of gout and its management among patients with T2DM in routine clinical practice remain limited.
Objectives :
To assess the clinical severity of gout and the quality of its management in patients with T2DM.
Methods :
We conducted a retrospective observational study including 100 patients with T2DM and a confirmed diagnosis of gout, followed in an Internal Medicine Department. Data regarding gout characteristics, comorbidities, and treatments were collected. Gout severity was assessed by annual flare frequency, polyarticular involvement, presence of tophi, and gout-related hospitalizations. Quality of management was evaluated based on the use of urate-lowering therapy (ULT), achievement of target serum uric acid (SUA) levels (<360 µmol/L), and colchicine use.
Results :
The study included 100 patients (mean age 58 ± 10 years; 54% male; mean duration of diabetes 12 ± 6 years). Cardiometabolic comorbidities were frequent: hypertension (78%), obesity (52%), dyslipidemia (61%), and chronic kidney disease stage ≥3 (46%). Gout had a high clinical burden: mean annual flares 2.0 ± 1.1, 44% experiencing ≥2 flares/year, polyarticular involvement in 41%, and tophi in 28%. Gout-related hospitalizations occurred in 22%.
Management was suboptimal: only 66% received ULT, with a mean allopurinol dose of 190 ± 60 mg/day and only 18% titrated to >300 mg/day. Target SUA (<360 µmol/L) was achieved in 39% of patients. Recurrent colchicine use was reported in 58%, and 12% required repeated NSAID courses. Patients with chronic kidney disease were less likely to receive ULT and less likely to achieve target uric acid, highlighting treatment gaps in high-risk subgroups.
Conclusion :

In this real-world cohort, gout in patients with T2DM was associated with substantial clinical severity and suboptimal management. These findings emphasize the need for improved recognition and optimized treatment strategies for gout in this high-risk population.

P762

IMPACT OF SGLT2 INHIBITORS ON GOUT OUTCOMES IN PATIENTS WITH TYPE 2 DIABETES: A REAL-WORLD STUDY

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Objective:
To investigate the association between SGLT2 inhibitor use and gout burden in patients with T2DM.
Methods :
We conducted a retrospective, single-center observational study including 100 patients with type 2 diabetes mellitus (T2DM) and a confirmed diagnosis of gout, followed in the Internal Medicine Department of the Hospital of the Internal Security Forces in La Marsa. Patients were categorized according to exposure to sodium–glucose cotransporter 2 inhibitors for at least six months (SGLT2i+ vs SGLT2i−). The primary outcome was the annual rate of gout flares. Secondary outcomes included changes in serum uric acid (SUA) levels, attainment of target uricemia (<360 µmol/L), use of urate-lowering therapy (ULT), colchicine use, and gout-related hospitalizations.
Results :
Among the 100 patients, 48% were treated with SGLT2 inhibitors. Baseline characteristics were comparable between groups, including age, sex, diabetes duration, and baseline SUA levels. During follow-up, patients in the SGLT2i+ group experienced a significantly lower mean annual number of gout flares compared with the SGLT2i− group (1.2 ± 0.8 vs 2.1 ± 1.1 flares/year, p=0.002). A significant reduction in mean SUA levels was observed in the SGLT2i+ group (−78 ± 34 µmol/L, p<0.001), whereas no significant change was noted in patients not receiving SGLT2 inhibitors. Achievement of target uricemia occurred more frequently in the SGLT2i+ group (62% vs 38%, p=0.01). The proportion of patients requiring colchicine for acute flares was significantly lower among SGLT2i-treated patients (35% vs 57%, p=0.03). Rates of gout-related hospitalization were reduced in the SGLT2i+ group, although this difference did not reach statistical significance. No increase in adverse events was observed. The association between SGLT2i use and reduced flare frequency persisted independently of concomitant ULT.
Conclusion :
In this real-world cohort of patients with T2DM, SGLT2 inhibitor therapy was associated with a significant reduction in gout flares and improved serum uric acid control. These findings suggest that SGLT2 inhibitors may provide clinically meaningful benefits beyond glycemic control and represent a promising adjunctive strategy in the management of gout among diabetic patients.

P763

APPENDICULAR SKELETAL MUSCLE MASS INDEX AND FALL RISK AMONG OLDER PATIENTS IN REHABILITATION UNIT

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Objective
Our purpose was to evaluate the relationship between appendicular skeletal muscle mass index (ASMI) and fall risk in older adults.
Material and Methods
A cross-sectional study enrolled 60 years and older individuals during inpatient rehabilitation after hip or knee arthroplasty, pelvic or femoral fractures and other chronic conditions e.g. lumbar stenosis. Body composition was assessed using bioelectrical impedance analyser Accuniq BC300. ASMI was calculated as the sum of lean muscle mass of the upper and lower limbs divided by height squared (kg/m^2). Fall risk was assessed by: Tinetti Performance Oriented Mobility Assessment (POMA), Timed-Up-and-Go test (TUG). High fall risk was defined as a POMA score <19 points and TUG time ≥ 20 seconds. Data was analysed using SPSS ver.27.0: Spearman's correlation, Mann-Whitney U test were performed.
Results
The study Participants' (38 (86.4% women), 6 (13.6% men)) mean age was 73.4 ± 9.1 years. POMA showed high fall risk in 16.1% of patients, TUG test in 33.3% of patients. The mean of ASMI was 7.726 ±1.366 kg/m^2, ranging from 5.57 to 11.46 kg/m^2. ASMI score showed a weak correlation with TUG time (r = -0.457, p=0.005). There was no significant correlation between ASMI and POMA scores. ASMI was significantly lower in the TUG high fall risk group (median = 6.91 kg/m^2, IQR 6.68-7.30) than in the group without high fall risk (median = 7.76 kg/m^2, IQR 7.35-9.21) (p=0.026). There was no significant difference in ASMI between the POMA groups.
Conclusions
Results of this study indicate a relationship between ASMI and fall risk in older adults. Patients with high fall risk assessed by the TUG test have lower ASMI than those without high fall risk.

P764

NUTRITIONAL STATUS AND FALL RISK AMONG OLDER ADULTS DURING INPATIENT REHABILITATION

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Objective
The purpose of the study was to evaluate the relationship between nutritional status and fall risk in older patients undergoing rehabilitation.
Material and Methods
A cross - sectional study included 60 years and older adults undergoing inpatient rehabilitation after pelvic or femoral fractures, hip or knee replacement or chronic diseases such as spinal stenosis. Patients with a Mini-Mental State Examination score of 18 or higher were included in the study. Nutritional Status was assessed by full form of Mini Nutritional

Assessment (MNA) and Nutritional Risk Screening 2002 (NRS). Based on NRS scores, patients with a score of 3 and more are suggested to be at risk of malnutrition. Based on full MNA, nutritional status was evaluated according to the following scores: malnourished (<17), at risk of malnutrition (17-23.5) and well- nourished (24-26). Fall risk was evaluated by the Timed Up and Go test (TUG) and Tinetti Balance Assessment Test (TT). High risk of falls was defined as TUG score ≥ 15 seconds and TT as < 19 points. Pearson 's correlation, Mann Whitney U tests were performed using SPSS ver.27.0.
Results
We enrolled 38 participants (86.4% women), whose mean age was 73.4±9.1 years. Based on MNA, 6 (13.6%) patients were malnourished, 24 (54.5%) were at risk of malnutrition, 14 (31.8%) were well-nourished. According to NRS, 40.4% were at risk of malnutrition. Based on the TUG and TT, a high risk of falls was identified in 61.1% and 16.1%, respectively. A moderate correlation between TUG and NRS (r = 0.573; p < 0.001) and negative weak correlation between TUG and MNA score (r = - 0.450; p = 0.004) was determined. There was no significant correlation between TT and MNA scores. A negative weak correlation was found between TT and NRS (r = - 0.463; p = 0.009). Patients with high fall risk according to TUG test had higher NRS scores – 2.5 (IQR 2.0-3.25) compared to those without fall risk – 1.5 (IQR 1.0- 2.0) (p = 0.013). According to TT, patients with high fall risk had higher NRS – 2.5 (IQR 1.0 - 4.0) compared with those without fall risk - 2.0 (IQR 1.25 - 3.0) (p = 0.029). There was no significant difference in MNA scores between groups with high fall risk and without high fall risk.
Conclusions
Findings of our study suggest that nutritional status in older patients undergoing rehabilitation is associated with a risk of falls. Patients with higher risk of fall had higher NRS score than those without high fall risk according to TUG and TT.

P765
NUTRITIONAL STATUS AND INCIDENCE OF SARCOPENIA IN OLDER ADULTS WITH CHRONIC HEART FAILURE

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Objective: The aim of this study was to investigate the nutritional status and influencing factors of sarcopenia in older adults with chronic heart failure (CHF).

Materials and methods: An inclusion criteria to this cross-sectional study were: age 65 or more years, diagnosis of CHF, unrestricted mobility, MMSE ≥ 21. Nutritional status was assessed by Mini Nutritional Assessment (MNA). Based on MNA score participants were classified as having normal nutrition, being at risk of malnutrition, or being malnourished. Sarcopenia was defined according to European Working Group on Sarcopenia in Older People criteria made in 2018. Body composition was measured by dual-energy x-ray absorptiometry (iDXA, GE Lunar, USA), muscle strength was evaluated measuring handgrip strength (JAMAR, Patterson Medical, UK), and physical performance was evaluated by the gait speed test. Chi-squared test was used to assess differences between sarcopenia and nutritional status groups. Multivariate logistic regression analysis was used to assess the odds of having sarcopenia if MNA score decreases.

Results: The study included 117 community dwelling older adults with heart failure: 21 (17.9%) men and 96 (82.1%) women. Mean age was 83.32±7.11 years, ranging from 65 years to 97 years. Out of all participants 61 (52.1%) were classified as having sarcopenia, of which 15 (24.6%) were men and 46 (75.4%) were women. According to MNA score 44 (37.6%) participants were in normal nutritional status, 58 (49.6%) were risk of malnutrition and 15 (12.8%) were malnurished. There was a statistically significant difference between nutritional status groups and sarcopenia category: participants without sarcopenia were in normal nutrition group while participants with sarcopenia were malnourished or at risk of malnutrition ($\chi 2$ = 15.95, p < 0.0001). Multivariate logistic regression analysis revealed that higher BMI and MNA were protective factors for sarcopenia (OR: 0.7, 95%CI (0.57;0.85), OR: 0.76, 95%CI (0.62;0.93)), respectively. Higher fat mass was associated with the risk of sarcopenia (OR: 1.1 (1.02;1.18)) in older adults with CHF, after adjusting for confounding factors.

Conclusion: Results of our study shows that in older adults with CHF and sarcopenia malnutrition is more prevalent than in participants without sarcopenia. In addition higher BMI and MNA reduced the risk of sarcopenia.
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P766
BIOMARKER EVIDENCE OF ACCELERATED BIOLOGICAL AGING IN HIP FRACTURE PATIENTS WITH OSTEOPOROSIS/OSTEOPENIA/ PATHOLOGIC PFRACTURE

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Objective: To study if hip fracture patients exhibit biomarker profiles consistent with accelerated biological aging independent of chronological age.
METHODS: This cross-sectional study analyzed Mayo Clinic platform data from 2000 to 2024, comparing biomarker profiles between hip fracture patients with osteoporosis/osteopenia/pathologic fracture (Cohort A) and general population controls (Cohort B). Both cohorts were restricted to ages 60-80 years to minimize age confounding, with mean age difference of <1 year. We examined 10 pre-specified aging biomarkers and conducted comprehensive screening of 10,921 laboratory tests. Effect sizes were calculated using Cohen's D.
RESULTS: Among 10 pre-specified biomarkers, minimal differences were observed for albumin (D=-0.26) and P1NP (D=-0.09). However, comprehensive screening identified strong evidence for accelerated aging across multiple physiological systems. Large effects (|D|≥0.8) were observed for proinsulin elevation (D=+1.15, indicating metabolic dysfunction), hematocrit reduction (D=-0.95, anemia/frailty), and

potassium elevation (D=+0.77, kidney dysfunction). Medium effects (|D|=0.5-0.8) included IGF-1 decline (D=-0.58, growth hormone axis decline) and HDL cholesterol elevation (D=+0.71, likely treatment effect). Small-to-medium effects included interleukin-18 elevation (D=+0.45, chronic inflammation). Paradoxically, some markers showed favorable changes likely reflecting medical treatment, such as eGFR (D=+0.47), vitamin D (D=+0.24), and calcium D=+0.24).
CONCLUSIONS: Individuals with osteoporosis, osteopenia, and hip fracture demonstrate biomarker patterns suggestive of accelerated biological aging across metabolic, hematologic, renal, endocrine, and inflammatory systems, independent of chronological age. The large effect size for proinsulin suggests severe metabolic dysfunction, while reduced hematocrit indicates diminished hematologic reserves characteristic of frailty. Although treatment effects complicate interpretation, they do not fully explain the multi-system aging pattern. These findings support the hypothesis that hip fractures are associated with advanced biological aging and suggest potential targets for comprehensive geriatric interventions beyond traditional bone-directed therapies. Longitudinal studies are needed to establish temporal relationships and causality.

P767

VERTEBRAL FRACTURES BY VFA/DXA: THE FACTS AND THE DEFINITIONS

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A vertebral fracture (VF) usually means osteoporosis (OP). Defined as ≥20% loss of vertebral height, it was found in 65.8% of patients (aged ≥ 65 years) in a densitometry unit[1], utilizing Vertebral Fracture Assessment by DXA (VFA/DXA). We analyze some implications of these findings
Objective:
To specify the characteristics of VF according to a pragmatic approach for their definition in the clinic.
Methods:
This retrospective study includes patients referred for densitometry on a iDXA GE-Lunar device, who had a VFA/DXA, by proposed criteria[2]. We define VF as a loss of vertebral body height of ≥20% in one or more vertebral areas[3], analyzing concordance of 2 observers identifying the number of vertebrae affected; percentage of VF grade 1 to 3; percentage of multiple (3 or more) VF and association with BMD value and OP. We report with simple descriptive statistics and a concordance analysis between observers.
Results:
We included 1226 patients (91.9% women, mean age of 74 ± 8.5 years); 807 (65.8%) had at least one VF. Most fractures (61.8%) were grade 1, but 56% of patients had 3 or more VF. More affected levels were from T6 to T9 and T11-T12. OP was significantly more common in the spine (79.1%) and femur (83.3%) in those with VF ($p<0.05$). Interobserver agreement was moderate when using the kappa coefficient ($\kappa = 0.60$), but increased to good when applying Gwet's AC1 (AC1 = 0.69; 95% CI 0.55–0.83), suggesting an effect of prevalence on kappa value.
Discussion: Is the 20% limit adequate to define the presence of a fracture? Different screening methods result in differences in the prevalence of VF. Overdiagnosis may occur, but the main problem is lack of identification. The definition used here for VFA/DXA is easy to apply and may result in increased case detection. Patients with grade 1 VF or even borderline have a higher risk of fractures, but those with multiple VF or even a single definable VF require treatment, keeping close surveillance on those with borderline changes.
Conclusions:

This definition reveals a high frequency of VF by VFA/DXA, highlighting the prevalence of multiple VF. All of them should be treated properly
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P768

ASSOCIATION BETWEEN 25-HYDROXYVITAMIN D (25OHD) LEVEL, BODY MASS INDEX (BMI), AND SEASON IN ADULT WOMEN

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Objective

To evaluate the association between BMI and 25OHD level in a population of adult women who did not receive Vit D supplementation, considering the influence of season, and to describe the distribution of vitamin D levels according to BMI.

Materials and methods

Observational study in 750 adult women from La Plata, Argentina, who were not receiving vitamin D supplementation. BMI, 25OHD level, and season were recorded.

Continuous variables were described using descriptive statistics, and associations were assessed using Spearman's rank correlation coefficient. Group comparisons were performed using parametric or non-parametric tests as appropriate. A p-value < 0.05 was considered statistically significant.

Results:

BMI x: 26.5 ± 5.9 kg/m², with a median of 25.2 kg/m²; 18.9% of the women were overweight and 3.5% met the criteria for obesity.

25OHD level showed an asymmetric distribution, with mean of 22.0 ± 8.3 ng/mL and a median of 21.5 ng/mL (IQR 15.9–27.1); 85.7% of the sample had levels below 30 ng/mL, while 14.0% had levels ≥30 ng/mL, including 3.3% with levels ≥40 ng/mL.

Association between BMI and 25OHD level: a statistically significant negative correlation was found, with lower vitamin D levels observed as BMI increased ($\rho = -0.20$; $p < 0.0001$).

25OHD levels varied significantly according to season (KW, H = 78.25; $p < 0.0001$). Median levels were highest during the summer (25.95 ng/mL) and lowest in winter (18.60 ng/mL), with intermediate values in autumn (23.45 ng/mL) and spring (21.10 ng/mL). Post-hoc analysis showed

significant differences between seasons.

25OHD levels according to BMI (Table).

25OHD	Obese women	No obese women
<20 ng/mL	55,2 %	36,5 %
20-30 ng/mL	38,8 %	46,4 %
30-40 ng/mL	4,2 %	13,1 %
>40 ng/mL	1,8 %	3,9 %

Conclusion

In adult women, insufficient vitamin D levels were frequently observed. While a small proportion reached concentrations ≥30 ng/mL without supplementation, level ≥40 ng/mL, which would be necessary for non-skeletal functions (such as the prevention of autoimmune diseases, etc), were exceptional. 25OHD levels were inversely associated with body mass index and showed marked seasonal variation, with deficient values being more frequent in obese women.

P769

OPTIMIZING GUIDELINE-BASED SCREENING FOR ADULTS IN SOUTHWESTERN ONTARIO WITH MULTIPLE ENDOCRINE NEOPLASIA TYPE 1 (MEN1) SYNDROME: A QUALITY IMPROVEMENT (QI) INITIATIVE

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Objective: Through a QI framework, we aim to improve adherence to guideline-based screening in adults with MEN-1 in Southwestern Ontario by at least 20% by 2030.
Material and Methods: We conducted a retrospective 5-year chart review of all adults with MEN1 followed by Southwestern Ontario's Tertiary Care Centre (n=26) to assess baseline adherence to the 2025 MEN1 guidelines, defined as the proportion of completed investigations relative to those due. To improve adherence, we sent patient-specific recommendations to their endocrinologist, disseminated and presented on the 2025 MEN1 guidelines within the division, and placed a guideline summary printout in clinical areas.
Results: Baseline screening adherence varied. For parathyroid hyperplasia, serum calcium was assessed at diagnosis in 57% and annually in 78%. For dp-NETs, serum fasting gastrin was assessed at diagnosis in 62% and annually in 38%; pancreatic imaging was assessed at diagnosis in 69% and follow up imaging in 100%. For sellar masses, prolactin and IGF-1 were assessed at diagnosis in 71% and 59% and annually in 67% and 31%, respectively; sellar imaging was assessed at diagnosis in 47% and follow up imaging in 85%. Screening adherence for thymic, bronchopulmonary, adrenal, and breast tumours had similar variable adherence. Patients had a mean of 9.7 clinical visits over the last 5-years.
Conclusion**:** Despite frequent follow up, adherence to MEN1 guideline-recommended screening is variable. Our targeted QI interventions may improve guideline-concordance and patient outcomes. If successful, these insights and strategies could be considered at other centres. Future work will evaluate intervention impact and refine strategies within the QI framework.

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THORACIC SPONDYLODISCITIS PRESENTING WITH BACK PAIN: A CASE REPORT

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Objectives: Spondylodiscitis is an infection of the body and vertebral disc whose early detection and treatment can prevent future relevant pathologies, such as compressive myelopathy. It is important to perform a detailed physical examination and complementary tests that avoid a late diagnosis that increases the comorbidity of the condition. We present a case of 66-year-old male who presented with back pain and diagnosed to have spondylodiscitis.
Material and Methods: A 66-year-old male with no medical comorbidities, with 4 months history of upper back pain and intermittent fever of up to 39oC coinciding with the same. Associated morning stiffness was present. He has received analgesic treatment without improvement. Dorso-lumbar X-ray: vertebral degenerative changes. Laboratory analysis revealed high acute inflammatory parameters and nuclear magnetic resonance of thoracic spine revealed signs of osteomyelitis in the disc-vertebral body complex D8-D9 with a large anterior paravertebral and epidural abscess causing severe dorsal stenosis with spinal cord compression and signs of compressive myelopathy. Blood cultures: Staphylococcus aureus positive.
Results: Based on collected results, we have concluded that diagnosis was infectious spondylodiscitis with left paravertebral abscess and antibiotic therapy was performed. The patient is currently without back pain or fever.
Conclusions: Early diagnosis of bacterial spondylodiscitis remains a challenge due to the nonspecific signs and symptoms reported by the patient and the wide variability of laboratory results and imaging. The basis for early diagnosis remains the clinical suspicion at the time of initial treatment.
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DIAGNOSTIC CHALLENGES IN A RARE SYSTEMIC INFLAMMATORY SYNDROME IN THE ELDERLY

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Objectives: Adult Onset Still's disease (AOSD) is an inflammatory disorder characterized by quotidian (daily) fevers, arthritis, and an evanescent rash. It is a rare inflammatory disorder of unknown etiology. Due to lack of definitive diagnostic test, the diagnosis of AOSD can only be made after exclusion of other causes. We present a case of adult

onset Still's disease.
Matherial and methods: An 84-year-old woman with two weeks histoy of fever, polyarthritis with edema in both hands, sore throat and erythematous macular rash on the arms, neckline and back that did not improve despite conservative treatment. Exploration and complementary tests: good general condition with good vital signs. Highlight the lung auscultation crackles in the right base, with rest unremarkable exploration. Hemogram with predominantly polymorphonuclear leukocytosis, elevated acute phase reactants, ferritin, and transaminases. Referred for hospital admission. Negative blood cultures, urine antigen detections, and autoimmunity. Chest, hands, wrists, lumbar spine, pelvis, and sacroiliac X- rays with marked signs of generalized degenerative osteoarthritis without lytic or blastic lesions. Chest CT showing bilateral pleural effusion and minimal pericardial effusion.
Results: When infectious and tumor processes were ruled out, treatment with high-dose steroids was started, associating weekly methotrexate. Clinical judgment: adult Onset Still's disease. She is doing well and is completely symptom free.
Conclusions: Adult Still's disease is a systemic inflammatory pathology with a prevalence of 1/100,000 people, whose diagnosis and etiology remain unclear, and may be related to viral infections, a certain seasonality in the symptoms, as well as activity factors and prognosis, the concentration of interleukin 1 and the increase in serum ferritin. Since the delay in its diagnosis leads to a worsening in the prognosis of patients (40% will have a chronic course), it is essential a high clinical suspicion based on the Yamaguchi criteria (fever with evening peaks, rash, inflammatory arthralgia, intense sore throat, and leukocytosis with a predominance of polymorphonuclear cells and hyperferritinemia) for optimal and early treatment.
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P772
CALCIUM KNOWLEDGE AND DAILY CALCIUM INTAKE AMONG MEN AGED 18 YEARS AND OLDER IN THE WESTERN REGION OF MONGOLIA

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Objective: Calcium is essential for bone structure, muscle contraction, nerve transmission, and blood clotting, and inadequate intake increases the risk of osteoporosis. International studies have mostly focused on adolescent and menopausal women, so there is a need for a broader study regardless of age or gender.To determine the knowledge and daily intake of calcium among men over 18 years of age in Uvs aimag, a western aimag, and to assess the influencing factors.
Methods: A cross-sectional study was conducted involving 109 men aged 18 to 75 who received care at the general hospital of Uvs province in the Western region. Daily calcium intake was assessed using the International Osteoporosis Foundation (IOF) questionnaire for calcium intake evaluation. The study results were analyzed using SPSS version 26 software.
Results: The average age of the participants was 44.39 ± 2.47 years. Among the male participants, 62.4% had a low level of knowledge about calcium, 13.8% had a moderate level, and 23.8% had a high level. Additionally, 45.9% of participants had very low daily calcium intake (<500 mg), 41.3% had insufficient intake (500–1000 mg), and 12.8% had adequate intake (1000 mg). The level of calcium knowledge among participants showed a statistically significant association with vitamin D intake and education level ($p = 0.001$). However, no statistically significant differences were observed between calcium knowledge and participants' age, BMI, smoking status, or alcohol consumption. Participants' education level was significantly associated with average daily calcium intake ($p = 0.001$). Furthermore, calcium knowledge was positively correlated with daily calcium intake ($r = 0.827$, $p < 0.003$).
Conclusion: The average daily calcium intake among adult men in the Western provinces was 603 mg, which is insufficient. Since lower levels of knowledge were associated with reduced calcium intake, it is necessary to enhance education and awareness efforts.

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RISK FALL ASSESSMENT AMONG RESIDENTS OF ULAANBAATAR CITY

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Objective: As of 2024, a total of 47 individuals aged 45 to 85 have died as a result of falls in Mongolia. Therefore, it is imperative to evaluate the risk of falls among the population, identify contributing risk factors, and implement effective prevention strategies to reduce accidents and related injuries nationwide. To assess the risk of falls among individuals aged 45 and over receiving care at referral hospitals in Ulaanbaatar city.
Methods: A cross-sectional study was conducted involving 408 participants aged 45 and above receiving care at referral hospitals in Ulaanbaatar city to assess the risk of falls using the International Fall Risk Assessment Tool (FRAT) questionnaire. The study results were analyzed using SPSS version 26 software.
Results: The average age of the participants was 59.2 ± 6.54 years, with 40% male and 60% female. Among the participants, 45.3% (n=185) were classified as having a low risk of falling, 33.6% (n=137) had a moderate risk, and 21.1% (n=86) had a high risk. Logistic regression analysis was conducted to identify risk factors influencing falls. The results showed the following significant factors: Whether the shoe sole slips: OR = 0.226, 95% CI (confidence interval) 0.119–0.428, p <0.001. Whether sudden, unsafe movements occur when changing position: OR = 0.262,

95% CI 0.143–0.48, p <0.001. Use of additional assistive devices while walking: OR = 0.209, 95% CI 0.11–0.397, p <0.001. Presence of anxiety or unstable emotional state: OR = 0.276, 95% CI 0.148–0.514, p< 0.001. Tendency to be disobedient or resistant to others' instructions: OR = 0.33, 95% CI 0.183–0.596, p <0.001. Difficulty recognizing the surrounding environment: OR = 0.354, 95% CI 0.187–0.671, p <0.001. History of previous falls: OR = 4.737, 95% CI 2.151–10.429, p<0.001 these factors were found to significantly affect the assessment of fall risk.

Conclusion: Fifty-five percent of the participants were at moderate to high risk of falls, and those with a history of previous falls had a 4.7 times higher risk. Therefore, it is necessary to develop a comprehensive fall risk assessment method tailored to the general population.

Keywords: FRAT, risk, referral, assessment

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X-LINKED HYPOPHOSPHATEMIA IN ADULTS: PHENOTYPE, GENOTYPE, AND THERAPEUTIC MANAGEMENT (CASE SERIES)

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Introduction: X-linked hypophosphatemia (XLH) is an inherited FGF23-mediated phosphate-wasting disorder leading to chronic hypophosphatemia and osteomalacia. Adult XLH is frequently underrecognized and may range from mild symptoms to disabling pain and pseudofractures.

Methods: Descriptive case series of six adults with XLH followed in a joint Rheumatology–Nephrology clinic. We systematically collected phenotype and orthopedic history, fasting serum phosphate and related biochemistry, bone scintigraphy, DXA (Dual-energy X-ray absorptiometry), PHEX genotype, and treatments. Clinical and biochemical response after therapy was assessed in routine care.

Results: Six adults (5 women), age range 26–64 years; short stature was common and 4/6 had childhood skeletal deformities with prior corrective surgery and/or multiple orthopedic procedures. DXA was available in most patients (5/6), with generally normal/high lumbar spine values and femoral neck osteopenia in some. Three patients were managed with conventional therapy (oral phosphate plus active vitamin D) and had no active scintigraphic lesions (one old femoral fracture). Three patients received burosumab; bone scintigraphy showed active skeletal lesions in two (2/3) and no active fractures in one (1/3). One patient had stage 1 chronic kidney disease.

Conclusions: Adult XLH shows marked phenotypic heterogeneity. In this real-world multidisciplinary cohort, half of patients received burosumab, often in the context of active skeletal lesions and/or limitations of conventional therapy. Structured adult follow-up integrating phenotype, imaging and genotype may support timely treatment selection and reduce fracture-related morbidity.

Tables and figures

Table 1. Adult XLH cases (n=6): phenotype, PHEX genotype, treatment and key investigations.



Figure 1.*Bone scan: active femoral fracture uptake (pseudofracture/ ongoing fracture).*



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SEX-SPECIFIC BONE ADAPTATION AFTER 4 MONTHS OF MILITARY BASIC TRAINING: DIVERGENT DXA AND PQCT FINDINGS IN SPANISH ARMY TRAINEES

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Objective

To quantify 4-month changes in total-body bone outcomes assessed by DXA and pQCT during military basic training, and to explore sex-specific determinants of response.

Material and Methods

Prospective analysis of Spanish Army trainees assessed at baseline and after 4 months. Primary outcomes were DXA total-body areal BMD (g/cm²) and pQCT total volumetric density (mg/cm³). Analyses were stratified by sex. Paired changes (Δ) were evaluated after testing Δ normality with Shapiro–Wilk: paired t-test with Cohen's dz if normal, otherwise Wilcoxon with effect size r. Sensitivity analyses excluded extreme Δ outliers (±3×IQR). Associations were examined using sex-specific OLS models with HC3 robust errors (dependent: ΔDXA or ΔpQCT; predictors: baseline bone value, age, Δ lean mass [or Δ weight/BMI if needed], baseline 25(OH)D, Δ25(OH)D, vitamin D/calcium supplementation).

Results

Men (N=104): DXA BMD increased from median 1.197 [IQR 1.153–1.278] to 1.235 [1.179–1.299]. In sensitivity analysis (paired n=90), mean

ΔDXA was +0.025±0.035 g/cm² (p<0.001, dz=0.717). pQCT total density showed no meaningful change (sensitivity paired n=86: Δ −0.19±11.06 mg/cm³, non-significant).

Women (N=26): DXA BMD increased (mean 1.136→1.155 g/cm²; p=0.004; dz=0.62). In contrast, pQCT total density decreased (Wilcoxon p=0.0048; sensitivity paired n=23: mean Δ −8.6±14.9 mg/cm³; p=0.005; r=−0.53).

Across both sexes, 25(OH)D rose by ~9–10 units on average, but robust models did not identify consistent predictors of ΔDXA or ΔpQCT (all p>0.28 in men for ΔDXA; none significant in women; weak, non-significant negative trends for Δ25(OH)D with ΔpQCT). Supplementation was rare (vitamin D 3%; calcium 0%).
Conclusion

After 4 months of military basic training, total-body DXA BMD increased significantly in both sexes (small-to-moderate in men; moderate in women). However, pQCT total density remained stable in men and decreased in women, suggesting sex-specific adaptation and/or methodological differences between areal and volumetric metrics that may mask compartmental remodeling. Future studies should include paired trabecular/cortical pQCT measures and larger female samples.

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COMPARTMENT-SPECIFIC BONE ADAPTATION DURING 4-MONTH BASIC MILITARY TRAINING: SEX-SPECIFIC PQCT CHANGES, DXA–PQCT DISCORDANCE AND THE ROLE OF 25OHD

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Objective
To assess sex-specific, compartmental bone adaptation to 4-month basic military training and whether 25-hydroxyvitamin D (25OHD), supplementation and lean mass gain predict peripheral quantitative computed tomography (pQCT) changes and discordance with dual-energy X-ray absorptiometry (DXA).
Material and Methods
Baseline and 4-month measures were analysed separately in men and women. Primary outcomes were Δ pQCT trabecular and cortical+subcortical volumetric density. Predictors were age, baseline bone value, baseline 25OHD, Δ25OHD, vitamin D/calcium supplementation (yes/no) and Δ lean mass. Δ was second minus baseline. Models used OLS with HC3 robust errors; sensitivity excluded extreme Δ outliers (±3×IQR). Within-individual trabecular–cortical contrasts used Wilcoxon when non-normal.
Results
Men (N=104; pQCT Δ n=90): Δtrabecular and Δcortical did not differ (Wilcoxon p=0.80). DXA–pQCT total discordance was 40/87 (46%), with no association with baseline 25OHD (p=0.56) or Δ25OHD (p=0.21); Δ lean mass showed a trend to lower discordance in logistic models (p=0.055). Compartment models (n=88) showed no significant 25OHD effects; the inverse association of Δ25OHD with Δcortical was not significant (p=0.22).

Women (N=26; pQCT Δ n=24): trabecular–cortical change differed (Wilcoxon p=0.031), reflecting cortical decline with trabecular stability. Discordance was 16/24 (67%) and was not associated with baseline 25OHD (p=0.98) or Δ25OHD (p=0.46). In compartment models (n=24), no predictor (including baseline 25OHD or Δ lean mass) significantly explained Δtrabecular or Δcortical.
Conclusion(s) Bone adaptation to training was compartmental and sex-specific: women showed cortical loss with trabecular–cortical decoupling, whereas men showed modest, homogeneous changes. DXA–pQCT discordance was frequent and not explained by 25OHD. Δ lean mass may relate to lower discordance in men, warranting confirmation.

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BASELINE BONE HEALTH AND MODIFIABLE RISK FACTORS IN SPANISH ARMY RECRUITS PRIOR TO BASIC TRAINING: SEX-SPECIFIC ASSOCIATIONS OF VITAMIN D AND BODY COMPOSITION WITH DXA AND PQCT PARAMETERS

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Objective
To describe baseline bone health in Spanish Army recruits before basic training and assess modifiable factors (25-hydroxyvitamin D [25OHD], supplementation, body composition) associated with a low bone profile by DXA and pQCT.
Material and Methods
Cross-sectional baseline-only analysis; sexes analysed separately. Primary outcomes: DXA total areal BMD (g/cm²) and pQCT total volumetric density (mg/cm³). Predictors: 25OHD (ng/mL; <20 deficient, 20–29 insufficient, ≥30 sufficient), vitamin D/calcium supplementation (yes/no), DXA lean mass (kg), BMI (kg/m²), age (years). Low bone profile = lowest within-sex quartile (Q1). OLS with HC3 robust errors; logistic models compared Q1 vs non-Q1 with reduced predictors.
Results
Men: N=104 (25OHD n=102; DXA n=102; pQCT n=92). Vitamin D: deficient 2.9%, insufficient 56.9%, sufficient 40.2%. Low DXA-Q1: 26/102; low pQCT-Q1: 23/92. OLS showed no associations for 25OHD, lean mass, BMI or age with DXA or pQCT total (all p≥0.20). For low DXA-Q1, lean mass showed a protective trend (per +5 kg, OR 0.62; 95% CI 0.37–1.04; p=0.069); 25OHD was not associated (OR 1.00; p=0.99). No predictors were significant for low pQCT-Q1 (all p≥0.29). Women: N=26 (pQCT n=25). Vitamin D: deficient 11.5%, insufficient 57.7%, sufficient 30.8%. Low DXA-Q1: 8/26; low pQCT-Q1: 7/25. Lean mass was positively associated with DXA (p=0.020) and pQCT total (p=0.028); 25OHD showed a trend for pQCT (p=0.086). Logistic models were unstable; low pQCT-Q1 predictors were non-significant (p≥0.11).

Conclusion
Vitamin D insufficiency was frequent (~58% in both sexes). Baseline bone parameters were more strongly linked to lean mass in women, while in men associations with 25OHD or body composition were not robust. Findings support sex-specific prevention emphasizing lean-mass accrual in women and vitamin D screening prior to training.

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MUSCLE–BONE COUPLING DURING 4-MONTH BASIC TRAINING: DOES LEAN-MASS GAIN TRANSLATE INTO BONE GAIN? SEX-SPECIFIC SLOPES USING DXA AND PQCT

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Objective
To test whether 4-month lean mass gain (Δ lean mass) during basic military training translates into bone gain (primary: Δ pQCT total volumetric density; secondary: Δ DXA total BMD), and to estimate sex-specific slopes and the prevalence of muscle–bone decoupling.

Material and Methods
Military recruits were assessed at baseline and after approximately 4 months of basic training; men and women were analysed separately. Muscle: DXA total lean mass (kg). Bone: pQCT total density (mg/cm³; primary) and DXA total BMD (g/cm²; secondary). Per sex, ordinary least squares models with HC3 robust errors were fitted: Δbone ~ Δlean mass + baseline bone value + age + baseline lean mass + ΔBMI. Decoupling (pQCT) was defined a priori as within-sex Q3 of Δlean mass combined with Q1 of ΔpQCT total; a residual-based variant was also used (Δlean mass ≥Q3 and model residual ≤Q1).

Results
Men: pQCT model n=90; DXA model n=88. For pQCT, the slope was β=−2.17 mg/cm³ per kg (p=0.21); sensitivity β=−0.80 (p=0.30). For DXA BMD, β=−0.0016 g/cm² per kg (p=0.51); sensitivity β=+0.0038 (p=0.132). Decoupling prevalence was 4.4% (Q3−Q1) and 3.3% (residual-based).

Women: pQCT model n=24; DXA model n=25. For pQCT, β=−0.49 mg/cm³ per kg (p=0.71); sensitivity β=+0.60 (p=0.33). For DXA BMD, β=+0.00070 g/cm² per kg (p=0.93), with no relevant sensitivity changes. Decoupling prevalence was 8.3% by both definitions. Between-sex differences in decoupling were not significant (Fisher p≈0.60; residual-based p≈0.28).

Conclusion(s)
During basic military training, lean-mass gain over 4 months was not associated with consistent whole-bone gains on pQCT or DXA in either sex. Decoupling was uncommon (about 3–8%) and did not differ by sex, suggesting limited short-term translation of lean-mass gain into measurable global bone accrual in this military setting.

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BODY COMPOSITION REDISTRIBUTION DURING 4-MONTH BASIC MILITARY TRAINING AND BONE HEALTH: SEX-SPECIFIC ASSOCIATIONS OF REGIONAL LEAN MASS AND ANDROID–GYNOID FAT PATTERNS WITH DXA/PQCT OUTCOMES

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Objective
To test whether regional body composition changes, rather than BMI, predict bone adaptation during basic military training, using change in total dual-energy X-ray absorptiometry (DXA) bone mineral density (BMD) as primary outcome and change in peripheral quantitative computed tomography (pQCT) total volumetric density as complementary.

Material and Methods
Participants underwent baseline and 4-month follow-up DXA/pQCT; men and women were analysed separately. Exposures were follow-up minus baseline (Δ): lower-limb lean mass (sum of both legs, DXA), android–gynoid fat ratio (A/G; android/gynoid fat mass), waist circumference and BMI. Outcomes were ΔDXA total BMD (g/cm²) and ΔpQCT total density (mg/cm³). Associations between Δoutcomes and Δexposures were tested with Spearman correlations. For ΔDXA, multivariable ordinary least squares with HC3 robust errors compared: Model A (age, baseline DXA, ΔBMI) and Model B (age, baseline DXA, Δlower-limb lean, ΔA/G, plus ΔBMI). A quadrant phenotype (median split of Δlower-limb lean up/down × ΔA/G down/up) compared ΔpQCT across quadrants (Welch t).
Results

ΔDXA: In both sexes, ΔBMI, Δwaist and ΔA/G showed small, non-significant associations; Δlower-limb lean did not independently predict ΔDXA. Model B modestly increased explained variance in women (R^2 0.25 vs 0.12), but regional predictors remained non-significant. In men, baseline DXA showed a strong negative coefficient consistent with mathematical coupling of baseline and change.

ΔpQCT: Women (n=24) showed a moderate negative association between ΔA/G and ΔpQCT (ρ=−0.52, p=0.009; sensitivity ρ=−0.46, p=0.029), indicating that greater reductions in relative central fat were associated with better pQCT adaptation. Δlower-limb lean was also negatively associated (ρ=−0.48, p=0.016; sensitivity p=0.050). Men (n=87) showed weak positive trends for Δlower-limb lean (ρ=+0.20, p=0.070) and ΔA/G (ρ=+0.17, p=0.11; sensitivity p=0.057). Quadrant analyses were non-significant in both sexes.
Conclusion(s)

During basic training, where the body changes appears more informative than how much it changes (BMI). In women, reductions in central fat pattern (A/G decrease) were associated with better volumetric bone adaptation (pQCT), whereas ΔBMI was uninformative. In men, regional

signals were weaker and did not reach significance. These data support sex-specific, regional targets over BMI alone.

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ULTRASOUNDGUIDED RADIOFREQUENCY ABLATION OF GENICULAR NERVES FOR CHRONIC KNEE PAIN: A FIVEYEAR SINGLECENTER RETROSPECTIVE STUDY

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Background and aims

Radiofrequency (RF) ablation of the genicular nerves has emerged as a promising interventional modality for the management of chronic osteoarthritic knee pain and persistent postsurgical pain (PPSP). This technique is particularly relevant in patients who demonstrate inadequate response to conventional pharmacological and nonpharmacological therapies.

Methods

A retrospective, singlecenter cohort study was undertaken at the Center for Regeneration and Rehabilitation, Novi Pazar, Serbia, spanning the period from October 2020 to November 2025. The study population comprised patients who received ultrasoundguided conventional radiofrequency (RF) ablation of the genicular nerves for chronic knee pain. In addition to evaluation of the entire cohort, subgroup analyses were conducted based on pain etiology, specifically persistent postsurgical pain (PPSP) and degenerative knee pain. Primary outcome measures included the global perceived effect (GPE), Numeric Rating Scale (NRS) for pain intensity, opioid consumption, and treatment safety. These parameters were assessed at six weeks, six months, twelve months, and crosssectionally at variable time points. Treatment success was defined as a GPE score of ≥ 50%.

Results

Of the 148 patients screened, 125 met the inclusion criteria and were enrolled in the study, comprising 33 cases of persistent postsurgical pain (PPSP) and 92 cases of degenerative knee pain. Treatment success was achieved in 104 of 125 interventions (83.2%) at six weeks, with comparable outcomes across both subgroups. Followup evaluations demonstrated that pain reduction was sustained in 92% of patients at six months and in 71% at twelve months, with the mean duration of therapeutic effect following RF treatment calculated at 9.1 months. Safety assessments performed at six weeks and at the subsequent evaluation point confirmed a favorable safety profile of the intervention.

Conclusion

Conventional radiofrequency (RF) ablation of the genicular nerves demonstrated encouraging outcomes in the study cohort, achieving a success rate exceeding 83.2% among patients refractory to standard medical management. The intervention was welltolerated, with a mean duration of therapeutic effect of 9.1 months.

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CRITERIA FOR EVALUATING PAIN IN PATIENTS WITH PELVIC DISORDERS IN POST -TRAUMATIC AND DEGENERATIVE STENOSIS OF THE SPINAL CANAL

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The criteria for evaluating the pain syndrome (BS) in patients with dysfunctions of the pelvic organs (NFTO) with stenosis of the vertebral canal (SEC), as a result of an injury or degenerative-dystrophic process of the thoracic and (or) lumbar spine, recommended for use in the medical and social examination) Rehabilitation (MR). A clinical and functional assessment of the condition of 65 NFTO patients under SEC: 40 (61.5%, CI: 49.1-72.4) men and 25 (38.5%, CI: 27.6-50.6) women. The age distribution of patients according to it seemed that most examined men were represented in groups: 41-50 years-19 people. (47.5%, DI: 33.0-62.5) and up to 40 years-13 people. (32.5%, DI: 20.1-48.0). Most of the examined women (48.0%) were in the age range of 41-50 years (12 people, DI: 30.0-66.5). According to the duration of the disease, patients were distributed as follows: up to one year - 26 people. (40.0%; DI: 29.0-52,1); From 1 year to 3 years-22 people. (33.8%, CI: 23.5-46.0); From 3 to 10 years-17 people. (26.2%, DI: 17.0-38.0). According to the etiological factor, the distribution of patients in the studied group was as follows: NFTO at the SEC at the level of the chest and (or) lumbar spine - 34 people. (52.3%, DI: 40.4-64.0), PSMT of the thoracic and (or) lumbar spine-15 people. (23.1%, DI: 14.5-34.7), a combination of PSMT and post-traumatic SPK-16 people. (24.6%, DI: 15.8-36.3).

Disorders of the statodynamic function in patients due to the reza (central spastic, sluggish peripheral, combined) varying severity were detected in 63 cases (96.9%, DI: 89.5-99.2). Along with impaired distinguishing functions (100% of cases) and statodynamic function, mental disorders (22 people, 33.9%, CI: 23.5-46.0), and blood circulation functions were often observed. (47.7%, CI: 36.0-59.6). BS of varying degrees of severity was detected in 63.0%, other types of disorders, partially exacerbating the severity of life restrictions: violations of surface, as well as deep sensitivity, neurotrophic disorders - in 69.9%. When analyzing the functional status, the degree of severity of the NFTO, changes in the state of health at all stages of the MR and ITU in patients with PSMT and SPK, scales and questionnaires were used.

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EFFECTS OF ACUTE AND CHRONIC STRESSORS ON SPONTANEOUSLY HYPERTENSIVE RATS: BONE MORPHOFUNCTIONAL ANALYSIS BY IMMUNOHISTOCHEMISTRY, MMP-2 AND MMP-9 ZYMOGRAPHY, AND MICRO-COMPUTED TOMOGRAPHY

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Background: Hypertension and psychological stress are prevalent conditions that may adversely affect bone health, yet their combined impact on bone remodeling remains underexplored. Objective: This study aimed to investigate the effects of acute and chronic stress on bone structure and remodeling in normotensive and spontaneously hypertensive rats. Methods: Forty male rats (20 normotensive Hannover and 20 spontaneously hypertensive) were randomly assigned to control, acute stress, or chronic variable stress groups. Acute stress consisted of a single 2-hour restraint session, while chronic variable stress involved five different stressors over 10 days. Bone remodeling was assessed using micro-computed tomography (micro-CT) for structural analysis, immunohistochemistry for VEGF, bone sialoprotein (BSP), osteocalcin (OCN), and TRAP, as well as enzymatic activity analysis (MMP-2 and MMP-9). Results: Micro-CT analysis revealed no significant changes in trabecular bone volume or cortical thickness during the study period. However, stress exposure reduced osteoblast activity (OCN, BSP), increased matrix remodeling enzymes (MMP-2, MMP-9), and promoted angiogenic signaling (VEGF). Notably, TRAP-positive osteoclasts were observed exclusively in stress- exposed animals, indicating elevated bone resorption. Conclusions: Stress induces early cellular and enzymatic changes in bone remodeling that precede detectable structural modifications by micro-CT, potentially compromising bone quality in hypertensive subjects. These findings highlight the importance of addressing psychological stress in populations at risk for bone fragility.

Keywords: Hypertension; Psychological Stress; Bone Remodeling; Osteoblast; Osteoclast; VEGF; Bone Sialoprotein; Osteocalcin; Matrix Metalloproteinases; Trabecular Bone; Corticosterone; Animal Model.

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BIOMATERIALS FUNCTIONALIZED WITH GENISTEIN ENHANCE BONE REPAIR IN OVARIECTOMIZED RATS

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Introduction:Estrogen deficiency is the primary cause of osteoporosis, compromising bone quality and potentially impairing peri-implant repair. Functionalizing biomaterials to enhance their osteoconductive properties can improve their regenerative potential. Genistein, a soy isoflavone phytoestrogen, interacts with estrogen receptors in osteoblasts, promoting their proliferation and differentiation through classical genomic pathways while also inhibiting osteoclast activity and modulating oxidative stress. This study aimed to investigate the effects of genistein incorporated into two different biomaterials, bioactive glass and deproteinized bovine bone, via sonochemistry, on peri-implant bone repair in ovariectomized rats.Method:Forty animals were randomly assigned to four groups (n=10): BG – bioactive glass; BG+GEN –bioactive glass with genistein; BO – deproteinized bovine bone; and BO+GEN – deproteinized bovine bone with genistein. After 30 days of ovariectomy, bilateral peri-implant defects were created in the tibial metaphysis, filled with the designated biomaterial, followed by titanium implant placement. Calcein and alizarin were administered on postoperative days 14 and 24, respectively. Animals were euthanized at 28 days. RT-PCR of RANKL, OPG, and IBSP was analyzed, while micro-CT was performed to quantify bone volume fraction (BV/TV) and trabecular separation (Tb. Sp). Additionally, confocal microscopy was used to measure the mineral apposition rate (MAR).Results:Higher expression levels of RANKL, OPG, and IBSP were detected in the BG+GEN and BO+GEN groups (two-way ANOVA, $p<0.05$). A significant interaction between biomaterial type and genistein was observed for RANKL and OPG, whereas IBSP showed independent effects of both variables. Micro-CT showed significantly increased BV/TV and decreased Tb.Sp in groups treated with genistein-functionalized biomaterials compared to controls (two-way ANOVA, $p<0.05$). No differences were observed among groups regarding MAR (two-way ANOVA, $p>0.05$).Conclusion:These findings suggest that local delivery of genistein incorporated into biomaterials enhances peri-implant bone repair in estrogen-deficient conditions.FAPESP 22/07158-8 and 24/05906-2

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JOINT POSITION SENSE IN ACTIVE OLDER WOMEN WITH AND WITHOUT OSTEOARTHRITIS: A PILOT STUDY

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ABSTRACT

Introduction: Population aging poses multiple challenges to health, such as the decline in proprioception - that is, the perception of the body in space - which plays a fundamental role in movement accuracy and fall prevention. Older adults with osteoarthritis may present even greater impairments in proprioception due to degenerative changes in articular cartilage and chronic inflammation, factors that can affect the integrity and sensitivity of articular, muscular, and tendinous mechanoreceptors, resulting in deficits in sensory feedback and neuromuscular control.

Objective: To compare performance on joint position sense tests between active older women with and without osteoarthritis.

Method: Eighteen older women who practiced aquatic activities - nine healthy (66 ± 6 years) and nine with osteoarthritis (67 ± 5 years) - were assessed using joint position sense tests of the hip and ankle with a goniometer (repositioning to a target of 30% of the maximum range of motion for each joint). Group comparisons were performed using Student's t test, with a significance level set at $p < 0.05$.

Results: The mean percentage errors in detecting the reference angle for the hip and ankle were 2.39 (± 1.72) and 5.72 (± 5.21) for healthy older women, and 3.08 (± 2.73) and 5.36 (± 4.39) for older women with osteoarthritis, respectively. No significant differences were found between groups ($p = 0.53$ and $p = 0.87$).

Conclusion: The fact that all participants maintained an active lifestyle may explain the similarity in results between older women with and without osteoarthritis. Although this research constitutes a pilot study at this initial stage, it reinforces the importance of aquatic exercise as a strategy to prevent degeneration of the proprioceptive system.

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MACROPHAGE INFLAMMATORY PROTEIN-3 (MIP-3A) IN AUTOIMMUNE DISEASES

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The primary mechanism controlling leukocyte migration in health and disease is mediated by the chemokine superfamily. One chemokine implicated in the pathogenesis of autoimmune diseases is macrophage inflammatory protein-3 (MIP-3α).

In the respiratory tract, MIP-3α is known to function as an antimicrobial peptide, targeting both gram-positive and gram-negative bacteria. In autoimmune diseases, it acts as a chemokine, attracting immature dendritic cells, B-, and T-lymphocytes to the site of injury.

In diabetic nephropathy, high glucose levels in proximal tubular cells trigger MIP-3α synthesis, which may be associated with the development of chronic low-intensity inflammation in the kidneys.

However, increased MIP-3α levels are not observed during low-intensity inflammation in osteoarthritis and atherosclerosis.

We compared MIP-3α levels in healthy individuals, those with seropositive diseases: RA and SLE, and those with seronegative ankylosing spondylitis. Patients with RA, SLE, and AS were comparable in age: 55.7±12.1 (49.7-61.7), 43.1±12.9 (38.2-48.0), and 46.8±10.9 (41.0-52.6) years, respectively. Women predominated in the RA and SLE group, while patients with AS were predominantly male. All patients had a normal BMI, which was slightly higher in the spondyloarthritis group (26.5 [23.4-33.1]; 25.7 [23.3-30.1]; 27.3±4.49 (24.9-29.7), respectively). We found that the MIP-3α level was 319.7±98.3 (244.1-395.2) in healthy individuals, in patients with RA -649.4 [373.6-2350], Z=2.29; p=0.0221; in patients with SLE -363.8 [321.2-404.2], Z=-1.05; p=0.295 and in patients with AS, respectively - 296.6 [258.9-345.7.4], Z=-0.74; p=0.462. From the presented data it is evident that the highest MIP-3α level, significantly different from the comparison group (healthy individuals), was detected in patients with RA; the minimum - in patients with AS, without a significant difference from the group of healthy individuals and SLE patients. As can be seen from the obtained results, a significant difference in MIP-3α levels compared to the comparison group was found only in patients with RA. In patients with SLE, which shares an autoimmune B-cell phenotype with RA, MIP-3α values were significantly lower and comparable to those in the healthy control group, while in patients with AS, they were even slightly lower than those in the healthy control group.

We continue to study the relationship between chemokine levels, particularly MIP-3α, in the most common autoimmune diseases depending on activity, comorbidity, stage, and duration.

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CHANGES IN BONE MINERAL DENSITY, PAIN AND MOBILITY DURING SPECIFIC PHARMACOLOGICAL OSTEOPOROSIS THERAPY

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Objectives

Back pain and limited pain-free mobility are common in osteoporosis; pain-related inactivity causes muscle loss, reduced standing/walking capacity, and higher fall risk. We assessed bone status, pain-free standing/walking time, and back pain intensity during specific pharmacological osteoporosis therapy (SPOT).

Methods

In this prospective real-life analysis, 178 patients with a confirmed osteoporosis

(T-score ≤ -2,5 SD) were observed over a median period of 4 years. All participants received a guideline-based SPOT and were divided into two therapy groups: antiresorptive therapy (bisphosphonates & denosumab) and osteoanabolic therapy (teriparatide). Both therapy groups included mono- and sequential therapies. Pain-free standing time (PST) / walking time (PWT) in minutes (min), as well as back pain intensity (BP) using a numerical rating scale (NRS), were measured at the start (T0) and the end (T1) of the observation period. In addition,

T-score values were determined by DXA bone density measurement (Lunar Prodigy). Statistical analysis was performed using linear mixed models with random intercept, estimated via the Restricted Maximum Likelihood (REML) method, and tested by the Likelihood Ratio Test (LRT) for significant interactions. Effect sizes were calculated according to Cohen's d. The significance level was set at $p < 0,05$.

Results

In the total cohort, a significant increase in PST and PWT, as well as a significant reduction in BP intensity, were observed. Mean PST increased by approximately 31 min ($p < 0,038$, $d \approx 0,45$), and the mean PWT increased by approximately 37,5 min ($p < 0,031$, $d \approx 0,42$). Mean BP intensity on the NRS decreased by approximately 1,5 points ($p = 0,001$, $d \approx 0.6$). Mean T-score improved by 0,45 SD ($p < 0,001$; $d \approx 0,72$). There was no significant difference between the antiresorptive and osteoanabolic therapy groups regarding the temporal course.

Conclusion

SPOT significantly improved bone density, pain, and mobility. Longer pain-free standing/walking indicates restored load tolerance; lower pain likely supports activity and may counter secondary sarcopenic deconditioning. SPOT benefits bone metabolism and function; structured strength and coordination training should complement therapy.

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HOUNSFIELD UNITS IN LUMBAR SPINE AND PROXIMAL FEMUR AS PREDICTORS OF OSTEOPOROSIS AND SACRAL INSUFFICIENCY FRACTURES IN ELDERLY PATIENTS: A RETROSPECTIVE COHORT STUDY

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Objectives

Sacral insufficiency fractures (SIF) typically affect older, osteoporotic patients and are often underdiagnosed due to non-specific lower back or pelvic pain. This study aimed to compare trabecular bone density in Hounsfield Units (HU) at the lumbar spine and proximal femur between patients with and without SIF, and to assess the diagnostic performance of HU values for predicting osteoporosis and fractures.

Methods

In this retrospective study, 253 patients with clinical suspicion of SIF were analyzed over 3 years. Group 1 (n=98) had confirmed SIF (FFP-classified); Group 2 (n=155) had no SIF or spine/hip fractures. HU values were measured in CT scans using ellipsoidal ROIs (L1–L3) and irregular ROIs in the proximal femur. Additional imaging (MRI, X-ray) was used to detect vertebral and hip fractures. 25-OH-vitamin D levels and pain intensity (VAS) were recorded. Statistical analyses included t-tests, Mann-Whitney U, Hedges' g, and ROC curves.

Results

SIF patients were significantly older than controls (78.95 vs. 70.62 years, $p < 0.001$). HU values were markedly lower in the SIF group: lumbar spine 44.8 vs. 105.7 HU ($p < 0.001$; $g = 2.48$), femur 47.0 vs. 148.0 HU ($p < 0.001$; $g = 2.28$). Patients with hip fractures had even lower femoral HU values (14.2 vs. 70.6; $p < 1e-12$). FFP type II accounted for 61.3% of SIF; unstable types (IIIc, IVb/c) for 38.7%. Among SIF patients, 232 silent vertebral and 30 prior hip fractures were detected. Immobilizing pain increased with fracture instability (VAS 7 vs. 9; $p < 0.05$). ROC analysis showed strong predictive performance for osteoporosis (AUC LWS-HU = 0.92, femur-HU = 0.98) and for SIF (AUC LWS-HU = 0.98, femur-HU = 0.97). Vitamin D deficiency (< 20 ng/ml) was found in 92.9% of all patients; mean levels were 3.72 ng/ml (SIF) vs. 8.24 ng/ml (controls; $p < 0.05$). HU thresholds for osteoporosis were ~96–98 HU.

Conclusion

HU values from routine CT scans allow reliable osteoporosis diagnosis and fracture risk estimation. SIFs indicate advanced osteoporosis, often accompanied by silent vertebral fractures. Severe vitamin D deficiency is a common and relevant risk factor. Severe immobilizing pain is found with increasingly unstable SIF.

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ATYPICAL FORM OF STIFF PERSON SYNDROME

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Background:

Stiff person syndrome (SPS) is a rare neurological disorder of autoimmune origin, characterized by progressive muscle stiffness, painful spasms, and increased sensitivity to external stimuli. It typically affects middle-aged women. We report a series of four cases of SPS occurring in young men hospitalized in a rheumatology department during the year 2025, highlighting an atypical demographic and clinical presentation.

Case reports

Case 1: The first case involved a 25-year-old man who presented with diffuse mechanical spinal pain evolving over five years, associated with a sensation of persistent muscle tightness. Physical examination revealed paravertebral muscle contracture predominantly on the right side, without spinal deformity, axial stiffness, or sacroiliac tenderness. Radiographic assessment and thoraco-abdomino-pelvic computed tomography were unremarkable, notably showing no evidence of sacroiliitis. Electromyography (EMG) demonstrated continuous motor unit activity at rest in the paravertebral muscles, suggestive of SPS.

Case 2: The second case concerned a 21-year-old man who consulted for mechanical low back pain of three months' duration. Physical examination showed paravertebral muscle contracture associated with lumbar stiffness. Radiographs and magnetic resonance imaging (MRI) of the lumbar spine and sacroiliac joints were normal. EMG revealed continuous muscle activity at rest, consistent with SPS. Anti–glutamic acid decarboxylase (anti-GAD) antibodies were negative. A paraneoplastic origin was ruled out by a normal thoraco-abdomino-pelvic CT scan. The clinical course was marked by worsening low back pain and the subsequent development of painful lower limb muscle spasms.

Case 3: The third case involved a 41-year-old man presenting with painful

contractures of the cervical and lumbar paravertebral muscles as well as the abdominal wall, associated with lower limb spasms. Physical examination confirmed diffuse muscle contracture. Brain and spinal MRI showed no abnormalities. Anti-GAD antibodies were positive, and EMG confirmed the diagnosis by demonstrating spontaneous continuous activity in both agonist and antagonist muscles, predominantly affecting the paravertebral muscles. A paraneoplastic etiology was excluded.

Case 4: The fourth case was a 42-year-old man with a history of coronary artery disease treated with coronary stenting, who presented with chronic mechanical neck pain and bilateral lower limb muscle spasms. Examination revealed contracture of the cervical paravertebral and trapezius muscles. Spinal and pelvic MRI were normal, while EMG demonstrated continuous paravertebral muscle activity at rest.

Conclusion

SPS is a rare disorder resulting from impaired gamma-aminobutyric acid–mediated inhibitory neurotransmission. While it most commonly affects women around the age of 45, our series illustrates an atypical presentation in young male patients. Two patients showed favorable clinical improvement with benzodiazepines, whereas two required escalation to rituximab therapy.

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OSSIFYING MYOSITIS: THREE CASE REPORTS WITH DIFFERENT LOCALIZATIONS

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Background:
Ossifying myositis (OM) is a rare benign condition characterized by heterotopic ossification within skeletal muscles, accounting for approximately 0.7% of soft tissue pseudotumors. It typically affects young individuals, most often following trauma, although non-traumatic forms have also been described. The pelvic and scapular girdle muscles are most commonly involved. Early diagnosis remains challenging due to nonspecific clinical and radiological features.

Objectives:
To report three cases of ossifying myositis with different anatomical localizations and to highlight diagnostic and therapeutic aspects.

Results:
Case 1 involved a 34-year-old woman with no history of trauma who presented with progressive inflammatory pain and swelling of the right elbow for one month. Physical examination showed a painful swollen elbow with limited range of motion and no systemic signs. Laboratory tests, including muscle enzymes and inflammatory markers, were normal. Initial radiographs revealed only soft tissue swelling. Magnetic resonance imaging demonstrated an infiltrative mass within the brachial muscle with heterogeneous enhancement, raising suspicion of a tumoral process. Surgical biopsy confirmed the diagnosis of ossifying myositis. Conservative treatment with nonsteroidal anti-inflammatory drugs (NSAIDs) and joint rest was initiated. A follow-up computed tomography scan later demonstrated characteristic lamellar ossification. The outcome was favorable with pain resolution and improved mobility after NSAIDs and physiotherapy.

Case 2 concerned a 29-year-old woman presenting with acute right shoulder pain and functional impairment without preceding trauma. Examination revealed a painful, inflamed shoulder with complete functional limitation. Laboratory investigations were normal. Standard radiographs were unremarkable, whereas computed tomography showed multiple calcifications involving the deltoid, supraspinatus, and infraspinatus muscles. Bone scintigraphy confirmed the diagnosis, revealing hyperfixation without bone involvement. Treatment with NSAIDs and physiotherapy led to clinical improvement. Long-term follow-up scintigraphy showed marked regression of hyperfixation areas.

Case 3 involved an 18-year-old woman presenting with jaw pain and progressive limitation of mouth opening. Imaging revealed ossifying myositis of the left masseter and pterygoid muscles. Clinical examination showed severe trismus and submandibular masses. Laboratory tests were normal. Bone scintigraphy confirmed the diagnosis. Initial NSAID therapy was insufficient, and bisphosphonates were added, resulting in favorable clinical evolution.

Conclusion:

Circumscribed ossifying myositis is a rare benign condition affecting young patients and may mimic malignant soft tissue tumors in its early stages. Awareness of its clinical and radiological evolution, along with appropriate imaging follow-up, can prevent unnecessary invasive procedures. Prognosis is generally favorable with conservative symptomatic treatment, and surgery should be reserved for complicated cases.

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CLINICAL AND RADIOLOGICAL FEATURES OF RENAL OSTEODYSTROPHY: EXPERIENCE FROM A RHEUMATOLOGY DEPARTMENT

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Background:
Renal osteodystrophy (ROD) encompasses various bone abnormalities associated with chronic kidney disease (CKD), including secondary hyperparathyroidism, osteomalacia, and adynamic bone disease, accounting for its clinical and radiological heterogeneity.

Objectives:
To describe the clinical and radiological features of ROD in patients managed in a rheumatology department.

Methods:
A descriptive retrospective study was conducted including patients diagnosed with ROD between 2010 and 2023. Diagnosis was based on clinical, biological, and radiological findings.

Results:
Eleven patients were included (mean age: 52.2±20 years; male/female ratio: 1.75). Most patients (72.7%, n=8) had longstanding CKD (mean duration 13.8±8 years), while three were diagnosed incidentally, including cases related to chronic NSAID use with hypertension. CKD etiologies included diabetic nephropathy (n=5), segmental and focal hyalinosis (n=2), and oxalosis (n=1). All patients were at end-stage renal disease requiring hemodialysis; kidney biopsy was performed in three cases. The mean interval between nephropathy diagnosis and osteoarticular manifestations was 9.9±7 years.

Osteoarticular symptoms included back pain (54.5%), large joint polyarthralgia (45.5%), myalgia (18.2%), diffuse bone pain (18.2%), and buttock pain (9%). Lumbar stiffness was universal, and hip stiffness was present in 63.6%. Functional impairment affecting gait due to gluteal and quadriceps weakness occurred in 18.2%. Laboratory findings showed anemia (81.8%), hypocalcemia (36.7%), hyperphosphatemia

(18.2%), elevated alkaline phosphatase (100%), elevated PTH (72.7%), extremely low 25-OH vitamin D (<8 ng/ml in all patients), and hypogammaglobulinemia (18.2%).
Radiological abnormalities were polymorphic: diffuse demineralization (18.2%), osteocondensation (54.1%), mixed lesions (36.7%), "heart-shaped" pelvis (18.2%), vertebral fractures (18.2%), femoral neck fractures/fissures (27.3%), salt-and-pepper skull (45.5%), subperiosteal resorption (45.5%), pseudo-widened sacroiliac joints (45.5%), pubic symphysis widening (27.3%), ligament calcifications (50%), and coxopathy (54.5%). Brown tumors were observed in two patients, and parathyroid nodules were detected in five (45.5%). Surgical intervention was indicated in three patients, but two could not undergo anesthesia. All patients received analgesics and vitamin D supplementation.
Conclusion:
ROD exhibits marked clinical and radiological heterogeneity, with secondary hyperparathyroidism being the most frequent form. Awareness of its diverse presentations facilitates timely diagnosis and management.

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ARTICULAR MANIFESTATIONS IN BEHÇET'S DISEASE: ANALYSIS OF 148 CASES

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Background:
Behçet's disease is a systemic vasculitis affecting arteries and veins of various calibers. It is associated with mucocutaneous signs and multi-system involvement. Articular manifestations can be an initial or revealing feature of the disease.
Objectives:
To describe the clinical characteristics and patterns of joint involvement in patients with Behçet's disease.
Methods:
This retrospective descriptive study included 148 patients hospitalized for Behçet's disease in the Internal Medicine Department of Habib Thameur Hospital, Tunis, over a period of six years (2015–2020). Data on demographic, clinical, and laboratory features were collected and analyzed.
Results:
Joint involvement was observed in 30% of patients (n=45), with a mean age of 34.2 years (range 14–54) and a male-to-female ratio of 2.75. Articular symptoms were the initial manifestation in 12 patients and revealed the disease in 23.6% of cases. During disease evolution, joint manifestations occurred in 10 patients (6.7%) after a mean delay of 69.5 months from diagnosis. Inflammatory polyarthralgia was the most frequent presentation (93.3%, n=42), while non-destructive arthritis was present in 57.7% (n=26). Joint involvement was monoarticular in 33.3% of cases, oligoarticular in 22.2%, and polyarticular in four patients. The large joints of the lower limbs (knees and ankles) were predominantly affected (86.6%), whereas small joints were less frequently involved. Additional findings included inflammatory low back pain (n=10), popliteal cysts (n=3), and inflammatory sacroiliitis (n=1). All patients with joint involvement also had mucocutaneous lesions; ophthalmological involvement occurred in 33.3% (n=15), vascular involvement in 26.6% (n=12), and neurological involvement in 24.4% (n=11). HLA-B51 was present in 20% (n=9), and 20 patients showed biological inflammatory syndrome. All patients received NSAIDs in combination with colchicine and corticosteroids. Evolution was favorable in most cases; relapse occurred in 11.1% (n=5), and one patient experienced disabling recurrent monoarthritis of the knee.
Conclusion:
Joint involvement is a common systemic manifestation of Behçet's disease and may be the presenting feature. Monoarticular involvement of large lower limb joints is the most typical pattern. Overall prognosis is favorable with symptomatic treatment, although recurrent or disabling arthritis can occur in rare cases.

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CLINICAL AND BIOLOGICAL FEATURES OF RHUPUS: ANALYSIS OF 12 CASES

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Introduction: Rhupus is an overlap syndrome combining systemic lupus erythematosus (SLE) and rheumatoid arthritis (RA). It is a rare condition, poorly described in the literature due to its low global prevalence (0.09%). This rarity underscores the importance of characterizing its clinical, biological, and therapeutic features.
Patients and Methods: We conducted a retrospective descriptive study, including 12 patients who fulfilled both the ACR criteria for SLE and RA over a 13-year period (2010–2023). The aim was to describe the epidemiological, clinical, and therapeutic aspects of rhupus.
Results: The mean age of our patients was 48 years (range 20–70), and all were female. Two patients had a history of miscarriage. In most cases (58.3%, n=7), RA was diagnosed prior to SLE. Articular involvement was universal: 83.3% (n=10) presented with bilateral, symmetric polyarthritis; one patient had oligoarticular involvement, and another experienced polyarthralgia without arthritis. Cutaneous manifestations occurred in 58.3% of patients (n=7), including photosensitivity in all cases and malar rash in 41.6% (n=5). Systemic symptoms, such as fever and general malaise, were noted in one-third of cases. Three patients had associated sicca syndrome.
Hematological abnormalities were common: lymphopenia in 75%, anemia in 66.6%, and leukopenia in five patients. Inflammatory markers (ESR and CRP) were elevated in 83.3% of cases. Immunologically, ANA titers were strongly positive (1:1280) in four patients, moderate (1:640) in half, and low (1:160) in 25%. Anti-dsDNA antibodies were positive in 50% of patients, and anti-Sm antibodies in 25%. Rheumatoid factor and anti-CCP antibodies were detected in seven and five patients, respectively; only one patient had positive anticardiolipin antibodies. All patients had erosive joint disease, with subclinical synovitis detected by ultrasound in two cases.
Therapeutically, half of the patients required high-dose corticosteroids for serositis (n=3) or hematological flare (n=3), while the others received low-dose corticosteroids (10–15 mg/day). RA-targeted disease-modifying therapy was administered in 11 patients, most commonly as combination therapy (methotrexate–hydroxychloroquine), with monotherapy in four cases. One patient did not receive RA-specific therapy due to inactive disease. Disease course was favorable in most cases; three patients experienced recurrent serositis flares, and two developed corticosteroid-induced osteoporosis.
Conclusion: Rhupus is a rare condition dominated by articular involvement. Hematological flares and serositis are not uncommon and may require high-dose corticosteroids. RA-targeted disease-modifying therapy should be prescribed routinely, but treatment regimens must be

individualized.

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CLINICAL AND BIOLOGICAL FEATURES OF INFECTIOUS SPONDYLODISCITIS IN ELDERLY PATIENTS

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Introduction: Infectious spondylodiscitis (IS) is a severe infection involving the intervertebral disc and adjacent vertebral bodies. Age is a significant determinant of prognosis in this condition.
Objective: To analyze the clinical, biological, and therapeutic characteristics of IS in elderly patients.
Methods: We conducted a retrospective study in a rheumatology department from 2009 to 2022, including 72 patients diagnosed with IS. Patients were divided into two age groups: <65 years (younger adults) and ≥65 years (elderly). Clinical, laboratory, and treatment data were compared between the groups.
Results: Elderly patients accounted for 30.5% of cases (n = 22). Immunosuppressive risk factors, including diabetes (40%) and prior neoplasms (15%), were more prevalent among the elderly, though without statistical significance. Inflammatory back pain was the primary symptom in both groups. Fever was more common in elderly patients, whereas general malaise was more frequent among younger adults. Neurological signs and cauda equina syndrome were more frequently observed in the elderly, without statistical significance. Radiographs revealed vertebral fractures and disc space narrowing predominantly in elderly patients, while erosions and geodes were more common in younger adults. MRI identified epiduritis and paravertebral abscesses mainly in the elderly. Cervical involvement was more frequent in older patients, whereas thoracic, multifocal, and tuberculous forms were more prevalent in younger adults. All patients received antibiotic therapy. Favorable outcomes were achieved in 81.3% of younger adults, whereas elderly patients experienced higher rates of neurological complications and mortality (15%, p = 0.01).
Conclusion: IS in elderly patients is associated with a poorer prognosis compared to younger adults, with increased neurological complications and mortality. This adverse outcome is likely related to comorbidities and age-related immunosuppression, highlighting the need for early diagnosis and tailored management in this vulnerable population.

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PREVALENCE AND ASSOCIATED FACTORS OF TUBERCULOSIS IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Introduction:
Tuberculosis (TB) is an infectious disease that predominantly affects immunocompromised individuals. Chronic inflammatory rheumatic diseases constitute a favorable background for the development of tuberculosis. Rheumatoid arthritis (RA), through its underlying pathophysiological mechanisms, increases the risk of both active and latent tuberculosis. This risk is further exacerbated by the use of corticosteroid therapy and biological agents.
Objectives:
The aim of this study was to evaluate the prevalence of tuberculosis among patients with rheumatoid arthritis and to identify the factors associated with the occurrence of tuberculosis infection.
Materials and Methods:
This was a retrospective descriptive study conducted over a 15-year period, including all patients diagnosed with rheumatoid arthritis who were hospitalized in a rheumatology department. Clinical, biological, and therapeutic data were collected, as well as potential risk factors associated with tuberculosis infection.
Results:
A total of 128 patients with rheumatoid arthritis were included. The mean age was 53.03 ± 12.8 years, with a marked female predominance (female-to-male ratio of 3). Comorbidities were present in 49 patients, including diabetes mellitus in 18%, hypertension in 14.9%, and dyslipidemia in 19% of cases. Two patients had a history of treated pulmonary tuberculosis. Rheumatoid arthritis was seropositive in 78.9% of patients and erosive in 70.3%, with a mean disease duration of 8.88 ± 7.5 years. Extra-articular manifestations were observed in 71 patients, with pulmonary involvement in 21.1% of cases. Nearly half of the patients had active disease (49.7%) associated with a biological inflammatory syndrome (49.4%). Corticosteroid therapy was prescribed in 112 patients, and 33.6% received biological therapy. Methotrexate was the most frequently prescribed conventional synthetic DMARD (91.4%), followed by sulfasalazine (15.6%) and leflunomide (10.9%).
The prevalence of tuberculosis, including latent and active forms, was 5.4% (n = 7). Tuberculin skin testing was positive in 3.1% of patients, while interferon-gamma release assay (QuantiFERON®) was positive in five cases. The mean delay between RA diagnosis and tuberculosis onset was 88.8 months. All patients who developed tuberculosis had received long-term corticosteroid therapy, with a mean daily dose of 10 mg for at least three years. All were treated with conventional synthetic DMARDs, and six patients were receiving anti-TNF therapy.
Conclusion:
In our cohort, the prevalence of tuberculosis was relatively low. Corticosteroid therapy and immunosuppressive treatments, particularly anti-TNF agents, were identified as major predisposing factors for tuberculosis infection in patients with rheumatoid arthritis

P798

THE ROLE OF BONE MINERAL DENSITY ADDED TO FRACTURE RISK ASSESSMENT TOOL (FRAX) IN THERAPEUTIC DECISION MAKING FOR OSTEOPOROSIS IN A MALAYSIAN POPULATION

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Objective: Fracture Risk Assessment tool(FRAX) is widely used to asses fracture risk and the interventional thresholds(IT) are used to identify patients for treatment. Adding femoral neck bone mineral density(BMD) to the FRAX tool is not mandatory. In this study we aimed to examine the role of BMD added to FRAX in therapeutic decision making for osteoporosis in a Malaysian population.

Materials and Methods : FRAX risk factors and femoral neck BMD data were collected from five different centres across different regions in Malaysia. Participants consisted of post-menopausal women and men between ages 40-90 years who underwent routine BMD scans. 10-year probability of major osteoporotic fracture(MOF) and hip fracture(HF) were calculated using the FRAX tool with (FRAX+BMD) and without BMD (FRAX-BMD). Correlation between both 10-year probability of MOF and HF using the FRAX tool +/- BMD values were analysed. Concordance and discordance percentages for changes in therapeutic decision making using FRAX+BMD and FRAX-BMD against the conventional IT were analysed.

Results: A total of 1914 participants were analysed (mean age: 65.3 ± 9.9 years, 86.1% post-menopausal women). FRAX scores increased with age for both groups. There was a strong overall correlation between FRAX + BMD and FRAX–BMD for MOF ($r = 0.81$, $p < 0.001$) and HF ($r = 0.66$, $p < 0.002$). When comparing FRAX+BMD and FRAX-BMD using the conventional IT, the concordance rates for therapeutic decision making were 89.5% for MOF and 79.0% for HF. On the other hand, the discordance rates were 10.5% for MOF (5.5% for upward reclassification and 5.0% for downward reclassification) and 21.0% for HF (11.2% for upward reclassification and 9.8% for downward reclassification). Concordance rates declined with increasing age groups: 40-59 years (99.3%); 60-69 years (92.5%); 70-79 years (81.2%); 80-90 years (67.1%) for MOF.

Conclusion : Our study showed that FRAX-BMD had good correlation with FRAX+BMD in a Malaysian population and is an acceptable alternative for making treatment decisions in situations where BMD services are not readily available. FRAX-BMD provided an age dependant treatment decision option with higher scores in the older age group compared to FRAX+BMD.

Disclosure : Authors have no relevant disclosures

P799

LARGE LANGUAGE MODELS. (LLMS) IN OSTEOPOROSIS: APPLICATIONS IN PATIENT EDUCATION AND CLINICAL DECISION SUPPORT: A SCOPING REVIEW

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Objectives:
Characterise the current use of LLMs in osteoporosis care, with specific attention to applications in patient education and clinical decision support, and to identify reported benefits, limitations, and future implementation considerations.
Materials and Methods:
A scoping review was conducted in accordance with JBI and PRISMA-ScR guidelines. Systematic searches of MEDLINE, Scopus, PubMed, and Web of Science were performed for English-language studies published between 2020 and 2025. Eligible studies described the use of LLMs in osteoporosis for either patient-facing or clinician-facing applications. Data were extracted and thematically analysed.
Results:
Ten studies met inclusion criteria. Patient-directed tools demonstrated high response accuracy and accessibility, though concerns regarding information completeness and variable readability were noted. Clinical decision support applications addressed triage, fracture risk assessment, and treatment recommendation, with several achieving high concordance with clinical guidelines.
Conclusion:
LLMs demonstrate emerging promise in supporting osteoporosis care. Further development requires prospective validation, integration with clinical workflows, and alignment with regulatory and ethical standards to ensure safe and effective use.

P800

BONE TURNOVER MARKERS AND FRAX IN DIABETIC OSTEOPOROSIS PATIENTS

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Introduction: Diabetes mellitus is associated with an increased risk of fractures, which is not explained by bone mineral density. Furthermore, in the Fracture Risk Assessment Tool (FRAX) model, common risk factors and BMD were underestimated the fracture risk in type 2 diabetes patients, thus adjustment methods to improve FRAX estimation of fracture risk in T2DM have been proposed, including reducing T-score by 0.5 standard deviations, increasing age input by 10 years, and selecting rheumatoid arthritis as a proxy for T2DM. Although, glycemic control

condition, the duration of disease, hypoglycemia, risk of falling, and adverse effects of medication, which could lead to higher fractures in diabetic patients, and many studies have investigated biochemical bone turnover rate in diabetes patients, no definite inferences can be made, but bone turnover markers have useful in fracture risk assessment and monitoring treatment efficacy in postmenopausal osteoporosis. The aim of this study is to evaluate the bone turnover and fracture risk in postmenopausal osteoporosis women with diabetes.

Methods: This cross-sectional study investigated patients who were postmenopausal osteoporosis women with diabetes at endocrine clinic. In this study, country-specific fracture risk for 10-year probability of a hip or major osteoporotic fracture, were calculated by the WHO Collaborating Center, using the FRAX algorithm. The FRAX algorithm includes femoral neck BMD, age, sex, body mass index, previous history of fracture, parental history of hip fracture, current smoking, recent use of corticosteroids, presence of rheumatoid arthritis, and at least 3 alcoholic beverages per day, we selected rheumatoid arthritis as a proxy for T2DM to adjust FRAX estimation of fracture risk in diabetes patient. A single, fasting blood sample to assess bone markers, and other biochemical tests were performed in the study visit. Patients were measure the bone specific alkaline phosphatase (BSALP) for formation markers, and beta-crosslaps (b-CTx) for resorbtion markers were analyzed the bone turnover rate.

Results: In this cross-sectional study, we investigated 80 Taiwanese postmenopausal women, with 42 subjects diabetes and 38 non-diabetes at osteoporosis clinic, aged between 50 and 78 years, had high risk for fractures by adjusted FRAX®, defined as 10-year major osteoporotic fracture probability (≥ 20%) or hip fracture probability (≥ 3%), and found both bone formation and resorption markers were elevated.

Conclusions: Our findings suggest that in diabetes osteoporosis women have high risk for fractures by diabetes adjusted FRAX®, with 10-year major osteoporotic fracture probability or hip fracture probability and high bone markers, but no significant difference bone markers in diabetes and non-diabetes osteoporosis women.

P801

ARIAT (RECOMMENDATION ON PHARMACOLOGICAL THERAPY IN OSTEOARTHRITIS OF THE KNEE AND HIP (ARGENTINIAN RECOMMENDATIONS OF INTRAARTICULAR THERAPIES)

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Osteoarthritis (OA) is the most prevalent rheumatic disease with around 600 million individuals suffering ir worldwide .There are evident differences regarding pharmacological therapies , especially with the role assigned to SySADOA and viscosupplementation . The aim of this group was to make a Consensus on pharmacological treatment of the knee and hip OA among argentine experts in this field . Seven of them were rheumatologists , three orthopaedics , two physicians specialized in sport medicine . Publications for the last 12 years were reviewed and those that met the required levels of evidence were selected . Virtual meetings and three in person meetings were held for the entire panel of experts . Grade scale were used to determine agreement of the statements presented to the panel .Twenty seven statements about Knee and Hip OA treatmet were included .Agreement were reached in 19 out of the 27 statements related to the use of analgesics , NSAIDs , duloxetin , IA , PRP and IA glucocorticoids and time to surgery and viscosupplementation . There was disagreement related to the use of viscosupplementation in Stage 4 of the Kellgren - Lawrence (KL) radiological classification. There was no definitions about the use of strong hypnoanalgesics , COXibs , muscle relaxants and the use of cannabinoids .

The ARIAT group recommends prescribing SySADOA and viscosupplementation in grades I , II and III of the Kellgren - Lawrence OA radiological state . Body weight reduction was strongly recommended in both knee and hip OA . Phisical therapies and active excercises are recommended in both knee and hip OA . In Grade IV OA surgery should not be delayed .

P802

LONG-TERM TRENDS AND SEASONAL VARIABILITY OF SERUM 25-HYDROXYVITAMIN D IN ENDOCRINE OUTPATIENTS (2018–2024)

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Objective

To assess long-term trends, seasonal variability and prevalence categories of serum 25-hydroxyvitamin D (25(OH)D) concentrations in endocrine outpatients.

Material and Methods

We retrospectively analysed all serum 25(OH)D measurements performed in an endocrine outpatient clinic between January 2018 and December 2024. Vitamin D deficiency was defined as <20 ng/mL, insufficiency as 20–30 ng/mL and optimal concentration as ≥30 ng/mL. Seasonal differences were assessed by month and season using non-parametric tests, and long-term trends were analysed by linear regression.

Results

A total of 615 patients (74.5% women) with 1,357 serum 25(OH)D measurements were included. Mean 25(OH)D concentration was 26.1 ± 10.2 ng/mL and was higher in women than in men ($p<0.001$). Overall, 28.4% of measurements were in the deficient range, 38.7% insufficient and 32.9% optimal. Deficiency prevalence peaked in 2020 (38.8%) and declined to 21.4% in 2024, while the proportion of optimal concentrations increased over time. Mean 25(OH)D rose from 25.2 ± 8.5 ng/mL in 2018 to 28.2 ± 10.4 ng/mL in 2024, showing a significant upward trend ($\beta=+0.50$ ng/mL/year, $p<0.001$). Marked seasonality was observed ($p<0.001$), with lowest concentrations in winter (23.8 ± 10.7 ng/mL) and highest in autumn (27.9 ± 9.8 ng/mL). Monthly values were significantly higher from June to September compared with December to March ($p<0.001$).

Conclusion

Vitamin D deficiency remains frequent among endocrine outpatients, despite a gradual improvement over time. Persistent and pronounced seasonal variability supports season-aware interpretation and management of 25(OH)D in routine endocrine practice.

P803

GUT MICROBIOTA AND BONE MASS AFTER OVARIECTOMY IN WOMEN: A PROSPECTIVE STUDY

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Objective: Prospective studies in experimental ovariectomy models [1] and in postmenopausal women [2] support an association between estrogens, gut microbiota, and bone health. This study [3] aimed to determine whether, in women experiencing acute estrogen deficiency after ovariectomy, the primary driver of decreased bone mineral density (BMD) is an immune response in the bone marrow or whether this immune response is triggered by changes in the gut microbiota.

Material and Methods: We enrolled 31 women of childbearing potential who underwent bilateral ovariectomy and did not receive hormone therapy. Stool and blood samples were collected every 6 months for 18 months following surgery. In addition, samples were collected from 13 women who began receiving estradiol (1 mg per day) 6 months after ovariectomy. Fecal bacterial composition was assessed by sequencing the 16S rRNA gene using Illumina MiSeq. Blood concentrations of estradiol, FSH, bone metabolism biomarkers, and markers of low-grade inflammation were measured. Bone mineral density (BMD) was evaluated at the lumbar spine, proximal femur, and femoral neck using GE Lunar bone densitometry.

Results. At 6 months post-ovariectomy, significant changes were observed in hormone levels, BMD, and bone metabolism; however, there were no significant alterations in gut microbiota α- or β-diversity. A decline in bacterial diversity became evident only at 18 months following surgery. Changes in gut microbiota diversity in untreated women became apparent later and were associated with persistently increased bone resorption and continued BMD decline. Estrogen treatment effectively prevented bone loss, and corrected intestinal dysbiosis. Notably, changes in bacterial α-diversity and taxonomy, including an increase in Lactococcus lactis, were observed after 12 months of estradiol therapy. Body mass index (BMI) was the most significantly associated with microbiota variance. Microbiota was not a suitable predictive factor for the state of bone metabolism. Sources of variability in microbiota composition are more related to interindividual differences than hormonal status.

Conclusion: Estrogens have the potential to prevent the alteration of the gut microbial composition.

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P804

NEIGHBORHOOD SOCIOECONOMIC DEPRIVATION IS MORE STRONGLY ASSOCIATED WITH MACHINE-LEARNING ASSESSED ABDOMINAL AORTIC CALCIFICATION FROM BONE DENSITY VERTEBRAL FRACTURE ASSESSMENT (VFA) IMAGES IN WOMEN THAN IN MEN

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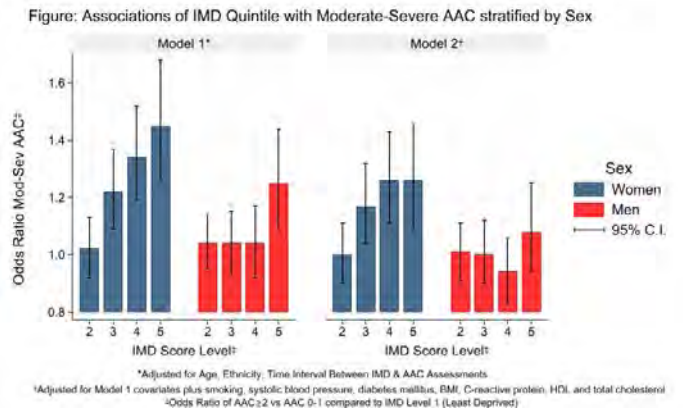
Objective: To examine the association of neighborhood deprivation with subclinical atherosclerosis, assessed as abdominal aortic calcification (AAC), stratified by sex.

Materials and Methods: Our study population was 38,907 (51.7% female, mean[SD] age 55.1 [7.6] years) residents of England enrolled in the UK Biobank study without cardiovascular disease diagnosis, who had bone density lateral spine VFA imaging a mean (SD) 9.5 (2.3) years between 2006-2010 (baseline visit). Neighborhood deprivation was assessed as Index of Multiple Deprivation (IMD) at baseline, along with other covariates. IMD score was categorized into five levels using national quintile cutpoints for England. A validated automated machine-learning algorithm was applied on VFA images to score and categorize ML-AAC24 as none-low (ML-AAC24 score <2) or moderate-severe (ML-AAC24 score ≥ 2). Logistic regression was used to estimate the association of IMD quintiles 2 through 5 vs quintile 1 (the least deprived) with moderate-severe ML-AAC. The base model was adjusted for age, ethnicity, sex, and years between baseline and VFA imaging dates. The full model additionally adjusted for systolic blood pressure, smoking status, diabetes mellitus, body mass index, C-reactive protein, HDL and total cholesterol levels. Analyses were done separately for men and women and associations of IMD with ML-AAC in women vs men compared with Stata *suest* command.

Results: Adjusted for base model covariates, increasing neighborhood deprivation was monotonically associated with higher odds of having moderate-severe ML-AAC in women (**Figure**). In contrast, only men residing in the most deprived neighborhoods had an increased odds of moderate-severe AAC, compared to the least deprived (difference women vs men p-value 0.006). After multivariable adjustment, the associations were attenuated, but were still significant for women (OR 1.26, 95% CI 1.09 to 1.46, for quintile 5 vs quintile 1), whereas no association of IMD with AAC was seen for men (OR 1.08, 95% CI 0.94 to 1.25, for quintile 5 vs quintile 1; difference women vs men p-value 0.005).

Conclusions: Residence in socioeconomically deprived neighborhoods is associated with increased ML-AAC in women more than in men. Further studies are needed to explain the greater impact of neighborhood

deprivation on women vs men.



P805

BEHAVIORS AND BARRIERS TO DISCUSSING ABDOMINAL AORTIC CALCIFICATION (AAC) IN PRIMARY CARE: A CLINICIAN SURVEY

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Objective: Abdominal aortic calcification (AAC) is associated with incident cardiovascular disease (CVD) events and fractures (Fx) independent of other risk factors, can be detected on bone density lateral spine images intended for vertebral fracture assessment (VFA), and hence may add to both CVD and Fx risk assessments.

Materials and Methods: We conducted a survey of 216 primary care physicians who order bone density tests, constructed designed using the Capability, Opportunity, Motivation and Behaviors (COM-B) model which specifies target behaviors or practices and categorizes barriers to those practices. We queried them about their current practices if they receive a report of AAC being present on a bone density image, and what barriers they experience conveying the presence of AAC and its significance to their patients.

Results: 74 clinicians (55 physicians and 19 nurse practitioners or physician assistants) responded, a response rate of 34%. Among all respondents, 64 (86%) indicated that discussing AAC, if present, would be somewhat or very important to discuss with patients, and 34 (46%) somewhat or strongly agreed that they knew how to incorporate AAC results into cardiovascular disease risk assessment for their patients. Similarly, 35 (47%), 32 (43%), and 31 (42%) indicated they would always or often talk to patients about the association of AAC and higher risk of CVD, recommend lifestyle changes, and recommend medication changes to lower CVD risk. Few (5, <7%) would refer patients on to cardiology. The majority (61, 82%) identified time as a significant barrier to communicating AAC results to their patients. Forty six (62%) perceived that a patient information handout (**Figure**) used in clinical trials regarding AAC would be useful and potentially time-saving communicating with patients about their AAC.

Conclusion: Bone density test images can opportunistically identify individuals with moderate to severe AAC, who are high risk of CVD events and higher risk of Fx. However, for this to be done systematically in clinical practice, primary care physicians need more information about the prognostic significance of AAC and a streamlined time-efficient process to incorporate the presence of AAC into their current cardiovascular risk and fracture risk assessment practices.



P806

HIP BONE COMPARTMENT RESPONSES TO ROMOSOZUMAB VERSUS ALENDRONATE IN PATIENTS WITH DIABETES: A SUBGROUP ANALYSIS FROM THE ARCH TRIAL USING 3D-DXA MODELLING

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Objective(s): Type 2 diabetes mellitus (T2DM) is linked to increased fracture risk.[1] The paradox of preserved bone mineral density (BMD) and trabecular bone structure but impaired cortical bone parameters in T2DM underscores the importance of advanced imaging for fracture risk assessment. We sought to evaluate changes in hip bone parameters

with romosozumab (Romo) versus alendronate (Aln) in postmenopausal women with osteoporosis (OP) and T2DM.

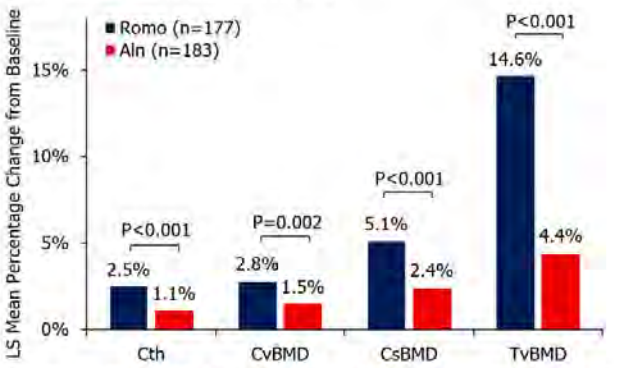
Materials and Methods: In ARCH (NCT01631214)[2], postmenopausal women with OP were randomised to monthly subcutaneous Romo (210 mg) or weekly oral Aln (70 mg) for 12 months (blinded). We analysed a subset of 360 women (Romo: n=177; Aln: n=183) who had T2DM at baseline and total hip Dual-Energy X-ray Absorptiometry (DXA) scans available. Cortical thickness (Cth), cortical volumetric BMD (CvBMD), cortical surface BMD (CsBMD) and trabecular volumetric BMD (TvBMD) estimates were obtained with 3DShaper Research software (v2.14, 3D-Shaper Medical, Barcelona, Spain). Percentage changes from baseline to Month 12 between treatments were assessed using an ANCOVA model adjusted for baseline covariates.

Results: Baseline characteristics, including mean (standard deviation) age (Romo: 75.8 [7.2] vs Aln: 75.5 [6.9] years), prevalence of severe vertebral fracture (66% vs 62%, respectively) and total hip areal BMD (0.659 [0.087] vs 0.651 [0.085] g/cm^2, respectively) were comparable between groups and generally consistent with overall ARCH populations.[2] At Month 12, Romo resulted in greater increases in all hip compartment-specific parameters vs Aln (least squares mean difference in cortical parameters: 1.3–2.7%; TvBMD: 10.2%; **Figure**).

Conclusions: In postmenopausal women with OP and T2DM, Romo demonstrated greater hip structural and density improvements vs Aln. The magnitude and pattern of these responses in the T2DM subgroup were consistent with the overall ARCH population.[3] Thus, T2DM did not attenuate the clinical efficacy of Romo.

References:1. Ferrari S. Osteoporos Int. 2025;36(7):1115–28. **2.** Saag KG. N Engl J Med 2017;377(15):1417–27. **3.** Lewiecki EM. J Bone Miner Res. 2024;39(4):473–83.

Figure. Percentage change from Baseline to Month 12 in cortical and trabecular parameters in women with OP and T2DM in ARCH.



P-values presented are nominal. The ANCOVA model for analysing percent change from baseline to Month 12 was adjusted for treatment, presence of severe vertebral fracture at baseline, baseline scan result, machine type and baseline scan result by machine type interaction. Abbreviations: Aln: alendronate; ANCOVA: analysis of covariance; BMD: bone mineral density; CsBMD: cortical surface BMD; Cth: cortical thickness; CvBMD: cortical volumetric BMD; LS: least squares; OP: osteoporosis; Romo: romosozumab; T2DM: Type 2 diabetes mellitus; TvBMD: trabecular volumetric BMD.

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Disclosure of Conflict of Interest (within past 24 months):

SF: Received consulting and lecture fees from Amgen, UCB Pharma, AgNovos, Gedeon Richter, Fresenius Kabi, Samsung Bioepis and Alexion.

NN: Consulting fees: Sandoz, Theramex and UCB; Speakers fee: Abiogen, Theramex and UCB.

BL: Received fees and honoraria for lectures and advice from Amgen, Angitia, Gedeon Richter, Samsung Bioepis and UCB and served on the advisory boards for Gedeon Richter, Mereo and UCB.

KL: Employee of UCB.

JT: Employee and shareholder of UCB.

LH: Employee and stockholder of 3D-SHAPER Medical.

MB: Employee of 3D-SHAPER Medical.

P807

SERUM PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS) AND BONE MINERAL DENSITY IN NORWEGIAN ADOLESCENTS: SEX-SPECIFIC ASSOCIATIONS AND MIXTURE EFFECTS

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Abstract

Background: Adolescence is the critical period for the development of peak bone mass (PBM). Per- and polyfluoroalkyl substances (PFAS) are widespread endocrine disruptors that may disturb skeletal development, but evidence in Nordic adolescents is limited.

Objectives: To evaluate sex-specific associations between serum PFAS and areal bone mineral density (aBMD) Z-scores among Norwegian adolescents.

Methods: This cross-sectional study utilised data from Fit Futures 1 (2010–2011), a cohort of adolescents in Northern Norway. Eighteen serum PFAS were quantified, and aBMD Z-scores (femoral neck, total hip, total body) were calculated using dual-energy X-ray absorptiometry. We used multivariable linear regression and mixture analyses (quantile g-computation and Bayesian kernel machine regression) to estimate sex-specific associations.

Results: Among 889 participants (421 girls and 468 boys; mean age 16.2 years), eight PFAS had detection rates >70%. The sum of linear and branched perfluorooctane sulfonic acid (ΣPFOS) had the highest median concentration (6.23 ng/ml). Perfluorononanoic acid (PFNA) (β = −0.16 per doubling, 95% CI: −0.26, −0.06) and perfluorodecanoic acid (PFDA) (β = −0.15 per doubling, 95% CI: −0.24, −0.06) showed consistent inverse association with total body aBMD. Mixture analyses suggested modest overall adverse mixture effects, with limited evidence of interaction between PFAS. Sex-specific patterns showed more pronounced inverse associations in boys.

Conclusions: Higher concentrations of several PFAS, most consistently PFNA and PFDA, were associated with lower aBMD Z-scores, with stronger inverse patterns in boys. These findings suggest possible sex-specific vulnerabilities in bone accrual, underscoring the need for longitudinal studies to clarify long-term skeletal impacts.

Keywords: perfluoroalkyl substances, bone mineral density, adolescents, population-based study, mixture effect

P808

ASSESSING THE STANDARD OF CARE FOR VERY HIGH FRACTURE RISK (VHFR) PATIENTS USING REAL-WORLD UK DATA

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Objective: Osteoporosis (OP) guideline updates and expert consensus reveal strong convergence around several clinical characteristics that consistently define those at very high fracture risk (VHFR). In this study, we examined these different VHFR definitions to compare fracture rates and current treatment patterns.

Material and Methods: We conducted a retrospective observational study using CPRD Aurum linked primary care data and secondary care data from Hospital Episode Statistics England. The study period covered Jan 2010 to Oct 2023; patients were eligible for inclusion if they met any criteria between Jan 2012 and Dec 2021. The cohort included women aged ≥50 years meeting at least one of ten VHFR definitions (Table 1), derived from literature review and National Osteoporosis (OP) Guideline Group guidance. Key outcomes included OP diagnosis, time to treatment initiation, therapy type, and subsequent fx incidence.

Results: VHFR cohort sizes (not mutually exclusive) ranged from 3,032 in the very low BMD T-score ≤3.5 to 222,821 in the major osteoporosis fx cohort (Table 1). OP diagnosis at baseline varied between 8.7-39.7%, increasing during follow-up to 17–91.1%. Except for high dose glucocorticoid cohort, over 20% of each cohort experienced a fx within two years of index, with higher rates among fx-based VHFR definitions (40% of multiple vertebral fracture cohort had a subsequent fracture within two years). Fracture based definition cohorts had the lowest treatment rates, with an average of 18.3% and 39.5% receiving therapy from baseline to follow-up. Median time to treatment was 2–5 months for anti-resorptives and 8–12 months for osteoanabolic. Treatment sequencing analysis showed oral bisphosphonates dominated first-line, with ~87% starting on alendronate.

Conclusion: Although patients with VHFR face a 20-40% two-yr fx risk, many remain undertreated. There is a continued reliance on alendronate, even though guidelines recommend starting with osteoanabolic therapy to rapidly reduce fx-risk. This highlights the importance of better identifying VHFR and prioritizing their clinical care.

Table 1: Study Cohort definitions for very high fracture risk (VHFR)

Fracture Based VHFR (Note was date that the patient fully met the criteria of the definition)	Cohort Size	2-year rate per 1,000PY	Mean Age	Osteoporosis Treatment at Follow Up %
Recent Major Osteoporosis Fracture:	122,582	311.26	78.91	42.1
Multiple Fractures:	204,962	399.42	74.35	36.0
Fall with Fracture History:	160,515	273.46	78.16	34.9
70+ with Fracture History:	170,869	275.93	82.13	38.3
Recent Typical Osteoporosis Fractures:	222,821	283.21	74.98	33.8
Multiple Vertebra Fractures:	14,105	410.14	78.01	32.6
Glucocorticoid based VHFR				
Continued Glucocorticoid use with Fracture History:	51,884	188.49	74.24	35.2
High dose Glucocorticoid:	42,921	84.58	71.6	45.3
Bone Mineral Density based VHFR				
WHO Severe Osteoporosis Low BMD ≤-2.5:	8,403	142.95	70.73	77.2
Very Low BMD ≤-3.5 hip or spine:	3,032	156.91	71.49	80.1

P809

INEQUALITIES IN THE USE OF TOTAL HIP REPLACEMENT TO TREAT HIP FRACTURE: A POPULATION-BASED STUDY

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Objective

To investigate variation in total hip replacement (THR) use for treating displaced intracapsular hip fracture in relation to socio-economic deprivation and across the English National Health Service (NHS).

Methods

A population-based study was conducted using data from the National Hip Fracture Database (NHFD) (April 2011–June 2025). Adults aged ≥60 years with a displaced intracapsular hip fracture who fulfilled national guidelines to be offered a THR and were treated with THR or hemiarthroplasty (HA) were included. The primary outcome was THR surgery (versus HA). Variation in THR use was explored by quintiles of the Index of Multiple Deprivation (IMD) at admission using logistic regression. Interactions between IMD and study period (2011-2016, 2017-2022, and 2023-2025) were explored. THR use was compared across hospitals through period-specific logistic regression models. All models adjusted for patient-level demographic and clinical characteristics.

Results

From April 2011 to June 2025, 144,192 patients presented to an NHS hospital in England with a displaced intracapsular hip fracture, were eligible for THR, and were treated with THR or HA. THR rates were significantly lower with increasing deprivation (**Figure 1)**; the casemix-adjusted deprivation gap between the most and least deprived quintiles was wider in 2023-2025 (OR 0.59, 95% CI 0.53 to 0.66) than in 2011-2016 (0.72, 0.66 to 0.78) (LR test $\chi 2 = 36.5$, $p_{interaction} < 0.0001$). Large between-hospital differences in THR use were observed. From 2023 to 2025, across 134 hospitals, the THR rate ranged from 0.6% to 53.2%, or from 0.6% to 49.2% after casemix adjustment. There was slightly less variation in later years than earlier years [adjusted mean THR rate 22.1% (SD 9.2%) in 2023-2025; 30.0% (9.5%) in 2017-2022; and 27.4% (11.3%) in 2011-2016; Levene's test of variances p=0.03].

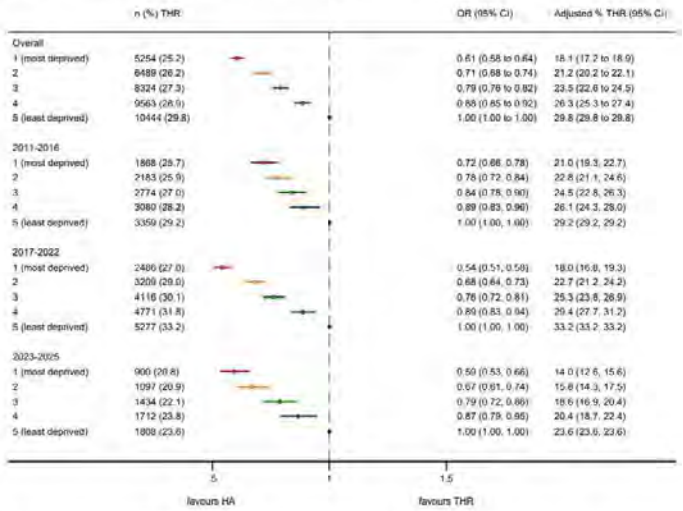
Conclusion

The use of THR to treat hip fracture among eligible patients is low, and varies widely by area-based deprivation and the treating hospital. These inequalities have remained wide over the past decade. Further research is needed to understand if differences in hospital resources, surgeon preferences, residual patient casemix, or other factors are driving these inequalities.

Disclosures

Authors are supported by Orthopaedic Research UK and NIHR Oxford BRC.

Figure 1: Total hip replacement use to treat displaced intracapsular hip fracture among patients deemed eligible by Index of Multiple Deprivation in England, April 2011– June 2025.



Adjustments made for differences in age (grouped in 5-year age bands from 60 to 90+ years), sex (male, female), mobility (freely mobile without aids, mobile outdoors with one aid), and American Society of Anaesthesiologists score (1, 2, 3) between Index of Multiple Deprivation (IMD) quintiles via logistic regression. Likelihood ratio test for IMD x study period interaction $\chi 2 = 36.5$, $p_{\text{interaction}} < 0.0001$. THR: total hip replacement. HA: hemiarthroplasty. OR (95% CI): adjusted odds ratio (95% confidence interval).

P810

TARGET-GUIDED FACTOR VIII REPLACEMENT MODEL IN HEMOPHILIA A FRACTURE SURGERY: PERIOPERATIVE HEMOSTATIC OUTCOMES AND SAFETY

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Objective: To evaluate the effectiveness and safety of a target-guided replacement strategy for coagulation factor VIII (FVIII) combined with dynamic monitoring during fracture surgery in patients with hemophilia A, and to establish a standardized, reproducible perioperative management model.

Methods: A retrospective analysis was conducted in 10 male patients with hemophilia A who underwent fracture surgery at our hospital between January 2020 and June 2024 (age range, 18–49 years; mean, 32.8 years). Fracture sites included the femur (n=4), tibia/fibula (n=3), humerus (n=2), and radius/ulna (n=1), with 3 open fractures. FVIII replacement was guided by the hematology department and performed until coagulation indices reached target levels before surgery. The intraoperative FVIII activity target was 100–150%, and 80–120% during the first 72 hours postoperatively. FVIII activity and activated partial thromboplastin time (APTT) were measured preoperatively and at 24 and 72 hours postoperatively. Intraoperative blood loss, wound healing, complications, and radiographic bone union were recorded.

Results: All patients underwent surgery successfully after FVIII activity reached the target range. The mean intraoperative blood loss was 240 ± 65 mL, all within controllable limits. Postoperative FVIII levels remained within the desired range, and APTT normalized gradually. Nine cases achieved primary wound healing, and one case of mild oozing was controlled with short-term dosage adjustment. No rebleeding, deep infection, or inhibitor formation occurred. At the 6-month follow-up, radiographic bone union was confirmed in all patients without functional impairment.

Conclusion: Target-guided FVIII replacement combined with dynamic monitoring can maintain stable coagulation and significantly reduce perioperative bleeding risk in fracture surgery for hemophilia A. This strategy ensures surgical safety and bone healing, providing a quantifiable and reproducible model for perioperative management.

P811

ALKYL CHAIN–MODIFIED TERIPARATIDE WITH ALBUMIN BINDING FOR LONG-CIRCULATING AND RESPONSIVE NANOTHERAPY IN OSTEOPOROSIS

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Teriparatide as a pivotal clinical drug for osteogenesis therapy is severely constrained by its short half-life, the propensity to induce osteoclastic activity at high concentration, and the requirement for frequent administration. Although responsive drug delivery systems have been explored to address these limitations, their effectiveness remains unsatisfactory because teriparatide is a high-molecular-weight, highly hydrophilic peptide, leading to low drug-loading efficiency and pronounced burst release. Herein, we design an alkyl chain-modified teriparatide molecule, in which the introduced alkyl moiety contains a cleavable disulfide bond and enables strong interactions with serum albumin in blood, thereby markedly prolonging the systemic half-life of teriparatide. Furthermore, the modified teriparatide can co-assemble with vitamin D and polyethylene glycol to form well-defined nanoparticles for osteoporosis therapy. The studies in vivo demonstrate that this nanosystem exhibits pronounced advantages in extending drug half-life, facilitating responsive release, and significantly enhancing bone mineral density, highlighting its great potential for effective osteoporosis treatment.

P812

TYPE 1 DIABETES AND BONE: ASSOCIATIONS WITH PERIPHERAL ARTERIAL CALCIFICATIONS USING HIGH-RESOLUTION PERIPHERAL QUANTITATIVE COMPUTED TOMOGRAPHY

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Objectives: The pathophysiology underlying increased bone fragility in type 1 diabetes [T1D] remains unclear. This study aimed to compare peripheral arterial calcifications [PAC], assessed by high-resolution peripheral quantitative computed tomography [HR-pQCT], between

individuals with T1D and non-diabetic controls. Secondary objectives in T1D were to evaluate associations between PAC severity and HR-pQCT bone indices, hip and spine BMD, bone turnover markers, and fracture history.

Materials and Methods: This cross-sectional study analyzed baseline data from the BEACON (T1D Bone HEAlth CONnection) cohort. HR-pQCT scans of the distal radius and tibia were assessed for PAC by two independent readers and scored using a standardized 12-point scale (maximum 6 points each for the radius and tibia). Scores were averaged across readers. Severe PAC was defined as a total score >5. Clinical data were obtained via questionnaires, chart review, physical examination, laboratory assessments, and dual-energy x-ray absorptiometry [DXA]. Descriptive statistics and univariate and multivariate regression analyses were performed. Data are presented as median (IQR).

Results: We included 96 participants with T1D (age 64 [59, 67] years; 51% male; HbA1c 7.0% [6.3–7.7]) and 55 controls (age 65 [61, 69] years; 52% male). Interrater agreement for PAC severity was excellent (Cohen's κ = 0.916). Participants with T1D had a higher prevalence of severe PAC (64% vs 10%), cardiovascular disease (22% vs 6%), and fragility fractures (26% vs 4%) than controls (all p<0.001). After adjustment for age, sex, and body mass index, severe PAC in T1D was associated with lower tibial cortical volumetric BMD (adjusted difference -4.7%, p = 0.011; Figure 1). No differences were observed in radius HR-pQCT parameters, hip or spine DXA-BMD, bone turnover markers, nor fracture history between severe and non-severe PAC groups.

Conclusions: PAC assessed by HR-pQCT was markedly higher in individuals with T1D compared with controls, despite relatively good glycemic control. In T1D, severe PAC was associated with reduced tibial cortical vBMD. Further studies are needed to elucidate the interplay between vascular calcification and bone health in diabetes.

HR-pQCT Parameter at the Tibia	Adjusted % Difference* Severe vs. Non-Severe PAC	p-value
Bone Density		
Total vBMD (mgHA/cm3)	0.23 [-7.02, 8.05]	0.951
Trabecular vBMD (mgHA/cm3)	4.50 [-5.26, 15.25]	0.375
Cortical vBMD (mgHA/cm3)	-4.66 [-8.08, -1.1]	**0.011**
Size/Morphology		
Total Area (mm2)	1.25 [-5.2, 8.13]	0.709
Trabecular Area (mm2)	-0.99 [-8.34, 6.95]	0.799
Cortical Area (mm2)	0.03 [-8.2, 9]	0.994
Microarchitecture		
Trabecular bone volume fraction (%)	1.87 [-6.24, 10.69]	0.658
Trabecular number (1/mm)	7.00 [-2.24, 17.12]	0.140
Trabecular thickness (mm)	0.33 [-3.05, 3.84]	0.847
Trabecular separation (mm)	-6.75 [-15.47, 2.86]	0.160
Trabecular inhomogeneity (mm)	-12.01 [-25.65, 4.13]	0.135
Cortical thickness (mm)	1.33 [-7.39, 10.86]	0.772
Cortical porosity (%)	11.91 [-9.07, 37.72]	0.284
Bone Strength		
Compressive Stiffness (kN/mm)	-4.10 [-11.61, 4.05]	0.311
Failure Load (kN)	-4.09 [-11.32, 3.74]	0.294

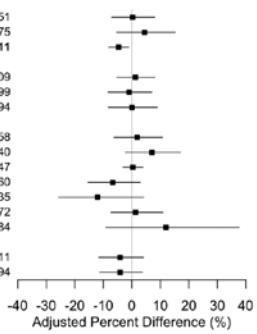


Figure 1. Adjusted Percent Differences for Tibial HR-pQCT Parameters Between Severe and Non-Severe PAC
*Results are adjusted for age, sex and body mass index. Data are presented as adjusted percent difference [95% CI].
A negative value indicates lower HR-pQCT parameter in the severe PAC group. P-values <0.05 are in bold font.
Abbreviations: HR-pQCT, high-resolution peripheral computed tomography; PAC, peripheral arterial calcification; vBMD, volumetric bone mineral density.

P813

BONE METABOLISM IN ADOLESCENTS UNDERGOING METABOLIC AND BARIATRIC SURGERY: TEEN-LABS COHORT 15-YEARS LATER

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Objectives: Little is known about the long-term effects of metabolic and bariatric surgery [MBS] on bone health during adolescence, a critical bone acquisition period. We aimed to compare areal and volumetric bone mineral density [aBMD; vBMD] between young women with history of MBS during adolescence and matched controls. We further aimed to evaluate whether demographics, surgical factors, and bone turnover markers correlated with BMD in the MBS group.

Materials and Methods: We conducted a cross-sectional substudy of the Teen-LABS cohort, that followed adolescents and young adults before and after MBS for 15 years. Female participants who underwent Roux-en-Y gastric bypass [RYGB] or vertical sleeve gastrectomy [VSG] were included and matched to controls by sex, age (± 5 years), body mass index [BMI] (± 5 kg/m^2), race and ethnicity. Spine, total hip [TH] and femoral neck [FN] aBMD were evaluated using dual-energy X-ray absorptiometry, and vBMD using quantitative computed tomography. C-terminal telopeptide of type 1 collagen [CTX] and procollagen 1 N-terminal propeptide [P1NP] were measured. Partial Pearson's correlations were performed accounting for time since surgery and BMI.

Results: We included 20 women with history of MBS (14 RYGB and 6 VSG, mean time since surgery 13.4 ± 2.6 years, current weight loss 23.5 ± 22.0 kg) and 28 matched controls. The average age of the cohort was 30.0 ± 5.5 years, and mean BMI was 39.8 ± 10.3 kg/m^2. Compared to controls, the MBS group had 7.4% lower spine aBMD and 14.6% lower spine vBMD (p≤ 0.03, Figure 1), but there were no significant differences in hip BMD nor bone turnover markers. Within the MBS group, P1NP was correlated with TH, FN and spine aBMD (r = -0.57 to -0.64; all p ≤ 0.01), whereas CTX was correlated with TH aBMD, TH vBMD and FN vBMD (r = -0.50 to -0.62; p ≤ 0.03). Weight change 6 months after surgery, but not at later time points, was correlated with FN vBMD (r = 0.60, p = 0.01). Race, ethnicity and type of surgery were not associated with BMD.

Conclusions: Young adults with history of MBS during adolescence had lower BMD at the spine but not at the hip compared to matched controls. Bone turnover markers and initial 6-month post-surgical weight loss correlated with BMD. More studies are needed to evaluate mechanisms driving these long-term skeletal changes in adolescents undergoing MBS.

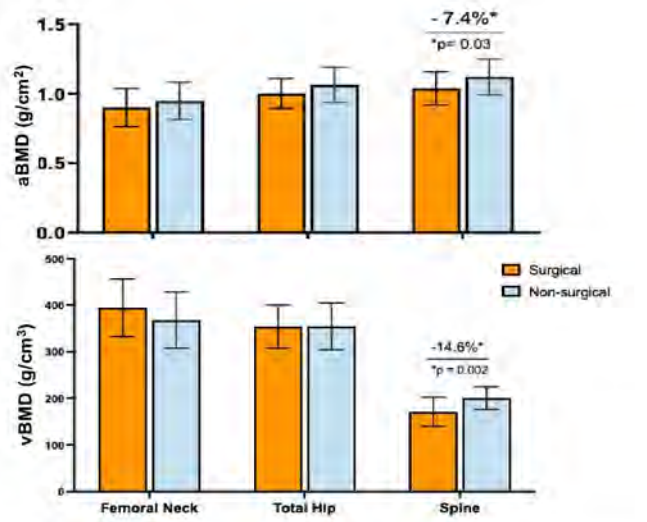


Figure 1. Comparison of Bone Density Between Metabolic and Bariatric Surgery Group and Matched Controls after ≥8 Years
Data are presented as mean ± standard deviation (SD).
Upper Panel: aBMD assessed by DXA is lower at the spine for surgical group.
Lower Panel: vBMD assessed by QCT is lower at the spine for surgical group.
Abbreviations: aBMD, areal bone mineral density; vBMD, volumetric bone mineral density; DXA, dual-energy x-ray absorptiometry; QCT, quantitative computed tomography

P814

COMPARISON OF EFFICACY AND SAFETY OF DENOSUMAB WITH ELDECALCITOL OR NATIVE VITAMIN D IN POSTMENOPAUSAL CHINESE WOMEN WITH OSTEOPOROSIS (ESCORT)

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Background: Denosumab is among the most widely used agents for osteoporosis management, and eldecalcitol (ELD) is also a common therapeutic option in this field. ELD effectively elevates bone mineral density (BMD) in osteoporotic patients, independent of baseline vitamin D status or calcium intake. However, the efficacy of denosumab combined with either ELD or native vitamin D in postmenopausal Chinese women with osteoporosis has not been established.
Methods: In this single-center, randomized, open-label, active-controlled clinical trial, postmenopausal women with osteoporosis (lumbar spine [LS], total hip [TH], or femoral neck [FN] BMD T-score ≤ −2.5, or low bone mass with fragility fracture history) were enrolled at Xi'an Honghui Hospital, China, and were randomly assigned (1:1) to receive ELD (0.75 μg orally daily) (ELD group) or denosumab (60mg subcutaneously every 6 months) plus either native vitamin D (800 IU orally daily) with calcium (600 mg orally daily) (Control group) for 12 months. The primary endpoint was the change from baseline in LS-BMD (L1–L4) at 12 months. Secondary endpoints included changes from baseline in FN- and TH-BMD, bone turnover markers, serum parathyroid hormone, quality of life, and the incidence of new fractures.
Results: Of 100 randomized patients, 45 patients in the ELD group and 46 in the control group were included in the efficacy analysis. At baseline, the absolute values of LS-BMD T-score were 0.68 ± 0.06 in the Eld group and 0.70 ± 0.05 in the control group, respectively. After 12 months of treatment, these values changed to 0.73 ± 0.07 (Eld group) and 0.74 ± 0.06 (Control group)the LS-BMD increased significantly in both groups (both $P < 0.05$), with a greater increase in the ELD group than in the control group (6.75% vs. 4.99%), yielding a statistically significant between-group least-squares mean difference of 1.75% ($P = 0.038$). Compared with the control group, β-CTX level was significantly higher in the ELD group at 3 months (0.05 vs. 0.03 ng/mL, $P = 0.002$), with the trend persisting through 6 and 12 months. Eight fractures were reported (one non-vertebral in the ELD group; one vertebral and six non-vertebral in the control group). No significant between-group differences were observed in FN- or TH-BMD, quality of life, or overall adverse event rates. Both regimens were generally well tolerated, without clinically meaningful calcium-related safety signals.
Conclusions: Combination therapy with denosumab and eldecalcitol improved LS-BMD more effectively than denosumab with native vitamin D and calcium.
Clinical trial registration number: NCT05884372
Keywords: Postmenopausal osteoporosis; Vitamin D; Bone mineral density; Bone turnover markers; Denosumab; Eldecalcitol

P815

DIFFERENCES IN PATIENT ATTITUDES TOWARD THE USE OF ARTIFICIAL INTELLIGENCE IN HEALTHCARE IN RELATION TO DIGITAL BEHAVIORAL CHARACTERISTICS

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Objective: To examine differences in patient attitudes with a range of claims about artificial intelligence (AI) and the health of digitally active patients in everyday life.
Material and Methods: The prospective cross-sectional study, approved by the Ethics Committee, included 101 patients of both sexes treated at the Special Hospital for Rheumatic Diseases in Novi Sad, Republic of Serbia, who signed an informed consent to participate in the research. Data was gathered via a questionnaire compiled by the examiner, exploring patients' attitudes toward AI and health, and was processed using SPSS v. 25.
Results: The sample (101 patients, 83.2% female, 16.8% male), reported on the social network use—YouTube (66.3%), Facebook (63.4%), Instagram (42.6%), TikTok (18.8%), LinkedIn (6.9%), X/Twitter (5.9%), Threads (2.0%), Snapchat (1%) - as well as messaging applications: Viber (94.1%), Messenger (59.4%), WhatsApp (46.5%), Telegram (11.9%), and Skype (1.0%). While only 13.9% of respondents use some kind of health monitoring application, 62.4% indicated they would be willing to use such an app, and 40.6% know someone who already does.
The number of messaging apps used by respondents was significantly related to the degree of agreement with statements about AI in healthcare (p=9.019). The lowest average score was recorded for respondents who do not use any applications (M=2.79, SD=0.54), while the highest was associated with the use of 3+ applications (M=3.42, SD=0.52).

Respondents who indicated willingness to use a health monitoring application showed a significantly higher (p=0.001) level of agreement with statements about the usefulness of AI in healthcare (M=3.40, SD = 0.49) compared to those who would not use such apps (M=2.90, SD=0.46).
Likewise, individuals who know someone using a health monitoring application indicated a statistically significantly (p=0.031) higher degree of agreement with statements about the usefulness of AI in healthcare (M=3.35, SD=0.53) compared to those who do not (M=3.12, SD=0.52).
Conclusion(s): Digital engagement and exposure to technological innovations (number of applications, willingness to use health applications, contact with technology users) is linked to a greater propensity to accept AI in healthcare.

P816

ASSOCIATION BETWEEN SOCIODEMOGRAPHIC CHARACTERISTICS AND PATIENT TRUST IN THE USE OF ARTIFICIAL INTELLIGENCE IN HEALTHCARE

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Objective: This study aimed to evaluate the association between patients' sociodemographic characteristics and their level of trust in the application of artificial intelligence (AI) in healthcare.
Material and Methods: A retrospective cross-sectional study included 297 patients from the Special Hospital for Rheumatic Diseases Novi Sad, Serbia. Data were obtained from a database containing sociodemographic variables, including age, sex, educational level, marital status, and place of residence. Attitudes toward AI were measured using a structured 24-item questionnaire with a five-point Likert scale, assessing trust in AI, perceived discomfort, and preference for human supervision. Associations between sociodemographic factors and attitudes toward AI were analyzed. Internal consistency of the domains was assessed using Cronbach's alpha coefficient. Statistical analyses were performed using Python, with significance set at $p < 0.05$.
Results: The mean age of participants was 53 years, with women representing 78% of the sample. Trust in AI varied by education and residence. Participants with less than eight years of education reported the highest trust (M = 3.19), followed by those with more than 12 years (M = 3.17), while those with 8–12 years showed the lowest trust (M = 3.02). Urban residents reported greater trust (M = 3.11) than suburban (M = 3.02) and rural residents (M = 3.05). Similar trends were observed for discomfort and preference for human oversight, with higher scores among those with lower education and non-urban residence. No consistent differences were observed by sex or marital status.
Conclusion: Sociodemographic factors, particularly education and place of residence, significantly influence patient trust, discomfort, and oversight preferences regarding AI in healthcare. These findings emphasize the need to consider educational and contextual differences when implementing AI-supported clinical tools to ensure equitable, transparent, and acceptable adoption.

P817

THE IMPACT OF AGE ON THE BARRIERS TO PHYSICAL ACTIVITY IN RHEUMATOLOGY PATIENTS

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Objective: Rheumatic diseases include a wide range of chronic ailments affecting the musculoskeletal system and often compromise functional ability and quality of life. Although physical activity plays an important role in the treatment and prevention of complications in rheumatological patients, engagement in regular exercise is often limited by various barriers. To examine the association between age and potential barriers to physical activity in rheumatological patients.
Material and Methods: Following the approval by the Ethics Committee, this retrospective-prospective study, involving 52 rheumatology patients aged 18–65 years, was conducted at the Special Hospital for Rheumatic Diseases in Novi Sad, Serbia. Data were collected using a sociodemographic questionnaire, the International Physical Activity Questionnaire (IPAQ) questionnaire, as well as additional questions inquiring into barriers to physical activity. Statistical processing was performed in SPSS v. 24.
Results: The sample comprised 84.6% women and 15.4% men. About half of the respondents did not participate in regular physical activity, while the other half engaged in exercise of varying intensity. Irrespective of age, lack of knowledge and the need for professional guidance during exercise was the most frequently reported barrier to physical activity (42.3%), followed by lack of time (28.8%) and financial limitations (19.2%), Pearson χ^2=1.878, df=4, p=0.758. Likelihood Ratio=2.546, p=0.636 confirms this conclusion, while Linear-by-Linear Association=1.748, p=0.186 indicates absence of a significant linear relationship between age and barrier. Thus, similar patterns in perceived physical activity barriers are exhibited by younger and older individuals. Moreover, Pearson's R= -0.185, p=0.189, and Spearman's correlation= -0.177, p=0.208 point toward a weak (statistically insignificant) negative association between age groups and barriers.
Conclusion(s): Age does not appear to influence the types of barriers to physical activity, as "I need someone to show me how" and "I haven't thought about it" are the most frequently cited reasons by all age groups, although high cost and skepticism about the effects of exercise are also mentioned by some respondents.

P818

PARENTAL SLEEP QUALITY DURING PEDIATRIC INPATIENT REHABILITATION: A PILOT STUDY

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Objective: To assess sleep quality and daytime sleepiness in parents of children undergoing inpatient rehabilitation and to identify hospital-related factors associated with impaired sleep.
Material and Methods: This pilot cross-sectional study included 30 parents whose children were hospitalized for at least two days at the Clinic for Physical Medicine and Rehabilitation, Institute for Health Care of Children and Youth of Vojvodina, Novi Sad, Serbia. The study was approved by the Ethics Committee of the Institute (No. 1904/2025), and all participants provided informed consent. Sleep quality was assessed using the Pittsburgh Sleep Quality Index (PSQI), a validated questionnaire evaluating subjective sleep quality, latency, duration and disturbances, while daytime sleepiness was assessed using the Epworth Sleepiness Scale (ESS). A sociodemographic and hospitalization-related questionnaire focusing on environmental conditions during hospitalization was also administered. Non-parametric statistical methods were applied.
Results: The mean PSQI score was 5.57 ± 2.76, indicating borderline poor sleep quality, while the mean ESS score was 6.43 ± 4.01, corresponding to normal daytime sleepiness. A significant negative correlation was found between sleep duration and PSQI ($\rho = -0.684$; $p < 0.001$), while sleep latency showed a positive correlation with PSQI ($\rho = 0.469$; $p = 0.009$). Hallway lighting during nighttime was significantly associated with increased daytime sleepiness ($p = 0.049$). More than 40% of parents reported sleep difficulties during hospitalization. All parents shared a hospital room with their child, and 60% shared the same bed.
Conclusion: Parents of children undergoing inpatient rehabilitation frequently experience impaired sleep quality, influenced by environmental and hospitalization-related factors. Improving hospital sleep conditions for parents may enhance family well-being and support more effective participation in the rehabilitation process.

P819

URINARY TRYPTOPHAN–KYNURENINE METABOLITE PROFILES IN OLDER ADULTS WITH DYNAPENIA AND SARCOPENIA

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Objectives: With advancing age, increased activity of the kynurenine pathway may contribute to the development of dynapenia and sarcopenia by enhancing oxidative stress and impairing mitochondrial function in skeletal muscle. Given the limited data in older populations, this study aimed to assess urinary concentrations of tryptophan (TRP) and its metabolites—kynurenine (KYN), 3-hydroxykynurenine (3-HK), and 3-hydroxyanthranilic acid (3-HAA)—in older adults with preserved muscle mass and strength (group A), isolated dynapenia (group B), and sarcopenia (group C).
Materials and Methods: Patients aged ≥60 years hospitalized in a geriatric ward were included. Dynapenia was defined as low handgrip strength (<16 kg in women and <27 kg in men). Sarcopenia was diagnosed based on the coexistence of dynapenia and low appendicular skeletal muscle mass (ASM; <20 kg in men and <15 kg in women), assessed by bioimpedance using the Sergi's equation. Serum TRP, KYN, and 3-HK were determined using RP-HPLC-UV, and 3-HAA using RP-HPLC. Statistical analyses included Spearman correlation, the Kruskal–Wallis test, and logistic regression.
Results: The study included 133 participants (mean age 79.0 ± 7.3 years; 72.9% women), with 61.9% classified in group A, 6.3% in group B, and 31.7% in group C. Median urinary concentrations of KYN and 3-HK increased progressively from group A to group C, although these differences did not reach statistical significance (KYN $p=0.08$; 3-HK $p=0.06$), while urinary TRP and 3-HAA showed similar non-significant patterns ($p>0.1$). Both ASM and ASM/height² were significantly and inversely associated with urinary 3-HK levels ($p=0.001$ and $p=0.02$, respectively). In logistic regression analysis, only older age was independently associated with a higher likelihood of sarcopenia (OR=1.14; 95% CI 1.07–1.22; $p<0.001$), regardless of urinary KYN and 3-HK concentrations or sex.
Conclusions: In older adults, urinary kynurenine pathway metabolites show trends toward higher levels with worsening muscle status and are associated with lower muscle mass indices, particularly 3-hydroxykynurenine. However, age remains the dominant determinant of sarcopenia in this population. These findings suggest that urinary kynurenine metabolites may reflect early metabolic alterations related to muscle decline, but their independent role as markers of sarcopenia requires further investigation.
Acknowledgments: The authors would like to thank dr. Łukasz Ołdak for conducting biochemical analyses.

P820

RADIAL NEUROPATHY-LIKE PRESENTATION OF DIGITAL EXTENSOR TENDON RUPTURE IN END-STAGE RENAL DISEASE: A CASE REPORT

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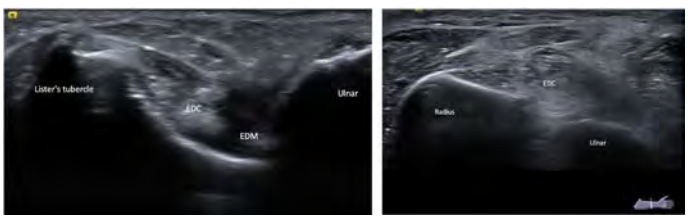
OBJECTIVE(S) To describe a rare case of digital extensor tendon rupture mimicking radial neuropathy in a patient with end-stage renal disease (ESRD).

MATERIAL AND METHODS A 59-year-old man with ESRD on maintenance hemodialysis, and a history of thyroid papillary carcinoma and renal hyperparathyroidism treated surgically, presented with four months of sudden right wrist soreness and difficulty lifting objects. He denied trauma or repetitive wrist use. Examination showed inability to extend the ulnar four digits (Figure 1). Radial neuropathy was suspected, but nerve conduction studies and electromyography were normal. Ultrasound demonstrated complete rupture of the right extensor digitorum communis (EDC) and extensor digiti minimi (EDM) tendons at the carpal level with EDC muscle atrophy (Figure 2). The patient underwent operative repair, with intraoperative confirmation of complete rupture of the second to fifth extensor tendons at zone VI. Tendon transfer was performed.

Figure 1. Impaired extension of the ulnar four digits.



Figure 2. Ultrasound showing rupture of EDC and EDM tendons.



RESULTS Ultrasound identified tendon rupture despite normal electrophysiologic studies, enabling timely surgical management. Postoperative recovery was uneventful, and tendon rupture was confirmed as the cause of finger extension loss.

CONCLUSION(S) Spontaneous tendon rupture occurs in up to 15% of hemodialysis patients, usually involving large tendons such as the quadriceps, patellar, or Achilles tendons. This case demonstrates an uncommon rupture of the EDC and EDM tendons presenting with radial neuropathy-like weakness. Clinicians should consider digital extensor tendon rupture in dialysis patients with sudden finger extension deficits even without trauma. Ultrasound is essential for distinguishing tendon pathology from neuropathic mimics and guiding appropriate management.

DISCLOSURES None.

P821

CURRENT VALUE OF ARTIFICIAL INTELLIGENCE IN PHYSICAL AND REHABILITATION MEDICINE: A SYSTEMATIZED NARRATIVE REVIEW

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Background

Functional limitations and mobility impairments arising from a wide range of conditions represent a growing public health challenge and contribute to an increased demand for Physical and Rehabilitation Medicine (PRM). This demand aligns with the framework of the World Health Organization's 'Rehabilitation 2030' initiative, which emphasizes equitable access to rehabilitation as a core global health priority. Artificial intelligence (AI) could offer promising opportunities to support this objective. In this context, exploring how AI is currently implemented in PRM is essential to better understand its documented contributions to date and future potential.

Objectives

The main objectives of this systematized narrative review are to (1) synthetize current studies exploring how AI is used in PRM, and (2) assess its relevance by identifying existing knowledge gaps to inform future research directions and potential applications in the field.

Material and Methods

Medline (Ovid) and Embase (www.embase.com) were searched in order to find studies published from 2020, focused on AI and PRM. Published studies in French or in English were included.

Results

A total of 87 references were found, including 32 on Medline and 55 on Embase. After removing 19 duplicates, 68 references were screened based on title and abstract. Full-text assessment was performed for 53 articles, leading to the inclusion of 37 studies. Currently, only a few articles show that, although some AI tools are already used in limited contexts in PRM, their integration remains mainly exploratory and potential.

Conclusions

To date, most articles in which AI is discussed in PRM report potential leads, without practical use or reported prospective clinical validation. A hybrid approach, combining human judgment and empathy with AI's efficiency, could substantially contribute to improving standardization and clinical decision support in PRM settings as well as improving education and research in rehabilitation.

Conflict of interest

The authors declare no conflict of interest.

P822

CORTICAL THICKNESS AND POROSITY OBTAINED USING BI-DIRECTIONNAL AXIAL TRANSMISSION DIFFERENTIATE BETWEEN INTRA- AND EXTRA-CAPSULAR HIP FRAGILITY FRACTURES

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Intra- and extracapsular hip fragility fractures (ICF and ECF) are still mainly considered as one entity, despite evidences [1]. Their differentiation should improve their prevention and treatments. Quantitative Ultrasound (QUS) have demonstrated a clear potential for fragility fracture assessment [2]. Bi-Directionnal Axial Transmission (BDAT) allows to estimate cortical thickness (Ct.Th) and porosity (Ct.Po) at the forearm, showing discrimination perfomances similar to DXA [3].

In this study, 130 participants (100 women, 30 men) were included, 60 without history of fragility fracture (NF group), and 70 with recent hip fragility fracture from Hosp. Dr G. Fricke. Differences in age (74 ± 7 *vs* 80 ± 8 years, $p < 0.001$), weight (68 ± 13 *vs* 60 ± 13 kg, $p < 0.001$) and BMI (27 ± 4 *vs* 23 ± 4 kg.m^{-2}, $p < 0.001$) were observed. BDAT parameters were found significantly different for Ct.Th (2.9 ± 0.6 *vs* 2.6 ± 0.8 mm, $p = 0.02$), Ct.Po (10 ± 4 *vs* 13 ± 5%, $p = 0.001$) and the ratio Ct.Po/Ct.Th (3.6 ± 1.5 *vs* 5.2 ± 1.8, $p < 0.001$). The highest discrimination was obtained considering the area under the ROC curve (AUC) and the odds ratio (OR) for the ratio Ct.Po/Ct.Th, adjusted with age and BMI: AUC = 0.81 [0.73 - 0.86] and OR = 1.63 [1.01 - 2.63] ($p = 0.04$).

When comparing 31 ICF to NF, Ct.Po was found significantly different (12.4 ± 4.5 %, $p = 0.02$) while no significant difference were observed for Ct.Th. Differently, when comparing 39 ECF to NF, both parameters were found different: Ct.Th (2.5 ± 0.9 mm, $p = 0.004$) and Ct.Po (13.4 ± 5.1%, $p = 0.001$). Morever, the ICF group was found younger (78 ± 8 *vs* 82 ± 8, $p = 0.03$) in agreement with previous studies [1]. ICF and ECF were also differentiated by the ratio Ct.Po/ Ct.Th (4.6 ± 1.6 *vs* 5.6 ± 1.8, $p = 0.02$) with the age, BMI-adjusted discrimination equal to AUC = 0.73 [0.62 - 0.83] and OR = 1.92 [1.03 - 3.57] ($p = 0.04$).

This study confirms that BDAT is useful obtaining scientific data and performing hip fragility fracture risk assessment, in particular where DXA is not available. Moreover, cortical thickness and porosity, can be clinical interpreted in terms of bone quantity and quality, as shown here for ICF and ECF differentiation.

[1] JL Dinamarca-M. et al. Aging and Disease 2025, doi: 10.14336/AD.2025.0414

[2] D Hans et al. Adv Exp Med Biol 2022 doi: 10.1007/978-3-030-91979-5_2

[3] JG Minonzio et al. PLoS ONE 2022 doi: 10.1371/journal.pone.0277831

P823

CORTICAL THICKNESS AND POROSITY OBTAINED USING BI-DIRECTIONNAL AXIAL TRANSMISSION DIFFERENTIATE BETWEEN INTRA- AND EXTRA-CAPSULAR HIP FRAGILITY FRACTURES

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This study confirms that BDAT is useful obtaining scientific data and performing hip fragility fracture risk assessment, in particular where DXA is not available. Moreover, cortical thickness and porosity, can be clinical interpreted in terms of bone quantity and quality, as shown here for ICF and ECF differentiation.

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[3] JG Minonzio et al. PLoS ONE 2022 doi: 10.1371/journal.pone.0277831

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IMPROVED 10-YEAR FRACTURE RISK PREDICTION WITH THE "BONE STRAIN INDEX" BEYOND BONE MINERAL DENSITY AND FRAX® IN COMMUNITY-DWELLING OLDER WOMEN

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Objectives: The Bone Strain Index (BSI), derived from finite element analysis of DXA, quantifies mechanical strain within bone. Its predictive value for fragility fractures in older women remains to be established in large prospective studies.
Methods: This prospective cohort study assessed the association between BSI, incident and major osteoporotic fractures (MOF) in 3338 community-dwelling older women (age 64-77 years) during a 5-year and 10-year follow-up. BSI was calculated at the lumbar spine, total hip, and femoral neck using baseline DXA scans. Incident fragility and MOF were radiographically validated. Discriminative performance was assessed using ROC curves, optimal cut-offs (Youden index), and Cox proportional-hazards models adjusted for age, areal bone mineral density (aBMD), or FRAX® score.
Results: During the 10-year follow-up, 803 women (24.1%) sustained at least one fragility fracture, including 525 MOF. Higher BSI values were significantly associated with increased fracture risk at 5 and 10 years, independently of age, aBMD, or FRAX®. Total hip BSI showed the strongest performance among all sites (AUC 0.63 at 5 and 10 years), outperforming lumbar spine BSI (AUC 0.58). Each 1-SD increase in total hip BSI was associated with higher fracture risk (HR 1.42 [1.32–1.53] at 5 years; 1.41 [1.34–1.49] at 10 years), which remained significant after FRAX® adjustment (HR 1.24 [1.14–1.35]).
Conclusions: BSI independently predicted incident fragility fractures and MOF during a 5-year and 10-year follow-up in community-dwelling older women. Total hip BSI showed stronger predictive performance than lumbar spine BSI, and both provided discriminative value beyond aBMD and FRAX®.

P826

SYSTEMIC INFLAMMATION PREDICTS BONE FRAGILITY IN ADULT-ONSET STILL'S DISEASE: A CROSS-SECTIONAL ANALYSIS

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Background: Adult-onset Still's disease (AOSD) is characterized by systemic inflammation with marked elevations in C-reactive protein (CRP) and ferritin. Although chronic inflammation is a well-known contributor to bone fragility, the impact of AOSD-specific inflammatory activity on bone density and microarchitecture remains unclear.

Methods: We retrospectively analyzed AOSD patients who met the Yamaguchi criteria and underwent dual-energy X-ray absorptiometry (DXA) between 2010 and 2023. Bone mineral density (BMD) at the lumbar spine, femoral neck, and total hip was measured, and trabecular bone score (TBS) was evaluated. Associations between inflammatory markers (CRP, ferritin) and bone parameters were analyzed using Spearman correlations and multivariable logistic regression.

Results: A total of 54 patients with AOSD were included, with a mean age of 58.2 ± 12.0 years and 81.5% being female. Mean BMD values were 0.950 ± 0.206 g/cm² (L spine), 0.769 ± 0.139 g/cm² (femoral neck), and 0.819 ± 0.147 g/cm² (total hip). Osteoporosis and osteopenia were identified in 40.7% and 38.9% of patients, respectively. Higher CRP levels correlated negatively with TBS (r = −0.445, P = 0.001). After adjustment for age, sex, and BMI, CRP remained an independent predictor of osteoporosis (OR 1.13, 95% CI 1.01–1.28, P = 0.037). In a subgroup analysis of patients aged ≥50 years, log-transformed ferritin showed a strong association with osteoporosis (OR 5.01, 95% CI 1.52–16.51, P = 0.008). Cumulative glucocorticoid exposure was not significantly related to any bone outcomes.

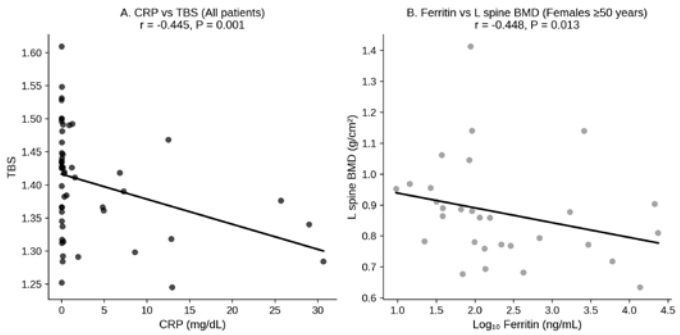
Conclusions: Our findings suggest that systemic inflammation—reflected by elevated CRP and ferritin—plays a central role in impaired bone health among patients with AOSD. Inflammation-related bone fragility appears to be an underrecognized complication, highlighting the need for routine bone health assessment in this population.

Table 1. Basline characteristics (n=54)

Variable	Value
Age, years	58.2 ± 12.0
Female, n (%)	44 (81.5)
BMI, kg/m²	22.9 ± 2.8
Disease duration, months	29.5 (4.5-83.5)
Laboratory findings at BMD	
CRP, mg/dL	0.14 (0.04-1.51)
Ferritin, ng/mL	129 (49-373)
Cumulative steroid, mg	5,062 (1,181-9,690)
Bone densitometry	

L spine BMD, g/cm²	0.950 ± 0.206
Femoral neck BMD, g/cm²	0.769 ± 0.139
Total hip BMD, g/cm²	0.819 ± 0.147
TBS	1.404 ± 0.081
Bone status, n (%)	
Osteoporosis	22 (40.7)
Osteopenia	21 (38.9)
Normal	11 (20.4)

Figure 1. Scatter plots showing correlations between inflammatory markers and bone parameters.



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AI-BASED BONE MINERAL DENSITY PREDICTION FROM PLAIN RADIOGRAPHS FOR OSTEOPOROSIS SCREENING: SINGLE-TOOL THRESHOLD OPTIMIZATION VERSUS MULTIMODAL STRATEGIES

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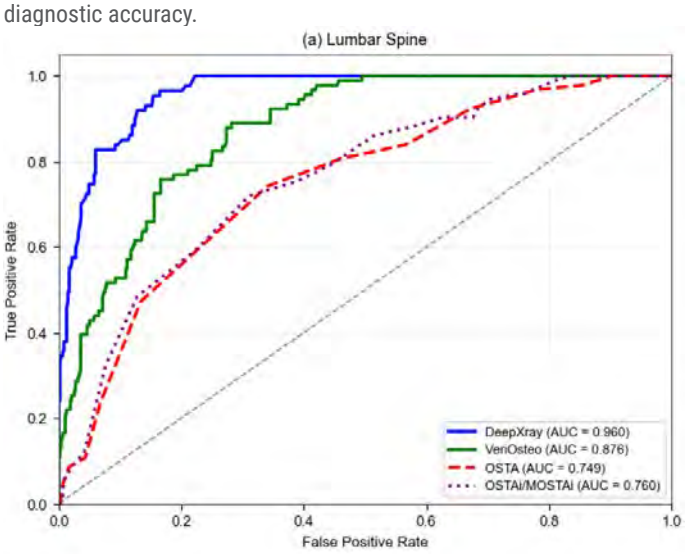
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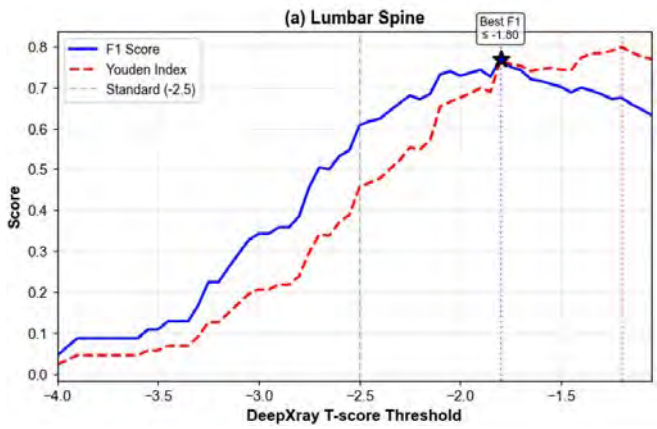
Objective: To compare the diagnostic performance of AI-based bone mineral density (BMD) prediction tools using plain radiographs with traditional questionnaire-based screening methods for osteoporosis detection, and to evaluate whether threshold optimization of single AI tools could achieve superior performance compared to multimodal screening strategies or traditional questionnaire-based screening approaches.

Material and Methods: This cross-sectional study included 578 participants (73.2% women, mean age 62.2±10.9 years) who underwent both plain radiographs and dual-energy X-ray absorptiometry (DXA). Two AI tools predicted BMD: DeepXray analyzed lumbar spine and pelvic radiographs, while VeriOsteo analyzed the T12-L1 region from chest radiographs. AI predictions were calibrated using manufacturer-specific Hologic transformation formulas. Traditional tools included Osteoporosis Self-Assessment Tool for Asians (OSTA) and OSTAi/MOSTAi. Diagnostic performance was evaluated using receiver operating characteristic analysis, and threshold optimization was performed to maximize F1 scores.

Results: Osteoporosis prevalence was 16.1% for lumbar spine and 30.1% for any skeletal site. For lumbar spine detection, DeepXray achieved the highest area under the curve (AUC=0.960, 95% CI: 0.923-0.997), outperforming VeriOsteo (0.876), OSTA (0.749), and OSTAi/MOSTAi (0.760). At standard thresholds, AI tools demonstrated high specificity (DeepXray: 98.9%) but lower sensitivity (47.1%), while traditional tools showed higher sensitivity (OSTA: 74.2%) but lower specificity (68.0%). Threshold optimization revealed that DeepXray alone with liberalized threshold (T-score ≤-1.80) achieved optimal performance (F1=0.772) with 83.9% sensitivity and 93.8% specificity, matching or exceeding constrained parallel combination strategies (F1=0.629).

Conclusion: Single AI tool (DeepXray) with optimized threshold outperforms multimodal combination strategies or traditional questionnaire-based screening approaches, representing a simplified yet highly effective approach for osteoporosis screening that eliminates the need for questionnaire-based assessments while achieving superior diagnostic accuracy.





P828

AI-BASED BMD PREDICTION ACROSS OSTEOPOROSIS TREATMENT STATES: IMPLICATIONS FOR MONITORING ANABOLIC AND ANTIRESORPTIVE THERAPY

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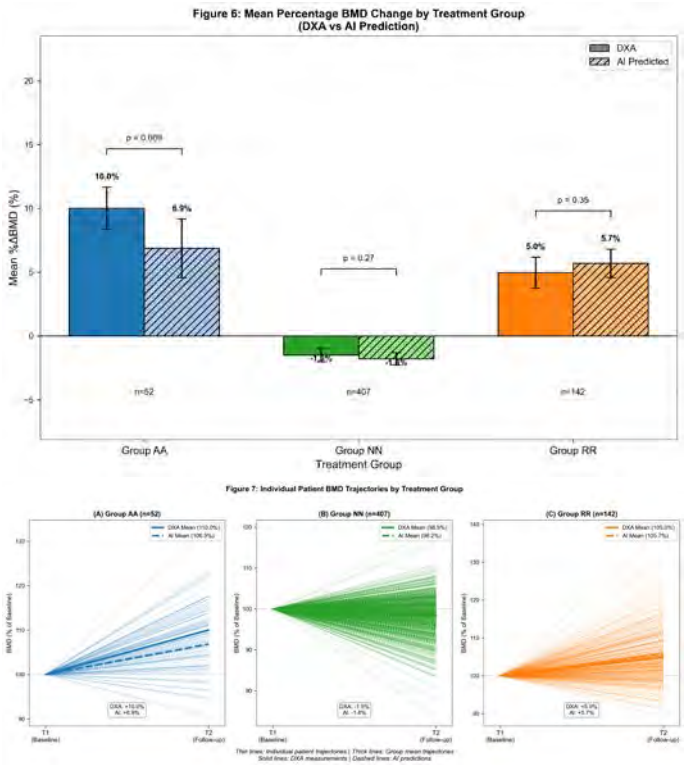
[1]Program for Precision Health and Intelligent Medicine, Graduate School of Advanced Technology, National Taiwan University, Taipei City, Taiwan; [2]Department of Orthopedics, National Taiwan University Hospital Yun-Lin Branch, Douliu, Taiwan; [3]Department of Medical Imaging, National Taiwan University Hospital Yunlin Branch, Douliu, Taiwan; [4]National Center for Geriatrics and Welfare Research, National Health Research Institutes, Huwei, Taiwan

Objective(s) To evaluate the performance of an AI algorithm for predicting lumbar spine bone mineral density (BMD) from routine radiographs across different osteoporosis treatment states, including anabolic therapy, antiresorptive therapy, and no treatment.

Material and Methods This retrospective study included 601 patients with 1202 paired spine radiograph-DXA measurements from a tertiary medical centre in Taiwan. Patients were categorized into three groups: anabolic therapy (AA, n=52; teriparatide or romosozumab), antiresorptive therapy (RR, n=142; bisphosphonates or denosumab), and no treatment (NN, n=407). A commercially cleared AI algorithm was applied to predict lumbar spine BMD. Cross-sectional agreement was assessed using intraclass correlation coefficient (ICC). Longitudinal performance was evaluated using ICC for BMD change and paired comparisons of percent BMD change (%ΔBMD) between DXA and AI predictions.

Results Cross-sectional agreement was excellent across all groups: ICC 0.88-0.92 for AA, 0.92 for NN, and 0.86-0.87 for RR. Longitudinal agreement varied substantially: NN showed moderate agreement (ICC=0.50), AA fair agreement (ICC=0.33), and RR poor agreement (ICC=0.15). Critically, AI significantly underestimated BMD gains during anabolic therapy (DXA +10.0% vs AI +6.9%, p=0.009), while no significant differences were observed for NN (DXA -1.5% vs AI -1.8%, p=0.27) or RR (DXA +5.0% vs AI +5.7%, p=0.35). Three-class classification agreement (±5% threshold) was 67-68% for AA and NN but only 49% for RR.

Conclusion(s) AI-based BMD prediction demonstrates consistent cross-sectional accuracy regardless of treatment status. However, longitudinal tracking capability varies by treatment type, with AI potentially underestimating rapid BMD gains during anabolic therapy. Clinicians should interpret AI-predicted BMD changes cautiously when monitoring treatment response, particularly for anabolic agents.



P829

AI-BASED LUMBAR SPINE BMD ESTIMATION FROM ROUTINE RADIOGRAPHS: CROSS-SECTIONAL ACCURACY AND LONGITUDINAL TRACKING IN A MULTICENTRE STUDY

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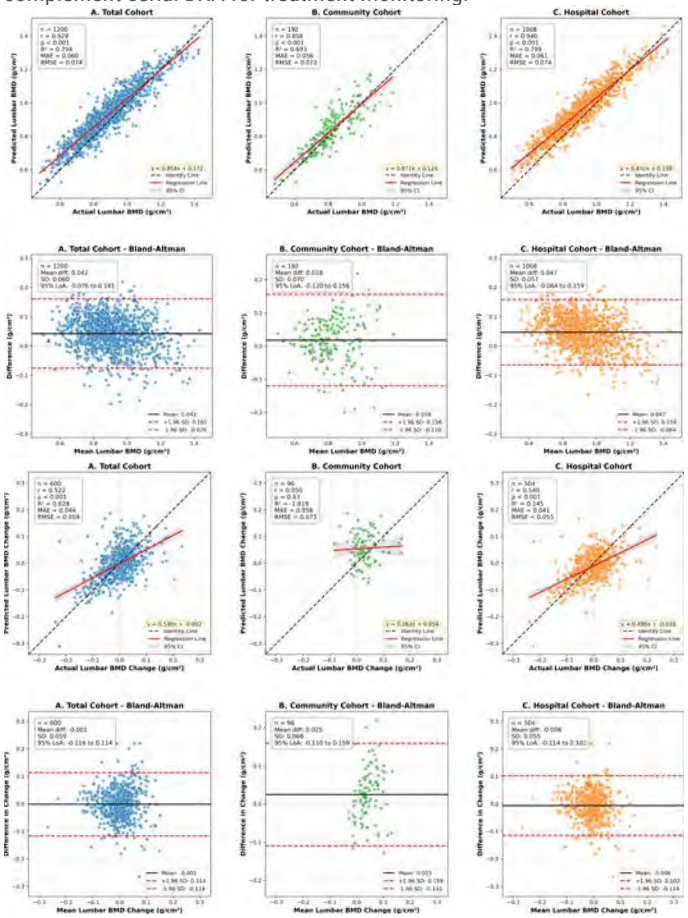
Objective(s) To evaluate cross-sectional accuracy and longitudinal tracking capability of a commercially cleared AI algorithm for predicting lumbar spine bone mineral density (BMD) from routine radiographs in hospital and community settings.

Material and Methods This retrospective multicentre study included adults from a tertiary medical centre, affiliated regional hospital, and rural community centres in Taiwan (March 2014 to December 2024) with paired spine radiographs (kidney-ureter-bladder, thoracolumbar, or lumbosacral) and lumbar DXA within 6 months at baseline and follow-up. DeepXray Spina, a commercial AI software with FDA/TFDA clearance, was applied without modification. Cross-sectional agreement was assessed using Pearson correlation, intraclass correlation coefficient (ICC), and Bland-Altman analysis. Longitudinal performance was evaluated using ICC for BMD change and three-class classification (decrease, no change, increase) using a ±5% least significant change threshold.

Results Of 644 participants, 600 were included (mean age 59.4 years [SD 13.6]; 75.2% women; 504 hospital, 96 community). Median follow-

up was 897 days (IQR 713-1709). Cross-sectional agreement was excellent (r=0.93; ICC=0.90; RMSE=0.074 g/cm²) with minimal bias (mean difference 0.04 g/cm²). Longitudinal agreement for BMD change was moderate overall (ICC=0.52), with better performance in hospital (ICC=0.54) than community settings (ICC=0.04). Three-class classification achieved 61.5% overall agreement (κ=0.31), with sensitivity 56.5% for detecting significant decreases.

Conclusion(s) This AI algorithm demonstrates excellent cross-sectional accuracy supporting opportunistic osteoporosis screening from routine radiographs. Moderate longitudinal performance, constrained by DXA precision limits, indicates algorithm refinement is needed before AI can complement serial DXA for treatment monitoring.



P831

INVESTIGATION OF THE THERAPEUTIC OUTCOMES OF ZOLEDRONIC ACID INJECTION AFTER 3 DOSES IN OSTEOPROTIC PATIENTS WITH LOW TRAUMA FRACTURES AT A TERTIARY HOSPITAL, OMAN. A RETROSPECTIVE STUDY.

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Objectives:
To assess the therapeutic outcomes of three annual doses of zoledronic acid (ZA) in osteoporotic patients with low-trauma fractures treated at tertiary hospital, Oman. Specifically, it evaluates changes in bone mineral density (BMD) following treatment and to assess response variation across different age groups.

Methodology:
This retrospective observational study was conducted at the orthopedic department using patient records from January 2011 to June 2025. Data was extracted from the electronic medical record system. Statistical analysis was performed using SPSS version 26.
The incidence of osteoporotic fractures was reported as percentages with 95% confidence interval (CI). Pre and post categorical comparisons were tested by McNemar tests. A p-value of <0.05 was considered statistically significant.

Results:
A total of 249 patients were included in this study. The mean ± SD age was 64.92±7.66 years. At baseline, the median BMD of the spine was 0.70 g/cm2, and the spine T score was -3.10. The median BMD for the hip was 0.69 g/cm2 (IQR: 0.62 to 0.79), and the hip T score was -2.0 (IQR: -2.60 to -1.20). Before treatment, 86 patients had an incidence of osteoporotic fractures, and after treatment, the incidence decreased to 36. The difference between pre and post treatment incidence was statistically significant (p<0.001). Regarding the BMD scores before and after treatment, BMD of spine increased from 0.70 to 0.75 g/cm2, which was statistically significant (p<0.001). Similarly, the BMD of spine T score increased from -3.10 to -2.67, p<0.001. Regarding hip score, BMD increased from 0.69 to 0.72 g/cm2, which was statistically significant (p=0.004). The BMD hip T score also increased from -2.0 to -1.90, p=0.007. Above 70 years of age group showed a statistically significant reduction from 47.6% to 23.8%, p=0.017. For hip BMD, a significant increase was observed only in the age group of 50 - 60 years where the median score significantly increased from 0.75 to 0.78 g/cm². The remaining age groups showed no significant difference in BMD change (p>0.05).

Conclusion:
Three doses of ZA were associated with a significant reduction in osteoporotic fracture incidence and improvements in BMD among patients. However, significant improvement in hip BMD was mainly seen in patients aged 50–60 years, suggesting age-related variation in treatment response.

P832

DEVELOPMENT OF PREDICTION MODEL FOR 1-YEAR MORTALITY AFTER HIP FRACTURE SURGERY

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Purpose: Hip fractures are associated with increased morbidity and mortality. The identification of risk factors of mortality could improve patient care. The aim of the study was to identify risk factors of mortality twelve months after surgery for a hip fracture and construct a mortality index.
Methods: Prospectively collected data from 597 patients with hip

fractures that were treated in the tertiary hospital, and another 147 patients that were treated in a secondary hospital were available. The perioperative data were collected from medical charts and interviews. Functional Assessment Measure score, Short Form-12 and mortality were recorded at 12 months. Patients and surgery variables that were associated with increased mortality were used to develop a mortality index.

Results: Mortality for the whole cohort was 19.4% at one year. From the variables tested only age >80 years, ASA category, time to surgery (>48 h), CCI, sex, use of anti-coagulants, and BMI >25 were associated with increased mortality and used to construct the mortality index. The area under the curve for the prediction model was calculated at 0.814. Functional outcome at one year was similar to preoperative status, even though their level of physical function dropped after the hip surgery and slowly recovered.

Conclusion: The mortality prediction model that was developed in this study calculates the risk of death at one year for patients with hip fractures, it is simple, and could detect high risk patients that need special management.

Keywords: hip fractures; mortality; functional outcome; time to surgery

P833

BALANCING THE "DO NO HARM" PRINCIPLE IN GLUCOCORTICOID THERAPY: A CRITICAL ASSESSMENT OF GLUCOCORTICOID-INDUCED OSTEOPOROSIS

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Objective: To present complications of long-term glucocorticoid (GC) therapy in a patient with rheumatoid arthritis (RA), with emphasis on secondary osteoporosis and fracture risk.

Materials and Methods: We report a 73-year-old woman with seropositive RA diagnosed in 2006. Comorbidities included asthma, hypertension, hypothyroidism, and ocular pathology. Menopause occurred at 48 years. Initial RA treatment consisted of methotrexate and hydroxychloroquine, with intermittent GC use, and vitamin D supplementation due to osteopenia on DXA. Tocilizumab induced remission for one year, after which methotrexate was continued. Disease progression was accompanied by systemic manifestations (anemia, pleuritis with empyema, scleritis, latent tuberculosis) and elevated inflammatory markers, requiring high-dose GC therapy and escalation to etanercept, with gradual GC tapering. In June 2025, after minor trauma, the patient developed left hip and groin pain with impaired weight-bearing. Clinical examination showed limited hip motion without synovitis. Pain VAS was 7/10. FRAX (Serbia) showed a 26% risk of major osteoporotic fracture and 17% risk of hip fracture; FRAX PLUS increased major fracture risk to 32%. Pelvic X-ray, laboratory tests and DXA were performed.

Results: Imaging revealed fractures of the left pubic bone rami with minimal displacement. Laboratory findings showed anemia, mildly elevated inflammatory markers, and increased bone resorption markers. DXA confirmed osteoporosis, with normal TBS. Anti-osteoporotic treatment with denosumab was continued alongside ongoing RA therapy and vitamin D supplementation.

Conclusion: Prolonged high-dose glucocorticoid therapy was the principal cause of secondary osteoporosis, leading to pathological fractures despite preventive measures, highlighting the need for early and aggressive bone protection in GC-treated RA patients.



P834

ASSOCIATION BETWEEN VERTEBRAL BODY HEIGHTS AND OSTEODENSITOMETRY FINDINGS

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Objective: The aim of this study was to evaluate whether a direct association exists between DXA-derived parameters and a reduction in vertebral body height.

Materials and Methods: DXA measurements including lumbar spine T-score (L1–L4) and bone mineral density (BMD) were analyzed together with the trabecular bone score (TBS) L1–L4. Vertebral body heights were measured in millimeters at three points (anterior, middle, and posterior) from L1 to L5 on lateral lumbar spine radiographs. Vertebral deformities were classified according to the Genant classification. Data were obtained from the "Improvement of diagnostic, treatment and rehabilitation methods in special hospitals of the cross-border area" (RE-TREAD) project database (Project ID: HR-RS00005).

Results: A total of 27 patients were included. One male patient had no available DXA data, while in one female patient vertebral body heights from L3 to L5 could not be measured due to severe scoliosis. TBS could not be calculated in four patients (14.8%) because of high body mass index (BMI), and TBS values were unavailable in three patients (11.1%). The mean lumbar T-score was −0.29, the mean BMD was 1.146, and the mean TBS value was 1.345. For L1, the mean anterior, middle, and posterior heights were 32.4 mm, 24.9 mm, and 33.8 mm, respectively. According to the Genant classification, 18.5% of vertebrae were classified as grade 0, 51.9% as grade 1, 22.2% as grade 2, and 7.4% as grade 3. At L2, mean anterior, middle, and posterior heights were 34.0 mm, 26.9 mm, and 34.9 mm, with 40.8% classified as grade 0 and 59.2% as grades 1–2. For L3, mean heights were 35.3 mm (anterior), 28.2 mm (middle),

and 34.2 mm (posterior), with grade 1 deformities being most prevalent (53.8%). At L4, mean heights were 35.0 mm, 29.6 mm, and 32.6 mm, with 69.2% classified as grade 0. L5 showed the least deformity, with 96.2% classified as grade 0.

Conclusion: The mean TBS value indicates degraded trabecular microarchitecture, whereas the mean BMD value falls within the normal range. Vertebral deformities were most frequently observed at the L1 level, with Genant grade 1 being the most common. Given the increased mechanical load at transitional spinal segments, these findings are consistent with biomechanical expectations.

P835

CHANGES IN BONE AND MINERAL METABOLISM BEFORE AND AFTER KIDNEY TRANSPLANTATION: A SINGLE-CENTRE STUDY IN LATVIA

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Objectives: Kidney transplant recipients face increased risks of bone and mineral disorders due to CKD-MBD and immunosuppressive therapy effects. Highlighting these post-transplant metabolic changes aims to inform clinical management and improve patient outcomes.

Materials and Methods: This single-centre observational study included adult patients who underwent kidney transplantation between January 1, 2023 and December 31, 2024. Of 102 transplantations, 96 patients were included in the final analysis. Clinical characteristics, dialysis modality, comorbidities, glucocorticoid use, laboratory parameters, hyperparathyroidism status, parathyroidectomy, and fracture history were analysed before and after transplantation.

Results: The cohort included 96 patients (mean age 50.4±12.9 years; 54.2% male). Before transplantation, 94.8% of patients received dialysis. Arterial hypertension was present in 96.9%, and diabetes mellitus in 8.3%. Secondary or tertiary hyperparathyroidism was observed in 96.9% of patients, and 7.3% had undergone parathyroidectomy. After transplantation, renal function and mineral metabolism significantly improved: serum creatinine and phosphorus decreased, while calcium and vitamin D levels increased, accompanied by a marked reduction in iPTH levels. Persistent hyperparathyroidism was observed in 70.8% of patients, and 4.2% required post-transplant parathyroidectomy. Diabetes mellitus prevalence increased to 33.3%, and 87.5% of patients received long-term oral glucocorticoid therapy. Fractures were present in 13.6% pre-transplantation, while new fractures occurred in 8.4% post-transplantation, emphasising ongoing fracture risk.

Conclusions: Kidney transplantation significantly improved renal function and mineral metabolism; however, issues such as persistent hyperparathyroidism, high glucocorticoid exposure, metabolic comorbidities, and an ongoing risk of fractures emphasise the need for long-term monitoring of bone health in kidney transplant recipients.

P836

FUNCTIONAL BALANCE AND FEAR OF FALLING IN PATIENTS WITH KNEE OSTEOARTHRITIS: A PILOT STUDY

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Background

Knee osteoarthritis is a degenerative joint disease with increasing prevalence and represents a common cause of pain and functional limitation in older adults. These impairments are often associated with balance deficits and an increased fear of falling, which may further compromise mobility and quality of life. Early identification of balance impairment and fear of falling is essential for optimal rehabilitation planning.

Objective

The aim of this study was to assess balance performance and fear of falling in patients with knee osteoarthritis using the Berg Balance Scale (BBS) and the Falls Efficacy Scale (FES).

Methods

This cross-sectional study included 38 patients diagnosed with knee osteoarthritis who were treated at the Special Hospital for Rheumatic Diseases in Novi Sad, Serbia. Functional balance was assessed using the Berg Balance Scale, while fear of falling was evaluated with the Falls Efficacy Scale. Based on the obtained scores, fall risk and the intensity of fear of falling were analyzed. Statistical analysis was performed using StatSoft Statistica software. The data were obtained from a registry established as part of the project 'Improvement of Diagnostic,Treatment, and Rehabilitation Methods in Special Hospitals of the Cross-Border Area', Identification Numer: HR-RS00005.

Results

The mean age of participants was 71 years, and the majority were women (74%). According to the Berg Balance Scale, 31 patients (81.5%) were classified as having a low risk of falling, 5 patients (13.2%) had a moderate risk, and 2 patients (5.3%) were at high risk of falling. Assessment with the Falls Efficacy Scale showed that 18 patients (47.4%) had low fear of falling, 15 patients (39.5%) had moderate fear, and 5 patients (13.1%) reported a high level of fear of falling. More than half of the participants (52.6%) demonstrated moderate to high fear of falling despite predominantly satisfactory balance performance.

Conclusion

Fear of falling is present in patients with knee osteoarthritis across different levels of objectively assessed balance, including those with low fall risk. The combined use of the Berg Balance Scale and the Falls Efficacy Scale allows a more comprehensive evaluation of functional stability and may contribute to improved planning of individualized rehabilitation interventions.

P837

ASSESSMENT OF DEPRESSIVE SYMPTOMS IN OLDER ADULTS WITH KNEE OSTEOARTHRITIS: A PILOT STUDY

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Objective: Patients with gonarthrosis are often limited by pain and function impairment, which significantly affects their daily lives and may lead to depressive symptoms. This study aimed to examine the relationship between depressive symptoms and knee osteoarthritis in adults aged ≥ 65 years.

Materials and Methods: A cross-sectional study was conducted in Special Hospital for Rheumatic Diseases Novi Sad, Republic of Serbia. The data were used from a registry created as part of the project: Improvement of diagnostic, treatment, and rehabilitation methods in special hospitals of the cross-border area, identification number: HR-RS00005. This research included 63 patients aged ≥ 65 years diagnosed with knee osteoarthritis according to clinical and radiographic criteria. Depressive symptoms were assessed using the Short Form of the Geriatric Depression Scale (GDS-SF), where scores from 0-5 indicated the absence of depressive symptoms, 6–9 indicated mild depressive symptoms, and 10–15 indicated moderate to severe depressive symptoms. Data on age, sex, body mass index, sociodemographic characteristics, and level of physical activity were also collected. Statistical analyses were performed using StatSoft Statistica software.
Results: The mean age of the participants was 72.03 years, with 79.36% being female, and 20.63% male. In the majority of patients (84.12%), no depressive symptoms were recorded, while 11.11% exhibited mild signs of depression and 4.76% showed more pronounced symptoms. According to gender, 82% of women showed no depressive symptoms, 12% exhibited mild symptoms, and 6% exhibited more severe symptoms, whereas 92.3% of male participants had no symptoms, and 7.69% had mild depressive symptoms. No significant differences were observed between groups in body mass index, sociodemographic characteristics, or level of physical activity ($p > 0.05$).

Conclusion: Early recognition of depressive symptoms in older adults with knee osteoarthritis may improve overall treatment effectiveness and patient well-being.

P838

SAFETY PROFILE OF ROMOSOZUMAB IN THE OLDEST-OLD (≥85 YEARS): A COMPARATIVE REAL-WORLD PHARMACOVIGILANCE ANALYSIS VS. OLDER ADULTS (65-84 YEARS)

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Objective: Romosozumab is a potent anabolic agent indicated for severe osteoporosis. However, pivotal clinical trials have often underrepresented the "oldest-old" population (≥85 years). Given the drug's boxed warning for cardiovascular risk, understanding its safety in this specific age demographic is critical. This study aimed to evaluate and compare the real-world safety profile of romosozumab in the oldest-old (≥85 years) versus younger geriatric patients (65-84 years) using the FDA Adverse Event Reporting System (FAERS).
Material and Methods: We queried FAERS for romosozumab-related adverse events (AEs) from approval to January 2026, stratifying cases into Older Adults (65-84 years) and Oldest-Old (≥85 years). Disproportionality analysis was performed using Reporting Odds Ratios (ROR) with 95% confidence intervals (CI). Group differences in AEs and fatal outcomes were assessed using Chi-square or Fisher's exact tests.
Results: A total of 4,371 geriatric cases were included in the analysis (n=3,555 aged 65-84; n=816 ≥85); both cohorts were predominantly female (>85%). AE profiles differed distinctively. The 65-84 group frequently reported administration site reactions (pain 5.3%, swelling 2.7%) and fatigue (2.8%). In contrast, the ≥85 group had a higher burden of severe systemic events. Falls were the most frequent AE in the oldest-old (n=124, 15.2%), a twofold increase vs. the younger cohort (ROR 2.06, 95% CI 1.65–2.59). Cardiac Failure was a significant signal in the oldest-old (6.5% vs. 1.9%; ROR 3.56, 95% CI 2.47–5.14). Fatal outcomes were significantly higher in the ≥85 group (15.9% vs 6.6%; ROR 2.68, 95% CI 2.13–3.37).
Conclusion: This analysis reveals age-related differences in romosozumab-associated AEs. While adults aged 65–84 years more frequently reported local administration site reactions, reports from patients aged ≥85 years had significantly higher reporting odds for falls, cardiac failure, and fatal outcomes. Falls were the most commonly reported adverse event in the oldest-old group; however, these observations cannot be interpreted as evidence of causality and may reflect underlying frailty and comorbidity burden in this population. Findings highlight the need for careful cardiovascular risk assessment when prescribing romosozumab to the oldest-old.

P839

MANIFESTATIONS, PROGRESSION, AND TREATMENT IMPACT OF ENZYME REPLACEMENT THERAPY IN ADULTS WITH HYPOPHOSPHATASIA (HPP): A 3-YEAR PROSPECTIVE STUDY

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Objectives To characterize the progression of HPP-related symptoms prior to treatment and assess the impact of enzyme replacement therapy (ERT) on pain and health-related quality of life.
Material and Methods We conducted a longitudinal survey of adults with HPP. Interviews were performed at baseline (prior to ERT initiation) and at 3, 6, 12, and 36 months. Patient-reported outcomes included RAPID3, PHQ-9, WPAI:SHP, PROMIS-29, TSQM and qualitative assessments of symptom chronicity and escalation. Inverse probability of response weighting (IPRW) was implemented to account for attrition bias in loss-to-follow-up. The IPRW modelled the probability of a patient being lost-to-follow-up at each time point *t* that the PROs were measured. Adjustment variables included age, sex, baseline RAPID3 score, and symptom evolution to compute IPRW weights for each participant at each time point to account for potential bias in loss-to-follow-up.
Results Seventy-two adults (mean age 46 years; 83% female) were analysed. The most frequently cited troublesome symptoms included fractures (36%), joint pain (28%), bone pain (21%), and dental issues (22%). Most participants (87%) reported at least one systemic symptom, notably pain (71%), fatigue or cognitive difficulties (50%), and neurological symptoms (e.g. neuropathy, headaches) (22%). Prior to treatment with ERT, nearly 90% reported that at least one of their 3 most troublesome symptoms worsened and 37% indicated that symptoms have increased in frequency or have become chronic over the past five years prior to treatment. At baseline, 65% had high disease activity per RAPID3, 29% had moderate activity, 4% had low activity, and 1% were in remission. At 12 months after ERT initiation, 23% had high disease activity, 37% had moderate activity, 16% had low disease activity, and 24% achieved remission. At 36 months, 14% had high disease activity, 46% had moderate activity, 5% had low activity, and 35% were in remission.
Conclusions Adults with HPP frequently experience chronic musculoskeletal pain, fractures, and systemic manifestations. Prior to treatment initiation, HPP is associated with symptom worsening. In this real-world cohort, ERT was associated with reduced disease activity and higher remission rates at 12 months, with remission proportions increasing at 36 months.

P840

POLYMORPHIC VARIANTS OF THE ADAMTS5 GENE AS MARKERS OF PHENOTYPIC TRAITS OF CONNECTIVE TISSUE DYSPLASIA

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Objective(s). Connective tissue dysplasia (CTD) is a hereditary, multifactorial condition characterized by systemic disturbances in the development, maturation, and metabolism of the extracellular matrix. CTD is a significant predictor for the early onset of osteoarthritis, osteoporosis, and other pathologies, necessitating timely diagnosis and preventive interventions.
This study aimed to investigate associations between three polymorphic variants of the *ADAMTS5* and CTD as a whole, as well as with specific CTD phenotypic traits.
Material and Methods. A cross-sectional study was conducted involving 181 subjects (35 males, 19.3%) with a mean age of 21.9±2.9 years. All participants underwent clinical examination to identify CTD signs using the modified Kadurina table (Tyurin AV). Subsequently, molecular genetic analysis was performed. Data were processed using Excel 2024 and GraphPad Prism 8.
Results. Clinical examination identified CTD signs in 130 subjects (71.8%). Comparative analysis of allele and genotype frequencies for *ADAMTS5* loci (rs226794, rs9978597, rs2830585) revealed significant associations. Allele A and genotype AA of rs226794 were associated with internal organ hernias (pFDR=0.015 and pFDR=0.007, respectively). Allele T and genotype TT of rs9978597 were associated with CTD (pFDR=0.003 and pFDR=0.004), skin hyperelasticity (pFDR=0.03 for both), and hypotension (pFDR=0.015 and pFDR=0.02).
Conclusion. The *ADAMTS5* polymorphic variant rs226794 is a risk marker for internal organ hernias, while rs9978597 is a risk marker for CTD, skin hyperelasticity, and hypotension.
Keywords: Connective tissue dysplasia, CTD, ADAMTS5, SNP

P842

GLOBAL DETERMINANTS OF THE OSTEOPOROSIS TREATMENT GAP: A SYSTEMATIC REVIEW

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Objective: To systematically identify and categorise patient-, physician-, and healthcare system-related factors contributing to the global osteoporosis treatment gap.
Material and Methods: This systematic review was conducted in accordance with PRISMA guidelines. PubMed, Scopus, Web of Science, ScienceDirect, and Europe PMC were searched for original research studies examining osteoporosis treatment gaps in adult populations, including studies published up to 7th April 2025. Risk of bias was assessed using the Newcastle–Ottawa Scale and CASP checklists, as appropriate. Findings were synthesised narratively and categorised by

contributing factors.
Results: Forty-three original studies were included. Reported treatment gap estimates ranged from 38.8% to 94.6% across countries and healthcare settings. Lower treatment rates were associated with patient-related factors such as male sex, lower socioeconomic status, and specific comorbidities, as well as healthcare system-related factors including limited physician awareness, institutional barriers, and inadequate interprofessional communication. Higher treatment rates were associated with older age, family history of osteoporosis, prior diagnosis or bone mineral density testing, and effective care coordination through specialised programmes.
Conclusion: Substantial global gaps in osteoporosis treatment persist, particularly following fragility fractures. These gaps are driven by patient-, physician-, and system-level factors, with consistent disparities related to sex, ethnicity, comorbidities, and socioeconomic status. Addressing these gaps will require integrated care pathways, improved clinical education, and scalable models for coordinated post-fracture management.

P843

REFINING OSTEOPOROSIS CLASSIFICATION USING BMD T-SCORE-ADJUSTED FOR TRABECULAR BONE SCORE (TBS): REAL-WORLD EVIDENCE IN WOMEN AGED ≥40 YEARS

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Objectives: Trabecular bone score (TBS), derived from DXA, is a validated surrogate of bone microarchitecture and is routinely integrated into clinical DXA workflows. Adjustment of BMD T-scores for TBS is an established function of TBS software in women, enabling incorporation of microarchitectural information into standard osteoporosis classification. In light of recent regulatory decisions recognising DXA-derived BMD as an accepted imaging endpoint in osteoporosis clinical trials, refinement of BMD-based classification using complementary measures such as TBS is of increasing relevance. This study quantified the impact of BMD T-score adjustment using TBS version 4 on osteoporosis classification in women aged ≥40 years in real-world clinical populations.
Methods: Reclassification analyses were performed in 14,640 women aged ≥40 years from international, multi-ethnicity real-world clinical cohorts in the USA and Europe. Osteoporosis categories (normal, osteopenia, osteoporosis) were defined using BMD T-scores alone and after adjustment for TBS (TBS Osteo Advanced, version 4). Analyses were conducted using site-specific BMD (total hip, femoral neck, lumbar spine) and the minimum BMD T-score. Diagnostic category shifts were assessed overall and by age group and summarised using the net reclassification index (NRI).
Results: Adjustment of BMD T-scores for TBS resulted in consistent upward reclassification of bone fragility across skeletal sites and age groups. Overall, 4,996 women (34%) were classified as osteoporotic using BMD alone, increasing to 6,494 women (44%) following TBS v4 adjustment (NRI +11%). Reclassification demonstrated a clear age gradient, with the largest effect in women aged 40–44 years (NRI +28%) and progressively smaller effects with advancing age; a modest net downward reclassification was observed only in women aged ≥85 years (NRI −2.0%). Upward reclassification was primarily driven by transitions from osteopenia to osteoporosis (1,696 women; 12%), while downward reclassification from osteoporosis to osteopenia was uncommon (209 women; 1%). By skeletal site, osteoporosis prevalence increased from 15% to 21% at the total hip, from 21% to 30% at the femoral neck, and from 22% to 34% at the lumbar spine.
Conclusions: BMD T-score adjustment using TBS v4 resulted in clinically meaningful reclassification of osteoporosis in women aged ≥40 years, predominantly from osteopenia to osteoporosis. Effects were consistent across skeletal sites and most pronounced at the lumbar spine, with the largest reclassification observed in women aged 40–44 years. These findings support the complementary use of TBS v4 with BMD to refine osteoporosis classification and may facilitate earlier identification of women at higher fracture risk.

P844

CLINICAL AND ECONOMIC IMPACT OF TRABECULAR BONE SCORE (TBS) IN OSTEOPOROSIS MANAGEMENT

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Objective: Osteoporosis is associated with substantial clinical and economic burden due to fragility fractures leading to pain, disability, and increased mortality. Trabecular bone score (TBS) is a validated index of bone microarchitecture derived from DXA and used alongside bone mineral density (BMD), to improve the identification of individuals at increased fracture risk. TBS also enhances fracture risk prediction when incorporated into tools such as FRAX®. This study evaluated the cost-effectiveness of adding TBS to FRAX® with BMD in osteoporosis management within a Scandinavian healthcare setting.
Methods: A patient level state transition Markov cost-effectiveness model was developed. The model comprised 10 health states, including fracture-specific and post-fracture states and death. Individual patient characteristics were drawn from a population-based UK cohort (n = 50,366) constructed to reflect the age distribution and prevalence of FRAX® clinical risk factors in the general population. These characteristics

defined individual risk profiles, while fracture probabilities, costs, and health outcomes were parameterised to reflect the Swedish healthcare setting using the country-specific FRAX® algorithm. Fracture risk estimation incorporated both short-term imminent risk following sentinel fractures and long-term fracture probabilities derived from FRAX® with BMD alone or FRAX® adjusted for TBS. Cost-effectiveness outcomes were compared for FRAX® + TBS versus FRAX® alone.

Results: Incorporation of TBS into FRAX®-based risk assessment was cost-saving compared with FRAX® alone, resulting in lower healthcare costs and higher quality-adjusted life years (QALYs). In the target population defined as individuals within ±5% of the FRAX® 10-year major osteoporotic fracture intervention threshold, FRAX® + TBS was associated with an incremental cost reduction of 2,228 SEK and a gain of 0.006 QALYs per patient.

At the population level, this corresponds to 60 QALYs gained per 10,000 individuals and total cost savings of around €2.0 million, equivalent to approximately −€33,000 per QALY gained. These results were driven by improved risk reclassification at the intervention threshold, with a NRI of 11.8% and nearly one-third of individuals near the threshold reclassified from no treatment to treatment when TBS was incorporated. Cost-saving findings were robust across sensitivity analyses varying age, fracture history, T-score thresholds, eligibility criteria, and the unit cost of TBS, and remained cost-saving when applied to the full population cohort.

Conclusions: Incorporation of TBS into FRAX®-based fracture risk assessment can improve health outcomes while reducing healthcare costs compared with FRAX® using BMD alone. By improving risk classification at treatment thresholds, TBS enables more efficient allocation of osteoporosis therapy without increasing patient burden. These results support adoption of TBS-adjusted FRAX® as a standard component of osteoporosis risk assessment in clinical and policy decision-making.

P845

ASSOCIATIONS BETWEEN MODIFIABLE LIFESTYLE FACTORS AND INCIDENT FRACTURE OVER TEN YEARS OF FOLLOW-UP: DATA FROM THE GEELONG OSTEOPOROSIS STUDY

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Objective

Absolute fracture risk is used to determine intervention thresholds and guide treatment. However, many factors involved in its computation are not modifiable, precluding individuals from pro-active involvement in preventative health care. This study aimed to develop a best-fit model of modifiable factors that could be identified and acted upon by an individual.

Material and Methods

This study included 1126 women and 978 men from the Geelong Osteoporosis Study. Fragility fractures of all bones excluding skull and digits were identified by radiological review and participants followed up for 10 years unless censored by event (first fracture) or death. Missing predictor data were handled using multiple imputation by chained equations. Three variable-selection approaches were compared to identify the best-fitting Cox proportional hazards model: stepwise selection using the Akaike Information Criterion (AIC), regularized least absolute shrinkage and selection operator (LASSO) regression, and univariable screening. Candidate predictors included measured (body mass index, waist circumference, timed-up-and-go (TUG) test, gait speed, blood pressure, cholesterol, fasting blood glucose) and self-reported (medication use, mobility, self-rated health, current smoking, calcium deficiency, alcohol intake, falls, sun exposure, poor sleep, pain, anxiety, depression) variables. All analyses were conducted using R 4.4.1.

Results

The StepAIC-based model demonstrated slightly better performance (pooled C-index=0.731), with lower AIC and BIC values across all imputed datasets. The final model included age (HR:1.04, 95%CI 1.03-1.05), BMI (0.94, 0.90-0.98), male sex (0.49, 0.36-0.67), better self-rated health (0.73, 0.53-1.02), oral glucocorticoid use (2.10, 0.98-4.51), antifracture medication use (1.62, 0.99-2.66), summer sun exposure (1.28, 0.99-1.65), high density lipoprotein cholesterol (1.68, 1.16-2.46), waist circumference (1.02, 1.00-1.04), gait speed (1.45, 0.91-2.29) and TUG (1.03, 1.00-1.05).

Conclusion

These data suggest that individuals may be able to reduce their fracture risk, even if only marginally, through careful consideration of summer sun exposure, medication use, cholesterol, reducing waist circumference and improving mobility.

P846

EFFICACY OF THE VDMT TECHNIQUE IN NEUROMA PREVENTION AND IMPROVED PROSTHETIC MOBILITY AFTER MINE-EXPLOSION–RELATED AMPUTATIONS

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Background: Mine-explosion–related amputations remain a major medical and social problem, particularly in military and post-conflict populations. A frequent late complication is symptomatic neuroma formation causing residual limb pain (RLP) and phantom limb pain (PLP), which significantly impair prosthetic use and patient independence. Conventional nerve management, including distal nerve resection, often fails to prevent recurrence. The Vascularized Denervated Muscle Target (VDMT) technique has been proposed as a physiological method for peripheral nerve implantation to reduce neuroma formation.

Methods: A prospective randomized study (2022–2025) included 50 patients (mean age 34.7 ± 6.8 years) with transfemoral or transtibial amputations after mine-explosion injuries. All patients had chronic pain (VAS ≥ 6) and ultrasound-confirmed neuromas. Patients were randomized into a VDMT group (n = 25) or a control group treated with distal nerve resection (n = 25). Pain intensity (VAS) and prosthetic mobility using the Locomotor Capabilities Index (LCI-5) were assessed preoperatively and at 3, 6, and 12 months.

Intervention: In the VDMT group, severed nerves were implanted into a vascularized, denervated muscle segment. Controls underwent standard distal nerve resection. All patients received standardized rehabilitation and prosthetic fitting. Follow-up included ultrasound evaluation for neuroma recurrence and LCI-5 assessment.

Results: Baseline VAS scores were comparable (7.84 ± 0.98 vs. 7.76

± 1.12). At 12 months, pain was significantly lower in the VDMT group (2.36 ± 0.67 vs. 5.42 ± 1.01; p < 0.001); minimal pain (VAS ≤ 2) was observed in 80% versus 20% of controls. LCI-5 improved from 24.1 ± 3.9 to 47.6 ± 4.2 in the VDMT group and from 23.7 ± 4.1 to 33.8 ± 5.6 in controls (p < 0.01). Independent prosthetic ambulation was achieved in 84% versus 32%. Neuroma recurrence occurred in 4% of VDMT patients and 44% of controls.

Conclusion: VDMT provides superior pain control, prevents neuroma recurrence, and significantly improves prosthetic mobility compared with distal nerve resection in mine-explosion–related lower limb amputations.

Keywords: amputation, VDMT, neuroma prevention, prosthetic mobility, LCI-5, residual limb pain, phantom limb pain

P847

TRENDS IN FRACTURE INCIDENCE AND FRACTURE PROGNOSTIC VALUE OF A BASELINE FEMORAL NECK (FN) BMD MEASUREMENT: THE ROTTERDAM STUDY (1989-2019)

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Objectives

Evaluate long-term trends in fracture incidence during three decades of follow-up (FUP) in a population-based setting; describe skeletal location patterns; and evaluate the prognostic value of a baseline femoral neck (FN) BMD measurement.

Material and Methods

Participants aged >45 years from the Rotterdam Study (N=14,465) were included at baseline. Fractures between 1989-2019 were identified through hospital and general practitioner records comprising 220,000 person-years (mean FUP 14.3, SD 7.2 years). Incidence rates (IRs) per 1,000 person-years were estimated and compared across three decades (1989–2000, 2000–2010 and 2010–2019) using Poisson regression. Patterns of fracture co-occurrence across sites – humerus, spine, hip wrist– were evaluated. Hazards ratios (per unit decrease in FN T-score) were obtained from Cox models adjusted for age, sex, BMI and subcohort; and stratified by: less than 10; between 10 and 20; and above 20 years FUP time.

Results

Of 4,563 participants with fractures, 19.5% sustained (non-simultaneous) fractures at multiple sites (Figure). The most frequent fracture sites (IR per 1000 years) were spine (IR 5.58), hip (IR 4.35), and wrist (IR 3.88). As compared to 1989–2000, fractures incidence in 2010-2019 declined for hip (IRR 0.33, 95%CI 0.21–0.5) and wrist (IRR 0.25, 95%CI 0.16–0.37), but increased for spine (IRR 2.44, 95%CI 1.82-3.32). A baseline FN BMD T-score was associated with increased hip fracture risk within 10 (HR 1.43 95% CI 1.26-1.59); between 10 and 20 (HR 1.36 95% CI 1.32–1.45); and after 20 (HR 1.26 95% CI 1.18–1.35) years of FUP.

Conclusions

Fracture incidence patterns across three decades have seen a decline of 67 to 75% in hip and wrist, respectively; and ~2.4 fold rise in spine. A single FN BMD remained associated with hip fracture risk across all decades, supporting its long-term prognostic relevance despite attenuation over time.

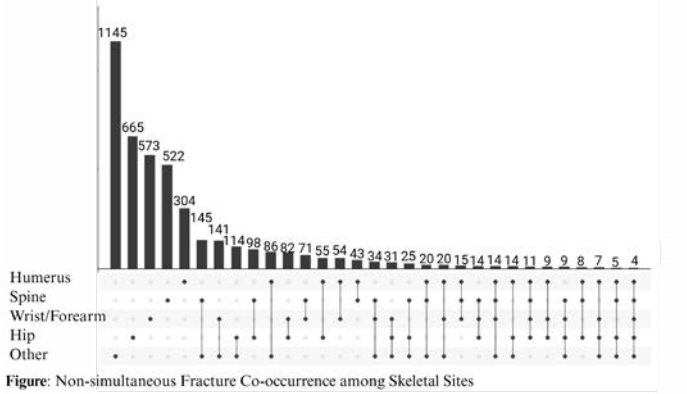


Figure: Non-simultaneous Fracture Co-occurrence among Skeletal Sites

P848

LONG-TERM EVALUATION OF HIP FRACTURE RISK USING FRAX - WITH AND WITHOUT BMD: THE ROTTERDAM STUDY (1989-2019)

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Objectives

Evaluate FRAX-based predictive discrimination for hip fractures, with and without inclusion of femoral neck BMD; age-specific performance and risk reclassification relative to fracture probabilities intervention thresholds in a population-based setting.

Material and Methods

Rotterdam Study participants (N=14,465) aged >45 years were included at baseline. Fractures between 1989-2019 were identified through general practitioner and hospital records during a mean follow-up (FUP) of 14.3 years (SD 7.2). Ten-year hip probabilities were calculated using (Dutch) FRAX, *with* and *without BMD*. Predictive discrimination for hip fractures was assessed using AUCs, overall and stratified by age group, at both 10 and upto 30 years FUP. Reclassification between FRAX models was based on UK NOGG risk categories.

Results

Ten-year AUCs for hip fractures for FRAX -without BMD was 0.81 (95%CI 0.79-0.83) and *-with BMD* 0.80 (95%CI 0.77-0.82); and >10 years AUC for FRAX *-without BMD* was 0.75 (95%CI 0.73-0.77) and -with BMD 0.76 (95%CI 0.74-0.77). Overall agreement between FRAX models declined with age, with 93% in subjects <65, 89% in 65–74, 67.6% in 75–84, and 51.2% in ≥85 years old. Inclusion of BMD resulted in 2.3% downward and 4.6% upward reclassification in those <65, 5.8% downward and 5.0% upward reclassification in those aged 65–74, 29.4% downward and 3.0%

upward reclassification in those aged 75–84, and 47.2% downward and 1.6% upward reclassification in those aged ≥85 years old.

Conclusions

FRAX demonstrated good discrimination for hip fracture risk at 10 years. Modest attenuation was observed after longer follow-up. Inclusion of FN BMD had little impact on overall discrimination, but substantially influenced age-specific intervention thresholds, particularly in older age groups. Pronounced downward reclassification after BMD inclusion may reflect survival selection in older individuals with better bone health; where inclusion of measured BMD shifts risk estimates below intervention thresholds.

P849

THE SINTER STUDY: A RECALL-BY-GENOTYPE DESIGN WITH MULTIDIMENSIONAL MUSCULOSKELETAL PHENOTYPING ACROSS INTERNAL-MEDICINE OUTPATIENT CLINICS

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Objectives

We describe the design of the EraSmus medIcal CeNTer skEletal fRagility (SINTER) Study, an observational clinical study integrating polygenic risk stratification with advanced musculoskeletal imaging and functional phenotyping to improve characterisation of skeletal fragility in chronic conditions.

Methods and Materials

SINTER is conducted across nine internal medicine outpatient clinics in two stages. First, 5,650 patients undergo genotyping. Second, ~1,500 individuals from the extremes of the polygenic score for bone mineral density (PGSBMD), plus 400 patients with mastocytosis are recalled for musculoskeletal phenotyping. Imaging includes DXA, EOS Edge imaging for three-dimensional spinal alignment and global biomechanics, and peripheral quantitative computed tomography for volumetric density and microarchitectural assessment. Skeletal material and tissue-level properties are assessed using quantitative ultrasound and reference point indentation. Muscle function and physical performance are evaluated using mechanography and handgrip strength. Lifestyle data are extracted from questionnaires, alongside patient-reported outcomes and perceptions related to musculoskeletal health. To validate the RbG design, simulation analyses were performed in the population-based Rotterdam Study, comparing clinical and skeletal characteristics between individuals selected from low and high extremes of the PGSBMD distribution.

Results

Ethical approval has been obtained, and recruitment is ongoing. In the Rotterdam Study, selection based on PGSBMD extremes, results in the expected separation in femoral neck BMD and osteoporotic fracture prevalence, while clinical and lifestyle characteristics remain well balanced, supporting the randomisation properties of the RbG approach (Table).

Conclusions

SINTER establishes a clinically embedded research framework that integrates genetic information with advanced musculoskeletal imaging and functional assessment. Validation in an independent population-based cohort demonstrates that RbG stratification based on polygenic scores achieves randomisation-like balance of clinical characteristics while enriching for skeletal fragility phenotypes, supporting its use for mechanistic musculoskeletal research.

Table. Characteristics of the study population compared between low and high BMD wPGS.

	Low BMD wPGS n=666	High BMD wPGS n=666	P-value
wPGS BMD (SD)	4.67 (0.13)	5.72 (0.14)	<0.001
FN-BMD (SD)	0.83 (0.13)	0.92 (0.14)	<0.001
OPFx (%)	204 (30.6)	160 (24.0)	0.008
Age (SD)	66.6 (8.8)	66.9 (9.2)	0.4
Sex (F) (%)	466 (70.0)	449 (67.4)	0.3
FRAX MOF >10% (%)	173 (26.0)	164 (24.6)	0.6
T2D (%)	87 (13.1)	99 (14.9)	0.3
TSH >3.85 mU/L (%)	90 (13.5)	104 (15.6)	0.3
eGFR <56.5 (%)	90 (13.5)	98 (14.7)	0.5
Falling last month (%)	101 (15.2)	108 (16.2)	0.6
BMI >31 kg/m2 (%)	92 (13.8)	99 (14.9)	0.6
Cholesterol >7.5 mmol/L (%)	86 (12.9)	98 (14.7)	0.3

wPGS- weighted polygenic score, BMD- bone mineral density OPFx- prevalent osteoporotic fractures, MOF- major osteoporotic fractures, TSH- thyroid stimulating hormone, eGFR- estimated glomerular filtration rate, BMI- body mass index

P850

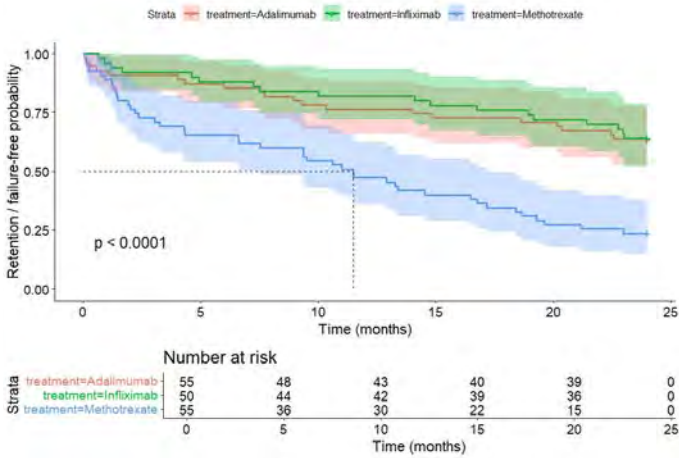
DYNAMICS OF TREATMENT RESPONSE, RETENTION, AND RELAPSE IN RHEUMATOID ARTHRITIS TREATED WITH BIOLOGIC DMARDS

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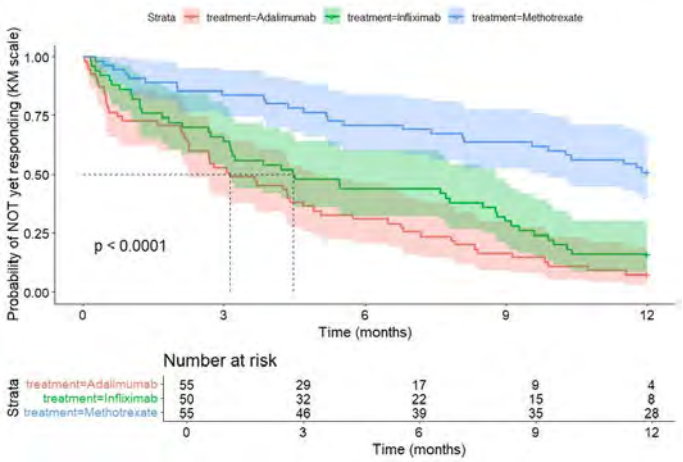
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Objectives. I this study we aimed to compare time to initial clinical response, treatment retention, and relapse-free survival among patients with RA treated with adalimumab, infliximab, or methotrexate.

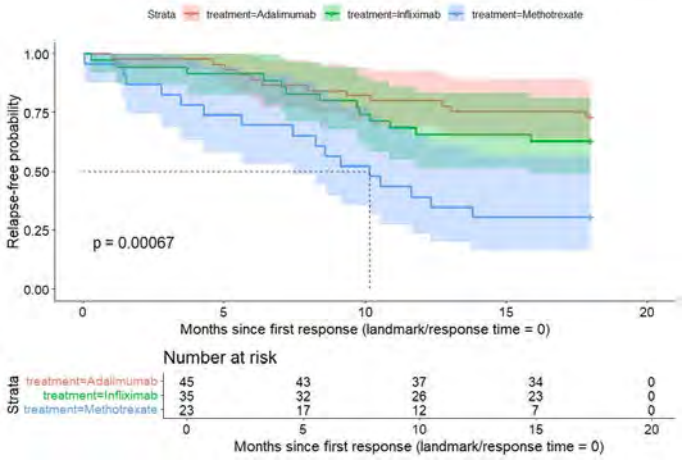
Results. Time to initial clinical response differed significantly between treatment groups (log-rank p<0.0001). At 3 months, response was achieved by 27/55 patients (49.1%) receiving adalimumab, 19/50 (38.0%) receiving infliximab, and 11/55 (20.0%) receiving methotrexate. At 6 months, cumulative response increased to 38/55 (69.1%), 27/50 (54.0%), and 19/55 (34.5%), respectively.



By 12 months, response was observed in 50/55 patients (90.9%) treated with adalimumab, 42/50 (84.0%) with infliximab, and 28/55 (50.9%) with methotrexate. Treatment retention over 24 months also differed significantly (log-rank p<0.0001). At 12 months, retention was maintained in 41/55 patients (74.5%) receiving adalimumab, 39/50 (78.0%) receiving infliximab, and 26/55 (47.3%) receiving methotrexate. At 24 months, retention declined to 33/55 (60.0%), 32/50 (64.0%), and 14/55 (25.5%), respectively.



Among patients who achieved an initial clinical response, relapse-free survival differed significantly between groups (log-rank p=0.00067). At 12 months after response, relapse-free survival was maintained in 28/35 responders (80.0%) treated with adalimumab, 17/25 (68.0%) treated with infliximab, and 9/20 (45.0%) treated with methotrexate.



At 18 months, relapse-free survival decreased to 26/35 (74.3%), 15/25 (60.0%), and 6/20 (30.0%), respectively.

Conclusions. Biologic DMARDS outperformed methotrexate across three complimentary time-to-event outcomes including response initiation, treatment retention, and duration of response. Adalimumab had the most advantageous overall profile by facilitating a more rapid clinical response, ensuring enhanced treatment persistence, and offering superior relapse-free survival.

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CONTINUATION RATE AND BONE MINERAL DENSITY RESPONSE TO ROMOSOZUMAB IN PATIENTS WITH RHEUMATOID ARTHRITIS: A REAL-WORLD STUDY

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Objective:
Patients with rheumatoid arthritis (RA) are at increased risk of osteoporosis and fractures due to chronic inflammation and glucocorticoid exposure. Romosozumab has been shown to improve bone mineral density (BMD) and reduce fracture risk; however, real-world data in RA patients remain limited. This study compared 12-month continuation rates and BMD changes between RA and non-RA patients treated with romosozumab in routine clinical practice.

Material and Methods:
We retrospectively analyzed 331 patients who initiated romosozumab at a single outpatient clinic between January 2021 and January 2023. Patients were categorized into RA and non-RA groups. The primary outcome was 12-month treatment continuation rate. Secondary outcomes included percentage change in BMD at the lumbar spine (LS), total hip (TH), and femoral neck (FN) among patients completing 12 months. BMD was measured by dual-energy X-ray absorptiometry (DXA). Mann–Whitney U and Wilcoxon signed-rank tests were used, with significance set at p<0.05.

Results:
The RA group included 22 patients (mean age 75.4 years; 100% female; BMI 24.47 kg/m²; glucocorticoid use 27.3%). The non-RA group included 222 patients (mean age 77.1 years; 92.3% female; BMI 25.02 kg/m²; glucocorticoid use 1.4%). Baseline BMD (RA vs non-RA) was 0.735 vs 0.706 g/cm² at LS, 0.575 vs 0.611 at TH, and 0.569 vs 0.578 at FN. One-year BMD changes were 11.6% vs 14.2% (LS), 1.7% vs 3.8% (TH), and 1.9% vs 3.6% (FN), with no significant differences. The 12-month continuation rate was significantly higher in the RA group than in the non-RA group (84.6% vs 75.1%, p=0.00195). Both groups demonstrated significant BMD increases from baseline.

Conclusion:
Romosozumab demonstrated favorable adherence and clinically meaningful BMD gains in RA patients, comparable with non-RA patients. Higher continuation in the RA cohort may reflect structured follow-up and multidisciplinary care typical in RA management. Tailored adherence strategies within rheumatology practice may further optimize outcomes in high-risk patients.

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A RARE CASE OF MULTIPLE CRANIAL NERVE PALSIES IN A YOUNG MALE WITHOUT RADIOLOGICAL CORRELATE

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Multiple cranial nerve palsies presenting simultaneously are rare and usually suggest serious central nervous system, infectious, or infiltrative pathology. Autoimmune etiologies are uncommon but increasingly recognized causes. We report a rare case of multiple cranial nerve palsies in a young male with no radiological correlate and an elevated rheumatoid factor, raising suspicion of autoimmune cranial neuropathy.
A 26-year-old male presented with acute onset bilateral lower motor neuron facial weakness, diplopia, dysphagia, dysphonia, and difficulty in chewing. Neurological examination revealed involvement of cranial nerves V, VI, VII, IX, and X, with preserved consciousness, normal limb power, intact reflexes, and absence of long-tract or cerebellar signs. Comprehensive laboratory evaluation showed mild neutrophilic leukocytosis with normal inflammatory markers. Cerebrospinal fluid analysis was unremarkable with normal biochemistry, minimal lymphocytic cells, and sterile cultures. Neuroimaging, including contrast-enhanced MRI of the brain and NCCT, revealed no structural lesions or meningeal enhancement. Serological testing demonstrated a significantly elevated rheumatoid factor without clinical evidence of articular involvement.
Differential diagnoses considered included infective cranial neuritis, post-infectious inflammatory neuropathy, Guillain–Barré syndrome variants, sarcoidosis, skull base pathology, and idiopathic cranial polyneuropathy. In the absence of supportive radiological or cerebrospinal fluid findings, an autoimmune cranial neuropathy possibly related to underlying rheumatoid arthritis was considered. The patient was managed conservatively with supportive care, eye protection, nutritional support, physiotherapy, and neurovitamin supplementation. Corticosteroids were deferred due to lack of definitive inflammatory evidence.
At two-week follow-up, partial improvement in facial movements and swallowing was observed, with stable residual bulbar symptoms.
This case highlights the diagnostic challenge posed by multiple cranial nerve palsies with normal imaging and emphasizes the importance of considering autoimmune mechanisms, including rheumatoid arthritis–associated neuropathy, even in the absence of classical systemic manifestations. A structured diagnostic approach and supportive management with close follow-up remain essential in such cases.

P853

DOES ROUTINE DOPPLER SONOGRAPHY IMPROVE THE DETECTION AND CLINICAL OUTCOME RELATED WITH DEEP VEIN THROMBOSIS AFTER TOTAL KNEE ARTHROPLASTY? : A REAL-WORLD COMPARISON OF TWO CLINICAL PATHWAYS?

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Background: Deep vein thrombosis (DVT) and pulmonary embolism (PE) are well known to be very serious complications that occur frequently after TKA. Furthermore, not only appropriate treatment, but also efforts to detect and prevent these complications can become legal issues in medical disputes. While routine Doppler screening can detect asymptomatic DVT, the benefit of these finding is uncertain. This study aimed to (1) compare the detection of DVT between routine Doppler sonography and symptom-guided imaging, (2) determine the association of symptoms with diagnostic yield, and (3) assess whether screening for PE is necessary in patients diagnosed with DVT or vice versa.
Patients and Methods: A retrospective cohort of 582 patients undergoing primary TKA (2017–2021) was analyzed. In clinical pathway 1 (CP1, n=282), routine bilateral Doppler sonography was performed on postoperative day 6. In clinical pathway 2 (CP2, n=300), Doppler sonography was only performed if symptoms or indicators were present, as indicated by our institution's modification of the Wells criteria. In both pathways, computed tomography (CT) pulmonary angiography was performed for all patients with confirmed DVT, and Doppler sonography was performed for all patients with confirmed PE. All patients received standardized thromboprophylaxis. All patients were evaluated for readmissions within 90 days.
Results: DVT was diagnosed in 6 patients (2.1%) in CP1 and 1 patient (0.3%) in CP2 (OR 6.5, 95% CI 0.78–54.3; P=0.061). Pulmonary embolism (PE) diagosed in 8 patients (2.8%) in CP1 and 4 patients (1.3%) in CP2 (OR 2.16, 95% CI 0.64–7.26; P=0.202). Clinical symptoms or signs significantly increased the diagnostic yield for PE (OR 15.1, 95% CI 3.93–57.7; P<0.001), but not for DVT (OR 1.93, 95% CI 0.22–16.9; P=0.451). In 7 patients diagnosed with DVT, three patients (two in CP1 and one in CP2) were subsequently found to have PE, despite the absence of PE-related symptoms or signs. Notably, none of the 12 patients diagnosed with PE had no concurrent DVT. No readmissions for thromboembolic events occurred within 90 days after discharge.
Conclusions: Routine Doppler sonography in asymptomatic patients is not improve the detection and clinical outcome related with DVT following TKA. Clinical symptoms or signs were more strongly associated with PE than with DVT. Doppler sonography is required to detect DVT in patients with confirmed PE, while routine CT pulmonary angiography in case of DVT is not recommended.

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BICARBONATE CONCENTRATION IS ASSOCIATED WITH LOWER BONE MINERAL DENSITY AT THE FEMORAL NECK AND MID-FOREARM IN WOMEN

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Objective(s)

Bone undergoes constant remodelling, influenced by many factors, including acid/base balance. This study examined associations between bicarbonate, a major contributor to acid-base balance, and bone mineral density (BMD).

Material and Methods

Participants (n=873, age 21-93yr) were women from the Geelong Osteoporosis Study. Bicarbonate concentrations were measured in fasting blood samples. BMD was measured at the femoral neck, lumbar spine, ultra-distal forearm and mid-forearm using a Lunar DPX-L densitometer.

Linear regression was used to examine cross-sectional associations between serum bicarbonate values and BMD, adjusting for anthropometric variables, lifestyle factors, medical conditions and medication use (menopausal hormone therapy, aspirin, nonsteroidal anti-inflammatory drugs, diuretics). Participants taking glucocorticoids or bisphosphonates were excluded. Analyses were stratified by the median age (52 years) due to a bicarbonate*age interaction term.

Results

For participants aged <52yr, higher bicarbonate was associated with lower BMD T scores at the femoral neck (adjusted coefficient; 95%CI: -0.188; -0.351, -0.024, p=0.024) and mid-forearm (-0.050; -0.089, -0.011, p=0.012).

Results were similar for participants aged ≥52yr, where the effect was more pronounced. Higher bicarbonate was associated with lower BMD T scores at the femoral neck (-0.964; -1.692, -0.235, p=0.010) and mid-forearm (-0.121; -0.173, -0.069, p<0.001).

No associations were found at other sites.

These novel results may be explained by differences in sample characteristics; women with higher bicarbonate (≥27mmol/L, n=311) were older, more likely to have a prior fracture, to be taking aspirin or diuretics, and had lower kidney function. Additionally, mean bicarbonate concentration was different between the two age groups (<52yr: 24.8±2.5 mmol/L vs ≥52yr: 26.1±2.8, p<0.001).

Conclusion(s)

In women, higher bicarbonate was associated with lower BMD at the femoral neck and mid-forearm, which contrasts with the few previous studies on this topic (1,2,3). This may be due to differences between groups or statistical methods.

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P855

BICARBONATE CONCENTRATION IS ASSOCIATED WITH HIGHER VALUES FOR A MARKER OF BONE RESORPTION IN WOMEN

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Objective(s)

Bone remodelling can be disturbed by factors such as mechanical loading, hormones and acid-base balance. This study examined associations between bicarbonate, a contributor to acid-base balance, and markers of bone turnover.

Material and Methods

Participants (n=873, age 21-93yr) were women drawn from the Geelong Osteoporosis Study. Fasting blood samples were analysed for bicarbonate concentration, C-terminal telopeptide (CTx, bone resorption) and procollagen type I N-propeptide (P1NP, bone formation). CTx and P1NP values were non-parametric and transformed using natural logarithms prior to analyses.

Cross-sectional associations between serum bicarbonate concentration and CTx or P1NP were examined using linear regression, adjusting for lifestyle variables, medical conditions, anthropometric measurements and medication use (menopausal hormone therapy, aspirin, nonsteroidal anti-inflammatory drugs, diuretics). Participants taking glucocorticoids or bisphosphonates were excluded. The association between age and CTx/P1NP was non-linear, and thus a cubic age term was included in the models. Analyses were stratified by the median age (52yr) due to a bicarbonate*age interaction term.

Results

For women aged <52yr, in unadjusted analyses, increasing bicarbonate concentrations were associated with greater values for CTx (coefficient; 95%CI: 0.024; 0.007, 0.040, p=0.005), but not P1NP (0.014; -0.001, 0.028, p=0.065). Following adjustment, the association with CTx was sustained (0.026; 0.011, 0.040, p=0.001), and the result for P1NP remained non-significant (0.009, -0.005, 0.023, p=0.202).

Among women aged ≥52yr, results were similar, greater bicarbonate concentrations were associated with higher values for CTx (0.020; 0.006, 0.034, p=0.006), but not P1NP (0.011; -0.002, 0.024, p=0.109). After adjustment, the associations were explained for CTx (0.005; -0.009, 0.019, p=0.474) and P1NP remained non-significant (0.006; -0.007, 0.018, p=0.387).

Conclusion(s)

Among women aged <52yr, higher bicarbonate concentrations were associated with higher values for the bone resorption marker CTx. No associations were observed for the bone formation marker P1NP.

P856

ASSESSING FRACTURE RISK IN SARCOPENIC TYPE 2 DIABETES (T2DM) PATIENTS: A CROSS-SECTIONAL STUDY IN A TERTIARY CARE HOSPITAL

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Objectives

Sarcopenia, characterized by reduced skeletal muscle quantity and quality, is frequently observed in individuals with type 2 diabetes mellitus (T2DM). Both conditions are independently associated with an increased risk of fragility fractures. However, the relationship among T2DM, sarcopenia, and fragility fracture risk remains unclear. This study aimed to compare fracture risk between T2DM patients with and without sarcopenia and to examine factors associated with sarcopenia.

Material and Methods

We conducted a cross-sectional study involving 250 adults with T2DM. Sarcopenia was diagnosed according to the Asian Working Group for Sarcopenia (AWGS) 2025 criteria. Ten-year probabilities of major osteoporotic and hip fractures were estimated using the Thai FRAX® tool. Demographic data, anthropometric measurements, basal metabolic rate (BMR), diabetes-related variables, laboratory parameters, and medication use were collected. Univariable and multivariable logistic regression analyses were performed to determine factors independently associated with sarcopenia.

Results

Sarcopenia was identified in 48.4% of participants. FRAX®-estimated 10-year hip fracture probability was significantly higher among participants with sarcopenia (1.3% vs 1.0%, p=0.035), whereas no significant difference was observed for major osteoporotic fracture risk (4.7% vs 3.8%, p=0.066). Diabetes duration, glycemic control, and medication use were comparable between groups. Multivariable analysis identified low BMR (OR 6.30; 95% CI 3.21–12.34) and low calf circumference (OR 2.48; 95% CI 1.00–6.12) as independent factors associated with sarcopenia.

Conclusions

Among patients with T2DM, sarcopenia was associated with higher FRAX®-estimated hip fracture risk, whereas major osteoporotic fracture risk did not differ. These findings suggest that sarcopenia may represent an additional determinant of hip fracture risk in T2DM, underscoring the potential importance of optimizing muscle health alongside glycemic management. Patients with low BMR and small calf circumference may require closer evaluation for sarcopenia. Prospective studies are needed to further elucidate the relationship among T2DM, sarcopenia, and fragility fracture risk.

Keywords: Type 2 diabetes, sarcopenia, fracture risk

P857

MRI SEVERITY MATTERS : PREDICTING RETURN TO SPORT AFTER BONE STRESS INJURIES IN ELITE FEMALE GYMNASTS

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Objectives

Bone stress injuries (BSI) are frequent in elite female artistic gymnastics and represent a major cause of training interruption. Magnetic resonance imaging (MRI) is the reference modality for diagnosis and severity assessment, but its prognostic value for return to sport remains insufficiently documented in this population. Our study aims to assess the association between MRI severity and time to return to sport in elite female artistic gymnasts with BSI, and to explore the relationship between lesion location, MRI severity, and clinical recovery.

Methods

We conducted a retrospective monocentric study including elite female artistic gymnasts followed at a national training center between 2014–2020 and 2023–2025 with MRI-confirmed BSI. Time to return to unrestricted training was recorded. MRI severity was assessed using the Fredericson classification and analysed as an explanatory variable. MRI examinations were independently reviewed by two blinded readers. Lesion locations were categorized as high-risk or low-risk sites. Associations between MRI severity and return-to-sport delay were analysed using Spearman's correlation coefficient. Inter-reader agreement was evaluated as an exploratory secondary outcome.

Results

Sixteen gymnasts were included. Mean time to return to sport was 3.4 ± 3.1 months (range <1 to 12 months). MRI severity was significantly correlated with return-to-sport delay ($\rho = 0.66$, $p = 0.011$), with higher severity associated with longer recovery. High-risk lesion locations were more frequently associated with greater MRI severity and prolonged return-to-sport delay compared with low-risk sites, although this association did not reach statistical significance. Inter-reader agreement for MRI severity assessment was low overall and decreased for the most severe MRI patterns.

Conclusions

MRI severity of bone stress injuries is associated with time to return to sport in elite female artistic gymnasts, supporting its prognostic value beyond diagnosis. Lesion location may further influence injury severity and clinical recovery. Limited inter-reader agreement for severe patterns highlights the need for improved imaging standardization and suggests that complementary CT-like MRI sequences could enhance cortical lesion assessment and support return-to-sport decision-making.

P858

ELEVATED PRO-BNP AND LOW-GRADE INFLAMMATION ARE ASSOCIATED WITH LOW BMD IN SYSTEMIC SCLEROSIS, A CASE CONTROL STUDY

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Objectives: Bone mineral density (BMD) is compromised in patients with systemic sclerosis (SSc) compared to the background population[1]; less is known about contributing factors. This study evaluates established risk factors for low BMD in SSc patients compared to controls, in addition to SSc disease-related features and predictability for BMD.
Methods: The study includes 211 SSc patients, 182 women and 29 men (mean age 61 yrs, mean disease duration 9 yrs) regularly followed at the Rheumatology Department, Skåne University Hospital, Lund, Sweden and 505 age- and sex-matched controls. Data collection: BMD hip and spine (DXA), BMI, SSc-features, biomarkers and potential risk factors through an extensive questionnaire.
Multinomial logistic regression analysis was used to calculate odds ratio (OR) for low BMD; multiple linear regression for associations between T-score and SSc-related variables and lifestyle factors; and machine learning to fit a model to predict total hip T-score in SSc.
Results: NT-proBNP and markers of inflammation were independently associated with low BMD in SSc patients (p<0.001), as were diffuse cutaneous disease subtype, finger ulcers, vital lung capacity and anti-topoisomerase I antibodies (ATA). In addition, BMI, menopausal status, low physical activity and higher medication burden were associated with lower hip T-score. Predictive modelling identified BMI and NT-proBNP as the strongest determinants of hip T-score in SSc patients.
Conclusion: This large case–control study finds elevated NT-proBNP, indicators of low-grade inflammation and indicators of disease severity negatively associated with BMD. In addition, it confirms that several established risk factors associated with low BMD, including low BMI and being post-menopausal influence bone health in patients with SSc. This highlights the importance of BMD assessment to identify at-risk SSc patients beyond traditional risk stratification.
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P859

FACTORS ASSOCIATED WITH PROLONGED HOSPITAL STAYS IN JUVENILE IDIOPATHIC ARTHRITIS

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Background: Juvenile idiopathic arthritis (JIA) is a chronic pediatric rheumatic disease. Hospitalizations are a major component of care, yet factors contributing to prolonged hospital stays in JIA remain poorly understood.
Objective: To investigate factors associated with the length of hospital stay in JIA.
Material and Methods: We conducted a retrospective study including patients with JIA who met the 2010 International League of Associations for Rheumatology (ILAR) classification criteria. Collected data included demographic and clinical characteristics, inflammatory markers (ESR, CRP), and disease activity assessed using JADAS-10 (ESR and CRP) for all subtypes and JSpDA for ERA and psoriatic arthritis and the Juvenile Spondyloarthritis Disease Activity Index (JSpDA) for enthesitis-related arthritis (ERA) and psoriatic arthritis subtypes.
Results:
Ninety-one patients were included (46 boys, 45 girls). The mean age was 15.9 ± 6.0 years, with a mean age at disease onset of 9.4 ± 4.2 years and a mean disease duration of 6.4 ± 4.6 years. ERA was the most common JIA subtype (42.9%), followed by oligoarthritis (30.8%). Mean ESR and CRP were 27.1 mm/h and 16.5 mg/L, respectively. Mean JADAS10-ESR and JADAS10-CRP scores were 19.6 and 16.0. The mean hospital stay was 10.2 days.Length of hospital stay was associated with JIA subtype. The longest stays were observed in patients with systemic JIA (16.7 ± 12.4 days; **p = 0.03**).Prolonged hospital stay was associated with the presence of sacroiliac joint pain (14 ± 15 vs. 8 ± 9 days; **p = 0.05**), hip involvement (16 ± 15 vs. 8 ± 9 days; **p = 0.02**), and the use of DMARDs (csDMARDs: 14 ± 12 days, **p = 0.01**; bDMARDs: 15 ± 13 days, **p = 0.005**). Length of hospitalization was correlated with age (r = 0.2; **p = 0.013**), age at disease onset (r = 0.31; **p = 0.004**), and body mass index (r = 0.31; **p = 0.02**). It was also positively correlated with patient, parent, and physician global assessments (PGA) (**p = 0.008**, **0.006**, and **0.001**, respectively), CRP levels (r = 0.4; **p = 0.006**), ESR (r = 0.24; **p = 0.02**), number of painful joints (r = 0.23; **p = 0.03**), and disease activity indices JADAS-10-ESR (r = 0.31; **p = 0.013**) and JADAS-10-CRP (r = 0.4; **p < 0.001**).No significant associations were found between hospitalization duration and sex, disease onset pattern, enthesitis, uveitis, diagnostic delay, or JSpDA score.
Conclusion: Duration of hospitalization in JIA patients was associated with JIA subtype, obesity, coxitis, use of DMARDs, early disease onset, and elevated inflammatory markers and disease activity. Early and optimal management is necessary to reduce hospitalization duration in children with JIA.

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LOWER BONE REMODELLING AND EARLIER MORTALITY IN FEMALES: A HISTORICAL EXAMPLE

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Objective
This study investigates variation in femur cortical bone remodeling among medieval females and males of low social status across age groups to assess how compounded biological and social stressors inform present-day disparities in bone health.
Material and Methods
Age was recorded from skeletal remains in 410 medieval individuals (n=207 females, n=203 males) exhumed from a low-status cemetery in Canterbury, UK. Histology sections prepared from the right midshaft femur were examined using static histomorphometry to estimate localised bone remodelling rates calculated from secondary osteon

densities. Based on absence of normal data distribution, age was correlated with bone remodelling rates using Spearman's Rho tests, while males and females were compared using a Mann-Whitney U test. Relative risk (RR) ratios, calculated by ages 25, 30, 40, and 50 years, were computed to evaluate whether females experienced an increased risk of premature death over males.
Results
In both males and females, bone remodeling rates were moderately positively correlated with age (p<0.0001, Rho males=0.25, females=0.28), but females had statistically significantly lower remodeling rates compared to males when adjusted for age and bone robusticity (p=0.0001). An inflated risk of premature death was found for females over males up until 50 years old, with females experiencing an almost four-fold increased risk of death by 25 years of age (RR=3.92, p<0.05).
Conclusions
Our finding suggests that skeletal maintenance was compromised in the females in this low-status medieval cohort, likely due to the cumulative effects of social and biological stressors. By demonstrating a link between lower bone remodeling and earlier female mortality in a socially disadvantaged medieval sample, we highlight the enduring relationship between inequality, skeletal health, and survival that continues to hold relevance for modern medical research[1,2].
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RISK FACTORS AFFECTING EMERGENCY DEPARTMENT VISIT IN PATIENT WITH GOUT

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Background/Purpose: This study aimed to identify the risk factors that significantly influence Emergency Department(ED) visits in patients with gout.
Methods: In this nationwide population based retrospective cohort study using National Health Insurance Database, we evaluated patients who were newly diagnosed with gout and initiated urate lowering therapies during the period of January 2012 to December 2017. The primary outcome of interest was the occurrence of ED visits within one year from the index date. Logistic regression analysis was conducted to determine the factors associated the outcome.
Result: Our analysis included a toal of 901,211 eligible patients with gout, The average age of the patients was 53.4 years and 613,931(67.6%) were male. Over a one year period following the index date, 8,613 patients visited the ED with an incidence rate of 9.56(95% CI: 9.36-9.76) per 1000 person-years. Male gout patients had an ED visit rate of 1.03 per 1,000 person-years, whereas the rate for female gout patients was substantially higher at 7.88 per 1,000 person-years. Logistic regresssion analysis revealed that severeal factors were associated with ED visits. These factors included patients older age, female, residing in rural regions, those with the lowest income level, and those with higher CCI scores. Regarding gout medications, patients with a history of receiving colchicine demonstrated the highest odds ratio among gout medication(OR 2.55;95% CI:2.45-2.67).
Conclusion: This study showed the increase trends of incidence of gout and ED visits within one year after diagnosis. Female gout patients had a higher rate of ED visits than male gout patients during the same person-year period. The associated factors related to ED visits included patients older age, residing in rural regiosn, those with the lowerest income level, and those with higher CCI scores. Clinicians should consider these trends and make greater efforts to appropriately treat and educate patients with gout.

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THE NECESSITY OF FRACTURE PREVENTION IN PATIENTS WITH PROSTATE CARCINOMA

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Introduction:
Prostate cancer (PCa) is the fourth most frequently diagnosed malignancy in men and accounts for 26% of all newly diagnosed cancers in men.
Androgen deprivation therapy (ADT) improves PCa treatment outcome – but adversely affects CVD, worsens metabolic profile, insulin resistance, atherosclerosis and reduces bone density.
Aim:
Bone mineral density (BMD) monitoring for fracture prevention in prostate cancer patients undergoing ADT.
Materials and methods:
50 men underwent ADT for PCa, who were noted to have decreased bone density. These patients had no history of medical conditions leading to secondary osteoporosis. 12 of them had fractures - which is why they were referred for densitometry, the rest came on the advice of a specialist (16) and on their own initiative (22). The average age of the patients was 68.3 ± 6.6 years. Medicines included vitamin D and bisphosphonates (BP).
The evaluation method examined the rate of change in BMD before treatment of reduced BMD and one year (respectively two days) after the administration of therapy. As a control, a group of men without PCa (n = 50) was selected, which was matched by age and risk factors. Significant differences were observed only in serum 25(OH)D levels - the group without PCa had higher vitamin D values.
Results:
At the beginning, the control group had higher BMD values in the lumbar spine by 78%, in the femoral neck by 61% and in the hip as a whole by 71%. After two years, this group recorded a decrease in BMD that was not statistically significant. In the first group, 15 patients with osteoporosis were registered (BP was included), 19 patients had osteopenia (vitamin D was included), 16 patients had normal BMD.
BMD of the first group - with osteoporosis, increased by 7.1% at the lumbar spine (LS). An increase in BMD of 5.5 was recorded at the neck of the femur (FN), overall there was an increase in BMD of the femur by 6.6%.
The BMD of the first group - with osteopenia, decreased by 7.3% after one year from the introduction of the LS supplement. A decrease in BMD of 5.7% was recorded at FN, and overall there was a decrease in BMD of the femur by 3.9%.
The BMD of the first group that had a normal finding decreased by 3.6% at LS after two years. A decrease in BMD of 2.7% was recorded at VBK, and overall there was a decrease in BMD of the femur by 2.4%.
In all cases there was a statistically significant difference (p < 0.01). And in one year, 6 new fractures were registered in the first group, one in the

group with osteoporosis and 5 in the group with osteopenia.
Conclusion:
It was found that in patients with prostate cancer on ADT therapy, there is a significant decrease in BMD compared to a group of patients without PCa.

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DENOSUMAB PRODUCES GREATER EARLY SUPPRESSION OF BONE TURNOVER MARKERS THAN ZOLEDRONATE IN POSTMENOPAUSAL WOMEN WITH PRIMARY HYPERPARATHYROIDISM: A RANDOMIZED TRIAL

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Objective: To compare the effects of denosumab and zoledronate on bone turnover markers (BTMs) and to identify clinical factors associated with treatment response in postmenopausal women with primary hyperparathyroidism (PHPT) and osteoporosis.
Methods: In this randomized, open-label pilot trial (ClinicalTrials.gov NCT04085419), 40 postmenopausal women with PHPT and osteoporosis were assigned to denosumab 60 mg subcutaneously every 6 months (DMAB) or zoledronate 5 mg intravenously once yearly (ZOL). Mean age was 73.0 ±7.8 years, time since menopause was 22.6 ±10.0 years, and BMI was 27.8 ±5.1 kg/m^2. Serum C-terminal telopeptide of type I collagen (CTX), procollagen type I N-terminal propeptide (P1NP), and bone-specific alkaline phosphatase (BAP) were measured at baseline and at 3, 6, 12, 18, and 24 months. Linear mixed models were used to evaluate associations of age, time since menopause, and BMI with changes in BTMs from baseline.
Results: At 3 months, CTX levels were lower with DMAB than with ZOL, with a greater percent reduction from baseline (99% vs. 83%; p=0.031). Between-group differences in CTX were no longer observed at later time points. P1NP levels were lower with DMAB at 3 months, and percent reductions from baseline were greater with DMAB than with ZOL across follow-up (e.g., 3 months: 82% vs. 71%; p=0.006). BAP levels were lower with DMAB at 24 months, with greater percent reductions at 3 and 12 months compared with ZOL. In mixed-effects models, older age was associated with greater suppression of CTX and P1NP, whereas longer time since menopause and higher BMI were associated with smaller decreases in these BTMs.
Conclusion: In postmenopausal women with PHPT and osteoporosis, DMAB produced greater early reductions in CTX and P1NP than ZOL. CTX between-group differences were not sustained. In contrast, BAP suppression with DMAB was evident at selected time points, with lower levels at 24 months and larger percent reductions at 3 and 12 months. Age, time since menopause, and BMI significantly modified treatment-related BTM responses.

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THE USE OF POLARIZED POLYCHROMATIC LIGHT IN THE TREATMENT OF ODONTOGENIC PERIOSTITIS

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The purpose of the work. To improve the treatment results of odontogenic periostitis by including polychromatic polarized light phototherapy sessions in the local therapy regimen.
Materials and methods. The study involved 40 patients with acute purulent odontogenic periostitis, divided into two equal groups – the main and the control. All patients underwent standard periosteotomy with preservation or removal of the causal tooth, as well as conventional general therapy. In the control group, the wound was treated daily with an aqueous antiseptic solution after surgery. UHF therapy was used as physiotherapy. In the main group, after opening the abscess, the wound was washed with a chlorhexidine solution, then a bandage with Sanguiritin was applied for 15 minutes, after which Emalan gel was applied. Additionally, patients in the main group underwent local irradiation with polychromatic polarized light using a Bioptron device. The effect was carried out externally, in the projection of the wound, at an angle of 90 ° to the skin from a distance of 3-5 cm. The duration of the procedure was 6 minutes, and the course included 8 daily sessions. Based on the results of observations, it was found that patients in the main group had more active wound repair processes, a faster decrease in general and local signs of inflammation, earlier cleansing of the wound from purulent-necrotic contents, shorter treatment time and a reduced risk of local infectious and inflammatory complications.
Conclusions. The use of polychromatic polarized light from the Bioptron device in the complex treatment of acute purulent odontogenic periostitis, due to its anti-inflammatory, decongestant, analgesic and regenerating effects, promotes faster relief of inflammation, activation of recovery processes and reduction of treatment time. This method can be recommended for use in surgical dentistry both for therapy and for the prevention of postoperative infectious and inflammatory complications.

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THE USE OF XENOGENIC OSTEOBIOL DERMA GRAFT FOR SOFT TISSUE AUGMENTATION IN CONDITIONS OF IMMEDIATE IMPLANTATION AFTER TOOTH EXTRACTION

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Derma xenogenic graft for soft tissue augmentation during the single-stage implantation procedure based on a comprehensive analysis of clinical, cytological and X-ray data.
Materials and methods. The study was conducted at the clinical base of the Ecodent dental clinic. The study included 10 patients (aged 30-50 years) both sexes with dental defects included, without a burdened somatic status. Immediate dental implantation was performed under local infiltration anesthesia Sol. Ultracaini 4% (1.7 ml). After detachment of the circular ligament, an atraumatic tooth extraction was performed

with maximum preservation of the bone structures of the alveoli and the root septum. The implants were installed in accordance with the standard protocol of simultaneous intervention. Bone defects between the wall of the well and the surface of the implant were filled with osteoplastic Gen-Os (Osteobiol) material. An Osteobiol Derma resorbable collagen membrane was placed on top of the augmentate and the installed implant, under the mucoposteal flap, followed by its adaptation and fixation with guide sutures.
Results. The study confirmed the high clinical efficacy of Osteobiol Derma. The postoperative period in all patients was physiological, with no signs of inflammation or rejection. Clinical and cytological monitoring data indicated a high intensity and harmonious course of reparative processes in the area of intervention. X-ray analysis (after 3 months) showed a significant reduction in the bone defect due to the formation of mature newly formed bone tissue. There was a controlled, gradual resorption of the membrane, which was accompanied by full-fledged bone regeneration according to the *restitutio ad integrum* type. These factors ensured stable protection and safety of the graft, creating optimal conditions for successful osseointegration of the installed implants.
Conclusions. The use of Osteobiol Derma collagen membrane as part of the immediate implantation protocol is an effective technique that provides stable protection of bone augmentate and acts as a guiding barrier for epithelial tissue that does not require removal. The key advantages determining clinical success and favorable aesthetic outcome are atraumatic use, high biocompatibility, controlled rate of resorption and the ability to vascularize. The set of listed characteristics allows us to recommend the widespread introduction of this technique into clinical practice as an effective means of preventing dental deformities and complications during single-stage implantation.

P866

TRAUMATIC SPINAL CORD DISEASE AND FEATURES OF MUSCLE TISSUE METABOLISM

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The purpose of this study was to analyze the state of the muscular system in patients with TBSM depending on the location of spinal cord injury.
Materials and methods. 90 male patients with TBSM aged from 26 to 45 years were examined. The localization of the injury was distributed as follows: cervical spine – 18 people, thoracic spine – 22, lumbar spine – 50 people. In addition to standard clinical methods, to assess muscle tissue damage, the concentration of myoglobin in blood serum was determined by enzyme immunoassay (ELISA) using the solid-phase principle.
Results. Analysis of myoglobin levels in the main group of patients with TBSM revealed a statistically significant ($p<0.001$) increase in this indicator (38.60±2.10 micrograms/l) compared with the control group (26.80±1.04 micrograms/l). The data obtained indicate the inflammatory nature of the increase in myoglobin concentration, which indicates the development of not only dystrophic but also inflammatory processes in muscle tissue in patients with TBSM.
Conclusions. Thus, in patients with traumatic spinal cord disease, there is a violation of the trophic skeletal muscles, which is confirmed by an increased level of serum myoglobin. The severity of these disorders correlates with the level of spinal injury, and an increase in myoglobin is noted not only in severe, but also in relatively mild cases of the disease. This is due to concomitant systemic disorders such as persistent inflammatory activity and the development of endothelial dysfunction. Together, these factors worsen disorders of tissue nutrition and disrupt the physiological mechanism of muscle contraction at all its stages.

P867

FEATURES OF REGIONAL BLOOD FLOW IN PATIENTS WITH MANDIBULAR FRACTURES ON THE BACKGROUND OF PHYSIOPHARMACOTHERAPY

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Circulatory disorders in the area of a mandibular fracture significantly affect bone tissue repair and the duration of the rehabilitation period (according to a number of authors).
The aim of the study was to evaluate the dynamics of recovery, as well as the effect of bioresonance therapy and its combination with Osteogenon on fracture consolidation and the state of local blood flow in the injured area.
Materials and methods. The study included 120 male patients aged 18-58 years with fractures of the mandible. The participants were randomized into three groups of 40 people each.
All patients underwent primary immobilization of fragments using a Tigerstedt splint with occlusion restoration. Group I: received a course of bioresonance therapy (BRS device). From day 2, the impact was carried out on the collar area, from day 5 - additionally on the fracture area. The parameters (power, time) gradually increased. The course consisted of 10 procedures. Group II: received combination therapy: bioresonance stimulation (according to the same scheme) and the drug Osteogenon. Group III (control): treatment according to the standard protocol (splinting, anti-inflammatory therapy, UHF). The effectiveness of the treatment was assessed on the basis of clinical and radiological data and rheography immediately after immobilization and after 2 weeks. The control indicators were obtained during the examination of 15 healthy individuals. The data was processed statistically.
Results. Upon admission, edema, hematomas, and dislocation of fragments were noted in patients of all groups. According to rheographic data, violations of regional hemodynamics were detected in 89% of patients (decreased rheographic index, angle of collapse, etc.), which indicated a deterioration in both arterial inflow and venous outflow. After splinting, the bite was restored, and the X-ray bias was eliminated in 68% of cases. However, at this stage, there was a slight deterioration in blood flow, probably due to additional tissue injury during reposition. Later, patients of groups I and II who received physiopharmacotherapy showed a faster disappearance of edema and hematomas compared with the control group. Clinical and radiological signs of consolidation, as well as recovery of working capacity, occurred earlier in the main groups. Rheographic examination after 2 weeks showed the most intensive restoration of regional blood circulation in patients of group II (combination therapy). The indicators of group I also exceeded the control ones, where hemodynamics remained significantly changed.
Conclusions. Comprehensive treatment of fractures of the mandible using bioresonance therapy and the drug Osteogenon helps to accelerate the consolidation of fragments, improve regional blood flow, reduce rehabilitation time and restore functional parameters.

P868

THE PROBLEM OF INCREASING THE EFFECTIVENESS OF THERAPY FOR TRAUMATIC OSTEOMYELITIS OF THE LOWER JAW

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The aim of the study was to evaluate how the addition of Bestim to standard therapy affects the treatment outcomes of patients with traumatic osteomyelitis of the mandible.
Materials and methods: 58 patients with this diagnosis participated in the study. They were divided into two groups: the control group (27 people), which received only standard treatment, and the main group (29 people). Standard therapy for all included jaw immobilization (if necessary) and traditional postoperative drug support. The patients of the main group additionally received Bestim intramuscularly, once a day, with a course of 5 to 7 injections. Prior to the start of treatment, all patients had characteristic clinical and radiological signs of a purulent-destructive process in the lower jaw. The analysis of the immune status revealed significant violations: the level of IgA was reduced by 39%, and IgM – by 24,7%, indicating systemic immunodeficiency, moderate inflammation and metabolic hypoxia. The dynamics of the recovery of immunogram parameters served as an important criterion for evaluating the effectiveness of both the operation (sequestrectomy) and the correction of secondary immunodeficiency. In the main group, normalization of IgM and IgG levels was observed by the 10th day of treatment, and IgA by the 21st day. In the control group, the recovery of these indicators occurred much later.
Conclusion: The addition of the immunomodulatory and antioxidant drug Bestim to the complex therapy of traumatic osteomyelitis of the mandible significantly increases its effectiveness. This is confirmed by a faster normalization of immunological parameters (7-14 days earlier than in the control group), a decrease in the frequency of local complications by 28,4% and a decrease in the number of disease recurrences by 7,7%.

P869

ASSESSMENT OF CHANGES IN CLINICAL AND BIOCHEMICAL PARAMETERS OF ORAL FLUID IN CARIES

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Objective: to determine the variability of oral fluid parameters depending on the time of year, to identify the most significant indicators for oral fluid with varying degrees of intensity of the carious process, as well as to establish a correlation between these indicators.
Materials and methods. The material for the study was the oral fluid of 50 patients aged 20-36 years, obtained by spitting into glass tubes in the morning from 8 to 9 o'clock 1-1.5 hours after brushing their teeth. There are 2 groups according to the value of the index of the intensity of dental damage by the carious process (KPU). Examination of the oral cavity and determination of biochemical parameters of oral fluid were performed twice: in spring and autumn. The first group (OH-I) consisted of patients with a compensated form of the carious process: 20 people in spring (CP=3.26+1.55) and 20 people in autumn (CP=2.68+1.67); the second group (OH-II) — with a decompensated form of the carious process: 10 people (KPU =11). The examination consisted of taking into account the medical history data, an objective examination of the oral cavity with the determination of hygiene indices.
Results. According to our data, the content of calcium in the oral fluid in the autumn period in OH-I is 3.4±0.009, OH-II is 1.5±0.012 mmol/l. Phosphorus OH-I 14.5±0.48, OH-II 3.1±0.03 mmol/l. The alkaline phosphatase indices of OH-I are 36.1±1.56 and OH-II are 107.3±1.18 E/L. In spring, the calcium indices are 1.63±0.078 and 1.36±0.03 mmol/l, respectively. Phosphorus is 6.7±0.23 and 2.79±0.16 mmol/l. Alkaline phosphatase 34.4±0.61 and 87.3±0.898 E/l. There is a tendency to an increase in the content of calcium and phosphorus in the oral fluid, and an increase in the activity of the alkaline phosphatase enzyme with an increase in the CP index. In addition, there was a parallel decrease in the content of calcium and phosphorus in autumn compared to their values in spring. However, in the second study group, these indicators are lower than in the first group, which may be due rather to the depletion of the body's reserve forces against the background of intense demineralization and an increase in the number of affected teeth, although a seasonal decrease in calcium and phosphorus levels is also observed.
Conclusion. Thus, the dependence of the biochemical composition of the oral fluid on the degree of intensity and prevalence of the carious process was revealed. Seasonal fluctuations in the content of calcium and phosphorus in the oral fluid were noted. A correlation has been established between the content of calcium, phosphorus and alkaline phosphatase in saliva.

P870

CORRECTION OF OSTEOPENIC SYNDROME IN CHILDREN WITH BRONCHIAL ASTHMA

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The purpose of our study was to study the effect of sanatorium–type treatment (SCL) on the structural and functional properties of bone tissue (SPS CT) in children in remission of bronchial asthma.
Materials and methods. We observed 103 children (from 7 to 16 years old) with remission of bronchial asthma (BA) and manifestations of osteopenic syndrome, diagnosed by ultrasound osteodensitometry, which was performed using the "Ahilles+" device (USA). Among the examined OH children with osteopenic syndrome, intermittent asthma was detected in 14 (13.6%) patients, mild persistent in 40 (38.8%) and moderate persistent in 49 (47.6%) patients. The control group (KG) consisted of 30 healthy peers.
The results of the study. In children with asthma, manifestations of nonspecific connective tissue dysplasia syndrome were detected in 64 (62.1%) patients, disharmonious physical development – in 67 (65%). According to ultrasound osteodensitometry, all patients with asthma included in the study showed a decrease in CT values of less than -1 SD. In 90 of 103 (87.3%) patients with ASTHMA, its value ranged from -1 to -2.5 SD, which indicated manifestations of osteopenia, and in 6 (5.8%) patients it was below -2.5 SD, which corresponded to osteoporosis. All examined children with asthma were divided into groups. The first group, consisting of 41 people, received a standard complex of SCL. The second group, consisting of 62 children, simultaneously took the drug Osteobios (Italy). Under the influence of SCL, IP CT tended to decrease from 80.01±1.18% to 76.0±1.64%. The SRU indicator is significant (p <0.001) It also decreased from 1544.23±2.29 m/s to 1531.46±2.24 m/s. The magnitude of the SHOW did not significantly change during therapy. The highest values of ultrasound osteodensitometry were recorded in the 2nd

group of patients. The average value of the SRU increased (p <0.001) by 15 m/s (from 1543.21 ±2.27 to 1560.01±2.095 m/s) and almost reached the values of KG. The CP of CT increased (p <0.05) from 79.08±1.26% to 86.70±1.49%, which indicated an increase in CT strength, but remained lower than in healthy children. The SHOW value was 104.91±1.78 dB/MHz versus the initial value of 100.05±1.69 dB/MHz.
Conclusions. Thus, the entire complex of SCL had a positive effect on the dynamics of ultrasound densitometry CT. A significant improvement in SPS CT was noted in the group who received the antihomotoxic drug Osteobios against the background of SCL.

P871

DETECTION OF UNDIFFERENTIATED CONNECTIVE TISSUE DYSPLASIAS IN ADOLESCENTS WITH DENTOFACIAL ABNORMALITIES

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The aim of our work was to assess the possibilities and the need for diagnosis of undifferentiated connective tissue dysplasias (NDST) by orthodontist doctors at the stage of treatment planning.
Materials and methods. A total of 54 adolescents (main group - PH) aged 12 to 15 years with various dentoalveolar anomalies (DFA) and deformities were followed up to study the prevalence of NDST in this cohort. For comparison, we estimated the prevalence of NDST signs among 50 adolescents in the control group (CG) who did not initially have information about the presence of HRA.
Results and their discussion. According to the results of our study, the prevalence of BAT according to the identified clinical signs in adolescents was 56.7%. In 30.7%, spinal deformities were detected, in 30.1% - asthenic type of constitution, in 15.1% - visual impairment in the form of astigmatism. In CG and OG patients, the CIC index was 8.4 and 9.1, respectively. The level of oral hygiene according to IG values in 44.6% of the examined patients was satisfactory, in 55.4% - unsatisfactory; CG parameters did not significantly differ from those of the patients (48.2% and 51.8%, respectively). The prevalence of inflammatory periodontal diseases by group was 35.1% and 29.9%, with bleeding and RMA indices of 1.7% and 14.8% (CG) and 1.6% and 15.4% (OH). Based on the results of the data obtained, out of 24 existing for the diagnosis of "large" and "small" signs of NDST, we identified the 10 most significant. According to the priority of the significance of the diagnostic coefficients of the discharge of "large" stigmas, we consider it sufficient at the primary reception to assess the type of adolescent constitution. Diagnostically reliable "small" stigmas of NDST can be directly types of dentoalveolar anomalies.
Conclusions. The results made it possible to determine that the prevalence of ZFA in combination with signs of BAT in the population of adolescents is 2.7 times higher than CG. The presence of ZFA itself may be one of the markers of NDST, especially in combination with the "large" and/or "small" dysplastic stigmas that we identified in 89.1% of OHT adolescents and in 40.5% of CG adolescents.

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P872

SCIENTIFIC SUBSTANTIATION OF THE USE OF METERED-DOSE PHYSICAL ACTIVITY IN THE REHABILITATION OF CHILDREN WITH PRIMARY ARTERIAL HYPOTENSION

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The purpose of the study. The aim was to analyze the specifics of physical development and metabolic disorders in children with PAH in order to develop a pathogenetically based methodology for the use of metered-dose physical activity. Scandinavian walking was considered as a therapeutic factor.
Materials and methods. In the period from June 2022 to March 2023, 67 children aged 7-12 years with a diagnosis of PAH who underwent a Nordic walking course were monitored. The program consisted of 10 daily workouts lasting 45-60 minutes each, the structure of which included a warm-up, the main part (training and practice), a game break and a hitch. Dynamic monitoring included daily monitoring of blood pressure (BP), heart rate (HR), and respiratory rate (HRR). Before and after the course, the body's functional reserves were assessed based on the results of the Barbell and Gencha tests, the 6-minute walking test (6-MST), as well as bioimpedance and bicycle ergometry data.
Results. The initial average blood pressure in the group was 79/42 mmHg. During the classes, 98% of patients showed positive dynamics: by the end of the 10-day course, the average blood pressure steadily increased to 92/60 mmHg. The achieved effect persisted for three days after the completion of the program. The results of functional tests (Barbell, Genchi, 6-MSHT) also demonstrated a statistically significant improvement, which indicates an increased adaptive capacity of the cardiovascular and respiratory systems to physical exertion.
Conclusion. A course of metered-dose training in the form of Nordic walking, consisting of 10 daily sessions, helps to normalize blood pressure levels in children with primary arterial hypotension to age-appropriate levels. In parallel, there is an increase in exercise tolerance and an improvement in the functional state of the cardiorespiratory system, which confirms the rehabilitation potential of this technique.

P873

ETHOLOGICAL AND IMMUNOLOGICAL CHARACTERISTICS OF CHILDREN WITH BRONCHIAL ASTHMA AT DIFFERENT STAGES OF THE DISEASE

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The aim of the work was to study the specifics of behavioral patterns and their relationship with immune parameters in pediatric patients with asthma.
Materials and methods: The study included 137 children aged 7-16 with asthma: 103 patients in the acute phase and 34 in remission undergoing sanatorium rehabilitation. The control group consisted of 28 healthy peers. The following methods were used: computer spirography (FVC, PSV,

OFV1, MOS50, MOS75), ethological observation, immunophenotyping of lymphocytes (determination of the absolute and relative number of CD3+, CD4+, CD8+, CD16+, CD22+ cells, immunoregulation index — IRI) and statistical analysis with the calculation of correlations.
Results: Ethological features: the most active communication channels in all children were facial expressions, postures and gestures. However, in the AD group, there was a change in the balance between them characteristic of healthy children: exacerbation of the disease correlated with increased facial activity against a background of decreased gestures and vocalizations, the persistent course of AD, unlike intermittent, was characterized by the dominance of facial expressions with a decrease in the activity of the postural and manipulative channels. A typical behavioral profile was aggressive-warning behavior, which included elements of submission (submission), autoaggression, and somatogenic depression. Increased aggression and depression against the background of reduced acts of grooming (self-cleaning, preening) served as an ethological marker of the activity and severity of the pathological process. Significant correlations were found between behavior and the function of external respiration (FVD): vocal activity positively correlated with MOS50, and grooming with FVC, PSV and MOS75. Anxiety had an inverse relationship with VVC. There was a statistically significant decrease in the absolute values of CD3+, CD16+, CD4+, CD8+ lymphocytes in both phases of the disease. In the acute phase, IRI and the relative number of B-lymphocytes (CD22+) significantly decreased. In the remission phase, there was an increase in the relative values of CD4+, CD16+, CD22+, and the IRI exceeded the control values. The level of total IgE was significantly increased at all stages of the disease. Interrelation of ethological and immunological parameters: Active gestures, manipulation of objects, and vocalization were associated with better cellular immunity. High facial activity, on the contrary, reflected its insufficiency and a decrease in IRI. Correlations between signs of aggressive behavior and atopy may indicate a common genetic basis. Acts of grooming served as a marker of reducing the body's allergic mood. The parameters of cellular immunity (CD8+, CD4+, CD16+, CD22+) were closely related to the parameters of FVD (OFV1, MOS50, MOS75), and the nature of the relationship in children with asthma was similar to that in the control group.
Conclusion: Children with bronchial asthma have a significant strain on the immune system in conditions of chronic disease, which is clearly reflected in specific changes in non-verbal behavior. The revealed complex correlations, as well as the positive dynamics of a number of indicators during the period of sanatorium treatment, justify the expediency of actively including methods based on nonverbal interaction in rehabilitation programs for this category of patients.

P874

FEATURES OF FUSION OF THE FRACTURE OF THE LOWER JAW AGAINST THE BACKGROUND OF THE USE OF THE DRUG "OSTEOGENON"

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The purpose of the study: to study the effect of the drug "Osteogenon" on bone mineralization in the regenerate zone in patients with fractured mandible.
Material and methods: The study involved 80 male patients aged 20 to 48 years with a unilateral fracture in the molars or angle of the mandible. The participants were divided into two groups. In the main (I) group, Osteogenon was included in the treatment regimen, while patients in the control (II) group received standard therapy. An Achilles ultrasound densitometer (Lunar) was used to assess the condition of bone tissue. Parameters such as the ultrasound propagation velocity (SRU), broadband ultrasound attenuation (WDE), and the density index (DDI), reflecting the structural and functional properties of bone, were analyzed.
Results: Initial densitometry in all patients showed a decrease in all the studied parameters: SRU to 1540 ±9.59 m/s, SHA to 107.3±3.2 dB/MHz, IP to 90.71±2.3%. These changes indicate the activation of bone remodeling processes with increased osteoblast activity and increased resorption. Repeated examination on day 21 revealed significant differences between the groups. In group I, who received Osteogenon, there was a significant increase in CP to normal values (from 1531±13.21 to 1568±4.25 m/s; $p<0.001$) and a significant increase in IP (from 89.55±3.2 to 96.3±2.0; $p<0.01$), while the SHAW index remained unchanged. In group II, the dynamics was less pronounced, and the IP value even decreased slightly (from 95.3±3.1 to 94.4±2.8), which is statistically unreliable.
Conclusion: In patients with a mandibular fracture, significant bone structure disorders are recorded before treatment, corresponding to the degenerative syndrome in 60.83% of patients. During therapy, there was a tendency towards normalization of densitometric parameters in both groups, which indicates the consolidation of the fracture. The most pronounced positive dynamics, especially in terms of the speed of ultrasound propagation and the density index, was recorded in the group receiving Osteogenon. This suggests that the inclusion of this drug in the complex treatment helps to accelerate the processes of mineralization and fracture fusion.

P875

SEASONAL FLUCTUATIONS IN VITAMIN D LEVELS IN CHILDREN WITH CHRONIC PYELONEPHRITIS

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The purpose of this study is to study these seasonal changes in children diagnosed with chronic pyelonephritis (CP).
Methods: 120 children (10-15 years old) from Crimea with CP in remission participated in the study. The children were divided into 4 equal groups of 30 people according to the survey season (winter, spring, summer, autumn). All participants underwent a comprehensive examination, which included: assessment of bone density using ultrasound densitometry, blood and urine analysis for calcium, phosphorus and kidney function, determination of the concentration of key hormones (parathyroid hormone, calcitriol, calcitonin, growth hormone) and markers of bone formation and destruction.
Results. In children with CP, the incidence of decreased bone density was highest in spring (48% of cases, peak in March), which is 12% higher than in other seasons. The more severe form (osteoporosis) was more common in autumn and spring. Even in the absence of pronounced changes in bone density in children with CP, an imbalance in the hormonal regulation of bone metabolism was revealed, which can be considered an early (prelatent) stage of osteopenia. In particular, a reduced level of calcitriol** (the active form of vitamin D) in the blood was found. The level of calcitriol directly depended on body weight, the degree of physical development and the content of growth hormone in the child. The severity of the revealed hormonal disorders varied depending on the time of the year.
Conclusions. The data obtained indicate the need for targeted prevention

of vitamin D deficiency and related osteopenia in children with chronic pyelonephritis. Given the slow cycle of bone tissue renewal, the authors recommend an annual preventive intake of vitamin D preparations, starting in November, with mandatory follow-up medical monitoring. The optimal duration of such a course for this group of patients requires further study.

P876

CHARACTERISTICS OF THE STRUCTURAL AND FUNCTIONAL STATE OF BONE TISSUE IN PATIENTS WITH JURA, DEPENDING ON DISEASE DURATION

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Objective: To study the structural and functional state of bone tissue (SPS CT) in children with JRA, depending on disease duration.
Materials and Methods: We examined 102 children aged 6 to 15 years with a reliable and definite diagnosis of JRA. Articular JRA was present in 80 (78.4%) children, and articular-visceral JRA was present in 22 (21.6%). The majority of children had a slowly progressive course (73 (71.5%)), while 22 (21.6%) had a rapidly progressive course and 7 (6.9%) had no noticeable progression. The examination was conducted according to the generally accepted rheumatology protocol.
Results. A CT scanning probe (SPS) study in patients with JRA revealed that the CT index decreased with increasing disease duration. For JRA lasting up to 1 year, the CT index was 62.9±1.9%, for patients from 1 to 3 years, it was 66.1±1.7%, and for patients with JRA lasting more than 3 years, it was 63.1±1.12%, which is significantly lower than the norm ($p<0.01$). A relationship was established between the duration of JRA and the severity of CT abnormalities. Total bone density insufficiency was detected in 3 patients (25%) with a disease duration of up to 1 year, 18 (69%) with a disease duration of 1 to 3 years, and 81 (94%) with a disease duration of more than 3 years (the percentage of patients is taken from the total number of children with JRA of the corresponding disease duration). The incidence of osteopenia and osteoporosis with a disease duration of up to 1 year was 21% and 4%, respectively; 59% and 10% with a disease duration of 1 to 3 years; and 84% and 40% with a disease duration of more than 3 years.
Conclusions. Children with JRA exhibit bone metabolism disorders, manifested by deterioration of bone strength characteristics and decreased osteodensitometry parameters. The severity of these disorders depended on the duration and type of the disease.

P877

OSTEOSARCOPENIA IS AN INDEPENDENT FACTOR RELATED TO FRAILTY IN OCTOGENARIANS

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Objectives: The aging process is characterized by a progressive decline in musculoskeletal health, frequently resulting in osteoporosis (OP) and sarcopenia. In this study, we aimed to investigate the relationship between these individual conditions and their coexistence as osteosarcopenia (OS) with frailty in a cohort of patients aged 80 years and older.
Methods: Following the screening of 223 patients, 120 patients met the inclusion criteria and proceeded to the final analysis. A comprehensive geriatric assessment (CGA) was performed on each participant. The Clinical Frailty Scale (CFS >4 = frail) was used for the assessment of frailty. Probable sarcopenia (PS) is defined as low handgrip strength. (<16 kg for female, < 27 kg for male). OP was defined by a T-score of -2.5 or lower; or the presence of documented fragility fractures. The patients with both OP and sarcopenia were accepted as OS.
Results: A total of 120 patients aged 80 years or older were included in the study. The median (IQR) age was 84.9 (81.9- 87.2) years and 60.0 % (n=72) were female. Patients were divided into two groups according to frailty status. In the frail group (n=77, 64.2 %), patients were older, more dependent in the ADLs, more likely to be female, and mostly had malnutrition risk, dementia, congestive heart failure, depression, and a history of fall in the previous year. The prevalences of OP, PS, and OS were 10.0 % (n=12), 35.0% (n=42), and 41.7 % (n=50), respectively. Patients living with frailty had a higher prevalence of PS and OS than the non-frail group.(Table 1)The logistic regression analyses, OS was related to a 4 times increased frailty risk, independent of age and sex (OR: 4.32, 95% CI: 1.21- 15.45, p= 0.024).(Table 2)
Conclusion: OS is an independent factor closely intertwined with frailty in patients aged 80 years and older. These findings suggest that identifying this coexistence of OP and sarcopenia is essential to better manage and prevent frailty in the oldest-old population.
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Table 1. Comparison of the demographic characteristics and comprehensive geriatric assessment parameters according to frailty status.

Age, median (IQR)	84.0 (81.0 – 87.0)	85.0 (82.0 – 88.0)	0.008
Female sex, n (%)	39 (50.7 %)	33 (78.6 %)	0.005
Diabetes mellitus, n (%)	18 (23.4 %)	14 (33.3 %)	0.418
Hypertension, n (%)	57 (74.0 %)	33 (78.6 %)	0.567
Dementia, n (%)	12 (15.6 %)	23 (54.8 %)	<0.001
Chronic renal disease, n (%)	19 (24.7 %)	07 (16.7 %)	0.368
Chronic pulmonary disease, n (%)	7 (10.4 %)	12 (28.6 %)	0.005
Congestive heart failure, n (%)	3 (3.9 %)	10 (23.8 %)	0.003
Connect tissue disease, n (%)	11 (14.3 %)	2 (4.8 %)	0.131
Cerebrovascular disease, n (%)	8 (10.4 %)	11 (26.2 %)	0.030
Atrial fibrillation, n (%)	9 (11.7 %)	10 (23.8 %)	0.055
Depression, n (%)	8 (10.4 %)	21 (50.0 %)	0.020
Physical inactivity, n (%)	2 (2.6 %)	12 (28.6 %)	0.003
Parkinson's disease, n (%)	1 (1.3 %)	0 (0.0 %)	0.204
Malignancies, n (%)	5 (7.0 %)	3 (8.1 %)	0.527
Polypharmacy, n (%)	39 (50.6 %)	29 (69.0 %)	0.058
Body mass index, median (IQR)	27.8 (24.2 – 31.9)	28.4 (25.0 – 35.0)	0.241
Clinical Frailty Scale score	4.0 (3.0 – 4.0)	6.0 (5.0 – 7.0)	<0.001
Katz ADL, median (IQR)	6.0 (6.0 – 6.0)	4.0 (2.0 – 5.0)	<0.001
Lawton-Brody IADL, median (IQR)	8.0 (8.0 – 8.0)	4.0 (2.0 – 7.0)	<0.001
GDS-15, score, median (IQR)	3.0 (1.0 – 7.0)	7.0 (3.0 – 7.0)	<0.001
Geriatric Depression Scale score, median (IQR)	3.0 (0.0 – 5.0)	5.0 (1.0 – 7.0)	0.091
Mini-nutritional Assessment Short-Form, median (IQR)	14.0 (12.0 – 14.0)	11.5 (10.5 – 13.0)	<0.001
Malnutrition risk (MNA < 11), n (%)	7 (10.3 %)	12 (42.9 %)	0.003
Handgrip strength, median (IQR)	26.0 (16.0 – 34.0)	16.0 (9.5 – 24.5)	<0.001
Anticholinergic drug exposure – None	16 (26.9 %)	7 (9.1 %)	0.004
Anticholinergic drug exposure – Minimal	6 (10.9 %)	4 (5.2 %)	
Anticholinergic drug exposure – Clinically Probable Involvement	19 (27.2 %)	29 (37.7 %)	
Anticholinergic drug exposure – Obvious	10 (25.0 %)	40 (51.9 %)	
Vitamin D level, median (IQR)	23.0 (15.0 – 31.2)	20.4 (12.3 – 34.5)	0.986
Taking a Supplement, n (%)	31 (39.0 %)	30 (76.9 %)	<0.001

Table 2. Logistic Regression Analyses of the Independent factors related to Frailty

	Frailty	
	OR (95%CI)	P value
Age	1.08 (0.98 – 1.19)	0.113
Female sex	3.56 (1.45 – 8.71)	0.005
Osteoporosis	0.45 (0.08 – 2.38)	0.352
Probable sarcopenia	2.21 (0.63 – 7.71)	0.213
Osteosarcopenia	4.32 (1.21- 15.45)	0.024

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RARE BONE DISEASES: DIAGNOSIS AND MANAGEMENT ABOUT 21 PATIENTS

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Introduction: Rare bone diseases constitute a heterogeneous genetic or acquired origin group, characterized by bone fragility that leads to an increased risk of fractures and deformities. Although rare, they present a diagnostic and therapeutic challenge due to their clinical variability.
The objective of our study is to describe the clinical, biological, and radiological characteristics of a cohort of patients with various rare bone diseases, in order to optimize the diagnostic and therapeutic approach.
Materials and Methods: This is a descriptive retrospective study conducted in the rheumatology department of the University Hospital Center of Casablanca. The inclusion criteria were patients being monitored for rare and bone diseases treated at the specialized hospital unit.
Results: We collected data from 21 patients. Paget's disease and osteogenesis imperfecta were the most common conditions, with seven patients each. Fibrous dysplasia and melorheostosis were identified in two patients each. Meanwhile, Van Buchem's disease, pycnodysostosis, and cleidocranial dysplasia were reported in only one patient each. The average age at diagnosis varied depending on the pathology, ranging from 16 years for cleidocranial dysplasia to 60.5 years for Paget's disease. A female predominance was observed in Paget's disease (4F/3M), whereas a male predominance was noted in osteogenesis imperfecta (3F/4M). Melorheostosis exhibited a balanced distribution (1F/1M). Conversely, pycnodysostosis and Van Buchem's disease had a male distribution. However, cleidocranial dysplasia and fibrous dysplasia affected female cases. The consanguinity context was reported in osteogenesis imperfecta, pycnodysostosis, and cleidocranial dysplasia. Almost all patients (90.47%) experienced bone pain. Deformities predominated in Paget's disease, osteogenesis imperfecta, fibrous dysplasia, and melorheostosis, while craniofacial and dental dysmorphologies characterized Van Buchem's disease, pycnodysostosis, and cleidocranial dysplasia. Polyostotic forms were predominant in Paget's disease (n=6) and fibrous dysplasia (n=2). Multiple fractures were observed in all patients with osteogenesis imperfecta (n=7), fibrous dysplasia (n=2), and pycnodysostosis (n=1). However, no cases were reported for melorheostosis, Van Buchem's disease, or Paget's disease.
Radiographs revealed specific characteristics according to the pathology. Paget's disease presented mixed osteolytic and osteosclerotic lesions. Osteogenesis imperfecta showed a "sandwich" appearance, while fibrous dysplasia resulted in a "shepherd's crook" deformity with "ground-glass" areas. Melorheostosis was characterized by "candle flow"-like cortical hyperostosis and ectopic ossifications. Van Buchem's disease involved cortical thickening alongside maxillary bone condensation. Pycnodysostosis manifested as diffuse bone hyperdensity, clavicular and mandibular hypoplasia, and resorption of the phalangeal tufts. Lastly, cleidocranial dysplasia associated macrocephaly with suture closure defects, clavicular hypoplasia, distal phalangeal hypoplasia with lengthening of the second metacarpals, pelvic hypoplasia with bilateral coxa vara, and anterolisthesis of L5-S1 due to congenital isthmic lysis. Bone densitometry indicated osteoporosis in seven patients, primarily in osteogenesis imperfecta (n=6), and osteopenia in two patients (Paget's disease n=1, osteogenesis imperfecta n=1). An elevation of bone remodeling markers (CTX) was noted in three cases (Paget's disease n=2, fibrous dysplasia n=1) and of alkaline phosphatases in one case of osteogenesis imperfecta.
Therapeutic Approach: Bisphosphonates, particularly zoledronic acid, alendronic acid, and pamidronate, formed the cornerstone of treatment in Paget's disease, osteogenesis imperfecta, melorheostosis, and cleidocranial dysplasia. A short course of corticosteroids in combination with symptomatic treatment was used to relieve pain in Van Buchem's disease.
Discussion and Conclusion: Fragilizing osteopathies, although rare, are characterized by significant clinical heterogeneity, ranging from simple bone pain to severe deformities and pathological fractures. Their diagnosis relies on a rigorous correlation between clinical and paraclinic.

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THE EFFECT OF NIGHTTIME ORTHOSIS USES ON MORNING STIFFNESS AND GRIP STRENGTH IN PATIENTS WITH RISARTHROSIS

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Aim. To evaluate the relationship between the nighttime duration of wearing an orthosis for rest and the severity of morning stiffness and grip strength in patients with stage I-II rhizarthrosis.
Materials and methods. A prospective single-center study included 38 women with a confirmed diagnosis of rhizarthrosis. All patients wore a standard rigid orthosis for the thumb during night sleep. The participants were divided into three groups depending on the average duration of orthosis use at night: group 1 (n=13) - less than 4 hours, group 2 (n=12) - 4-6 hours, group 3 (n=13) - more than 6 hours. The main result was an assessment of the intensity of morning stiffness on a 10-point visual analog scale (VAS) after waking up. The secondary result was grip strength (in kg), measured using a dynamometer in the morning before removing the orthosis and after morning SARAH training. The assessments were carried out at the initial stage and after 4 weeks of using the orthosis.
Results. After 4 weeks, a significant negative correlation was found between the duration of wearing the orthosis and morning stiffness ($p= -0.72$, $p<0.01$). Group 3 (>6 hours) showed the most pronounced decrease in pain compared to VAS from 6 [5; 7] mm to 2 [1.4; 3] mm ($p<0.001$), ahead of groups 1 and 2 ($p<0.05$). The morning grip strength before removing the orthosis was significantly higher in group 3, 14.1 [11.3; 16.9] kg compared with group 1, 18.5 [15.3; 20.7] ($p<0.05$). After the exercises, grip strength was equal in all groups, but the dynamics of recovery was more pronounced in group 3.
Conclusions. Using an orthosis to rest at night for more than 6 hours leads to a statistically significant and clinically significant reduction in morning stiffness and an improvement in initial grip strength in patients with rhizarthrosis. To achieve optimal clinical effect, patients should be advised to wear the orthosis for at least 6 hours continuously during sleep. Further research is needed to establish the long-term effect of orthosis on disease progression.

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ANALYSIS OF DISEASE INCIDENCE, CLINICAL MANIFESTATIONS, AND ASSESSMENT OF TREATMENT EFFECTIVENESS IN PATIENTS WITH ANKYLOSING SPONDYLITIS IN KAZAKHSTAN

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Background/Purpose: To investigate the incidence rates and clinical manifestations of ankylosing spondylitis (AS), as well as to assess the effectiveness and safety of golimumab (GLM) in the treatment of patients in real-world clinical practice.

Methods: National epidemiological data from the Ministry of Health of the Republic of Kazakhstan covering the period 2014–2023 were analyzed, including official statistical yearbooks and the consolidated healthcare utilization reporting form (Form No. 12). Adult patients (≥18 years) with a confirmed diagnosis of ankylosing spondylitis (AS) according to the ASAS 2009 classification criteria who were receiving biologic therapy within the framework of the Guaranteed Volume of Free Medical Care were included in the analysis (Kazakhstan's state-funded healthcare program providing free access to essential medical services, including biologic therapies). Golimumab (GLM), a tumor necrosis factor-α (TNF-α) inhibitor, was prescribed following the decision of a multidisciplinary expert committee after comprehensive evaluation of patients' medical history, clinical manifestations, and laboratory and imaging findings. In the prospective cohort, 102 patients fulfilling the inclusion criteria and presenting with active disease were treated with GLM at a dose of 50 mg administered subcutaneously every 4 weeks for a period of 3 years. Treatment effectiveness was evaluated based on changes in disease activity assessed by the ASDAS, and the by BASDAI, and predefined clinical response criteria. Treatment safety, including combination therapy with conventional DMARDs, was assessed through systematic monitoring of adverse events (AEs).

Results: In 2014, the total number of patients with ankylosing spondylitis (AS) in Kazakhstan was 3,331, including 1,162 women. Over a 10-year period, the cumulative increase in AS prevalence across the country reached 64.7%. Male patients predominated (65.1%), consistent with established epidemiological patterns. In the study cohort, males accounted for 74.5% of patients, and individuals of Asian ethnicity comprised 66.7%. Disability related to AS was documented in 31.4% of patients, while 61.8% were employed or actively studying. Body mass index (BMI) was reduced in 5.9% of patients, normal in 50.0%, and increased in 44.1%. Smoking was reported by 55.9% of patients. The mean age at first visit was 39.3 ± 11.6 years (range 16–68 years). The median disease duration was 12 years [Q1; Q3: 7–19]. A proportion of patients had been followed by other specialists (neurologists, orthopedists), and the median diagnostic delay from symptom onset to AS diagnosis was 5 years [Q1; Q3: 2–9], ranging from 0 to 38 years. HLA-B27 positivity was detected in 79.4% of patients. High or very high disease activity was observed in 91.2%, and functional class II–IV was documented in 50.0%. Extra-axial clinical manifestations (peripheral arthritis, enthesitis, dactylitis) were present in 91.2% of patients, while extra-skeletal manifestations (uveitis, inflammatory bowel disease, psoriasis, nephropathy) were observed in 67.6%. Disease-related complications, including osteoporosis, vertebral compression fractures, and joint arthroplasty, were identified in 34.3% of patients. Comorbid conditions (arterial hypertension, diabetes mellitus, ischemic heart disease, gastropathy) were present in 59.8%. The median fecal calprotectin level was 39.1 μg/g [Q1; Q3: 23.6–73.4]. At baseline, 92.1% of patients were receiving NSAIDs, 73.5% conventional DMARDs (methotrexate, leflunomide, sulfasalazine), and 34.3% corticosteroids. Prior to registry inclusion, 24.5% of patients had been treated with biologic agents (adalimumab, infliximab, or golimumab), while 75.5% were biologic-naïve. The median baseline BASDAI score was 5.5 [Q1; Q3: 4.4–7.0], and the ASDAS-ESR was 3.2 [Q1; Q3: 2.8–3.5]. A significant reduction in disease activity was observed over the course of therapy ($p < 0.001$). During follow-up, 65.7% of patients achieved major clinical improvement (ASDAS decrease ≥2.0), and 25.5% achieved clinically important improvement (ASDAS decrease ≥1.1). Switching from golimumab to another biologic agent due to clinically insufficient response was required in 7.1% of patients. Golimumab was discontinued in two patients due to suspected pulmonary tuberculosis and in one patient due to suspected malignancy. An allergic reaction to golimumab was reported in one patient (0.9%).

Conclusion: Analysis of epidemiological indicators confirms that ankylosing spondylitis remains a significant healthcare burden in Kazakhstan, underscoring the need for increased clinical awareness, earlier diagnosis, and timely implementation of innovative therapeutic strategies.

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EFFECTIVENESS AND SAFETY OF UPADACITINIB IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Objectives: Upadacitinib (UPA) is a selective oral Janus kinase (JAK) inhibitor with a preferential inhibition of JAK1 over JAK2, JAK3, and TYK2.

Material and Methods: The study included 28 adult patients with active RA (DAS28-ESR >3.2) and an inadequate response (IR) to ≥1 conventional synthetic disease-modifying antirheumatic drug (csDMARD) (71% to methotrexate) and/or ≥1 biological or targeted synthetic DMARD (24% to TNF-α inhibitors). All patients received UPA at a dose of 15 mg once daily. Disease activity was assessed using composite indices (DAS28-ESR, SDAI, CDAI) at baseline and after 3, 6, and 12 months of therapy. Treatment response was evaluated according to EULAR criteria. All adverse events (AEs) were systematically recorded. Statistical analysis was performed using non-parametric tests (Wilcoxon signed-rank test for paired samples), with data presented as mean ± standard deviation or median.

Results: A statistically significant reduction in all disease activity indices was observed after 12 months of therapy ($p < 0.001$ for all comparisons to baseline). The median DAS28-ESR decreased from 5.1 to 2.2 [1.2; 3.3], SDAI from 27.5 to 7.6 [3.0; 10.9], and CDAI from 24.5 to 7.5 [3.0; 10.5]. According to the EULAR response criteria, clinical improvement was achieved in 86.7% of patients at 3 months, 76.9% at 6 months, 92.3% at 9 months, and 87.5% at 12 months (completer analysis). The proportion of patients achieving a good EULAR response increased from 53.3% (8 out of 15) at month 3 to 87.5% (7 out of 8) by month 12. The rate of low disease activity (CDAI ≤10) reached 75% (6 out of 8) among

completers at the 12-month visit. Adverse events were reported in 14% of patients (n=3). The most common AEs were mild upper respiratory tract infections. No serious adverse events, including major adverse cardiovascular events (MACE), venous thromboembolism (VTE), or deaths, were recorded during the observation period.

Conclusions: In this small real-world with active RA and prior inadequate response to therapy, upadacitinib at a dose of 15 mg once daily demonstrated significant and sustained clinical effectiveness, with a high rate of low disease activity achievement. The safety profile was favorable and consistent with data from pivotal clinical trials. The main limitations of this study are its small sample size, single-center design, and the absence of a control group. The obtained results support the effectiveness and acceptable tolerability of upadacitinib in routine clinical practice for managing complex RA cases.

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CLINICAL COURSE OF GOUT IN CANCER PATIENTS

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Objective: The management of gout in oncology patients is clinically challenging. Hyperuricemia can be both a pre-existing condition and a consequence of cancer or its treatment. Chemotherapy, radiation, and major surgery can enhance catabolism and tumor cell lysis, leading to increased uric acid (UA) production. This elevates the risk of acute gout flares and urate nephropathy, particularly in the context of tumor lysis syndrome. This study aimed to retrospectively analyze the onset and course of gout in patients with concomitant malignancies to optimize hyperuricemia management strategies in this population.

Material and Methods: A retrospective analysis was performed using medical records of 47 patients (24 men, 23 women) diagnosed with both gout and cancer, treated at a multidisciplinary center between 2021 and 2025. Inclusion criteria: age >18, verified gout diagnosis (by ACR/EULAR 2015 criteria or presence of tophi), active malignancy. We assessed: chronological relationship between gout and cancer onset, serum UA dynamics during cancer treatment, frequency of acute arthritis, and efficacy/adjustments of urate-lowering therapy (ULT). Descriptive statistics were applied.

Results:

1. Demographics and Cancer Types. Mean age: men 66±12 yrs, women 64±14 yrs. Predominant cancers: prostate cancer (PCa) in men (n=16; 66.7%), breast cancer (BCa) in women (n=7; 33.3%).
2. Gout Onset vs. Cancer Diagnosis. Gout preceded cancer diagnosis in 57% of PCa patients. All bladder cancer patients (n=4) had pre-existing gout. In Hodgkin's lymphoma and renal cell carcinoma patients, acute gout debuted during chemotherapy.
3. Hyperuricemia and Gout Course During Treatment. In PCa patients with previously controlled gout, serum UA increased by 21-85% after cancer diagnosis/surgery, necessitating ULT intensification in 65.7% (switch from allopurinol to febuxostat). Acute flares within the first post-operative month occurred in 61.7% of surgically treated patients. Target UA (<360 µmol/L) was difficult to achieve in metastatic PCa. Conversely, two bladder cancer patients achieved sustained normouricemia and could discontinue allopurinol after radical cystectomy.
4. Impact of Different Cancer Therapies. Chemotherapy was associated with high UA levels (>650 µmol/L) and new-onset acute arthritis. Hormonal therapy (aromatase inhibitors, tamoxifen for BCa) did not significantly worsen gout control. Targeted therapy in one case was associated with normouricemia. Radiation therapy showed no significant impact on flare frequency.
5. Specifics in Female Patients. Patients with thyroid cancer (n=3) had a persistent gout course with frequent flares that continued post-operatively despite ULT.

Discussion: Our findings align with known pathophysiology of hyperuricemia in cancer. Increased catabolism post-surgery and the cytolytic effect of chemotherapy are potent triggers for acute gout, even with baseline ULT. The variable response (worsening in PCa vs. improvement in bladder cancer) requires further study but may be related to surgery extent, renal function, and metabolic effects of hormonal therapy. The neutral impact of some targeted and hormonal therapies on UA levels is a favorable finding for comorbidity management.

Conclusions: The development of cancer, especially metastatic disease, is associated with a more severe gout course, frequently requiring ULT intensification. Chemotherapy and major surgeries are high-risk periods for acute gout flares, mandating proactive UA monitoring and management. The effect of anticancer treatment on UA levels and gout activity is heterogeneous and depends on tumor type, treatment modality (cytoreductive vs. hormonal/targeted), and likely baseline renal function.

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SHOULDER PAIN AFTER ACUTE SPINAL CORD INJURY: SYSTEMATIC REVIEW – PRELIMINARY RESULTS

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Objective: The aims of this study were (1) to review the literature on shoulder pain in individuals with acute SCI (2) to summarise prior research regarding shoulder pain during rehabilitation treatment.

Material and Methods: A systematic literature search was conducted in MEDLINE (Ovid), CINAHL (EBSCOhost), Cochrane Library, Pedro and EMBASE. The literature was searched from the earliest record until April 2025. Inclusion criteria: Adults with acute (<1 year) SCI; shoulder pain as outcome measure; full-text articles published in English. Excluded criteria: participants with other conditions or where the data from the SCI participants could be extracted. Studies was not excluded on the basis of quality or methodological rigour. Titles and abstracts were screened by two reviewers and then the full text of relevant articles were similarly screened using Covidence systematic review software. Data of included studies was extracted into an excel spreadsheet and the quality was assessed.

Results: 14 studies were included (totalling 2510 participants), one clinical trial, 4 observational study, 9 prospective or retrospective. Four studies came from the same research programme; two studies from one multicentral rehabilitation programme. Studies have shown that shoulder pain is a common condition in patients with spinal cord injury, even in the acute phase. Shoulder pain was more prevalent in those with tetraplegia. Rehabilitation programs in the acute phase can be effective

in the early identification and management of shoulder pain. However, due to its multifactorial causes, a consistent treatment protocol has not been observed. Studies have used various methods to assess pain, such as asking about the presence of pain; pain rating scales; or the use of validated questionnaires.
Conclusion: . Although there is consensus that shoulder pain is a common condition in patients with spinal cord injury and a rehabilitation programme is necessary, the evidence remain insufficient to consistently assess its cause, prevention, or treatment.

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ASSOCIATION OF MALNUTRITION SCORES WITH OSTEOSARCOPENIA IN MIDDLE-AGED AND OLDER ADULTS: A CROSS-SECTIONAL STUDY

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Objectives: The aim of this study was to explore the association of malnutrition indices, such as the geriatric nutritional risk index (GNRI) and the controlling nutritional status (CONUT) scores, with osteosarcopenia.
Methods: In this cross-sectional study, we used data from the National Health and Nutrition Examination Survey cycles 2011-2014. Participants were aged 50-85 years and osteosarcopenia was defined according to established criteria [(diagnosis of osteoporosis or osteopenia and low handgrip strength (HGS)]. Multivariable logistic regression models, adjusted for age, sex, race, education, body mass index, comorbidities, physical activity, and protein intake, were used to examine associations of GNRI (<98 vs. ≥98) and CONUT (≥2 vs. 0-1) with markers of osteosarcopenia. Linear regression was used to investigate the bidirectional association of osteosarcopenia markers with malnutrition, continuously.
Results: Among 2733 adults (58.3 ± 11.8 years; 1372 men/1361 women), a lower GNRI score was associated with higher odds (OR) of osteopenia and low HGS [3.98, 95% confidence interval (CI) 1.47 – 10.74, p = 0.01] and osteoporosis and low HGS (3.11, 95%CI 1.40 – 6.90, p < 0.01), a relationship driven by low HGS (3.06, 95%CI 1.38 – 6.78, p < 0.01). No associations were observed with higher CONUT (p>0.05). These were translated into linear associations of low HGS (b = 1.61, p = 0.02) and osteopenia and low HGS (b = 1.73, p = 0.02), but not osteoporosis and low HGS (b = 1.91, p = 0.05) with higher GNRI. Similar OR were observed in adults >65 years in relation to lower GNRI with low HGS (2.35, 95%CI 1.04 – 5.31, p = 0.04), osteopenia and low HGS (3.39, 95%CI 1.36 – 8.45, p = 0.01), osteoporosis and low HGS (2.72, 95%CI 1.00 – 7.40, p = 0.05).
Conclusions: Lower GNRI, but not higher CONUT score, is strongly associated with osteosarcopenia measures in middle-aged-to-older adults. These results may support nutritional interventions to mitigate musculoskeletal decline.

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IMPACT OF DIGITAL PATIENT-REPORTED OUTCOME MONITORING ON TREATMENT ADHERENCE AND DISEASE ACTIVITY CONTROL IN RHEUMATOID ARTHRITIS IN THE REPUBLIC OF TAJIKISTAN

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Objective: To evaluate the impact of regular digital monitoring of patient-reported outcomes (PROs) on treatment adherence and disease activity control in patients with rheumatoid arthritis (RA), and to correlate patient engagement in digital monitoring with clinical treatment outcomes.
Methods: A prospective observational study included 500 RA patients under follow-up in rheumatology departments of the Republic of Tajikistan. The mean age was 52.6 ± 11.4 years; 78% were women, and the mean disease duration was 6.8 ± 4.9 years. A Telegram bot was used for remote monitoring, allowing patients to self-assess pain, fatigue, functional limitations, psycho-emotional state, and treatment satisfaction on a weekly basis. Treatment adherence was indirectly assessed based on the regularity of PRO submissions, self-reported compliance with medical prescriptions, and stability of parameters between visits. Disease activity was assessed during in-person visits at baseline and after 6 months of follow-up using the DAS28 index. Patients were stratified based on their level of engagement in digital monitoring (regular vs. irregular PRO submissions).
Results: Regular use of digital PRO monitoring was recorded in 72% of patients, including those residing in rural areas. By the second visit, patients with regular PRO submissions showed an average reduction in DAS28 score of −1.6 ± 0.8, while those with irregular monitoring showed a reduction of −1.1 ± 0.7. Remission or low disease activity according to DAS28 was achieved in 45% of highly engaged patients and 31% of those with low engagement. Patients actively using the Telegram bot demonstrated greater improvement in PROs, including pain and functional limitations, along with less variability in subjective symptoms between visits. In contrast, irregular PRO submission was associated with a higher likelihood of persistent moderate or high RA activity and unstable subjective symptom dynamics.
Conclusion: Regular digital monitoring of PRO is associated with higher treatment adherence and better control of RA activity. The use of digital PROs enhances patient engagement in the treatment process and improves clinical outcomes, supporting the feasibility of integrating digital monitoring tools into routine RA management practice.

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PATIENT-REPORTED OUTCOMES AS A MEDIATOR BETWEEN ANTIRHEUMATIC THERAPY AND CLINICAL OUTCOMES IN RHEUMATOID ARTHRITIS: DIGITAL MONITORING DATA FROM THE REPUBLIC OF TAJIKISTAN

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Objective: To assess the role of patient-reported outcomes (PROs) as a mediator between administered antirheumatic therapy and changes in disease activity in patients with rheumatoid arthritis (RA).

Methods: A prospective observational study included 500 RA patients under follow-up in rheumatology departments of the Republic of Tajikistan. The mean age was 52.6 ± 11.4 years, 78% were women, and the mean disease duration was 6.8 ± 4.9 years. A Telegram bot was used for remote patient monitoring, enabling regular collection of PROs (pain, fatigue, functional limitations, psycho-emotional state, treatment satisfaction) between physician visits. RA activity was assessed during in-person visits at baseline and after 6 months of follow-up using the DAS28 and CDAI indices. A correlation analysis was performed to examine the relationship between changes in PROs and the dynamics of disease activity indices, and a mediation analysis was conducted to evaluate the influence of PROs on the efficacy of RA therapy.

Results: Higher baseline disease activity according to DAS28 was associated with worse PRO scores. Changes in PROs recorded via digital monitoring demonstrated a moderate correlation with the dynamics of DAS28 (r = 0.61) and CDAI (r = 0.57). In some patients, PRO improvement was recorded earlier than a clinically significant decrease in disease activity indices at the follow-up visit.

Mediation analysis revealed that PRO improvement accounted for a significant portion of the therapy's effect on reducing RA activity: up to 40% of the overall treatment effect on DAS28 dynamics was mediated through improvement in PROs. In patients with an insufficient response to therapy, unfavorable PRO dynamics persisted despite reductions in laboratory and clinical activity markers.

Conclusion: PROs play a significant mediating role between antirheumatic therapy and clinical outcomes in RA patients. Digital monitoring of PROs enables the detection of changes in patient status that are not fully captured by standard clinico-laboratory disease activity indices, thereby complementing traditional approaches to therapy efficacy assessment. Integrating PROs in a digital format into routine RA monitoring practice enhances the accuracy of treatment response evaluation and improves the patient-centered focus of clinical management.

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MEAN ARTERIAL PRESSURE IS A NOVEL VASCULAR MARKER OF OSTEOPENIA AND OSTEOPOROSIS IN PATIENTS WITH TYPE 2 DIABETES

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Objectives

Mean arterial pressure (MAP) is a vascular marker which indicates the average pressure in arteries during a complete heartbeat cycle. It reflects overall cardiovascular health. Given the shared biological mechanisms underlying hypertension and osteoporosis such as diabetes, inflammation, oxidative stress and increased angiotensin, we investigated the relationship between MAP with osteopenia and osteoporosis.

Materials and Methods

This cross-sectional study was conducted on 95 patients with type 2 diabetes (T2D). MAP was calculated as systolic blood pressure [(SBP) + 2 x diastolic blood pressure (DBP)]/3. We used dual-energy x-ray absorptiometry (DEXA) to derive T-score. Osteopenia was defined as T-score between -1.0 and -2.5. Osteoporosis was defined as T-score < -2.5. Logistic and linear regressions were used to examine the relationship between MAP with binary outcome (osteopenia and osteoporosis) and continuous outcome (DEXA T-score) respectively, adjusting for demographics, clinical variables, medications and physical activity.

Results

The mean age was 59.6 (SD 11.9) years. The mean MAP was 97.0 (SD 10.2). The prevalence of osteopenia and osteoporosis was 54.7% (49.4% osteopenia, 10.5% osteoporosis). Compared to Tertile 1, Tertile 3 MAP was associated with higher odds of osteopenia and osteoporosis with OR 4.79 (95%CI 1.63,14.06; p=0.004) in crude analysis. In the fully adjusted analysis, the association persisted with OR 5.79 (95%CI 1.30, 25.80; p=0.021). On the contrary, SBP and DBP were not associated with osteopenia and osteoporosis. Tertile 3 MAP was also associated with lower DEXA T-score in crude (coefficient -0.84, 95%CI -1.48, -0.19; p=0.011) and fully adjusted (coefficient -0.99, 95%CI -1.74, -0.25; p=0.010) analyses.

Conclusions

There was a non-trivial prevalence of osteopenia in patients with T2D. Higher MAP was independently associated with osteopenia and osteoporosis. The findings suggest that the combined effect of SBP and DBP was more pronounced in osteopenia and osteoporosis than either component alone. Further studies are needed to elucidate the underlying pathophysiological mechanism.

Acknowledgements

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P889

QUANTITATIVE ASSESSMENT OF EFFUSION-SYNOVITIS IN KNEE OSTEOARTHRITIS AND COMPARISON WITH GOLD-STANDARD RADIOLOGICAL READINGS

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Objectives To quantify effusion-synovitis (ES) volume using MRI and fully automated AI-based technology, and to compare measurements between knees classified as having effusion vs. without effusion based on expert semi-quantitative (sq) MRI readings.

Methods In this preliminary analysis, ES was graded by expert MOAKS readings (grades 0–3) in 168 knees (66% female; age 63±9 y; BMI 31±5.0 kg/m²) from the OA Initiative. ES volume (mm³) was determined using an in-house convolutional neural network (CNN)-based segmentation algorithm applied to axial reformatted DESS MRI. The model was trained using 395 knees with semiautomated, quality-controlled segmentation (214 grade 0, 181 grades 1-3). Owing to limited numbers of higher grades in the test set, comparison was restricted to effusion presence (MOAKS grades 0 vs. 1–3). Group differences were assessed using independent-samples t-tests and effect sizes using Cohen's d with 95% confidence intervals.

Results Of the 168 knees in the test, 114 had effusion and 54 did not based on expert sq readings. ES volume tended to be greater in knees with effusion compared to those without, with an effect size (Cohen's d) of 0.30 (95% CI −0.02 to 0.63).

Conclusions These preliminary results suggest that differences in expert semi-quantitative ES MOAKS scores (presence and absence of ES) are reflected in quantitative ES volumes derived from fully automated segmentation. Visual inspection revealed instances of oversegmentation by the CNN algorithm, and measures will be implemented to further improve technical accuracy. Additional analyses using larger datasets will enable comparisons across individual MOAKS effusion grades and evaluation of automated ES measures against external benchmarks, such as osteoarthritis progression and Hoffa synovitis, to allow greater analytic granularity and assess their relative clinical performance (Eckstein et al., same conference).

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P890

PRACTICE PATTERNS AND PERCEPTIONS IN AVASCULAR NECROSIS (AVN) MANAGEMENT: A NATIONWIDE SURVEY AMONG INDIAN ORTHOPAEDICIANS

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Background: Avascular Necrosis (AVN) is a progressive bone disorder often culminating in joint collapse and disability. Post-COVID-19, anecdotal reports suggested a surge in AVN cases, warranting systematic evaluation of perceptions and management strategies among Indian Orthopaedicians.

Objective: To assess current clinical perspectives on AVN etiology, post-pandemic trends, therapeutic and surgical preferences across disease stages.

Methods: A structured questionnaire comprising 18 items was disseminated to Orthopaedicians nationwide (N=625). Responses were analyzed descriptively to identify common trends in etiology, treatment awareness, and management patterns for early (Ficat 0–II) and advanced (Ficat III-IV) AVN.

Results: Corticosteroid exposure was perceived as the leading cause of AVN (47.2%), followed by trauma (24.5%) and chronic alcoholism (11.8%). A majority (81.4%) reported that the post-COVID spike in AVN cases persists, attributing it primarily to corticosteroid use (61.4%). Bilateral hip involvement was most frequently encountered (54.9%). For early-stage AVN, 83.4% were aware of pharmacological management; bisphosphonates were considered the most effective drug class (56.5%). Clinical improvement was expected within 4–12 weeks (57.1%), with a typical treatment horizon of two years (51.2%) with bisphosphonates. Notably, 58.7% favored medical therapy over surgical decompression, and 59.0% perceived its success rate as superior to biological therapy in early stages. In advanced AVN, Ficat stage III, core decompression combined with stem-cell therapy was preferred (39.0%), followed by osteoblast implantation (20.2%), and for Ficat stage IV, total hip replacement (THR) (19.2%). Post-THR, sitting on the floor was the most restricted activity (33.3%). Implant longevity was estimated at 15–20 years by 56.6% of respondents. Adjunctive strategies when bisphosphonates were deemed marginal included physical therapy (62.4%), calcium/vitamin D supplementation (58.4%), and combination bisphosphonate regimens (57.4%). Gentle range-of-motion exercises (63.7%) and non-weight-bearing activities (59.7%) were widely recommended.

Conclusion: Corticosteroid use remains the predominant perceived driver of AVN, which has attributed to the post-COVID AVN surge. Awareness of medical management in early AVN, especially with bisphosphonate regimens, is strong among the doctors, who generally expect clinical benefit within 4–12 weeks and practice a management horizon of ~2 years. These findings underscore the need for evidence-based guidelines on steroid stewardship, pharmacologic optimization, and rehabilitation protocols.

P891

DENOSUMAB DEMONSTRATES EFFECTIVENESS IN PREVENTING FEMORAL HEAD COLLAPSE FOLLOWING NON-TRAUMATIC OSTEONECROSIS

K. Sukhonthamarn[1], N. Niyomrattanakit[1], W. Tangphromphan[1], W. Kosuwon[1]

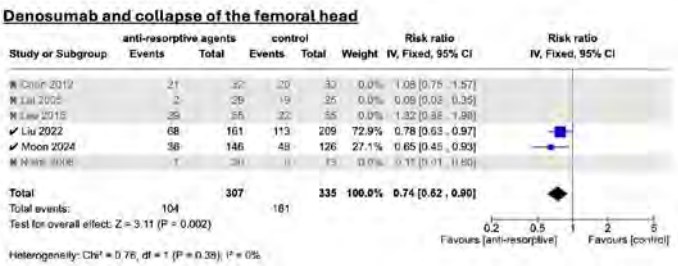
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Introduction: The use of traditional anti-resorptive agents, such as bisphosphonates, to prevent femoral head collapse in atraumatic osteonecrosis of the femoral head (ONFH) has yielded inconclusive results. Denosumab, a potent RANKL inhibitor, has shown superior efficacy in increasing bone mineral density and reducing fracture risk. This systematic review and meta-analysis aimed to evaluate the efficacy of denosumab and other anti-resorptive agents in preventing femoral head collapse and improving functional outcomes.

Materials and Methods: A comprehensive search was performed across PubMed, CENTRAL, and Scopus for studies published through November 2025. Primary outcomes included the rate of femoral head collapse and conversion to total hip replacement (THR). Secondary outcomes included functional scores (Harris Hip Score [HHS] and WOMAC). Heterogeneity was assessed using I^2 and chi-square statistics; a random-effects model was applied if $I^2 > 50\%$

Results: Six studies (904 hips) were included for analysis from an initial 238 records. Interventions included alendronate (n=3), zoledronate (n=1), and denosumab (n=2). Initially, pooled results for all anti-resorptive agents showed no statistically significant difference in collapse prevention compared to controls. However, sensitivity analysis specifically for denosumab demonstrated a significant reduction in femoral head collapse (Risk Ratio [RR] = 0.74; 95% CI: 0.62–0.90; p=0.002; I^2=0%). No significant difference was observed in THR conversion rates across the anti-resorptive groups. While functional scores (HHS and WOMAC) favored anti-resorptive treatment, the results did not reach statistical significance.

Conclusion: This meta-analysis supports the efficacy of denosumab in reducing the incidence of femoral head collapse in patients with non-traumatic ONFH, whereas results for traditional bisphosphonates remain inconsistent. Further large-scale, randomized controlled trials are warranted to confirm the long-term clinical benefits of high-potency anti-resorptive agents in this population.



P892

FACTORS ASSOCIATED WITH FALL-INDUCED HIP FRACTURES IN ELDERLY PATIENTS

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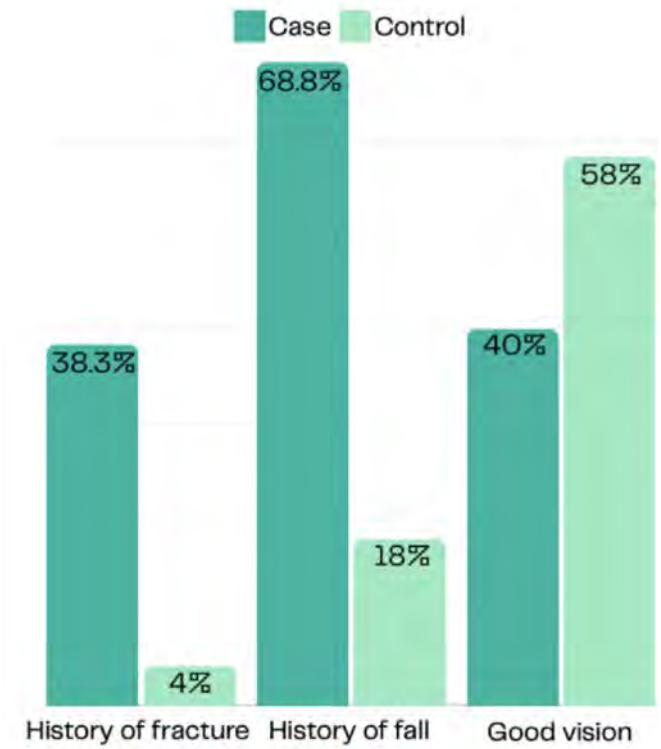
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Background and Objectives: Fall-induced hip fractures in the elderly significantly impair quality of life and are associated with high mortality rates. Identifying and managing modifiable risk factors are critical steps in fracture prevention. This study aims to evaluate the correlation between potential predictors of falls and the incidence of hip fractures among elderly patients at a university-based tertiary care center.

Methods: A case-control study was conducted involving 180 subjects, including elderly patients with fall-induced hip fractures and age-matched controls. Data were collected using standardized questionnaires. Statistical analysis was performed using Fisher's exact test and Chi-square tests to determine associations between clinical variables and fracture occurrence.

Results: The study achieved a response rate of 90.91% (180/198). Analysis revealed that an increased frequency of falls and hip fractures was most strongly associated with a **history of fracture within the past year** and a **history of falls within the past year**. Conversely, **preserved visual acuity** was identified as a significant protective factor against both falls and subsequent hip fractures. Other assessed risk factors did not demonstrate a statistically significant association with the outcomes in this cohort.

Conclusion: In the elderly population, a history of falls or fractures within the previous year serves as a primary predictor for hip fracture risk. Furthermore, good vision is a key protective factor. Targeted screening of fall history and regular visual assessments should be integrated into geriatric fall-prevention programs to reduce the incidence of hip fractures.



P893

DEEP LEARNING BASED OPPORTUNISTIC OSTEOPOROSIS SCREENING ON CHEST RADIOGRAPHS WITH UNCERTAINTY AND CALIBRATION

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Objective: To evaluate the performance of AI-based opportunistic osteoporosis (OP) screening with predictive uncertainty and calibration in heterogeneous clinical environments.
Material and Methods: Two AI-based screening models were developed using chest radiographs (CXRs): a model distinguishing non-OP from OP (Model M1), and the other model classifying normal, osteopenia (OPe), and OP (Model M2). These models were trained on CXRs from a tertiary hospital (Hospital A; N, Ope %, OP %; 62,420, 34.82, 5.85, respectively). Internal (A; 15,357, 34.42, 6.21, respectively), and external 1 from a secondary hospital (Hospital B; 3,338, 34.90, 8.78, respectively) in South Korea, and external 2 validation from a global platform in America (Hospital Cs; 1,026, 53.31, 19.49, respectively) were performed. To enable fair comparison, performance was evaluated using the area under the receiver operating characteristic curves (AUCs) and the area under the precision-recall curves (AUPRCs) for screening OP. Uncertainty estimation was conducted using the Laplace approximation, and calibration was assessed using expected calibration error (ECE).
Results: Both models achieved identical AUCs of 0.96 and 0.92 in A and B, respectively. In Cs, M1 demonstrated a significantly higher AUC than M2 (0.84 vs. 0.81; DeLong $p = 0.01$). Despite comparable AUC performance, M2 consistently achieved higher AUPRC across all cohorts (0.73, 0.53, and 0.61) than M1 (0.70, 0.52, and 0.60). In addition, M2 exhibited higher uncertainty across internal, external, and global validations (48.83 ± 17.36%, 48.86 ± 18.05%, and 57.41 ± 22.03%) compared with M1 (40.77 ± 12.32%, 43.34 ± 20.57%, and 49.89 ± 22.77%), respectively (Wilcoxon $p < 0.01$). Despite this increased uncertainty, M2 demonstrated superior calibration with lower ECE values in Hospitals A and B (2.83% and 3.70%) than M1 (6.71% and 7.01%), respectively. However, under a strong domain shift in Cs, the ECE of M2's degraded substantially (23.40%), whereas M1 remained relatively stable (6.15%).
Conclusion: Both models demonstrated comparable performance across cohorts for opportunistic OP screening; however, M2 showed improved performance under class imbalance and more conservative behavior in ambiguous cases, as reflected by higher predictive uncertainty and better calibration.

P894

IMPACT OF PROJECTION VIEWS (PA VS. AP) ON AI-BASED OSTEOPOROSIS SCREENING USING CHEST RADIOGRAPHS

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Objective: To evaluate the diagnostic performance of an AI-based osteoporosis screening model using chest radiographs (CXRs), with a specific focus on performance differences between posterior–anterior (PA) and anterior–posterior (AP) views in a real-world clinical setting.
Materials and Methods: This retrospective study included CXRs from 969 patients acquired at a specialized musculoskeletal hospital in Seoul between July 2021 and December 2024. The dataset comprised 555 PA images (osteoporosis prevalence 31.35%, female 68.83%, age 69.55 ± 10.04 years) and 414 AP images (prevalence 50.00%, female 71.01%, age 73.87 ± 12.17 years). All CXRs were paired with dual-energy X-ray absorptiometry (DXA) results obtained within a 3-month interval. An AI model originally trained using PA CXRs was evaluated without retraining. Diagnostic performance was assessed using AUROC, sensitivity, specificity, accuracy, and F1-score.
Results: The model demonstrated higher diagnostic performance on PA images than on AP images. For PA views, the AUROC was 0.8618, with a sensitivity of 91.95% and a specificity of 56.69%. For AP views, the AUROC was 0.7480, with a sensitivity of 56.04% and a specificity of 78.74%. Overall accuracy was comparable between PA and AP views (67.75% vs. 67.39%), and the F1-score showed only a modest difference (PA: 0.6413; AP: 0.6321).
Conclusion: An AI-based osteoporosis screening model trained on PA chest radiographs demonstrated robust performance in standard PA imaging and preserved clinically meaningful diagnostic capability when externally validated on AP views. These findings support the feasibility of opportunistic osteoporosis screening using CXRs in heterogeneous real-world settings. Incorporating AP-specific training or calibration strategies may further enhance performance and facilitate broader clinical deployment across diverse acquisition protocols.

P895

EARLY-ONSET HYPOPARATHYROIDISM IN OSTEOPENIC RODENT MODELS ASSOCIATED WITH BILATERAL HYDRONEPHROSIS AND SPONTANEOUS HYPERTENSION

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Enlargement of the pelvicalyceal structures, as observed in bilateral hydronephrosis, leads to damage to renal tubular cells, thereby impairing calcium and bone metabolism. In addition, chronically elevated blood pressure, as seen in essential hypertension, is associated with microvascular damage in various organs, including the renal parenchyma, and induces systemic inflammation, which in turn interferes with bone remodeling. Herein, we investigated dysregulation of calciotropic hormones in two inherited rodent models, namely ICR/Mlac-*hydro* mice (Hydro) and spontaneously hypertensive rats (SHR). The results showed that both young Hydro mice and SHR (age ≤3 months) exhibited reductions in femoral maximum load, yield load, and stiffness, as determined by a three-point bending test. Using synchrotron radiation Fourier-transform infrared (SR-FTIR) spectroscopy, osteopenia and impaired mechanical properties were found to be associated with alterations in the organic composition of bone tissue. Meanwhile, circulating levels of intact parathyroid hormone (iPTH) in young Hydro mice and SHR were markedly

lower than those in age-matched wild-type rodents, suggesting that early-onset hypoparathyroidism contributes to impaired bone metabolism. Further longitudinal studies revealed that reduced iPTH levels persisted into advanced ages. In conclusion, unlike many osteoporotic rodent models characterized by secondary hyperparathyroidism, Hydro mice and SHR exhibit early-onset hypoparathyroidism, which may explain how bilateral hydronephrosis and hypertension aggravate bone loss, leading to osteopenia and an increased risk of fracture. This project was approved by the Mahidol University Institutional Animal Care and Use Committee.

P896

THE CILIA-WNT AXIS AS A THERAPEUTIC TARGET FOR SOX9 MRNA-LNP IN OSTEOARTHRITIS

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Background: Osteoarthritis (OA) is the most prevalent joint disease, imposing a substantial burden on healthcare systems; however, no approved disease-modifying OA drugs (DMOADs) currently exist to halt structural progression. Current guidelines largely prioritize pain relief, and while numerous compounds have been tested, reproducible structure-modifying efficacy remains elusive. Consequently, therapeutic strategies are shifting toward enhancing endogenous cartilage regeneration. SRY-box transcription factor 9 (Sox9) is identified as the master regulator of chondrogenesis, essential for driving hyaline matrix synthesis (e.g., COL2A1, ACAN) and stabilizing the chondrocyte phenotype by restraining hypertrophic drift and counteracting RUNX2 signaling. Although viral vectors delivering Sox9 have demonstrated potential in cartilage repair, clinical translation is hindered by safety concerns and delivery challenges. Therefore, developing an effective non-viral delivery system, such as lipid nanoparticles (LNPs), to transiently but potently augment Sox9 signaling represents a promising approach to re-establish chondrocyte homeostasis.
Objective: This study aimed to investigate the therapeutic efficacy and underlying molecular mechanisms of intra-articular delivery of Sox9 mRNA encapsulated in lipid nanoparticles (LNPs) in a rat surgical OA model.
Methods: Sox9 mRNA was synthesized and encapsulated into LNPs using a microfluidic system. The physicochemical properties were characterized by dynamic light scattering, scanning electron microscopy, and FT-IR. In vitro validation was performed using IL-1β-stimulated chondrocytes. For in vivo evaluation, a rat anterior cruciate ligament transection with partial medial meniscectomy (ACLT+pMMx) model was established. Rats received intra-articular injections of Sox9 mRNA-LNPs, Lorecivivint (positive control), or PBS. Therapeutic outcomes were assessed via weight-bearing index, micro-CT, and histological scoring. Additionally, bulk RNA sequencing of articular cartilages was conducted to elucidate transcriptomic alterations and chondrocyte subpopulation shifts.
Results: Sox9 mRNA-LNPs exhibited stable physicochemical properties and robustly induced Sox9 protein expression in vitro. In vivo, intra-articular administration of Sox9 mRNA-LNPs significantly attenuated pain behavior and preserved articular cartilage structure compared to the PBS-treated group, demonstrating therapeutic efficacy comparable to that of Lorecivivint. Immunofluorescence confirmed enhanced Sox9 and suppressed MMP13 expression within the cartilage. Transcriptomic profiling revealed that Sox9 treatment enriched pathways associated with cilium movement and cytosolic calcium regulation, while concurrently suppressing pathological Wnt signaling. Furthermore, deconvolution analysis demonstrated that Sox9 therapy restored the cellular landscape by increasing the fractions of regulatory and proliferative chondrocytes while reducing the effector chondrocyte subpopulation compared to OA controls.
Conclusion: Intra-articular delivery of Sox9 mRNA-LNPs effectively retards OA progression and provides pain relief. Mechanistically, this therapeutic effect is mediated by enhancing cilium movement and suppressing pathological Wnt signaling, which in turn restores the anabolic balance and modulates chondrocyte subpopulations toward a regenerative phenotype.
Keywords: Osteoarthritis; Sox9; Lipid nanoparticles; mRNA therapy; Cilia; Wnt signaling

P897

FAHR SYNDOM IN A PATIENT WITH 25(OH) VITAMIN D DEFICIENCY

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Introduction. Fahr syndrome (FS) is a rare neurodegenerative disorder characterized by bilateral, symmetrical calcification of the basal ganglia, resulting in a wide range of progressive motor and cognitive impairments. FS is most often associated with dysregulation of phosphocalcic metabolism.
Results. A 54 year old female presented for evaluation of basal ganglia calcification. Specific to FS computed tomography (CT) changes visualized in 2018 due to migraine attack: headache attacks with no aura first started in her early 30's. Laboratory studies: total serum calcium 2.12 mmol/l (RR: 2.15-2.55), 25(OH)VitD 10 ng/ml (RR: 30.0-100.0) and PTH 90 pg/ml (RR: 15.0-65.0) – suggesting secondary hyperparathyroidism. After a 3-month treatment with loading dose of cholecalciferol, the level of 25(OH)VitD increased to 36 ng/ml with total calcium of 2.22 mmol/l and PTH 52 pg/ml. Bone densitometry was performed: BMD of the lumbar spine of -0.4, total hip -1.9, femoral neck -1.2 by a Z-score. In 2023 the episode of vision loss occurred. No evidence of post-ischemic changes were identified using MRI, the detected alterations in the subcorctical nuclei bilaterally and in both cerebellar hemispheres at the level of dentate nuclei most likely to be attributed to a neurodegenerative disease, such as Fahr syndrome. Due to a long period of cholecalciferol 20.000 IU treatment there was a high level of PTH again up until 93 pg/ml with hypocalcaemia (total calcium 2.08 mmol/l) and magnesium level of 0.82 mmol/l (RR: 0.70-1.05), 25(OH)VitD – 44.7 ng/ml. Ditamin D metabolite profile defined 25-OH-D2 deficiency (<0.5 ng/ml (20.0-60.0)) with normal levels of all of the other 25(OH)VitD forms. The patient received different doses of calcium citrate: from 260 to 760 mg per day. Despite that hypocalcaemia persisted (calcium corrected for albumin 2.06 mmol/l) with PTH level of 68 ng/ml. Either way, the bone density at the level of the spine improved by 2.0% (-0.2 by a Z-score).
Conclusion. FS is most commonly caused by hypoparathyroidism or pseudohypoparathyroidism, with an estimated prevalence of approximately 1:1,000,000. In our clinical case, FS developed in the setting of secondary hyperparathyroidism, a finding that warrants consideration in the differential diagnosis of neurodegenerative disorders.

P898

ATTITUDES TOWARD OPPORTUNISTIC AI SCREENING FOR OSTEOPOROSIS VIA CHEST RADIOGRAPHS: A QUALITATIVE STUDY

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OBJECTIVE(S): To explore patient acceptance, trust, and perceived value of AI-generated bone health reports derived from routine chest radiographs, comparing experiences between patients with and without prior DEXA scanning.

MATERIAL AND METHODS: Two 90-minute moderated focus groups were conducted at a specialized osteoporosis clinic (median participant age ~66). One group included patients who had previously undergone DEXA scans, and the other included patients without DEXA experience. All participants reviewed sample AI-generated Analysis Reports. Sessions were audio-recorded, transcribed, and analyzed using NVivo software with thematic coding, coding matrices, and word frequency queries.

RESULTS: Four core themes were consistent across both groups: (1) conditional trust in AI, which improved with physician involvement; (2) desire for greater clarity and context in AI-generated reports, particularly numeric values and comparisons; (3) limited willingness to pay unless tools were endorsed by physicians or covered by insurance; and (4) the importance of physician oversight to aid understanding and decision-making. Notably, participants without prior DEXA experience expressed stronger skepticism toward AI's commercial motives and raised ethical concerns regarding data use and corporate benefit.

CONCLUSION(S): While patients in both groups expressed openness to AI-based tools for bone health, they emphasized the need for clear communication, physician involvement, and transparency in purpose. Ethical concerns, especially from non-DEXA participants, highlight the need to frame AI tools as patient-centered and clinically integrated.

DISCLOSURES: Stuart Silverman, M.D. is a consultant to Promedius. This study was funded by Promedius Inc., which had no role in data analysis or interpretation.

P899

ADVANCED HAEMOPHILIC ARTHROPATHY: IMAGING SEVERITY AND THERAPEUTIC INTERVENTIONS IN A TERTIARY HOSPITAL

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Background: Patients with haemophilia A and B (HA/HB) frequently experience hemarthrosis, leading to progressive joint damage and haemophilic arthropathy. This condition evolves through different stages and may require specific interventions such as synoviorthesis or arthroplasty in advanced cases.
Objectives: To analyse imaging findings in patients with haemophilic arthropathy and to evaluate the association between haemophilia type and severity and the need for synoviorthesis or arthroplasty.
Methods: A retrospective descriptive study was conducted in patients with HA/HB and hemarthrosis between 2010 and 2024. Haemophilia severity was classified as moderate or severe based on clotting factor activity. Arthropathy was assessed using the Arnold and Hilgartner radiological scale (AHRS). Ultrasound (US), magnetic resonance imaging (MRI) and computed tomography (CT) were analysed for hemarthrosis, synovial hypertrophy and structural damage. Associations were evaluated using the chi-square test.
Results: 95 patients were included. The knee was the most frequently affected joint (51.6%), followed by the ankle (25.3%) and elbow (17.9%). AHRS assessment was available in 92 patients, with 50% presenting scores ≥3. MRI was the most commonly used imaging modality (65.3%), frequently showing advanced structural alterations. Synoviorthesis was performed in 22 patients (23.2%), predominantly in HA. A significant association was observed between severe HA and synoviorthesis requirement (p=0.044). Arthroplasty was performed in 13 patients (13.7%), mainly involving the knee, with no significant association with haemophilia type or severity.
Conclusion: Haemophilic arthropathy frequently affects the knee and often presents with advanced structural damage. Severe HA is associated with a higher need for synoviorthesis, likely due to increased hemarthrosis frequency. Early diagnosis and optimised management are essential to improve outcomes in these patients.

CATEGORIES	CHARACTERISTICS (N=95)
HAEMOPHILIA N(%)	Haemophilia A: 81 (85.3%) Haemophilia B: 14 (14.7%)
SEX N(%)	Men 94 (98.9%) Female/carrier 1 (1.1%)
AGE, MEAN ± SD	36 ± 16.5
SEVERITY N(%) HAEMOPHILIA A HAEMOPHILIA B	 Moderate: 28 (35%) Severe: 52 (65%) Moderate: 2 (14.3%) Severe: 12 (85.7%)
TARGET JOINT N(%)	Knee: 49 (51.6%) Ankle: 24 (25.3%) Elbow: 17 (17.9%) Ankle + elbow: 1 (1.1%) Other: 4 (4.2%)
AHRS, N (%), PERCENTILES	92 (96,84%), 3 without image test P25 (1) P50 (3) P75 (4)
US N(%)	28 (29,5%) 1. Normal: 7 (25%) 2. Hypertrophy: 2 (3.6%) 3. Hemarthrosis: 11 (39.3%) 4. Structural alteration: 5 (17.9%) 5. (2 + 3): 3 (10,7%) 6. (3 + 4): 1 (3,6%)
MRI N(%)	62 (65,3%) 1. Normal: 5 (8.1%) 2. Hypertrophy: 3 (4.8%) 3. Hemarthrosis: 7 (11.3%) 4. Structural alteration: 43 (69.4%) 5. (2 + 3): 1 (1,6%) 6. (3 + 4): 3 (4,8%)
CT N(%)	13 (13,7%) 1. Normal: 3 (23.1%) 2. Hypertrophy: 0 (0%) 3. Hemarthrosis: 2 (15.4%) 4. Structural alteration: 7 (53.8%) 5. (2 + 3): 0 (0%) 6. (3 + 4): 1 (7,7%)
SINOVIORTHESIS N(%)	22 (23,2%) → 30 Synoviorthesis: Knee: 11 Ankle: 12 Elbow: 7 →Isotope: Rhenium-186: 10 (47.6%) Yttrium-90: 8 (38.1%) Rhenium-186 + Yttrium-90: 3 (14.3%)
ARTHROPLASTY N(%)	13 (13,7%) → 15 arthroplasties: Knee: 12 Ankle: 1 Hip: 2

P900

HAEMOPHILIC ARTHROPATHY AND JOINT BLEEDING: INFLUENCE OF DISEASE SEVERITY AND TREATMENT

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Background: Haemophilia A and B (HA/HB) are X-linked recessive disorders associated with bleeding risk. Haemophilic arthropathy is a major cause of morbidity and reduced quality of life. Bleeding frequency and joint damage vary according to haemophilia type and severity, presence of inhibitor and therapeutic regimen (TR).

Objectives: To analyse baseline characteristics of patients with haemophilia and hemarthrosis (H), evaluate the association between haemophilia type, severity, Arnold and Hilgartner radiological scale (AHRS) and number of H, and assess the relationship between inhibitors, TR and number of H.

Methods: Retrospective descriptive study including patients with HA/HB and H under clotting factor treatment between 2010–2024. Severity was classified as moderate or severe according to clotting factor activity. TR was categorised as on-demand or prophylaxis. Inhibitor positivity was defined as >0.6 Bethesda units (BU) for factor VIII and ≥0.3 BU for factor IX. Total H included objectified and at-home episodes. Associations were analysed using Spearman correlation and Mann-Whitney U-test.

Results: A total of 95 patients were included. A statistically significant association was found between haemophilia type and number of total H ($p<0.001$), with fewer H in HA (median 4) than HB (median 20). Similar results were observed for objectified and at-home H. No association was found between HA severity and number of H. AHRS stage was positively correlated with total H ($p=0.002$; $r=0.315$) and at-home H ($p=0.007$; $r=0.281$). Inhibitors were present in 23.2% of patients, with no association with H. TR was on-demand in 49.5% and prophylaxis in 50.5%, with no association with H.

Conclusion: Patients with HB showed a higher number of H compared to HA, possibly influenced by outliers. Higher AHRS stages were associated with increased H, reflecting greater joint damage. No association was found between inhibitors or TR and H. Further studies are needed to identify predictors of hemarthrosis and improve patient outcomes.

CATEGORIES	CHARACTERISTICS (N=95)		
SEX N(%)	Males: 94 (98.9%) Female/carrier: 1 (1.1%)		
AGE, MEAN ± SD	36 ± 16.5		
HEPATITIS B N(%)	5 (5,3%)		
HEPATITIS C N(%)	31 (32,6%)		
HUMAN IMMUNODEFICIENCY VIRUS N(%)	24 (25,3%)		
HAEMOPHILIA N(%)	Haemophilia A: 81 (85.3%) Haemophilia B: 14 (14.7%)		
SEVERITY N(%) HAEMOPHILIA A HAEMOPHILIA B	 Moderate: 28 (35%) Severe: 52 (65%) Moderate: 2 (14.3%) Severe: 12 (85.7%)		
INHIBITOR N(%)	Positive: 22 (23.2%) - Active: 11 (50%) - Inactive: 11 (50%) Negative: 73 (76.8%)		
CLOTTING FACTOR ADMINISTERED N(%)	- Factor VIII: 20 (21.1%) - Recombinant factor VIII: 41 (43.2%) - Recombinant factor VIII, Fc fusion protein: 3 (3.2%) - Factor IX: 5 (5.3%) - Recombinant factor IX: 6 (6.3%) - Factor VIII + Von Willebrand Factor: 15 (15.8%) - Factor II, IX, X not activated and VII activated: 2 (2.1%) - Factor II, VII, IX, X and protein C: 1 (1.1%) - Activated recombinant factor VII: 2 (2.1%)		
TARGET JOINT N(%)	- Knee: 49 (51.6%) - Ankle: 24 (25.3%) - Elbow: 17 (17.9%) - Ankle + elbow: 1 (1.1%) - Other: 4 (4.2%)		
AFFECTED JOINT GROUPS, PERCENTILES	P25 (2) P50 (3) P75 (3)		
AHRS, N (%), PERCENTILES	92 (96,84%), 3 without image test P25 (1) P50 (3) P75 (4)		
NUMBER OF OBJECTIFIED HEMARTHROSIS, PERCENTILES	GLOBAL: P25 (0) P50 (1) P75 (3)	HA: P25 (0) P50 (1) P75 (2)	HB: P25 (1) P50 (3.5) P75 (8.5)
NUMBER OF HEMARTHROSIS AT HOME, PERCENTILES	GLOBAL: P25 (1) P50 (4) P75 (9)	HA: P25 (0.5) P50 (3) P75 (7.5)	HB: P25 (3.75) P50 (8.5) P75 (18.5)
TOTAL NUMBER OF HEMARTHROSIS, PERCENTILES	GLOBAL: P25 (2) P50 (6) P75 (14)	HA: P25 (2) P50 (4) P75 (10.5)	HB: P25 (6.75) P50 (20) P75 (30)

P901

PSORIATIC ARTHRITIS AND METABOLIC SYNDROME. MUSCULOSKELETAL AND METABOLIC MANIFESTATIONS

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Psoriatic arthritis is an autoinflammatory disease with multiple musculoskeletal and skin manifestations. The disease is known to be accompanied by metabolic syndrome. The presence of the metabolic syndrome may aggravate the inflammatory nature of psoriatic arthritis as metabolic syndrome is known to be associated with an inflammatory phenotype. The aim was to describe the intimate relationship of psoriatic arthritis with metabolic manifestations taking the form of the metabolic syndrome.

Within a cohort of 30 patients, 17 male and 13 female, aged 25-56 years, the presence of musculoskeletal complications as well as metabolic manifestations was studied. In particular, the presence of arthritis and sarcopenia was noted. The presence of abdominal obesity was noted. The presence of diabetes mellitus type 2 was noted. The presence of arterial hypertension and hyperlipidemia was noted.

Within the cohort of 30 patients, 18 patients, 12 male and 6 female, aged 26-54 years were found to fulfill the criteria of metabolic syndrome, as they were found to have abdominal obesity, diabetes mellitus type 2, arterial hypertension and hyperlipidemia. The presence of metabolic syndrome was related with increased disease activity of psoriatic arthritis.

Psoriatic arthritis appears to be related with metabolic syndrome. Abdominal obesity, diabetes mellitus type 2, arterial hypertension and hyperlipidemia are observed in patients with psoriatic arthritis. The presence of metabolic syndrome is related with an inflammatory phenotype and appears to be related with increased disease activity in patients with psoriatic arthritis. The presence of metabolic syndrome in patients with psoriatic arthritis requires dose modification of the treatment applied for the management of psoriatic arthritis.

P902

PREGNANCY AND LACTATION ASSOCIATED VERTEBRAL FRACTURES. REPORT OF A CASE

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The presence of pregnancy and lactation associated vertebral fractures is a very rare event which occurs port partum in female patients. The etiology and pathophysiology of the disorder remains unknown. Factors like calcium metabolism during pregnancy and lactation are considered in the pathophysiology of the disorder. According to other authors, the developCase reportment of pregnancy and lactation associated vertebral fractures may be the outcome of preexisting and developing osteopenia and osteoporosis which appear due to disordered calcium metabolism during pregnancy and lactation. The aim was to describe the case of a female patient who developed multiple vertebral fractures during lactation of her first healthy child.

A female primipara patient aged 38 years had a normal pregnancy and delivered normally a healthy male infant. During the lactation period of this infant the patient started having serious pain over the spine and started to develop difficulty in carrying her child. However, lactation continued normally. As the pain became unbearable CT scanning of the spine MRI of the spine were performed.

Evaluation of the spine with CT and MRI revealed the presence of nine compression vertebral fractures. Vitamin D levels were within the normal range. The administration of teriparatide was initiated. Over a period of 6 months the patient started to improve. Pain remitted and she was able to carry and care for the infant.

In conclusion, the case of a patient with multiple pregnancy and lactation associated vertebral compression fractures is described. This is an extremely rare case of pregnancy and lactation associated vertebral fractures. Although, case reports have appeared in the literature of pregnancy and lactation associated vertebral fractures, the pathophysiology of the condition has not yet been clarified. However, it appears that either with the administration of alphacalcidol or teriparatide the condition improves and the patient requires only careful follow-up.

P903

MULTIPLE SUCCESSIVE FRACTURES IN PATIENTS WITH PRIMARY HYPERPARATHYROIDISM AS A CAUSE OF MORBIDITY AND MORTALITY

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Primary hyperparathyroidism is a disease characterized by the presence of hypercalcemia, hypercalciuria and increased PTH levels. The disease may be due to one or multiple parathyroid adenomas or to parathyroid hyperplasia. The differential diagnosis remains difficult, even after the excision of one or more parathyroid adenomas. The disease is treated by surgery or conservatively. It causes osteoporosis which becomes evident by fractures.

The aim was to present a cohort of 3 patients with primary hyperparathyroidism who were treated by surgery, i.e. surgical excision of the adenoma or adenomas. Following surgical excision of the adenoma the patient remained biochemically cured for a period of 5 to 10 years. However, in all three of the patients hyperparathyroidism recurred with increased PTH and calcium levels.

In the course of follow-up all three patients developed multiple successive fractures which rendered the patients unable to walk and move without help. The successive fractures led to operative treatment of the fractures. However, patients were unable to move unassisted and despite medical treatment for osteoporosis their quality of life was dismally affected considerably.

In conclusion, primary hyperparathyroidism remains a disease which is

very difficult to treat adequately. In the long – term follow up it may cause successive fractures which render the patient unable to walk unassisted and greatly affect quality of life.

P904

MULTIPLE SCLEROSIS AND OSTEOPOROSIS

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Multiple sclerosis is an autoimmune demyelinating disease which may affect patient mobility. The disease is characterized by autoimmune etiology. The disease may lead to multiple falls as it affects patient balance and mobility. The aim was to present a cohort of 10 female patients aged 45-67 years, with multiple sclerosis who developed osteoporosis and fractures.

A group of 10 female patients, aged 45-67 years old, who presented with multiple sclerosis and osteoporosis or osteopenia is presented. In the course of the disease, patients were evaluated for the presence of osteoporosis. A subgroup of 6 patients underwent multiple falls which in 4 patients led to fractures.

DEXA scans were performed for the measurement of bone mineral density which revealed osteoporosis in 6 patients and osteopenia in 4 patients. A subgroup of 6 patients underwent multiple falls which in 4 patients led to fractures, hip fractures in 3 patients and vertebral fractures in 1 patient. Patients were administered vitamin D and calcium. In the patients with osteoporosis alphacalcidol 1 μg daily and effervescent alendronate 70 mg once weekly were administered. All patients underwent physical therapy evaluation to improve balance and mobility and prevent further falls.

In conclusion, a cohort of patients with multiple sclerosis is presented who developed osteoporosis. Multiple sclerosis is known to be associated with osteoporosis. The disease affects patient mobility and balance and may lead falls. All patients should be administered treatment for the prevention of osteoporosis and osteopenia as well as treatment for osteoporosis. Physical therapy evaluation and treatment for the prevention of falls should also prescribed. Osteoporosis in the context of multiple sclerosis is thought to be due to mobility limitations as well as to the immune modulating treatment for the autoimmune inflammatory process.

P905

EFFECT OF METFORMIN ON CLINICAL OUTCOMES IN OBESE PATIENTS WITH KNEE OSTEOARTHRITIS: A ONE-YEAR PROSPECTIVE CONTROLLED STUDY

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Background: Knee osteoarthritis (KOA) is frequently associated with obesity and metabolic dysfunction. Metformin has demonstrated potential anti-inflammatory and weight-modulating effects, which may influence KOA symptoms. However, its clinical benefit in obese KOA patients remains understudied.

Objectives: The main goal of this study was to assess the impact of metformin on pain and functional outcomes in obese patients with radiographically confirmed knee osteoarthritis over a 12-month period, compared with a control group receiving chondroitin sulfate.

Methods: This prospective controlled study included 82 patients with KOA (Kellgren–Lawrence grade II–III), BMI > 35 kg/m², followed for 12 months. The metformin group (n=40) consisted of patients with newly diagnosed or newly treated type 2 diabetes who initiated metformin therapy at baseline according to standard metabolic syndrome and glucose management protocols. The control group (n=42) included non-diabetic KOA patients receiving chondroitin sulfate (placebo comparator). Both groups were comparable at baseline in terms of age, sex, OA severity, and baseline VAS/WOMAC scores. Assessments were performed every 3 months using the Visual Analog Scale (VAS) and Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC). BMI was monitored throughout follow-up.

Results: The metformin group demonstrated greater improvement in pain and functional outcomes compared with controls. Mean VAS decreased from approximately 7.5 to 5.5 in the metformin group versus 7.5 to 6.5 in the control group, while WOMAC scores improved from 78 to 57 versus 80 to 74, respectively ($p < 0.05$). Mean BMI decreased from 37 to 32 in the metformin group, whereas it remained stable or slightly increased in controls (36 to 37). The reduction in BMI in the metformin group likely reflects lifestyle modification accompanying diabetes management and may have partially mediated the observed symptomatic improvement.

Conclusion: Metformin use in obese patients with KOA was associated with clinically meaningful reductions in pain and functional impairment over 12 months compared with placebo. These findings suggest a potential therapeutic role of metformin in metabolically driven osteoarthritis phenotypes. The beneficial effect may be mediated both by metabolic improvement and weight reduction. Further randomized controlled trials are warranted to confirm these observations and clarify mechanistic pathways.

P906

UROGENITAL INFECTIONS IN ANKYLOSING SPONDYLITIS: INFLAMMATORY BONE LOSS AND IMPLICATIONS FOR SECONDARY OSTEOPOROSIS

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Objectives:
To evaluate the impact of chronic and recurrent urogenital infections on inflammatory activity, bone remodeling and risk of secondary osteoporosis in patients with ankylosing spondylitis (AS).
Material and Methods:
A prospective observational study included 162 patients with ankylosing spondylitis, diagnosed according to modified New York criteria. The cohort comprised 108 males (66.7%) and 54 females (33.3%), with a mean age of 38.4±9.2 years and mean disease duration of 7.6±4.1 years. A history of urogenital infection (bacterial urethritis, prostatitis, cervicitis or recurrent urinary tract infection) within the previous 5 years was documented in 68 patients (42.0%).
Clinical activity was assessed using ASDAS-CRP, BASDAI and inflammatory markers (CRP, ESR). Bone-related outcomes included inflammatory bone involvement on MRI and surrogate markers of bone loss (radiographic structural changes and fracture risk indicators). Statistical analyses comprised group comparisons, correlation analysis, multivariate logistic regression and ROC curve analysis.
Results:
Patients with a documented history of urogenital infection exhibited significantly higher disease activity compared with those without infection (ASDAS-CRP 3.2±0.6 vs 2.6±0.5, p<0.001). Elevated inflammatory markers were more frequent in the infection-associated group (CRP >10 mg/L in 61.8% vs 38.7%, p=0.004).
MRI evidence of active osteitis and bone marrow edema was observed more frequently in patients with prior urogenital infection (47.1% vs 26.5%, p=0.008), suggesting enhanced inflammation-driven bone remodeling. Multivariate analysis identified history of urogenital infection as an independent predictor of high disease activity (OR 3.21, 95% CI 1.64-6.29, p<0.001) and inflammatory bone involvement (OR 2.74, 95% CI 1.38–5.46, p=0.004).
Markers suggestive of increased skeletal fragility were more prevalent in the infection-associated group, including higher prevalence of vertebral structural damage and reduced bone integrity indicators. ROC analysis demonstrated good predictive performance of urogenital infection history for identifying patients with inflammatory bone involvement (AUC 0.79, 95% CI 0.71-0.86).
Conclusions:
Urogenital infections are frequently observed in patients with ankylosing spondylitis and are associated with higher inflammatory activity, increased bone marrow inflammation and features suggestive of accelerated bone loss. These findings support the concept that persistent mucosal immune activation triggered by urogenital pathogens may contribute to inflammation-driven bone remodeling and secondary osteoporosis in AS. Systematic assessment and timely management of urogenital infections may represent an important adjunctive strategy for reducing skeletal complications and improving long-term bone health in ankylosing spondylitis.

P907

GUT MICROBIOME DYSBIOSIS IN ANKYLOSING SPONDYLITIS: INFLAMMATORY BONE LOSS AND IMPLICATIONS FOR OSTEOPOROSIS

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Objectives:
To investigate the relationship between gut microbiome dysbiosis and inflammatory activity in ankylosing spondylitis (AS), with a focus on inflammation-driven bone remodeling and potential risk of secondary osteoporosis.
Material and Methods:
A prospective observational study included 75 patients with ankylosing spondylitis (42 males, 33 females; mean age 36.8±9.7 years; mean disease duration 8.2±3.6 years) and 25 age- and sex-matched healthy controls. AS was diagnosed according to modified New York criteria. None of the patients were receiving biologic therapy at inclusion, and antibiotics or probiotics were discontinued ≥3 months prior to sampling. Disease activity was assessed using ASDAS-CRP, BASDAI, and inflammatory markers (CRP, ESR). Fecal samples were collected and gut microbiota composition was analyzed using 16S rRNA gene sequencing (V3-V4 region). Alpha diversity indices, Firmicutes/Bacteroidetes (F/B) ratio, taxonomic abundance, multivariate analyses and receiver operating characteristic (ROC) curves were applied. Associations between microbial patterns, disease activity and bone-related inflammatory features were explored.
Results:
Patients with AS demonstrated a significant reduction in gut microbial diversity compared with controls (Shannon index, p=0.004), indicating intestinal dysbiosis. The Firmicutes/Bacteroidetes ratio was significantly lower in AS patients (mean 1.1 vs 1.9 in controls, p<0.01), reflecting depletion of beneficial Firmicutes and overrepresentation of Bacteroidetes.
Taxonomic analysis revealed increased abundance of Prevotella, Dialister and Collinsella, alongside significant reductions in Bacteroides and Lachnospira, key producers of short-chain fatty acids involved in bone-protective and anti-inflammatory pathways. Principal component analysis demonstrated clear separation between AS patients and controls, confirming a distinct microbial signature associated with disease.
Prevotella abundance showed a strong positive correlation with disease activity (ASDAS-CRP, r=0.56, p<0.001) and systemic inflammation, suggesting a role in sustaining inflammation-driven bone loss. ROC analysis demonstrated good discriminatory performance of Prevotella abundance for identifying AS patients (AUC 0.82). The dysbiotic profile observed is consistent with activation of the IL-23/IL-17 axis, known to promote osteitis, pathological bone remodeling and increased risk of osteoporosis in AS.
Conclusions:
Ankylosing spondylitis is associated with a distinct gut microbiome dysbiosis characterized by reduced microbial diversity, imbalance of Firmicutes/Bacteroidetes ratio and overrepresentation of pro-inflammatory taxa such as Prevotella. These alterations correlate with disease activity and may contribute to inflammation-driven bone

remodeling and secondary osteoporosis. Gut microbiome profiling may provide novel biomarkers for disease activity and skeletal risk assessment, supporting integrative strategies targeting both intestinal dysbiosis and bone health in ankylosing spondylitis.

P909

PREDICTION OF BONE REMODELING DISORDERS AND OSTEOPOROSIS DEVELOPMENT IN RHEUMATOID ARTHRITIS

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Objective: Imbalance of bone remodeling often leads to the development of osteoporosis (OP) [1, 2]. Search for markers for the early prediction of bone metabolism disorders in rheumatoid arthritis (RA) is a pressing scientific challenge.

Aim: To identify markers for the early prediction of osteoporosis (OP) development in patients with RA.

Materials and Methods: RA was diagnosed according to the 2010 ACR/EULAR criteria. The study included 88 women with RA, with an average age of 47.5±9.6 years and an average disease duration of 7.9±5.2 years. All subjects underwent LUNAR DPX-Pro osteodensitometry. The diagnostic value of the parameters was determined using ROC analysis.

Results: 25-OH vitamin D had high prognostic value in predicting the development of AP. The diagnostic decision point was a level of 58.741 ng/mL (sensitivity of the method 95.45%, specificity 37.88%). N-terminal propeptide of procollagen type 1 (P1NP) was also a valuable diagnostic marker for AP in RA. The diagnostic decision point was 50.225 ng/mL (sensitivity 71.21%, specificity 81.82%). C-telopeptide of type I collagen had sufficient predictive power for osteoporosis (sensitivity 36.36%, specificity 90.91%).

Conclusions: Thus, in RA, 25-OH vitamin D, C-telopeptide of type I collagen, and P1NP levels have high prognostic value and can be used for the early diagnosis of bone metabolism disorders and prediction of osteoporosis development.

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P910

A STUDY OF THE LEVELS OF THE CHEMOATTRACTANT PROTEIN MCP-1 IN PATIENTS WITH RHEUMATIC DISEASES AND HEALTHY INDIVIDUALS

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Objective: Monocyte chemoattractant protein-1 (MCP-1) is a key chemokine regulating the migration and infiltration of monocytes, macrophages, and other immune cells into sites of inflammation and tissue damage. It plays a critical role in chronic inflammation, cancer, and metabolic diseases, acting as a potent proinflammatory cytokine. Studying its role in the pathogenesis of rheumatic pathologies is of great scientific interest.
Aim: To determine MCP-1 levels in patients with rheumatic diseases and healthy individuals.
Materials and Methods: The study included 18 patients with rheumatoid arthritis, 29 patients with systemic lupus erythematosus (SLE), 16 patients with ankylosing spondylitis (AS), and 9 apparently healthy individuals without complaints of joint pain (control group). MCP-1 levels were determined by ELISA using commercial assays.
Results: In the control group of healthy individuals, the MCP-1 level was 300.0 [290.0-380.0] pg/ml. In RA, the average MCP-1 concentration was 361.0 [310.6-411.5] pg/ml. In SLE - 388.2 [310.6-450.3] pg/ml. In patients with AS - 438.7 [411.5-504.7] pg/ml. Based on the obtained data, the reliability of differences in the average MCP-1 level between conditionally healthy individuals and patients with rheumatic diseases was studied. The following data were obtained: the reliability of differences between the control group and the RA group was Z = 0.80; p = 0.425; with the SLE group Z = -1.36; p = 0.175; with the AS group - Z = 2.52; p = 0.0118.
Conclusions: Thus, there is evidence that MCP-1 is closely associated with chronic diseases such as obesity, diabetes, cardiovascular disease, and cancer. The role of this protein in rheumatic diseases remains understudied. Our study revealed a statistically significant difference between MCP-1 levels in healthy individuals and patients with ankylosing spondylitis (Z=2.52; p=0.0118). No significant differences were found between MCP-1 levels in patients with RA and SLE.

P911

PATHWAYS OF "INTERNET+ NURSING" EMPOWERING COMMUNITY-HOME INTEGRATED MEDICAL AND ELDERLY CARE SERVICES UNDER THE MEDICAL CONSORTIUM MODEL: A MIXED-METHODS STUDY

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Objective: To explore the implementation pathways and effectiveness of "Internet+ Nursing" in enhancing community-home integrated medical and elderly care service capacity within the medical consortium framework in China.
Methods: A sequential explanatory mixed-methods design was employed from March 2022 to September 2024. In Phase I, a cross-sectional survey was conducted among 1,248 elderly residents and 386 nurses across 12 community health centers within three medical consortiums. The Nursing Service Capacity Scale and Elderly Care Needs Questionnaire were administered. In Phase II, semi-structured interviews with 32 stakeholders (administrators, nurses, patients, caregivers) explored facilitators and barriers. The Consolidated Framework for Implementation Research guided pathway development. A 6-month pilot intervention was subsequently implemented in six communities.
Results: The "Internet+ Nursing" pathway model comprising four dimensions—platform construction, resource integration, competency enhancement, and quality monitoring—was established. Post-intervention, nursing service accessibility increased by 42.6% (P<0.001), service response time decreased from 48.2±12.5 to 18.6±8.3 hours (P<0.001), and elderly satisfaction scores improved significantly (87.32±6.45 vs. 71.28±8.92, P<0.001). Healthcare resource utilization efficiency within the consortium increased by 35.8%. Qualitative findings revealed critical success factors including leadership support, digital literacy training, and seamless information sharing.
Conclusions: The "Internet+ Nursing" empowerment pathway effectively strengthens community-home integrated care capacity under the medical consortium model, offering a scalable framework for addressing aging population healthcare demands in developing countries.

P912

EXTENDED 18-MONTH LONGITUDINAL EVALUATION OF BODY COMPOSITION CHANGES UNDER GENDER-AFFIRMING HORMONE THERAPY IN A COLOMBIAN TRANSGENDER COHORT

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Background: Gender-affirming hormone therapy (GAHT) produces gradual modifications in muscle and fat distribution. Evidence describing long-term body composition trends in Latin-American transgender populations remains scarce.

Objective: To assess 18-month longitudinal changes in body composition among transgender adults undergoing GAHT at the San José Hospital, Bogotá, Colombia.

Methods: A retrospective cohort including adults with confirmed gender dysphoria treated between 2019 and 2025 was analyzed. Body composition was measured by bioelectrical impedance (OMRON HBF-514C) at baseline, 3, 6, 12, and 18 months. Variables included BMI, total fat percentage, muscle mass, and visceral fat. Statistical comparisons used Wilcoxon and Friedman tests with p<0.05 considered significant.

Results: Fifty-nine patients (64% transgender men) were evaluated, with a median age of 23 years (IQR 21–29). After 18 months of GAHT, transgender men demonstrated a significant increase in muscle mass (p=0.007) and reduction in visceral fat (p=0.002), without relevant BMI variation. Transgender women showed modest increases in fat mass but stable BMI and muscle mass.

Conclusion: At 18 months of GAHT, transgender men maintained favorable body recomposition characterized by muscle gain and visceral fat reduction, while transgender women exhibited mild fat redistribution. These findings support the clinical use of bioelectrical impedance as a sensitive monitoring tool beyond BMI in transgender metabolic follow-up.

Keywords : Gender-affirming hormone therapy; body composition; bioelectrical impedance; transgender adults; visceral fat.

P913

HOW MUCH DO POSTMENOPAUSAL WOMEN KNOW ABOUT OSTEOPOROSIS? INSIGHTS FROM THE OKAT QUESTIONNAIRE

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Background:
Postmenopausal osteoporosis (PMO) is a major public health concern due to the high risk of fractures and their associated consequences. Despite the proven effectiveness of available treatments, therapeutic adherence remains frequently suboptimal. Patients' disease-related knowledge may influence adherence. However, this aspect remains insufficiently explored.

Objective:
To assess osteoporosis-related knowledge among women with PMO and to explore factors associated with knowledge levels.

Methods:
A cross-sectional study was conducted including women followed for PMO and treated with bisphosphonates. Osteoporosis-related knowledge was assessed using the Osteoporosis Knowledge Assessment Tool (OKAT), a validated 20-item questionnaire covering general knowledge, nutrition, physical activity, and treatments. Each correct answer scored one point, with a total score ranging from 0 to 20. Knowledge levels were classified as low (0–10), moderate (11–15), or high (16–20).

Results:
Fifty patients were included, with a mean age of 65.3 ± 9.7 years [48–76]. Mean age at menopause was 46.8 ± 4.3 years. Among participants, 53.3% were illiterate, 68.9% lived in urban areas, and 71.1% were homemakers.

The main comorbidities were arterial hypertension (28.9%), diabetes mellitus (29.5%), and dyslipidemia (28.9%).

The mean lumbar spine T-score was −3.5 ± 0.46, and the mean femoral T-score was −0.42 ± 1.87. A history of osteoporotic fractures was reported in 57.8% of patients, mainly involving the distal radius (34.6%), vertebrae (19.2%), and femoral neck (11.5%).

All patients were receiving oral bisphosphonates (alendronate in 34.1% and risedronate in 59.1%), with correct adherence to intake rules reported in 93.3% of cases.

The mean OKAT score was 11.4 ± 4.6 [2–18]. Knowledge level was low in 33.3% of patients, moderate in 53.3%, and high in 13.3%. Higher OKAT scores were significantly associated with younger age (< 60 years) ($p = 0.048$), rural residence ($p = 0.043$), and higher educational level ($p = 0.02$).

Conclusion:
Osteoporosis-related knowledge among women with postmenopausal osteoporosis remains limited to moderate despite established pharmacological treatment. Knowledge levels were associated with age, educational attainment, and place of residence, underscoring the importance of developing tailored patient education strategies.

P914

WHEN TREATMENT FAILS TO BE TAKEN: IMPACT OF THERAPEUTIC ADHERENCE ON QUALITY OF LIFE IN POSTMENOPAUSAL OSTEOPOROSIS

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Background:
Postmenopausal osteoporosis is a chronic disease associated with skeletal fragility and a significant alteration in patients' quality of life. Despite the availability of effective therapies, therapeutic adherence remains suboptimal in routine clinical practice, potentially reducing treatment benefits. The impact of poor adherence on quality of life in postmenopausal osteoporosis remains insufficiently explored. The objective of this study was to assess therapeutic adherence and analyze its impact on quality of life.

Patients and methods:
We conducted a cross-sectional study including patients followed for osteoporosis. Sociodemographic and clinical data were collected from medical records and patient interviews. Therapeutic adherence was assessed using the Medication Adherence Rating Scale (MARS-5), a 5-item questionnaire with scores ranging from 5 to 25, with higher scores indicating better adherence. Quality of life was assessed using the Evaluation of Osteoporosis Quality of Life Questionnaire (ECOS-16), which ranges from 16 to 80, with higher scores indicating greater impairment of quality of life.

Results:
Fifty female patients were included, with a mean age of 65.3 ± 9.7 years (range 53–76). More than half were illiterate (53.3%), 68.9% lived in urban areas, and 71.1% were housewives. The majority of patients had a middle socioeconomic level (46.7%), followed by a low level (33.3%). A history of osteoporotic fractures was present in 57.8% of patients.
The mean MARS-5 score was 20.3 ± 2.4, with high adherence (MARS-5 > 20) observed in 60% of patients. The mean ECOS-16 score was 52.1 ± 12.8 (range 23–71). Quality of life impairment was mainly driven by physical and emotional domains. The highest mean score was observed in physical function (18.4 ± 4.2), followed by emotional status (14.2 ± 3.8). Pain and mobility domain scores were 11.5 ± 3.1 and 8.0 ± 2.5, respectively. Items related to fear of falling and difficulty bending over showed the highest levels of impairment.
The mean MARS-5 score was significantly higher in patients with primary or secondary education compared with illiterate patients ($p = 0.004$), and in rural compared with urban patients ($p = 0.03$). Quality of life impairment was significantly associated with fracture history ($p < 0.01$), socioeconomic status ($p < 0.001$), educational level ($p = 0.021$), and living environment ($p = 0.037$). Better treatment adherence was associated with less impaired quality of life, with a significant negative correlation between MARS-5 and ECOS-16 scores ($p = 0.04$).

Conclusion:
Suboptimal therapeutic adherence in postmenopausal osteoporosis is associated with poorer quality of life, particularly affecting physical and emotional dimensions, highlighting adherence as a key target to improve quality of life.

P915

WHAT IS THE RELATIONSHIP BETWEEN STRUCTURAL PROGRESSION AND QUALITY OF LIFE IN PATIENTS WITH AXIAL SPONDYLOARTHRITIS?

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Background
Axial spondyloarthritis (axSpA) is a chronic inflammatory rheumatic disease that may lead to progressive structural damage, resulting in impaired spinal mobility and functional disability. The relationship between radiographic structural damage, functional impairment, and quality of life in axSpA remains incompletely understood. The aim of this study was to evaluate the impact of radiographic structural damage on functional disability and quality of life in patients with axSpA.
Patients and Methods
This was a cross-sectional study including patients fulfilling the ASAS 2010 classification criteria for axSpA. Structural damage was assessed using two radiographic scores: the modified Stoke Ankylosing Spondylitis Spine Score (mSASSS, 0–72) and the Bath Ankylosing Spondylitis Radiology Index (BASRI, 0–16). Functional disability was evaluated using the Bath Ankylosing Spondylitis Functional Index (BASFI) and the Health Assessment Questionnaire (HAQ). Quality of life was assessed using the Ankylosing Spondylitis Quality of Life questionnaire (ASQoL).
Results
A total of 51 patients were included, with a mean age of 43.9 ± 15.8 years (range 18–76), including 33 men (64.7%). The mean disease duration was 9.2 ± 8.8 years (range 1–36). The mean BASFI score was 4.0 ± 1.9 (range 0–8.5), with significant functional disability (BASFI > 4) observed in 27 patients (52.9%). The mean HAQ score was 0.83 ± 0.62 (range 0–2.7), indicating moderate to severe functional difficulty (HAQ > 1) in 18 patients (35.3%). The mean ASQoL score was 6.2 ± 4.3 (range 0–16).

The mean mSASSS was 19.3 ± 16.2 (range 0–66), and the mean BASRI total score was 5.5 ± 4.1 (range 0–16). Both structural scores were significantly correlated with functional disability, as shown by their association with BASFI (BASRI: p = 0.040; mSASSS: p < 0.001) and HAQ (BASRI: p = 0.011; mSASSS: p = 0.002). They were also significantly associated with impaired quality of life assessed by ASQoL (BASRI: p = 0.011; mSASSS: p < 0.01).

Conclusion

Radiographic structural damage in axial spondyloarthritis is significantly associated with functional disability and impaired quality of life.

P917

THE EFFECT OF POOR ADHERENCE IN THE EFFECTIVENESS OF OSTEOPOROSIS TREATMENT IN PATIENTS WITH TYPE 2 DIABETES MELLITUS: A POPULATION-BASED COHORT STUDY

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Introduction: Adherence to osteoporosis medications (OM), as with other chronic diseases, is low. Previous studies have observed that poor adherence is associated with a higher risk of osteoporotic fracture (OF). However, there is limited evidence on whether this also applies to patients with type 2 diabetes mellitus (T2DM).

Aim: To analyze the effectiveness of OM in real-life conditions in patients with T2DM compared to non-diabetics, based on adherence to OM.

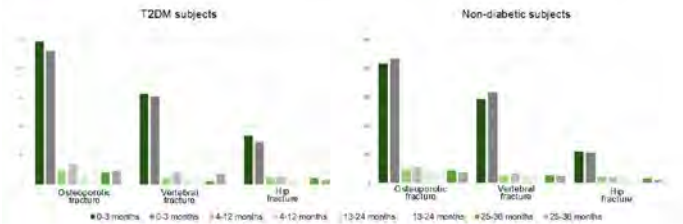
Methods: A population-based cohort study was conducted in primary care. All subjects who started an OM between 2012 and 2016 were selected from the SIDIAP database, which contains pseudo-anonymized clinical information from over 5.5 million patients in Catalonia. Exclusion criteria included prior OM use in the previous 12 months, history of neoplasia, Paget's disease, or HIV infection. Up to three non-diabetic subjects were matched to each T2DM subject by propensity score. Adherence was estimated using the medication possession ratio (MPR), with poor adherence defined as MPR <0.8. Effectiveness was analyzed by calculating incidence rates of hip fracture, vertebral fracture and OF in the periods 0–3 months, 4–12 months, 13–24 months, and 25–36 months.

Results: Of the 42,946 patients who started an OM, 5,828 were T2DM patients and 37,118 were non-diabetics. Of these, 34,545 (80.4%) received oral bisphosphonate (BF), 4,215 (9.8%) denosumab, 2,769 (6.5%) SERM, and 1,417 (3.3%) teriparatide. Poor adherence to BF was observed in 52.6% of T2DM patients versus 49.8% of non-diabetics; with denosumab, 9.8% vs. 9.3%; with SERM, 34.1% vs. 43.3%; and with teriparatide, 33.6% vs. 38.4%.

Incidence of fractures after matching, in all analyzed periods, in T2DM and non-diabetic subjects, according to treatment adherence, is presented in Figure 1.

Conclusions: Between 30–50% of patients receiving an OM show poor adherence (except for denosumab, which is <10%), with worse adherence to BF observed in T2DM patients compared to non-diabetics. Poor adherence is associated with a higher incidence of fractures across all time periods, particularly among T2DM patients.

Figure 1:Incidence of fractures (x1,000 person/year) in T2DM and non-diabetic subjects, according to treatment adherence
Green columns = good adherence (MPR ≥0,8); grey columns = poor adherence (MPR <0,8)



P918

ENTHESITIS IN PSORIATIC ARTHRITIS: A MARKER OF INFLAMMATION-DRIVEN BONE REMODELING AND OSTEOPOROSIS RISK

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Objectives:

To evaluate the relationship between entheseal inflammation and markers of bone remodeling in psoriatic arthritis (PsA), and to explore the potential role of enthesitis as a contributor to secondary osteoporosis.

Material and Methods:

A prospective observational study included 70 patients with psoriatic arthritis (23 males, 47 females; mean age 39.4±10.2 years) and a comparison group of 30 patients with rheumatoid arthritis (RA). PsA was diagnosed according to CASPAR criteria. Disease activity ranged from low to high, with early and established forms included.

All patients underwent comprehensive musculoskeletal ultrasound assessment of large and small joints, with special focus on entheses, synovial membrane, tendon–ligament apparatus and adjacent bone structures. Ultrasound was performed using gray-scale and power Doppler techniques. Magnetic resonance imaging (MRI) was applied as a reference method in a subgroup of patients. Clinical activity, inflammatory markers and imaging signs of bone involvement were analyzed. Statistical analysis included group comparisons, correlation analysis and regression models.

Results:

Entheseal involvement was significantly more prevalent and severe in PsA compared with RA, particularly at the patellar ligament and quadriceps tendon insertions (PsA 68.6% vs RA 21.3%, p<0.001). Power Doppler–positive enthesitis was detected in 54.3% of PsA patients versus 13.3% of RA controls (OR 7.65, 95% CI 3.01-19.41, p<0.001), indicating a strong association with active inflammation at the bone–enthesis interface.

Quantitative ultrasound assessment demonstrated significantly higher entheseal thickness and structural damage scores in PsA, which

correlated with synovial vascularization (r=0.59, p<0.001), inflammatory markers (CRP: r=0.46, p=0.002; ESR: r=0.41, p=0.004) and composite disease activity indices.
Entheseal severity, expressed by ultrasound-based enthesitis indices, showed a robust association with imaging markers of bone involvement. MRI-confirmed bone marrow edema adjacent to inflamed entheses was observed in 46.7% of PsA patients with active enthesitis compared with 18.2% without enthesitis (p=0.006). Multivariate regression analysis identified Power Doppler–positive enthesitis as an independent predictor of inflammatory bone involvement (β=0.44, p<0.001), after adjustment for age, sex and disease duration.
Furthermore, higher entheseal inflammatory burden was associated with markers suggestive of increased skeletal fragility. Patients in the upper tertile of entheseal activity demonstrated a significantly higher prevalence of structural bone changes (OR 3.28, 95% CI 1.42-7.58, p=0.005). ROC analysis confirmed good discriminative performance of entheseal ultrasound parameters for identifying patients with bone involvement (AUC 0.86, 95% CI 0.78-0.93), with Power Doppler signal showing the highest predictive accuracy (sensitivity 81.4%, specificity 84.6%).
Conclusions:
Enthesitis is a central feature of psoriatic arthritis and represents a key site of inflammation-driven bone remodeling. Persistent entheseal inflammation is associated with structural bone alterations that may contribute to secondary osteoporosis in PsA. Ultrasound-based assessment of enthesitis provides valuable insight into bone–inflammation interactions and may help identify patients at increased risk of skeletal fragility. Integrating entheseal evaluation into routine PsA assessment could improve early detection of bone involvement and support preventive strategies for osteoporosis.

P919

IS AGE A DIFFERENTIATING FACTOR IN THE RESPONSE TO ROMOSOZUMAB TREATMENT IN WOMEN WITH SEVERE OSTEOPOROSIS? REAL-WORLD DATA

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Introduction Romosozumab (RMZ) has demonstrated efficacy in the treatment of severe osteoporosis in clinical trials, although there is limited data on elderly women in real-world clinical practice in Europe.

Objective To evaluate the efficacy of RMZ in women with osteoporosis at high risk of fracture in real-life settings and to analyse possible differences depending on age (<75 years *vs*. ≥75 years).

Materials and methods Multicentre observational study in real clinical practice involving 142 women with severe osteoporosis treated with RMZ. 97 women who completed treatment were analysed. The mean age was 77.8 years (SD: 11.4). 39 patients (27.5%) were ≥75 years old. The mean age of menopause was 47.6 (SD: 5.1). Most patients had previously suffered fractures due to fragility (90.8%). Comorbidities: hypertension (31.7%), dyslipidaemia (29.5%), diabetes mellitus (4.9%), history of smoking (12%). Analytical data was collected before RMZ and after completing treatment (calcaemia, creatinine, PTH, and vitamin D). Changes in bone mineral density (BMD) and TS after treatment were analysed in the lumbar spine, total hip, and femoral neck. Patients were stratified according to age into two groups: <75 years and ≥75 years, analysing the response of each group individually. Differences between pre- and post-treatment data were compared in each group. Likewise, the degree of patient satisfaction with the drug (scale 0-5) and treatment after completing RMZ was collected.

Results Following treatment with RMZ, a statistically significant increase in BMD and TS data was observed in the overall population in the lumbar spine, total hip, and femoral neck (Table 1). The magnitude of the response was comparable between women ≥75 years and <75 years, with no significant differences in densitometric change after treatment between the two age groups. A statistically significant difference was observed only in the increase in total hip BMD, which was not accompanied by a significant difference in T-score. (Table 2).

No analytical alterations were observed before or after treatment. 6 patients reported adverse events, the most common being local reactions at the injection site. Treatment was suspended in 2 patients due to adverse events, one due to a significant reaction at the injection site and the other due to CVA. None of the patients suffered a new fracture during the follow-up period.

The degree of satisfaction with the drug was 4.6 (0-5). Most patients continued treatment with denosumab (65%), followed by oral bisphosphonates (14.5%).

Conclusion In real-world clinical practice, RMZ showed similar efficacy in women with severe osteoporosis regardless of age, including patients aged 75 years or older, supporting its use in elderly women.

Table 1- RMZ densitometric response in all patients

	PRE Tx	POST RMZ	P value
C LUMBAR BMD	0.76+-0,15	0.86+- 0.13	<0.001
CL TS	-3.13+-1.28	-1.96+-1.48	<0.001
CF BMD	0.62+-0.11	0.65+-0.13	0.005
CF TS	-2.49+-0.85	-2.02+-1.18	0.003
CT BMD	0.66+-0.13	0.72+-0.13	0.002
CT TS	-2.38+-1.09	-1.91+-1.08	<0.001

Table 2- Comparison of post-treatment differences with RMZ in age groups

	<75 years	≥75 years	p value
Dif CL BMD	0.10+-0.7	0.07+-0.11	0.230
Dif CL TS	1.20+-1.36	0.85+-1.34	0.247
Dif CF BMD	0.02+-0.06	0.04+-0.05	0.267
Dif CF TS	0.24+-0.99	0.55+-0.92	0.249
Dif CT BMD	0.05+-0.06	0.11+-0.36	0.041
Dif CT TS	0.44+-0.36	0.73+-0.56	0.275

P920

THE BURDEN OF VERTEBRAL FRACTURES CAUSED BY FALLS AMONG ELDERLY IN ECUADOR

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Vertebral fractures (VF) are a global health problem. The burden of VF is increasing, especially in older adults.

Objective: To analyze the incidence, prevalence, and years lived with disability (YLD) attributable to vertebral fractures due to falls among people aged 50 years and older between 1990 and 2021 at the national level, and to establish trends stratified by gender and age.

Methods: This study used data from the 2021 Global Burden of Disease (GBD) study, focusing on trend changes and stratified characteristics of the burden of vertebral fractures caused by falls among people aged 50 years and older. We assessed incidence, prevalence, and years lived with disability (YLDs). The projection of epidemiological indicators until 2030 was performed using the method described by Rahib [1].

Results: In 2021, an estimated number of 3,569 new cases of vertebral fractures due to falls in people aged 50 years and older were recorded nationwide, with 3,710 prevalent cases and 371 YLDs. Between 1990 and 2021, the incidence increased from 685.8 to 3,568.5 cases (5.2-fold), the prevalence from 699.4 to 3,709.7 (5.3-fold), and YLDs from 70.4 to 371.4 (5.3-fold). The age-standardized incidence rate (ASIR) in 2021 was 97.4 per 100,000 inhabitants, representing an increase from 1990 with an average annual percentage change (AAPC): 1.05 (p<0.05), the age-standardized prevalence rate (ASPR) AAPC: 1.06 (p<0.05), and the age-standardized years lived with disability (ASYR) AAPC: 1.06 (p<0.05). The projected number of incident cases for 2030, 2040, and 2050 is 3,921, 4,352, and 4,832, respectively; for prevalent cases, 4,079, 4,533, and 5,037, respectively; and for YLDs, 408, 453, and 503, respectively.

Table 1. Age Standardized Rate * of incidence, prevalence, and YLDs of elderly Vertebral Fracture (50+years) from 1990 to 2021.

Year	1990			2021		
	ASIR	ASPR	ASYR	ASIR	ASPR	ASYR
Both	65.8 (94.2–42.3)	28.9 (36.5–22.7)	3.0 (4.6–1.9)	97.4 (141.4–62.7)	43.9 (55.0–35.1)	4.59 (6.8–3.1)
Male	97.1 (138.7–63.2)	40.7 (52.3–31.9)	4.3 (6.4–2.8)	133.9 (190.0–86.7)	56.4 (71.7–44.8)	5.9 (9.0–4.0)
Female	35.4 (54.0–20.5)	17.4 (22.2–13.6)	1.8 (2.6–1.1)	63.0 (94.8–38.2)	32.2 (40.2–25.3)	3.3 (4.8–2.1)

*per 100,000 inhabitants (95 % UI); ASIR, Age-standardized Incidence Rate; ASPR, Age-standardized Prevalence Rate; ASYR, Age-standardized YLDs Rate

Conclusions: The disease burden of vertebral fractures due to falls in people aged 50 and older increased fivefold between 1990 and 2021, and a significant increase is projected in the coming decades. With the aging of the population, vertebral fractures caused by falls require ongoing attention.

[1] Rahib L (**2014**) Cancer Res. 74(11):2913-21

P921

RELATIONSHIP BETWEEN LIVER FIBROSIS RISK, BODY MASS INDEX, AND OSTEOPOROSIS IN POSTMENOPAUSAL WOMEN WITH MASH

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Introduction:

Postmenopausal estrogen deficiency significantly accelerates bone loss. Steatohepatitis-related metabolic dysfunction (MASH) and diabetes mellitus may further increase the risk of osteoporosis through insulin resistance, chronic inflammation, and altered bone-liver interaction. Data on impaired bone mineral density in postmenopausal women with MASH remain limited.

Purpose:

To compare the prevalence of osteopenia and osteoporosis based on DXA-derived T-score criteria in postmenopausal women with MASH, with and without diabetes mellitus, and to examine the relationship with liver fibrosis risk and body mass index (BMI).

Methods:

The study included 35 postmenopausal women aged 55-67. 17 patients (48.6%) had diabetes, and 18 (51.4%) did not. All participants had a confirmed diagnosis of MASH. BMI ranged from 25 to 29 kg/m ². FIB-4 index values ranged from 1.3 to 2.67. In patients with diabetes, HbA1c levels ranged from 6.7% to 7.9%. The duration of menopause ranged from 8 to 22 years. Bone mineral density was assessed by dual-energy X-ray absorptiometry (DXA). Osteopenia was defined as a T-score between -1.0 and -2.5, and osteoporosis as a T-score ≤ -2.5.

Results:

Overall, a decrease in bone mineral density (osteopenia or osteoporosis) was observed in 74.3% of study participants. Osteoporosis (T-score ≤ -2.5) was detected in 41.2% of women with diabetes compared to 22.2% of women without diabetes. Osteopenia was observed in 35.3% of patients with diabetes and in 44.4% of patients without diabetes. Higher FIB-4 values (≥ 2.0) were associated with osteoporosis in 57.1% of cases, indicating an association between increased risk of liver fibrosis and lower T-score scores.BMI within overweight limits did not demonstrate a protective effect against osteoporosis, especially among patients with diabetes. Longer duration of menopause (> 15 years) was associated with osteoporosis in 61.5% of women with the condition.

Conclusion:

Postmenopausal women with MASH and diabetes mellitus have a higher prevalence of T-score osteoporosis compared to women without diabetes. Increased risk of liver fibrosis and longer duration of menopause appear to be associated with lower bone mineral density. These data support the need for a comprehensive assessment of liver, metabolism, and skeletal health in postmenopausal women with MASH.

P922

ARTIFICIAL INTELLIGENCE-ASSISTED META-ANALYSIS OF PREVALENCE AND RISK FACTORS FOR VERTEBRAL FRACTURES IN SYSTEMIC LUPUS ERYTHEMATOSUS

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BACKGROUND: Patients with systemic lupus erythematosus (SLE) are at a significantly heightened risk for vertebral fractures (VF), primarily due to chronic inflammation and long-term glucocorticoid exposure. However, VF often remains clinically "silent" or is masked by the routine use of non-steroidal anti-inflammatory drugs (NSAIDs), leading to delayed diagnosis and increased morbidity. This study aims to provide a comprehensive global prevalence estimate and a systematic evaluation of risk factors for VF in SLE patients. Furthermore, it explores a novel multi-model AI workflow to optimize the traditional meta-analysis pipeline.

METHODS: A systematic search was performed across PubMed, Web of Science, Embase, and Cochrane Library to identify relevant observational studies. We implemented a cutting-edge AI-human collaborative framework: **DeepSeek** was utilized for its advanced logic and programming capabilities to generate robust R scripts for automated literature screening and complex statistical pooling. Simultaneously, **Gemini 3.0 Pro** was strategically employed for its superior performance in high-dimensional data extraction and multimodal image recognition, enabling the precise interpretation of forest plots and visual data from published figures. Quality assessment was conducted using the Newcastle-Ottawa Scale (NOS) integrated with Gemini's analytical modules. This dual-AI approach was rigorously validated against manual review by independent researchers to ensure data integrity.

RESULTS: Seventeen high-quality studies met the inclusion criteria. The pooled prevalence of VF among SLE patients was determined to be **23%**. Our analysis identified 18 potential variables, with 7 key factors showing strong statistical significance:

• Advanced age and postmenopausal status;

• Prolonged SLE disease duration;

• Higher cumulative glucocorticoid dosage;

• Elevated SLICC/ACR Damage Index (SDI) scores;

• Personal history of previous fractures and lower bone mineral density (BMD).

The integrated AI workflow achieved a **94% concordance rate** with traditional manual methods while reducing the total processing time by **90%**, allowing the entire project—from initial search to final manuscript revision—to be completed within just **43 days**.

CONCLUSION: The strategic integration of AI tools—optimizing DeepSeek for computational scripting and Gemini for data synthesis—represents a paradigm shift in evidence-based medicine, significantly accelerating the research cycle without compromising accuracy. Clinicians should maintain a high index of clinical suspicion for VF in SLE patients presenting with the identified risk factors to facilitate early intervention.

P923

CURRENT GLUCOCORTICOID USE IS ASSOCIATED WITH INCREASED CORTICAL POROSITY, REDUCED PHYSICAL PERFORMANCE AND INCREASED FRACTURE RISK IN OLDER WOMEN

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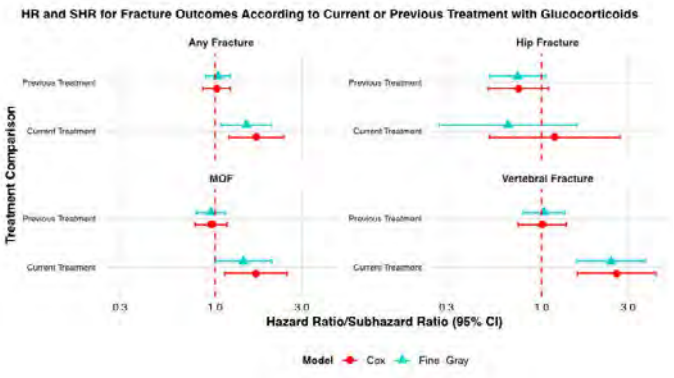
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Objective(s):
Glucocorticoid (GC)-induced osteoporosis is the most common form of secondary osteoporosis, yet fracture risk frequently remains underestimated. Conventional tools (DXA - BMD, FRAX) fail to capture cortical microarchitectural deterioration and impaired physical function, key contributors to fracture risk. We examined the impact of current and previous oral GC exposure on bone mineral density (BMD), microarchitecture, physical function, and fracture risk in older women.

Material and Methods:
3,028 women aged 75–80 years from the Swedish population based SUPERB cohort were included and followed for 7.3 (4.4-8.4) years (median (IQR). Women were classified as current (n=154), previous (n=728), or never (n=2,146) GC users (≥2 oral GC prescriptions in the last 120 days, Swedish Prescribed Drug Register). Bone health was assessed using DXA, trabecular bone score (TBS), high-resolution peripheral quantitative computed tomography (HR-pQCT) at the tibia. Physical function was evaluated using Timed Up and Go (TUG) and walking speed. Incident fractures were identified via radiology archives and categorized as major osteoporotic (MOF), hip, vertebral, or any fracture. Associations were analyzed using Cox proportional hazards and Fine–Gray models, adjusted for age, BMI, clinical risk factors, and femoral neck BMD.

Results:
Areal BMD did not differ significantly between exposure groups. Compared with GC-naïve women, current GC users had 8.7% higher cortical porosity, 1.6% lower cortical volumetric BMD, and 2.5% lower TBS (all $p < 0.05$). Physical performance was considerably worse in current GC users than in nonusers (13.0% higher TUG, 6.5% slower walking speed, $p<0.05$). Only current, but not previous, GC use was associated with increased risk of MOF (HR 1.68, 95% CI 1.13–2.49), vertebral (HR 2.59, 95% CI 1.58–4.24), and any fracture (HR 1.68, 95% CI 1.19–2.38), but not hip fracture (HR 1.13 95% CI 0.59–2.69)(Figure).

Conclusion(s):
Current, but not previous, GC treatment was associated with increased fracture risk accompanied by substantially increased cortical porosity and impaired physical function. These results indicate that timing of glucocorticoid use, cortical bone microstructure and physical function should be included in fracture risk assessment for GC exposed patients.



P924

EFFICACY AND SAFETY OF CETYLATED FATTY ACIDS IN OSTEOARTHRITIS: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Background: Osteoarthritis (OA) is a major cause of pain and disability worldwide. Current management often relies on non-steroidal anti-inflammatory drugs (NSAIDs), which carry long-term safety concerns. Cetylated fatty acids (CFAs) have been proposed as adjunctive therapies due to their purported anti-inflammatory and lubricating properties. This study evaluated the effectiveness of CFAs in reducing pain and improving functional outcomes in adults with osteoarthritis.

Methods: We conducted a systematic review and meta-analysis in accordance with PRISMA and Cochrane guidelines (PROSPERO ID: CRD420251009414). PubMed, EMBASE, and Scopus were searched from inception to March 2025, with an updated search conducted up to September 2025. Eligible studies included randomized controlled trials (RCTs) and observational studies assessing CFAs in adults with OA. The primary outcome was a change in pain scores. Secondary outcomes included physical function, stiffness, and adverse events.

Results: Seven studies (n = 347) met inclusion criteria; five RCTs (n = 277) contributed to quantitative synthesis. The pooled analysis revealed that CFAs resulted in a significant reduction in pain compared to the control group, with a moderate effect size (SMD = −0.68, 95% CI −0.93 to −0.44; $p < 0.00001$). Between-study heterogeneity was negligible ($I^2 = 0\%$), and the direction of effect was consistent across individual comparisons.

Conclusion: CFAs are associated with a statistically significant analgesic benefit in osteoarthritis, with highly consistent effects across trials. While encouraging, these findings derive from a small evidence base, and it is unclear whether this effect is clinically meaningful; larger, rigorously designed, placebo-controlled RCTs with standardized pain and function outcomes and longer follow-up are needed to define optimal formulation, dosing, and durability of benefit.

P925

PREVALENCE OF VITAMIN D DEFICIENCY/ INSUFFICIENCY IN PATIENTS WITH OBESITY AND DIABETES MELLITUS TYPE 2

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Objective: To assess the prevalence of vitamin D deficiency/insufficiency in patients with obesity and diabetes mellitus (DM) type 2.

Materials and methods: The study involved 32 patients: group 1 – 46,9% (n=15) with obesity and group 2 – 53,1% (n=17) with DM type 2. The average age in this groups were 65 (50; 77) and 68 (63; 71) respectively, (p>0.05). The following parameters were examined: body mass index (BMI), blood pressure (BP), creatinine, triglycerides (TG), cholesterol (CH), glycated hemoglobin (HbA1c), fasting blood glucose (FGL) and vitamin D level (25(OH)D). Statistical processing of the obtained results was carried out using the program "STATISTICA 10.0".

Results: The analyzed groups of patients had not differences in age, BP, creatinine, CH, or TG (p>0,05). BMI was higher in group 1 if compared to group 2 (34,2 kg/m^2 vs 30,1 (28,8; 31,2) kg/m^2, p=0,01). FGL was higher in group 2 if compared to group 1 (7,3 (6,2; 8,3) mmol/l vs 5 (4,7; 5,2) mmol/l, p <0,05). The level of 25(OH)D in the blood plasma of patients in group 1 was 14.2 (10.0; 18.8) ng/ml and corresponded to vitamin D insufficiency in 20% (n=3) and deficiency in 80% (n=12) of those examined.

In group 2, the level of 25(OH)D was 14,3 (11,8; 20,3) ng/ml, which corresponded to insufficiency in 29,4% (n=5) and deficiency in 70,6% (n=12) of patients. The level within the optimal range of 25(OH)D in the blood plasma of patients for these two groups was not revealed. No significant differences were found in the levels of 25(OH)D between those examined, nor was there a significant difference in the ratio of vitamin D deficiency to insufficiency (p>0,05).

In group 2, we found a negative relationship between 25(OH)D levels and HbA1c (R =-0,50, p=0,04), as well as a positive relationship between HbA1c levels and TG (R=0,61, p=0,01), CH (R=0,53, p=0,03) and FGL (R=0,55, p=0.02).

Conclusion. The study revealed a significant prevalence of vitamin D deficiency/insufficiency (100%) among patients with obesity and DM type 2. The level of 25(OH)D had an inverse correlation with HbA1c in patients with type 2 DM.

P926

EFFICACY OF FUNCTIONAL REHABILITATION IN COMMON BACK PAIN: WHEN PERSEVERANCE PAYS OFF

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Introduction: Common back pain is a frequent reason for consultation that significantly impacts patients quality of life. Functional rehabilitation plays a key role in the management of this condition, but its effectiveness may vary depending on various factors.
Objective: The aim of our study was to evaluate the effectiveness of functional rehabilitation in treating common back pain.
Methods: We conducted a cross-sectional study including patients treated for common back pain who underwent functional rehabilitation. Clinical evaluations included pain intensity (visual analog scale for spinal pain [VASBack] and radicular pain [VASRadicular]), spinal mobility measurement (Schöber index [SI]), and sleep quality (evaluated on a scale from 0 [very impaired] to 5 [good]).
Results: We included 42 patients, 35 women and 7 men, with a mean age of 54.69 ± 10.98 years. Twenty-two patients were professionally inactive (52%). Five patients were smokers (12%), and 37 were sedentary (92%). Seventyone percent of patients had comorbidities (n=30). Overweight was noted in 74% of cases (n=31). The most common spinal pathology was lumbosciatica (n=18; 43%), followed by low back pain (n=12; 29%) and cervical radiculopathy (n=9; 21%). The most common radiological abnormalities were lumbar osteoarthritis (29 cases) and posterior facet joint osteoarthritis (17 cases). The mean duration of symptoms was 5.13 ± 4.46 years. Functional rehabilitation was performed in different settings: at the hospital (17 cases) and in a private center (26 cases). The average number of sessions was 12.4 ± 5.1, with an average duration of 53.63 ± 29 minutes per session. Before rehabilitation, the average VASBack and VASRadicular scores were 7 ± 1.87 and 4.4 ± 3.67, respectively. Thirty-six patients presented spinal syndrome (86%) and 21 presented radicular syndrome (48%). The mean SI was 1.87 ± 0.86. Sleep quality was impaired in 69% of patients (n=29), with an average score of 4.83 ± 2.1. After rehabilitation, VASBack and VASRadicular scores decreased to averages of 3.78 ± 2.83 and 3.17 ± 1.14, respectively. Similarly, improvements in SI and sleep quality were noted, with averages of 3.17 ± 1.14 and 6.9 ± 2.26, respectively. Spinal syndrome and radicular syndrome persisted in 16 and 10 patients, respectively. Post-rehabilitation VASBack was negatively correlated with the number of rehabilitation sessions (r=-0.351; p=0.026). Post-rehabilitation SI was correlated with the average duration of sessions (r=0.489 ; p=0.007). Furthermore, post-rehabilitation sleep quality improved with the number of sessions (r=0.390; p=0.011).
Conclusion: Our study showed that physical therapy, depending on the number and duration of sessions, is effective in treating common back pain, with significant improvements in pain and sleep quality.

P927

SCHOOL ABSENTEEISM IN JUVENILE IDIOPATHIC ARTHRITIS: FREQUENCY AND ASSOCIATED FACTORS

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Introduction: Juvenile idiopathic arthritis (JIA) can impair a child's quality of life due to joint and extra-articular involvement, leading to a negative impact on school attendance. The aim of our study was to assess the frequency of school absenteeism among children with JIA and to identify associated factors.
Methods: This was a cross-sectional study including school-aged children with JIA fulfilling the ILAR 2010 criteria. The following data were collected: age, sex, erythrocyte sedimentation rate (ESR), and C-reactive protein (CRP) levels. Disease activity was assessed using the JADAS10-ESR and the JSpADA scores. Data related to school absenteeism included its frequency, mean duration, reasons for absenteeism, and patients' perceptions.
Results: Sixty patients were included. The sex ratio was 1. The mean age was 14.88 ± 5.01 years. School absenteeism was reported in 60% of patients, mainly occurring after initiation of therapeutic management (43.3% of patients). The most frequently reported reasons were hospital admissions (36.7%), joint pain (26.7%), and disease flares (25%). The mean duration of absenteeism was 5.5 ± 5 days per month. School absenteeism was significantly associated with the following parameters: later age at disease onset (p=0.03), longer disease duration (p=0.04), enthesitis-related arthritis (ERA) subtype (p=0.024), higher CRP levels (p=0.05), higher JADAS10-ESR and JSpADA activity scores (p=0.05 and p=0.04, respectively), presence of erosions (p=0.03), hip involvement (coxitis) (p=0.001), sacroiliitis (p=0.03), and use of disease-modifying antirheumatic drugs (p=0.02). The duration of absenteeism was positively correlated with disease duration (p=0.007), JADAS10-ESR score (p=0.026), and JSpADA score (p=0.029). In multivariate analysis, the ERA subtype (p=0.035) and hip involvement (p=0.027) were independently associated with school absenteeism.
Conclusion: According to our study, school absenteeism reflects higher disease activity, as evidenced by inflammatory markers, disease activity scores, and structural damage.

P928

FRACTURES IN JUVENILE ARTHRITIS: RACING AGAINST SKELETAL LOSS

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Introduction: Bone growth is a critical period for achieving optimal skeletal mass. In children with juvenile idiopathic arthritis (JIA), chronic inflammation and corticosteroid intake can be responsible for bone weakening and fracture risk.
Objective: We aimed to identify factors associated with fractures in JIA.

Methods: A retrospective study was conducted including JIA patients diagnosed according to ILAR 2001 criteria. Data collected included demographics, clinical features, laboratory markers, radiographic findings, and treatment history. Disease activity was assessed using JADAS10 (ESR and CRP). Erosive disease was defined as joint space narrowing and/or radiographic/ultrasound erosions. Bone mineral density (BMD) was assessed using a dual-energy X-ray absorptiometry of the entire body and expressed in g/cm ^{2} and Z-score.
Results: Ninety-one patients were included (46 boys, 45 girls). The mean age was 15.9±6 years. The mean age at disease onset was 9.4±4.2 years. The mean disease duration was 6.4±4.6 years. JIA subtypes were ERA 42.9%, systemic 7.7%, oligoarthritis 30.9%, polyarthritis 11.5%. Mean JADAS10-ESR and JADAS10-CRP were 19.6±6.7 and 16± 8.3, respectively. Hip involvement and erosions were noted in 28.6%, and 30.8%, respectively. Treatments included NSAIDs (93.4%), oral corticosteroids (11%), csDMARDs (59.3%), bDMARDs (29.7%), and intra-articular corticosteroid injections (40.7%).
The mean BMD was 0.926±0.123g/cm² with a mean Z-score of -0.7±1.12 SD.
Fractures occurred in 8 patients (8.8%), involving forearm (n=2), ankle (n=2), wrist (n=2), supracondylar humerus (n=1), and basicervical femur (n=1). Patients with fractures were younger (13.1 ± 2 vs 16.1 ± 6.2 years; p=0.006) and had earlier disease onset (6.5 ± 2.8 vs 9.7 ± 4.2 years; p=0.038). No significant associations were found with sex, BMI, bone mineral density, JIA subtype, JADAS, JSpADA, corticosteroid use, intra-articular injections, or BMD.
Conclusion: Younger age and earlier disease onset are associated with fracture risk in JIA. Early and individualized assessment of bone health is essential for optimizing fracture prevention and long-term management.

P929
IMPACT OF HLA-B27 AND HLA-B51 ON CLINICAL AND BIOLOGICAL FEATURES OF JUVENILE IDIOPATHIC ARTHRITIS

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Introduction: Juvenile idiopathic arthritis (JIA) prognosis may be influenced by genetic factors. Among these, HLA-B27 and HLA-B51 antigens are of particular interest. However, their role in JIA remains controversial.
Objective: We aimed to analyze the prevalence of HLA-B27 and HLA-B51 in JIA and to identify associated factors.
Methods: A retrospective study was conducted including JIA patients diagnosed according to the 2001 International League of Associations for Rheumatology (ILAR) criteria. The following data were collected: sociodemographic, erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), treatments and disease activity assessed using Disease activity was assessed using the Juvenile Arthritis Disease Activity Score (JADAS) and the Juvenile Spondyloarthritis Disease Activity Index (JSpADA). Only patients who had undergone HLA typing were included.
Results: Fourty-three patients were included (25 boys and 18 girls). The mean age of patients was 16.5 ± 4.3 years. The mean age at disease onset was 3.3±2.1 years. The JIA subtypes were: systemic (n=1), oligoarthritis (n=8), polyarthritis (n=2), enthesitis-related arthritis (ERA) (n=27), psoriatic arthritis (n=4), and undifferentiated JIA (n=1). The mean CRP and ESR levels were 14.5±22.5 mg/L and 26.8±23.9mm/h, respectively. The mean JADAS-CRP and JADAS-ESR scores were 14.7 ± 7.9 and 18.6 ± 6.4, respectively. The mean JSpADA score was 2.9 ± 1.5. Uveitis was reported in 6 patients (14%), and cutaneous psoriasis in 2 patients (4.7%).
HLA typing revealed 8 HLA-B27-positive patients (18.6%) and 7 HLA-B51-positive patients (16.3%). HLA-B27 was significantly associated with male sex (p=0.009), ERA subtype (p=0.019), higher CRP (32.3±33 vs. 10.3±18mg/L; p=0.029), and higher ESR (49.6±37.8 mm/h vs. 21.9±16.3 mm/h; p=0.044).
No significant association was observed between HLA-B27 and the presence of enthesitis (p=0.673), back pain (p=0.508), or sacroiliitis (p=0.304). Similarly, uveitis was not associated with either HLA-B27 (p=0.509) or HLA-B51 (p=0.270).
Conclusion: Our study showed that HLA-B27 was associated with male sex, the ERA subtype, and higher inflammatory activity. Recent studies have shown that HLA-B27 status is linked to more severe disease activity, particularly in ERA, and to lower long-term remission rates [1,2]. These results emphasize the importance of closer monitoring and optimized therapeutic strategies in HLA-B27-positive patients.
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P930
SPORTS ACTIVITY AND MEDICAL EXEMPTION IN JUVENILE IDIOPATHIC ARTHRITIS

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Introduction: Juvenile idiopathic arthritis (JIA) may be responsible for the alteration of patients' quality of life due to joint and extra-articular involvement, particularly, by limiting participation in sports activities.
Objective: The aim of our study was to assess sports participation among children with JIA.
Methods: A cross-sectional study was conducted including JIA patients fulfilling the ILAR 2010 criteria. The following data were collected: age, sex, visual analogue scale, parent global assessment, disease activity assessed using the JADAS10-ESR and the JSpADA, and structural damage. Data related to sports activity were obtained through patient interviews during pediatric rheumatology consultations.
Results: Sixty patients were included. The sex ratio was 1. The mean age was 14.88 ± 5.01 years. Sports participation was reported in 58.3% of patients, mainly in the school setting (50% of patients), with a mean duration of 4 ± 2.8 hours per week. The most commonly practiced sports were swimming (50%), football (35%), and running (26.7%). A medical exemption from sports was prescribed in 53.3% of patients, mainly indicated by the rheumatologist (36.7%), with a mean duration of 2.89 ± 2 years.
Absence of sports activity was associated with the following parameters: patient VAS (6.56 ± 2.3 vs 3.5 ± 2; p < 0.001), parent global assessment

(6.42 ± 2 vs 4.27 ± 2.18; p < 0.001), physician global assessment (5.16 ± 1.9 vs 3.27 ± 1.97; p = 0.001), JADAS10-ESR (23 ± 5.5 vs 18.3 ± 7.4; p = 0.006), and JSpADA (3.7 ± 1.3 vs 2.67 ± 1.7; p = 0.04). Similarly, hip involvement, radiographic sacroiliitis, and erosive JIA form were more frequently observed in patients with no sports activity (p = 0.008, p = 0.019, and p = 0.023, respectively).

Conclusion: Our study showed that absence of sports activity was associated with higher disease activity, functional impairment, and structural damage. These findings highlight the potential impact of disease severity on sports participation and emphasize the importance of encouraging adapted physical activity in the management of JIA patients, in order to improve quality of life and functional prognosis.

P931

CONTEMPORARY MANAGEMENT OF SPINAL CORD INJURY (SCI)-ASSOCIATED OSTEOPOROSIS: CLINICAL CHALLENGES AND EMERGING STRATEGIES

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Introduction

SCI is complicated by rapid and profound bone loss, resulting in a significantly increased risk of fragility fracture (60% of these patients will suffer a fracture during their lifetime), and a reduction in quality of life. Bone loss after SCI begins within weeks from injury (up to 1% per week in the acute phase), and is more pronounced in the distal femur, proximal tibia and hip. Despite its clinical importance, SCI-associated osteoporosis remains underdiagnosed and undertreated, determining a significant gap in research and clinical practice. The purpose of this study is to highlight these gaps and propose potential solutions.

Methods

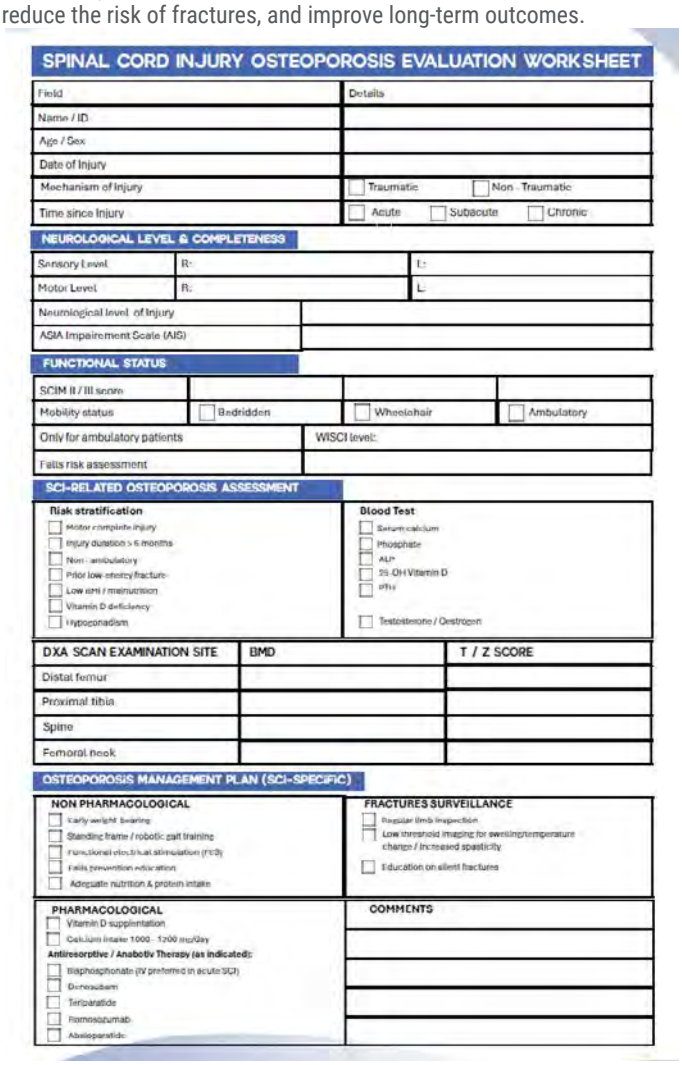
The Authors conducted a literature review covering publications from 1953 to present using the keywords spinal cord injury/lesion and osteoporosis. A total of 806 articles were identified; after excluding studies not specifically addressing post-SCI osteoporosis, 396 were included in the analysis.

Results

Advances in the management of SCI have improved survival and neurological outcomes, but long-term skeletal health remains an unmet need. Current diagnostic approaches are inadequate; DXA often produces misleading results because lumbar spine BMD may appear preserved or increased due to sitting-related loading or the presence of degenerative calcifications, while the most affected sites are not assessed by DXA and normative data are not available. From a therapeutic perspective, antiresorptive drugs show limited and often transient efficacy, failing to prevent bone loss around the knee. Anabolic treatments, particularly Teriparatide, appear promising but require further confirmation, while newer agents (Romosozumab and Denosumab) demonstrate potential benefits in preventing or reversing bone loss after spinal cord injury. Non-pharmacological interventions, particularly functional electrical stimulation and loading strategies, play a complementary role in preserving bone mass.

Conclusions

Comprehensive and effective management of patients with SCI requires close coordination between rehabilitation medicine, endocrinology, orthopaedics, and neurosurgery. The use of specific diagnostic tools and the implementation of multimodal treatment strategies for early and proactive management of osteoporosis should be considered an integral part of comprehensive care for patients with spinal cord injury, particularly in order to implement the use of new anabolic therapies, that reduce the risk of fractures, and improve long-term outcomes.



SPINAL CORD INJURY OSTEOPOROSIS EVALUATION WORKSHEET

Field	Details
Name / ID	
Age / Sex	
Date of Injury	
Mechanism of Injury	☐ Traumatic ☐ Non - Traumatic
Time since Injury	☐ Acute ☐ Subacute ☐ Chronic

NEUROLOGICAL LEVEL & COMPLETENESS

Sensory Level	R:	L:
Motor Level	R:	L:
Neurological level of Injury		
ASIA Impairement Scale (AIS)		

FUNCTIONAL STATUS

SCIM II / III score			
Mobility status	☐ Bedridden	☐ Wheelchair	☐ Ambulatory
Only for ambulatory patients	WISCI level:		
Falls risk assessment			

SCI-RELATED OSTEOPOROSIS ASSESSMENT

Risk stratification
- ☐ Motor complete injury
- ☐ Injury duration > 6 months
- ☐ Non - ambulatory
- ☐ Prior low-energy fracture
- ☐ Low BMI / malnutrition
- ☐ Vitamin D deficiency
- ☐ Hypogonadism

Blood Test
- ☐ Serum calcium
- ☐ Phosphate
- ☐ ALP
- ☐ 25-OH Vitamin D
- ☐ PTH
- ☐ Testosterone / Oestrogen

DXA SCAN EXAMINATION SITE	BMD	T / Z SCORE
Distal femur		
Proximal tibia		
Spine		
Femoral neck		

OSTEOPOROSIS MANAGEMENT PLAN (SCI-SPECIFIC)

NON PHARMACOLOGICAL
- ☐ Early weight bearing
- ☐ Standing frame / robotic gait training
- ☐ Functional electrical stimulation (FES)
- ☐ Falls prevention education
- ☐ Adequate nutrition & protein intake

FRACTURES SURVEILLANCE
- ☐ Regular limb inspection
- ☐ Low threshold imaging for swelling/temperature change / increased spasticity
- ☐ Education on silent fractures

PHARMACOLOGICAL
- ☐ Vitamin D supplimentation
- ☐ Calcium intake 1000 - 1200 mg/day

Antiresorptive / Anabolic Therapy (as indicated):
- ☐ Bisphosphonate (IV preferred in acute SCI)
- ☐ Denosumab
- ☐ Teriparatide
- ☐ Romosozumab
- ☐ Abaloparatide

COMMENTS

P933

SARCOPENIA-DEFINING PARAMETERS CORRELATE WITH SPECIFIC GUT MICROBIOTA: PRELIMINARY FINDINGS FROM THE TEMPUS-FUGIT STUDY

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Objectives

This study aimed to clarify associations between sarcopenia(-defining parameters), gut microbiota (GM), systemic and intestinal inflammation in community-dwelling persons ≥65 years.

Materials and methods

This exploratory, cross-sectional study comprising data from the TEMPUS-FUGIT study (NCT05008770), included 144 community-dwelling persons, of whom 45 had probable, confirmed or severe sarcopenia as per EWGSOP2-criteria. Muscle mass and function were evaluated using Appendicular Lean Mass (ALM), Hand Grip Strength (HGS), 5-time Chair Stand Test (CST), Short Physical Performance Battery (SPPB) and gait speed. Gut microbiota (GM) taxa, enterotypes, and diversity indices were profiled by 16S rRNA sequencing; fecal calprotectin (fCPT), interleukins (IL1β, 4, 6, 8, 10), tumor necrosis factor (TNFα), InterFeroN (IFN)-γ, albumin, highsensitivity Creactive protein (hsCRP), and white blood cell (WBC) counts were measured. Group comparisons and correlations were multiple testing-adjusted. Linear regression analyses were conducted correcting for age, sex, body mass index, steps/day, Bristol Stool Score, intake of statins and proton pump inhibitors, and protein and fiber.

Results

Albumin levels decreased from the lowest to highest tertiles of SMI and ALM. IL-8 increased across HGS tertiles and TNF-α declined from HGS tertile 1 to 2 and rose again in tertile 3. Chao1 richness increased from controls to persons with probable sarcopenia, increased across higher CST tertiles (thus worse muscle strength) and decreased across gait speed tertiles (and thus faster gait). *Eggherthella*, *Eisenbergiella*, *Enterobacter* and *Prevotellaceae* were enriched in controls. A higher CST, associated with lower abundance of *Anaerosporobacter* (β: -0.107; [-0.199; -0.014]) and fCPT associated with *Streptococcus* (β: 0.307[0.108; 0.506]), *Lactobacillus* (β: 0.766 [0.395; 1.137]), *Slackia* (β: 0.465 [0.151; 0.780]) and *Dorea* (β: 0.443[0.174; 0.712]). In persons with any sarcopenia stage, HGS associated with *Mogibacterium* (β: 0.253 [0.062; 0.443]) and fCPT associated with *Acetitomaculum* (β: -0.993 [-1.837; -0.149]). Persons with a *Prevotella*-dominated enterotype walked faster than those with a *Ruminococcus*-dominated enterotype. All findings had a $p_{adj} < 0.05$.

Conclusions

Specific GM taxa were associated with intestinal inflammation in the full cohort and among participants with sarcopenia. Only in those with sarcopenia, GM also associated with muscle strength. GM richness increased with worse lower limb muscle strength and faster gait speed, somewhat contradictory to the expectations. These findings warrant further research in larger, longitudinal cohorts.

Disclosures: all authors have nothing to disclose.

P934

AI-DRIVEN ASMI PREDICTION FROM ROUTINE HIP RADIOGRAPHS FOR OPPORTUNISTIC SARCOPENIA SCREENING

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Objectives

To develop and validate a deep learning model predicting DXA-derived Appendicular Skeletal Muscle Mass Index (ASMI) from routine hip radiographs for opportunistic sarcopenia screening.

Material and Methods

This retrospective study included 1,267 patients (development n=1,140, validation n=127). A multimodal deep learning model integrating radiographic images (ResNet-34 backbone) and clinical variables predicted continuous ASMI and classified sarcopenia per AWGS 2019 criteria (<7.0 kg/m² males, <5.4 kg/m² females). Automated implant masking handled orthopedic hardware. Metrics: Pearson r, R^2, mean absolute error (MAE), area under curve (AUC).

Results

On external validation, the model achieved r=0.806, R^2=0.650, MAE=0.414 kg/m², and AUC=0.874 for sarcopenia classification. Applying AWGS diagnostic thresholds yielded sensitivity of 70.5% and specificity of 83.3%. Performance remained consistent across gender subgroups (females AUC=0.854, males AUC=0.864) and age groups (<60 years AUC=0.854, 60-75 years AUC=0.829, >75 years AUC=0.937). Gradient-weighted Class Activation Mapping confirmed anatomically relevant focus on gluteal and proximal thigh musculature. Automated implant masking improved performance (r: 0.78→0.80).

Conclusions

This first hip radiograph-based ASMI prediction model enables automated sarcopenia screening with performance comparable to complex imaging modalities. With 1.6 million hip radiographs performed annually in aging populations, this approach transforms existing workflows into opportunistic screening infrastructure at near-zero marginal cost, particularly valuable for hip fracture patients and fracture liaison services.

Disclosures

The authors declare no conflicts of interest.

P935

PREOPERATIVE STATIN USE AND 1-YEAR SURVIVAL BENEFIT IN GERIATRIC HIP FRACTURE PATIENTS: A REAL-WORLD ANALYSIS

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Objective
To investigate the association between preoperative statin exposure and 1 year survival outcomes in geriatric patients undergoing hip fracture surgery, aiming to address the disproportionately high postoperative mortality rates in this vulnerable population.
Material and Methods
This retrospective cohort study utilized the TriNetX US Collaborative Network database to identify patients aged 65 to 85 years diagnosed with hip fracture who underwent surgery within 30 days of diagnosis between January 1, 2013 and December 31, 2024. The exposure cohort comprised patients with at least 3 instances of statin use within 3 months prior to surgery, while the control cohort had no history of statin use within 3 months before surgery. A 1:1 propensity score matching (PSM) was performed based on demographics, comorbidities, medications and laboratory values. The primary outcome was all cause mortality at 1 year. Secondary outcomes included acute myocardial infarction (AMI), cardiac arrest and venous thromboembolism (VTE). Survival probabilities were estimated using Kaplan Meier analysis and hazard ratios (HR) with 95% confidence intervals (CI) were calculated using Cox proportional hazards models. Subgroup analyses were conducted by gender, age and diabetes status, alongside sensitivity analyses across 3, 6 and 12 month exposure windows.
Results
After PSM, 13,222 patients were included (6,611 per group) with a mean age of 76 years. The statin cohort demonstrated a significantly lower risk of 1 year all cause mortality compared to controls (9.3% vs 11.8%; HR 0.78, 95% CI 0.70 to 0.86, p<0.001). This survival benefit was also evident at 1 month post surgery (HR 0.79, p=0.025). Subgroup analyses confirmed consistent protective effects across all stratifications. Sensitivity analyses across varying exposure windows validated these findings. Notably, long term statin users (12 month exposure) maintained a significant survival advantage (mortality HR 0.80, p<0.001) despite presenting with a higher baseline cardiovascular risk profile as reflected by increased AMI incidence (HR 1.38, p=0.001). No significant differences were observed for cardiac arrest or VTE.
Conclusion
Preoperative statin exposure is associated with substantial 1 year survival benefits in geriatric hip fracture patients undergoing surgery, persisting even in those with higher cardiovascular burdens. These findings support maintaining statin therapy to provide crucial perioperative protection for this high risk population.

P936

EFFECT OF LONG TERM CINACALCET THERAPY ON HYPERPARATHYROIDISM IN PATIENTS WITH CHRONIC KIDNEY DISEASE STAGE 5

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Background. Treatment of the secondary hyperparathyroidism (sHPT) in patients with chronic kidney disease (CKD) G5D remains an actual problem. The ***aim*** was toeveluate the effect of long-term therapy with calcimimetic cinacalcet (LCT) on the course of sHPT in CKD G5D patients. ***Materials and methods.*** The study examined 268 individuals with CKD G5D, who received therapy by program hemodialysis. In all patients, levels of intact parathyroid hormone (iPTH), serum calcium (Ca), phosphorus (P) and alkaline phosphatase (ALP) activity were analyzed before treatment, after one and two years of therapy. The data were analyzed using SPSS, version 21, with statistical significance set at p <0.05. ***Results.*** The single-center cohort prospective study was conducted. SHPT was detected in 33.6 % of patients, whose average age was 52.22±12.9 years. The study group included patients who received LCT and basic sHPT therapy with the use of vitaminD alfacalcidol and calcium-containing/ synthetic phosphate-binder calcium acetate/sevelamer hydrochloride; the control group received long-term basic therapy. LCT contributed to the achievement of the target level of iPTH in 83.3 % of patients with sHPT, which was accompanied by a significant decrease in the frequency of fractures and clinically significant vascular calcification. During LCT there was also significant decrease of P, Ca level and, to a lesser extent, ALP activity in patients with sHPT. ***Conclusion.*** During LCT of sHPT with cinacalcet, there was a significant decrease in the level of iPTH, which was accompanied by a decrease in the level of serum P, Ca and, to a lesser extent, ALP. Cinacalcet can be considered as a safe and effective tool in the treatment of sHPT in CKD G5D patients.

P937

THE IMPACT OF A COMPREHENSIVE REHABILITATION PROGRAM ON BODY COMPOSITION IN POST-MASTECTOMY UPPER LIMB LYMPHEDEMA: A BIOIMPEDANCE ANALYSIS STUDY

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INTRODUCTION. Upper limb lymphedema is a common and disabling complication following radical breast cancer treatment, with a prevalence of 20-40%. Although volumetry remains the gold standard for diagnosing limb lymphedema, it cannot differentiate between lymphatic edema and adipose hypertrophy. Bioimpedance analysis (BIA) offers a more comprehensive approach to assessing body composition. However, the impact of complex rehabilitation programs on multi-compartment body composition in postmastectomy upper limb lymphedema has not been sufficiently studied.

Aim. To investigate the effect of a comprehensive medical rehabilitation program—including laser therapy, magnet therapy, therapeutic physical exercises, intermittent pneumatic compression, and workouts on cyclic trainers—on body composition parameters measured by BIA in patients with upper limb lymphedema associated with radical breast cancer treatment.
MATERIAL AND METHODS. A cross-sectional study included 30 women aged 35-75 years with secondary upper limb lymphedema following mastectomy for breast cancer. Over a 10-day period, patients underwent comprehensive rehabilitation while maintaining a high-protein diet. Efficacy was assessed using anthropometry (circumference measurements of upper limb segments) and BIA of body composition before and after the treatment course.
RESULTS. A statistically significant reduction was observed in the circumferences of all upper limb segments on both arms ($p<0.05$), except for the right elbow circumference. The most pronounced dynamics were noted in the proximal segments. BIA revealed a significant decrease in total ($p=0.00035$), extracellular ($p=0.00008$), and intracellular fluid ($p=0.000002$), as well as a reduction in waist ($p=0.00004$) and hip circumference ($p=0.0003$). Changes in lean body mass ($p=0.0018$) and musculoskeletal mass ($p=0.004$), along with an improvement in basal metabolic rate ($p=0.026$), were noted.
CONCLUSION. The comprehensive medical rehabilitation program is an effective means of correcting not only local manifestations of lymphedema but also systemic body composition disorders. The combined use of BIA and traditional anthropometry provides an objective multi-component assessment of rehabilitation efficacy.

P938

NEW OPPORTUNITIES IN REHABILITATION: THE IMPACT OF A SPA RESORT COMPLEX ON METABOLIC PARAMETERS IN DIABETIC ANGIOPATHY (RESULTS OF A RANDOMIZED TRIAL)

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Introduction. Diabetes mellitus (DM) is a global non-communicable pandemic, leading to early disability and mortality, primarily due to vascular complications. Diabetic angiopathy of the lower extremities (DALE) is one of the most severe complications, significantly impairing quality of life and increasing the risk of amputations. In this regard, the search for effective rehabilitation methods, including spa and resort treatment (SRT), is of particular importance.
Aim: To study the effect of a comprehensive SRT program on carbohydrate and lipid metabolism parameters in patients with DALE.
Materials and Methods. A randomized prospective study with two parallel groups was conducted. The study included 30 patients with type 1 and type 2 DM and DALE aged 18–70 years. Patients in the main group (n=15) received a 14-day SRT course including carbon dioxide-mineral baths, massage with an elastic pseudo-boiling layer, applications of Ilovo-sulfide mud from Lake Tambukan, intake of mineral water "Essentuki No. 4", and clinical psychological counseling. The comparison group (n=15) received a standard rehabilitation complex (therapeutic exercises, circular shower, vortex foot baths). All patients underwent testing for levels of glucose, total cholesterol (TC), triglycerides (TG), low-density lipoproteins (LDL), and high-density lipoproteins (HDL) before and after the treatment course.
Results. In the main group, after the treatment course, a significant decrease in TC level (from 5.6 [4.9; 6.2] to 5.08 [4.4; 5.6] mmol/l, $p=0.0005$), LDL (from 3.41 [2.73; 3.91] to 3.04 [2.47; 3.54] mmol/l, $p=0.02$), and fasting glucose (from 5.98 [5.3; 6.2] to 5.68 [5.0; 5.8] mmol/l, $p=0.023$) was revealed. In the comparison group, only glucose level decreased significantly (from 6.09 [5.2; 6.15] to 5.54 [5.1; 5.8] mmol/l, $p=0.03$). No significant changes in TG and HDL parameters were noted in either group ($p>0.05$).
Conclusions. The use of a specialized SRT complex, including balneo-, peloido-, and drinking therapy, against the background of a standard diet in patients with DALE leads to a significant improvement in lipid (TC, LDL) and carbohydrate metabolism parameters, surpassing the effect of a standard rehabilitation program.

P939

COMBINING IBANDRONATE WITH MEDICAL REHABILITATION: IMPACT ON TREATMENT OUTCOMES IN POSTMENOPAUSAL OSTEOPOROSIS AT 6 MONTHS

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The aim: to evaluate the effect of treatment with oral form of ibandronic acid 150 mg on the duration of maintaining the effect of medical rehabilitation in patients with established postmenopausal osteoporosis undergoing the 2nd stage of medical rehabilitation.
Material and methods. The work included 70 women aged 45 years and older in the postmenopausal period of more than 1 year, admitted to hospital for the 2nd stage of medical rehabilitation for diseases of the musculoskeletal system and diagnosed with postmenopausal osteoporosis. Women were randomized into 2 groups: the main group (n=35), where ibandronic acid, 150 mg tablets for administration once a month, was prescribed, and the comparison group (n=35). All patients in the main and comparison groups received cholecalciferol (vitamin D3) at an average dose of 1500 IU per day. Evaluation of the effectiveness of treatment after 6 months was carried out using a "battery" of functional tests to assess the function of movement, strength of the muscles of the spine and abdomen, static and dynamic balance indicators, as well as by assessing pain on a 5-point VAN scale and quality of life using the SF-36 questionnaire.
Results. After 6 months, in the main group, in contrast to the comparison group, an increase in static endurance of the back muscles ($p=0.017$) and dynamic endurance of the back muscles ($p=0.024$ vs with the initial level; $p=0.030$ vs with the comparison group), an increase in walking speed in the test were noted. 10-meter walk ($p=0.043$) and a decrease in the time to complete the Stand and Go test ($p=0.035$ vs. baseline; $p=0.028$ vs. comparison group). Also, in the main group, a decrease in the degree of forward body displacement in the Fukuda test was observed ($p=0.035$ vs. baseline; $p=0.047$ vs. comparison group) and an increase in the time to maintain balance with eyes open, both on the right ($p=0.018$) and left legs ($p=0.031$). After 6 months, the main group also noted an increase in the score on the SF-36 Physical Functioning ($p=0.040$), Pain Intensity ($p=0.025$ vs. baseline; $p=0.006$ vs. comparison group) and Life Activity ($p=0.024$) scales. The social functioning indicator increased in both groups ($p<0.05$), but the quality of life level in this domain in the main

group was better than in the comparison group (p=0.043). A decrease in the severity of pain syndrome was detected only in the main group (p=0.044).

Conclusion. Preliminary data of the scientific work showed the effectiveness of treatment with oral form of ibandronic acid 150 mg in maintaining the effect of medical rehabilitation in patients with established postmenopausal osteoporosis.

P940

INDIVIDUALIZED FACTOR IX REPLACEMENT AND HEXAPOD EXTERNAL FIXATION IN HEMOPHILIA B PATIENTS WITH OPEN TIBIA AND FIBULA FRACTURES: PERIOPERATIVE SAFETY AND OUTCOMES

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Objective:
To assess the perioperative safety and clinical outcomes of individualized coagulation factor IX (FIX) replacement combined with hexapod external fixation in hemophilia B patients with open tibia and fibula fractures, and to develop a standardized management protocol for high-bleeding-risk cases.

Methods:
A retrospective review was performed on 9 male patients with hemophilia B who sustained open tibia and fibula fractures and were treated at our institution between January 2015 and June 2024 (age range, 19–54 years; mean, 35.7 years). Preoperatively, all patients received FIX replacement therapy under hematology guidance until coagulation targets were achieved. The intraoperative FIX activity target was ≥80%, maintained at 50–70% for the first 3–5 days postoperatively, and adjusted subsequently according to clinical monitoring. All patients underwent fracture reduction and stabilization using a hexapod external fixator (Taylor Spatial Frame / Ortho-SUV). FIX activity and APTT were monitored preoperatively and at 24 and 72 hours postoperatively. Intraoperative blood loss, wound healing, complications, and radiographic bone union were documented.

Results:
All 9 patients underwent successful surgery after achieving target FIX activity. The mean intraoperative blood loss was 220 ± 70 mL, with no major bleeding or reoperation for hemostasis. Postoperative FIX levels remained within the target range, and APTT normalized progressively. Eight wounds healed primarily, while one superficial infection resolved with dressing changes. Soft-tissue recovery was satisfactory, and fixator adjustment proceeded smoothly. At 6-month follow-up, radiographic bone union was achieved in all cases, with no rebleeding, refracture, or inhibitor formation observed.

Conclusion:
In hemophilia B patients with open tibia and fibula fractures, individualized FIX replacement combined with hexapod external fixation is a safe and effective approach. This method provides reliable hemostatic control and stable fracture healing, offering a practical and reproducible perioperative management model for complex high-risk cases.

Keywords: Hemophilia B; Factor IX; Hexapod external fixation; Open tibia and fibula fracture; Perioperative management

P941

CLINICAL APPLICATION OF A PORTABLE FEMORAL TRACTION DEVICE IN ELDERLY PATIENTS WITH OSTEOPOROTIC INTERTROCHANTERIC FRACTURES

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Background
Osteoporotic intertrochanteric femoral fractures are common in the elderly, and PFNA is widely used as a minimally invasive fixation method. However, the traditional supine traction table is bulky, complex to assemble, and provides limited fluoroscopic access, which may prolong operative time and increase complications. This study aimed to evaluate the clinical utility of a newly developed portable lateral-position traction device in PFNA surgery.

Methods
A retrospective analysis was conducted on elderly patients with intertrochanteric fractures who underwent PFNA from January to October 2025. Patients were divided into a control group (traditional supine traction table) and an experimental group (portable traction device). Surgical efficiency and complications were compared. Outcome measures included traction device installation time, reduction time, fluoroscopy frequency, total incision length, device removal time, intraoperative blood loss, and incidence of perineal pressure sores.

Results
A total of 63 patients were enrolled (31 in the control group and 32 in the experimental group), with no significant differences in baseline characteristics such as sex, age, weight, anesthesia type, or Evans classification ($P > 0.05$). Compared with the control group, the experimental group demonstrated significantly improved intraoperative performance: installation time was reduced from 32 to 6 minutes (81% reduction), reduction time decreased by 12 minutes (37 to 25 minutes), fluoroscopy frequency was reduced by approximately 50% (4–5 vs. 8–10 exposures), total incision length shortened by 1.5 cm (5.8 cm vs. 7.3 cm), and device removal time decreased from 8 to 3 minutes (62.5% reduction). In addition, intraoperative blood loss was reduced by about 17% (35 mL vs. 42 mL), and the incidence of perineal pressure sores decreased from 6.5% to 3.1%. These findings indicate that the portable traction device can markedly optimize procedural efficiency and reduce intraoperative risks.

Conclusion
The portable lateral-position traction device significantly enhances surgical efficiency and safety in PFNA procedures for elderly intertrochanteric fractures, reduces complications, and improves the intraoperative experience. Its lightweight structure and ease of use make it suitable for primary hospitals and resource-limited settings, supporting its potential for broader clinical adoption.

P942

ASSOCIATIONS OF FEMORAL NECK COMPOSITE STRENGTH INDICES WITH VITAMIN D AND GLYCATED HEMOGLOBIN IN OLDER SARCOPENIC WOMEN

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Background
Bone mineral density does not fully reflect skeletal fragility, particularly in older adults with sarcopenia. Femoral neck composite strength indices like Compression Strength Index (CSI), Bending Strength Index (BSI), and Impact Strength Index (ISI), integrate bone density geometry, and body size to estimate bone mechanical competence. Metabolic factors such as vitamin D status and glycemic control may influence these indices, yet data in sarcopenic older women from Middle Eastern populations are scarce.
Objective
The objective of this study is to examine the associations between total vitamin D, glycated hemoglobin (HbA1c), and femoral neck composite strength indices (CSI, BSI, ISI) in non-diabetic sarcopenic Lebanese women aged 60 years and older.
Methods
58 sarcopenic women (mean age 66.1 ± 5.7 years) underwent dual-energy X-ray absorptiometry for calculation of CSI, BSI, and ISI. Sarcopenia was defined according to EWGSOP criteria using skeletal muscle mass index and handgrip strength. Fasting serum total vitamin D and HbA1c were measured. Associations were assessed using Pearson correlation and multiple linear regression adjusted for age.
Results
Vitamin D levels were positively associated with CSI ($r = 0.301$, $p = 0.0217$) and ISI ($r = 0.296$, $p = 0.0241$). In addition, HbA1c was negatively associated with BSI ($r = -0.270$, $p = 0.0404$), with non-significant negative trends for CSI and ISI. After age adjustment, vitamin D remained an independent positive predictor of CSI ($p = 0.025$) and ISI ($p = 0.028$), while HbA1c remained an independent negative predictor of BSI ($p = 0.030$).
Conclusion
In older sarcopenic women, vitamin D and glycemic status are independently associated with different mechanical components of femoral neck strength. Higher vitamin D is related to greater compression and impact resistance, whereas higher HbA1c is associated with reduced bending strength. Femoral neck composite strength indices may improve fracture-risk assessment by capturing metabolic influences on bone strength beyond BMD.

P943

ASSOCIATIONS BETWEEN FUNCTIONAL PERFORMANCE AND TRABECULAR BONE SCORE IN OLDER WOMEN WITH SARCOPENIA

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Aim:

This study aimed to explore the association between Six-Minute Walk Test (6MWT), and trabecular bone score (TBS) in a group of older women diagnosed with sarcopenia.
Methods:

36 women aged between 60 and 82 years were enrolled in this study. Participants were recruited from several cities in northern Lebanon. All subjects completed a series of clinical and physical assessments, including dual-energy X-ray absorptiometry (DXA), the 6MWT, handgrip strength testing, and a vertical jump test. Sarcopenia was defined according to EWGSOP criteria using skeletal muscle mass index and handgrip strength.
Results
L1–L4 trabecular bone score (TBS) was positively associated with Six-Minute Walk Test performance and vertical jump height in older sarcopenic women, and these associations remained significant after adjusting for age.
Conclusion:

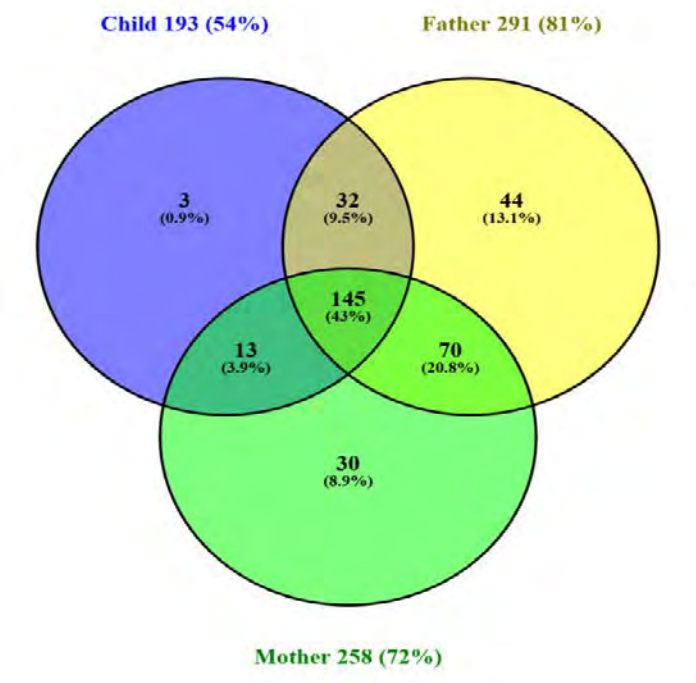
The findings of this study indicate that performance in the 6MWT and vertical jump test are significant and independent predictors of lumbar spine (L1–L4) trabecular bone score in older women with sarcopenia.

P944

FRAGILITY RUNS IN THE FAMILY: INTERGENERATIONAL CLUSTERING OF OSTEOPOROSIS IN A RURAL INDIAN COHORT

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Objectives

To study the prevalence of osteopenia and osteoporosis across two generations and to examine the extent and pattern of familial clustering of low bone mass in a well-characterised rural Indian birth cohort.

Material and Methods

The Pune Maternal Nutrition Study (PMNS) is a prospective intergenerational cohort established in 1993 in rural western India. Dual-energy X-ray absorptiometry (DXA) measurements of the lumbar spine and femoral neck were obtained in 558 adult offspring (F1 generation), 392 fathers and 502 mothers (F0 generation). Familial clustering was evaluated among 358 complete parent-offspring trios using Venn-diagram-based visualisation.

Results

In the F1 generation, mean age of males was 26 years and of females was 23 years. Mean age of fathers was 53 years, and of mothers was 46 years. In the F1 generation (children), the prevalence of osteoporosis was 5.3% in males and 3.9% in females while osteopenia was prevalent in 49.8% and 50.3% respectively. In the F0 generation (parents), the prevalence of osteoporosis was 32.6% in fathers and 25.1% in mothers while osteopenia was prevalent in 48.7% of fathers and 48.6% of mothers. There was a strong association between BMD of children and parents, both at AP spine and neck of femur.

Among 358 parent-offspring trios, osteoporosis or osteopenia was present in 81% of fathers and 72% of mothers, with 54% of children affected. Notably, 43% of trios showed clustering of compromised skeletal health in all three family members, indicating strong familial aggregation. In 177 (52%), families there was father-child concordance and in 158 (46%) families, there was mother-child concordance, showing no significant parent-of-origin effect (Figure 1)

Conclusion

Familial clustering of compromised skeletal health in this cohort shows that osteoporosis is a life-course trait shaped by inheritance and shared family environments. Beyond genetics, intergenerational factors such as maternal nutrition, fetal growth, and early-life living conditions appear to program skeletal risk. This makes family-centred, early-life intervention a rational and potentially transformative strategy in prevention of fractures.

P945

GUIDING COST-EFFECTIVE OSTEOPOROSIS CARE IN SOUTH ASIA USING FRAX®-BASED INTERVENTION THRESHOLDS

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Objectives

Osteoporotic fractures are a growing public health challenge in South Asia, where constrained resources amidst an ageing population necessitate robust economic evaluation of fracture-risk–based intervention strategies to optimize health-care resource utilisation.This study aimed to evaluate the cost-effectiveness of oral bisphosphonate therapy in post-menopausal women at age-dependent FRAX®-based Major Osteoporotic (MOF) and Hip Fracture (HF) intervention thresholds (ITs) in three South-Asian countries - Bangladesh, Sri Lanka, and Pakistan, incorporating country-specific epidemiological and cost inputs.

Methods

Country-specific Markov microsimulation models were adapted to estimate the lifetime healthcare costs and quality-adjusted life years (QALY) of the most commonly used anti-osteoporotic medications (oral risedronate in Bangladesh, oral alendronate in Pakistan and Sri Lanka) compared with no treatment. Cost-effectiveness of age-dependent FRAX®-based MOF and HF ITs was estimated. Cost-effectiveness was evaluated as cost per QALY gained, where one QALY represents one year of life in perfect health. The incremental cost-effectiveness ratio (ICER) reflects the additional cost incurred to gain one additional QALY compared with the alternative. Interventions were considered cost-effective when ICERs were below the country-specific cost-effectiveness

threshold, defined as one-times GDP per capita.
Results
In Bangladesh, treatment with oral risedronate was cost-effective when applied at MOF ITs from 60 years of age and at HF ITs from 55 years under full adherence, and from 70 years for both thresholds under real-world adherence. In Sri Lanka, oral alendronate was cost-effective for both thresholds at 60 and 65 years with full adherence and real-world adherence respectively. In Pakistan, oral alendronate was cost-effective at MOF ITs from 60 and 70 years with full and real-world adherence respectively, and at 70 years for HF ITs with full adherence.
Conclusion
This study suggests that the treatment of South Asian women with oral bisphosphonates is cost-effective at age-dependent FRAX® intervention thresholds from the late 50s to early 70s depending on country, fracture site, and adherence assumptions. Offering cost-effective access to therapy for individuals with high FRAX®-based fracture probabilities, will help guide efficient, equitable osteoporosis treatment strategies in resource-constrained South Asian settings.

P946

AI-DERIVED, DXA-INDEPENDENT PREDICTION OF PREVALENT FRAGILITY FRACTURES: DEVELOPMENT AND VALIDATION OF A CLINICALLY INTERPRETABLE RISK SCORE FOR RESOURCE LIMITED SETTINGS IN INDIA (ASTHI-RISK)

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Objectives
DXA-based bone mineral density (BMD) and FRAX are central to fracture risk assessment but are limited by access, cost, and reliance on predefined risk weightings. There is growing interest in explainable artificial intelligence (AI) approaches that can leverage routinely available clinical data to improve fracture case-finding, particularly in resource-constrained settings.
To develop and validate a DXA- and FRAX-independent, clinically interpretable AI-derived risk score (ASTHI-RISK) for identifying individuals with prevalent fragility fractures, using explainable machine learning and penalized regression techniques.
Methods
We analyzed data from 300 adults evaluated for osteoporosis, with prevalent fragility fracture as the primary outcome. Multiple machine-learning models were trained and compared in a stepwise fashion, progressively excluding FRAX variables, BMD, and T-scores. Model performance was assessed using accuracy, precision, recall, F1-score, and ROC–AUC.
To ensure interpretability, SHapley Additive exPlanations (SHAP) were used to quantify the relative contribution and directionality of individual predictors at both global and patient levels. Key features identified through SHAP analysis were subsequently entered into a penalized logistic regression model, enabling derivation of a parsimonious, weighted, point-based clinical risk score.
Results
Among evaluated models, ensemble methods demonstrated superior performance. In a strict DXA- and FRAX-independent setting, XGBoost achieved an accuracy of ~90%, F1-score of 0.94, and ROC–AUC of approximately 0.90. SHAP analysis consistently identified age, body mass index, height, weight, diabetes status, history of falls, glucocorticoid exposure, rheumatoid arthritis, and age at menopause as dominant contributors to fracture risk.
These variables were incorporated into the ASTHI-RISK score (range 0–15), categorizing individuals into low, intermediate, and high-risk groups. A threshold ≥7 demonstrated a sensitivity of ~82% with specificity ~74%, while higher cut-offs achieved specificity >90%, enabling flexible use for screening or confirmatory case-finding.
Conclusions
Explainable AI models can accurately identify prevalent fragility fractures using routinely available clinical data alone, without reliance on DXA or FRAX. By combining SHAP-based feature attribution with penalized regression, ASTHI-RISK translates complex machine-learning outputs into a transparent, clinically actionable risk score. This approach offers a scalable, interpretable strategy for fracture case-finding and prioritization, particularly relevant to low- and middle-income healthcare settings



P947

ATYPICAL SCAPULAR SPINE FRACTURE DURING DENOSUMAB THERAPY: A CASE REPORT

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Introduction
Antiresorptive therapies effectively reduce osteoporotic fracture risk; however, prolonged suppression of bone turnover may lead to atypical fractures (AFs). Although AFs are predominantly described in the femur, recent evidence indicates that non–weight-bearing sites, including the scapula, may also be affected(1).Several reports link long-term bisphosphonate therapy to atypical scapular or scapular-spine fractures, yet no case has been documented during denosumab monotherapy(2-3). We present what appears to be the first reported case of an atypical scapular spine fracture associated with denosumab use.

Case Report
A 78-year-old woman presented with acute onset of right shoulder pain and restricted range of motion. Her medical history included osteoporosis treated with denosumab for four years (eight doses). She reported no trauma. Physical examination revealed marked tenderness over the scapular spine and painful limitation of shoulder movements. Radiography demonstrated a vertical fracture line at the proximal aspect of acromion, consistent with an atypical scapular spine fracture. An individualized, conservative treatment plan was initiated based on fracture stability and clinical findings.

Conclusion
This case highlights that atypical fractures may occur even at non–weight-bearing sites during denosumab therapy, underscoring the importance of clinical vigilance for unexplained shoulder pain in patients receiving antiresorptive treatment.

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P948

IMPACT OF HORMONAL CONTRACEPTIVES ON BONE HEALTH - AN UMBRELLA REVIEW

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Objective This study aims to systematically review and assess evidence from existing systematic reviews on the link between hormonal contraceptive use and bone health outcomes.

Material and Methods A comprehensive literature search was conducted in December 2025 in Medline (Ovid®), Embase, and the Cochrane Database of Systematic Reviews, following the PRISMA guidelines and the Joanna Briggs Institute manual[1], adapted for umbrella reviews. Manual search was also conducted. Systematic reviews and meta-analyses of observational and interventional studies were included if they evaluated hormonal contraceptive use (combined hormonal contraception, CHC; combined oral contraceptives, COC; progestin-only contraceptives, POC) among reproductive-age women and reported fracture risk, bone mineral density (BMD), or bone turnover markers. The risk of bias was assessed using the AMSTAR-2 tool. (PROSPERO CRD420261279749)

Results Of 1,593 screened records, 12 systematic reviews and 2 meta-analyses published between 2006 and 2025 met inclusion criteria. The primary studies included in systematic reviews were highly heterogeneous, limiting synthesis, with moderate overlap across reviews (corrected covered area = 8%). Most reviews focused on CHC (CHC, n=9; COC, n=3), predominantly evaluating ethinyl estradiol-based formulations; only 2 addressed POC (mainly depot medroxyprogesterone acetate (DMPA), with limited data on implants and hormonal intra-uterine device (IUD)), while oral POC were not covered. Outcomes were BMD (n=11); fracture (n=4) and bone turnover markers (n=2). In the general population, CHC use has no significant impact on BMD or fracture risk (n=5). In adolescents, CHC use reduces bone accrual compared to nonusers (n=3), especially with low-dose COC (n=3) (limited evidence). During perimenopause, CHC use may reduce bone turnover and limit BMD loss (n=5). These effects likely depend on different endogenous estradiol level requirements to build or maintain bone health, which differ across adolescence, reproductive years, and perimenopause. DMPA significantly reduces BMD compared to nonusers (n=4), while limited data suggest that POC implants, and hormonal-IUDs may not affect BMD (n=2). The impact of these BMD changes during reproductive years on future fracture risk remains unknown (n=2).

Conclusion Few high-quality systematic reviews exist for assessing bone health in users of hormonal contraceptives. The heterogeneity of the results (for CHC) or the paucity of data (for POC and hormonal-IUD), except for DMPA, suggests the need for further research in this area.

Reference: [1] https://synthesismanual.jbi.global

P949

QUALITY OF LIFE AFTER TOTAL HIP ARTHROPLASTY: A CROSS-SECTIONAL STUDY

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Background:
Total hip arthroplasty (THA) is a widely performed procedure aimed at restoring function and improving quality of life in patients with advanced hip osteoarthritis. However, postoperative quality of life remains variable and may be influenced by pain-related factors and underlying psychological conditions.
Objectives:
To assess quality of life after THA and to identify factors associated with impaired outcomes.
Methods:
We conducted a cross-sectional study including patients evaluated at least two months after THA. Quality of life was assessed using the

Short Form-36 (SF-36), including its eight domains and the Physical Component Summary (PCS) and Mental Component Summary (MCS). Sociodemographic variables (age, sex, educational level, occupation, living environment) and underlying hip pathology were analysed for their associations with SF-36 scores.

Results:

A total of 51 patients were included (mean age: 51.6 ± 17.6 years; range: 22–85), with a male predominance (male-to-female ratio = 1.55). Most patients lived in urban areas (68.2%), were sedentary (68.6%), and had physically demanding occupations, mainly manual labor (35.5%). The most common comorbidities were hypertension (45.1%) and diabetes mellitus (37.3%). Secondary hip osteoarthritis accounted for 58.8% of surgical indications, primarily related to chronic inflammatory rheumatic diseases and femoral head osteonecrosis. Mean SF-36 physical and mental component scores were 48.9 ± 9.6 (PCS) and 51.7 ± 8.8 (MCS), respectively. The most impaired domains were physical functioning (59.8 ± 23.0), role limitations due to physical health (61.4 ± 25.4), bodily pain (62.6 ± 19.3), and mental health (61.0 ± 20.8). No significant association was found between PCS or MCS scores and age ($p = 0.62$ and $p = 0.67$, respectively) or sex ($p = 0.15$ and $p = 0.07$, respectively). A low educational level was significantly associated with reduced PCS scores ($p = 0.04$). Patients with secondary osteoarthritis related to inflammatory rheumatic diseases had significantly lower physical SF-36 scores compared with those operated on for primary osteoarthritis (235.5 ± 90.5 vs. 248.7 ± 67.1; $p = 0.045$). A strong negative correlation was observed between SF-36 scores and pain intensity measured by the visual analogue scale (VAS) ($r = -0.71$; $p < 0.001$).

Conclusions:

Quality of life after THA is variably affected, with significant impairment in both physical and mental domains. It is strongly correlated with postoperative pain and functional limitation. These factors should be systematically evaluated during follow-up to optimize patient outcomes.

P950

CHRONIC NOCICEPTIVE POSTSURGICAL PAIN FOLLOWING TOTAL HIP ARTHROPLASTY: PREVALENCE AND ASSOCIATED FACTORS

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Background :

Total hip arthroplasty (THA) has revolutionized the management of advanced hip osteoarthritis and is now considered the treatment of choice. Despite generally excellent functional outcomes, chronic postsurgical pain (CPSP) persists in a subset of patients and significantly affects postoperative satisfaction and recovery.

Objectives :

To identify factors associated with chronic nociceptive CPSP after THA.

Methods :

We conducted a cross-sectional study including patients evaluated at least two months after THA. Sociodemographic, clinical, and rehabilitation-related variables were analyzed. Nociceptive pain was assessed using the Visual Analogue Scale (VAS). Psychological status was evaluated using the Hospital Anxiety and Depression Scale (HADS)

Results:

Fifty-one patients were included (mean age: 51.6 ± 17.6 years; 38 men and 13 women). Mean postoperative follow-up was 12.7 ± 5.6 months. Most patients lived in urban areas (68.2%), were sedentary (68.6%), and had physically demanding occupations, mainly manual labor (35.5%). The most frequent comorbidities were hypertension (45.1%) and diabetes mellitus (37.3%). Secondary hip osteoarthritis related to chronic inflammatory rheumatic diseases accounted for 58.8% of surgical indications. Chronic nociceptive CPSP was observed in 27.4% of patients, predominantly presenting as mechanical hip pain, with a mean VAS intensity of 45.5 ± 19.4. No significant associations were found between nociceptive CPSP and age, sex, body mass index, socioeconomic status, physical activity, or type of osteoarthritis (primary vs. secondary). Patients with nociceptive CPSP exhibited significantly higher anxiety (HADS-A: 7.3 ± 3.3 vs. 4.6 ± 1.2; $p < 0.001$) and depression scores (HADS-D: 8.2 ± 3.1 vs. 4.7 ± 1.4; $p < 0.001$). Early initiation of postoperative rehabilitation was associated with a reduced risk of developing nociceptive CPSP ($p = 0.024$).

Conclusions:

Chronic nociceptive CPSP after THA is present in approximately one-quarter of our patients and was strongly associated with underlying anxiety and depression. Early functional rehabilitation may decrease the risk of developing nociceptive CPSP. Our results highlight the need for comprehensive perioperative psychological assessment and tailored rehabilitation strategies.

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ANXIETY, DEPRESSION AND PAIN CATASTROPHIZING AFTER TOTAL HIP ARTHROPLASTY AND THEIR IMPACT ON QUALITY OF LIFE

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Background :

Psychological factors, such as anxiety, depression, and pain catastrophizing, are recognized contributors to poor postoperative outcomes and reduced quality of life in patients undergoing total hip arthroplasty (THA).

Objectives :

To evaluate the prevalence of anxiety and depressive symptoms after THA, assess their association with pain catastrophizing, and determine their impact on quality of life.

Methods :

A cross-sectional study was conducted including 51 patients who had undergone THA, with a mean postoperative follow-up of 12.7 ± 5.6 months. Anxiety and depression were assessed using the Hospital Anxiety and Depression Scale (HADS), while quality of life was measured using the Short Form-36 (SF-36), including physical (PCS) and mental (MCS) component summary scores. Correlations between HADS scores and SF-36 dimensions were analyzed.

Results:

Probable anxiety was identified in 13.7% of patients (mean HADS-A: 6.0 ± 3.0), and probable depression in 9.8% (mean HADS-D: 6.6 ± 2.8). Patients with higher HADS scores showed significantly lower SF-36

scores, reflecting worse quality of life. The total SF-36 score was reduced in patients with psychological distress (mean 484.9 ± 178.9) compared to those without (496.6 ± 134.8). Significant negative correlations were observed between HADS-A and MCS ($r = 0.63$; $p < 0.001$), HADS-D and MCS ($r = -0.71$; $p < 0.001$), and between combined HADS scores and PCS ($r = -0.42$; $p = 0.003$), indicating an impact on both mental and physical components of quality of life.

Conclusions :

Anxiety, depression, and pain catastrophizing are present in a substantial subset of THA patients and are significantly associated with reduced physical and mental quality of life. These findings highlight the importance of early screening and targeted psychological interventions to optimize postoperative outcomes and patient well-being.

P952

CLINICAL, FUNCTIONAL AND RADIOGRAPHIC PROFILE OF KNEE OSTEOARTHRITIS IN A TERTIARY RHEUMATOLOGY CENTER

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Background: Knee osteoarthritis (KOA) is a common cause of pain and functional disability. Patients referred to tertiary care centers often present with advanced disease.

Objective: To describe the clinical, functional and radiographic characteristics of patients with knee osteoarthritis followed in a tertiary rheumatology center.

Methods: This descriptive study included 143 patients with knee osteoarthritis followed at the Rheumatology Department of Charles Nicolle Hospital, Tunis. Demographic, anthropometric, clinical and radiographic data were collected. Pain intensity and functional impact were assessed using the visual analog scale (VAS, 0–10), the Lequesne algofunctional index and the Knee injury and Osteoarthritis Outcome Score (KOOS). Radiographic severity was graded according to the Kellgren–Lawrence (KL) classification. Results are expressed as mean ± standard deviation or as numbers and percentages.

Results: The mean age of patients was 61.4 ± 8.9 years (range 42–90), with a marked female predominance (80.4%). The mean body mass index was 31.4 ± 5.3 kg/m², indicating a high prevalence of overweight and obesity. The mean disease duration was 6±6 years.

Baseline pain was moderate to severe, with a mean VAS score of 6.6 ± 1.6. Functional impairment was substantial, with a mean Lequesne index of 9.2 ± 3.6. Mean KOOS scores showed: pain 59.5 ± 16.2, symptoms 60.7 ± 18.9, activities of daily living 62.6 ± 17.3, sport and recreation 45.8 ± 20.4, and knee-related quality of life 48.3 ± 17.

Clinically, axial deformities were observed in 25.3% of patients (genu valgum 14.7%, genu varum 10.5%). Joint motion limitation was found in 29.5% of cases and 12.6% of patients required walking aids. Radiographically, mixed femorotibial and femoro-patellar involvement was the most common pattern (63.4%). Advanced disease predominated, with 68.8% of patients classified as KL grade 3 or 4.

Conclusion: Patients with knee osteoarthritis managed in this tertiary care center present withadvanced disease, characterized by excess body weight, marked pain, significant functional impairment and severe radiographic stages.

P953

EFFECTIVENESS OF PLATELET-RICH PLASMA INJECTIONS IN KNEE OSTEOARTHRITIS: A PROSPECTIVE REAL-WORLD STUDY OF 143 PATIENTS

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Background

Platelet-rich plasma (PRP) has emerged as a biological treatment option for knee osteoarthritis (KOA), aiming to improve pain and functional impairment. Real-world data evaluating its global effectiveness across different clinical domains remain rare.

Objectives

To evaluate the effectiveness of intra-articular PRP injections on pain, neuropathic pain component, function, and disability in patients with KOA.

Methods

A prospective study was conducted including 143 patients with knee osteoarthritis treated with intra-articular PRP injections at the Rheumatology Department of Charles Nicolle Hospital, Tunis.

Pain was assessed using the visual analogue scale (VAS), neuropathic pain using the DN4 questionnaire, knee-related function using the KOOS score, and disability using the Lequesne algofunctional index. Assessments were performed at baseline (J0), 3 months (M3), and 6 months (M6).

Paired comparisons were performed using paired t-tests, with a significance threshold of $p < 0.05$.

Results

At baseline, mean VAS pain was 6.58 ± 1.69, significantly decreasing to 2.94 ± 2.31 at M3 and 3.51± 2.49 at M6 ($p < 0.001$ for both).

The DN4 score decreased from 1.35 ± 1.61 at baseline to 0.68 ± 1.17 at M3 ($p < 0.001$) and 0.83 ±1.16 at M6 ($p = 0.001$).

Significant functional improvement was observed, with KOOS symptom score increasing from 58.3 ±19.0 at baseline to 71.6 ± 21.9 at M3 and 66.2 ± 21.0 at M6 ($p< 0.001$).

The Lequesne index decreased significantly from 9.4 ± 3.6 at baseline to 6.3 ± 3.5 at M3 and 7.0 ±3.6 at M6 ($p <0.001$).

Conclusion

In this cohort, PRP injections were associated with significant improvements in nociceptive and neuropathic pain, function, and disability at three and six months. These findings support the effectiveness of PRP as a symptomatic treatment option in routine clinical practice.

P954

SAFETY AND ADVERSE EVENTS OF PLATELET-RICH PLASMA INJECTIONS IN KNEE OSTEOARTHRITIS

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Background
Platelet-rich plasma (PRP) is increasingly used as a biological treatment for knee osteoarthritis. Although its efficacy has been widely studied, real-world data on safety and adverse events remain limited.

Objectives
To describe the frequency and type of adverse events associated with double intra-articular PRP injections in patients with knee osteoarthritis.

Methods
An observational study was conducted including 143 patients with knee osteoarthritis treated with two intra-articular PRP injections in the Rheumatology Department of Charles Nicolle Hospital, Tunis. Adverse events were systematically recorded after the first and second injections and classified according to their type.

Results
After the first PRP injection, adverse events were reported in 45 patients (32.4%). All adverse events were local and transient, with no systemic or serious complications observed. The most frequent manifestation was post-injection pain, followed by local swelling, functional limitation, and joint stiffness, occurring either alone or in combination. After the second injection, the incidence of adverse events decreased substantially, affecting only 12 patients (10.9%). Reported events were limited to localized pain (58.3%) and transient swelling (41.7%). No severe or unexpected adverse events were reported after the second injection.

Conclusion
In this real-world cohort, PRP injections for knee osteoarthritis demonstrated a favorable safety profile. Adverse events were frequent but mild, exclusively local, and transient, with a markedly lower incidence after the second injection. These findings support the good tolerability of PRP in routine clinical practice.

P955

EFFECT OF A PATIENT EDUCATION PROGRAM ON DISEASE ACTIVITY IN RHEUMATOID ARTHRITIS

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Introduction:
Rheumatoid arthritis (RA) is a chronic inflammatory disease causing pain, stiffness, and functional impairment. Effective management requires active patient involvement. Therapeutic patient education (TPE) may enhance self-management and improve disease outcomes.

Objective:
To evaluate the impact of a TPE program on disease activity in RA patients.

Material and Methods :
In this prospective longitudinal study, RA patients participated in a 2-month TPE program, consisting of 90-minute face-to-face sessions delivered in small groups of four to six patients by two rheumatologists trained in TPE. Disease activity was assessed before and after the program using the DAS28-CRP score.

Results:
Eighty RA patients were included, 72 women and 8 men, with a mean age of 61.1 ± 8.6 years and a median disease duration of 20 years. Median HAQ score was 1.2, with 66% of patients showing significant functional impairment. Median patient global assessment (EGP) was 70 mm, and median pain VAS was 6.5. Oral corticosteroids were used by 80% of patients (median dose 5 mg/day), csDMARDs by 81%, and bDMARDs by 49%. Mean baseline DAS28-CRP was 4.64 ± 1.27, with 3.8% in remission, 6.3% low, 53.8% moderate, and 36.3% high disease activity.
After the TPE program, mean DAS28-CRP decreased to 3.59 ± 0.73, with a mean reduction of 1.05 ± 0.94 ($p < 0.001$). The proportion of patients in remission increased to 5%, those with low disease activity to 31.3%, while patients with high disease activity decreased significantly to 2.5%.

Conclusion:
Therapeutic patient education may improve self-management and reduce disease activity in patients with rheumatoid arthritis.

P956

IMPACT OF THERAPEUTIC PATIENT EDUCATION ON ANXIETY AND DEPRESSION IN PATIENTS WITH RHEUMATOID ARTHRITIS: A PROSPECTIVE STUDY

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Introduction:
Rheumatoid arthritis (RA) is a chronic inflammatory disease frequently associated with anxiety and depression. These psychological comorbidities worsen quality of life and complicate disease management. Therapeutic patient education (TPE) may improve psychological well-being in RA patients.

Objective:
To evaluate the effect of a TPE program on anxiety and depression in patients with RA.

Materials and Methods :
A prospective longitudinal study was conducted in a rheumatology department in Tunisia. RA patients participated in a 2-month TPE program delivered in small groups of 5–6 patients. Anxiety and depression were assessed using the Hospital Anxiety and Depression Scale (HADS) at baseline (T0) and after two months (T1).

Results:
Eighty patients were included, mean age 61.1 ± 8.6 years [40-83], 72 women and 8 men (sex ratio H/F 0.11). Most had low educational levels, and 49% had medium socioeconomic status. Median disease duration was 20 years [1–60], and median HAQ score 1.2 [0.1–3]. At T0, mean HADS scores were 12.88 ± 4.93 for anxiety and 12.04 ± 5.22 for depression; anxiety and depression were present in 86.25% and 80% of patients, respectively. After the TPE program, mean HADS scores decreased to 7.55 ± 2.64 for anxiety (−5.33 ± 3.64, $p < 0.001$) and 7.55 ± 2.96 for depression (−4.49 ± 3.49, $p < 0.001$). Anxiety prevalence decreased to 50% and depression to 48.75%.

Conclusion:
TPE significantly reduced anxiety and depression in RA patients. Structured TPE programs may enhance psychological well-being and support overall disease management.

P957

FUNCTIONAL IMPACT OF FOOT INVOLVEMENT IN SPONDYLOARTHRITIS : A CROSS-SECTIONAL STUDY

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Introduction :
Spondyloarthritis (SpA) is a chronic inflammatory disease characterized by axial and peripheral involvement. Foot involvement is frequent, contributes substantially to functional impairment, and remains under-recognized in routine clinical practice.

Patients and Methods :
We conducted a cross-sectional study including patients with SpA fulfilling the ASAS classification criteria. Clinical and podoscopic foot examinations, laboratory parameters, and radiological findings were collected. Foot pain was assessed using a visual analogue scale (VAS, 0–10), and functional impact was evaluated using the validated French version of the Foot Function Index (FFI). Factors associated with functional impairment were analyzed.

Results :
Thirty-two patients were included (17 men and 15 women; male-to-female ratio 1.13), with a mean age of 41.9 ± 13.6 years [20–72]. Eight patients had occupations involving increased foot load, and nine were overweight. Foot pain was reported by 15 patients (46.9%). Podoscopic abnormalities were observed in 12 patients (37.5%), including pes cavus in 5 patients, pes planus in 2, calcaneal valgus in 2, and calcaneal varus in 2 patients (each 6.3%). Radiological foot involvement was present in 7 patients.
Mean BASDAI was 2.2 ± 1.64 [0–5.7], and mean ASDAS-CRP was 2.08 ± 1.24 [0.2–4.85]. The mean total FFI score was 22.0 ± 25.7 [0–74.6]. A significant difference in activity limitation score was observed according to sex ($p = 0.020$). The total FFI score was positively correlated with age ($r = 0.46$, $p = 0.008$), CRP levels ($r = 0.36$, $p = 0.044$), pain intensity (VAS: $r = 0.91$, $p < 0.001$), disease activity (BASDAI: $r = 0.69$, $p < 0.001$), and ASDAS-CRP ($r = 0.67$, $p < 0.001$).
In multivariate analysis, only pain intensity independently predicted functional impairment ($p < 0.001$). No significant associations were found with occupational foot load, physical activity, comorbidities, overweight, positive squeeze test, plantar pathology, radiological involvement, or disease duration.

Conclusion :
Foot involvement is common in spondyloarthritis and is associated with significant functional impairment, predominantly driven by pain. Systematic foot examination and functional assessment should be incorporated into routine patient evaluation to optimize disease management.

P958

IMPACT OF THERAPEUTIC PATIENT EDUCATION ON INTERNALIZED STIGMA IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Introduction:
Rheumatoid arthritis (RA) is a chronic inflammatory disease that affects not only physical function but also psychosocial well-being. Internalized stigma, defined as the negative self-perception associated with chronic illness, may adversely affect quality of life, psychological health, and treatment adherence. Therapeutic patient education (TPE) could help patients cope with disease-related stigma, however, its impact in RA remains insufficiently explored.

Objective:
To assess the level of internalized stigma in patients with RA and to evaluate the effect of a structured TPE program on stigma levels.

Methods:
We conducted a prospective longitudinal study over 11 months in a rheumatology department. Internalized stigma was assessed at baseline (T0) and two months after TPE using the Internalized Stigma of Mental Illness scale adapted for RA (ISMI-RA). TPE was delivered by two trained healthcare professionals in small groups of 6–7 patients. Each session lasted 90 minutes and consisted of interactive workshops combining reflection, group discussion, and theoretical input.

Results:
Eighty patients with RA were included (72 women, 8 men; mean age 61.1 ± 8.6 years). At baseline, internalized stigma was severe in 61.3% of patients, moderate in 13.8%, mild in 8.8%, and minimal in 16.3%. Among ISMI-RA subscales, *Alienation* was the most affected domain, followed by "Stereotype Endorsement" and "Social Withdrawal,". "Perceived Discrimination" was less marked and "Resistance to Stigma" was minimally affected.
Two months after TPE, the mean ISMI-RA score decreased significantly from 3.05 ± 0.79 to 2.22 ± 0.52, with a mean reduction of 0.83 ± 0.41 ($p < 0.001$). The proportion of patients with severe stigma declined markedly from 61.3% to 2.5%, whereas minimal and mild stigma increased to 30% and 40%, respectively.
Changes in ISMI-RA scores were significantly associated with socioeconomic status ($p = 0.015$), history of total knee replacement ($p = 0.018$), rheumatoid factor (RF) positivity ($p = 0.018$) and serum RF levels ($r = 0.357$, $p = 0.02$), antinuclear antibody positivity ($p = 0.047$), and serum C-reactive protein levels ($r = 0.223$, $p = 0.047$). Depressive and anxiety symptoms were negatively correlated with ISMI-RA improvement (HADS-depression: $r = -0.396$, $p < 0.001$; HADS-anxiety: $r = -0.337$, $p = 0.002$). No significant associations were found with other sociodemographic, clinical, functional, or treatment-related variables.

Conclusion:
Therapeutic patient education significantly reduced internalized stigma in RA patients, highlighting its value in improving psychosocial well-being and supporting self-management alongside medical treatment.

P959

MOLECULAR PROFILING OF POSTMENOPAUSAL OSTEOPOROTIC VERTEBRAL FRACTURES

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Objective: Osteoporotic vertebral fractures (OVF) represent a major clinical challenge, yet Bone Mineral Density (BMD) often fails to accurately predict fracture risk. A substantial proportion of fractures occur in individuals with BMD above the osteoporotic threshold, highlighting the need for molecular biomarkers reflecting bone quality beyond simple density measurements.
Material and Methods: We investigated genomic and transcriptomic profiles associated with OVF versus non-osteoporotic controls in postmenopausal women. Intraoperative vertebral bone tissue and peripheral blood were collected from patients undergoing surgery for OVF (n=67) and elective thoracolumbar surgery without osteoporosis (n=48). RNA sequencing was performed using NEBNext Ultra II Directional RNA Library Prep Kit on Illumina NovaSeq6000 platform (150-bp paired-end reads). Differential expression analysis and pathway enrichment were performed comparing osteoporotic and control samples.
Results: Groups were age-matched with similar comorbidity profiles. Controls showed higher BMI and type 2 diabetes prevalence (45.8% vs 19.4%, p=0.004). Mean T-scores were -2.51±0.9 in OVF and -0.7±0.72 in controls. Bone tissue transcriptomic analysis revealed 285 differentially expressed genes (FDR<0.05; >2-fold change): 256 downregulated and 29 upregulated in OVF. The most significantly downregulated genes included *GPR128*, *COL2A1*, and *COL10A1*. Pathway analysis identified significant enrichment in ECM-receptor interaction (p=3.52E-10), focal adhesion (p=6.60E-06), and PI3K-Akt signaling (p=1.83E-04). Gene ontology analysis highlighted skeletal system development (q=1.22E-13), extracellular matrix organization (q=1.20E-10), and collagen fibril organization (q=5.70E-05). Blood transcriptome analysis identified 23 differentially expressed genes (FDR<0.2; >2-fold change): 6 downregulated and 17 upregulated in OVF.
Conclusion: This study establishes a comprehensive transcriptomic signature distinguishing OVF patients from controls, characterized by profound disruption of collagen metabolism, extracellular matrix organization, and skeletal development pathways. Combined genomic and transcriptomic profiling identifies potential non-invasive biomarkers for assessing bone quality and fracture risk beyond conventional BMD measurements, offering promise for improved risk stratification in osteoporotic patients.

P960

IMAGING SPECTRUM OF BONE INVOLVEMENT IN PATIENTS WITH HEMATOLOGICAL DISEASES: A RHEUMATOLOGY PERSPECTIVE

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INTRODUCTION

Secondary osteoporosis is a frequent complication of various conditions, including hematological diseases. In some cases, the prioritization of hematological disorders may lead to under-recognition and undertreatment of associated bone disease.

MATERIALS AND METHODS

During my one-year rotation in the Rheumatology Department, 338 inpatient consultation requests were assessed, of which 12 originated from Hematology. Three (25%) corresponded to vertebral fractures (VFs) meeting severity criteria.

Six illustrated clinical cases are presented, including these three and three additional cases evaluated in outpatient clinics, representing different clinical contexts that encourage multidisciplinary reflection.

RESULTS

1. ♀ **55 years old**, chronic myelomonocytic leukemia, progression to acute leukemia. **13 vertebral fractures (VFs).**

2. ♀ **81 years old**, IgG lambda multiple myeloma. Diffuse bone marrow infiltration with multiple focal lytic lesions, one located in the right L5 pedicle with cortical disruption. **T12 VF.**

3. ♀ **71 years old**, acquired hemophilia A treated 2 years earlier with prednisone 70 mg/day and rituximab.Previous VFs: L2, L5, right humerus and both wrists. Non-adherent to teriparatide.

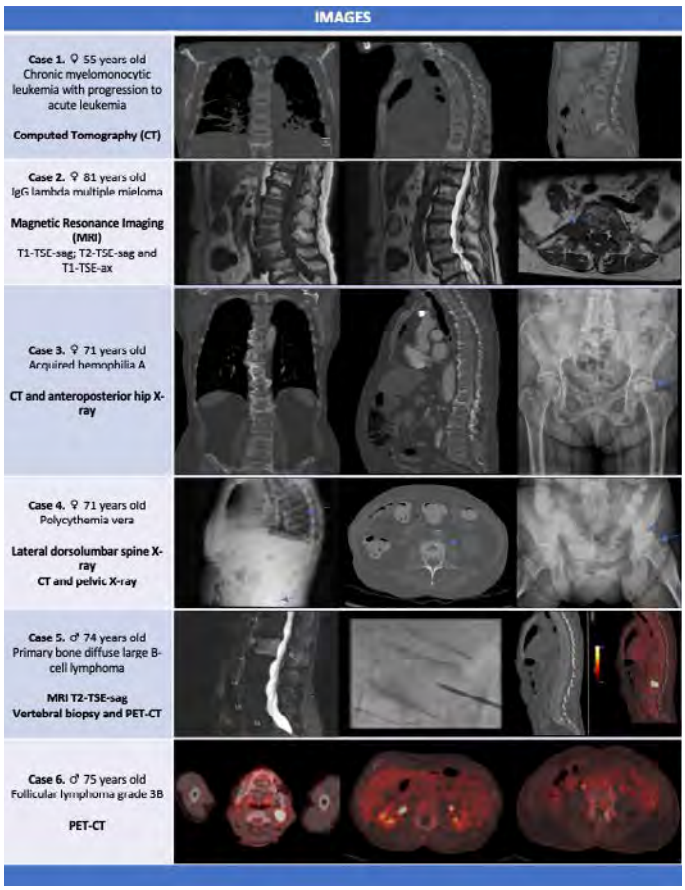
Current VFs: C7, T2, superior endplate of T4, T5, T7, T9, T12, L1, L2, L3, L4 and L5.

Avascular necrosis (AVN) of the femoral heads and radiolucent images compatible with AVN at T12 and L1.

4. ♀ **71 years old**, polycythemia vera. VFs at T7 and L3, subcapital fracture and AVN of the left hip.

5. ♂ **74 years old**, primary bone diffuse large B-cell lymphoma, and

6. ♂ **75 years old**, follicular lymphoma grade 3B,both treated with R-CHOP + radiotherapy, **without vertebral fractures.**



CONCLUSIONS

Multidisciplinary collaboration, with specific attention to fracture prevention (early diagnosis, lesion stabilization, bone densitometry, trabecular bone score [TBS], nutritional support, mobilization, and management of glucocorticoid-induced osteoporosis), could help improve quality of life and reduce morbidity and mortality in patients with hematological diseases.

P961

TECHNOLOGY TO NOT FORGET THE BONE: THE APP THINKBONE

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We know that osteoporosis is an often overlooked disease, with a significant gap in secondary prevention, and that a network of different specialists is necessary for proper patient management based on the severity of the osteoporotic disease. Technology is proving increasingly useful for facilitating physicians' clinical work and for creating a communication network, so why not create an app to share information, standardize the management of osteoporosis patients, and facilitate communication between centers at different levels of care? With multidisciplinary support for content entry, an app called ThinkBone was created. It can be downloaded for free from Google Play by clicking

"Search: ThinkBone" and, for iPhone users, from the website: https://www.thinkbone.net

ThinkBone is an app aimed at GPs, non-bone specialists, and bone specialists, and in the near futur, patients as well. The objectives are:

1. To gather all useful information for managing osteoporosis: e.g., links to the DEFRA algorithm for calculating fracture risk, and to Italian guidelines and recommendations.

2. To answer the most frequently asked questions about managing patients with osteoporosis: Vitamin D management, ONJ, etc., in accordance with national and international guidelines.

3. To improve the flow of patients requiring specialist assessment of their bone disease based on geographic area and level of care. The app provides a map of specialist osteoporosis centers. For each center, practical information is provided on how to book, services provided, type of referral, phone number, address, etc.

4. To answer questions interactively using artificial intelligence. This section is under development but should answer questions such as: should I refer my patient to a bone specialist?

The app is currently in Italian and has been downloaded by 81 professionals from 81 different Italian cities. 34% have entered their center, of which 26% can administer monoclonal antibodies. 12% are equipped to administer intravenous zolendronate.

In conclusion, we hope that the treatment gap will be reduced by introducing an additional tool to improve care for patients with osteoporosis

P962

STRONG BONES, STRONG RECOVERY: ENHANCING OSTEOPOROSIS MANAGEMENT POST-HIP FRACTURE SURGERY

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Objectives

To improve osteoporosis management in elderly patients with hip fracture surgery through a structured, multidisciplinary approach.

Material and Methods

Hip fractures are a major cause of morbidity, and mortality in the elderly population, and osteoporosis is a key underlying risk factor. Timely identification and treatment of osteoporosis following a fragility fracture is essential to reduce the risk of recurrent fractures and improve patient outcomes. Despite the availability of effective treatment options and evidence-based osteoporosis management guidelines, treatment rates remain suboptimal in many care settings. A study conducted in our setting (Wen et al., 2022) revealed a concerningly low rate of osteoporosis treatment initiation (22.4%), highlighting a significant gap in our current practice. Given the ageing population, high morbidity and mortality of fragility fractures our team aimed to improve osteoporosis management in this vulnerable group.

A pre/post-implementation design was used for this quality improvement initiative. Root cause analysis identified 4 key gaps in care, including absence of structured workflows for osteoporosis treatment, dental clearance, and patient education. A multidisciplinary team developed and implemented a structured osteoporosis management workflow. The interventions included standardised assessments, optimization of calcium and vitamin D, initiation of appropriate osteoporosis treatment, timely dental referrals, scheduled follow ups and targeted patient education by trained nurses.

Results

There was a significant improvement in performing appropriate investigations (75.8% to 100%), calcium and vitamin D optimization (90.3% to 95.8%), dental referrals (53.2% to 95.8%), targeted patient education (89.6%) and scheduled follow up for osteoporosis management (40.3% to 87.5%). A median of 85% of patients received appropriate osteoporosis management.

Conclusion

Implementing a standardized multidisciplinary workflow presents a promising approach to enhancing osteoporosis care following hip fracture surgery. Integration into coordinated clinical pathway, and regular staff orientation will support sustainability and continued improvement.

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P963

DURABLE IMMUNOMODULATORY HIERARCHICAL PATCH FOR ROTATOR CUFF REPAIRING

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Introduction/Objectives

High re-tear rates exceeding 50% in degradable shoulder cuff patches, observed over a five-year follow-up, are attributed to the failure of degradable polymers alone to restore the inflammatory niche post-rotator cuff injury, hindering tendon-bone interface healing. Theoretically, a degradable polymer with durable immunomodulatory functions throughout its degradation procedure might address this issue.

Methods

Ferulic acid (FA) was introduced into the repeating unit fragments of polyurethane by skeletal copolymerization to construct a biodegradable polymer (poly(ester- ferulic acid-urethane) urea, PEFUU) with long-lasting anti-inflammatory effects. After verifying the anti-inflammatory function of PEFUU in vitro, hierarchical composite nanofiber patch (HCNP) with sustained anti-inflammatory niche was constructed by electrospinning and lyophilization of decellularized Wharton jelly tissue. The HCNP was used for rotator cuff repairing in rat model. The effectiveness of promoting iRCT repairing by the HCNP was also validated by imaging, histology, and molecular biology methods.

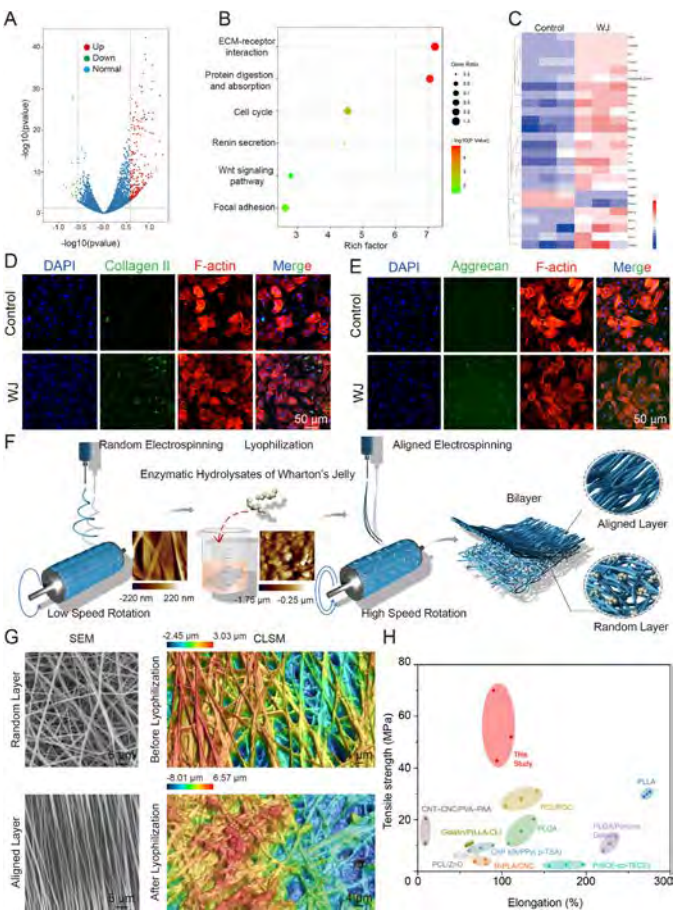
Results

Via employing the paradigm of polymer backbone functionalization, a hierarchical composite nanofiber patch

(HCNP) distinguished by its enduring immunomodulatory properties, was fabricated, adept at sustaining a protracted anti-inflammatory microenvironment conducive to fostering tissue regeneration (Scheme 1). The synthesis process by fabricating (PEFUU) was initiated, wherein FA was incorporated as a bioactive constituent. PEFUU stably releases FA in vitro, reversing the inflammatory niche produced by M1 macrophages and restoring the directed differentiation of stem cells. Subsequently, PEFUU was subjected to the electrospinning process, yielding a bipolar fiber patch characterized by an organized, yet partially random, stratified architecture. Within this stratified architecture, the random layer was strategically imbued with the enzymatic hydrolysate derived from decellularized Wharton jelly tissue (HDWJT). In vitro experimentation demonstrated the propensity of FA to undergo a gradual release profile concomitant with the progressive degradation of the HCNP. In a compelling demonstration of the HCNP's therapeutic prowess, this study extended to an in vivo milieu, employing a rat model of tendon-to-bone injury, manifesting as the restoration of the microstructural continuity inherent to the tendon-to-bone interface, coupled with the establishment of a trinomial distribution of collagen ordering.

Conclusions

This study provides an idea for the use of an electrospun nanofiber mat in tissue regeneration. By introducing anti-inflammatory small molecules through copolymerization, the inflammatory niche of the damaged tissue can be altered persistently, effectively inducing tissue regeneration.



P964

APPROPRIATE MECHANICAL STIMULATION INHIBITS THE SENESCENCE OF CHONDROCYTES

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Background and aims

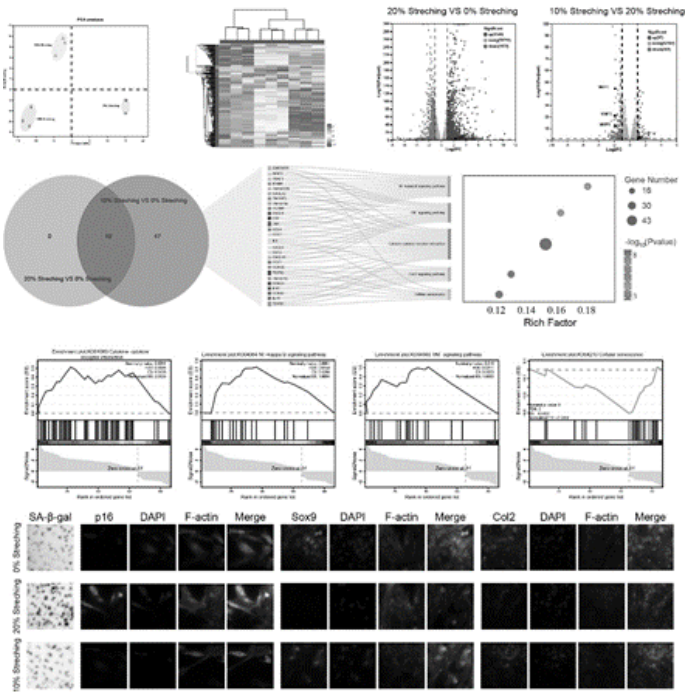
Osteoarthritis and related joint diseases are increasingly prevalent, significantly impacting the quality of life globally[1,2]. A critical component in the progression of these diseases is the senescence of chondrocytes, the cells responsible for maintaining healthy cartilage. Recent advancements in biomechanics suggest that controlled mechanical stimulation may retard the senescence process in these cells[3]. This study aims to elucidate the impact of varying degrees of mechanical stimulation on chondrocyte senescence, providing insights potentially transformative for therapeutic approaches in joint disease management.

Methods

We employed an advanced RNA sequencing technique to analyse the genomic expressions of chondrocytes subjected to three different levels of mechanical stimulation: none (0%), mild (10%), and moderate (20%). The mechanical stresses were applied using a custom-designed bioreactor, which allowed precise control over the duration and intensity of the stimuli. This approach enabled a comprehensive comparison of the cellular responses to different mechanical environments.

Results

Our results offer a nuanced view of the chondrocyte response to mechanical stress. In the absence of mechanical stimulation, chondrocytes showed signs consistent with typical senescence processes. Interestingly, under mild mechanical stimulation (10%), there was an upregulation of genes associated with inflammation, paradoxically coupled with a downregulation of senescence markers, suggesting a protective response against cellular senescence. However, increasing the mechanical load to 20% led to a marked increase in stress responses and degenerative markers, indicative of cell damage and accelerated senescence processes. These findings highlight a delicate balance between beneficial and detrimental mechanical forces on chondrocyte health.



Conclusion

The study underscores the critical role of mechanical forces in chondrocyte physiology and senescence. Mild mechanical stimulation appears to confer a protective effect against senescence, while excessive mechanical stress induces cellular damage and degeneration. These insights open avenues for targeted biomechanical therapies in osteoarthritis, where controlled mechanical stimuli could be harnessed to slow down or even reverse cartilage degeneration. Future research should aim to fine-tune these mechanical interventions to optimize therapeutic outcomes in joint disease treatments.

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P965

INCOMPLETE ROTATOR CABLE DID NOT CAUSE ROTATOR CUFF DYSFUNCTION IN CASE OF ROTATOR CUFF TEAR: A BIOMECHANICAL STUDY OF THE RELATIONSHIP BETWEEN ROTATOR CABLE INTEGRITY AND ROTATOR CUFF FUNCTION

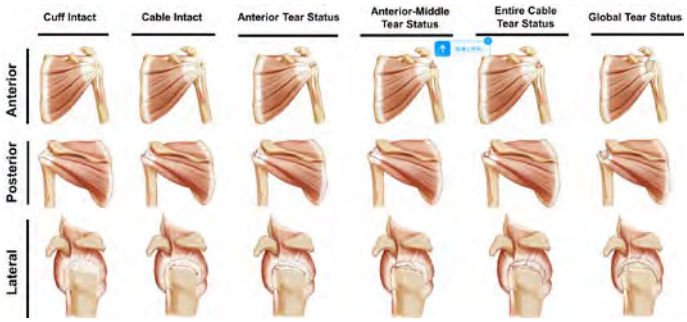
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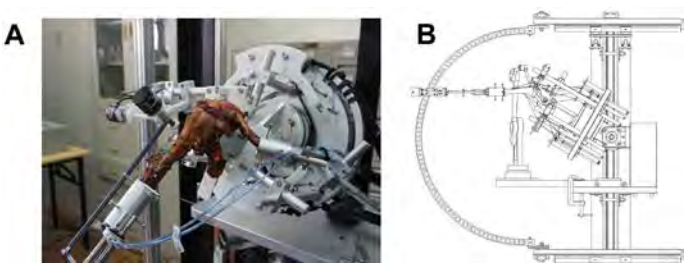
Purpose: This study seeks to evaluate the biomechanical relationship between the severity of rotator cable tears and the function of the rotator cuff.

Methods: Twelve cadaveric shoulders with intact rotator cuff, existing rotator cable and a critical shoulder angle below 35° were included. For each shoulder, a posterosuperior rotator cuff tear (PSRCT) [model 2] in the crescent area was formed. Then anterior insertion detached [model 3], anterior insertion detached together with the middle cable tear [model 4] and the whole rotator cable tear [model 5] were subsequently created. The rotator cuff that lay above the humeral head rotation centre was detached as a global tear control [model 6], along with the primitive status as the intact control [model 1]. Glenohumeral abduction was initiated by simulating deltoid and remaining rotator cuff force. Functioning of the remaining rotator cuff was evaluated using the middle deltoid force (MDF), as required for abduction.

Results: No statistically- significant differences in peak MDF values were seen between the four PSRCT statuses (44.10 ± 7.30 N [model 2], P = 0.96; 45.50 ± 9.55 N [model 3], P = 0.86; 45.90 ± 3.53 N [model 4], P = 0.30; 44.20 ± 8.19N [model 5], P = 0.80) and intact control status (39.79 ± 7.65 N [model 1]). However, significant differences in peak MDF values were found between the four PSRCT statuses and the global tear control status (54.53 ± 7.46 N [model 6], P<0.01).



Conclusion: The PSRCT, regardless of how severe the rotator cable tear, does not induce functionally-significant biomechanical impairment. Tear extension involving all rotator cuff tissue above the geometric rotation centre of the humeral head results in obvious functional impairment.



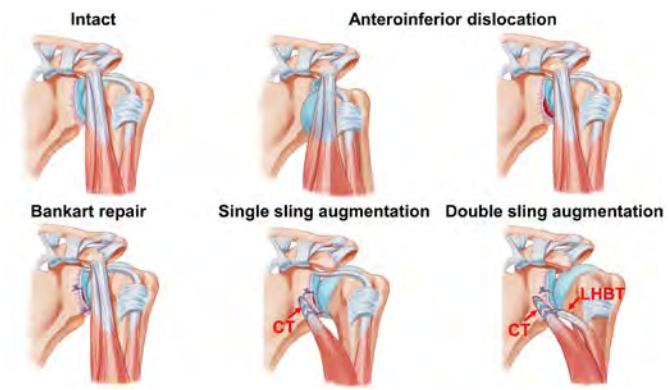
P966

DYNAMIC DOUBLE-SLING AUGMENTATION PREVENTS ANTEROINFERIOR TRANSLATION FOR RECURRENT ANTEROINFERIOR SHOULDER DISLOCATION WITH 20% GLENOID BONE LOSS: A CADAVERIC BIOMECHANICAL STUDY

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Purpose: To biomechanically compare the dynamic double-sling with single-sling augmentation using the conjoined tendon (CT) with 20% of an anteroinferior glenoid bone defect under the high loads in shoulders.
Methods: With the shoulder in 60° of glenohumeral abduction and 60° of external rotation, the 12 shoulders stability was tested sequentially in 5 conditions: intact, 20% glenoid bone loss, Bankart repair, single-sling augmentation with the CT, and double-sling augmentation with both the CT and long head of the biceps tendon (LHBT). The anteroinferior humeral head (HH) translation force of 20N, 30N, 40N, 50N, or 60N was applied to determine the shoulder stability in each condition.
Results: The total HH translation over 8.77 mm represented the anteroinferior shoulder instability (95% CI of bone defect: 7.76 – 8.77 mm). A significant increase in anteroinferior HH translation was demonstrated following the creation of 20% glenoid bone defect under the 20N translational force (10.52 ± 0.71 mm). Structural failure following the Bankart repair and the single-sling augmentation under the 30N (9.84 ± 1.25 mm) and 40N (9.59 ± 0.66 mm) translational forces, respectively, were observed. The double-sling augmentation effectively prevented the anteroinferior HH translation under the translational force of less than 40N, and only half of the augmentation structure (8.25 ± 1.66 mm) had failed under the 50N translational forces.
Conclusion:
In the absence of any Hill-Sachs lesion and when tested at 60° abduction and external rotation in shoulders with 20% glenoid bone defects, at time-zero, the double-sling augmentation strategy could effectively prevent anteroinferior translation when compared with the Bankart repair or the single-sling augmentation technique under all magnitudes of the translational force in biomechanical simulation. Nevertheless, none of the constructs restored the HH translation to the normal intact state.



P967

STRESS FRACTURE IN THE ROYAL NAVY: CAN ROUTINELY COLLECTED ORGANISATIONAL DATA HELP IDENTIFY THOSE AT INCREASED RISK?

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Objective
Stress fractures (SFs) are overuse musculoskeletal injuries that impact mobility. They occur more frequently in military personnel than in the general population, disrupting occupational training and operational preparedness. We used routinely collected organisational healthcare data to identify characteristics associated with SF in Regular Royal Navy (RN) personnel and evaluated the predictive ability of these characteristics.
Material and Methods
We studied 63,442 Regular RN personnel (90.3% men) who served between 2013 and 2023. SFs were identified from Read codes. Baseline exposures included age, ethnicity, height, weight, body mass index (BMI), smoking status, trained status (untrained or trained), service (RN or Royal Marines [RM]), job role, rank, number of bodily systems medicated in the first year (as a marker of poorer baseline health), and (in women) progestogen contraceptive use. Some variables were incomplete or not concurrent with service entry. Associations with incident SF were examined using sex-stratified univariate and multivariable Cox regression.
Results
Median (lower quartile, upper quartile) baseline age was 25 years in both men (21, 32) and women (21, 30). SF incidence was 1.3% in men and 1.7% in women. In men, RM service was the strongest individual predictor (hazard ratio 8.55, 95% CI 7.25–10.07 versus RN; Harrell's C 0.75), followed by ≥1 medicated system (3.32, 2.42–4.55 versus <1); higher BMI was protective (0.86, 0.84-0.88). In women, trained status (0.11, 0.05–0.24 versus untrained) and higher BMI (0.86, 0.80-0.91) were protective, while ≥1 medicated system increased risk (7.15, 4.67–10.95). Most individual predictors showed modest discrimination (C ≈0.60) but multivariable models, including univariate-significant variables, showed good discrimination (C 0.85 in men; 0.81 in women).
Conclusions
Consistent risk factors for SF were BMI, trained status and poorer baseline health. As all personnel are pre-assessed against service entry medical and fitness standards, higher BMI values may reflect healthier (muscle- vs. fat-mass) body composition rather than obesity per se. Given this pre-assessment—as well as the age-distribution of this military workforce and limitations to data completeness and timeliness—BMI associations should be interpreted cautiously. Improving consistency and quality of service entry and through-career data could improve injury surveillance and prevention.

P968

ANALYTICAL AND CLINICAL PERFORMANCE OF A NOVEL SANDWICH IMMUNOASSAY FOR TOTAL 25-HYDROXYVITAMIN D

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Background-aim: Chemiluminescent immunoassays used for 25(OH)D detection often show inconsistencies with LC-MS/MS in clinical practice, which can lead to misclassification of vitamin D status, impacting patient care. This study assessed the performance of a novel sandwich VD-T immunoassay.

Methods: Analytical performance was evaluated according to CLSI guidelines. A total of 118 selected serum samples, which showed discrepancy results(bias≥20%) on any two immunoassay platforms were also measured with a LC-MS/MS method traceable to the National Institute of Standards and Technology (NIST).

Results: The LoB for the sandwich VD-T assay was ≤2.00 ng/mL, while the LoD and LoQ were both≤3.00 ng/mL. The correlation coefficient (r) is 0.9998 within the linear range of 3.00 to 150.00 ng/mL. The within-run imprecision ranged from 1.64% to 2.36%, and the within-laboratory imprecision from 3.08% to 6.32%, aligning with manufacturer specifications. The cross-reaction rates of the VD-T assay with 1,25-(OH)2 D and 3-epi-25(OH)D3 were 67.00%, and with Vitamin D and 24,25-(OH)2 D were 5.00%. Linear regression analysis between immunoassays and LC-MS/MS showed correlation coefficients(r) and slops(k) of 0.963 and 1.02 for this assay as well as 0.725 and 0.890, 0.762 and 0.78, and 0.792 and 0.790 for other three immunoassays.

Conclusions The novel sandwich VD-T assay demonstrates high analytical sensitivity, specificity, and excellent consistency with LC-MS/MS, making it a reliable tool for clinical measurement of 25(OH)D in routine clinical practice.

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QUALITY OF LIFE AND REHABILITATION PROGRAM IN CIRRHOSIS-ASSOCIATED SARCOPENIA PATIENTS

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[1]University of Medicine and Pharmacy , Doctoral School, Craiova, Romania; [2]Filantropia Hospital, Craiova, Romania; [3]University of Medicine and Pharmacy, Craiova, Romania

Background. Sarcopenia is a frequent and clinically relevant complication of liver cirrhosis, characterized by reduced skeletal muscle mass and strength, and is associated with frailty, increased risk of falls, poorer prognosis, and impaired health-related quality of life. Despite increasing awareness, there is still limited consensus regarding standardized rehabilitation protocols in this population, especially considering cirrhosis-related fatigue, malnutrition, and reduced exercise tolerance.

Aim. In this prospective study, we assessed the efficacy of a complex rehabilitation program (TENS, electrostimulation, and an exercise program) on quality of life in patients with cirrhosis-associated sarcopenia.

Methods. We included 26 patients aged 67–73 years diagnosed with liver cirrhosis and sarcopenia. Participants underwent clinical and anthropometric assessment (body mass index - BMI, total body fat - TBF, skeletal muscle - SM, measured by bioelectrical impedance analysis, BF511 - OMRON), laboratory testing (screening tests and leptin), and functional evaluation (Timed Up and Go test - TUG, handgrip strength - HG, and SarQoL quality of life questionnaire). The rehabilitation program included electrotherapy (TENS and electrostimulation) and supervised kinetic training (aerobic and resistance exercises), delivered 5 days/week, structured as 2 weeks inpatient followed by 2 weeks outpatient, with continuation recommendations thereafter. Assessments were performed at baseline (T1) and at 4 weeks (T2) and 12 weeks (T3).

Results. Overall, parameters showed a trend toward improvement, most evident at T3 ($p < 0.05$), particularly for BMI, HG, and TUG. Correlations between baseline and follow-up SarQoL scores were weak, likely due to the limited follow-up interval. In multivariate analysis, SarQoL correlated with performance measures (HG and TUG). At 12 weeks, improvements in functional status were maintained.

Discussions and Conclusions. Our findings highlight that sarcopenia in liver cirrhosis is associated with reduced functional capacity and impaired quality of life, and that a structured rehabilitation approach may improve or maintain functional outcomes over 12 weeks. Rehabilitation interventions should be integrated into a multidisciplinary management strategy addressing the key drivers of cirrhosis-related sarcopenia, including adequate nutrition (especially sufficient protein intake), tailored physical activity, and appropriate medical management, with close monitoring to ensure safety and adherence in this vulnerable population.

P970

FACTORS INFLUENCING QUALITY OF LIFE AMONG SAUDI INDIVIDUALS WITH KNEE OSTEOARTHRITIS: AN ICF-ORIENTED MULTIDIMENSIONAL ANALYSIS

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[1]King Abdulaziz University, Jeddah, Saudi Arabia

Purpose: This study aimed to provide a comprehensive, biopsychosocial understanding of factors influencing quality of life (QoL) in individuals with knee osteoarthritis (OA). Specifically, it sought to determine the relative contribution of physical impairments, psychological status, and cognitive-related health perceptions within an International Classification of Functioning (ICF) framework to identify the strongest predictors of QoL.

Methods: A cross-sectional design was employed involving 148 adults aged 40–75 years with clinically diagnosed knee OA. Participants were excluded if they had undergone recent knee surgery, had inflammatory arthritis, severe comorbid medical conditions, or significant language barriers.

QoL was assessed using the **SF-36**. Knee-related symptoms and functional limitations were measured with **WOMAC**. Broader patient-reported outcomes reflecting activities, participation, and environmental influences were recorded using a general PRO measure. Psychological status was evaluated through the **Hospital Anxiety and Depression Scale (HADS)**. Physical performance and impairment measures included the **Timed Up and Go (TUG)**, **Five Times Sit-to-Stand Test (FTSST)**, **Lower Extremity Functional Scale (LEFS)**, **Visual Analog Scale (VAS) for pain**, and knee range of motion (ROM). Pearson correlation analyses and multiple linear regression models were conducted using SPSS to explore associations and identify predictors of QoL.

Results: The SF-36 physical component score demonstrated moderate

associations with physical performance measures, psychological variables, and ICF-related functional indicators. In contrast, correlations with the SF-36 mental component score were not statistically significant, suggesting that mental health-related QoL was not directly linked to physical or functional impairments within this cohort. Consistent with previous literature, higher levels of pain, stiffness, functional restriction, and emotional distress were associated with poorer physical and overall QoL, with WOMAC and HADS scores emerging as important contributors.
Conclusions: In Saudi adults with knee OA, physical aspects of health-related QoL are strongly influenced by pain severity, joint stiffness, limited knee ROM, emotional distress, and ICF-defined functional limitations. Interventions targeting pain management, psychological well-being, and functional capacity may play a critical role in improving QoL outcomes. Longitudinal studies are warranted to determine the impact of multidimensional rehabilitation strategies on HRQoL in this population.
Keywords: Knee osteoarthritis, Quality of life, ICF framework, Disability, Rehabilitation.

P971

OUT-OF-PROPORTION OSTEOPOROSIS AND FRAGILITY HIP FRACTURES IN SAUDI ARABIA: IMPLICATIONS FOR CLINICAL PRACTICE AND HEALTH POLICY

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[1]Neom Hospital / King Fahad Armed Forces Hospital, Neom, Saudi Arabia; [2]King Fahad Armed Forces Hospital, Jeddah, Saudi Arabia

Objective(s): To evaluate the epidemiology, fracture patterns, biochemical risk factors, and surgical management of osteoporotic hip fractures in Saudi Arabia, and to identify region-specific implications for prevention, treatment, and healthcare policy.
Material and Methods: A retrospective cohort study was conducted on 247 consecutive patients admitted with osteoporotic hip fractures between 2017 and 2020. Data collected included demographics, fracture type, serum sodium levels, medications affecting sodium balance, and surgical interventions. Descriptive and inferential statistical analyses were performed with significance set at $p < 0.05$.
Results: The cohort comprised 53% males and 47% females, with a mean age of 77.2 ± 9.1 years. The highest incidence occurred in patients aged 71–80 years (42.1%). Intertrochanteric fractures were most frequent (51.8%), followed by intracapsular fractures (42.0%). Hyponatremia was observed in 33.2% of patients, and 83.4% were taking medications known to alter sodium metabolism, most commonly proton pump inhibitors and antihypertensive agents. Surgical management predominantly included short cephalomedullary nailing for extracapsular fractures and uncemented hemiarthroplasty for intracapsular fractures.
Conclusion(s): This study identifies important deviations from global patterns of osteoporotic hip fractures. The male-to-female ratio was nearly equal, highlighting the need for targeted osteoporosis screening in men. Fracture incidence peaked approximately a decade earlier than in Western populations, indicating earlier onset of osteoporosis and the need for earlier preventive interventions. The predominance of intertrochanteric fractures suggests region-specific biomechanical or biological factors. The high prevalence of hyponatremia, largely associated with modifiable medication use, represents an actionable risk factor for falls and fractures. Finally, the widespread use of uncemented hemiarthroplasty warrants reconsideration in light of evidence favoring cemented fixation for improved functional outcomes. These findings support the implementation of national screening programs, standardized fracture care pathways, and evidence-based surgical practices to reduce morbidity, mortality, and economic burden in Middle Eastern populations.
Disclosures: The authors declare no conflicts of interest

P973

DIAGNOSTIC ACCURACY OF ULTRASOUND FOR DETECTING KNEE OSTEOARTHRITIS: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Objective: This systematic review and meta-analysis aims to evaluate the diagnostic accuracy of Ultrasound (US) in detecting Knee Osteoarthritis (KOA) and related parameters.
Material and Methods: PubMed, Web of Science, and Scopus were searched from inception to April 4th 2025, for studies evaluating US diagnostic accuracy in detecting KOA. Studies were included if they provided sufficient data to construct 2×2 tables and used a valid reference standard. A meta-analysis estimated pooled sensitivity (Se), specificity (Sp), and the summary receiver operating characteristic (SROC) curve of US for diagnosing KOA and related parameters. All analyses were performed using R software 4.4.2.
Results: 27 studies were included in the qualitative synthesis and 17 in the meta-analysis, encompassing 7,187 and 3,871 knee radiographs, respectively. US achieved a pooled Se of 0.94 (95% CI: 0.71–0.99) and Sp of 0.79 (95% CI: 0.48–0.94) for total KL grading. For KL grade 0, Se was 0.47 (95% CI: 0.12–0.85) and Sp was 0.98 (95% CI: 0.19–1.00). For KL grade 1, Se was 0.95 (95% CI: 0.53–1.00) and Sp was 0.89 (95% CI: 0.44–0.99). For KL grade 2, Se was 0.99 (95% CI: 0.69–1.00) and Sp was 0.86 (95% CI: 0.48–0.97). For KL grade 3, Se was 0.87 (95% CI: 0.82–0.91) and Sp was 0.90 (95% CI: 0.67–0.98). For KL grade 4, Se was 0.94 (95% CI: 0.84–0.98) and Sp was 0.97 (95% CI: 0.42–1.00). For osteophyte detection, Se was 0.86 (95% CI: 0.76–0.92) and Sp was 0.76 (95% CI: 0.65–0.84). For cartilage degeneration, Se was 0.88 (95% CI: 0.71–0.95) and Sp was 0.76 (95% CI: 0.73–0.79). For medial meniscus protrusion (MMP), Se was 0.77 (95% CI: 0.56–0.90) and Sp was 0.70 (95% CI: 0.47–0.86).
Conclusion: This is the first systematic review and meta-analysis to assess US diagnostic accuracy in detecting KOA and KOA-related structural changes, showing high pooled sensitivity and specificity for overall KL grading, individual KL grades, and the detection of osteophytes, cartilage degeneration, and MMP. Future research should focus on enhancing early stage KOA detection for more timely diagnosis and intervention, and explore the link between clinical symptoms and ultrasound findings to better understand how imaging correlates with patient reported outcomes.

P974

DIAGNOSTIC TEST ACCURACY OF ARTIFICIAL INTELLIGENCE IN EARLY DIAGNOSIS OF OSTEOARTHRITIS: A SYSTEMATIC REVIEW AND META-ANALYSIS OF 45,588 KNEES

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Objective: This study aims to assess the diagnostic accuracy of artificial intelligence (AI) detection and classification of radiographic Kellgren–Lawrence (KL) grades for knee osteoarthritis (KOA).

Material and methods: We conducted a systematic search across PubMed, Web of Science, and Scopus databases, covering all available literature up to March 1st, 2025. We screened and evaluated the methodological quality of the eligible studies, selecting only those deemed to be of high quality and excluding studies without outcome data or insufficient quality. We performed a meta-analysis to estimate pooled sensitivity, pooled specificity, and diagnostic likelihood ratios (LR+/LR-). All analyses were conducted using RStudio version 4.4.2.

Results: A total of 14 studies were included in the systematic review and meta-analysis, encompassing 45588 radiographs. As for KL grading, AI showed robust diagnostic performance across all grades. In KL Grade 0, specificity was 0.954 (95% CI: 0.877–0.984) and sensitivity was 0.829 (95% CI: 0.488–0.961) with Pre Test Probability (PP) of 30%, Post Test Probability +ve (PTP +ve) of 88%, and Post Test Probability -ve (PTP -ve) of 7%. For KL Grade 1, specificity remained high at 0.956 (95% CI: 0.880–0.984), with modest sensitivity of 0.680 (95% CI: 0.392–0.875) and (PP: 20%, PTP +ve: 79%, PTP -ve: 8%). For KL Grade 2, specificity was 0.937 (95% CI: 0.883–0.967), sensitivity was 0.850 (95% CI: 0.733–0.921) and (PP: 25%, PTP +ve: 82%, PTP -ve: 5%). KL Grade 3 yielded a specificity of 0.977 (95% CI: 0.937–0.992), sensitivity of 0.906 (95% CI: 0.793–0.961) and (PP: 15%, PTP +ve: 87%, PTP -ve: 2%). in KL Grade 4, specificity reached 0.995 (95% CI: 0.984–0.999), sensitivity 0.938 (95% CI: 0.800–0.983) and (PP: 10%, PTP +ve: 96%, PTP -ve: 1%).

Conclusion: This is the first systematic review and meta-analysis to evaluate the use of AI in the early diagnosis of KOA. AI demonstrates consistently good sensitivity and specificity across all KL grades. These findings support the use of AI as a valuable assistant for rheumatologists in the early diagnosis of KOA. However, further research is needed to focus on developing, training, and validating of a unified model capable of accurate KOA diagnosis, especially the early stages of the disease.

P975

DIAGNOSTIC DELAY IN PSORIATIC ARTHRITIS AND ITS IMPACT ON RADIOLOGICAL OUTCOMES: A SYSTEMATIC REVIEW AND META-ANALYSIS OF 23,894 PATIENTS

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Objective: This study aims to examine the extent and consequences of diagnostic and referral delays in Psoriatic arthritis (PsA) and their impact on radiographic outcomes.

Material and methods: PubMed, Web of Science, and Scopus were systematically searched from inception to March 16, 2025 for observational studies reporting diagnostic delay in PsA. Eligible studies included patients diagnosed using CASPAR criteria, rheumatologist-confirmed diagnosis, or self-reported physician diagnosis. Diagnostic and referral delays were extracted as mean (SD) or median (IQR). Meta-analysis was performed using Review Manager (RevMan) 5.4.

Results: Twenty observational studies including 23,894 participants were identified, with 15 studies (22,749 participants) included in the meta-analysis. The pooled mean diagnostic delay was 31.24 months (95% CI: 22.48, 40.00) using a random-effects model, with considerable heterogeneity (I^2 = 100%). The mean referral delay was analyzed using both fixed- and random-effects models, with the random-effects model yielding a pooled mean referral delay of 21.69 months (95% CI: 15.02, 28.35) and the fixed-effects model yielding 15.32 months (95% CI: 13.98, 16.67), with considerable heterogeneity (I^2 = 92%). Patients with prolonged diagnostic delay had significantly increased odds of radiographic damage. The fixed-effects model yielded a pooled OR of 2.80 (95% CI: 2.31, 3.39), while the random-effects model showed an OR of 2.54 (95% CI: 1.58, 4.09). Heterogeneity for both was moderate (I^2 = 49%). geographically, diagnostic delay varied widely ranging from 6.55 months in India to over 62 months in Italy.

Conclusion: This is the first systematic review and meta-analysis that explores diagnostic and referral delays in PsA and their relationship to radiographic joint damage confirming that diagnostic and referral delays in PsA are substantial and clinically significant, with longer delays associated with increased radiographic joint damage. These findings highlight deficiencies in disease recognition and referral pathways, underscoring the need for earlier detection, particularly in primary care and dermatology settings, and more efficient referral to rheumatology to reduce structural damage and improve patient outcomes.

P976

DIAGNOSTIC DELAY IN RHEUMATOID ARTHRITIS AND ITS IMPACT ON RADIOGRAPHIC OUTCOMES: A SYSTEMATIC REVIEW AND META-ANALYSIS OF 100,066 PATIENTS

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Objective: This study aims to evaluate the extent of diagnostic delay in rheumatoid arthritis (RA) across multiple countries and examine its impact on radiographic joint damage, with emphasis on erosive outcomes.
Material and Methods: We systematically searched PubMed, Web of Science, and Scopus from inception until April 5th, 2025 for observational studies reporting diagnostic delay and radiographic outcomes in RA. Studies were included if RA diagnosis was confirmed by a rheumatologist according to a classification criteria. Diagnostic delays were extracted if reported as mean (SD) or median (IQR). Meta-analyses were conducted for the pooled mean diagnostic delay and prevalence of radiographic damage in delayed diagnosis patients. Heterogeneity was assessed using I^2 statistics following Cochrane guidelines.
Results: A total of 48 studies were identified encompassing 100,066 participants of which 28 were included in the meta-analysis encompassing 15,226 participants. The pooled mean diagnostic delay was 31.92 months (95% CI: 27.48, 36.37) with considerable heterogeneity (I^2 = 100%, τ^2 = 122.29). Radiographic outcomes, primarily bone erosions, were reported in a subset of studies. The pooled proportion of patients with radiographic joint damage was 51.4% (95% CI: 43.3%, 59.5%), with considerable heterogeneity (I^2 = 96.16%). There was marked geographic variation in diagnostic delay, with reported mean delays ranging from 5.47 months in Singapore to 120.5 months in Brazil.
Conclusion: This is the first systematic review and meta-analysis to evaluate diagnostic delay in RA. It revealed a significant mean diagnostic delay, with over half of the patients exhibiting radiographic erosions. These findings highlight critical gaps in early disease recognition, which hinder the implementation of the treat-to-target approach and contribute to irreversible structural damage. The development of clear diagnostic criteria and expansion in the use of diagnostic technologies such as ultrasonography are vital to facilitate earlier detection.

P977

THE ASSOCIATION BETWEEN INSOMNIA AND RHEUMATOID ARTHRITIS: A SYSTEMATIC REVIEW AND META-ANALYSIS OF 546,822 PATIENTS

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Objective: This study aims to investigate the association between rheumatoid arthritis (RA), disease activity, and insomnia.
Material and Methods: PubMed, Web of Science, and Scopus were systematically searched from inception to March 18, 2025. Eligible studies included case–control, cohort, or cross-sectional designs with RA diagnosed by a rheumatologist, classification criteria, ICD codes, or self-reported physician diagnosis. A meta-analysis estimated the pooled association between insomnia and RA by comparing RA patients with controls, low/remission versus moderate/high disease activity, and rheumatoid factor (RF)–positive versus RF-negative patients. Data were analyzed using Review Manager (RevMan).
Results: Of 1,273 identified records, 25 studies were included in qualitative synthesis and 14 in the meta-analysis, comprising 546,822 and 41,565 participants, respectively. Nine studies explored the association between insomnia and RA. Both fixed- and random-effects models showed significantly higher odds of insomnia in RA patients compared to controls (OR: 2.21; 95% CI 1.85 – 2.64, $p < 0.00001$) and (OR: 3.92; 95% CI 1.59 – 9.7, $p = 0.008$), respectively, with considerable heterogeneity. Sensitivity analysis revealed that RA patients had nearly seven times higher odds of experiencing insomnia (OR: 6.82; 95% CI: 2.32–20.1, $p = 0.006$). Five studies compared insomnia in RA patients based on disease activity. Patients with moderate/high disease activity had higher odds of insomnia (OR: 1.76; 95% CI 1.29–2.39, $p = 0.0004$). RF +ve RA patients had higher but not statistically significant odds of insomnia (OR 1.12; 95% CI 0.74–1.71, $p = 0.59$). Among the countries with insomnia in both the RA and control groups, China had the highest odds of insomnia (OR: 16.48; 95% CI 8.68 – 31.51) and UK had the lowest odds (OR: 1.06; 95% CI 0.73 – 1.54).
Conclusion: This is the first meta-analysis to assess the association between RA, high disease activity, and insomnia, revealing that RA is strongly associated with insomnia, particularly in patients with higher disease activity. These findings highlight the need for increased awareness and targeted interventions to improve sleep and disease management in RA. Further large-scale studies are needed to clarify the relationship between RF and insomnia.

P978

SAFETY AND EFFICACY OF COLCHICINE IN OSTEOARTHRITIS: A SYSTEMATIC REVIEW AND META-ANALYSIS OF 6,965 PATIENTS

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Objective: Despite growing interest, the evidence regarding colchicine efficacy and safety in osteoarthritis (OA) management remains inconclusive. This study aims to determine the safety and efficacy of colchicine in treating OA.

Material and Methods: A systematic search of PubMed, Web of Science, and Scopus was conducted from inception to April 5, 2025 to identify randomized controlled trials assessing colchicine in OA. Pain assessed by the visual analogue scale (VAS) was the primary outcome. Outcomes were stratified by follow-up duration into short-term (4–8 weeks), medium-term (10–16 weeks), and long-term (≥20 weeks). Meta-analysis was conducted using Review Manager (RevMan) version 5.4.

Results: A total of 21 clinical trials encompassing 6,965 participants were included in this systematic review, with 13 contributing to the meta-analysis including 879 participants. Colchicine significantly improved pain in the short term at week 8 (standardized mean difference [SMD] = -1.03, 95% confidence interval [CI]: -2.01, -0.06, p=0.04), and a non-significant improvement at medium-term follow-up at week 12 (SMD = -0.34, 95% CI: -0.78, 0.10, p=0.75), and a significant long-term improvement at week 20 follow-up (SMD = -1.24, 95% CI: -1.73, -0.76, p< 0.00001), with an overall significant improvement (SMD = -0.73, 95% CI:-1.06, -0.41, p < 0.00001). Similarly, quality of life indicated significant impact of colchicine treatment (SMD = -0.48, 95% CI: -0.83, -0.12, p =0.008). However, for physical dysfunction, the analysis reveals no statistically significant difference (SMD = -0.21, 95% CI: -0.45, 0.04, p=0.09), with significant difference in adverse events (AEs) (risk ratio [RR]: 1.27; 95% CI:1.07, 1.50, p=0.007) between colchicine and control groups.

Conclusion: This is the most recent and comprehensive systematic review and meta-analysis showing that colchicine is an effective therapeutic option for OA, with significant pain relief measured by VAS score. Additionally, it contributes to improved quality of life in patients with OA. However, physical dysfunction did not show significant differences. Future research should focus on optimal dosing, long-term safety, and larger randomized controlled trials to validate these findings.

P979

SHORT- AND LONG-TERM EFFICACY OF METHOTREXATE IN OSTEOARTHRITIS: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Objective: This study aims to evaluate the safety and efficacy of methotrexate (MTX) in reducing osteoarthritis (OA) symptoms in both the short and long term.

Material and methods: PubMed, Web of Science, Embase, Ovid, and Scopus were systematically searched from inception to April 22, 2025 for studies assessing MTX in OA. The primary outcome was pain, measured by the Visual Analogue Scale (VAS) or Numeric Rating Scale (NRS). Outcomes were stratified by follow-up duration: short-term (less than 6 months), medium-term (6 months and 9 months), and long-term (12 months). Data were analyzed using Review Manager (RevMan).

Results: Fourteen studies were included in the qualitative synthesis and 8 in the meta-analysis, with 1,251 and 649 participants, respectively. MTX reduced pain overall (SMD: −0.47; 95% CI: −0.68 to −0.26). with subgroup SMDs of −0.46 (95% CI: −0.75 to −0.17) at <6 months, −0.75 (95% CI: −1.2 to −0.29) at 6 months, −0.42 (95% CI: −1.35 to 0.51) at 9 months, and −0.06 (95% CI: −0.46 to 0.34) at 12 months. For WOMAC, overall effect was (SMD: −0.71; 95% CI: −1.2 to −0.22), with subgroup SMDs of −0.45 (95% CI: −0.88 to −0.01) at <6 months, −1.81 (95% CI: −4.56 to 0.94) at 6 months, −0.37 (95% CI: −0.78 to 0.04) at 9 months, and −0.27 (95% CI: −0.68 to 0.13) at 12 months. Physical function improved overall (SMD: −0.53; 95% CI: −0.84 to −0.23), with subgroup SMDs of −0.46 (95% CI: −0.76 to −0.16) at <6 months, −0.88 (95% CI: −1.73 to −0.03) at 6 months, −0.35 (95% CI: −0.81 to 0.12) at 9 months, and −0.19 (95% CI: −0.58 to 0.19) at 12 months. Stiffness improved overall (SMD: −0.44; 95% CI: −0.65 to −0.23). Subgroup SMDs were −0.33 (95% CI: −0.68 to 0.01) at <6 months, −0.52 (95% CI: −0.81 to −0.24) at 6 months, −0.39 (95% CI: −1.49 to 0.72) at 9 months, and −0.34 (95% CI: −1.43 to 0.75) at 12 months. There was an overall significant difference in adverse events (AEs) (RR, 0.75; 95% CI, 0.60 to 0.94), with a significant difference in mild AEs (RR, 0.77; 95% CI, 0.61 to 0.97) and no significant difference in serious AEs (RR, 0.65; 95% CI, 0.31 to 1.34).

Conclusion: MTX provides significant short- and medium-term improvements in pain, stiffness, and physical function in OA, with maximal effect at 6 months. Long-term efficacy and real-world safety require further investigation. Large-scale randomized trials are needed to confirm these findings.

P980

PREVALENCE OF HYPERMOBILITY SYNDROME AND ASSOCIATED FACTORS IN UNIVERSITY STUDENTS: A CROSS-SECTIONAL STUDY

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Objective: Joint hypermobility syndrome (JHS) is characterized by joint hypermobility resulting in musculoskeletal pain, sprains, and poorer quality of life. We aim to assess prevalence and related factors of JHS in University students.

Methods: We conducted a cross-sectional study on a coneonvenient sample of University students, from March 12, 2025 to July 5, 2025. We included students 18 to 29 years old, registered at a university. We excluded staff and faculty members or connective tissue disease patients. We collected demographics, lifestyle characteristics, musculoskeletal complaints, quality of life, and JHS Beighton scoring system. Statistical analyses were done using IBM SPSS v26.0. p value <0.05 was determined as statistically significant.

Results: Out of 493 collected response, 431 fit the inclusion criteria. Age, Height, Weight, BMI, Median (IQR) were 20 (3), 170 (15.50), 70 (20), 24.2 (5.74), respectively and female were 50.1%.Total Beighton score was median (IQR) 4 ± 4 and 55.5% of students had JHS. Age (p=0.001), Gender (P=0.03), Height (P=0.045), Year of study (P=0.012), were all statistically significantly associated with JHS. JHS was statistically significantly with overall health rating of the students (P=0.006). Gender was statistically significantly with total Beighton score (P=0.038) and JHS most affected body part (P=0.043).

Conclusion: Our study showed majority of student had JHS, and associated with risk factors such as age, gender, height and year of study. Gender was associated with JHS and most affected body part of JHS. The high prevalence of JHS may negative affect musculoskeletal health, academic performance, and overall quality of life, highlighting the need for early screening and preventive measures. Further research is recommended to explore gender differences and guide tailored interventions.

Table (1) Prevalence of Hypermobility Syndrome and Associated Factors among the study population

	Hypermobile (N=239)	Not Hypermobile (N=192)	Total (N=431)	p value
How would you rate your overall health?				0.006[1**]
N-Miss	38.0	184.0	222.0	
Excellent	41.0 (20.4%)	3.0 (37.5%)	44.0 (21.1%)	
Fair	47.0 (23.4%)	1.0 (12.5%)	48.0 (23.0%)	
Good	107.0 (53.2%)	2.0 (25.0%)	109.0 (52.2%)	
Poor	6.0 (3.0%)	2.0 (25.0%)	8.0 (3.8%)	
Age				0.001[2**]
Mean (SD)	20.3 (1.8)	20.9 (2.0)	20.6 (1.9)	
Range	18.0 - 27.0	18.0 - 26.0	18.0 - 27.0	
Gender				0.030[1*]
Female	131.0 (54.8%)	85.0 (44.3%)	216.0 (50.1%)	
Male	108.0 (45.2%)	107.0 (55.7%)	215.0 (49.9%)	
Height (cm)				0.045[2*]
Mean (SD)	169.2 (9.9)	171.1 (9.5)	170.0 (9.7)	
Range	145.0 - 193.0	152.0 - 193.0	145.0 - 193.0	
University				0.024[3*]
MUST	239.0 (100.0%)	192.0 (100.0%)	431.0 (100.0%)	
Year of Study				0.012[1*]
1st Year	73.0 (30.5%)	59.0 (30.7%)	132.0 (30.6%)	
2nd Year	63.0 (26.4%)	36.0 (18.8%)	99.0 (23.0%)	
3rd Year	40.0 (16.7%)	21.0 (10.9%)	61.0 (14.2%)	
4th Year or above	63.0 (26.4%)	76.0 (39.6%)	139.0 (32.3%)	

P981

PREVALENCE OF LOW BACK PAIN AND ITS ASSOCIATED RISK FACTORS AMONG UNIVERSITY STUDENTS: A CROSS-SECTIONAL STUDY

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Objectives: Low back pain (LBP) is one of the most common musculoskeletal disorders. Although traditionally associated with older adults, recent evidence shows that LBP is increasingly common among university students. Early onset of LBP may increase the risk of chronic pain in adulthood, impair academic performance, and negatively affect social life. We aim to determine the prevalence and risk factors of LBP among university students.

Methods: We conducted a cross-sectional study on a convenient sample of university students from May 26, 2025, to June 30, 2025. We included adults aged 18-30 years and excluded students with conditions causing generalized pain (e.g., rheumatoid arthritis) or sensory loss (e.g., paraplegia) using a validated questionnaire. Statistical analysis was performed using SPSS version 29 (IBM Corp., Armonk, NY, USA). A p-value < 0.05 was considered statistically significant.

Results: We included 1331 students, 57.8% were females, Age median (IQR) was 21 (3). LBP prevalence was 75.7%. Activities like personal care, lifting, walking, sitting, standing, sleeping, social life, and travelling were significantly associated with LBP (p = 0.001). Age, Smoking,

History of smoking, and Drinking alcohol were risk factors significantly interfered with classwork (p = 0.001). Age was a significant predictor (OR = 1.17, 95% CI: 1.04–1.32, p = 0.009). Females had higher odds (OR) of LBP compared to males (OR: 2.3; CI 1.658-3.243, p < 0.001). History of smoking also had higher odds of LBP (OR: 2.67; CI 1.508-4.758, p < 0.001).

Conclusion: Our study showed three out of every four students had LBP which was significantly associated with risk factors like age, gender, smoking history, etc. More studies, awareness campaigns, ergonomic training, and physical activity promotion should all be incorporated into the health programs within universities to establish an early screening and lifestyle modification program to reduce LBP and further complications.

	No (N=638)	Yes (N=693)	Total (N=1331)	p value
Age				<0.001[1]
Mean (SD)	21.6 (1.9)	21.2 (2.0)	21.4 (2.0)	
Range	18.0 - 30.0	18.0 - 32.0	18.0 - 32.0	
Collage of study	638 (47.93%)	693 (52.06%)	1331 (100%)	<0.001[2]
Year of college	638 (47.93%)	693 (52.06%)	1331 (100%)	<0.001[2]
Currently smoking				0.002[2]
No	593.0 (92.9%)	610.0 (88.0%)	1203.0 (90.4%)	
Yes	45.0 (7.1%)	83.0 (12.0%)	128.0 (9.6%)	
History of smoking				0.001[2]
No	559.0 (87.6%)	563.0 (81.2%)	1122.0 (84.3%)	
Yes	79.0 (12.4%)	130.0 (18.8%)	209.0 (15.7%)	
Drinking Alcohol				<0.001[2]
No	631.0 (98.9%)	660.0 (95.2%)	1291.0 (97.0%)	
Yes	7.0 (1.1%)	33.0 (4.8%)	40.0 (3.0%)	

P982

POSTURE AND ASSOCIATED SPINAL MALALIGNMENT AMONG UNIVERSITY STUDENTS: A CROSS-SECTIONAL STUDY

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Objective: To determine the frequency of self-reported spinal malalignment among university students and to identify associated lifestyle and familial risk factors.

Methods: A cross-sectional survey was conducted among 796 university students between March and July 2025. Students completed a structured self-report questionnaire capturing perceived changes in posture, specific spinal deviations, prior diagnoses, musculoskeletal symptoms, and lifestyle factors. Statistical analysis was performed using SPSS version 29 (IBM Corp., Armonk, NY, USA). A p-value < 0.05 was considered statistically significant.

Results: We included 796 students, 61.6% (n=400) of 649 respondents reported that their posture had worsened since starting higher education. The most commonly perceived spinal deviations were forward head tilt (47.8%, n=191) and rounded shoulders (44.5%, n=178), whereas lordosis (4.5%, n=18) and scoliosis (3.3%, n=13) were less frequently reported; only 43% (n=172) of those perceiving malalignment had a formal medical diagnosis. In bivariate analyses, dentistry students were more likely to report worsened posture compared with medicine and pharmacy students (p=0.032), and a positive family history of spinal problems (p=0.035), ≥5 hours/day of sitting (p=0.006), and more slouched sitting postures (p=0.016) were significantly associated with posture deterioration. In multivariable logistic regression, prolonged daily sitting, habitual slouched sitting, positive family history, and being enrolled in dentistry remained significant predictors of perceived postural malalignment (p<0.05), while regular exercise ≥5 times/week was associated with lower odds of deterioration (p=0.018).

Conclusions: Postural malalignment is highly prevalent among MUST students and is associated with extended sitting, slouched sitting habits, family history of spinal disorders, and field of study, particularly dentistry. Regular physical activity appears protective, supporting the need for targeted ergonomic education, promotion of active lifestyles, and early preventive strategies within university settings to mitigate posture-related musculoskeletal problems in young adults.

Table 1 Demographics and lifestyle factors

	Have your posture worsened since starting higher education?			
	Yes (N=400)	No (N=249)	Total (N=649)	p value
Age (in years)				0.824[1]
Median (IQR)	21 (19 — 23)	21 (20 — 22)	21 (20 — 23)	
Gender:				0.692[2]
Female	188 (47.0%)	121 (48.6%)	309 (47.6%)	
Male	212 (53.0%)	128 (51.4%)	340 (52.4%)	
Study field?				0.032*[2]
Dentistry	133 (33.2%)	67 (26.9%)	200 (30.8%)	
Medicine	162 (40.5%)	127 (51.0%)	289 (44.5%)	
Pharmacy	105 (26.2%)	55 (22.1%)	160 (24.7%)	
Family History				0.035*[2]
Yes	106 (26.5%)	48 (19.3%)	154 (23.7%)	
No	294 (73.5%)	201 (80.7%)	495 (76.3%)	
How many hours per day do you typically spend sitting?				0.006*[2]
5 or more hours	249 (62.2%)	128 (51.4%)	377 (58.1%)	
less than 5 hours	151 (37.8%)	121 (48.6%)	272 (41.9%)	
Exercise frequency				0.097[2]
Once or twice a week	57 (14.2%)	25 (10.0%)	82 (12.6%)	

3-4 times a week	54 (13.5%)	41 (16.5%)	95 (14.6%)	
5 times a week	28 (7.0%)	30 (12.0%)	58 (8.9%)	
It varies by week	32 (8.0%)	20 (8.0%)	52 (8.0%)	
Don't exercise regularly	229 (57.2%)	133 (53.4%)	362 (55.8%)	
When sitting for long periods, how do you usually position your body?				0.016*[2]
Straight Posture	59 (15%)	51 (20%)	110 (16.9%)	
Slight Slouching	175 (44%)	87 (35%)	262 (40.4%)	
Sit with Poor Posture	111 (28%)	61 (24%)	172 (26.5%)	
Don't pay attention	55 (14%)	50 (20%)	105 (16.2%)	

P983

DIAGNOSTIC UTILITY OF SYNOVIAL D-LACTATE FOR PROSTHETIC JOINT INFECTION: A DIAGNOSTIC TEST ACCURACY SYSTEMATIC REVIEW AND META-ANALYSIS

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Objective: To evaluate the diagnostic accuracy of synovial fluid D-lactate for detecting prosthetic joint infection (PJI) and to explore factors influencing its performance across different clinical settings.
Methods: We conducted a diagnostic test accuracy systematic review and meta-analysis according to PRISMA-DTA. PubMed, Scopus, EMBASE, Google Scholar, Cochrane Library, and professional society websites were searched without language or time restrictions for studies assessing synovial D-lactate against established PJI reference standards and reporting data. Two reviewers extracted study characteristics, assay methods, cut-off values, and tables; risk of bias was assessed with QUADAS-2. Pooled sensitivity, specificity, likelihood ratios, diagnostic odds ratio (DOR), and area under the summary ROC curve (AUC) were estimated using random-effects and bivariate models, with subgroup analyses for reference criteria and cut-offs.
Results: Seven studies involving 1,328 patients (413 PJI, 915 aseptic failures) met inclusion criteria. Pooled sensitivity and specificity of synovial D-lactate for PJI were 0.84 (95% CI 0.76–0.90) and 0.85 (95% CI 0.76–0.91), respectively. The pooled positive and negative likelihood ratios were 4.31 (95% CI 3.14–5.92) and 0.20 (95% CI 0.12–0.32), and the DOR was 27.11 (95% CI 11.55–63.63). At the optimal threshold, both sensitivity and specificity were 0.81, and the AUC was 0.90. Subgroup analyses showed sensitivity ranging from 0.81 to 0.92 and specificity up to 1.00 across different definitions and cut-offs. Overall quality was variable, with most studies at low-to-moderate risk of bias.
Conclusions: Synovial fluid D-lactate demonstrates high diagnostic accuracy for PJI, supporting its potential role as a rapid, low-cost adjunctive biomarker and early rule-out tool. Standardized cut-off values and prospective multicenter validation are needed before routine integration into diagnostic algorithms.

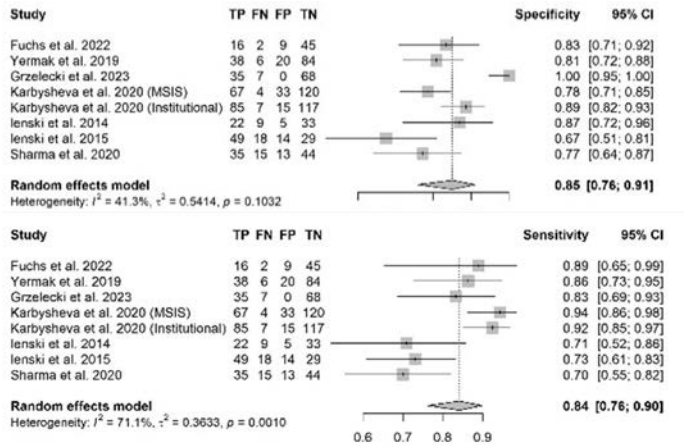


Figure 1: Showing Random-effect model of pooled Sensitivity and Specifity for Synovial fluid D-lactate in included studies

P984

COMPUTED TOMOGRAPHY–DERIVED HOUNSFIELD UNITS FOR OPPORTUNISTIC ASSESSMENT OF BONE MINERAL DENSITY AND PREDICTION OF FRACTURE RISK

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Objective: This study evaluated the ability of lumbar HU measurements to predict osteoporotic fractures and compared their performance with conventional DXA parameters.

Materials and Methods: Ninety-six patients who underwent lumbar CT and DXA within one year were analyzed. HU values were recorded from L1–L4 across axial, coronal, and sagittal planes. Fracture status was available in 65 patients. Diagnostic performance for fracture prediction was assessed using ROC analysis, Youden index thresholds, and model quality scoring.

Results: HU demonstrated the strongest predictive performance for osteoporotic fracture risk compared with BMD and T-score. The optimal HU threshold for fracture prediction was 95.9 HU, yielding a sensitivity of 46.7% and a specificity of 88.6%. HU achieved the highest model quality score (0.51), outperforming T-score (0.40) and BMD (0.38).

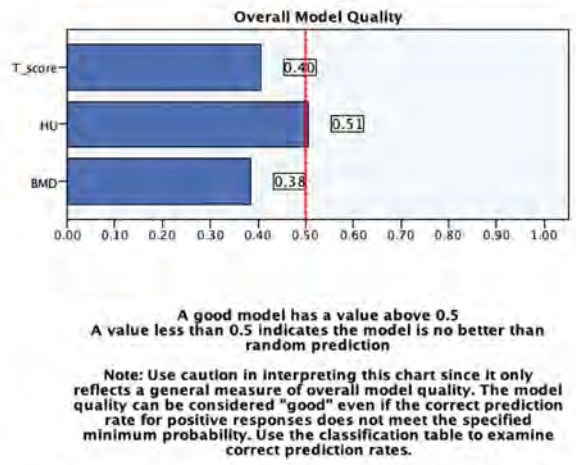


Figure 1: Overall model quality comparison demonstrating the relative predictive performance of HU, T-score, and BMD. HU achieved the highest model quality score (0.51), exceeding T-score (0.40) and BMD (0.38).

Conclusion: Lumbar CT-derived HU values provide a superior predictive signal for osteoporotic fracture risk compared with conventional DXA measures. Opportunistic assessment of HU during routine CT imaging may support early fracture risk stratification and improve screening in populations unlikely to undergo DXA evaluation.

P985

ASSESSMENT OF BRIEF ACTION PLANNING TO PROMOTE PHYSICAL ACTIVITY OVER 4 WEEKS IN ADULTS WITH CHRONIC KNEE SYMPTOMS

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Background:
Physical inactivity can worsen pain and disability in individuals with chronic knee symptoms. Brief Action Planning (BAP) to increase physical activity (PA) offers promise as a form of health coaching but remains understudied in real-world contexts. This study aimed to (1) assess the impact of coaching metrics on device-tracked physical activity (PA) in participants with chronic knee symptoms; and (2) to monitor the patterns of PA during four weeks' observation based on participants' baseline indicators. Participants (n=18) randomized to the PA coaching arm of a randomized controlled trial.
Materials and Methods:
At baseline, participants completed the Numerical Pain Rating Scale, Self-Efficacy for Exercise Scale, WOMAC osteoarthritis index, and the Tampa Scale of Kinesiophobia. PA was tracked using Fitbit Inspire 3® during a health coaching intervention for four weeks. PA was recorded as the average number of steps per week over 4 weeks. Participants who exceeded 7500 steps/week were categorized as "physically active", and participants with <7,500 steps/week were "insufficiently active". Meaningful improvement in the insufficiently active was defined as 20% increase in average number of steps from baseline. Coaching metrics included the use of behavioral menus, plan changes, plan confidence, and the number and duration of calls. Statistical assumptions including normality were assessed. The statistical tests (X^2 or Fisher's Exact test, independent samples t-test, and Pearson's correlation) were applied accordingly. Binary logistic regression assessed the impact of coaching metrics on the outcome of exceeding 7500 steps/week, and linear regression assessed change in PA trajectories. P<0.05 was considered statistically significant.
Results:
At baseline, six of the 18 participants (33.3%) were physically active, and by week four, ten participants were physically active (55.6%, p=0.125). Four additional participants showed meaningful PA improvements by four weeks. Among the18 participants, average four-week PA was significantly higher among those with lower baseline BMI (p=0.009), and significantly higher among participants who held a college degree or higher (p=0.032). PA did not vary based on coaching metrics. Lower pain levels and higher self-efficacy were associated with higher PA (p=0.006; p=0.028, respectively). Trajectories of PA over four weeks showed that participants with low pain intensity (<4) and low WOMAC scores (<19) experienced higher PA.
Conclusions:
Improved physical activity does not appear to be based on BAP coaching metrics over 4 weeks, but may be affected by demographics, clinical characteristics, disease-related quality of life, and pain values. Further studies with larger sample sizes and longer follow-ups are needed.

P986

BRIEF ACTION PLANNING HEALTH COACHING FOR ADULTS WITH CHRONIC KNEE SYMPTOMS: A QUALITATIVE STUDY

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Background:
Physical inactivity worsens pain and disability in individuals with chronic knee symptoms (CKS), yet many interventions are poorly tailored to individual motivation. Brief Action Planning (BAP), a self-management support tool offers promise for supporting health coaching but remains understudied in real-world contexts. This study aimed to explore the feasibility, acceptability, and perceived impact of a computer-supported BAP coaching program on physical activity behavior among employees with CKS. 9 participants were enrolled in a 12-week physical activity coaching program recruited from participating employers in a randomized controlled trial.
Materials and Methods:

The 12-week program consisted of a 30-minute BAP session and four to eleven 10-minute follow-up sessions delivered remotely by trained health coaches. Semi-structured interviews were conducted post-intervention and analyzed using qualitative content analysis. Codes were organized thematically across seven domains: program effectiveness, impact, motivation for participation, opinions of BAP, perceived necessity, personal experience, and sustainability of change. Social Determination Theory's (SDT) three psychological needs autonomy, competence, and relatedness were used to interpret the motivational mechanisms supporting behavior change.

Results:

Three main thematic categories emerged from the data. The first was value and sustainability of the BAP program, including subthemes of acceptability, positive experience with coaching, and anticipated sustainability of behavioral change. The second was active ingredients that facilitated physical activity behavior, including coaching accountability, goalsetting structure, and behavioral monitoring via Fitbit. The third was contextual conditions influencing motivation and program fit, including personal motivation, knee pain management needs, and workplace or lifestyle integration. Participants consistently viewed the coaching relationship as the central driver of behavior change. Coaching enhanced personal accountability, enabled adaptive goal setting, and fostered supportive dialogue. Fitbit use complemented goal adherence but was viewed as secondary to interpersonal support. Mapping to SDT, autonomy was supported by individualized goal-setting, competence through iterative plan refinement and feedback, and relatedness through an empathic, nonjudgmental coaching relationship. Participants reported increased physical activity and most described the changes as sustainable due to internalized motivation and increased self-efficacy.

Conclusions:

BAP coaching was perceived as feasible, highly acceptable, and impactful for promoting physical activity in individuals with CKS. The findings reinforce SDT's utility in understanding how personalized, need-supportive coaching interventions can foster sustained engagement in self-management behaviors.

P987

PATTERNS AND ASSOCIATED FACTORS OF MUSCULOSKELETAL PAIN AMONG HAJJ PILGRIMS

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Background:Every year, the Hajj season brings together approximately two to three million pilgrims from around the world in Mecca, Saudi Arabia, and lasts for about five to seven days.Hajj is a sequence of rituals performed at specific locations and times in Mecca. These rituals require substantial physical exertion, which can lead to musculoskeletal pain (MSP) across various age groups.

Objective:This study aimed to determine the prevalence and distribution of MSP and to identify factors associated with muscular pain among pilgrims during Hajj.

Methods:A web-based questionnaire was administered during the annual Hajj mass gathering, with pilgrims recruited from ritual sites. The questionnaire collected information on demographic characteristics, MSP across ten anatomical body regions, and physical activity (PA) level. Data were analyzed using descriptive and inferential statistical methods, with a significance level of 0.05.

Results:A total of 248 pilgrims participated, with a mean age of 43.49 ±12.70 years. Overall, 78.6% of participants reported experiencing MSP in at least one body region during Hajj. Lower-limb pain was the most commonly reported, particularly in the legs (46%), followed by the lower back (45%), knees (37%), and ankles/feet (30%). No significant associations were found between MSP and age, sex, or PA level; however, body mass index (BMI) was significantly associated with MSP ($p < 0.05$).

Conclusion:A high proportion of pilgrims experienced musculoskeletal pain in one or more body regions during Hajj. Despite of existing physical fitness guidelines from the Saudi Ministry of Health, there is a need for broader dissemination of MSP prevention strategies by relevant organizations worldwide.

P988

POLYOSTOTIC FIBROUS DYSPLASIA REVEALED IN ADULTHOOD ASSOCIATED WITH MCCUNE–ALBRIGHT SYNDROME: A DIAGNOSTIC CHALLENGE

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Introduction: Fibrous dysplasia is a rare benign bone disorder in which normal bone is replaced by fibro-osseous tissue. Polyostotic forms in adults are uncommon and may occasionally be associated with McCune–Albright syndrome, which can delay diagnosis due to variable clinical presentation.

Objective: To report a rare adult-onset case of polyostotic fibrous dysplasia and emphasize key clinical and radiological features for timely diagnosis.

Case presentation: A 45-year-old woman with no prior medical history presented with one year of mechanical hip pain and a limp. Examination revealed painful limitation of both hips, scoliosis with restricted anterior trunk flexion, and congenital café-au-lait spots on the left thigh and back. Laboratory tests demonstrated elevated alkaline phosphatase (270 UI/L), hypophosphatemia (2 mg/dL), and normal calcium, vitamin D, PTH, and thyroid function, consistent with active bone remodeling.

Radiographs of the skull, long bones, and pelvis, and CT scans of the spine showed multiple bone lesions with characteristic ground-glass appearance, cortical thinning, and deformities. Diagnosis of polyostotic fibrous dysplasia was made on clinical and radiological grounds without biopsy. The patient was treated with analgesics and bisphosphonates and scheduled for close clinical and radiological follow-up.

Discussion: Adult-onset polyostotic fibrous dysplasia is rare, and its recognition may be delayed, particularly in the absence of endocrine involvement. This case emphasizes the importance of a careful clinical examination, recognition of cutaneous manifestations, and systematic imaging to establish the diagnosis. Laboratory evaluation can provide supportive evidence of active bone remodeling. Early identification allows implementation of appropriate management strategies, including pharmacologic treatment, monitoring for skeletal complications, and planning follow-up to prevent fractures and progressive deformities

Conclusion: Polyostotic fibrous dysplasia in adults remains underdiagnosed. A thorough clinical assessment, supported by imaging and laboratory evaluation, is crucial for timely diagnosis. Early recognition and tailored management are essential to optimize patient

outcomes and prevent complications .

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Figure 1: Cutaneous involvement: café-au-lait spots (back and thigh).



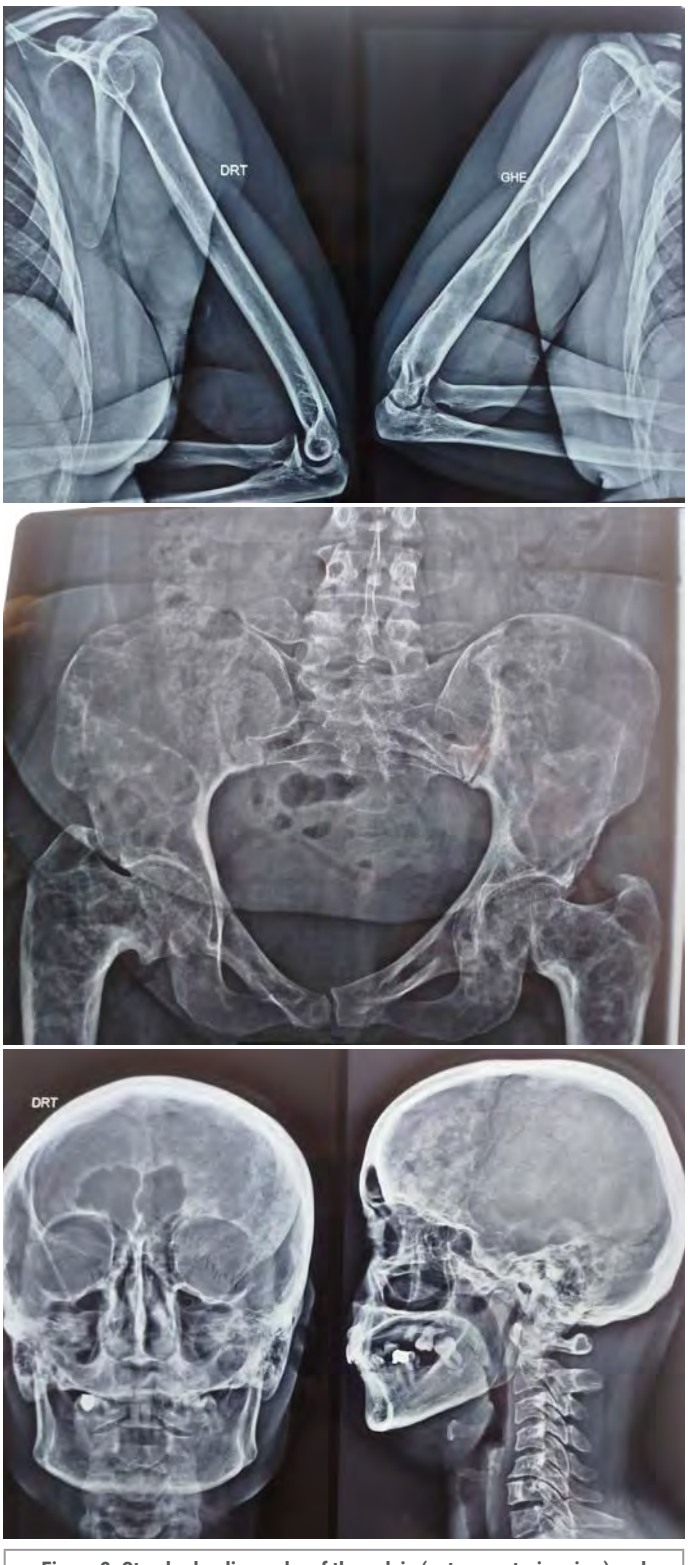


Figure 2: Standard radiographs of the pelvis (anteroposterior view) and humerus.
A: Ground-glass appearance with focal thinning of the cortical bone.
B: Ground-glass appearance associated with "shepherd's crook" deformity of the proximal femur, with varus angulation.

Figure 3. Skull radiographs (frontal and lateral views).
A, B: Mixed lytic and sclerotic lesions involving the left parietal bone.

P989

REDUCED QUADRICEPS MUSCLE THICKNESS AND IMPAIRED MUSCLE FUNCTION ARE ASSOCIATED WITH HIGHER FRAX®-PROJECTED HIP FRACTURE RISK IN OLDER ADULTS

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Objective

Muscle mass and function play a key role in mobility, balance, and fracture prevention. However, their relationship with fracture risk estimation tools remains insufficiently explored. This study aimed to evaluate whether muscle thickness and functional performance differ between older adults with and without elevated FRAX®-projected 10-year hip fracture risk (≥3%).

Material and Methods

Community-dwelling older adults aged ≥65 years were stratified according to FRAX® Turkey–projected 10-year hip fracture risk into Group 1 (no elevated risk) and Group 2 (elevated risk, ≥3%). Quadriceps muscle thickness was measured by ultrasound, while muscle strength and physical performance were assessed using handgrip strength and the chair stand test, respectively. (Figure 1)

Results

A total of 164 older adults were included (Group 1: n=38; Group 2: n=126). Group 2 was significantly older than Group 1 (78.5±6.2 vs 71.2±5.3 years; p<0.001), while the proportion of women was similar between groups (83.3% vs 89.5%; p=0.356). Body mass index did not differ significantly between groups (27.9±5.5 vs 29.5±4.9 kg/m²; p=0.127). Quadriceps muscle thickness was significantly lower in the elevated-risk group (20.4±6.8 vs 22.9±5.6 mm; p=0.045). The prevalence of low handgrip strength was higher in Group 2 (61.6% vs 39.5%; p=0.016). Chair stand test performance indicated poorer lower extremity function in Group 2 (21.9 [17.8–29.6] vs 19.0 [14.9–24.4] s; p=0.012).

Conclusion

Older adults with higher FRAX®-projected hip fracture risk exhibit reduced muscle thickness and functional impairment. These findings highlight the clinical relevance of muscle-related parameters in fracture risk evaluation and support integrating muscle assessment into osteoporosis-focused risk stratification.

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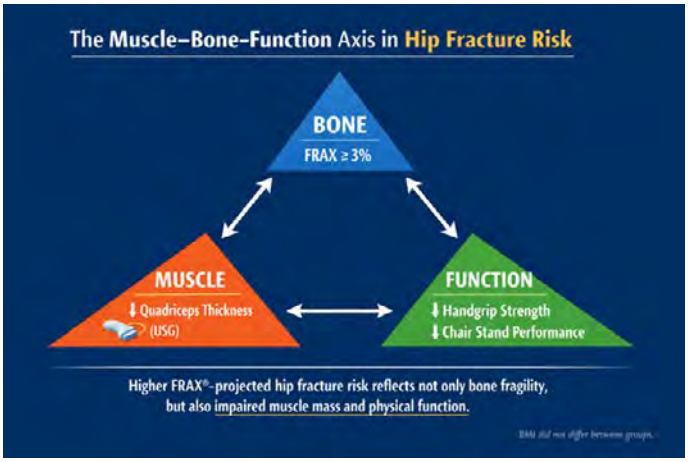


Figure 1. Assessment of muscle thickness and functional performance in relation to hip fracture risk.

P990

VITAMIN D REPLACEMENT IN ADULTS AND ELDERLY IN THE MIDDLE EAST AND NORTH AFRICA REGION: A SYSTEMATIC REVIEW AND META-REGRESSION

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Objective(s):

To update evidence on the impact of vitamin D supplementation on serum 25-hydroxyvitamin D [25(OH)D] levels in adults and elderly populations in the MENA region and investigate the dose-response relationship.

Materials and Methods:

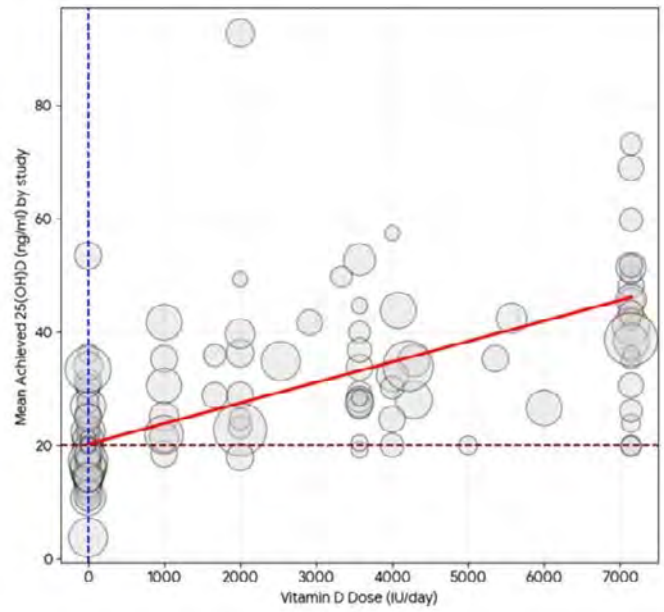
Following PRISMA 2020 guidelines, we searched PubMed, Embase, and Cochrane Library (2015-December 2024) for randomized controlled trials (RCTs) conducted in MENA countries evaluating oral vitamin D for ≥3 months in adults and elderly (>18 years). We assessed the risk of bias (ROB) using the Cochrane RoB 2 tool (2019). We pooled weighted mean differences (WMD) using random-effects models. We conducted a multivariate meta-regression to identify predictors of achieved 25(OH)D levels using STATANow 18 BE. (PROSPERO CRD42014010488)

Results:

From 1,589 citations, 64 trials (61 in adults, 3 in elderly) were included. Weighted mean baseline 25(OH)D was 14.5 ng/mL in elderly and 19.5 ng/mL in adults. Mean age of participants ranged from 21.3 to 73.5 years, and mean BMI ranged from 20.7 to 39.9 kg/m². Gender distribution varied, with the proportion of men ranging from 7.5% to 100% (including 4 studies that enrolled men only). Vitamin D doses ranged from 1,000 to 7,143 IU/day over 3-12 months.

Multivariate meta-regression (R^2=0.737) identified baseline status, dose, and BMI as significant predictors. Achieved 25(OH)D levels increased by 0.79 ng/mL for every 1 ng/mL increase in baseline level (β=0.79; p<0.001)) and by 0.36 ng/mL for every additional 100 IU/day dose (β=0.36, p<0.0001). Conversely, every 1 kg/m² increase in BMI predicted a 0.67 ng/mL decrease in achieved levels (β=-0.67; p=0.002). Participants' age, gender, supplementation duration, vitamin D type (D2

vs. D3), calcium co-administration, latitude, assay method, publication year, or ROB were not significant predictors.
Achieved 25 (OH)D (ng/ml)= 23.46 +0.36* (VitD dose in 100IU) + 0.79* Baseline 25(OH)D (ng/ml) - 0.67 * BMI (kg/m^2)
Conclusion(s):
Vitamin D supplementation response in the MENA region is highly predictable. Baseline status and BMI are critical factors for clinicians when determining the optimal cholecalciferol dose required to reach sufficiency.
No conflicts of interest.
Figure: Impact of daily Vitamin D dosage on mean achieved serum 25(OH)D: A random-effects meta-regression analysis adjusted for baseline status and BMI



P991

HYPOVITAMINOSIS D: TIME TRENDS AND PREDICTORS ACROSS THE LIFE COURSE: 2016-2023

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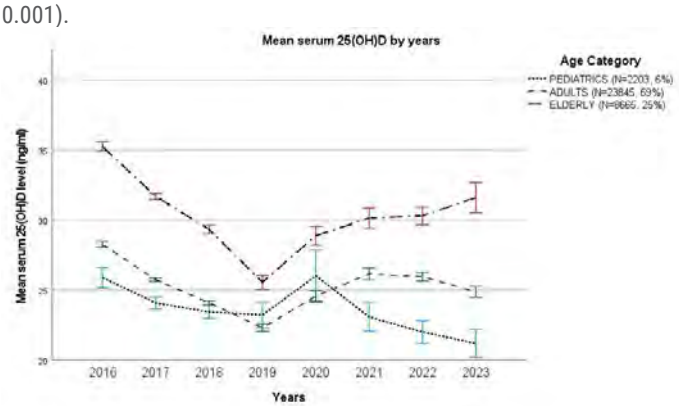
Objective: To assess the prevalence, predictors, and secular trends of hypovitaminosis D in a Lebanese cohort.
Materials & Methods: This retrospective study analyzed 34,713 inpatients and outpatients 6% pediatric (0-18 years), 69% adult (19-64 years), 25% elderly (≥65 years)) from the American University of Beirut Medical Center laboratory database (2016–2023). 25(OH)D values were standardized to LC-MS/MS equivalents. Multivariate logistic regression (SPSS 27) identified predictors of deficiency (<12, <15, and <20 ng/ml), evaluating age, sex, BMI, supplementation, inpatient status, and season.
Results: Overall prevalence of hypovitaminosis D was 9.4%, 16.8%, and 31.8% at <12, <15, and <20 ng/ml, respectively.

• **<12 ng/ml**: Pediatric risk increased with older age (6.9% per year) and was 69% lower in summer versus winter. Adults/ elderly: Risk increased with higher BMI (4.4% per kg/m^2) and inpatient status (76% higher). Risk decreased with older age in adults (3% per year), female sex (38% lower in elderly), and summer season (40%–65% lower risk vs. winter, in elderly and adults respectively).

• **<15 ng/ml**: Pediatrics: Risk increased with older age (6.6% per year) and inpatient status (124% higher); risk decreased in summer (65.5% lower vs. winter). Adults: Risk increased with higher BMI (4.4% per kg/m^2) and inpatient status (57% higher); risk decreased with older age (3% per year), female sex (26% lower), and summer (60% lower vs. winter). Elderly: Risk increased with higher BMI (4.4% per kg/m^2); risk decreased with older age (1% per year), female sex (51.5% lower), and summer (28% lower vs. winter).

• **<20 ng/ml**: Pediatrics: Risk increased with older age, winter season, inpatient status, and BMI; risk decreased in summer (65% lower vs. winter). Adult/elderly: Patterns mirrored the <15 threshold. The strongest seasonal effect was at this cutoff, with risk decreasing in summer by 52.7% in adults and 22% in the elderly compared to winter.

Secular trends: levels declined (2016–2019), then increased through 2023. Repeat testing within individuals correlated with increased supplementation and rising 25(OH)D levels.
Conclusions: Hypovitaminosis D remains common, particularly in children and adult men. Levels have been increasing over time, possibly reflecting increased supplementation.
Disclosures: No conflicts of interest.
Figure 1: Annual serum 25(OH)D levels (standardized to LC-MS/MS) were analyzed across pediatric (N=106–678), adult (N=845–8,979), and elderly (N=288–3,304) cohorts. Statistically significant year-to-year variation was observed within each age group (One-Way ANOVA, p < 0.001).



P992

SEQUENTIAL THERAPY WITH DENOSUMAB OR ZOLEDRONIC ACID FOLLOWING ROMOSOZUMAB IN POSTMENOPAUSAL WOMEN WITH SEVERE OSTEOPOROSIS

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Our objective is to compare BMD changes and bone turnover marker profiles in postmenopausal osteoporotic women receiving sequential denosumab (Dmab) or zoledronic acid (Zol) therapy after completing 12 months of romosozumab (Romo) treatment.

Methods

We conducted a prospective study assessing densitometric parameters (lumbar spine (LS), total hip (TH), femoral neck (FN), distal radius), radiographic vertebral fractures, and bone turnover markers. Of 50 enrolled patients, 36 completed Romo therapy. This analysis includes 23 patients who completed 12 months of sequential therapy: 16 received Dmab and 7 received Zol. Sequential treatment selection was based on densitometric response at completion of Romo therapy (Zol: T-Score > -3 and/or BMD gain with Romo ≥ 5%; Dmab: T-Score ≤ -3 and/or BMD gain with Romo < 5%).

Results

Of the 36 patients who completed Romo, median age was 72.6 years (54–89); 69% had a history of fractures (fx) (51% multiple, 57% vertebral, 11% hip, 17% wrist). Recent fx was present in 31%. 14% were treatment-naïve. Baseline BMD data were as follows: LS BMD 0.807 (0.546-0.945), TScore -3 (-5.2 to -2); TH BMD 0.674 (0.540-0.971), TScore -2.6 (-3.8 to -0.3). Dmab group: median age 73 years (61-75); 88% with fx history (69% multiple, 81% vertebral, 19% hip, 19% wrist); 44% recent fx (<24 months); 13% treatment-naïve. Zol group: median age 76 years (70-82); 100% with fx history (71% multiple, 71% vertebral, 14% hip, 14% wrist); 43% recent fx 43% treatment-naïve. Sequential therapy was initiated within 3 months in 91% of patients (range: 1-6 months Dmab, 1-4 months Zol). There were no statistically significant differences between the two groups. In the Dmab group, a final BMD gain of 17% at the LS , 10% at the TH and 6% at the FN was observed. In the ZOL group, a final BMD gain of 9% at the LS, 6% at the TH and 4% at the FN was observed. Baseline characteristics, bone turnover markers, and BMD changes for each group are presented in Table 1.

Discussion

Our real-world cohort demonstrated higher fracture burden than FRAME/ARCH trials yet achieved comparable or superior BMD outcomes. Zol effectively maintained Romo-induced BMD gains, supporting recent meta-analyses validating bisphosphonates as viable alternatives in appropriately selected patients.

Table 1. Comprehensive Results: BMD Changes and Bone Turnover Markers During Romosozumab and Sequential Therapy

Parameter	Denosumab Sequential Therapy (n=16)						Zoledronic Acid Sequential Therapy (n=7)					
Parameter	Baseline Romo	Gain with Romo (%)	Baseline Sequential Tx	12 Months Sequential Tx	Gain with Sequential Tx (%)	Total 24-Month Gain (%)	Baseline Romo	Gain with Romo (%)	Baseline Sequential Tx	12 Months Sequential Tx	Gain with Sequential Tx (%)	Total 24-Month Gain (%)
BONE MINERAL DENSITY (g/cm²)												
Lumbar Spine	0.829 (0.546-0.971)	+12.2	0.93 (0.70-1.199)	0.977 (0.793-1.248)	+4.98	+17.24	0.847 (0.694-0.892)	+0.61	0.926 (0.743-1.369)	0.923 (0.770-1.091)	+0.32	+8.93
Total Hip	0.674 (0.54-0.9)	+6.37	0.727 (0.572-0.893)	0.752 (0.574-0.915)	+3.83	+9.88	0.717 (0.629-0.909)	+4.74	0.751 (0.663-0.939)	0.759 (0.665-0.130)	+1.06	+5.86
Femoral Neck	0.604 (0.458-0.677)	+3.8	0.715 (0.593-0.877)	0.725 (0.61-0.875)	+1.11	+5.91	0.695 (0.651-0.895)	+7.53	0.746 (0.687-0.852)	0.721 (0.703-0.877)	-3.35	+3.98
Distal Radius 33%	0.686 (0.607-0.729)	-0.66	0.685 (0.606-0.698)	0.685 (0.5-0.700)	+0.16	+0.02	0.586 (0.527-0.731)	-4.88	0.564 (0.389-0.845)	0.536 (0.390-0.802)	-4.96	-9.04
BONE TURNOVER MARKERS												
PTH (pg/mL)	45	—	54.5	50	-8.25%	—	42.85	—	58.8	55.9	-30.946%	—
25(OH)VD (ng/mL)	68.8	—	60.65	86.7	+43.45%	—	51.85	—	30.4	69.8	+29.01%	—
Osteocalcin (ng/mL)	23.45	—	21.75	9.6	-55.84%	—	27.9	—	20.75	17.45	-23.29%	—
Bone ALP (µg/L)	10.7	—	10.9	8.2	-41.11%	—	14.1	—	14.55	11.1	-23.71%	—
β-CTX (pg/mL)	498	—	410	180	-56.89%	—	494.5	—	372	285	-11.49%	—

Values presented as median [inter-quartile range] for BMD measurements. Romo = Romosozumab; Sequential Tx = Sequential Therapy; PTH = Parathyroid Hormone; 25(OH)VD = 25-Hydroxyvitamin D; ALP = Alkaline Phosphatase; β-CTX = Beta-C Terminal Telopeptide. — = Indicates data not applicable for this measurement period.

P993

IMPACT OF BALNEOTHERAPY AND INDIVIDUALIZED KINESIOTHERAPY ON SARCOPENIA PREVENTION IN PATIENTS AFTER OSTEOPOROTIC FRACTURES

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Background: Osteoporotic fractures are associated with increased risk of sarcopenia and functional decline. Comprehensive rehabilitation strategies are essential to prevent frailty and restore independence.

Objectives: To assess the impact of balneotherapy combined with individualized kinesiotherapy on muscle strength and functional recovery in post-fracture patients at the Clinic for Physical Medicine and Rehabilitation, UKC Niš.

Methods: A cohort of 60 patients (mean age 71 ± 7 years; 45 women, 15 men) with recent osteoporotic fractures underwent a 6-week rehabilitation program including balneotherapy (mineral water baths, 5 sessions/week) and individualized kinesiotherapy tailored to fracture type and baseline muscle strength. Outcomes were assessed using handgrip dynamometry, Short Physical Performance Battery (SPPB), and EuroQol-5D at baseline and after 6 weeks.

Results: Muscle strength improved significantly (handgrip +18%, $p < 0.01$), SPPB scores increased by 2.1 points ($p < 0.05$), and quality of life (EQ-5D index) improved by 22%. Patients reported high satisfaction with balneotherapy as an adjunct to exercise.

Conclusion: The integration of balneotherapy and individualized kinesiotherapy in tertiary rehabilitation settings contributes to prevention of sarcopenia and enhances recovery after osteoporotic fractures, supporting a holistic approach to post-fracture care.

P994

RISK FACTORS FOR OSTEOPOROTIC FRACTURE IN PATIENTS WITH THYROTOXICOSIS: A RETROSPECTIVE OBSERVATIONAL STUDY

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Background:

Thyrotoxicosis is a well-recognised cause of secondary osteoporosis and is associated with increase in bone turnover, preferential loss of cortical bone, and an increased risk of fragility fractures. In the presence of excess thyroid hormone, bone remodelling becomes markedly increased, with bone resorption outpacing formation. This imbalance leads to loss of bone mineral density (BMD) and deterioration of bone

microarchitecture, particularly at cortical sites such as the femoral neck.[1] Both overt and subclinical hyperthyroidism have been linked to reduced BMD and a higher incidence of osteoporotic fractures, especially in older individuals and postmenopausal women.[1]

Despite this established association, fracture risk assessment in patients with thyrotoxicosis is largely extrapolated from tools developed for the general population, including FRAX and QFracture. These instruments may not fully capture thyroid-specific skeletal vulnerability. While population-based studies have consistently demonstrated an increased fracture risk in hyperthyroid states,[2] there remains limited evidence defining which clinical and densitometric factors are most predictive of fracture within this group. In particular, the relative contribution of falls risk, previous fracture history, and DXA-derived measures of bone density alongside conventional fracture prediction algorithms has not been clearly delineated.

The aim of this study was therefore to undertake a comprehensive assessment of risk factors for osteoporotic fracture in patients with thyrotoxicosis, incorporating demographic characteristics, lifestyle factors, falls history, fracture prediction scores, and BMD and T-scores.

Methods:

Data were analysed using a retrospective observational approach. Patient characteristics were summarised using means and standard deviations for continuous variables and counts and percentages for categorical variables. Patients with and without osteoporotic fractures were compared using t-tests for continuous variables and chi-square or Fisher's exact tests for categorical variables, as appropriate. Logistic regression was used to examine factors associated with fracture, with adjustment for age, sex, body mass index, and QFracture risk estimates. Other clinical risk factors were assessed individually. Bone mineral density and T-scores at the lumbar spine and femoral neck were compared between groups. Statistical significance was defined as $p < 0.05$.

Results:

A total of 782 patients with thyrotoxicosis were included, of whom 213 (27.2%) had sustained a major osteoporotic fracture. Patients with fracture were more likely to be female and demonstrated higher fracture prevalence despite comparable BMI. In multivariable analysis, female sex and BMI showed borderline associations with fracture risk, while age and QFracture-derived risk estimates were not independently predictive. Lower BMD and T-scores at the femoral neck and lumbar spine were observed in fractured patients. Prior fracture history and recurrent falls emerged as the strongest risk factors.

Conclusion:

In patients with thyrotoxicosis, osteoporotic fracture risk is influenced by a combination of skeletal fragility and non-skeletal factors. Prior fracture history, recurrent falls, female sex, and reduced bone mineral density emerged as the principal determinants of fracture risk in this cohort. These findings are in keeping with established evidence demonstrating accelerated bone turnover, preferential cortical bone loss, and impaired neuromuscular function associated with excess thyroid hormone. [1]

Notably, fracture prediction tools did not adequately identify individuals at highest risk, suggesting that methods developed for the general population may underestimate fracture susceptibility in thyrotoxicosis. As thyroid hormone excess affects both bone strength and neuromuscular function, fracture risk assessment in this population may benefit from a more tailored approach that incorporates falls history, prior fractures, and direct measures of bone density alongside recognition of thyroid-related skeletal and neuromuscular effects.[1,2]

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P995

HIGH RATES OF NORMOCALCEMIA AFTER RADIOFREQUENCY ABLATION FOR PRIMARY HYPERPARATHYROIDISM: REAL-WORLD BIOCHEMICAL OUTCOMES FROM A SINGLE-CENTER COHORT

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Objective To evaluate biochemical outcomes and safety of radiofrequency ablation (RFA) in patients with primary hyperparathyroidism (PHPT) who were not candidates for or declined surgery.

Materials and Methods Prospective single-center cohort of patients with PHPT due to single parathyroid adenoma treated with ultrasound-guided RFA between June 2022 and January 2026. All patients had an indication for parathyroidectomy but were either high surgical risk or refused surgery. Serum calcium and parathyroid hormone (PTH) levels were assessed before and after the procedure. Follow-up included biochemical and ultrasound evaluations. Biochemical response was categorized as complete (normal calcium and PTH), normocalcemia with persistent PTH elevation, or persistent hypercalcemia. Complications were recorded.

Results Forty-four patients were treated (mean age 60.4 years, range 38–80; 89% women). Post-procedural PTH <65 pg/mL was observed in 86.4% (38/44), and a ≥50% PTH reduction in 86.4%.

Among patients who had reached 6 months of follow-up (n=36) normocalcemia was achieved in 88.9% (32/36). Complete biochemical response occurred in 72.2% (26/36), while 16.7% (6/36) had normocalcemia with persistent PTH elevation; persistent hypercalcemia was observed in 11.1% (4/36). At 12 months (n=31), normocalcemia was maintained in 83.9% (26/31), with complete biochemical response in 74.2% (23/31).

Ultrasound follow-up at 12 months (n=24) showed a mean adenoma volume reduction of 81%.

Transient dysphonia occurred in 6.8% and transient hypocalcemia in 4.5%. No permanent complications were recorded.

Conclusions In this real-world cohort of patients with PHPT who were not candidates for or declined surgery, RFA was associated with high rates of normocalcemia, effective biochemical control, significant adenoma volume reduction, and a favorable safety profile. RFA may represent a valuable minimally invasive option in carefully selected patients, particularly those at high surgical risk.

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CARE GAPS IN HYPOPARATHYROIDISM: PRELIMINARY BASELINE DATA FROM THE HIPOPARARED REGISTRY

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Objective: To describe the preliminary baseline results of a prospective observational registry of patients with hypoparathyroidism in Argentina, and to analyze how many patients would meet the criteria for treatment with PTH according to recent European guidelines[1].

Materials and methods: Adult patients with chronic hypoparathyroidism were enrolled in the prospective observational registry, recruited through a dedicated online platform, and included from multiple healthcare centers across Argentina. Baseline etiology, clinical characteristics, symptom burden, long-term complications, and biochemical parameters were evaluated.

Results: A total of 183 patients were included: 166 women (90.2%) and 17 men (9.8%). The most frequent cause was postsurgical (163/183; 89.1%), with total thyroidectomy for thyroid cancer as the main indication (82/163; 50.3%). Among non-surgical cases (20/183; 10.9%), most were classified as idiopathic or autoimmune. The cohort's mean age was 55 years (range 22–87), with a mean age at diagnosis of 44 years, a mean body mass index (BMI) of 27.8 kg/m², and a mean disease duration of 11.2 ± 8.7 years (median: 9 years). Baseline serum calcium at entry was low-normal (mean 8.37 mg/dL); however, 89 patients (48.6%) had hypocalcemia, and 103 (56.6%) had hyperphosphatemia (mean phosphorus: 4.69 mg/dL). Urinary calcium excretion was assessed in 96 patients, with 18 (18.7%) showing hypercalciuria. Hospitalization was required in 26% of patients, primarily due to hypocalcemia. Sixty-six patients (36.1%) reported at least one complication—renal, cardiovascular, ophthalmologic, and/or neurologic—which were more prevalent among those with disease duration >10 years (44/109, 40%). Although a trend toward a greater burden of complications with longer disease duration was observed, this finding did not reach statistical significance (p = 0.40). According to current international guidelines, 70% of patients (133/183) would meet criteria for PTH treatment. However, 14 patients (7.7%) were receiving off-label PTH (1–34). Palopegteriparatide is not yet available in Argentina.

Conclusions: Our findings are consistent with those reported in other cohorts. A significant care gap was identified, with patients commonly experiencing hypocalcemia, hyperphosphatemia, and other long-term complications. A high proportion of patients would meet international criteria for PTH replacement therapy[1]. This first preliminary report provides relevant data to better understand current therapeutic management and to inform future improvements in care.

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P997

EFFECT OF FOUR-WEEK TRAINING SESSION IN NORMOBARIC HYPOXIA ON BONE MINERALISATION INDICES AMONG WOMEN AGED 50-59 YEARS

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Objective

The study aim was to assess the effect of training in normobaric hypoxia on bone mineral density among women aged 50-59 years.

Material and methods

The study group included 57 women aged 50-59 years, who were randomly assigned to one of four groups: HT (n=15, training in normobaric hypoxia), NT (n=13, training in normoxia), B (n=15, passive exposure to normobaric hypoxia), and C (n=14, control group). The intervention comprised 4 weeks of progressive training, performed three times a week, for 60 minutes. The exercise intensity was individualised based on maximum heart rate (HRmax). Each session combined endurance training on a cycle ergometer with resistance training using resistance bands. The simulated altitude was 2,500 m a.s.l. in the HT and B groups, and 223 m a.s.l. in the NT group. The baseline and final values of the following indices: bone mineral content (BMC), bone mineral density (BMD), T-score and Z-score, were determined using Dual Energy X-ray Absorptiometry (DEXA).

Results

Repeated measures ANOVA did not reveal any significant main or interaction effects for any of the analysed bone mineralisation indices. For both BMC and BMD, there was no effect of training condition ($p = 0.937$ and $p = 0.781$), timing of measurement ($p = 0.842$ and $p = 0.298$), or condition × timing of measurement interaction ($p = 0.964$ and $p = 0.601$). Similarly, T- and Z-scores did not change significantly with the intervention; no significant differences were observed for either main effects ($p = 0.748$ and $p = 0.757$, respectively) or interactions (T-score: $p = 0.439$; Z-score: $p = 0.265$).

Conclusion

The planned intervention did not allow us to consider high-altitude conditions or endurance and resistance training in such conditions as an effective approach to osteoporosis prevention. Repeating the protocol at higher altitudes and/or with a longer exposure duration could be contemplated.

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P998

STUDY OF BONE ARCHITECTURE IN LUNG TRANSPLANT RECIPIENTS

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Objectives

To evaluate bone microarchitecture in lung transplant (LT) recipients, analyze post-transplant changes, and assess their relationship with fractures.

Methods

Ambispective study including LT recipients evaluated at Hospital Universitari Vall d'Hebron between 2022 and 2026. Bone mineral density (BMD) was assessed by DXA, bone microarchitecture by trabecular bone score (TBS), and vertebral fractures by dorsolumbar radiography before and within the first year after transplantation.

Results

Seventy-five patients were analyzed (mean age 58.4 ± 9.8 years; 63% men). At follow-up (17.3 ± 8.2 months), 36% had osteoporosis and 40% osteopenia. TBS was normal in 42.7%, partially degraded in 34.7%, and degraded in 20%. A significant decrease was observed only in femoral neck BMD (−3.8%, p<0.001).

Seventy-one patients received anti-osteoporotic treatment, which was associated with higher BMD at all skeletal sites, without significant effects on TBS or post-transplant changes.

Nine patients developed post-transplant fractures, mainly vertebral. Fractured patients showed significantly lower BMD at all sites and lower TBS. Lumbar spine BMD and T-score at follow-up were the best fracture predictors (AUC 0.830 and 0.835). No association was found between glucocorticoid exposure and BMD, TBS, or fractures.

Table 1. Association of Postransplant BMD and TBS with fractures and ROC curve analysis.

	ALL (N=75)	FRACTURED (N=9)	NON-FRACTURED (N=66)	p	AUC (ROC)
BMD (mean (SD))					
. L1-L4 (g/cm²)	1.072 (0.2)	0.869 (0.2)	1.100 (0.2)	**0.001**	**0.830**
. T-score LS	-1.11 (1.6)	- 2.74 (1.2)	-0.89 (1.5)	**0.001**	**0.835**
. Femoral neck(g/cm²)	0.833(0.2)	0.722 (0.1)	0.849 (0.2)	**0.021**	0.743
. T-score FN	-1.62 (1.2)	-2.40 (0.9)	-1.51 (1.2)	**0.032**	0.726
. Total hip(g/cm²)	0.872 (0.2)	0.760 (0.1)	0.888 (0.2)	**0.023**	0.753
T-score TH	-1.47 (1.2)	-2.24 (1.1)	-1.36 (1.1)	**0.033**	0.734
BMD change(%)					
. L1-L4	1.11 (8.8)	-1.94 (10.7)	1.53 (8.5)	0.270	0.562
. Femoral neck	-3.81 (6.0)	-7.28 (4.1)	-3.34 (6.1)	0.067	0.727
. Total hip	-2.60 (5.5)	-4.12 (3.4)	-2.40 (5.7)	0.381	0.609
TBS	1.308 (0.1)	1.188 (0.1)	1.325 (0.1)	**0.003**	0.772
TBS change(%)	1.80 (11.0)	0.65 (10.7)	1.96 (11.1)	0.742	0.530

SD: standard deviation, BMD: bone mineral density, LS: lumbar spine FN: femoral neck, TH: total hip TBS: trabecular bone score

Conclusions

Altered bone microarchitecture is frequent in lung transplant recipients. Despite improvements in BMD with anti-osteoporotic therapy, TBS continues to deteriorate post-transplant. Lumbar spine BMD at follow-up is the most reliable predictor of post-transplant fractures, whereas femoral BMD and TBS changes have limited predictive value. Glucocorticoid exposure was not associated with fracture risk or TBS impairment.

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DIAGNOSTIC PERFORMANCE OF AI-SUPPORTED OPPORTUNISTIC DETECTION OF OSTEOPOROTIC VERTEBRAL FRACTURES ON ROUTINE CT SCANS

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Objectives

Only about 15% of osteoporotic vertebral fractures (VFs) are identified by radiologists in routine computed tomography scans (CT) performed for non-spinal indications. Missed VFs represent a critical diagnostic gap in osteoporosis care. Contributing factors may include high reporting workload, the need for a quick conclusion due to the patient's acute condition, and limited awareness of the prognostic importance of early VFs detection. Artificial intelligence (AI) offers a promising approach to addressing this gap by enabling opportunistic VF detection on routine CT scans.

Material and Methods

We conducted a monocentric, retrospective cross-sectional study at Hanusch hospital (Vienna, Austria) in collaboration with Image Biopsy Lab to evaluate the diagnostic performance of the AI-based software (IB Lab Flamingo) in identifying VFs on CT, using radiologist assessment as the reference standard. Sensitivity, specificity, and accuracy were calculated at the vertebra and patient level.

AI-identified false-positive findings were re-evaluated by radiologists to assess whether they represented overlooked fractures.

Results

Among 205 patients (59% male; mean age 67.9 ± 9.5 years), VFs were initially identified in 11.2% by the radiologist. The AI-software analyzed 190 patients (92.7%), detecting fractures in 24.7%. At the patient level, IB Lab Flamingo showed 81% accuracy, 74% sensitivity and 82% specificity. Vertebra-level performance (N = 3040) demonstrated high accuracy (97%) and specificity (97%). Upon radiologist re-evaluation, fractures were confirmed in 29 of 30 AI-positively flagged patients, increasing sensitivity to 88.5%, specificity to 99.3%, and the overall prevalence of VFs to 25%.

Conclusion

The AI-based IB Lab Flamingo software demonstrated high diagnostic performance in detecting VFs and can markedly increase the detection of vertebral fractures, addressing a persistent diagnostic gap. AI-enhanced diagnostic solutions can reduce the workload on radiologists, enable timely treatment of osteoporosis and secondary prevention of fractures, and improve patient treatment outcomes.

Declaration of competing interest:

Christoph Salzlechner and Richard Ljuhar are employees of ImageBiopsy Lab GmbH. All other authors declare no conflict of interest.

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PHYSICAL ACTIVITY AND DAILY FUNCTIONING AND SELF-RATED HEALTH IN OLDER ADULTS

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Objectives

To assess the association between regular physical activity and daily functioning, pain intensity, and self-rated health in older adults.

Material and Methods

The study included 100 participants aged ≥50 years, divided into two groups. The study group consisted of 52 individuals regularly training swimming, while the control group included 48 physically inactive individuals. The mean age of participants was 63.0 ± 7.3 years in the physically active group and 63.0 ± 5.7 years in the control group. Data was collected using an original questionnaire, the Visual Analogue Scale (VAS) for pain intensity, and the WHOQOL-BREF questionnaire for self-rated health. Statistical analysis was performed using non-parametric tests, with statistical significance set at $p < 0.05$.

Results

Self-rated health was significantly higher in the physically active group compared with the control group (mean ± SD: 3.88 ± 0.67 vs. 3.25 ± 0.75; $p < 0.001$). Mean pain intensity assessed using the VAS was significantly lower in physically active participants than in controls (1.92 ± 2.51 vs. 3.00 ± 2.79; $p = 0.045$). In the physically active group, pain was most frequently associated with bending (32.69%), whereas in the control group it was most often related to lifting heavy objects (33.33%). A moderate negative correlation between pain intensity and self-rated health was observed among physically active participants ($\rho = -0.39$; $p = 0.004$).

Conclusions

Regular physical activity is associated with better self-rated health and lower pain intensity in older adults. These findings support the role of physical activity in maintaining daily functioning and functional independence in later life.

Table 1. Pain intensity and self-rated health in study groups

Variable	Physically active group (n = 52) mean ± SD	Control group (n = 48) mean ± SD	*p value*
Pain intensity (VAS)	1.92 ± 2.51	3.00 ± 2.79	0.045
Self-rated health (WHOQOL-BREF item)	3.88 ± 0.67	3.25 ± 0.75	< 0.001

VAS – Visual Analogue Scale; WHOQOL-BREF – World Health Organization Quality of Life Questionnaire (short version)

P1001

OCCUPATIONAL DETERMINANTS OF LOW BACK PAIN AMONG MANUAL WORKERS: A COMPARISON OF CONSTRUCTION WORKERS AND SHOP ASSISTANTS

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Objectives The aim of the study was to evaluate the prevalence and occupational determinants of low back pain among manual workers, with particular emphasis on work ergonomics, work posture, work seniority, and physical activity.

Material and Methods The study included 120 manual workers aged 24–60 years, comprising 60 construction workers and 60 shop assistants. Data was collected using an original questionnaire consisting of 31 items addressing job characteristics, work posture, adherence to ergonomic principles, physical activity, and the occurrence of low back pain. Statistical analysis was performed to assess associations between occupational factors and the prevalence of low back pain, with statistical significance set at $p < 0.05$.

Results Low back pain was reported more frequently by construction workers (73%) than shop assistants (65%), although this difference was not statistically significant ($p = 0.322$). Among shop assistants, work seniority was not significantly associated with pain prevalence ($p = 0.1218$). In contrast, among construction workers, longer work seniority was significantly associated with a higher prevalence of low back pain ($p = 0.0001$).

Failure to adhere to ergonomic principles was strongly associated with pain occurrence, affecting 89% of construction workers and 97% of shop assistants. Work posture and the physical demands of work had a statistically significant impact on pain prevalence ($p < 0.001$). Low back pain was most frequently reported by shop assistants working in a forward-bent standing position (53%), whereas among construction workers it was most common in those working in kneeling or squatting positions (59%). Notably, low back pain was reported by all participants who did not engage in any form of physical activity

Conclusion Work ergonomics, work posture, and physical activity are key determinants of low back pain among manual workers. In contrast, occupation type and work seniority among shop assistants were not

significantly associated with pain prevalence. These findings underscore the importance of ergonomic interventions and regular physical activity in the prevention of occupational low back pain.

P1002

ASSOCIATION OF HBA1C WITH BONE HEALTH IN OLDER ADULTS WITH HIP FRAGILITY FRACTURES IN MALTA.

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Diabetes mellitus is a growing public health concern in Malta, with 48 thousand adults aged 20–79 years suffering from diabetes in 2024. This number has been projected to increase to 60.1 thousand by 2050 (1).
Objectives
In the Maltese older adult population, diabetes is therefore, not uncommon. The association of glycemic control, as measured by glycated haemoglobin (HbA1c), and bone health, assessed using hip bone mineral density (BMD) and hip T-score, warrants further exploration.
Materials and Methods:
A cross-sectional observational study was conducted among 97 older adults aged over 60 years with hip fragility fractures attending fragility fracture clinics in Malta. Data was collected retrospectively using anonymised clinic documentation. Demographic characteristics were recorded together with measures of bone health; Hip BMD and Hip T-score. Thirteen potential predictors and confounding variables were also collected. Separate general linear models were fitted to relate hip BMD and hip T-score with the explanatory variables, including HbA1c. A backward elimination approach was applied to find the parsimonious model by excluding weak predictors and retaining significant ones.
Results:
Significant predictors of hip BMD included creatinine clearance, HBA1c, and BMI assuming a 0.1 level of significance. Significant predictors of hip T-score included BMI and HBA1c at the same significance threshold. Parameter estimates were carried out and a negative correlation was noted between HbA1c and both BMD and T-score.
Conclusions:
In this cohort of older adults with hip fragility fractures, HbA1c was a significant predictor of bone health, demonstrating a negative correlation with both hip BMD and T-score. These findings contrast with the described "diabetes bone paradox", where individuals with type 2 diabetes mellitus have an increased risk of fractures despite preserved or higher BMD (2). This suggests that poorer glycaemic control may adversely affect bone health in this high risk population and underscores the importance of considering glycaemic status in the assessment and management of fracture risk in older adults with diabetes.
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P1003

PAIN IN ELDERLY PATIENTS WITH KNEE OSTEOARTHRITIS: ASSESSMENT AND IMPACT

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Background

Knee osteoarthritis (KOA) is a common degenerative osteoarticular condition in the elderly, and represents a major cause of chronic pain and functional disability. The aim of this study was to assess pain and its impact in the geriatric population and to identify factors associated with moderate to severe pain.
Methods

A cross-sectional study was conducted including patients aged 65 years and older with a confirmed diagnosis of knee osteoarthritis. Pain and functional status were assessed using three validated instruments: The Visual Analog Scale (VAS), the Lequesne Algofunctional Index (AFI) and the Knee Injury and Osteoarthritis Outcome Score-12 (KOOS-12). Our patients were divided into two groups according to VAS scores: G1: patients with mild pain (VAS<40mm) and G2:patients with moderate to severe pain (VAS≥40mm).
Results

Fifty-two patients (40 women and 12 men) were included, with a mean age of 70.2 ± 4.4 years. The median duration of KOA was 10.1 [1–30] years. Knee pain was the main presenting symptom in 85% of patients, and symptoms were bilateral in 72% of cases. The mean VAS pain score was 60.9±21.4mm [20,90mm]. Moderate to severe pain was reported by 79% of patients. Patients aged 75 years and older had significantly higher VAS scores than those under 75 years (75±8.3mm vs 59.1±22mm, p=0.004). The mean AFI pain subscale score was 3.42 ± 2 [0-8], with a statistically significant difference between genders,women reporting higher pain levels than men (3.73 ± 2.0 vs 2.42 ± 1.7; p = 0.048). The mean KOOS-12 pain subscale score was 57.4 ± 20.0 [18.8–100], with no significant difference between genders.
Regarding the groups, patients in G2 showed higher body weight (84.4±14.4 kg vs 75.3±7 kg, p=0.05), higher AFI scores (13.4±3.6 vs 6.5±3.2, p<0.001) and its subscales "Walking Distance" (3.4±1.7 vs 1.5±1.2, p=0.003) and "Activities of Daily Living" (5.9±1 vs 3.9±1.3, p<0.001), as well as lower KOOS-12 scores (44.5±15.2 vs 74±18.9, p<0.001) , particularly in the "Function" (44.2±17.4 vs 76.1±21.6, p<0.001) and "Quality of Life" subscales (37±16.4 vs 70±24, p=0.001) compared with G1 with statistically significant differences.
Conclusions
Knee pain is a common reason for consultation and it can be especially severe in the elderly, affecting activities of daily living and quality of life. Appropriate management is therefore essential.

P1004

PRAYER PRACTICES AMONG ELDERLY PATIENTS WITH KNEE OSTEOARTHRITIS

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Background

Knee osteoarthritis (KOA) is a common degenerative joint disease, particularly prevalent among the elderly. It can significantly affect activities of daily living, including religious practices such as prayer. The aim of this study was to evaluate the impact of knee osteoarthritis on prayer practices in elderly patients.

Methods

A cross-sectional study was conducted including patients aged 65 years and older with a confirmed diagnosis of knee osteoarthritis. Pain and functional status were assessed using three validated instruments: the Visual Analog Scale (VAS), the Lequesne Algofunctional Index (AFI), and the Knee Injury and Osteoarthritis Outcome Score-12 (KOOS-12).

To assess the impact of KOA on the practice of prayer among elderly individuals, a simple six-item questionnaire was designed. Patients were asked whether they perform prayer, the duration of their practice in years, the position adopted during prayer, the number of bowing movements (Rukū) performed per day, and whether they experience pain during bowing and prostration (Sujūd).

Results

A total of 52 patients (40 women and 12 men) were included, with a mean age of 70.2 ± 4.4 years. The median duration of KOA was 10.6 years [1–30]. Knee pain was the main presenting symptom in 85% of patients, and symptoms were bilateral in 72% of cases.

Fifty-one patients reported performing prayer. Among them, 90.2% adopted a seated position during prayer. The mean number of bowing movements per day was 19.57 ± 2.6 [17–29]. Knee pain was reported by 25.5% of participants during bowing and by 96% during prostration.

The adoption of a seated position during prayer was significantly associated with female gender with 97% of women using this position compared to 66.7% of men (p = 0.009). It was also associated with higher body mass index (32±6.1 kg/m² vs 26±3 kg/m², p=0.039), larger waist circumference (108.1±14.2 cm vs 98.6±4.6 cm, p=0.006), more severe pain assessed by VAS (63.2±20.5 mm vs 36±13.4 mm, p=0,006), higher AFI score (12.6±4 vs 4.8±1.9, p<0.001), and lower KOOS-12 score (48.8±18.9 vs 73.3±16.3 , p=0.008).

Conclusions

Knee pain is a common reason for medical consultation and can be particularly severe in the elderly, affecting activities of daily living, including meaningful routines such as the practice of prayer. Knee osteoarthritis specifically impacts prayer practices, with most patients adopting a seated position to reduce discomfort, particularly women and individuals with obesity.Appropriate management is therefore essential to maintain both mobility and participation in these important daily activities.

P1005

REAL-WORLD PATTERNS OF OSTEOANABOLIC THERAPY AFTER FRAGILITY FRACTURE: PATIENT PROFILES AND TREATMENT SEQUENCING IN A TERTIARY ORTHOPAEDIC CENTRE

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• **Objectives:**

To describe the use of osteoanabolic therapies after fragility fracture in routine clinical practice and to characterize patient profiles, previous anti-osteoporotic treatment and subsequent sequential treatment strategies.

• **Material and methods:**

We conducted an observational, descriptive study including consecutive patients treated with osteoanabolic therapy following a recent fragility fracture in a tertiary care centre. Demographic data, comorbidities, fracture history, bone mineral density, laboratory parameters, previous anti-osteoporotic treatment, time to treatment initiation, adherence, adverse events, mortality, subsequent fractures and post-treatment sequential therapy were recorded. Analyses were purely descriptive.

• **Results:**

A total of 117 patients were included (mean age 77.9 ± 10.2 years; 98% women); 86 received abaloparatide and 31 romosozumab. Patients treated with abaloparatide were older and had a higher comorbidity burden (mean age 80.9 vs 69.8 years; ASA 3.0 vs 2.2), whereas those receiving romosozumab presented with more severe baseline osteoporosis based on densitometric values. Previous anti-osteoporotic treatment was common (63% overall) and was more frequent among patients treated with romosozumab (87% vs 62%). Time from index fracture to initiation of osteoanabolic therapy showed wide variability. Adherence to osteoanabolic treatment was high (>94%), adverse events were infrequent (<6%) and predominantly mild. Following completion of osteoanabolic therapy, most patients were transitioned to antiresorptive treatment, mainly oral bisphosphonates or denosumab.

• **Conclusions:**

In routine clinical practice, osteoanabolic therapies are prescribed to patients with distinct clinical profiles after fragility fracture. Previous anti-osteoporotic treatment is frequent, and sequential therapy with antiresorptive drugs is commonly implemented. Despite advanced age, frailty and a high comorbidity burden, osteoanabolic therapies were generally well tolerated, with a low incidence of mostly mild adverse events. These findings provide real-world context on osteoanabolic treatment pathways after fragility fracture.

P1006

TEMPORAL TRENDS IN CARE PROCESSES, OUTCOMES AND SECONDARY FRACTURE PREVENTION AFTER HIP FRACTURE: A REGISTRY-BASED COHORT STUDY (2018–2024)

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• **Objectives:**

To analyse year-by-year temporal trends in care processes, early outcomes, functional recovery and secondary fracture prevention after hip fracture between 2018 and 2024.

• **Material and Methods:**

We conducted an observational cohort study including consecutive patients admitted with hip fracture between 2018 and 2024 in a regional tertiary care hospital. Data were obtained from a prospectively maintained institutional hip fracture registry, with systematic data submission to the Spanish National Hip Fracture Registry. Demographic characteristics, fracture type, surgical delay, length of stay, mortality, mobility and residence at 30 days, and osteoporosis treatment initiation at 30 and 120 days were recorded. Temporal trends were analysed using appropriate trend tests for proportions and continuous variables.

• **Results:**

A total of 2,624 patients were included (mean age 83.2 years; 74.6% women). Patient characteristics remained stable throughout the study period. The proportion of patients undergoing surgery within 48 hours declined significantly over time, particularly after the COVID-19 pandemic, from 73.4% in 2018 to 47.2% in 2024 (p for trend <0.001).
Despite this, early outcomes improved. Thirty-day mortality decreased significantly across the study period (from 8.0% in 2018 to 4.1% in 2024; p for trend =0.003). Recovery of ambulation at 30 days also improved over time (p for trend <0.001); however, among patients who were ambulatory before fracture, 70.0% had not recovered their previous ambulatory status at 30 days. In addition, 10.3% of patients who lived at home before fracture had not returned to their previous place of residence at 30 days. Osteoporosis treatment initiation at 30 days declined in recent years; however, treatment uptake at 120 days increased significantly in the post-COVID period (p for trend =0.006), suggesting a delay rather than a loss of secondary fracture prevention.

• **Conclusions:**

In this large registry-based cohort, early mortality and functional outcomes after hip fracture improved significantly over time, particularly in the post-COVID period, despite less favourable trends in surgical timing. Nevertheless, a substantial proportion of patients did not recover ambulation or residential autonomy at 30 days, showing the persistent functional impact of hip fracture. Secondary fracture prevention was largely maintained at mid-term follow-up, although treatment initiation tended to be delayed. These findings highlight the importance of interpreting care process indicators alongside clinical and functional outcomes in hip fracture care.

P1007

REGIONAL ADIPOSITY AND FRACTURE RISK IN INFLAMMATORY BOWEL DISEASE: DIFFERENTIAL EFFECTS OF GLUCOCORTICOID EXPOSURE

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Objectives
Patients with Inflammatory Bowel Disease (IBD) are at higher risk of osteoporosis and fractures, potentially mediated by inflammation, body composition changes and glucocorticoid (GC) use. We tested whether regional adiposity predicts fracture risk in IBD and how this is affected by GC exposure.
Materials and Methods
All patients with IBD referred to a regional DEXA scanner in Northern England between 2004 and 2019 were included, stratified by current/previous GC use. Logistic regression analyses were conducted for hip fractures and other major osteoporotic fractures (forearm, spine, humerus) respectively, using DEXA-derived Abdominal Fat Percentage (AFP) and Average Hip Fat Percentage (AHFP) as predictors. Results were adjusted for all FRAX® risk factors.
Results
The study included 1,302 patients including 266 males (20.4%). Mean age was 66.2 years (SD 9.7) and mean BMI 27.6 kg/m² (SD 5.8); 753 (57.8%) had GC exposure. Hip fractures occurred in 65 (5.0%) and other major fractures in 339 (26.0%). Logistic regression outputs are shown in Table 1.

Table 1: Odds Ratio (95% Confidence Interval) for Fracture Type and Regional Body Fat Percentage
Key: (*p<0.05, **p<0.01 ***p<0.001)

	Hip Fractures		Other Major Fractures	
	Abdominal Fat %	Avg Hip Fat %	Abdominal Fat %	Avg Hip Fat %
GC Exposure	0.98 (0.92, 1.03)	1.02 (0.94, 1.10)	*** 0.95 (0.92, 0.98)	1.03 (0.99, 1.08)
No GC Exposure	1.03 (0.98, 1.09)	1.02 (0.93, 1.11)	0.99 (0.96, 1.02)	1.03 (0.98, 1.08)

Conclusion
We found a significant inverse association between non-hip major fractures and AFP only in GC-exposed patients, with no relationship between fractures and AHFP. There was no relationship between hip fractures and AFP or AHFP. Our study demonstrates novel relationships between regional adiposity and fracture risk in IBD that are GC-dependent. Further research is needed to fully understand the role of regional adiposity in IBD fracture risk.
Disclosures
W Donlon: None. H Amin: None. M Bukhari: None.

P1008

UK ADULT REFERENCE CURVES FOR TRABECULAR BONE SCORE (TBS OSTEO V4)

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Trabecular bone score (TBS) is a validated index of bone microarchitecture that can identify more people at risk of fragility fractures than DXA bone mineral density alone. The provision of TBS reference data can support greater clinical utility, but no such data are currently available in the UK.
Objective: To produce the first UK-specific reference curves for TBS in males and females, and using the latest software version, TBS Osteo Advanced (version 4).
Material and Methods: The reference group was from an NHS Trust DXA clinic in Northwest England with scans performed between 2001 and 2024. Lumbar spine L1-L4 scan data were analysed to obtain TBS (TBS iNsight version 4.0 software, Medimaps Group, Switzerland), accounting for soft tissue thickness. TBS reference curves were fitted with the LMS method (*gamlss* package in R, RStudio) to generate age-specific values for males and females with the 50th centile (median) as the reference curve.
Results: 3496 patients (2808 women, 688 men, mean age 68y [22-98y], 99% white, mean BMI 26.7kg/m^2) were included in the study. TBS decreased with age, with marked reduction in women 50-65y, corresponding to the postmenopausal period. In women, median values decreased from a normal TBS (>1.31) at earliest DXA scan to degraded TBS on average (<1.23) at age 80y. In men, median TBS values remained within normal range (>1.31) in the third and fourth decades, but unlike women, TBS did not, on average, reach the degraded range in older age groups (eighth and ninth decades). Age- and sex-specific TBS reference ranges are presented as the 5th, 10th, 25th, 50th, 75th, 90th, and 95th centiles for women and men.
Conclusion: These UK-based TBS v4 reference data enable age- and sex-specific interpretation of TBS, providing assessment of bone microarchitecture in routine practice that may support wider clinical uptake of TBS, demonstrating its capacity to characterise differences in bone microarchitecture between men and women with ageing. By providing population-relevant centiles across the adult lifespan, these data facilitate contextualisation of individual patient results, and complement BMD derived from DXA, without additional patient burden.

P1009

OSTEOGENESIS IMPERFECTA: VARIABLE PHENOTYPIC EXPRESSION IN MEMBERS OF A FAMILY

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Osteogenesis imperfecta (OI) comprises a group of rare connective tissue disorders characterized primarily by increased bone fragility leading to multiple fractures, bone deformity, and disability. Its incidence is estimated at between 1/10,000 and 1/20,000 live births. Clinical severity is variable, with different impacts on quality of life, mobility, and independence. Patients may present with skeletal and extra-skeletal manifestations, including blue sclerae, dentinogenesis imperfecta, hearing loss, and valvular heart disease.[1,2]
Most cases are due to structural or quantitative mutations in the genes encoding type I collagen (COL1A1 and COL1A2). However, up to 25% are associated with alterations in other genes involved in collagen biosynthesis, osteoblast differentiation, or bone mineralization.[1,2]
Diagnosis is clinical and can be confirmed by genetic testing when available. In 1979, Sillence et al. proposed a clinical classification based on specific phenotypes (types I to IV)[3]. With advances in molecular biology and genetic analysis, this classification has been expanded to recognize greater genotypic and phenotypic diversity.
OBJECTIVES: Describe the phenotypic, biochemical, and densitometric characteristics of four patients diagnosed with OI who belong to the same family.
MATERIALS AND METHODS: This was an observational, descriptive, cross-sectional study based on data collected from the electronic medical records of four patients diagnosed with OI who belong to the same family.
RESULTS: A family with a clinical diagnosis of OI is presented, consisting of four members: a 42-year-old mother, two 19-year-old male twins, and a 22-year-old son. The phenotypic characteristics of the four family members are detailed in **Table 1**. All were diagnosed at an early age and suffered multiple fractures throughout their lives. Bone densitometry (Lunar DPX scanner) revealed low bone mass, with greater involvement in the members recently diagnosed with celiac disease. Biochemical evaluation of calcium and phosphorus metabolism showed elevated bone alkaline phosphatase levels in three members (>20 U/L) and vitamin D levels <30 ng/mL. To date, none of the patients have received treatment with antiresorptive or anabolic drugs. Gastroenterology and nutrition evaluations were requested due to celiac disease. Normal levels of calcium, phosphorus, magnesium, PTH, and CTX (<0.5 ng/ml) were found in all four members, and hypogonadism was ruled out. They are currently being followed up and treated with vitamin D in conjunction with dietary and physical activity guidelines. None of them experienced fractures in the last two years.
Table 1.

	Age	Weight Kg	Height Cm	Phenotype OI	Blue sclerae	Fractures	Hearing loss	Dentino-genesis imperfecta	Bone densitometry	Comorbidities
Mother	42	75	150	I	Yes	Wrist Vertebral Clavicle phalanges	Yes	No	LS Z-s -3.1 TH Z-s -0.9	Celiac disease Arterial hypertension
Eldest Son	22	59	162	I	Yes	Ribs Metacarpal metatarsal	No	Yes	LS Z-s -3.4 TH Z-s -2.4	Celiac disease
Twin 1	19	53	163	I	Yes	Tibia Metatarsal Wrist Humerus	Yes	Yes	LS Z-s -1.7 TH Z-s -2.6	Clubfoot Esophageal atresia Genu varum
Twin 2	19	66	172	I	Yes	Olecranon Humerus Metacarpal	No	Yes	LS Z-s -2.4 TH Z-s -2.2	No

LS:Lumbar spine; TH:Total Hip; Z-s: Z-scores

CONCLUSIONS: OI is a rare and heterogeneous condition and should be considered in the differential diagnosis of adult patients with multiple fractures and extra-skeletal manifestations. The knowledge gained from experience, the appropriate transition from childhood to adulthood, and early referral to a specialist are fundamental for multidisciplinary care and improving patients' quality of life. Genetic diagnosis is of great importance for establishing a genotype-phenotype correlation and providing genetic counseling to patients of reproductive age.

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P1010

BONE MINERAL DENSITY LOSS AND FUNCTIONAL LIMITATIONS AFTER THORACAL SPINAL CORD INJURY IN A 65 YEAR OLD MALE

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Objectives: To evaluate bone mineral density impairment, functional status, and rehabilitation outcomes in an older male patient with chronic thoracolumbar spinal cord injury (SCI) and osteoporosis.

Material and Methods: We report the case of a 65-year-old male patient with spastic paraparesis following traumatic thoracolumbar SCI at T12–L1–L2, initially surgically treated with spinal osteosynthesis in 1997 and reoperated in 2025 for spinal canal stenosis (T9–T10 hemilaminectomy). Neurological status was classified as AIS C, with a neurological level of injury at L1. The patient was admitted for paraparetic motor deficit, impaired standing and gait, limitations in activities of daily living (ADLs), low back pain, and bilateral hip and shoulder pain. Clinical examination revelead that the patient was able to walk for short distances using two Canadian crutches. Motor examination showed preserved active movement in the lower limbs with muscle strength graded 3/5 on the left and 2/5 on the right, and spasticity graded 2 on the Modified Ashworth Scale in the hip adductors and lower-limb extensors. Bone mineral density was assessed using dual-energy X-ray absorptiometry (DXA). Functional mobility was evaluated using the Timed Up and Go (TUG) test. Functional independence was assessed using the Functional Independence Measure (FIM), Barthel Index, and ADL scale. Pain intensity was evaluated using the Visual Analog Scale (VAS). Assessments were performed at admission and discharge. The rehabilitation program included thermal water hydrokinetic therapy (36°C), individualized physiotherapy, occupational therapy, therapeutic massage, electrotherapy for lumbar pain, pneumatic compression therapy, functional electrical stimulation, and LASER therapy.

Results: DXA revealed osteoporosis at the left hip (T-score: −2.5, Z-score: −1.9) and left forearm (T-score: −2.8, Z-score: −1.9). Functional mobility remained severely impaired, with TUG improving from 65 s at admission to 60 s at discharge. Functional scores indicated moderate dependence (FIM 80/126, Barthel Index 50/100, ADL 5/10). Pain intensity decreased from 6/10 to 3/10 on the VAS scale.

Conclusions: Chronic thoracolumbar SCI in older adults is frequently associated with clinically significant osteoporosis and functional limitation. A comprehensive, multimodal rehabilitation program may reduce pain and improve functional capacity, even in the presence of advanced bone loss, highlighting the importance of osteoporosis-oriented assessment and management in SCI rehabilitation.

P1011

BONE HEALTH IN PATIENTS WITH NON-METASTATIC PROSTATE CANCER ON ANDROGEN DEPRIVATION THERAPY INTERNATIONAL OSTEOPOROSIS FOUNDATION – BONE AND CANCER WORKING GROUP – POSITION STATEMENT

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Objective

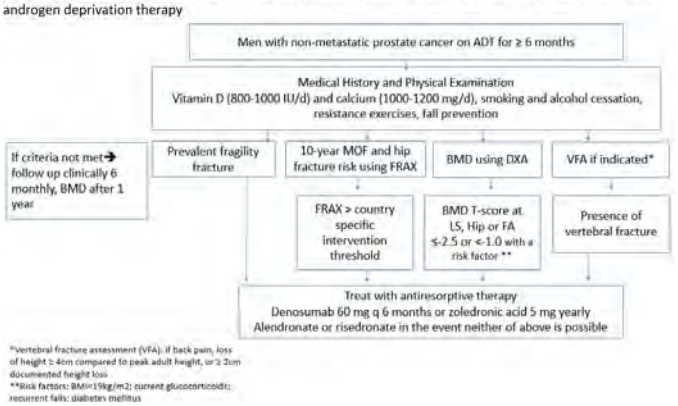
Androgen deprivation therapy (ADT) induces bone loss and significantly increases fracture risk in non-metastatic prostate cancer (nmPCa). Our aim is to provide physicians an evidence-based and practical guidance on the approach to bone health management in patients with nmPCa on ADT.

Material and Methods

The International Osteoporosis Foundation- Bone and Cancer Working Group (BCWG) members agreed on evaluating a set of 7 clinical questions. We addressed each question based on the evidence retrieved from 2 systematic reviews, including original studies and guidelines that aimed to optimize bone health in patients with nmPCa on ADT (CRD42021225502; CRD420251013073). The BCWG members voted anonymously on each question on answer.forms app, using strongly agree (SA), weakly agree (WA), weakly disagree (WD), strongly disagree (SD), not qualified (NQ).

Results

Figure: Suggested approach to bone health management in patients with non-metastatic prostate cancer on androgen deprivation therapy



Patients with nmPCa on ADT should be assessed for a previous fragility fracture (100%SA), and have a bone mineral density (BMD) and a fracture risk assessment upon the initiation of ADT (87%SA, 13%WA). A calcium intake of 1000-1200 mg/d (86%SA; 14%WA) and vitamin D supplementation of 800-2000 IU/d (71%SA; 29%WA) are required. A bone active agent is recommended for a previous fragility fracture (93%SA; 7%WA), a 10-year fracture risk above the country specific intervention threshold (80%SA;20%WA) or a BMD T-score at the lumbar spine, total hip, femoral neck or forearm ≤ -2.5, or ≤ -1 in the presence of one or more risk factors (53%SA; 34%WA; 13% WD). First line treatment options are Denosumab 60mg every 6 months (as it reduces radiologic vertebral fractures by 85% at 1 year, versus placebo) or Zoledronic acid 5mg yearly (as it increases BMD by 6.9% at lumbar spine, versus placebo) (87%SA; 13%WA) (Figure).

Conclusion

ADT increases osteoporosis risk. Bone health in patients with nmPCa should be prioritized. Screening and early intervention following our simple and practical approach allow to reduce fracture and its related morbidity. Strategies to improve guidelines implementation, increase physician and patient awareness, and investigation of the cost effectiveness of our approach are needed to close the bone health care gap.

P1012

REAL-WORLD EFFECTIVENESS, SAFETY, AND ADHERENCE OF ROMOSOZUMAB: A 12-MONTH AMBISPECTIVE COHORT STUDY IN COLOMBIAN WOMEN WITH POSTMENOPAUSAL OSTEOPOROSIS

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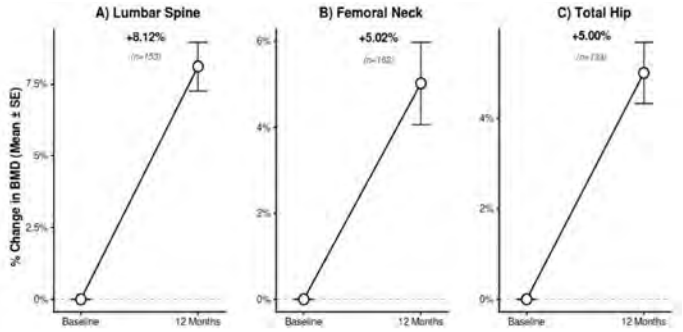
Objective: To assess the 12-month effectiveness and safety of romosozumab in Colombian women with postmenopausal Osteoporosis (OP) treated in routine clinical practice.

Methods: We conducted an ambispective, multicenter cohort study of postmenopausal women with very high risk OP who started romosozumab between January 1, 2022, and September 30, 2024. Eligible patients had very high risk OP according to international guidelines Demographics, clinical, radiological and laboratory values were included.

The primary outcome was percent change in lumbar spine BMD at 12 months; secondary outcomes included femoral neck and total hip BMD changes, incident fractures, adverse events

Results: We included 202 women (mean age 71.7 years); 82% were at very high fracture risk. At 12 months, mean BMD increased by 8.1% at the lumbar spine, 5.0% at the femoral neck, and 5.0% at the total hip. During treatment, 6 patients (3.1%) sustained incident fractures and 15 (7.7%) experienced adverse events, including 2 serious events (1.0%). Overall, 75.9% of patients received ≥12 doses, with a mean of 10.5 (SD 3.1) doses.

Conclusions: In a real-world clinical practice setting in Colombia, romosozumab was associated with robust and clinically meaningful gains in BMD, a low incidence of fractures, acceptable safety, and good treatment adherence over 12 months in women with postmenopausal osteoporosis at high or very high fracture risk.



Real-world effectiveness, safety, and adherence of romosozumab: a 12-month ambispective cohort study in Colombian women with postmenopausal osteoporosis

Figure 1. Mean percent change in bone mineral density from baseline to 12 months of romosozumab treatment.

Table 2. Incident fractures, adverse events, treatment discontinuation, and adherence during romosozumab treatment.

Outcome	n with data	n (%) or mean (SD)
Any incident fracture	191	6 (3.1%)
Vertebral fracture	185	3 (1.6%)
Nonvertebral osteoporotic fracture	185	0 (0%)
Any adverse event	194	15 (7.7%)
Serious adverse events	194	2 (1.0%)
Treatment discontinuation	194	28 (14.4%)
Complete adherence (≥12 doses)	191	145 (75.9%)
Number of romosozumab doses received	191	10.5 (3.1)

Funding: Amgen biotecnoligica SAS

P1014

CENTRALIZED DXA IMAGING WORKFLOW FOR STANDARDIZED ASSESSMENT IN MULTICENTRE CLINICAL STUDIES

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Background
Dual-energy X-ray absorptiometry (DXA) is widely used in clinical research to assess bone mineral density (BMD) and body composition across a range of musculoskeletal and metabolic conditions such as osteoporosis, osteogenesis imperfecta, obesity, and related musculoskeletal disorders. In multicentre clinical studies, variability in DXA acquisition, positioning, artefact management, and analysis across sites can introduce measurement error and limit the reliability of quantitative imaging endpoints used for subject eligibility, baseline characterization and longitudinal follow-up.

Objective
To describe the implementation and performance of a centralized DXA imaging workflow designed to improve data quality and consistency in multicentre clinical research.

Material and Methods
DXA was used to assess bone mineral density at the lumbar spine and hip; spinal radiographs were reviewed in parallel by a radiologist to identify vertebral fractures and to inform exclusion of affected lumbar vertebrae from DXA analysis where required. All DXA scans met quality criteria sufficient to allow subsequent derivation of trabecular bone score (TBS) as an adjunct indicator of trabecular bone microarchitecture, with imaging data transferred and managed using the Dynamika™ cloud-based imaging platform to enable centralized quality control, reader oversight, query management, and harmonized reporting.

Results
Across multiple sites, 930 images were received. Of these, 901 images (97%) passed centralized quality control at first review; 27 images (3%) required re-scan, and 2 images (<1%) failed without the possibility of re-scan due to pre-existing bilateral hip pathology. A total of 271 image-related queries were resolved centrally, with median turnaround times of 1.66 days from image acquisition to upload and 1.38 days from upload to central image reading. Imaging facility qualification timelines were 33 days for DXA and X-ray and 114 days for QCT, enabling standardized acquisition prior to enrolment. These metrics reflect upstream quality control and error interception within a centralized workflow. The centralized imaging workflow, implemented using the Dynamika™ platform, supported timely site activation and completion of subject enrolment, with no enrolment delays attributable to imaging. In contrast, published audits of routine site-level DXA practice report technical and/or interpretative errors in approximately 76–92% of examinations, with 13–42% classified as major, only ~24% judged error-free, and inter-centre coefficients of variation of approximately 2–6% for some DXA measurements [1–4].

Conclusion
Centralized DXA imaging, supported by standardized protocols and centralized quality control implemented using the Dynamika™ platform, reduces variability associated with site-level DXA practice and delivers more consistent, trial-ready quantitative endpoints. This approach supports robust longitudinal assessment, limits avoidable re-scans, and enables integration of complementary DXA-derived measures within a harmonized imaging framework, and supports timely site activation and completion of subject enrolment without imaging-related delays.

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P1015

BONE FRAGILITY AND AXIAL DEFORMITIES IN ADVANCED PARKINSON'S DISEASE: FUNCTIONAL IMPACT AND REHABILITATION OUTCOMES IN A COMPLEX CASE

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Objectives: The aim of this paper is to highlight the interaction between Parkinson's Disease (PD), bone fragility, and severe postural deformities in the context of increased disability risk in an elderly patient.

Materials and Methods: We present the case of an 82-year-old female patient, known with rigid-akinetic PD diagnosed in 2012, multiple fall-related injuries resulting in L1–L2 compression fractures (2012; 2015),

arterial hypertension, anxiety–depressive disorder, and hiatal hernia. The patient was admitted to the rehabilitation clinic complaining of gait disturbances, especially instability, severe locomotor impairment, and reduced selfcare abilities. The neuromusculoskeletal examination revealed: severe thoracic kyphosis and severe left-convex scoliosis with pelvic rotation and left costo-muscular gibbus, trunk flexion of 90 degrees, severely restricted thoracolumbar mobility in all planes, emotional lability with easy crying, hypomimic facies, global hypobradykinesia, frequent dyskinesias more pronounced cranially, absence of tremor, impaired focusing, diminished amplitude and frequent hesitations in alternating upper-limb movements, limited fine motor control, distal hypoesthesia in the left upper limb and intermediate-to-distal left lower limb, positive Noica sign on the left, and a positive Pull Test. Functionally: during ON periods the patient is able to perform bed transfers with difficulty, stands up with the aid of a cane and upper-limb support, experiences frequent freezing of gait with movement initiation facilitated intermittently by verbal cues. The rehabilitation program included gait and balance training, transfer optimization, postural correction exercises, electrotherapy, and therapeutic massage.
Results: Following multimodal treatment, the patient demonstrated only minor functional improvements, without major benefits on postural stability or global mobility. The limited therapeutic response was significantly influenced by her frail biological status, advanced PD, fluctuating motor phenomena (ON/OFF), and severe structural vertebral deformities.
Conclusions: This case underscores the complexity of managing an elderly patient with advanced PD and vertebral fragility, in whom the risk of falling is substantially increased by severe postural abnormalities, thereby exacerbating disability. Multidisciplinary management is essential to prevent progressive deterioration and to maintain functional independence.

P1016

REHABILITATION CHALLENGES AFTER TOTAL HIP ARTHROPLASTY IN A PATIENT WITH SEVERE NEUROLOGICAL AND MUSCULOSKELETAL SEQUELAE: A CASE REPORT

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Background: The success of total hip arthroplasty (THA) is often conditioned by the patient's pre-existing neuromotor status. This report analyzes the rehabilitation complexities of a 72-year-old male who underwent left uncemented THA, complicated by severe contralateral neurological deficits and biomechanical misalignments.
Case Presentation: The patient's history was marked by a 2015 L5–S1 laminectomy complicated by a multi-pathogen infection (Acinetobacter, Pseudomonas, Proteus), resulting in permanent right common peroneal nerve palsy, severe muscle atrophy, and a varus equinus deformity. Despite subsequent corrective surgeries (subtalar arthrodesis, tendon lengthening), significant sequelae persisted: a 2 cm limb length discrepancy, marked atrophy (5 cm calf/3 cm thigh differential), and impaired postural control. At presentation for left THA, the patient exhibited a complex gait pattern characterized by right forefoot initial contact, pelvic tilt, and compensatory spinal sagittal imbalances.
Management and Outcomes: Following an uncemented THA via a posterior approach, an individualized rehabilitation program was implemented. This included a dual approach: analgesic physiotherapy (interferential current, laser, ultrasound, and shortwave diathermy) to manage lumbar and bilateral knee pain, combined with a specialized kinesitherapy protocol. The latter focused on strengthening the stabilizers of the hip and cervico-dorso-lumbar spine, alongside intensive proprioceptive and balance re-education to compensate for the contralateral limb's deficits.
Conclusion: Clinical evolution was favorable, achieving significant pain reduction and near-independent ambulation. This case underscores that pre-existing severe neurological sequeale do not preclude successful THA outcomes, provided that the rehabilitation strategy is multidisciplinary and specifically tailored to address the complex biomechanical compensations of the patient.

P1017

MEDICAL REHABILITATION AS A PALLIATIVE–FUNCTIONAL INTERVENTION IN COMPLEX OSTEO-ARTICULAR PATHOLOGY: A CASE REPORT

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Objective. To evaluate the effectiveness of a short-term medical rehabilitation program on global functional status and associated pain in a patient with severe osteo-articular pathology.
Material and Methods. We report the case of a 68-year-old female patient diagnosed with seropositive rheumatoid arthritis stage III–IV, osteoporosis, arterial hypertension, ischemic heart disease, Graves' disease, Sjögren's syndrome, and extensive infected pseudoarthrosis of the left femur, with a complex surgical history and refusal of limb amputation. At admission, the patient reported severe low back pain, rated 8/10 on the Visual Analog Scale (VAS), with bilateral gluteal radiation, associated with gait disturbance. Neuromusculoskeletal and arthrokinetic (NMAK) examination revealed thoracolumbar dextroconvex scoliosis, loss of lumbar lordosis, reduced spinal mobility, and thoracolumbar paravertebral muscle contractures. Upper limb examination showed bilateral elbow flexion contractures (−15° on the left, −25° on the right), ulnar deviation of the fingers, "swan-neck" deformities, and bilateral impairment of grip function. Lower limb assessment revealed a 25° flexion contracture of the right knee, multiple postoperative scars on the anterior and lateral aspects of the left thigh, muscle strength graded 3/5 proximally and intermediately and 4/5 distally, as well as a left lower limb shortening of approximately 12 cm. The patient underwent a 14-day medical rehabilitation program consisting of individualized physiotherapy, postural re-education exercises, gait training with assistive devices, and analgesic electrotherapy. Clinical evaluation was performed at admission and discharge using the VAS for pain, NMAK clinical examination, and assessment of functional independence.
Results. At discharge, complete resolution of low back pain was observed, with improved postural comfort and increased tolerance to orthostatism. Functional limitations of the lower limbs, particularly involving the left lower limb, remained largely unchanged. Walking ability, dependence on assistive devices, and the level of functional dependency showed no significant improvement. Overall functional status remained stable throughout the rehabilitation program.
Conclusions. Short-term medical rehabilitation is effective in controlling spinal pain in patients with complex osteo-articular pathology; however, its impact on major functional deficits caused by severe and irreversible structural lesions is limited. In such cases, rehabilitation plays a

predominantly palliative role, aimed at symptom relief and preservation of quality of life.

P1018

REHABILITATION CHALLENGES IN A PATIENT WITH THORACIC SPINAL TUBERCULOSIS AND CHRONIC CERVICAL SEQUELAE: A CASE REPORT

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Background: The functional recovery of patients following surgery for spinal tuberculosis is often complicated by pre-existing degenerative pathologies. This report analyzes the rehabilitation of a 60-year-old female treated for thoracic spondylodiscitis, superimposed on a history of cervical spine surgery.
Case Presentation: The patient's history includes a 2016 cervical spine surgery (C3-C6), which resulted in mild residual motor deficits in the right upper limb. In April 2024, the patient underwent surgery for T11-T12 tubercular osteomyelitis following two months of immobilization due to severe thoracic pain. At presentation, the patient exhibited significant postural deviations, including dextroconvex scoliosis and marked trunk anteversion. Clinical assessment revealed incomplete recovery of the right upper limb strength (wrist flexors 4/5) and C5 hypoesthesia. However, lumbar sequelae were evident, including S1 hypoesthesia and difficulty maintaining orthostatism without support, requiring a cane for ambulation due to incomplete gait rollover.
Management and Outcomes: A multimodal rehabilitation program was implemented alongside Rifampicin therapy. The protocol combined analgesic physiotherapy (TENS, interferential current, laser) to manage diffuse pain, with a specialized kinesitherapy regimen. The latter focused on "back school" education and strengthening the paravertebral and abdominal stabilizers to correct the anteverted trunk posture. The intensity of the exercises was carefully titrated to accommodate the patient's obesity-related limitations and low effort tolerance, while protecting the cervical spine.
Conclusion: Despite an intensive rehabilitation protocol, the clinical outcome remained static regarding mobility and endurance. This underscores the challenge of treating patients with "fragile spines" where systemic factors (obesity, deconditioning) outweigh the benefits of localized physical therapy, limiting the patient's capacity to regain independent ambulation.

P1019

REHABILITATION PROGRAM IMPACT ON MUSCULOSKELETAL ABILITY TO REDUCE THE RISK OF FALLS FOR SENIOR PATIENTS

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Objective: We intend to determine the impact and role of individualized rehabilitation therapy for elderly patients with a high risk of falls and fall-related injuries. As the world's population ages quickly, there is an increased danger of physical impairments as well as psychological repercussions that further restrict activities and deteriorate general health. Illnesses, including osteoarthritis, sarcopenia, and osteoporosis, result in slower gait, weaker grips, and difficulties carrying out daily duties. Early intervention and diagnosis are essential in order to reduce the complications.
Methods: A multidisciplinary approach helps patients after a fall to restore autonomy and confidence. Personalized rehabilitation treatment includes medical, physical, psychological, and environmental techniques. According to the direction of a multidisciplinary team, rehabilitation programs include physical therapy and exercise programs, occupational therapy aimed at maximizing the capacity to perform daily activities safely and independently, psychological and sensory rehabilitation, and not last, integrating virtual reality programs.
Results: Rehabilitation techniques are essential to this endeavor to improve balance, strength, coordination, and confidence, in addition to restoring physical function for elderly patients. A proactive, multidimensional approach that incorporates environmental, medical, educational, and physical techniques as treatment must be associated with effective prevention focused on risk factors (functional capacity, health status, and living conditions).
Conclusions: We underline the importance of rehabilitation as a key aspect of clinical care and public health for preventing and reducing the number of falls and related repercussions as the world's population ages. Fall prevention is crucial for maintaining independence, functional capacity, and the quality of life in addition to preventing further injuries and complications. By empowering patients to reclaim their independence and enhance their quality of life, the comprehensive approach aids in ending the cycle.

P1020

ANTENATAL FEMORAL NECK FRACTURE AS A COMPLICATION OF TRANSIENT OSTEOPOROSIS OF THE HIP IN PREGNANCY

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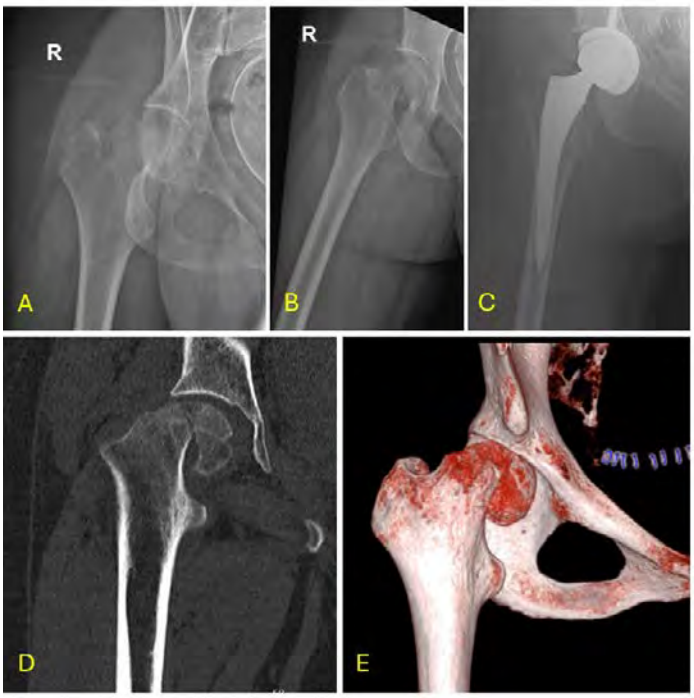
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Objective
To highlight the importance of early recognition and appropriate multidisciplinary management of transient osteoporosis of the hip (TOH) during pregnancy in order to prevent severe maternal complications.
Materials and Methods
We present a case of TOH complicated by a displaced femoral neck fracture occurring in the third trimester of pregnancy.
Results
A 36-year-old primigravida at 37+5 weeks of gestation presented at the emergency room with acute right hip pain and inability to bear weight following a low-energy fall. Obstetric assessment, including ultrasound, was unremarkable. She reported a three-week history of progressive mechanical hip pain and functional limitation prior to the trauma, managed conservatively without medical evaluation. The patient had no relevant medical history nor took regular medication, and the pregnancy was uneventful until the present episode.
Due to persistent symptoms, radiographic imaging was performed and revealed a displaced subcapital fracture of the right femoral neck. After multidisciplinary discussion, a cesarean section was performed to achieve pain control and minimize risks associated with vaginal delivery.

Postpartum computerized tomography confirmed the fracture. On the third postdelivery day, the patient underwent a non-cemented total hip arthroplasty. Full weight bearing was allowed immediately. Recovery was uneventful, and the patient was discharged seven days after surgery. At four-week follow-up, she was pain free, ambulating with two crutches, and radiographs showed appropriate implant positioning. Medical anti-osteoporotic treatment was not initiated since this is a transient disease and bone alterations tend to regress spountaneuosly.

Conclusions

Although rare, TOH should be suspected in pregnant women presenting with progressive hip pain, particularly in the third trimester. Early diagnosis with timely imaging and a multidisciplinary approach with institution of fracture-preventing measures such as protected weight bearing, analgesia and schedule delivery by cesarean section may prevent serious complications and ensure optimal maternal and fetal outcomes.



• Panel A and B – Right hip x-rays showing displaced femoral neck fracture

• Panel C – Postoperative hip x-ray showing non-cemented total right hip arthroplasty

• Panel D – CT scan (Coronal) showing femur neck fracture

• Panel E – CT-based 3D reconstruction of the femoral neck fracture

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P1021

REGIONAL MIGRATORY OSTEOPOROSIS WITH SEQUENTIAL HIP AND KNEE INVOLVEMENT: A CASE REPORT

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Background

Regional migratory osteoporosis (RMO) is a rare, self-limiting condition within the spectrum of transient bone marrow edema syndromes, characterized by sequential involvement of weight-bearing joints, most commonly in the lower extremities. Due to overlapping clinical and imaging features, it is frequently misdiagnosed as avascular necrosis or stress fracture, which may result in unnecessary diagnostic and therapeutic interventions (1,2).

Case Presentation

A 54-year-old male patient initially presented in March 2024 with atraumatic left hip pain. Physical examination revealed preserved but painful range of motion of the hip, without swelling or erythema. Magnetic resonance imaging (MRI) demonstrated diffuse bone marrow edema involving the left femoral head and neck, characterized by hypointense signal on T1-weighted images and hyperintense signal on T2/STIR sequences (Fig1). No evidence of subchondral fracture, femoral head collapse, or serpiginous lines suggestive of osteonecrosis was observed. Conservative treatment consisting of nonsteroidal anti-inflammatory drugs and activity modification was initiated, resulting in complete spontaneous resolution of symptoms.

In August 2025, the patient developed similar atraumatic pain in the right hip. Physical examination again showed preserved but painful range of motion. MRI findings were comparable to the previous episode, revealing bone marrow edema without fracture or osteonecrosis (Fig2). Symptoms resolved spontaneously under conservative management.

In January 2026, the patient presented with severe pain in the right knee, causing functional limitation. Physical examination demonstrated full range of motion of the knee, with no swelling, erythema, or joint effusion. MRI revealed extensive bone marrow edema involving the distal femur and proximal tibia, without evidence of a fracture line, meniscal pathology, ligamentous injury, or history of trauma (Fig3). Laboratory investigations were unremarkable. Based on the characteristic sequential migratory pattern, imaging findings, and spontaneous resolution of previous episodes, a diagnosis of regional migratory osteoporosis was established (Fig4).

Conclusion

This case demonstrates the characteristic migratory pattern of regional migratory osteoporosis with sequential involvement of bilateral hips followed by the knee. Recognition of this rare entity and its benign natural course is essential to avoid misdiagnosis, unnecessary invasive diagnostic procedures, and inappropriate treatment (3). MRI plays a pivotal role in establishing the diagnosis, while conservative management remains effective and is associated with favorable clinical outcomes (4).

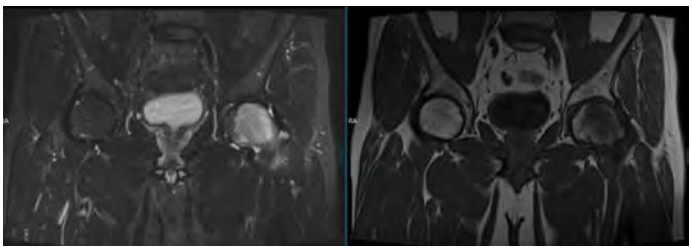


Figure-1

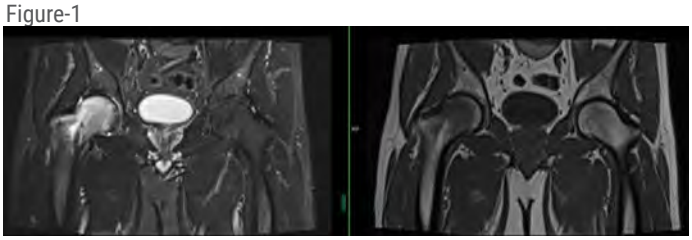


Figure-2

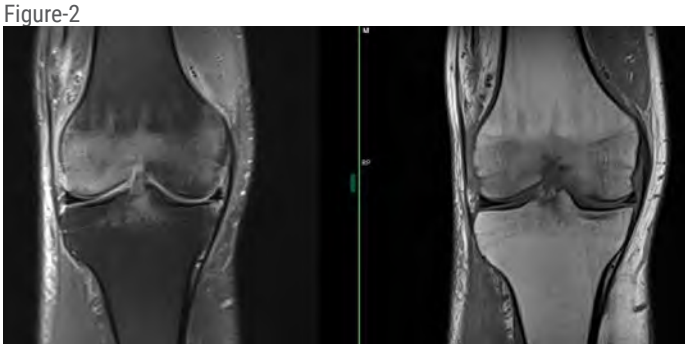


Figure-3

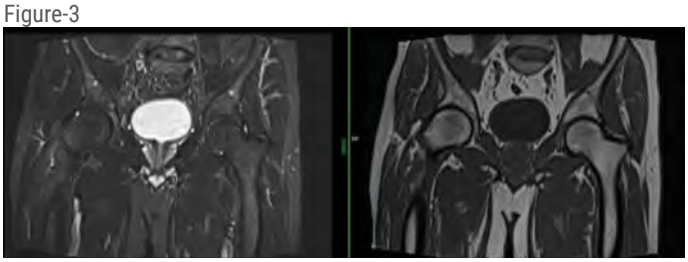


Figure-4

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P1022

TRABECULAR BONE SCORE (TBS) IN PEDIATRIC FEMALES WITH ANOREXIA NERVOSA

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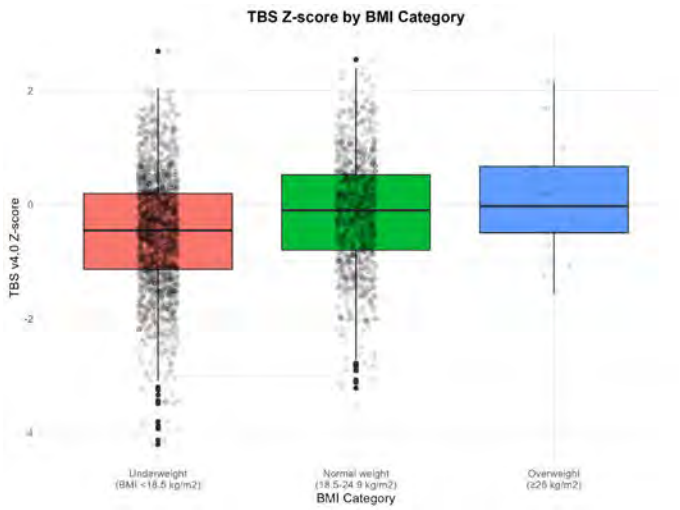
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*Objective:*Anorexia nervosa is characterized by prolonged energy deficiency and low body weight, leading to impaired bone development during critical periods of skeletal growth and an increased risk of fragility fractures. While DXA–derived bone mineral density is commonly used to assess bone health in this population, it does not fully capture alterations in bone microarchitecture. Trabecular bone score (TBS) is a validated, DXA-derived index that provides indirect information on bone microstructure providing insights into skeletal impairment associated with undernutrition. This study aimed to evaluate TBS in a pediatric female cohort with anorexia nervosa and to examine its association with disease severity, as reflected by body mass index (BMI).

*Material and Methods:*DXA scans from female participants aged 5–20 years with anorexia nervosa (AN) were analyzed using TBS Osteo Advanced (version 4), with soft-tissue thickness adjustment. Participants outside the age range and those with abdominal tissue thickness outside the manufacturer-recommended range for TBS v4 (7.0–30.0 cm), were excluded. TBS Z-scores were calculated relative to an age-matched reference population. One-sided statistical testing was performed to assess whether TBS values in AN were lower than reference values. One-way ANOVA was used to compare TBS Z-scores of BMI categories (underweight <18.5, normal weight 18.5-24.9, overweight ≥25 kg/m²), with Tukey post-hoc tests for pairwise comparisons.

*Results:*A total of 2,774 females were included in the final analysis (mean age 15.43 ± 1.77 years; 86.6% White; mean BMI 17.80 ± 2.30 kg/m²). Overall, mean TBS Z-scores were significantly lower than those of the age-matched reference population (−0.36 ± 1.00; $p < 0.001$). Most AN were underweight (64.2%), with 35.2% classified as normal weight and a very small proportion, overweight. Underweight participants demonstrated significantly lower TBS Z-scores compared with the normal-weight group (mean difference −0.35; $p < 0.001$). These findings indicate a graded association between lower BMI and impaired trabecular bone microarchitecture within the cohort.

*Conclusions:*In this large AN cohort, trabecular bone score was significantly reduced compared with age-matched reference values, consistent with compromised trabecular bone microarchitecture. Lower TBS Z-scores in underweight individuals highlight the adverse skeletal effects of low body weight during critical periods of bone development. These findings support the use of TBS as a complementary DXA-derived measure to enhance the assessment of skeletal impairment and disease severity in pediatric patients with anorexia nervosa.



P1023

PHILIPPINE ADULT REFERENCE VALUES FOR TRABECULAR BONE SCORE (TBS OSTEO V3)

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Objective: Trabecular bone score (TBS) is a validated index of bone microarchitecture derived from DXA images and used alongside areal bone mineral density (BMD) to improve the identification of individuals at increased risk of fragility fracture. The availability of population-specific TBS reference data supports clinical interpretation; however, such data are limited for some non-Western populations. The purpose of this study was to establish the first age- and sex-specific TBS reference curves for adult men and women in the Philippine population.

Material and Methods: Lumbar spine DXA scans from 1,924 apparently healthy participants were retrospectively analysed to derive mean TBS values from L1–L4 using TBS iNsight version 3 (Medimaps Group, Geneva, Switzerland). Participants younger than 20 years, those with body mass index (BMI) outside the manufacturer-recommended range for TBS v3 (15–37 kg/m²), and statistical outliers were excluded. Reference curves were fitted using the Lambda–Mu–Sigma (LMS) method implemented through Generalized Additive Models for Location, Scale, and Shape (GAMLSS), generating age- and sex-specific estimates for the median and variability, together with ±1 and ±2 standard deviation limits.

*Results:*1,869 DXA scans from healthy adults aged 20–98 years were included (mean age 65.4 ± 12.3 years; BMI 25.1 ± 4.1 kg/m²). For women, 1,473 scans (mean age 66.8 ± 10.6 years; BMI 25.0 ± 4.1 kg/m²) were used to construct reference curves across the age range 25–90 years. Peak median TBS values reached approximately 1.36, followed by a gradual decline beginning at 40–45 years to around 1.21 at 70–75 years, after which values plateaued. For men, 396 scans (mean age 60.1 ± 15.9 years) were analysed across the age range 20–90 years. A more modest decline in TBS was observed, from approximately 1.40 at 20–25 years to 1.35 at 65–70 years, with relative stability at older ages.

Conclusion: This study provides the first age- and sex-specific TBS reference curves for the Philippine population. By enabling population-appropriate interpretation of bone microarchitecture, these data complement BMD derived from routine DXA examinations without additional patient burden. The availability of locally derived reference ranges may enhance the clinical relevance and accessibility of TBS in non-Western settings.

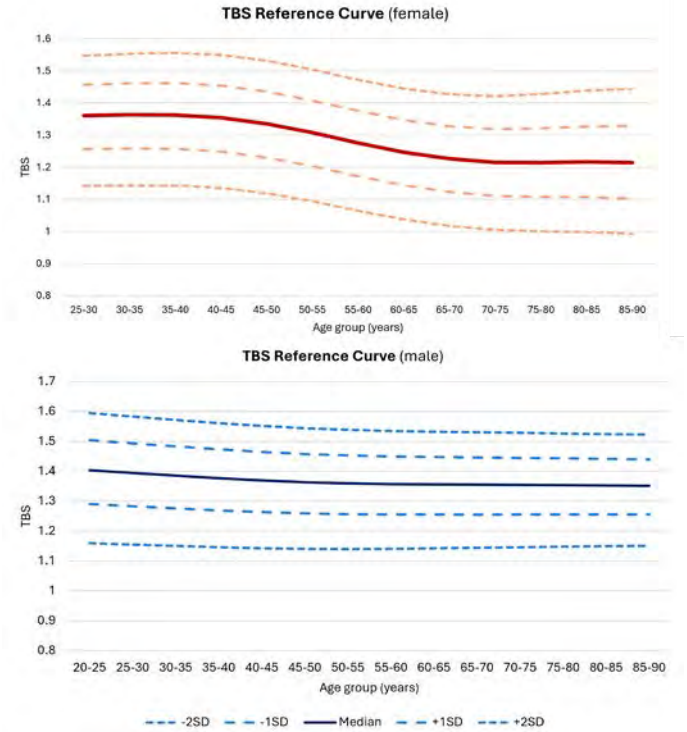


Figure 1. Trabecular Bone Score (TBS) reference curves for Philippine females and males

P1024

A CHARACTERISTIC "LINCOLN SIGN" IN MONOSTOTIC PAGET'S DISEASE OF THE MANDIBLE

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A 70-year-old woman with a remote history of breast carcinoma treated ten years earlier by lumpectomy, adjuvant radiochemotherapy, and hormonal therapy was referred for evaluation of an incidental abnormality detected on routine follow-up bone scintigraphy. She was asymptomatic, with no bone pain, facial swelling, deformity, or functional complaints, and her general condition was preserved. Physical examination was unremarkable.

Laboratory investigations revealed an isolated elevation of alkaline phosphatase (214 U/L; 1.6× the upper limit of normal), while serum calcium and phosphate levels were normal. Whole-body bone scintigraphy using ^99mTc-labeled radiotracers demonstrated a focal, intensely increased uptake confined to the mandible **(Figure.1)**. The tracer distribution followed a linear pattern along the mandibular borders,

corresponding to an osteosclerotic area on complementary imaging.
In a patient with a prior history of malignancy, such a finding raises concern for metastatic bone disease. However, the absence of symptoms, the isolated biochemical abnormality, and the highly specific scintigraphic appearance suggested an alternative diagnosis related to focal bone remodeling rather than tumor infiltration. The striking mandibular outline on scintigraphy resembles a dark contour tracing the jaw, prompting recognition of a classic but uncommon imaging sign. What is the diagnosis suggested by this image?
The imaging findings are diagnostic of monostotic Paget's disease of the mandible. The linear, intense uptake outlining the jaw corresponds to the classic "Lincoln sign," also known as the "black beard sign," which reflects increased osteoblastic activity and accelerated bone remodeling along the mandibular cortex.
Paget's disease most commonly involves the pelvis, spine, skull, and long bones, while isolated mandibular involvement is rare. In oncologic patients, this presentation may closely mimic metastatic disease, making recognition of this distinctive scintigraphic pattern essential to avoid misdiagnosis and unnecessary invasive procedures.



Figure 1. Anterior planar image of 99mTc-MDP bone scintigraphy showing an intense, well-defined linear tracer uptake outlining the mandible, producing the characteristic "Lincoln sign" or "Black beard" sign.

P1025

WHEN ARTHRITIS TELLS A DIFFERENT STORY: NON-LANGERHANS CELL HISTIOCYTOSIS REVEALED BY SYNOVIAL INVOLVEMENT

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Introduction
Non-Langerhans cell histiocytoses represent a rare and heterogeneous group of proliferative disorders of the monocyte–macrophage system. Isolated or inaugural articular involvement is exceptional and may mimic chronic inflammatory or infectious rheumatic diseases, leading to significant diagnostic delay.
Case Presentation
We report two cases illustrating atypical rheumatologic presentations of non-Langerhans cell histiocytoses.
The first case involves a 51-year-old man with a three-year history of recurrent oligoarthritis affecting large joints of the lower limbs, associated with biological inflammatory syndrome and microcytic anemia. Synovial fluid analysis was inflammatory, while infectious and immunological investigations were negative. Imaging revealed diffuse joint space narrowing with large geodes. Synovial biopsy demonstrated infiltration by non-Langerhans histiocytes with mild emperipolesis, consistent with Rosai–Dorfman disease. Whole-body positron emission tomography revealed associated skeletal and cardiovascular involvement.
The second case concerns a 35-year-old woman followed for recurrent febrile biarthritis involving the left knee and shoulder, persisting despite prolonged treatment for a previously documented septic arthritis. Given the persistence of fever and inflammatory markers, a synovial biopsy was performed, revealing a dense infiltrate of foamy histiocytes strongly positive for CD68 and negative for CD1a, supporting the diagnosis of Erdheim–Chester disease. Extensive systemic evaluation was unremarkable, leading to the diagnosis of isolated erosive articular involvement.
Discussion
These cases highlight the diagnostic challenge of non-Langerhans cell histiocytoses with predominant articular presentation, frequently misdiagnosed as chronic inflammatory or infectious arthritis. Synovial biopsy with immunohistochemical analysis remains the cornerstone of diagnosis.
Conclusion
Non-Langerhans cell histiocytoses should be considered in cases of atypical or refractory chronic arthritis. Early synovial biopsy is essential to avoid diagnostic and therapeutic delay.

P1026

OPPOSITE DISTRIBUTION OF LOW BONE MINERAL DENSITY AND LOW APPENDICULAR LEAN MASS IN WOMEN AND MEN WITH HIP FRACTURE: A CROSS-SECTIONAL STUDY

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Objective. To compare the distribution of low femoral bone mineral density (BMD) and low appendicular lean mass adjusted by height squared (aLM/height^2) in women and men with subacute hip fracture.
Materials and Methods. At a median of 18 days after the occurrence of an original hip fracture due to fragility we measured both BMD at the non-fractured femur and body composition by dual-energy x-ray absorptiometry. Densitometric osteoporosis was diagnosed with a T-score < -2.5 (total proximal femur). The reference population for T-score calculations was derived from the Third National Health and Nutrition Examination Survey (NHANES III) and was sex-specific. Low aLM/height^2 was defined according to the criteria released by the European Working Group on Sarcopenia in Older People in 2019 (EWGSOP2), with cut-off values of 5.5kg/m^2 in women and 7kg/m^2 in men.
Results. We studied 1097 Caucasian patients (953 women and 144 men) with subacute hip fracture. The prevalence of densitometric osteoporosis was significantly higher in women (56%) than in men (26%): c^2=43.3, P<0.001. The association between sex and densitometric osteoporosis persisted after adjustment for age, fat mass, 25-hydroxyvitamin D and PTH (P<0.001). The adjusted odds ratio (women versus men) for having densitometric osteoporosis was 4.87 (95% CI from 3.14 to 7.57). The

prevalence of low aLM/height^2 was significantly lower in women (72%) than in men (90%): c^2=20.6, P<0.001. The association between sex and low aLM/height^2 persisted after adjustment for age, fat mass, 25-hydroxyvitamin D and PTH (P<0.001). The adjusted odds ratio (men versus women) for having low aLM/height^2 was 3.90 (95% CI from 2.2 to 7.0).

Conclusions. Low BMD and low aLM/height^2 had opposite sex-associated distributions in hip-fracture patients: low BMD was more prevalent in women than in men, whereas low aLM/height^2 was more prevalent in men than in women. Data suggests that BMD and muscle mass depletion may have sex-specific roles in the genesis of hip fractures in older people, encouraging sex specific preventive approaches. However, longitudinal studies are needed to validate our cross-sectional results.

P1027

PATIENTS WITH OBESITY AND TYPE 2 DIABETES MELLITUS SUSTAIN HIP FRACTURES AT HIGH LEVELS OF BONE MINERAL DENSITY: A CROSS-SECTIONAL STUDY

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Objective. To compare femoral bone mineral density (BMD) in hip-fracture patients categorized into 4 groups depending on the presence of type 2 diabetes mellitus (T2DM), obesity, both the conditions (T2DM and obesity) or absence of both the conditions (controls).

Materials and Methods. At a median of 20 days after the occurrence of an original hip fracture due to fragility we measured BMD by dual-energy x-ray absorptiometry at the non-fractured femur. Densitometric osteoporosis was diagnosed with a T-score < -2.5 (total proximal femur). Obesity was defined with a body mass index ≥ 30kg/m^2.

Results. We studied 964 patients with subacute hip fracture. BMD was significantly different across the 4 categories of patients (F=27.9; P<0.001). Mean (SD) T-score was -2.6 (0.93) in the 754 patients without obesity and T2DM, -2.14 (1.10) in the 128 with T2DM, -1.85 (0.96) in the 60 with obesity and -1.35 (0.93) in the 22 with both T2DM and obesity. The percentage of patients with T-scores below -2.5 also differed across the 4 categories (F=41.8; P<0.001), ranging from 55% (controls) to 14% (concomitant presence of both T2DM and obesity). The significant association between densitometric osteoporosis and the 4 categories of patients persisted after adjustment for age, sex, hip-fracture type, concomitant neurologic impairment, 25-hydroxyvitamin D, PTH and estimated glomerular filtration rate (P<0.001).

Conclusions. Hip fractures occur at high levels of femur BMD in patients with T2DM or obesity and very high levels in the presence of both the conditions. Preserved BMD may not protect patients with T2DM and obesity against hip fractures and may falsely reassure patients and clinicians. To avoid underestimation of hip-fracture risk due to high BMD, we suggest an adjustment of risk calculation based on the T-score differences shown in our sample. Adjustment validation by robust prospective studies is needed.

P1028

PREDICTING A GOOD RESPONSE TO ROMOSOZUMAB IN TERMS OF PERCENTAGE INCREASE IN BONE MINERAL DENSITY IN ROUTINE CLINICAL PRACTICE

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Objective: There is a strong relationship between bone mineral density (BMD) and fracture risk. The increase in BMD following treatment with romosozumab is highly variable. Accordingly we have studied a cohort of women treated at the Royal Cornwall Hospital Trust, Truro, UK to determine what factors are associated with a good response to romosozumab in terms of percentage increase in BMD.

Methods: One hundred and twenty women received treatment with romosozumab for one year. A DEXA scan measured the BMD before and after treatment. A good clinical response was deemed to be those women with a percentage increase in BMD at either the lumbar spine and total hip in the upper quartile and a poor response in those women with a percentage increase in BMD at either the lumbar spine and total hip in the lowest quartile.

The age, BMI, baseline BMD at the lumbar spine and total hip, previous osteoporosis treatment, QRISK 3 (UK-developed, validated, clinical algorithm that calculates the percentage of risk of developing heart attack or stroke over the next 10 years), NOGG 10 year risk of major osteoporotic fracture and hip fracture and category of subsequent fracture risk

Participants with missing data exceeding 20% of the total study variables were excluded from the analysis. Consequently the final analytical sample comprised 114 women to determine a good clinical response in terms of an increase in percentage BMD.

Results: The mean age was 69.90±8.05 years, Age >75 years, n=35 (28.9%), mean BMI 24.95±4.54, mean baseline BMD (g/cm^2) at the lumbar spine, total hip and femoral neck 0.73±0.11, 0.66±0.09, 0.55±0.07 respectively. Mean bone mineral density T scores at the lumbar spine, total hip and femoral neck -2.97±1.00, -2.26±0.75 and -2.60±0.86 respectively.

The mean BMD improvement (%) at the lumbar spine was 13.05%±7.65 and total hip 3.23%±4.95. A poor response at the lumbar spine ≤7.4% was oberved in 23 women and at the total hip≤0% in 25 women and a good response at the lumbar spine ≥18.5% in 22 women and at the total hip ≥6.4% in 23 women.

In women with a lumbar spine baseline T score > -3.0 only 6 (31.6%) had a good response to treatment compared to 16 (61.5%) with a T score ≤ -3.0), odds ratio 3.48 (95% CI 0.99- 12.08), P= 0.047. In women with a T score of > -3.0 only 16 women (30.4%) had a good response compared to 7 women (69.6%) with a T score of ≤ -3.0 at the total hip, odds ratio 10.5 (95% CI 1.18-93.69), P= 0.014.

No other factor studied was associated with a good response to romosozumab in terms of percentage increase in BMD at the lumbar spine and total hip.

Conclusion: Baseline BMD was the only factor associated with a good response to romosozumab in terms of percentage increase in BMD. We sugest patients with a T score <-3 should be prioritised for treatment with romosozumab.

P1029

FRACTURE INCIDENCE AND RISK FACTORS IN A PERITONEAL DIALYSIS SETTING

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Objectives: To evaluate the incidence and determinants of fragility fractures in peritoneal dialysis patients and to assess the performance of the Fracture Risk Assessment Tool (FRAX®).

Materials and Methods: We conducted a retrospective single-center cohort study including adult patients on PD for ≥12 months between 2013 and 2025. Fragility fractures during PD follow-up were identified through clinical records and review of lateral spine radiographs. Clinical and biochemical data were collected. Vascular calcification was assessed using the Adragão vascular calcification score (VCS). FRAX® probabilities were calculated without bone mineral density. Logistic regression identified independent predictors of fractures, and ROC analysis evaluated FRAX® performance.

Results: Among 325 PD patients (mean age 53±8 years; 57.2% male), 32 (9.8%) sustained fragility fractures, corresponding to an incidence of 30.3 per 1,000 patient-years. Most fractures were asymptomatic vertebral fractures (n=23, 7.1%). Patients with fractures were older (p<0.001), more frequently had previous fractures (p<0.001), and were more often diabetic (p=0.05). They also had lower baseline phosphorus (p=0.038) and intact parathyroid hormone (iPTH) levels (p=0.032), although values remained within guideline targets and KDIGO iPTH categories did not differ between groups. There was a trend to higher VCS in the patients with fractures (p=0.064), and mortality was higher (p=0.038). In multivariable analysis, previous fracture history (OR 4.85, 95% CI 1.22–19.27, p=0.025) and higher VCS (OR 2.10, 95% CI 1.10–4.03, p=0.025) were independently associated with fracture occurrence. FRAX® showed modest discriminatory ability for fragility fractures (AUC 0.69, **figure 1**). Using standard intervention thresholds, sensitivity was very low (4.8%), increasing only modestly when CKD was classified as secondary osteoporosis (14.3%).

Conclusions: PD patients experience a high burden of fragility fractures, particularly asymptomatic vertebral fractures. Prior fracture history and vascular calcification are strong predictors of fracture risk. FRAX® underestimates fracture risk in this population, highlighting the need for CKD-specific fracture risk assessment strategies tailored to PD patients.

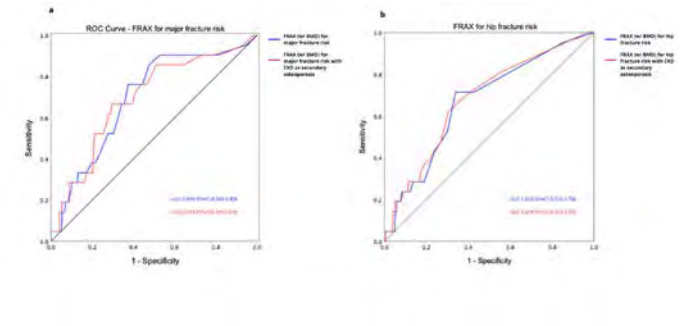


Fig.1 Receiver operator characteristic (ROC) curves comparing the diagnostic performance of FRAX in identifying any fracture during follow-up using FRAX major fracture risk (a) and FRAX hip fracture risk (b)

P1030

LONGITUDINAL EVALUATION OF BONE STATUS WITH RADIOFREQUENCY ECHOGRAPHIC MULTI SPECTROMETRY (REMS) TECHNOLOGY IN A PERITONEAL DIALYSIS COHORT

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Objectives: Dual x-ray absorptiometry (DXA) is the gold standard for bone mineral density (BMD) assessment in chronic kidney disease patients, but it can have limited accuracy and radiofrequency echographic multi-spectrometry (REMS) may overcome some of its limitations. We aimed to evaluate and compare longitudinal BMD changes assessed by DXA and REMS in peritoneal dialysis (PD) patients.

Material and Methods: Prospective cohort study including 20 PD patients that underwent two separate DXA and REMS evaluations. Clinical, biochemical, and imaging data, including abdominal aorta calcification (AAC) scores and fracture history were collected. Longitudinal BMD changes were analyzed using linear mixed-effects models.

Results: Over a median follow-up period of 19.8 months, DXA revealed significant BMD declines at the femoral neck (FN) (−3.2%, p=0.039) while REMS showed non-significant numerical declines **(figure 1).** REMS consistently yielded lower BMD values than DXA at both lumbar spine (LS) and FN. Despite these differences, the trajectories over time were similar between DXA and REMS for LS BMD (p=0.806) and FN BMD (p=0.229, **table 1**), regardless of whether patients were receiving anti-osteoporosis treatment and of the presence of fractures. However, there was no correlation of the annualized changes in BMD at the FN and LS between the two methods (r^2=0.001, p=0.905 and r^2=0.001, p=0.928, respectively).

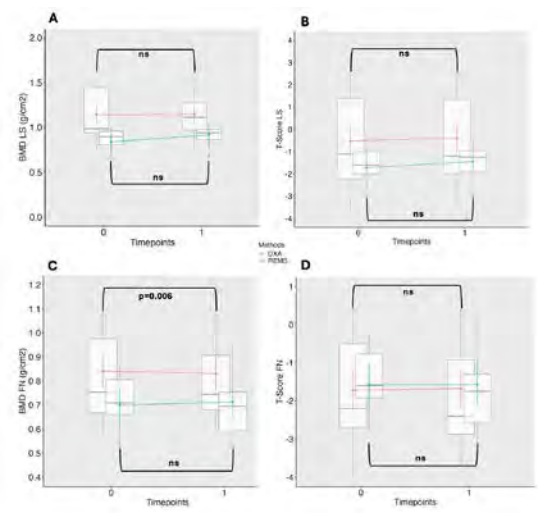
Conclusion: REMS and DXA demonstrated similar longitudinal trends in BMD, but DXA detected a significant decline in BMD at cortical sites, whereas REMS did not. Larger studies are needed to clarify the comparative and complementary roles of REMS and DXA in monitoring bone health in end-stage kidney disease.

Table 1. Comparison of longitudinal changes in BMD over time assessed by REMS (vs. DXA) at the lumbar spine and femoral neck, with and without adjustment for covariates All models included time and methods (REMS vs DXA) as fixed effects, and the other covariates were consecutively included. All presented results are derived from the interaction with time.

	Lumbar Spine		Femoral Neck	
Change in BMD over time (x time)				
Unadjusted Analysis				
	Coefficient	**p-value**	**Coefficient**	**p-value**
REMS (compared to DXA)	0.074	0.806	-0.002	0.229
Adjusted Analysis				
	Coefficient	**p-value**	**Coefficient**	**p-value**
AAC score	0.002	0.957	0.002	0.177
Treatment (yes)	-0.002	0.754	-0.001	0.672
Vertebral fractures (yes)	-0.007	0.136	-0.017	0.872
REMS (compared to DXA) x AAC score	-0.011	0.465	-0.003	0.210
REMS (compared to DXA) x Treatment	-0.003	0.754	0.005	0.911
REMS (compared to DXA) x Fractures	0.004	0.525	0.007	0.710

Footnote: BMD - bone mineral density; DXA - dual x-ray absorptiometry; REMS - Radiofrequency Echographic Multi-Spectrometry; AAC - abdominal aorta calcification

Figure 1 – Individual longitudinal evaluation of BMD and T-scores assessed by DXA and REMS (A – BMD LS, B – T-Score LS, C – BMD FN, D – T-Score FN). p-values derived from linear mixed-effects with covariate (time between evaluations).



P1031

ROMOSOZUMAB DOES NOT IMPROVE VOLUMETRIC BONE MINERAL DENSITY AT DISTAL RADIUS BUT INCREASES BONE STRENGTH: A PROSPECTIVE STUDY

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Objectives:

Romosozumab (ROMO) leads to substantial BMD gains at the lumbar spine and the hip, but its effects on distal radius volumetric BMD (vBMD) remain unclear. High-resolution peripheral Quantitative Computed Tomography (HR-pQCT) allows for detailed assessment of bone microarchitecture and strength at peripheral regions. We aimed to evaluate the effects of 12 months of ROMO on vBMD, microarchitecture and biomechanical properties of the distal radius using HR-pQCT.

Material and Methods:

We did a prospective study on 49 postmenopausal women with osteoporosis treated with ROMO for 12 months who underwent HR-pQCT with microfinite element analysis (uFEA) assessments at baseline, 3, 6 and 12 months. We also performed DXA at lumbar spine, femoral neck and total hip. HR-pQCT parameters trajectories were analyzed using mixed-effects modeling.

Results:

Mean age was 73.4±10.1 years old, mean BMI was 23.1±3.4 kg/m2 and most patients were no smokers (n=45, 91.8%). The majority of the patients had a previous vertebral fracture (n=41, 83.7%) and a smaller percentage had sustained previous hip (n= 9, 18.4%) and wrist fractures (n= 16, 32.7%).

No significant increases were observed in cortical or trabecular vBMD or microarchitectural parameters at the distal radius **(table 1).** On the other hand, uFEA showed early increases in cortical failure load and shear strength, suggesting potentially improved bone mechanical behavior. Cortical failure load increased at both 3 and 6 months (p=0.018 and p=0.049, respectively) but was stable when considering the overall period of treatment (p=0.102). Consistent with these findings, shear strength increased at 3 and 6 months, with significant changes at month 6 (p=0.008). Stiffness remained relatively stable until 12 months (p=0.288). Lumbar spine, femoral neck, and total hip aBMD significantly increased by 11.6%, 8.3%, and 3.1%, respectively (all p<0.001).

Conclusions: ROMO treatment was associated with improved biomechanical properties at the distal radius, despite non-increasing vBMD. ROMO treatment might improve skeletal health beyond BMD gains.

Table 1. High-resolution peripheral quantitative computed tomography (HR-pQCT) parameters changes at distal radius in patients treated with romosozumab

	M0	M3	M6	M12	p-value
Tot. vBMD (mgHA/cm³)	263.245 (222.426-303.816)	256.903 (280.720-)	275.159 (225.079-310.731)	271.625 (227.468-313.298)	0.960
Ct.vBMD (mgHA/cm³)	778.401 (718.450-844.725)	755.957 (691.460-805.905)	767.680 (719.022-836.766)	763.181 (711.32-801.153)	0.905
Tb.vBMD (mgHA/cm³)	120.161 (82.706-149.975)	121.449 (90.851-143.075)	122.648 (86.439-163.279)	129.967 (103.441-148.317)	0.383
Ct.Th (mm)	0.716 (0.668-0.781)	0.697 (0.653-0.770)	0.733 (0.665-0.784)	0.721 (0.662-0.764)	0.463
Tb.BV/TV (%)	10.284 (8.642-12.015)	11.241 (9.202-12.204)	10.986 (8.943-12.226)	10.842 (9.319-12.136)	0.137
Tb.Th (mm)	0.269 (0.256-0.278)	0.271 (0.263-0.273)	0.265 (0.257-0.273)	0.268 (0.253-0.273)	0.868
Tb.Sp (mm)	0.910 (0.860-0.971)	0.878 (0.846-0.988)	0.894 (0.841-0.960)	0.905 (0.851-0.959)	0.617
Stiffness (kN/mm)	37.542 (36.909-38.087)	37.408 (39.969-37.746)	37.508 (37.222-37.677)	37.198 (36.771-38.022)	0.288
Shear (KN/m²)	118639.3 (107618.6-137550.1)	151812.7 (110633.125-180862.150)	143614.3 (11.4588.4-170783.8)	137988.2 (119754.5-151843-3)	**0.019**
% Cortical Break Bricks at 1500N	8.108 (6.283-10.351)	6.299 (4.777-9.100)	7.303 (4.646-9.423)	7.336 (5.749-9.185)	0.102
% Trabecular Break Bricks at 1500N	6.510 (3.054-10.502)	4.229 (2.496-10.007)	5.734 (3.403-11.429)	5.276 (2.237-8.549)	0.052

Footnote: Tot.vBMD – total volumetric bone mineral density; Ct.vBMD – cortical volumetric bone mineral density; Tb.vBMD – trabecular volumetric bone mineral density; Tb.BV/TV - Trabecular bone volume fraction; Tb.Th – trabecular thickness; Tb.Sp – trabecular separation

P1032

RADIOFREQUENCY ECHOGRAPHIC MULTI SPECTROMETRY (REMS) TECHNOLOGY IN THE EVALUATION OF GLUCOCORTICOID-INDUCED OSTEOPOROSIS IN SYSTEMIC LUPUS ERYTHEMATOUS PATIENTS

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Objectives: The aim of this study was to assess the diagnostic agreement between Radiofrequency Echographic Multi Spectrometry (REMS) and dual-energy X-ray absorptiometry (DXA) for bone mineral density (BMD) in patients with systemic lupus erythematosus (SLE), particularly those receiving glucocorticoids (GCs).

Material and Methods: 106 SLE patients (44 GC-treated) underwent BMD assessment using both DXA and REMS. We compared BMD and T-scores between methods and analyzed diagnostic agreement using linear regression, Cohen's kappa and Bland-Altman analysis. Receiver operator characteristic (ROC) curves evaluated the ability of REMS and DXA to discriminate fracture status. To assess the predictive performance of both methods relative to patient demographic characteristics, we used FRAX to estimate the 10-year major osteoporotic fracture risk based solely on age, sex, and body mass index (BMI) for each patient.

Results: BMD measurements at all sites were significantly lower with REMS when compared with DXA across all skeletal sites ($p<0.001$). Agreement in osteoporosis classification was slight to moderate (κ ranging from 0.229 at lumbar spine (LS) in all patients to 0.549 at femoral neck (FN) in GC-treated patients, **table 1).** REMS showed moderate correlation with DXA and demonstrated 45% sensitivity and 88.4% specificity for diagnosing osteoporosis. ROC curves in all patients demonstrated that REMS exhibited similar discriminative ability compared to DXA across all skeletal sites evaluated **(Fig.1).** When a clinical predictor model based on age, sex, and BMI was included, its standalone AUC was 0.735 (95% CI 0.582-0.889) at the FN and 0.729 (95% CI 0.574-0.884) at the LS, comparable to REMS and DXA. In a linear regression model, REMS BMD values were more strongly associated with age, sex, and body mass index: r^2 values for REMS LS ($r^2=0.569$), FN ($r^2=0.696$), and total hip ($r^2=0.744$), compared to the corresponding r^2 values for DXA (0.208, 0.489, and 0.429, respectively).

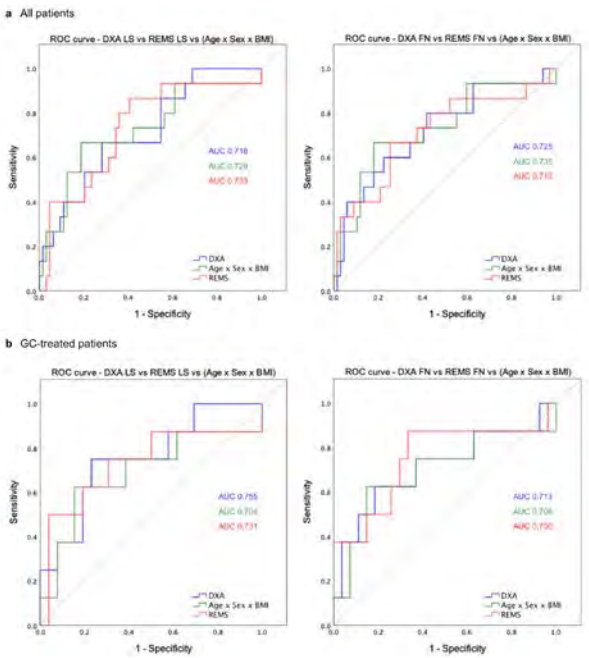
Conclusion: REMS and DXA showed a fair to moderate agreement in osteoporosis diagnosis and in fracture discrimination in SLE patients. REMS measurements showed stronger associations with age, sex, and BMI than DXA.

Table 1 - Association and agreement between radiofrequency echographic multispectrometry (REMS) and dual x-ray absorptiometry (DXA) in the overall SLE population and glucocorticoid (GC) treated group; * represents $p<0.05$

	GC treated (n=44)			All patients (n=106)		
Anatomical site	Lumbar Spine	Femoral Neck	Total Hip	Lumbar Spine	Femoral Neck	Total Hip
Valid cases (n)	34	35	34	79	82	78
Sensitivity° (%)	33.3	60.0	0.0	33.3	45.5	40.0
Specificity° (%)	91.4	94.9	94.6	90.4	89.5	96.6
κ	0.239	0.549*	-0.036	0.229	0.301*	0.366
r	0.40*	0.41*	0.50*	0.54*	0.50*	0.61*
r^2	0.16*	0.17*	0.25*	0.29*	0.25*	0.37*
Regression line slope	0.40	0.39	0.44	0.42	0.34	0.65
SEE (g/cm²)	0.190	0.127	0.132	0.157	0.118	0.109
Average differences (mean±1.96 SD, g/cm²)	0.171±0.211	-0.128±0.165	-0.066±0.152	-0.197±0.192	-0.146±0.136	-0.078±0.165
	All sites			All sites		
Diagnostic Classification, n (%)	Normal	Osteopenia	Osteoporosis	Normal	Osteopenia	Osteoporosis
REMS	18 (40.9)	20 (45.5)	6 (13.6)	39 (36.8)	48 (45.3)	19 (17.9)
DXA	14 (31.8)	16 (36.3)	12 (27.3)	36 (34.0)	50 (47.2)	20 (18.9)

°for classification of osteoporosis REMS vs DXA T-scores

Fig.1 Receiver operator characteristic (ROC) curves comparing the diagnostic performance of dual x-ray absorptiometry (DXA) and radiofrequency echographic multispectrometry (REMS) and the clinical predictor model (age x sex x body mass index) in identifying morphometric vertebral fractures in all patients (a) and in glucocorticoid (GC) treated patients (b)



P1033

BEYOND THE POST–ZOLEDRONIC ACID SYNDROME: AN UNEXPECTED FLARE OF ANKYLOSING SPONDYLITIS

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INTRODUCTION:

Zoledronic acid is widely used in the treatment of osteoporosis and is known to induce a transient inflammatory response related to immune system activation. In patients with ankylosing spondylitis, this immune stimulation may potentially contribute to the occurrence of an inflammatory disease flare.

OBJECTIVE:

To report a case of ankylosing spondylitis flare occurring after intravenous zoledronic acid infusion.

CASE REPORT:

A 60-year-old woman, with no significant past medical history, had been followed for more than 20 years for axial and entheseal spondyloarthritis. The disease had remained clinically stable and was well controlled with non-steroidal anti-inflammatory drugs (NSAIDs).

She subsequently developed fracture-related osteoporosis associated with low bone mineral density, which led to the initiation of injectable bisphosphonate therapy with zoledronic acid at a dose of 5 mg.

Clinical course after infusion

Seven days after the infusion, the patient developed a constellation of symptoms including:

• low-grade fever (38 °C),

• diffuse arthralgia and myalgia,

Ten days after the infusion, she presented with inflammatory-type spinal pain that was resistant to her usual NSAID treatment (celecoxib 200 mg/day).

Biology revealed :

• Inflammatory markers: CRP 220 mg/L, elevated ESR

• CBC: within normal limits

• Other biochemistry: unremarkable

Emergency spinal MRI demonstrated multilevel spondylodiscitis extending from T10 to S1, characterized by T1-weighted hypointensity and T2/STIR hyperintensity of the adjacent vertebral endplates and intervertebral discs.

An extensive infectious workup was performed and yielded negative results.

Outcome

Treatment was switched to a maximal dose NSAID from a different pharmacological class (naproxen 1100 mg/day), resulting in rapid clinical and biological improvement. CRP levels decreased from 220 mg/L to 24 mg/L within one week.

Given the presence of inflammatory spinal pain, a marked biological inflammatory syndrome, negative infectious investigations, and a rapid response to NSAIDs, the diagnosis of an inflammatory flare of ankylosing spondylitis was considered the most likely.

DISCUSSION:

The close temporal relationship between the post–zoledronic acid syndrome, which is frequent and well described, and the occurrence of a severe inflammatory flare of ankylosing spondylitis in a patient with long-standing stable disease raises the question of a potential triggering

role of zoledronic acid.

Bisphosphonates, particularly zoledronic acid, are known to induce transient immune activation through stimulation of γδ T lymphocytes and increased production of pro-inflammatory cytokines, mainly interleukin-6 and tumor necrosis factor alpha. This pseudo-infectious inflammatory response may act as a trigger for disease flare in patients with underlying inflammatory conditions.

Although only rare cases of spondyloarthritis flares following zoledronic acid infusion have been reported in the literature, the pathophysiological plausibility exists, and the temporal sequence observed in this patient supports a possible causal relationship.

CONCLUSION:

The occurrence of an inflammatory flare of ankylosing spondylitis following intravenous zoledronic acid infusion remains exceptional. Most published data describe inflammatory articular reactions after bisphosphonate administration.

The plausibility of such an event relies on the known immunomodulatory mechanisms of zoledronic acid, including inhibition of the mevalonate pathway, accumulation of isopentenyl pyrophosphate, and activation of γδ T lymphocytes, leading to increased release of pro-inflammatory cytokines. In patients with stable chronic inflammatory diseases, this acute immune activation may act as a triggering factor for disease flare. This case highlights the importance of increased clinical vigilance and appropriate biological monitoring following zoledronic acid infusion in patients with chronic inflammatory rheumatic diseases, particularly ankylosing spondylitis.

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P1034

FRACTURES AFTER DENOSUMAB DISCONTINUATION: PRELIMINARY REAL-WORLD EVIDENCE FROM A 60-PATIENT FRACTURE LIAISON SERVICE COHORT

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Objectives

To assess the characteristics of fractures after denosumab in a monocentric Fracture Liaison Service cohort.

Material and methods

We retrospectively included all patients who discontinued denosumab between 2013 and 2023 and had ≥ 12 months of follow-up. Data were extracted from medical records. This abstract reports preliminary analyses from patients with completed follow-up between 2013 and 2016.

Results

Sixty patients were included (83% women; mean age 74 ± 11 years). Before denosumab, 85% had received prior osteoporosis treatment and all had a history of fragility fracture. Comorbidities included diabetes (15%), hypertension (72%), thyroid disorders (30%), chronic kidney disease (17%), and vitamin D insufficiency (41%). Denosumab was given for a median of 5 years; 7 patients had delayed injections and 8 missed at least one dose. Rheumatology follow-up occurred in 43%. Two atypical femoral fractures were reported. After discontinuation, 19% received bisphosphonates. Vitamin D and calcium supplementation continued in 88% and 59%. Three patients (5%) sustained new fractures: one isolated vertebral fracture, one non-vertebral fracture, and one case combining a vertebral and four rib fractures. Median time to fracture was 21 months. All these patients were women, of low weight and short stature, had prior long-term bisphosphonate exposure, excellent adherence to denosumab (no delays or missed injections), and adequate vitamin D and calcium intake. Two received risedronate and one zoledronate after denosumab.

Conclusions

In this preliminary FLS cohort, 5% of patients fractured after denosumab discontinuation. Fractures occurred in women with low body weight and height, prior bisphosphonate exposure, and excellent treatment adherence, despite receiving post-denosumab bisphosphonates, whereas only 19% of the overall cohort received a relay therapy. These findings contrast with classical risk factors such as long injection delays or lack of antiresorptive relay, and highlight the need for larger datasets to better identify fracture-related determinants and support predictive modelling, including AI-based tools.

Disclosures

MD, PF, and VG received travel and subsistence support from Amgen; PF and VG received speaking honoraria. NM has no conflicts of interest.

P1035

IMPACT OF BUROSUMAB ON QUALITY OF LIFE AND BIOLOGICAL PARAMETERS IN ADULTS WITH X-LINKED HYPOPHOSPHATEMIA

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Objectives

X-linked hypophosphatemia (XLH) is the most common hereditary form of rickets, caused by mutations in the PHEX gene leading to excess fibroblast growth factor 23 (FGF23), renal phosphate wasting, and chronic osteomalacia. While burosumab, an anti-FGF23 monoclonal antibody, has demonstrated biological efficacy, its impact on quality of life (QoL) in adults has not been well established. This study aimed to evaluate the effects of burosumab on QoL and biological parameters in adults with XLH in a real-world setting.

Material and Methods

This was a prospective, single-center, real-world study. Six adult patients with XLH refractory to conventional therapy received burosumab 1 mg/kg by subcutaneous injection every four weeks. Clinical parameters, biochemical markers, bone mineral density (BMD), and QoL were assessed at baseline, 12 months, and 24 months. QoL was evaluated using six validated questionnaires (FACIT-F, RAPID3, HAQ, SF-36, EQ-5D-5L, WOMAC). Radiographs of non-healed fracture were performed before and after treatment.

Results

All six patients completed 24 months of treatment without serious adverse events or treatment discontinuation. No significant improvement was observed across most QoL questionnaires, except for RAPID3, which showed a trend toward improved QoL at 24 months. Burosumab induced a rapid and significant increase in serum phosphate levels (0.54 mmol/L at baseline vs 0.76 mmol/L at month 3; p = 0.016) and a significant increase in lumbar spine BMD at 24 months (1.084 g/cm² at baseline vs

1.131 g/cm² at month 12; p = 0.028). P1NP levels significantly decreased (301 µg/L at baseline vs 128 µg/L at 24 months; p = 0.028). C-terminal FGF23 levels increased. Three response profiles were identified: improvement in both QoL and biological parameters (50%), biological response without perceived QoL improvement (33%), and biological response with worsening QoL (17%). All patients achieved consolidation of initial fracture sites without recurrence.

Conclusions

Burosumab significantly improves key biochemical and skeletal parameters in adults with XLH and demonstrates a favorable safety profile. However, the impact on quality of life remains heterogeneous, highlighting the need for individualized follow-up and larger studies to better characterize patient-reported outcomes.

Disclosures

MD, PF, and VG received travel and subsistence support from Kiowa Kirin; PF received speaking honoraria. MP and PAB have no conflicts of interest.

P1036

DENOSUMAB THERAPY IN MEN WITH OSTEOPOROSIS: A SINGLE-CENTRE RETROSPECTIVE COHORT STUDY (OSTEOPROM PART 4)

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Objective: This study aims to evaluate the effects of denosumab therapy on bone mineral density (BMD) and fracture incidence in men with osteoporosis treated in routine clinical practice.

Material and Methods: This study was conducted from 2014 to 2025 (12 years) and included 76 men diagnosed with osteoporosis. We collected REUH Outpatient Clinic data from medical records and then manually analysed it. Demographic and clinical data, including age, body mass index, duration of osteoporosis, prior antiosteoporotic therapy, glucocorticoid use, and fracture history, were collected. BMD at the lumbar spine (L1–L4) and total mean hip was assessed using dual-energy X-ray absorptiometry. Serum cholecalciferol, parathyroid hormone, and calcium levels were evaluated before, during or after denosumab therapy. Fracture incidence was recorded before and during treatment. We performed descriptive statistical analysis.

Results: The mean age of patients was 65.7±14,5SD years (min. 21, max. 89), with 75% aged ≥60 years. The duration of denosumab therapy ranged from 6 months to 7 years; only 10% of patients received denosumab for five years or longer. Among the men with osteoporosis, 26.3% had glucocorticoid-induced osteoporosis, while 73.7% had idiopathic osteoporosis. Prior to denosumab therapy, fractures were documented in 40.8% of patients, including vertebral fractures in 14.5%. During treatment, fractures occurred in 5.3% of patients, of which 75% were non-vertebral. At the lumbar spine, bone mineral density increased by >0.05 g/cm² in 42% of patients and remained stable (±0.05 g/cm²) in 32%. At the total mean hip, a clinically relevant increase in bone mineral density (>0.05g/cm²) was observed in 79% of patients with available paired measurements. The prevalence of cholecalciferol deficiency (≤30ng/mL) decreased from 18.4% before therapy to 4.0% during therapy. A mild increase in PTH levels was noted in 65 patients, while serum calcium levels remained within the normal range in 100%. No significant adverse cardiovascular events, including myocardial infarction or stroke, were observed during denosumab therapy.

Conclusions: This study's findings demonstrate that denosumab can significantly improve patient health by reducing fracture risk and improving bone density. These findings support the effectiveness of denosumab as a therapeutic option for male osteoporosis, a population that remains insufficiently studied, encouraging clinicians to consider it as a reliable treatment option.

P1037

BONE MICROARCHITECTURE IN THE CONTEXT OF INSULIN SIGNALING

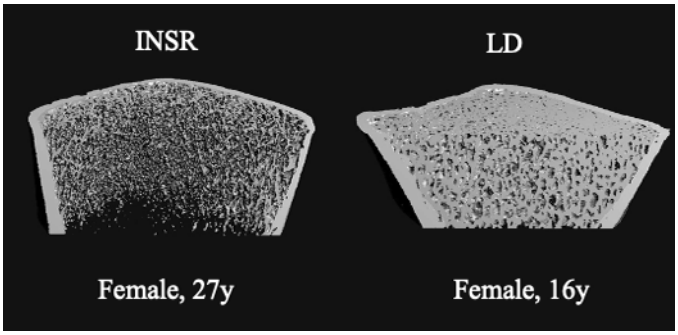
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Insulin's action on bone is not well understood, especially in insulin resistance (IR). Patients with lipodystrophy (LD) lack adipose tissue and have severe IR, causing hyperinsulinemia and increased insulin signaling. Patients with insulin receptor (INSR) pathogenic variants have hyperinsulinemia, but very low insulin signaling from failure of insulin to stimulate its receptor. To study effects of differential insulin signaling on bone, we performed High Resolution Peripheral Quantitative CT of the diaphyseal and distal radius and tibia in patients with LD (n=9) and INSR (n=3). Measurements included volumetric bone mineral density (vBMD), trabecular bone volume fraction (BV/TV), and trabecular thickness (TT). Micro-finite element analyses evaluated stiffness and failure load (FL).

At the distal radius, LD vs INSR had increased mean total vBMD (354 vs 284 mgHA/cm^3), BV/TV (0.25 vs 0.15), trabecular vBMD (183 vs 115 mgHA/cm^3), TT (0.27 vs 0.21 mm), stiffness (68294 vs 48212 N/mm), and FL (5867 vs 4187 N). At the diaphyseal radius, LD patients had 2.5-fold higher BV/TV and trabecular vBMD, and higher TT (0.18 vs 0.12 mm), stiffness (74771 vs 69538 N/mm), and FL (6607 vs 6263 N). At the distal tibia, LD patients had 2-fold higher BV/TV and trabecular vBMD, and higher total vBMD (378 vs 269 mgHA/cm^3), TT (0.33 vs 0.22 mm), stiffness (209970 vs 127792 N/mm), and FL (17560 vs 10983 N). At the diaphyseal tibia, LD patients had 4-fold higher BV/TV, 10-fold higher trabecular vBMD, 2-fold higher TT, and higher total vBMD (751 vs 714 mgHA/cm^3), stiffness (229949 vs 195003 N/mm), and FL (19785 vs 16717 N). At the distal tibia, those with generalized LD (n=3), who have more severe IR vs partial LD (n=6), had ~2-fold higher total vBMD, trabecular vBMD, BV/TV, TT, stiffness, and FL vs partial LD.

Compared to a database of healthy volunteers, trabecular parameters were ~99th centile for LD and ~1st centile for INSR. These data suggest that excess insulin signaling in LD associates with excess bone mass, especially in trabeculae, while decreased insulin signaling in INSR associates with decreased bone mass. Potential mechanisms include increased osteoblast activity via insulin stimulation of IGF-1 pathways, and differentiation of bone marrow mesenchymal cells into osteoblasts vs adipocytes in patients with LD who cannot produce adipocytes.



P1038

RISK FACTORS FOR OSTEOPOROSIS IN PATIENTS WITH CALCIUM PYROPHOSPHATE DEPOSITION DISEASE

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Objective. To determine the prognostic significance of individual factors in the development of osteoporosis in patients with calcium pyrophosphate deposition disease (CPPD).

Materials and methods. An open prospective study was conducted with the participation of 90 patients. The main group consisted of 61 patients with a verified diagnosis of CPPD (33 men and 28 women). The control group consisted of 28 patients with osteoarthritis (8 men and 20 women). The diagnosis of CPPD was established according to the McCarty criteria, which include the detection of calcium pyrophosphate crystals in the synovial fluid using polarized microscopy and radiological or ultrasound confirmation of chondrocalcinosis. All patients underwent densitometry at the initial stage and at the end of the follow-up.

Results. The initial characteristics of patients by gender, age, and duration of the disease did not reveal statistically significant differences between the groups.

At the end of the follow-up period, osteoporosis was diagnosed in 22 (36%) of the 61 patients with CPPD (13 men and 9 women) and in 8 (28.6%) of the 28 patients with osteoarthritis (2 men and 6 women).

The analysis of risk factors revealed the following associations with the development of osteoporosis in patients with CPPD: age over 55 years in women OR=5.1; 95% CI=1.019-24.29; p=0.047); age over 65 years in men (OR=3.8; 95% CI=1.25-11.5; p=0.013); hyperparathyroidism (OR=14.28; 95% CI=1.65-136.8; p=0.015); increased erythrocyte sedimentation rate (ESR)>20 mm/h (OR=14.37; 95% CI=1.12–10.1; p=0.025); elevated C-reactive protein (CRP) values>5.0 mg/L (OR=5.21; 95% CI=2.03-19.04; p=0.002).

When a multivariate analysis was performed using logistic regression (model sensitivity – 71%, specificity – 82%), the only significant factor associated with the development of osteoporosis in patients with CPPD was hyperparathyroidism (OR=13.64; 95% CI=1.04–193.03; p=0.038). It is important to note that the use of glucocorticoids in this cohort of patients did not show a statistically significant effect on the development of osteoporosis.

Conclusions. In patients with calcium pyrophosphate deposition disease, hyperparathyroidism is associated with the development of osteoporosis.

P1039

RISK FACTORS FOR OSTEOPOROSIS AND OSTEOPOROTIC FRACTURES IN TYPE 2 DIABETES: THE ROLE OF ANTIDIABETIC DRUGS

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Objective. Identification of risk factors for the development of osteoporosis and osteoporotic fractures in patients with type 2 diabetes (T2DM), including taking into account the antidiabetic therapy.

Materials and methods. The study was conducted on the basis of a multidisciplinary hospital. We evaluated the body mass index minus fat, the percentage of adipose tissue using bioimpedansometry, bone mineral density (BMD) in the lumbar spine and proximal femur using dual-energy X-ray absorptiometry, the absolute risk of fractures over 10 years (FRAX) and/or chest and lumbar spine radiography, taking into account the recommendations of the International Osteoporosis Foundation for patients with T2DM.

Results. The study included 35 patients with T2DM and osteoporosis (54% women); the average age was 62.5±9.7 years (group I) and 30 patients with T2DM without osteoporosis, without statistically significant differences in age, gender (group II). The absolute risk of fracture according to the FRAX scale was 22.4±1.2% in group I and 12.9±2.2% in group II. A positive strong association was found between the level of glycated hemoglobin (failure to reach the target level), the presence of microvascular complications, and the FRAX score. Metformin was found to have a protective effect on the development of osteoporosis, especially postmenopausal osteoporosis (OR 3.3; 96% CI=0.001-0.08, p <0.05), indicating its potential bone-protective effect by reducing bone resorption and increasing osteoblast activity. Sodium-glucose cotransporter 2 inhibitors (SGLT-2Is) showed a weak negative association with osteoporosis (OR 2.8; 95% CI=0.81-0.99, p=0.04). Glyclazide demonstrated an increased risk of pathological fractures.

Conclusions. The main risk factors for fractures are poor metabolic control, the presence of nephropathy and retinopathy, and uncontrolled hypertension. The study results indicate the potential ability of metformin to protect bone tissue, which may be beneficial for patients with a high risk of fractures. On the other hand, the use of gliclazide should be approached with caution, especially in individuals with osteoporosis or a high risk of fractures. These results highlight the importance of an individualized approach to the treatment of patients with T2DM to maintain bone health.

P1040

THE EFFECTIVENESS OF DENOSUMAB IN THE TREATMENT OF OSTEOPOROSIS IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Objective. A comparative study of the antiresorptive efficacy of denosumab and oral bisphosphonates was conducted in patients with rheumatoid arthritis (RA) and osteoporosis (OP).

Materials and methods. 25 patients with RA were included in the study. All participants underwent lumbar spine and proximal femur densitometry using the Lunar Prodigy device. Automatically calculated T- and Z-scores were used to assess bone mineral density (BMD) (WHO, 1994; ISCD, 2007). Osteoporosis (T-score <-2.5 SD) was confirmed in all participants. The diagnosis of osteoporosis (T-score <-2.5 SD) was confirmed in all patients based on DXA data. All patients were in postmenopause. The average age was 60.5±8.5 years, and the average DAS28 activity was 4.17±0.95. The radiological stage of the disease was as follows: stage II in 8 patients, stage III in 10 patients, and stage IV in 7 patients.

14 patients received an injection of denosumab, and 13 patients received alendronate. The control group consisted of 13 patients with RA and OP who did not receive anti-resorptive therapy.

All patients had their serum β-CTX and osteocalcin (OC) levels quantified three times (before treatment and at 1 and 6 months) using a solid-phase enzyme-linked immunosorbent assay. Statistical data processing was carried out using standard methods.

Results. Analysis of bone tissue resorption markers (β-CTX and OC) revealed the following patterns. In the group of patients treated with denosumab, there was a significant decrease in β-CTX levels 1 month after treatment initiation (median 859.3 pg/mL vs. 725.3 pg/mL, p=0.047) and OC levels (median 12.9 vs. 8.39, p=0.045) compared to the group treated with bisphosphonates.

In the group of patients who took bisphosphonates, there was no significant decrease in markers of resorption compared to the denosumab group.

In the control group, there was an increase in the level of β-CTX (median 895.8 pg/ml vs. 915.3 pg/ml, p>0.051) and OC (median 21.8 vs. 26.21, p=0.028), indicating ongoing bone resorption in the absence of therapy.

Conclusions. Denosumab has shown its effectiveness in the treatment of osteoporosis in patients with rheumatoid arthritis, while having a more pronounced antiresorptive effect compared to oral bisphosphonates.

P1041

THE DOSE OF FEBUXOSTAT REQUIRED TO ACHIEVE THE TARGET LEVEL OF URIC ACID IN PATIENTS WITH NORMAL AND IMPAIRED RENAL FUNCTION

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Objective: to compare the dosage of Febuxostat (FS) required to achieve the target level of uric acid (UA) in blood serum in patients with gout with normal or near normal (glomerular filtration rate (GFR) >60 ml/min/1.73 m2) and moderately impaired (GFR 30–60 ml/min/1.73 m2) renal function.

Material and methods. The study included 159 patients with gout without urate-lowering drugs and MC levels >360 mmol/l. The patients were divided into two groups: GFR >60 ml/min/1.73 m2 (n=123) and GFR 30-60 ml/min/1.73 m2 (n=36). All received febuxostat 80 mg / day, if necessary, the dose was increased to 120 mg / day. The observation lasted 6 months. Changes in the MC level, achievement of the target level (<360 mmol/l) and the required dose of the drug were evaluated.

Results. Data from 152 patients who completed the study were analyzed: 34 of 36 patients with GFR 30–60 ml/min/1.73 m2 and 118 of 123 with GFR >60 ml/min/1.73 m2 . During the observation period, 129 (84.9%) of 152 patients reached the target level of serum UA: 101 (85.6%) of 118 patients with GFR >60 ml/min/1.73 m2 and 28 (82.4%) of 34 with GFR 30–60 ml/min/1.73 m2 (p=0.6). In the GFR >60 ml/min/1.73 m2 group in 68 (67.3%) patients FS dose of 80 mg/day was enough to achieve the target level of UA and in 33 (32.7%) the dose of 120 mg/day was requires, and for the GFR 30–60 ml/min/1.73 m2 group such doses were required in 13 (46.4%) and 15 (53.6%) patients, respectively (p=0.04). The dose of the prescribed drug after the adjustment until the target level of UA was reached was statistically lower in patients with GFR >60 ml/min/1.73 m2 (93.1±18.9 mg/day) than in the group of patients with GFR 30–60 ml/min/1.73 m2 (101.4±20.3 mg/day), p=0.04

Conclusion. The efficacy of FS does not decline in patients with gout and moderate decline in renal function. In more than 80% of cases it is possible to achieve the target level of UA in these patients, but it is associated with the need to use the maximum daily doses of the drug.

P1042

CLINICAL FEATURES IN CALCIUM PYROPHOSPHATE CRYSTAL DEPOSITION DISEASE PATIENTS WITH HYPERURICEMIA (DATA FROM A PILOT STUDY)

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There are suggestions that Hyperuricemia (HU) can often accompany calcium pyrophosphate deposition (CPPD) disease and affect the clinical manifestations of it. The aim was to determine the frequency of HU and its clinical significance in patients with CPPD.
Materials and Methods. The study included 213 patients with an established diagnosis of CPPD. The serum uric acid (sUA) level was determined in all patients, after which the patients were divided into 2 groups depending on the presence of sUA level (sUA level of ≥360 mmol/l was taken as HU): patients with CPPD and HU (n=75) and with CPPD and without HU (n=138). A comparative characteristic of the groups was carried out according to the clinical manifestations of the disease, comorbidity, therapy taken, and laboratory blood parameters.
Results. The groups did not differ in age. HU was detected in 75 out of 213 patients (35.2 %). The average sUA level in the group with CPPD and HU was 444.6±77.7 mmol/l, in the group with CPPD without HU – 273.2±53.0 mmol/l. In patients with CPPD and HU, chronic kidney disease was more frequently detected (18.7 % vs 8.7 %) and increased parathyroid hormone level (39.0 [29.8; 61.0] pmol/l vs 29.8 [18.4; 41.5] pmol/l). Hypertension, chronic heart failure (CHF), diabetes mellitus (DM) (for all p<0.05), and obesity (p<0,01) were also more frequently detected with CPPD and HU. Among the patients with CPPD and HU there were more people with chronic arthritis (60.0 % vs 45.0 %), and their ankle joints were more often involved (24.0 % vs 13.0 %). The median serum c-reactive protein level was also higher (3.8 [1.7; 6.7] mg/l vs. 2.1 [0.8; 5.9] mg/l).
Conclusion. The high frequency of HU in CPPD (35.2 %) and their combination with each other determines the high probability of comorbidity and metabolic disorders (obesity, hypertension, CHF, DM), and also creates conditions for the development of chronic inflammation.

P1043

COMPARISON OF ANAMNESTIC AND LABORATORY PARAMETERS IN PATIENTS WITH DIFFERENT PHENOTYPES OF HYPERURICEMIA (DATA FROM A PILOT STUDY)

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Asymptomatic hyperuricemia (AHU) and gout are pathological conditions characterized by elevated uric acid (UA) levels in the blood. Gout is characterized by acute arthritis attacks due to UA crystallization in the joints. Other differences between AHU and gout require further study.
Study objective: To identify key differences between AHU phenotypes.
Materials and methods: 220 patients with HU (UA >360 µmol/L) over 18 years of age were examined and divided into the following phenotypes: AHU; AHU with monosodium urate crystals (verified by ultrasound or synovial fluid analysis) (AHU+crystals); intermittent gout (G); tophaceous gout (G+tophi). Comparative characteristics of the groups included an assessment of the frequency of comorbidities, metabolic disorders, and the main laboratory parameters.
Results: According to phenotyping results, the group of patients with AHU included 40 people (18.2%), AHU+crystals - 26 (11.8%), G - 111 (50.5%), G+tophi - 43 (19.5). The average age in the groups was comparable (p = 0.5). An increase in the frequency of hypertension and nephrolithiasis was revealed in the series AHU without crystals - AHU+crystals - G - G+tophi (p = 0.0006 and p = 0.00006, respectively). Similar patterns were found for the mean serum levels of UA (p=0.00001), creatinine (p=0.0003), and GGT (p=0.0003), the mean values of which increased sequentially from AHU to G+tophi. The maximum mean levels of CRP (4.1 [2.3; 8.4] mg/L) were in patients with G and G+tophi (5.3 [2.3; 12.5] mg/L), which was significantly higher than in AHU patients, but statistically significantly different from the AHU+crystals group (p=0.04). GFR was lower in the G+tophi group compared to AHU (74.7±20.0 ml/min/1.73 m2 vs 86.8±17.9 ml/min/1.73 m2, respectively, p=0.02).
Conclusions: The incidence of hypertension, nephrolithiasis, serum GGT and creatinine levels increases as HU progresses from AGU to G+tophi, which may reflect the intensity of chronic microcrystalline inflammation.

P1044

ULTRASONOGRAPHIC SIGNS OF URATE CRYSTAL DEPOSITION IN THE RENAL PARENCHYMA IN PATIENTS WITH GOUT (PILOT STUDY DATA)

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Study objective: to obtain data on the frequency of urate crystal deposition detection in the renal parenchyma using ultrasound (US), and its association with clinical manifestations of the disease in patients with gout.
Materials and methods: the study included 25 patients, 23 (92%) of whom were male. Inclusion criteria were age >18 years and a confirmed diagnosis of gout. All patients underwent evaluation of laboratory blood and urine parameters, calculation of the estimated glomerular filtration rate (eGFR), and renal ultrasound using Doppler mapping.
Results: the mean age of the patients was 48.0±11.4 years. The mean uric acid level was 491.2±120.3 µmol/L. Chronic kidney disease stage >2 was detected in 68% of patients. Ultrasound changes characteristic of urate deposition in the renal medulla were found in 5 (20%) patients. These changes manifested as twinkling artifacts during color Doppler ultrasonography. The presence of urate crystals in the kidneys was associated with a longer disease duration and reduced eGFR.
Conclusion: the preliminary results of this pilot study demonstrate a high (20%) frequency of detecting signs of urate deposition in the renal parenchyma in patients with gout and suggest an association between the identified ultrasound changes and disease duration and decreased eGFR.

P1045

IMPLEMENTATION OF A FRACTURE LIAISON SERVICE REDUCES FRAGILITY FRACTURE RATES IN OLDER ADULTS: A FIVE-YEAR PROSPECTIVE COHORT STUDY

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Objective of this study was to evaluate the impact of a fracture liaison service (FLS), integrated into the structure of Trauma Center of Central City Hospital, on the incidence of fragility fractures and overall mortality after 12 months of follow-up.

Materials and Methods. A prospective cohort study with retrospective analysis was conducted among 2,915 patients aged 60 years and older who presented to the Trauma Center of Central City Hospital No.7, Yekaterinburg from January 2019, to December 2023, with diagnoses of hip fracture (ICD-10 S72.0–S72.2), humerus fracture (ICD-10 S42.2), wrist fracture (ICD-10 S52.5–S52.6), thoracic vertebral fracture (ICD-10 S22.0–S22.1), and lumbar vertebra fracture (ICD-10 S32.0, S32.7). An FLS was implemented at the Trauma Center in June 2021. The FLS included a trauma center, rheumatologist consultation office, and nurse coordinator. Data were analyzed to assess the incidence of new fractures and overall mortality after 12 months of follow-up.

Results The study included 2,915 primary patients aged 60 years and older, with a median age of 71[65;79] years. There were 2,507(86%) women, with a median age of 74[65;79], and 408(14%) men, with a median age of 69.5[64;78]. The distribution of fracture locations was as follows: 333 (11.4%) with a hip fracture, 774(26.6%) with humerus fracture, 1,582(54.3%) with wrist fracture, and 226(7.7%) lumbar and/or thoracic vertebrae fracture. In the period before FLS implementation, the annual rates of fragility fractures at 12 months were 5.9%(34/578) in 2019, 6.3%(32/507) in 2020, and 5.7%(31/546) in 2021. The average fragility fracture rate for the entire pre-FLS period was 5.9%(97/1,631). Following the implementation of the FLS in June 2021, annual fragility fracture rates at 12 months decreased to 4.5%(28/620) in 2022 and to 4.1%(27/664) in 2023. The average recurrent fracture rate for the post-FLS period was 4.3%(55/1,284). Implementation of the FLS was associated with a statistically significant reduction in fragility fracture rates (Pearson χ^2 test = 4.03, p = 0.045). The absolute reduction in fragility fracture rates was 1.6% (from 5.9% to 4.3%). The odds ratio (OR) of fragility fracture in the pre-FLS versus post-FLS group was 1.41 (95% CI: 1.01–1.98), indicating a relative risk reduction of approximately 30% compared to the pre-implementation period. Analysis of overall mortality at 12 months revealed no statistically significant differences between periods (Pearson χ^2 test = 0.50, p = 0.48). Mortality rates were: 2019: 5.9% (34/578), 2021: 5.9% (32/546), 2022: 5.3% (33/620), and 2023: 5.1% (34/664). Overall mortality rates at one year remained stable throughout the study period. Mortality data for 2020 were excluded due to the impact of the COVID-19 pandemic.

Conclusions The implementation of an FLS in the fragility resulted in a clinically significant 30% reduction in the annual recurrence rate in older adults with fragility fractures. These real-world results support the rationale for systematically integrating FLS programs in trauma centers as an effective intervention for secondary fracture prevention.

P1046

IMPACT OF ANTIOSTEOPOROTIC THERAPY ON FRAGILITY FRACTURE RATES IN ELDERLY PATIENTS: A 12-MONTH PROSPECTIVE COHORT STUDY FROM THE OUTPATIENT DEPATMENT FRACTURE LIAISON SERVICE

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Objective: to evaluate the effect of antiosteoporotic therapy on the incidence of fragility fractures after 12 months of follow-up in real clinical practice at the outpatient department of the Central City Hospital of Yekaterinburg.

Materials and Methods. A prospective cohort study was conducted among 564 patients aged 60 years and older who visited the Fracture Liaison Service at the outpatient depatment of the Central City Hospital No. 7, Yekaterinburg from June 2021 to June 2024 with diagnoses of hip fracture (ICD-10 S72.0–S72.2), humerus fracture (ICD-10 S42.2), wrist fracture (ICD-10 S52.5–S52.6), thoracic vertebral fracture (ICD-10 S22.0–S22.1), lumbar vertebral fracture (ICD-10 S32.0, S32.7), and fractures at other locations. Data analysis included an assessment of the incidence of new fractures over 12 months of follow-up and adherence to antiosteoporotic therapy. A comparison was made between two groups of patients who regularly took antiosteoporotic therapy (compliance greater than 80%) and those who did not take them or took them irregularly.

Results. The study included 564 primary patients aged 60 years and older, including 37(6.6%) men, with a median age of 70.8[66;74] years, and 527(93.4%) women, with a median age of 69.7[65;74]. The distribution of patients by fracture location was as follows: 33(5.9%) patients with hip fracture were included in the observation, 120(21.3%) patients with humerus fracture, 308(54.6%) patients with a wrist fracture, 128(22.6%) patients with lumbar and/or thoracic vertebrae fractures, and 8(1.4%) patients with fractures in other locations. At the initial consultation, all patients were recommended additional examination for further diagnosis of osteoporosis, and an appointment was made to start antiosteoporotic therapy.

A total of 318(56.4%) patients attended a follow-up consultation after 12 months, including 18(5.7%) men, median age 70.8[65; 76] years, and 300(94.3%) women, median age 70.2[66; 74]. Treatment adherence was assessed: 316(99.6%) patients regularly took calcium and/or vitamin D3 supplements. 232(72.9%) were taking the recommended antiosteoporotic therapy after 12 months, of which 176(75.9%) were taking it regularly (compliance greater than 80%) and 56(24.1%) were taking it intermittently. Of the 318 patients, 86(27.1%) did not start antiosteoporotic therapy, including 23 who were not prescribed it due to a low 10-year fracture risk, and 63 did not take it for various other reasons, such as not considering it necessary or not having heard of this medication from friends.

During the 12-month follow-up, 14 of the 318 patients experienced fragility fractures. Of these, 9(64.3%) had vertebral and large bone fractures (humerus and hip fracture). An analysis of the causes of fragility fractures was conducted in 14 patients. 12(85.7%) patients did not receive recommended antiosteoporotic therapy; one patient took antiosteoporotic therapy irregularly for less than 3 months during the observation period; and one patient regularly received pathogenetic treatment. A subgroup analysis of patients with fractures not receiving antiosteoporotic therapy revealed that 10(83.3%) patients had a high fracture risk and refused further examination and treatment; 2(16.7%) patients had a moderate risk; densitometry data showed osteopenia and

antiosteoporotic therapy was not indicated for them.
After 12 months, 176(55.3%) patients received regular antiosteoporotic therapy. Of these, only one patient experienced a fragility fracture within the first year after the index fracture. When comparing two groups (Group 1 (n=176): regular antiosteoporotic therapy intake, Group 2 (n=142): irregular intake/no antiosteoporotic therapy intake), statistically significant results were obtained (χ^2=15.2, p<0.001), confirming the effectiveness of antiosteoporotic therapy in preventing recurrent fractures. The relative risk (OR) of fractures without therapy was 17.6 (95% CI 2.3-136.4), with regular treatment 0.057 (95% CI 0.007-0.43).
Conclusions. The fragility fracture rate after 12 months was 4.4%, with 64.3% of these being severe osteoporotic fractures. The main cause of fragility fractures was treatment refusal. Regular antiosteoporotic therapy was associated with a 17-fold reduction in the risk of fragility fractures (0.6% vs. 9.2%, p<0.001). The main problems remain low attendance at follow-up examinations and non-compliance with recommendations in individuals at high risk of fractures.

P1047

ANALYSIS OF A SINGLE CENTRE 20-YEAR SURGICAL MANAGEMENT FOR GIANT CELL TUMOR OF BONE

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Giant cell tumor of bone (GCTB) is a locally aggressive and rarely metastasizing neoplasm which is mainly treated with surgery. The main issue with the selection of the most appropriate surgical procedure is its high recurrence rate, possible malignancy and location near the joints which may lead to significant functional impairment. In this retrospective study, we analyze data from patients with GCTB who were treated in the period 2000-2020 at the University Clinic for Orthopaedic Surgery-Skopje. This institution is a tertiary care center and referral center for bone tumors in North Macedonia. The following data of each patient were reviewed: age, sex, location of tumor, type of operative procedure, follow up and recurrence. In the study period, total of 80 patients were treated: 30 male (37,5%), 50 female (62,5%), age : 6-79 (median 35 years). There were total of 108 surgical procedures performed on 80 patients with GCTB. Follow- up 36-144 months (average 84 months), 2 patients lost during follow-up for non-related reasons, 13 patients (16,25%) with 17 local recurrences (21,25%). No metastases during the follow up period. After the initial surgical treatment, 23 patients required a second surgery. Group of 5 patients were treated with additional surgery. There was no significant association between age, sex, location of GCTB and type of operative procedure with local recurrence. There was a statistically significant association between Campanacci staging of tumor and local recurrence. We hope that our study provides useful insights into the management and prognosis of this challenging bone tumor.

P1048

BONE AND WEIGHT OUTCOMES WITH PIOGLITAZONE VS SEMAGLUTIDE IN OBESE POSTMENOPAUSAL WOMEN WITH TYPE 2 DIABETES MELLITUS

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Background: Type 2 diabetes mellitus (T2DM) in older adults is commonly associated with obesity, impaired bone quality, and increased fall risk. Pioglitazone is an insulin sensitizer frequently used in elderly patients due to its low hypoglycemia risk, but long-term use has been associated with decreased bone mineral density (BMD). Conversely, GLP-1 receptor agonists such as semaglutide induce significant weight loss, which may independently worsen BMD through reduced mechanical load. The net skeletal impact of these two agents in osteopenic elderly women remains insufficiently clarified.
Objective: To goal of this study is to compare the effects of pioglitazone and semaglutide on body weight changes and osteoporosis progression risk over 2 years in obese postmenopausal women with T2DM and baseline DEXA-confirmed osteopenia.
Methods: This prospective observational study included 204 postmenopausal women aged 55–75 years with T2DM (HbA1c 7.5–9%) and BMI >35 kg/m², all with osteopenia at baseline. Participants received either pioglitazone (n=103) or semaglutide (n=101), in addition to calcium 1200 mg/day and vitamin D 2000 IU/day. Clinical parameters, HbA1c, and BMI were reassessed every 3 months; vitamin D every 6 months; and DEXA annually. FRAX scores were calculated at baseline and annually.
Results: The pioglitazone group showed a slight increase in BMI (from 37 to 38 kg/m²), while the semaglutide group demonstrated significant weight reduction (from 36 to 29 kg/m²). Osteoporosis developed in 22 of 103 patients (21.4%) in the pioglitazone group versus 14 of 101 (13.9%) in the semaglutide group. No patient in either group progressed to a T-score below −3.0. HbA1c improvement was comparable in both groups, and FRAX risk scores did not meaningfully increase over the 2 year period. The difference in osteoporosis progression represented a trend but did not reach a clinically significant threshold. No severe hypoglycemic events were recorded.
Conclusion: Although osteoporosis progression was slightly higher in the pioglitazone group, the difference was modest and did not result in severe bone loss. Semaglutide was associated with favorable weight reduction, while pioglitazone provided stable glycemic control with minimal hypoglycemia risk, a clinically relevant benefit in elderly patients prone to falls. These findings suggest that pioglitazone remains an appropriate therapeutic option in select obese postmenopausal women with T2DM, particularly those at higher risk of hypoglycemia or falls, where fracture risk from hypoglycemic events may outweigh its modest negative impact on bone density.

P1049

IMMUNE DYSREGULATION IN PATIENTS WITH RADIATION-INDUCED OSTEONECROSIS OF THE JAWS (RONJ)

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Objective: The pathogenesis of Radiation-Induced Osteonecrosis of the Jaws (RONJ) involves a complex interplay of hypovascularity, tissue injury, microbial infection, and immune dysregulation. While systemic and local immunodeficiency components are recognized, the specific immunophenotype in RONJ patients requires deeper characterization.
Material and Methods: A comprehensive immunological analysis was performed alongside conservative management in 6 cancer patients with RONJ of the lower jaw. Treatment included oral antiseptic rinses, wound care, and hyperbaric oxygen therapy (as an adjunct). Immune assessment was expanded to include:
Local immunity: Analysis of oral fluid for sIgA, pro-inflammatory cytokines (IL-6, TNF-α), and microbial profiling.
Systemic immunity: Clinical blood count with advanced flow cytometry for T-cell subpopulations (CD4+, CD8+, T-reg, Th17), serum levels of immunoglobulins (IgA, IgG), and inflammatory markers (CRP).
Results:
Local Immunity: Markedly reduced sIgA levels were confirmed, indicating a compromised mucosal barrier. The phagocytic activity of neutrophils was impaired. A significant increase in pro-inflammatory cytokines (IL-6, TNF-α) was observed, confirming a dominant and persistent inflammatory milieu.
Systemic Immunity: Flow cytometry revealed a significant decrease in CD4+ T-helper cell count and an altered CD4+/CD8+ ratio, indicating T-cell dysregulation. Serum IgA was decreased, correlating with low local sIgA. Elevated CRP and IgG levels supported the presence of chronic systemic inflammation and antigenic stimulation.
Conclusions: In patients with RONJ, radiation-induced tissue damage and persistent microbial biofilm lead to a state of chronic non-resolving inflammation and secondary immune dysregulation. This is characterized by impaired mucosal immunity (sIgA deficiency), systemic T-cell dysfunction, and a pronounced humoral inflammatory response. These immunological alterations contribute to impaired bone healing and disease chronicity. Modern management should prioritize surgical removal of necrotic bone combined with targeted anti-inflammatory and antimicrobial strategies, addressing both the cause and the immunological consequences of RONJ.

P1050

ATYPICAL OSTEONECROSIS OF THE JAWS

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Objective: Atypical osteonecrosis of the jaws (AONJ) is a severe, treatment-resistant complication, underscoring its high clinical significance. Its relevance is indeed primarily linked to medication-related osteonecrosis of the jaw (MRONJ), which is associated not only with bisphosphonates (BPs) but also with other antiresorptive (denosumab) and antiangiogenic (sunitinib, bevacizumab) drugs, thereby expanding the at-risk population (Ruggiero et al., 2022). The problem of osteonecrosis related to drug abuse (most often associated with inhalational or intravenous use of methamphetamine and cocaine) is indeed recognized as a distinct clinical entity, often termed "drug-induced osteonecrosis of the jaw" or "drug jaw." Its pathogenesis is fundamentally different and involves a combination of severe vasospasm, chemical toxicity, immunosuppression, and poor oral hygiene (Dietrich et al., 2021). Both conditions lead to a similar outcome - exposed necrotic bone - but require fundamentally different approaches to diagnosis and management.
Material and Methods: The study presents data on 10 patients. To enhance scientific rigor, modern publications recommend clearly specifying diagnostic criteria (e.g., the American Association of Oral and Maxillofacial Surgeons criteria for MRONJ), follow-up periods, imaging methods (in addition to MSCT, cone-beam computed tomography [CBCT] is often used for better detail), and specific conservative therapy protocols (e.g., antibiotic regimens, antiseptic use). It is important to note that a comparison of two etiologically distinct groups (n=5 each) is preliminary and descriptive in nature; larger cohorts are required to identify statistically significant differences.
Results: As a result of the study, the following features were identified for bisphosphonate-related osteonecrosis of the jaws: prolonged course, the size of the lesion area depends on the trauma of the preceding extraction, the duration and composition of chemotherapy for the underlying disease, prolonged sequestration formation, and in most cases—a conservative treatment protocol with a positive prognosis upon achievement of sequestration. For jaw osteonecrosis in patients with drug addiction, the following are characteristic: rapidly progressive development of the disease, severe and prolonged course, a hypoergic type of inflammatory reaction, manifested by sluggish clinical progression and absence of a temperature response; in long-term processes, stages of exacerbation and remission alternate.
Conclusions: The assertion regarding the necessity of surgical treatment with primary reconstruction is more applicable to drug-induced osteonecrosis, where the extent of destruction is often significant, or to advanced cases of MRONJ (stage 3). For early-stage MRONJ, international guidelines (Ruggiero et al., 2022) prioritize conservative management. Thus, the key correction is a differentiated approach. The main conclusion from current literature is that the treatment strategy depends not only on the type of osteonecrosis but also on its stage, location, and the patient's overall condition. For MRONJ, the algorithm progresses from conservative to surgical management as the condition advances. For "drug jaw," surgical debridement is often a necessary but insufficient measure without addressing the underlying pathology.

P1051

STIMULATION OF OSTEOINTEGRATION IN THE "BONE-IMPLANT" SYSTEM BY ER:YAG LASER IRRADIATION: AN EXPERIMENTAL STUDY

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Objective: Dental implantation is the standard of care for edentulism, whose long-term success directly depends on the speed and quality of osteointegration. A key stage is the preparation of the bone bed, traditionally performed using rotary instruments. However, this method is associated with thermal and mechanical trauma, leading to the formation of a necrosis zone around the implant, which can slow down and impair bone remodeling processes.

In the search for less traumatic techniques, increasing attention is being paid to laser technologies. The Er:YAG laser (wavelength 2940 nm) has a unique property: its radiation is effectively absorbed by water and hydroxyapatite, ensuring precise bone ablation with minimal thermal damage (less than 1-2 μm of coagulation zone). Modern *in vitro* and *in vivo* research demonstrates that irradiation of bone with an Er:YAG laser stimulates the expression of osteogenic factors (BMP-2, RUNX2, type I collagen), increases the proliferative activity and differentiation of osteoblasts, and improves the surface topography of the bone, creating more favorable conditions for cell adhesion and migration. Furthermore, laser treatment (photobiomodulation) at sub-ablative parameters shows a stimulating effect on microcirculation and cellular metabolism.

Thus, the hypothesis of the study is that the use of an Er:YAG laser for preparing a bone bed for a dental implant, both as a standalone method and in combination with classical drilling, will reduce the invasiveness of the procedure, create a more favorable biological environment, and consequently, improve the quality and speed of osteointegration compared to the traditional mechanical technique, provided optimal laser parameters are used (e.g., energy 100-300 mJ/pulse, frequency 10-20 Hz, with water-air cooling).

Material and Methods: In this work, we used 27 non-pedigree female rats weighing 250-300g; an Er:YAG laser with a wavelength of 2940 nm; a physiodispenser; 27 titanium mini-implants; a set of surgical instruments; a microfocus X-ray diagnostic complex "PRDU-02"; and a panoramic digital radiography system Digora PCT. The animals were divided into three groups according to the method of bone bed preparation. In the first group, Er:YAG laser irradiation was used; in the second group, a rotary instrument was used; in the third group, a combination of tools from the first and second groups was used. Animals were euthanized at three time points: 7, 14, and 28 days after implant placement (3 animals from each group at each time point) for histological and histomorphometric analysis. Radiological assessment was performed on all animals prior to sample retrieval.

Results:

1. Histomorphometric analysis revealed statistically significant differences between the groups. On day 28, the percentage of bone-to-implant contact (BIC) was: Group 1 (Er:YAG): 65±5%, Group 2 (rotary instrument): 48±6%, Group 3 (combination): 55±4% ($p<0.05$ between Group 1 and Group 2). The volume of newly formed bone tissue (BV/TV) in the peri-implant area was also higher in Group 1.

2. Radiological assessment (microfocus radiography and panoramic radiography) correlated with histomorphometric data. Group 1 (Er:YAG laser): Radiographs showed the best visualization of bone trabeculae in the peri-implant area. Bone density was homogeneous, with no signs of destruction or sclerotic changes at the edges of the prepared site. The radiolucent zone between the bone and the implant was minimal or absent already at early observation points.

3. Group 2 (Rotary instrument): A zone of moderately increased density around the implant was visualized in the initial stages, possibly corresponding to reactive sclerosis. The trabecular pattern was less clear compared to the laser group. In some cases, a thin, uniform radiolucent line at the contact interface was observed.

4. Group 3 (Combined technique): The findings were similar to Group 1, but there was a tendency for a more rapid disappearance of any potential thin radiolucent zone remaining after mechanical preparation. Trabecular structure was actively and uniformly restored.

5. Dynamics of Bone Remodeling: In groups where the laser was used (1 and 3), signs of more active bone formation were observed: per unit area in the peri-implant zone, a greater number of thin, well-organized bone trabeculae, oriented according to load direction, were visualized compared to control Group 2. In Group 2, the pattern corresponded to a standard reparative process following mechanical trauma.

Conclusions: Based on the histomorphometric data, the use of Er:YAG laser irradiation for preparing the bone bed for an implant results in a statistically significant increase in the percentage of direct bone-to-implant contact (BIC) compared to the classical rotary technique. The combined method shows intermediate results. The qualitative radiological picture in the laser groups corresponds to more active and less traumatic bone remodeling. The use of microfocus radiography with magnification and digital image processing serves as an effective non-invasive screening method for assessing general bone architecture and the formed interface in the "bone-implant" system. Thus, Er:YAG laser treatment can be considered a promising method for improving osteointegration in dental implantology.

P1052

ELECTROMYOGRAPHIC STUDY OF TEMPORAL AND MASTICATORY MUSCLES AFTER BIOFEEDBACK THERAPY IN PATIENTS DURING ORTHODONTIC TREATMENT STAGES

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Objective: Contemporary understanding considers hypertonicity and parafunction of the masticatory muscles within the framework of the biopsychosocial model, where central sensitization (increased excitability of neurons in the central nervous system) plays a key role. Central sensitization is often initiated and maintained by peripheral factors, such as occlusal disturbances and stress. Electromyography remains the standard method for the objective assessment of muscle activity. For the treatment of myofascial pain dysfunction associated with hypertonicity, the biofeedback (BFB) method is recommended as

part of complex therapy. Its effectiveness, especially in combination with elements of cognitive-behavioral therapy, is confirmed by a number of randomized controlled trials and systematic reviews (Michelotti et al., 2020). BFB allows the patient to recognize and correct dysfunctional muscle patterns, leading to reduced pain and muscle tension.

Material and Methods: The study involved 22 patients with generalized increased tooth wear (wear index >1 according to Smith & Knight) against the background of diagnosed temporomandibular disorder (TMD) myofascial pain and/or awake bruxism. The patients' ages ranged from 20 to 40 years. They were divided into two groups. The first group underwent 10 training sessions on the "BIOFEEDBACK 2000 x-pert" system - an innovative wireless biofeedback system by "SCHUHFRIED"- during the stages of orthodontic treatment. The second group underwent orthodontic treatment without BFB therapy. For both groups, before and after the intervention, an electromyographic examination was conducted using surface electrodes to study the peripheral innervation of the masticatory muscles. The total interference EMG of the masticatory and temporal muscles on both sides was recorded. The muscles were examined at rest, during inhalation, and under voluntary clenching. The level of statistical significance was set at $p < 0.05$.

Results: The study revealed the greatest decrease in masticatory muscle activity in the group of patients undergoing BFB therapy during orthodontic treatment stages. In the second group, masticatory muscle activity decreased to a lesser extent. A statistically significant ($p<0.01$) greater reduction in the amplitude of bioelectrical activity (BEA) of the masticatory muscles during dental arch clenching was recorded in the BFB group (an average reduction of 35%) compared to the control group (a reduction of 10%). The average BEA of the temporal muscles after BFB therapy was 1070±13 μV; for the masticatory muscles, this indicator was 880±12 μV. These absolute EMG values are specific to the conditions of this study.

Conclusions: The application of the biofeedback method as part of orthodontic treatment for patients with increased generalized tooth wear shows positive results, demonstrating a statistically significant reduction in masticatory muscle hypertonicity compared to the control group. This positive effect on muscle regulation can favorably influence treatment outcomes and long-term stability.

P1053

CLINICAL EFFICACY OF GUIDED TISSUE REGENERATION IN MANAGING CHRONIC PERIODONTITIS

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Objective: Achieving bone regeneration in patients diagnosed with periodontitis remains a significant priority in contemporary dental practice. This study aims to evaluate the effectiveness of the Guided Tissue Regeneration (GTR) technique, utilizing the "Bio-Gide" barrier membrane, for the remediation of periodontal bone defects.

Materials and Methods: The study cohort comprised nine individuals with moderate chronic periodontitis. Following a comprehensive diagnostic phase - which included periodontal pocket depth probing and assessment of alveolar bone status via orthopantomography (OPG), along with an initial phase of non-surgical therapy - surgical treatment was performed. Five subjects underwent GTR procedures with the placement of a "Bio-Gide" collagen membrane, while the remaining four received a conventional flap operation supplemented with an osteoplastic graft material.

Results: The investigation findings demonstrated that the GTR protocol yielded a mean bone fill reaching approximately 80% of the original defect volume. In contrast, bone reconstruction following the flap surgery with bone grafting did not exceed 55%.

Conclusions: Therefore, the application of the Guided Tissue Regeneration method facilitates considerable alveolar bone reconstruction, substantially enhancing the overall quality and outcomes of the therapeutic intervention.

P1054

FUNCTIONAL RECOVERY AFTER CONSERVATIVE MANAGEMENT OF A SACRAL FRAGILITY FRACTURE: THE ROLE OF TARGETED LUMBOPELVIC REHABILITATION

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Objective To describe functional recovery following a structured, targeted rehabilitation programme in a patient with a **sacral fragility fracture** managed conservatively, with particular emphasis on pain reduction, lumbopelvic stability, and mobility improvement.

Materials and Methods A 72-year-old female presented with severe lumbosacral pain in the absence of trauma and was diagnosed with a sacral fragility fracture. Conservative management included analgesic therapy and temporary reduction of weight-bearing, followed by a four-week physical medicine and rehabilitation programme. The intervention comprised core stabilisation and lumbopelvic control exercises, sacroiliac joint unloading strategies, progressive verticalisation, posture retraining, and graded gait training. Outcomes were assessed using the Visual Analogue Scale (VAS), Oswestry Disability Index (ODI), and the Timed Up and Go (TUG) test.

Results After four weeks of rehabilitation, pain intensity decreased significantly (VAS from 8/10 to 4/10). At ten weeks, functional disability improved from severe to mild (ODI reduced from 56% to 22%), while mobility performance improved, with TUG time decreasing from 24 to 13 seconds. The patient regained the ability to walk continuously for more than 20 minutes. Enhanced lumbopelvic stabilisation played a key role in reducing pain fluctuations and restoring tolerance to functional loading.

Conclusion A structured rehabilitation programme focused on core stabilisation and optimisation of lumbopelvic biomechanics can significantly enhance functional recovery in patients with sacral fragility fractures. Individualised progression under physiatrist supervision is essential for achieving favourable clinical outcomes.

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Disclosures: The author reports no conflicts of interest.

Keywords: sacral fragility fracture; conservative management; lumbopelvic rehabilitation; functional recovery.

P1055

REHABILITATION CHALLENGES IN AN ATYPICAL PROXIMAL HUMERUS FRACTURE ASSOCIATED WITH LONG-TERM BISPHOSPHONATE THERAPY IN A POSTMENOPAUSAL WOMAN

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Objective
To present a rare case of an atypical proximal humerus fracture in a postmenopausal woman receiving long-term bisphosphonate therapy and to highlight rehabilitation-related challenges associated with delayed healing and altered shoulder biomechanics.
Material and Methods
A 67-year-old woman with more than four years of bisphosphonate therapy presented with shoulder pain and functional limitation following a low-energy incident. Imaging revealed an atypical fracture pattern with cortical thickening. Surgical fixation was performed, and an individualised physical medicine and rehabilitation programme was initiated three weeks postoperatively. The programme included gradual shoulder range-of-motion exercises within pain-free or tolerated limits, scapular stabilisation training with emphasis on restoring scapulothoracic rhythm, closed-chain proprioceptive exercises, and a progressive transition from isometric to concentric strengthening. Outcomes were assessed using the Disabilities of the Arm, Shoulder and Hand (DASH) score and active range-of-motion measurements.
Results
Initial rehabilitation progress was limited by signs of delayed fracture healing. After five weeks of rehabilitation, pain intensity decreased significantly (VAS from 7/10 to 3/10). Active shoulder flexion improved from 45° to 110°, and abduction from 40° to 100°. The DASH score improved from 72 to 34 points. Improved scapular stabilisation contributed substantially to enhanced movement control and reduction of secondary pain.
Conclusion
Atypical humeral fractures associated with long-term antiresorptive therapy present significant rehabilitation challenges. An individualised, gradually progressed rehabilitation programme focused on scapulothoracic control and carefully monitored loading can lead to meaningful functional improvement. Early and continuous physiatrist involvement is critical for achieving optimal recovery.
Keywords
atypical humeral fracture; bisphosphonate therapy; rehabilitation; scapular stabilisation.
Acknowledgments:
None.
Disclosures:
The authors report no conflicts of interest.

P1056

COMPREHENSIVE REHABILITATION APPROACH IN A PATIENT WITH SEVERE SARCOPENIA FOLLOWING OSTEOPOROTIC VERTEBRAL COMPRESSION FRACTURES: A 5-WEEK INTENSIVE INTERVENTION PROTOCOL

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Objective
To evaluate the effectiveness of a short, intensive, and individualised rehabilitation programme in a patient with severe sarcopenia following osteoporotic vertebral compression fractures, with emphasis on rapid improvement in muscle strength, postural stability, and functional capacity.
Material and Methods
A 74-year-old man with osteoporotic compression fractures at T11–L2 and clinically significant sarcopenia, characterised by reduced muscle strength, impaired posture, balance deficits, and low endurance, participated in a five-week intensive physical medicine and rehabilitation programme. The intervention included targeted strengthening of paravertebral and abdominal muscles, postural exercises aimed at improving thoracic extension and activating trunk stabilisers, progressive core stabilisation training, balance and statodynamic control exercises, and moderate aerobic activity delivered in short, supervised intervals. Functional assessment was performed using the Short Physical Performance Battery, the Timed Up and Go test, and the Five-Times Sit-to-Stand test.
Results
After five weeks of rehabilitation, significant functional improvements were observed. The Short Physical Performance Battery score increased from 4/12 to 7/12 points. Timed Up and Go performance improved from 22 to 16 seconds, while Five-Times Sit-to-Stand time decreased from 23 to 16 seconds. Clinical evaluation confirmed improved postural control, reduced lumbar pain during standing and walking, and increased tolerance to physical activity. The patient regained stable and independent functional mobility in daily activities.
Conclusion
A short but intensive multimodal rehabilitation programme can lead to substantial functional improvement in patients with sarcopenia following osteoporotic vertebral compression fractures. Interventions focused on postural correction, trunk stabilisation, and gradual progression of physical activity enable rapid clinical gains and meaningful improvement in functional independence.
Keywords
sarcopenia; vertebral compression fractures; rehabilitation; functional recovery.
Acknowledgments:
None.
Disclosures:
The author reports no conflicts of interest.

P1057

OBESITY, WEIGHT REDUCTION THERAPY AND BONE MINERAL DENSITY IN PSORIATIC AND RHEUMATOID ARTHRITIS: A COMPLEX INTERPLAY BETWEEN INFLAMMATION AND OSTEOPOROSIS

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Objectives:
To evaluate the impact of obesity and weight reduction therapy on bone mineral density (BMD) in patients with psoriatic arthritis (PsA) and rheumatoid arthritis (RA), and to explore the interaction between adiposity, inflammatory burden and secondary osteoporosis.
Material and Methods:
A cross-sectional observational study included 88 patients with inflammatory arthritis, divided into three groups: PsA with obesity (n=32), RA with obesity (n=30), and PsA/RA patients with prior weight reduction therapy (n=26). Obesity was defined as BMI ≥30 kg/m^2. The cohort comprised 58 women (65.9%) and 30 men (34.1%), with a mean age of 51.8±10.6 years and mean disease duration of 8.1±4.5 years.
Disease activity was assessed using DAPSA (PsA) and DAS28-CRP (RA). Body composition was evaluated by BMI and waist circumference. Bone status was assessed by DXA at the lumbar spine (L1-L4) and femoral neck. Weight reduction therapy included structured hypocaloric diet ± pharmacological anti-obesity treatment for ≥12 months. Multivariate regression models and ROC analyses were applied.
Results:
Reduced BMD (osteopenia or osteoporosis) was identified in 52.3% of the total cohort, with osteoporosis present in 18.2%. Despite higher BMI, obese PsA and RA patients showed lower lumbar spine BMD compared with weight-reduced patients (-0.94±0.12 vs -0.61±0.10 T-score, p=0.004), indicating impaired bone quality.
Weight reduction therapy was independently associated with higher lumbar spine BMD (β=0.38, p=0.002) after adjustment for age, sex, disease duration and glucocorticoid exposure. Obesity was associated with increased inflammatory activity and bone loss (OR for low BMD 2.91, 95% CI 1.32-6.41, p=0.008).
Inflammatory activity correlated negatively with BMD (DAS28/DAPSA vs lumbar spine BMD: r=-0.46, p<0.001). ROC analysis demonstrated good predictive performance of combined BMI and disease activity indices for identifying osteoporosis (AUC 0.83, 95% CI 0.74-0.92).
Conclusions:
In psoriatic and rheumatoid arthritis, obesity is associated with increased inflammatory burden and reduced bone mineral density, despite higher body weight. Weight reduction therapy appears to mitigate inflammation-driven bone loss and is associated with improved BMD. These findings highlight obesity as a modifiable risk factor for secondary osteoporosis in inflammatory arthritis and support integrated strategies targeting both adiposity and inflammation to preserve skeletal health.

P1058

PRESERFLO MICROSHUNT WITH TRIAMCINOLONE SUB-TENON APPLICATION IN MANAGEMENT OF GLAUCOMA PATIENTS

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Background: Preserflo Microshunt is a recent simple way in glaucoma management but can adding triamcinolone sub-tenon get better results and reduce post operative complications?!
Methods: we did randomized controlled clinical study, eyes with medically uncontrolled or drug intolerant glaucomatous patients, who had Preserflo glaucoma mini-shunt. The eyes were randomly divided to two group. In the first group 3 corneal shield sponges soaked in 0.5 mg Mitomycin C were applied for 3 minutes. In the second group 3 corneal shield sponges soaked in 0.5 mg Mitomycin C were applied for 3 minutes and 10 mg Triamcinolone injected in sub-tenon space. The main outcome was the postoperative intraocular pressure (IOP). Secondary outcomes were, prevalence of complications, number of postoperative glaucoma molecules, and secondary interventions.
Results: A total of 67 patients were included in the final analysis. Mean IOP was lower in the triamcinolone sub-tenon group at most follow-up visits, however, the difference was bigger at 3 months (11.8 mmHg versus 13.6 mmHg) and 9 months (15.5 mmHg versus 20.5 mmHg). Linear mixed model showed that IOP was significantly lower in the triamcinolone sub-tenon group throughout the study period (P = 0.028). Similarly, there was significant less incidence in the post operative complications between the triamcinolone sub-tenon group compared to non-triamcinolone sub-tenon group (P = 0.003).
Conclusions: Triamcinolone sub-tenon application with Preserflo Microshunt surgery is more effective in IOP reduction and decrease the incidence of complications.
Keywords: IOP, MD, Glaucoma, Preserflo Microshunt, triamcinolone sub-tenon.

P1059

ASSOCIATIONS BETWEEN CONTROLLING NUTRITIONAL STATUS AND MORTALITY IN OSTEOPOROSIS: EVIDENCE FROM NHANES, 2005-2018

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Background: Malnutrition and immune dysregulation are common in patients with osteoporosis but are often overlooked and may contribute to poor outcomes. The Controlling Nutritional Status (CONUT) score is a simple instrument reflecting both nutritional and immune status, but its prognostic value in osteoporosis remains unclear.
Methods: This retrospective, observational study included data of adults aged ≥50 years with osteoporosis extracted from three two-year cycles of the National Health and Nutrition Examination Survey (NHANES), 2005–2010, 2013–2014, and 2017–2018. Osteoporosis was defined as femoral neck T-score < −2.5. CONUT scores were calculated from participants' serum albumin, total cholesterol, and total lymphocyte count, and high CONUT was defined as ≥2. All-cause and cardiovascular disease (CVD)-

related mortality through December 31, 2019, was ascertained via the National Death Index. Weighted Cox regression models were used to estimate hazard ratios (HRs) for mortality outcomes.
Results: Among 871 participants representing 5.86 million US adults with osteoporosis, 40.7% had high CONUT scores. During a median follow-up of 9.8 years, high CONUT scores were associated with increased all-cause (53.2% vs 30.9%, p<0.001) and CVD mortality (17.6% vs 8.2%, p<0.001). Multivariable analysis, after adjustments for possible confounders, high CONUT scores were independently associated with higher all-cause (HR 1.64; 95% CI: 1.25–2.14) and CVD mortality (HR 1.91; 95% CI: 1.15–3.19). Associations with all-cause mortality were consistent across sex, diabetes, and CKD subgroups and associations with CVD mortality were most pronounced among females and patients with diabetes.
Conclusion: The CONUT score independently predicts all-cause and CVD mortality in adults with osteoporosis, providing a practical tool for risk stratification and guiding early interventions.

P1060

PREVENTIVE DENTAL VISITS AND MEDICATION-RELATED OSTEONECROSIS OF THE JAW IN RHEUMATOID ARTHRITIS PATIENTS RECEIVING OSTEOPOROSIS THERAPY

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Objectives
To investigate the association between dental visit status and medication-related osteonecrosis of the jaw (MRONJ) in rheumatoid arthritis (RA) patients receiving osteoporosis (OP) treatment.
Materials and Methods
We retrospectively studied RA patients receiving OP treatment who visited our outpatient clinic between January and December 2025. Dental visit status was categorized as preventive visits, restorative visits, or no regular visits. MRONJ was defined as stage ≥1 according to AAOMS criteria. In patients with MRONJ, clinical variables—including demographics, RA treatments, glucocorticoid use, disease activity, OP medications, and dental visit status—were assessed at the time of MRONJ onset.
Results
Among 276 RA patients receiving OP treatment (241 women), dental visit status was preventive visits in 59 patients, restorative visits in 54, and no regular visits in 147; status was unknown in 16. MRONJ was identified in 15 patients (13 women), with a mean age of 79.6 years at onset. None of the MRONJ patients had preventive dental visits. Five patients had restorative visits, while ten had no regular visits. Thirteen patients were treated with biologic or targeted synthetic DMARDs, and nine received low-dose glucocorticoids (prednisolone 2–5 mg/day). OP treatments included bisphosphonates, denosumab, and romosozumab, with treatment durations ranging from 3 months to over 10 years.
Conclusions
RA patients are particularly susceptible to infection-related complications, including MRONJ, due to the high prevalence of periodontal disease[1] and the established role of infection in RA pathogenesis[2]. In this cohort of RA patients receiving OP treatment, engagement in preventive dental visits was low, despite infection being the strongest known risk factor for MRONJ[3]. All MRONJ cases occurred exclusively in patients without preventive dental care, indicating that a high-risk population remained clinically unprotected. Insufficient preventive dental management may therefore facilitate infection-driven MRONJ. Systematic integration of preventive dental visits into OP management for RA patients should be prioritized.
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P1061

MUSCLE WEAKNESS AND BONE MICROARCHITECTURE IN POSTMENOPAUSAL WOMEN

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Objetive: To examine bone health parameters assessed by dual-energy X-ray absorptiometry (DXA) and trabecular bone score (TBS), as well as muscle strength measured by handgrip strength, in postmenopausal women.
Material and methods: Observational cross-sectional study was conducted included 73 postmenopausal women aged 49 to 85 years. Demographic, anthropometric, clinical and biochemical variables were studied. Bone mineral density (BMD) in the lumbar spine (CL), femoral neck and total hip was determined using DXA and TBS iNsight software. Hand grip strength of the dominant hand (kg/cm2) was measured with a Jamar manual hydraulic dynamometer. Hand grip below the age- and sex-specific 5th percentile, according to normative reference values from a Spanish population[1], was defined as low muscle strength. Data were analyzed using SPSS version 25.0.
Results: 73 postmenopausal women were studied. The mean age was 66.6 ± 9.3 years, and the mean body mass index (BMI) was 32.1 ± 5.3 Kg/m2. Low muscle strength was present in 43% of participants. Handgrip strength was positively correlated with TBS (R = 0.321, p < 0.01) and total hip BMD (R = 0.268, p < 0.05).
Conclusion: Reduced muscle strength was significantly associated with decreased bone mass and impaired bone microarchitecture in postmenopausal women.
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P1062

SIMULTANEOUS MEASUREMENT OF 1-HYDROXYLATED AND 24-HYDROXYLATED VITAMIN D METABOLITES BY LIQUID-CHROMATOGRAPHY TANDEM MASS-SPECTROMETRY – AN INNOVATIVE TOOL IN CHRONIC KIDNEY DISEASE MANAGEMENT

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Bone and mineral metabolism is altered in chronic kidney disease (CKD) patients. As kidney function declines, renal 1-alpha- and 24-hydroxylation of vitamin D metabolites decreases thus limiting the utility of 25-hydroxyl-vitamin D (25[OH]D) as a marker for patients vitamin D status. The analysis of additional metabolites could facilitate a functional assessment of vitamin D status that potentially correlates better than 25(OH)D with bone and mineral metabolism in CKD patients. Therefore, we developed and validated a liquid-chromatography tandem mass-spectrometry (LC-MS/MS) method capable of tracking simultaneously 25-hydroxyvitamin D (25[OH]D), 1,25-dihydroxy vitamin D (1,25[OH]2D), 24,25-dihydroxyvitamin D (24,25[OH]2D), and 1,24,25-trihydroxyvitamin D (1,24,25[OH]3D). Sample preparation combined protein precipitation, liquid-liquid-extraction and derivatization. A Nexera UHPLC (SHIMADZU, Kyoto, Japan) with a Kinetex® 5 µm F5 100 Å LC column (150×4.6 mm, Phenomenex, Torrance, CA, USA) coupled to a QTRAP 6500 (SCIEX, Framingham, MA, USA) was used for analysis. Clinical utility was demonstrated analyzing serum from individuals with 24-hydroxlase deficiency, kidney donors and recipients. For all metabolites, linear ranges and limits of quantitation cover the concentrations range physiologically observed in humans. Recovery ranged between 90.8 to 105.5% for all four metabolites. Imprecision was ≤11.5% across the entire analytical range for all metabolites. Analysis of patient samples showed that kidney transplantation and 24-hydroxylase deficiency are associated with profound alterations of 24-hydroxylated, but not 1alpha-hydroxylated, vitamin D metabolites. Hence, the simultaneous measurement 25(OH) D and its 1-alpha and 24-hydroxlated metabolites by LC-MS/MS is a promising tool to identify abnormalities in vitamin D metabolism.

P1063

OPTIMIZING DEEP LEARNING-ENHANCED OPPORTUNISTIC OSTEOPOROSIS SCREENING FROM CHEST X-RAYS IN AUSTRALIA: IMPACT OF FOLLOW-UP AND TREATMENT ADHERENCE ON CLINICAL AND ECONOMIC OUTCOMES

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Introduction: Opportunistic osteoporosis screening using artificial intelligence (AI) on routine chest radiographs offers a low-burden way to improve detection and treatment uptake. This study evaluated the cost-effectiveness of AI-enhanced screening versus no screening in Australian women aged ≥50 years, focusing on health outcomes and the added value of improved follow-up and adherence.

Methods: A microsimulation-based Markov model estimated lifetime costs and quality-adjusted life years (QALYs) from the Australian healthcare perspective, expressed in 2025 Australian dollars. The model incorporated AI screening performance on chest radiographs, rates of DXA confirmation, treatment initiation, and real-world medication persistence. Scenario analyses evaluated the potential effect of optimized follow-up pathways and enhanced adherence on clinical and economic outcomes.

Results: AI-enhanced opportunistic screening was associated with better health outcomes (+0.0025 QALYs and −0.0043 fractures per patient) and reduced lifetime costs (−AUD59), making it a dominant strategy compared with no screening. When scaled to 10,000 screened women aged ≥50 years, the model projected prevention of 43 fractures, 25 additional life-years, 25 QALYs gained, and healthcare savings of AUD590,000. Enhanced follow-up and adherence produced four- to five-fold increases in clinical benefit relative to the base-case analysis.

Discussion: AI-enhanced osteoporosis screening using routine chest X-rays appears cost-effective and potentially cost-saving within the Australian healthcare system. Linking AI detection to timely DXA, treatment initiation, and sustained adherence substantially amplifies its clinical value. These findings highlight that follow-up and persistence are not ancillary but essential components for realizing the full potential of AI-driven opportunistic screening programs.

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PREVALENCE OF COMPARTMENT-SPECIFIC BONE DENSITY IMBALANCES AT THE PROXIMAL FEMUR IN A REFERENCE POPULATION

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Objectives

Bone compartmental imbalance in the proximal femur may reflect distinct patterns of bone strength not captured by standard DXA metrics, and its assessment may be helpful in the context of clinical fracture risk assessment or treatment decision-making. The aim of the presented analysis was to quantify the prevalence of significant imbalances between cortical and trabecular bone compartments at the proximal femur in a reference population using three-dimensional DXA (3D-DXA).

Materials and methods

Hip DXA scans from 1366 adults (1015 women, 351 men) enrolled in the Spanish multicentre SEIOMM-3D-DXA project were analysed with 3D-Shaper software (v2.14, 3D-Shaper Medical) [1]. Trabecular volumetric (v) bone mineral density (BMD) and cortical surface (s) BMD Z-scores were calculated from age- and sex-specific reference curves. Compartmental imbalance was defined as the absolute difference between trabecular and cortical Z-scores exceeding the least significant change (LSC), calculated using precision data [2].

Results

The LSC for the Z-score difference was 0.397. Overall, 52.0% of females and 48.7% of males had a significant Z-score difference value (**Figure 1**). 26.3% of females and 25.4% of males exhibited a significant positive Z-score difference, indicating trabecular dominance (green bins), while 25.7% of females and 23.4% of males showed a significant negative Z-score difference, indicating cortical dominance (red bins). Both imbalance patterns were observed with similar frequency across age groups.

Conclusions

Nearly half of individuals in a reference population exhibit significant compartmental imbalances at the proximal femur that are not detectable by standard DXA. 3D-DXA enables compartment-specific assessment of bone density and may provide clinically relevant information beyond areal BMD. Further investigations should be undertaken to determine the effect of these differences in bone strength.

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Acknowledgments

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Disclosures

M.I. Bracco is an employee of 3D-Shaper Medical; L. Humbert is an employee and stakeholder of 3D-Shaper Medical.

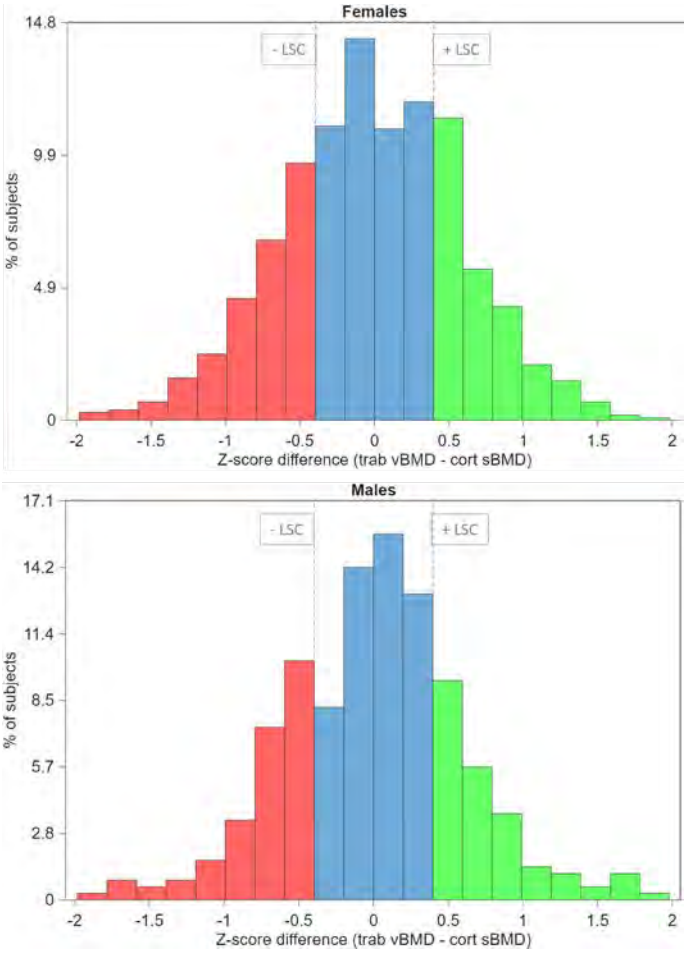


Figure 1. Z-score differences distribution in female (top) and male (bottom) subjects, expressed as percentage of subjects.

P1066

EFFECTIVENESS OF ADJUNCTIVE SMALL NEEDLE KNIFE THERAPY FOR FROZEN SHOULDER: A RANDOMIZED CONTROLLED TRIAL

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Objective

To evaluate the efficacy of adjunctive small needle knife (SNK) therapy combined with rehabilitation on pain, shoulder mobility, and functional outcomes in patients with frozen shoulder.

Material and Methods

In this prospective randomized controlled trial, 70 patients with idiopathic frozen shoulder were randomized (1:1) to receive either SNK therapy plus rehabilitation or rehabilitation alone. SNK therapy was administered once weekly for three weeks. Rehabilitation included hot-pack thermotherapy and transcutaneous electrical nerve stimulation. Assessments were conducted at baseline, 3 weeks, and 3 months. Primary outcomes were pain score (visual analogue scale, VAS) and shoulder passive range of motion. Secondary outcomes included the Shoulder Pain and Disability

Index (SPADI) and the World Health Organization Quality of Life Brief Version (WHOQOL-BREF).

Results

At 3 weeks, a greater proportion of patients in the SNK group achieved clinically meaningful pain reduction (≥1-point VAS decrease) compared with controls (75.0% vs. 34.5%, *p*=0.001). Pain reduction from baseline to 3 months was greater in the SNK group (−4.13±2.11 vs. −2.33±2.21, *p*=0.012). Passive shoulder flexion range at 3 weeks was significantly higher in the SNK group (127.61±16.81° vs. 117.48±18.32°, *p*=0.029). Total SPADI scores were also lower in the SNK group at 3 weeks (45.48±18.73 vs. 56.21±22.03, *p*=0.044). No significant between-group differences were observed in WHOQOL-BREF scores.

Conclusion

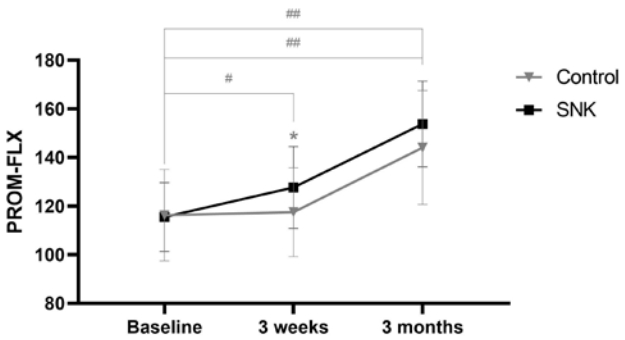
Adjunctive SNK therapy combined with rehabilitation significantly improved pain, shoulder mobility, and functional outcomes in frozen shoulder, with sustained benefits at 3 months.

Acknowledgments

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Disclosures

No conflicts of interest declared.



P1067

EVALUATION OF FRAX INDEX FOR EARLY OSTEOPOROSIS RISK ASSESSMENT IN PATIENTS UNDERGOING HAEMODIALYSIS

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Objective

To assess the usefulness of FRAX calculated without bone mineral density (BMD) input for early fracture-risk stratification in adults aged ≥40 years on haemodialysis, including estimation of FRAX-defined high-risk prevalence and its associations with demographic, clinical, and laboratory characteristics.

Materials and Methods

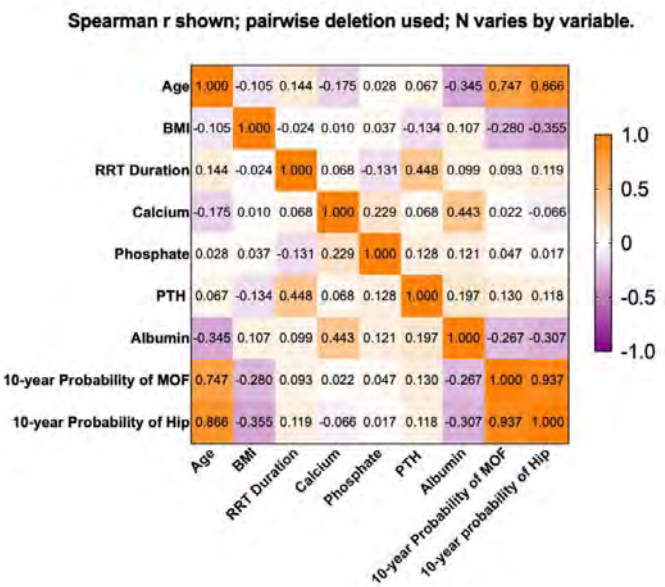
This observational cross-sectional study included adults aged ≥40 years receiving haemodialysis at a tertiary care centre. Data on comorbidities, including rheumatoid arthritis, diabetes mellitus, and hypertension, were collected. FRAX 10-year probabilities were calculated without BMD input. High fracture risk was defined as major osteoporotic fracture (MOF) ≥20% and/or hip fracture ≥3%. Statistical analyses were performed in GraphPad Prism.

Results

Among 76 haemodialysis patients, 6 (7.9%) met the FRAX high-risk definition. FRAX-high patients were older than not-high patients (median 70 vs 56 years; p=0.0014). Dialysis vintage and CKD–MBD markers were not significantly different, including RRT duration (median 61.0 vs 30.5 months; p=0.1678), calcium (9.16 vs 9.14 mg/dL; p=0.637), phosphate (6.10 vs 5.05 mg/dL; p=0.476), and PTH (178.7 vs 286.0 pg/mL; p=0.628; PTH available in 55 patients, including 4 FRAX-high). Albumin was borderline lower in FRAX-high patients (3.57 vs 3.84 g/dL; p=0.0535). FRAX correlated strongly with age (MOF r=0.747; hip r=0.866; both p<0.001) and inversely with BMI (MOF r=−0.280, p=0.014; hip r=−0.355, p=0.0017) as well as albumin (MOF r=−0.267, p=0.0206; hip r=−0.307, p=0.0075). FRAX-high status was more frequent in women than men (21.7% vs 1.9%; p=0.0086), and all FRAX-high patients had diabetes (p=0.0265).

Conclusion

FRAX without BMD identified a small high-risk subset in haemodialysis patients. Risk estimates were largely driven by age and showed modest inverse associations with BMI and albumin, whereas dialysis vintage and CKD–MBD biochemistry showed little association. FRAX may support pragmatic first-line fracture-risk stratification when DEXA is unavailable, but validation in larger cohorts with imaging and fracture outcomes is needed.



P1068

TERIPARATIDE BIOSIMILAR IN REAL WORLD - A SINGLE CENTRE EXPERIENCE

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Teriparatide, a recombinant human parathyroid hormone, significantly reduces the risk of fractures in patients with postmenopausal and glucocorticoid-induced osteoporosis. In the UK, NICE has restricted its use to high-risk patient groups. This project aims to analyse the use of Teriparatide (both originator and biosimilar) at a large University teaching hospital with 55% ethnic catchment population, providing insight into the real-world patient demographic and evaluating the treatment's effectiveness.

A retrospective analysis was conducted to evaluate the use of Teriparatide in patients receiving treatment between 2014-2024 at our unit. Full demographic and clinical data was collected using electronic health records and live multipurpose database. Dual-energy X-ray absorptiometry (DXA) scan results were reviewed to assess bone mineral density (BMD) both before the initiation of Teriparatide treatment and after completion. Data was analysed to provide insights into the demographic characteristics of the treated population, the efficacy of teriparatide based on BMD improvements, treatment adherence, and local compliance with national guidelines.

Over the ten-year study period, a total of 480 patients were prescribed Teriparatide - all women with an average age of 74 years. Alendronate was the most common first-line bisphosphonate. Participants suffered three fractures on average prior to commencing therapy. 224/480 were prescribed teriparatide biosimilar. Pre-treatment, the average T score was -2.7 for the lumbar spine and hip with -2.4 for the femoral neck. Post-treatment, these values improved to -2.2, -2.4 and -2.3 respectively. Treatment was well tolerated with 63.5% completing two years of therapy. During mean follow up of three years, only 10 patients (0.02%) suffered a fragility fracture.

To our knowledge, this is the largest real world study of Teriparatide in nearly 500 patients. Our study demonstrates real world use of Teriparatide in a multi-ethnic diverse setting. It shows that Teriparatide is used predominantly in complex, multi-morbid older individuals with several prior fractures. Despite that, Teriparatide remains effective for a wide range of individuals including those with inflammatory arthritis and/or concurrent steroid use. This is in line with recent meta-analysis of real life Teriparatide use in complex osteoporosis with multimorbidity. Though NICE stipulates minimum two fractures requirement (unless T score <-4.0), in practice patients may have had more suggesting that clinicians are reserving it for high disease burden or there is a delay in diagnosis. We also demonstrate the large scale clinical effectiveness of the biosimilar. Our study should enhance clinicians' confidence in its prescribing. We believe that since the availability of more cost-effective Teriparatide biosimilars, NICE ought to amend its guidance and provide easier access to therapies for better patient outcomes.

P1069

RELIGIOUS AND SPIRITUAL WELL-BEING, BELIEFS, AND PRACTICES IN PATIENTS WITH KNEE OSTEOARTHRITIS: A DESCRIPTIVE STUDY

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Objective: To investigate the effects of knee OA on religious and spiritual well-being, beliefs, and practices.

Material and Methods: A cross-sectional study including symptomatic knee OA patients. Spiritual well-being was assessed using Ellison's Spiritual Well-Being Scale (SWBS), a 20-item instrument comprising two subscales: emotional well-being (EWB) and religious well-being (RWB) (10 items each), scored on a 6-point Likert scale. (Total score range: 20–120; subscale range: 10–60). Religious aspects were evaluated using a 25-item self-developed questionnaire to assess four dimensions (religious beliefs, religious and spiritual practices, assistance-seeking, and feelings) 9rated on a 5-point Likert scale (1 = never to 5 = always). Higher scores reflecting greater religious and spiritual engagement.

Results: Forty-one knee OA patients were included. Male-to-female ratio was 6/35. The mean age was 58 ± 10 years [37-78]. Regarding spirituality, the mean SWBS score was 86 ± 27 [36–117]. Nineteen patients had high SWBS, while 20 had moderate levels. Concerning religious practice, 73.2% of patients (n = 30) reported frequent overall religious practice, while 11 practiced occasionally. All patients observed Ramadan fasting, 30 patients prayed regularly. Sixteen patients reported always having difficulties with religious practices. Prayer was the most affected practice, reported by 90% of patients (n = 37). Among these, the most challenging movements were prostration (sujood) for 33 patients and bending the legs during tashahhud for 4 patients. 27 patients reported performing prayers on a chair to avoid knee movement. For ablution, 19 patients reported modifying their practice: 16 using warm water and 3 performing tayammum. Regarding fasting during Ramadan, 11 patients reported difficulties and a reduced ability to fast. These difficulties led to feelings of guilt in 28 patients and shame in 19 patients. To cope, 17 patients asked for help from doctors, 5 from family or friends, and 10 patients chose to remain silent. Regarding beliefs, 17 patients perceived their illness as a punishment from God.

Conclusion: This study revealed a significant divergence in patients' spirituality levels, changes in practice, and coping strategies. Understanding this divergence is crucial for providing more personalized medical, psychosocial, and spiritual care.

P1070

DETERMINANTS OF SPIRITUAL WELL-BEING IN PATIENTS WITH KNEE OSTEOARTHRITIS

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Introduction: Knee osteoarthritis (OA) is a common form of OA that requires complex management. Spirituality is increasingly recognized as helping patients cope with chronic illness. Exploring this dimension in knee OA remains largely understudied.

Objective: To identify factors associated with spiritual well-being in patients with knee osteoarthritis.

Methods: A cross-sectional study including symptomatic knee OA patients. Socio-demographic, disease characteristics and imaging data were collected. Health status and psychological impact were assessed using SF-36 and HADS for anxiety and depression. Spiritual well-being was assessed using Ellison's Spiritual Well-Being Scale (SWBS), a 20-item instrument scored on a 6-point Likert scale, higher scores indicating greater well-being.

Results: Forty-one knee OA patients were included. Male-to-female ratio was 6/35. The mean age was 58 ± 10 years [37-78]. Most patients had mild to moderate radiographic changes (Kellgren–Lawrence stage 1–2; 70%).The mean SWBS score was 86 ± 27 [36–117]. Nineteen patients had high overall SWBS, 21 had moderate levels and one with low SWBS. Physically active patients had higher SWBS (15 in the high SWBS group vs. 6 in the low-to-moderate group, **p = 0.004**). Similarly, participation in a functional rehabilitation program was associated with greater spiritual well-being (16 vs. 8, **p = 0.006**). Lower SWBS levels were associated with obesity (**p = 0.005**), smoking (**p = 0.01**), coexisting degenerative low back pain (**p = 0.01**), and limited walking distance (<1000 m; **p = 0.05**). Low SWBS was associated with higher levels of anxiety, depression, and pain catastrophizing: Among the 20 patients with low-to-moderate SWBS, 16 experienced moderate to severe anxiety (**p<0.01**), 25 had moderate depression (**p = 0.003**), and 13 patients showed significant pain catastrophizing (**p = 0.01**). Whereas, high spiritual well-being was associated with higher SF-36 score (**p = 0.01**). Furthermore, SWBS was not associated with sex, age, disease duration, time to diagnosis, patient medical history and radiographic stage of knee OA.

Conclusion: High spirituality was associated with physical activity and linked to lower anxiety, depression, and pain catastrophizing, as well as better quality of life, highlighting the importance of considering spiritual well-being in the management of patients with knee OA.

P1071

DXADERIVED BODY COMPOSITION AND BMD IN PATIENTS WITH T2DM AND MASLD

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Objectives

This study examined relationships among the extent of hepatic steatosis, DXAderived bodycomposition metrics, bone mineral density (BMD), and boneturnover markers (BTM) in a European cohort with type 2 diabetes (T2DM) and metabolic dysfunctionassociated steatotic liver disease (MASLD), addressing ongoing uncertainty about MASLD's effects on bone metabolism.

Material and Methods

Crosssectional study including 156 T2DM patients with MASLD (95 females, 61 males; mean age 62.9 ± 10.7 years) and 40 T2DM controls without hepatic involvement (mean age 59.13 ± 14.12 years). Hepatic steatosis was quantified using the FibroScan® controlled attenuation parameter (CAP), with steatosis defined as CAP >238 dB/m. DXA assessed TotalBMD, HipBMD, total and regional fat/lean mass, android/gynoid ratio (AGR), and appendicular lean mass index (ALMI). Laboratory panel included HOMAIR, GH/IGF1 axis markers, Osteocalcin, P1NP and bCTX. Correlation analyses and multivariable ROC modelling were used to identify combinations of clinical and DXA metrics that best predict reduced BMD and altered bone turnover.

Results

MASLD patients had significantly higher BMI, visceral adiposity and HOMAIR versus controls. In the full cohort CAP correlated positively with total BMD (r=0.21; p=0.001); stratified analysis showed this association was significant in females (r=0.29; p=0.004) but not in males. In males, CAP correlated negatively with BTM (Osteocalcin r=−0.35; p=0.006; bCTX r=−0.26; p=0.04), suggesting suppressed remodeling. Multivariable ROC models: in females a model combining CAP, age and android fat % achieved AUC 0.746 (sensitivity 76.4%, specificity 71.4%) (Fig 1). The inclusion of AGR (Fig 2) and ALMI (Fig 3) improved the detection of reduced total-BMD and hip-BMD, respectively, in the overall cohort.

Conclusions

In T2DM patients MASLD shows a sexually dimorphic relationship with bone health: in women steatosis associates with higher BMD likely mediated by android fat distribution and mechanical loading; in men steatosis associates with reduced bone turnover. Clinical implication: fracturerisk screening in MASLD should move beyond BMI to include soft tissue metrics (AGR, ALMI) and sexspecific algorithms to better identify secondary osteoporosis and fracture risk.

P1072

MICROARCHITECTURAL BONE DEFICITS IN ADULTS WITH HYPOPHOSPHATASIA

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Background:
Hypophosphatasia (HPP) is rare inherited disorder due to ALPL variants causing deficient tissuenonspecific alkaline phosphatase and impaired skeletal mineralization. Adult HPP often presents with fractures, pseudofractures and delayed fracture healing despite apparently "normal" areal bone mineral denisty (aBMD) on DXA.
Aim: Comparison of conventional (aBMD, TBS) and advanced bone measures (HR-pQCT) between adults with HPP and healthy controls.
Methods:
In a case–control study, from 3 international centres (Austria, Slovakia, Czech republic) adults with clinically/biochemically confirmed HPP (n = 38, mean age 50.3 ± 14.7 years; 14males/24 females) were comapred with age, sex – comaprable controls (n = 24, mean age 45.9 ± 8.6 years; 11 males/13 females). Assessments included anthropometry, biochemistry (ALP, Ca, phosphate, PTH, CTX, P1NP, 25OHvitamin D), aBMD of total hip, femoral neck, and lumbar spine (L1–L4) plus trabecular bone score (TBS). In the subset of 8 HPP subjects and 22 controls a HRpQCT at distal radius and tibia (density, trabecular microarchitecture, cortical parameters) was performed. Fractures (including atypical femoral fractures [AFF]) and delayed healing were recorded.
Results:
HPP participants were shorter (165.9 ± 9.5 vs 171.5 ± 9.7 cm; p = 0.028). Any fracture was recorded in 23 (61%) of HPP subjects vs 0 in control group; p < 0.001). Biochemically, HPP had characteristically low ALP (p < 0.001), higher calcium and phosphate (both p < 0.001), lower PTH (p < 0.001), higher CTX (p = 0.018) and higher 25OHvitamin D (p = 0.0027). No difference in vitamin D and calcium supplementation were observed. DXAderived BMD, T and Zscores at total hip, femoral neck, and L1–L4 and TBS showed no significant betweengroup differences (all p > 0.15). HRpQCT at the radius demonstrated compromised trabecular microarchitecture in HPP: lower metaphyseal density (RadDmeta; p = 0.026), fewer trabeculae (Tb.N; p = 0.001), greater trabecular separation (Tb.Sp; p = 0.006), and higher heterogeneity (Tb.N SD; p = 0.0009); BV/TV was markedly reduced. At the tibia, HPP showed smaller total and cortical areas (TibTotArea p = 0.034; TibCortArea p = 0.014), lower composite density (TibDcomp p = 0.013), and lower BV/TV, with other trabecular indices largely similar.
Conclusions:
Adults with HPP suffer a high fracture burden despite largely normal DXA results. HRpQCT uncovers significant trabecular—plus some cortical—deficits explaining this mismatch. Combining HRpQCT with the characteristic biochemical profile improves detection and phenotyping of adult HPP.

P1073

CORRELATION OF NEURO-QOL LOWER EXTREMITY FUNCTION COMPUTER ADAPTIVE TEST SCORES WITH LEGACY SOCRES IN OLDER PATIENTS AFTER HIP FRACTURE: A NEW OPPORTUNITY FOR TECH-BASED ASSESSMENT

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Objective
In this study, we aimed to use technology to evaluate whether the Neuro-QoL-Lower Extremity Function-Computer Adaptive Test (NQoL-CAT) correlates with traditional functional assessment scales (Barthel Index and Functional Ambulation Classification-FAC) in elderly patients with hip fractures.
Material and Methods
Prospective study that included patients over 69 years admitted to the orthogeriatric unit of a tertiary university hospital for 12 months. Patients were excluded if they had a concomitant fracture, they were not able to walk before the fracture, or they had a terminal illness. Sociodemographic, functional and clinical variables were measured at baseline, 3 months and 12 months by educating patients/proxies in using the MyCap app in their phones, which was connected with a REDCap secured hospital database. The NQoL-CAT was chosen because of its potential advantages: lower limb specific, self-administered by the patient, it is a computer adaptive test scale which reduces application time, and it can be implemented within a technological solution. Non-parametric analysis (Spearman's Rho) was performed to determine the observed correlation between the NQoL-CAT and the functional legacy scores Barthel and FAC at the 3 time points.
Results
105 patients were included, with a mean age of 87 years. Baseline function: Barthel: 79, FAC: 4, NQoL: 42.2. At discharge, 66% received home physiotherapy, 20% rehabilitation in a skilled nursing facility, and 13% were transferred to a hospital for functional recovery. Functional status at 3 months: Barthel: 69, FAC: 3.5, NQoL: 33.2, and 12% were institutionalized. Functional status at 12 months: Barthel: 70, FAC: 3.7, NQoL: 38.5, and 20% of patients were institutionalized. The correlation of NQoL with Barthel and FAC was: 0.61 and 0.65 at baseline, 0.79 and 0.76 at 3 months, and 0.85 and 0.86 at 12 months (p=0.01).
Conclusions
There is a strong correlation between the NQoL-CAT and traditional functional assessment scales in older adults up to 12 months after a hip fracture, suggesting that the use of technology implementing this scale could optimize the measurement of their functional recovery in the future, in order to find predictive models and design potential intervention programs.

P1074

ATTENUATED X-LINKED HYPOPHOSPHATEMIA: LATE DIAGNOSIS IN AN ADULT PATIENT

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Introduction: X-linked hypophosphatemia (XLH) is caused by loss-of-function of the PHEX gene. It presents with increased levels of fibroblast growth factor 23 and hypophosphatemia. The phenotypic spectrum ranges from mild hypophosphatemia to severe bowing of lower limbs.
Objective: To describe late onset presentation of XLH in adult patient.
Clinical Case: A 50-year-old woman was referred to endocrinology due to a recent clinical and molecular diagnosis of XLH in her son. Her daughter doesn't exhibit XLH phenotype. She reports loss of some teeth three years ago. Her height: 1.59 m (mother's height 1.57m, father's height 1.78 m), weight: 56 kg.
Radiography: slight valgus curvature of both tibial bones and bilateral coxa vara; the spine, hands, and feet were normal. Renal ultrasound and audiometry were normal Laboratory: hypophosphatemia:2,3mg%, hyperphosphaturia:956mg/24hs, tubular reabsorption of phosphate: 80% Molecular analysis by next-generation sequencing (NGS) of the ALPL, CLCN5, CTNS, CYP27B1, CYP2R1, DMP1, ENPP1, FAH, FAM20C, FGF23, FGFR1,GNAS,KL,OCRL,PHEX,SLC34A1,SLC34A3,andVDRgenesidentified the variant chrX:22.227.584 - 22.227.589 CCAGCT>CATAACTCAG (or c.2044_2048delinsATAACTCAG – ENST00000379374) in heterozygosity in the PHEX gene (p.Gln682Ilefs*36). Panel examination for XLH in the patient's mother and sister by NGS: absence of pathogenic variants.
Conventional treatment was initiated with phosphorus salts, calcitriol and cholecalciferol.
Discussion: The variant identified has not been previously described and is absent in approximately 1.2 million population-based samples. The combination of the molecular mechanism with the early interruption of protein translation, the characteristics of the region where it is located, and the presence of clinical symptoms allow this variant to be classified as pathogenic.
Conclusions: This case illustrates the variability in the XLH phenotype. In this family, the index case was a boy, and the maternal diagnosis occurred in adulthood through a segregation study. Genetic testing is crucial in the diagnosis of cases with attenuated manifestations of the disease, especially when the variant of the index case is known. Furthermore, we underscore its importance for genetic counseling and family planning.
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P1075

CANCER-TREATMENT-INDUCED BIOLOGICAL AND EPIGENETIC SIGNS OF ACCELERATED AGING IN CANCER SURVIVORS: A SYSTEMATIC REVIEW

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Objective
With growing populations of cancer survivors, late effects of cancer treatments became a major public health burden. Emerging evidence suggests that cancer treatments may induce biological alterations consistent with an accelerated aging hypothesis; however, fragmented. This systematic review (SR) aimed to synthesize biological biomarkers of treatment-induced accelerated aging in cancer survivors (CS) vs. cancer-free individuals.
Material and Methods
The SR was conducted according to PRISMA guidelines. Databases (Scopus, PubMed) were searched (September 2025) to identify observational studies assessing biological or epigenetic aging biomarkers in cancer survivors exposed to cancer treatments. Eligible studies should also include a cancer-free comparison group. Aging biomarkers comprised inflammatory markers, immune cell phenotypes, telomeres, mitochondrial or DNA damages, and epigenetic clocks. Study selection, data extraction, and quality assessment were performed by 2 reviewers. When appropriate, pooled effect estimates were computed, and sensitivity analyses were conducted.
Results
Of the 11,006 screened references, 22 studies were included. The most frequently reported biomarkers were inflammatory markers, immune cell phenotyping, circulating microRNAs, and epigenetic DNA methylation clocks. The included references were mainly cross-sectional or retrospective cohort studies, with sample sizes ranging from 38 to 2,000 CS. Most cohorts included childhood CS (n = 9) and breast CS (n = 8), with sex-specific or mixed populations, depending on cancer type. In pooled analyses, (hs)CRP was significantly higher in CS (k = 7; n = 15,544 individuals; standardized mean difference (SMD) = 1.06, 95% confidence interval (CI): 0.23-1.88; p = 0.012; I^2 = 97.7%), and epigenetic age acceleration was also higher (k = 3 cohorts; 7 effect sizes; n = 2,607 individuals; SMD = 0.31, 95% CI: 0.15-0.48; I^2 = 84.2%) vs. cancer-free controls. Heterogeneity between studies was high. Consistent patterns were observed in subgroup (chemotherapy vs. chemoradiotherapy; childhood vs. adult) and leave-one-out analyses, confirming the robustness of significant pooled effects.
Conclusion
This SR identified biological and epigenetic signs consistent with accelerated aging in CS from clinical studies. Major gaps include limited prospective data, heterogeneous methodologies, and underrepresentation of non-chemotherapy treatments. Standardized biomarkers are needed to support precision oncology, optimize treatment, prevent aging morbidities, and allow healthy aging in CS.

P1076

BISPHOSPHONATES OR DENOSUMAB AFTER FRACTURE? REAL-WORLD EVIDENCE FROM A TARGET TRIAL EMULATION IN MULTIMORBID ADULTS

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Objective: Individuals with multimorbidity (MM) are often excluded from randomised trials, limiting evidence on comparative effectiveness of antiresorptive therapies. We implemented target trial emulation (TTE) to compare bisphosphonates (BP) versus denosumab (Dmab) for refracture and all-cause mortality across MM clusters.

Methods: Using whole-population linked administrative data, we identified treatment-naïve adults aged ≥50 years in New South Wales, Australia, who sustained fractures requiring emergency or hospital admission between 2010 and 2018. We excluded individuals with prior osteoporosis treatment, prior fractures, metastatic cancer, or other metabolic bone disorders. A clone-censor-weight approach compared two strategies: initiation of BP (alendronate, risedronate, or zoledronic acid) versus Dmab within 12 months post-fracture (grace period). Time zero was the fracture date, with follow-up of up to 4 years for refracture and mortality. Individuals were cloned, assigned to each strategy, and censored if their observed treatment deviated from the assigned strategy. Inverse probability of censoring weights addressed informative censoring. Latent class analysis (LCA) classified individuals into MM clusters based on comorbidities at time of fracture. Sex-specific weighted pooled logistic regression estimated hazard ratios (HRs) and 4-year risk differences (RDs).

Results: Among 117,031 eligible individuals (mean age 75.7 years; 64% women), 6036 initiated BP and 2611 initiated Dmab within grace period. LCA identified four MM clusters (cardiovascular, cardiometabolic, geriatric, mental health; median comorbidity count: 4-12) and one low MM cluster (median: 0). Compared with Dmab, BP use was associated with lower all-cause mortality in women (HR 0.71, 95% CI 0.67–0.76; RD −26.3%, 95% CI −31.1% to −21.1%) and men (HR 0.79, 95% CI 0.74–0.85; RD −24.4%, 95% CI −30.6% to −17.9%). Mortality reduction was consistent across multimorbidity clusters. Refracture risk was comparable between treatment groups.

Conclusion: In this real-world TTE, initiation of BP after fracture was associated with lower mortality compared to Dmab in both healthy and MM populations, with comparable refracture risk. These findings suggest BP have non-skeletal benefits that warrant further investigation.

P1077

COMPARATIVE CARDIOVASCULAR SAFETY OF BISPHOSPHONATES AND DENOSUMAB AFTER FRACTURE: A SEQUENTIAL TARGET TRIAL EMULATION

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Objective

Bisphosphonates (BP) and denosumab (Dmab) are widely used for fracture prevention. Beyond skeletal effects, both agents have been hypothesised to confer potential cardiovascular protection, although evidence remains inconsistent.

Methods

We emulated a sequential target trial using linked, administrative health data from New South Wales, Australia. Adults aged ≥50 years with incident fracture requiring hospitalisation or emergency admission between 1 January 2005 and 30 June 2019, without prior cardiovascular disease (CVD) or antiresorptive therapy, were eligible. New users of BP or Dmab initiating treatment between 1 December 2010 and 30 June 2019 were included. Time zero was treatment initiation, with monthly trial starts. Follow-up was up to 3 years until outcome, death or administrative censoring. Baseline inverse probability of treatment weighting was applied. Outcomes were first hospitalised acute myocardial infarction (AMI), stroke, heart failure (HF) or arrhythmia. Intention-to-treat (ITT) effects were estimated using weighted Cox proportional hazards and Fine–Gray (FG) models accounting for competing risk of death. Per-protocol (PP) analyses used inverse probability of censoring weights.

Results

Baseline characteristics were well balanced (all SMD<0.1). Incidence rates per 1,000 person-years were similar between BP and Dmab for hospitalised AMI (4.71 vs 4.84), stroke (6.77 vs 6.83), HF (5.98 vs 5.88) and arrhythmia (6.05 vs 6.56). In ITT analyses, BP initiation was associated with similar cardiovascular risk compared with Dmab. Weighted Cox hazard ratios (BP vs Dmab) were 1.00 (95% CI 0.80–1.24) for AMI, 1.07 (0.89–1.28) for stroke, 1.14 (0.94–1.38) for HF and 0.98 (0.81–1.19) for arrhythmia; FG estimates accounting for competing risk of death were consistent (HR range 0.92-1.00). PP analyses accounting for treatment non-adherence produced similar estimates. Time-to-event distributions and mortality rates were comparable.

Conclusion

In this large real-world sequential target trial, initiation of BP and Dmab was associated with comparable cardiovascular safety over 3 years of follow-up among fracture patients without prior CVD.

P1078

EXTRASKELETAL EFFECTS OF SCLEROSTIN INHIBITION: ROMOSOZUMAB IMPROVES SARCOPENIA PARAMETERS IN POST-MENOPAUSAL OSTEOPOROSIS

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The Wnt signaling pathway regulates skeletal homeostasis but also drives mesenchymal stem cells differentiation and inhibits adipogenesis. Sclerostin, an endogenous Wnt inhibitor, contributes to osteoporosis, sarcopenia, and ectopic fat accumulation. Romosozumab, an anti-sclerostin monoclonal antibody, enhances bone formation and reduces fracture risk; emerging evidence suggests additional extra-skeletal benefits, including reduced falls.

This real-world prospective study aims to compare the extra-skeletal effects of Romosozumab vs Alendronate on body composition and sarcopenia-related parameters in postmenopausal women with osteoporosis.

45 postmenopausal women with osteoporosis previously treated with alendronate were enrolled: 24 switched to Romosozumab 210mg/month (ROMO) and 21 continued Alendronate (ALN). Exclusion criteria included mobility impairment, advanced CKD, diabetes, chronic corticosteroid use, autoimmune diseases, active cancer, and cirrhosis. Assessments at baseline (T0), 6 months (T1), and 12 months (T2) included DXA (BMD and body composition analysis), handgrip strength (HG), Short Physical Performance Battery (SPPB) and serum cytokines involved in bone-muscle-adipose tissue crosstalk. Appendicular lean soft tissue standardized for weight (appLST/Kg) was derived from DXA.

At T0, ALN showed significant greater HG and appLST/Kg, while ROMO showed lower BMD T-scores at all skeletal sites. Both groups showed increased HG at T2 vs T0 (ROMO: +3.05±3.57 kg, p=0.0012; ALN: +2.71±4.03 kg, p=0.0222), although without significant differences between the two groups. At T2 SPPB improved significantly compared to T0 in both groups, but ROMO showed a greater improvement in SPPB at T1 and T2 compared to ALN (+20.79±17.95 % vs +5.68 ± 9.71 % at T2 respectively, p=0.0036). At T2, myostatin decreased in ROMO and increased in ALN (-3.60±42.35 vs +33.02±44.07; p=0.0045). In ROMO, multiple regression showed an inverse association of myostatin and TNF-α with HG (R^2: 49.09%; p=0.0137).

Romosozumab showed rapid, extra-skeletal effects on muscle strength and physical performance, independent of muscle mass changes, suggesting a potential role in mitigating sarcopenia.

P1079

IMMUNOFIXATION NOT SERUM PROTEIN ELECTROPHORESIS IS THE PREFERRED SCREENING TEST FOR MYELOMA IN PATIENTS PRESENTING WITH VERTEBRAL COMPRESSION FRACTURES (VCF)-3 CASES OF LIGHT CHAIN MYELOMA WITH HYPOGAMMAGLOBULINEMIA PRESENTING WITH VCF

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OBJECTIVE

Light chain myeloma comprises 10-20% of myeloma cases in large series. This study describes 3 patients presenting with VCF to a fracture clinic diagnosed with light chain myeloma and hypogammaglobulinemia whose diagnosis would have been overlooked if screened with serum protein electrophoresis.

METHODS

Chart review of 3 patients found to have light chain myeloma and hypogammaglobulinemia among a group of 14 patients presenting to a fracture clinic with a VCF who were subsequently diagnosed with myeloma.

RESULTS

All 3 patients were male ages 72 (Patient 1), 75 (Patient 2), and 84 (Patient 3) at the time of diagnosis, with no previous history of fracture, bone or joint pain, or infection. Underlying conditions included diabetes, hypogonadism, and obesity-Patient 1, and kidney stone-Patient 2. Fractures occurred without a fall in all cases at locations T-4, T-12, and T-12, L1 and L2 respectively. All patients had normal CBC, calcium, alkaline phosphatase, creatinine, urinalysis, magnesium, vitamin D, vitamin B-12, TSH, PTH, and total protein levels. An M-spike was not present in any case. Gamma globulin levels were 0.3, 0.4, and 0.5 g/dL (normal 0.4-1.8), A/G ratios 1.6, 1.4, 1.3 (normal 1.2-2.2), total globulin levels 1.8, 2.7, 2.6 g/dL (normal 1.5-4.5) respectively. Low levels of IgG, IgA and IgM were found in all patients. Kappa light chain paraprotein was identified on immunofixation in all patients as well as Bence-Jones protein. Free kappa light chain levels were 1708, 1652, and 1141 (normal 3.3-19.4) with free light chain ratios of 632, 232, 170 (normal 0.26-1.65). Blastic and lytic lesions were found in other locations in all cases. Femoral neck bone density T-score was -3.3 in Patient 1 and -1.7 and -2.3 in Patients 2 and 3. Diagnosis was established by bone marrow biopsy with all patients responding to therapy without further fracture and surviving 8 months, 3 and 5 years from diagnosis.

CONCLUSION

Patients with myeloma can present with VCF without any manifestations of hypercalcemia, renal insufficiency, anemia, previous fracture or other clinical clues to their underlying diagnosis. Serum protein electrophoresis will fail to diagnose patients with light chain myeloma with hypogammaglobulinemia. Therefore, immunofixation is the preferred screening test for myeloma in patients presenting with VCF.

P1080

SCALING UP A VALIDATED COMMUNITY-BASED OSTEOPOROSIS RISK SCORING SYSTEM IN LOW-RESOURCE SETTINGS: A MULTICENTER IMPLEMENTATION STUDY

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Category	Risk Factor	Points
Clinical Risk Factors		
Age	40-49 years	1
	50-59 years	2
	60-69 years	3
	70+ years	4
Gender	Female	2
	Male	1
Body Mass Index (BMI)	BMI < 20	3
	BMI 20-25	1
	BMI > 25	0
History of Previous Fractures	Yes, after age 50	6
	Yes, before age 50	3
	No	0
Parental History of Hip Fracture	Yes	4
	No	0
Smoking Status	Current smoker	3
	Former smoker	1
	Never smoked	0
Alcohol Consumption	More than 3 units/day	3
	1-3 units/day	1
	Occasional or none	0
Corticosteroid Use (≥ 3 months)	Yes	5
	No	0
Menopause (for Women)	Menopause before 45	3
	Menopause after 45	1
	Not yet menopausal	0
Physical Activity	Sedentary	3
	Moderately active (1-2 times/week)	1
	Regularly active (3+ times/week)	0
Calcium Intake	Low calcium intake	2
	Adequate calcium intake	0
Vitamin D Intake/Exposure	Low vitamin D exposure	2
	Adequate vitamin D exposure	0
History of Falls	Two or more falls in the past year	4
	One fall in the past year	2
	No falls	0
Chronic Conditions	Presence of chronic condition affecting bone	3
	No chronic conditions	0
Radiographic Findings		
Vertebral Compression Fractures on X-Ray	Presence of one or more vertebral fractures	6
	No vertebral fractures	0
Generalized Osteopenia on X-Ray	Evidence of cortical thinning/reduced bone	3
	Normal bone appearance	0
Trabecular Bone Loss	Notable loss of trabecular patterns	2
	Normal trabecular patterns	0

Table 1:
The Muzzammil's Osteoporosis Risk Scoring System.
Risk Categories: Low Risk: 0-10 points.
Moderate Risk: 11-20 points.
High Risk: 21-30 points.
Very High Risk: 31+ points.

Background

Osteoporotic fragility fractures represent a growing and under addressed public health problem in low and middle income countries. Limited access to DXA scanning results in delayed diagnosis, missed prevention opportunities, and high fracture related morbidity. A simple community based osteoporosis risk scoring system was previously developed and validated in a single center. This study evaluated its real world performance, scalability, and implementation feasibility across diverse low resource healthcare settings.
Objective

To assess diagnostic accuracy, fracture risk stratification, and feasibility of a low cost osteoporosis risk scoring system when deployed by primary healthcare workers in urban, peri urban, and rural environments.
Methods

This prospective multicenter implementation study enrolled 1,000 adults aged 40 years or older from an urban tertiary hospital, a peri urban health center, and a rural outreach clinic. Participants with known osteoporosis or metabolic bone disease were excluded. Trained primary healthcare workers administered a structured questionnaire and applied the risk score. Lumbar spine and pelvic radiographs were obtained for all participants and independently interpreted by blinded orthopedic radiologists. Fragility fractures were defined as fractures following low energy trauma with radiographic confirmation. Diagnostic performance, fracture prevalence across risk categories, and feasibility metrics were analyzed. Two cutoff strategies were evaluated to reflect screening and referral intent.
Results

The cohort included 57.2% females with a mean age of 59.4 years. Low dietary calcium intake was present in 61.2% and low vitamin D exposure in 68.5%. Radiographic osteoporotic changes were identified in 64.8% of participants, with vertebral compression fractures in 17.3%. Risk stratification classified 36.7% as low risk, 33.2% as moderate risk, 20.8% as high risk, and 9.3% as very high risk. Fragility fracture prevalence increased sharply from 4.9% in the low risk group to 48.4% in the very high risk group. Using a sensitive screening threshold, sensitivity reached 89.2% with a negative predictive value of 95.1%. Using a referral focused threshold, specificity was 75.9% with an area under the ROC curve of 0.80. Primary healthcare workers successfully administered the tool in over 95.0% of encounters, with a mean completion time under seven minutes.
Conclusion

This multicenter study demonstrates that a simple community based osteoporosis risk scoring system can accurately stratify fracture risk and be feasibly implemented at scale in low resource settings. The tool offers a practical pathway for early identification, targeted prevention, and national osteoporosis screening strategies.

P1081

PREDICTING DISABILITY AND HOSPITALIZATION AFTER FRAGILITY FRACTURES IN LOW INCOME SETTINGS. MULTICENTER VALIDATION OF A SIMPLE SCREENING SCALE FOR ELDERLY PATIENTS

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Background

Fragility fractures in older adults represent a growing cause of disability and repeated hospitalization in low and middle income countries. Early risk identification remains limited due to the absence of simple, context appropriate screening tools that can be used at the point of care by non specialist providers.
Objective

To develop and externally validate the Low Income Country Simple Comprehensive Screening Scale, LIC SCSS, as a practical tool to predict disability and hospitalization risk in elderly patients presenting with fragility fractures.
Methods

We conducted a multicenter prospective cohort study across three tertiary hospitals in Pakistan, Bangladesh, and Kenya. A total of 300

patients aged 65 years or older with low energy hip, vertebral, or distal radius fractures were enrolled. LIC SCSS is a 13 item score covering physical frailty, psychological health, and socioeconomic vulnerability. The tool was administered at admission and followed at 6 and 12 months. Primary outcomes included functional decline measured by activities of daily living and all cause hospitalization within 12 months. Predictive performance was assessed using logistic regression and receiver operating characteristic analysis. Inter rater reliability was evaluated among trained non specialist healthcare workers.

Results

Median LIC SCSS score was 6. High risk patients showed significantly higher rates of functional decline and hospitalization. At 12 months, high risk patients had a 60 percent rate of three or more ADL decline compared with 7 percent in the low risk group. Hospitalization occurred in 41 percent of high risk patients versus 5 percent of low risk patients. LIC SCSS demonstrated strong predictive accuracy with an AUC of 0.86 for functional decline and 0.84 for hospitalization, outperforming the Clinical Frailty Scale and FRAIL Index. Inter rater reliability was excellent with a Cohen kappa of 0.83. Mean administration time was under five minutes.

Conclusion

LIC SCSS is a rapid, reliable, and highly predictive screening tool for elderly fragility fracture patients in resource limited settings. Its simplicity and strong performance support integration into routine orthopedic and community based care to enable early intervention and reduce avoidable disability and hospitalization.

LIC-SCSS Scoring System

Domain	Dimension	Criteria	Score
Physical Health	Clinical Frailty Scale (CFS)	Mild frailty (CFS 4-5) = 1; Moderate/Severe (CFS 6-7) = 2 = 2	0–2
	Weight Loss	Unintentional weight loss >5% in 6 months	1
	Polypharmacy	≥3 regular medications	1
	Fall History	≥1 fall in the past year	1
	Dizziness/Balance Issues	Frequent dizziness/unsteady gait	1
	Pressure Sores	Present at admission	1
Psychological Health	Insomnia	Difficulty sleeping ≥3 nights/week	1
	Depression (PHQ-2)	Score ≥3 on PHQ-2	1
	Delirium (4AT)	4AT score ≥4	1
Socioeconomic Factors	Living Alone	No primary caregiver/support at home	1
	Elder Neglect/Abuse (EASI)	Positive response on Elder Abuse Suspicion Index	1
	Economic Constraints	Unable to afford medications/home modifications	1
Total Score		Total Score	0–13

Table-1: Risk Stratification Based on LIC-SCSS Score

Total Score	Risk Level	Suggested Intervention
0-3	Low Risk	Routine follow-up, standard post-fracture care
4-7	Moderate Risk	Physiotherapy, nutritional support, home safety assessment
8-13	High Risk	Intensive rehabilitation, social support intervention

Table-1: Risk Stratification Based on LIC-SCSS Score

P1082

A ONE MINUTE BEDSIDE SARCOPENIA RISK MODEL PREDICTS DISABILITY, MORTALITY, AND CARE BURDEN AFTER FRAGILITY FRACTURES IN THE ELDERLY

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Background

Muscle and bone form a functional unit that determines fracture risk and recovery in older adults. Sarcopenia worsens outcomes after fragility fractures but is rarely screened in routine care in low resource settings despite availability of simple bedside tools.

Objective

To develop a simple sarcopenia risk stratification model and evaluate its impact on fracture pattern, mortality, functional recovery, and health system burden in elderly fragility fracture patients.

Methods

This prospective cohort study included patients aged 60 years and above presenting with low energy fragility fractures. Sarcopenia was assessed at admission using hand grip strength and calf circumference based on Asian Working Group cutoffs. Patients were classified into low risk, moderate risk, or high risk sarcopenia categories. Primary outcomes were poor functional recovery at three months defined as Modified Barthel Index below 70, loss of independent ambulation, and new caregiver dependence. Secondary outcomes included thirty day mortality, ninety day readmission, length of hospital stay, and institutionalization. Multivariable regression adjusted for age, sex, fracture type, and comorbidities. Interaction analysis assessed combined effects of sarcopenia and hip fracture.

Results

A total of 400 patients were enrolled with a mean age of 71.4 ± 7.2 years. Sarcopenia was present in 47.0 percent, with 28.0 percent classified as high risk. Poor functional recovery increased stepwise across risk categories, occurring in 21.4 percent of low risk, 46.8 percent of moderate risk, and 71.6 percent of high risk patients. Thirty day mortality rose from 2.1 percent in low risk to 11.6 percent in high risk patients. Mean hospital stay increased from 6.1 ± 2.4 days to 10.8 ± 3.6 days. Patients with combined sarcopenia and hip fracture demonstrated the worst outcomes, with poor recovery in 78.9 percent compared to 34.6 percent in non sarcopenic non hip fracture patients. This group showed an adjusted odds ratio of 3.62 for poor recovery with a 95 percent confidence interval of 2.18 to 6.01. Sarcopenia accounted for an excess of 2.8 hospital days per patient and an additional caregiver requirement of 3.4 hours per day at three months. Among sarcopenic patients, early physiotherapy within 48 hours was associated with higher Barthel scores, 69.1 versus 58.4.

Conclusion

A two parameter bedside sarcopenia screen identifies high risk elderly fragility fracture patients within one minute and accurately predicts disability, mortality, and care burden. Sarcopenia markedly amplifies the adverse impact of hip fractures. This zero cost risk model offers an immediately scalable strategy to improve outcomes and optimize resource use in low resource healthcare systems.



P1083

VITAMIN D DEFICIENCY AND FALL RELATED FRAGILITY FRACTURES IN URBAN ELDERLY. PREVALENCE, SEVERITY, FUNCTIONAL AND HEALTH SYSTEM IMPACT

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Background

Vitamin D deficiency impairs muscle strength, balance, and mobility and increases fall related fracture risk in elderly populations. Urban elderly in developing countries experience high fracture burden despite abundant sunlight. Data linking vitamin D status with functional outcomes, fracture severity, and early mortality remain limited.

Objective

To determine the prevalence and severity of vitamin D deficiency in elderly patients with fall related fractures and to quantify its association with muscle strength, fall frequency, fracture pattern severity, early mortality, functional recovery, and hospital resource utilization.

Methods

This prospective observational study enrolled 500 adults aged 60.0 years and above presenting with fall related fractures to a public tertiary care hospital. Mean age was 71.6 years with a standard deviation of 7.8 years. Serum 25 hydroxyvitamin D levels were measured at admission. Severe deficiency was defined as less than 10.0 ng per mL, moderate deficiency as 10.0 to 19.9 ng per mL, and sufficient as 20.0 ng per mL or above. Muscle strength was assessed using hand grip strength in kilograms and chair rise test time in seconds. Mobility was evaluated using gait speed in meters per second and Timed Up and Go test time. Fall history over the preceding 12.0 months was recorded. Fractures were classified as hip, vertebral, or peripheral. Outcomes included 30.0 day mortality, length of hospital stay, and 90.0 day functional status assessed by Barthel Index. Multivariable regression analysis adjusted for age, sex, and comorbidities.

Results

Vitamin D deficiency was present in 390 of 500 patients, representing 78.0 percent. Severe deficiency was identified in 215 patients, or 43.0 percent. Mean serum vitamin D level was 13.2 ng per mL with a standard deviation of 6.4. Mean grip strength was 16.1 kg in the severe deficiency group, 18.9 kg in moderate deficiency, and 21.4 kg in sufficient patients. Mean chair rise time was 21.6 seconds, 18.3 seconds, and 14.2 seconds respectively. Mean gait speed was 0.48 m per s in severe deficiency compared to 0.72 m per s in sufficient patients. Recurrent falls occurred in 62.3 percent of severe deficiency patients versus 28.7 percent in sufficient patients. Hip and vertebral fractures accounted for 68.4 percent of fractures in severe deficiency compared to 31.9 percent in sufficient patients. Thirty day mortality was 7.4 percent in severe deficiency versus 2.1 percent in sufficient patients. Mean hospital stay was 9.6 days in severe deficiency and 6.1 days in sufficient patients. Mean Barthel Index at 90.0 days was 55.2 in severe deficiency compared to 72.8 in sufficient patients. Each 5.0 ng per mL decrease in vitamin D level increased odds of recurrent falls by 1.8 times and hip fracture by 2.3 times after adjustment.

Conclusion

Vitamin D deficiency affects more than three quarters of urban elderly patients with fall related fractures and nearly half have severe deficiency. Lower vitamin D levels are independently associated with muscle weakness, impaired mobility, recurrent falls, higher early mortality, prolonged hospitalization, and severe fracture patterns involving the hip and spine. Routine vitamin D screening at first fall or fracture and early supplementation represent a low cost, scalable strategy with potential to reduce fracture severity, disability, and health system burden in urban elderly populations of developing countries.

Fracture Patterns and Outcomes by Vitamin D Status

Variable	Severe Deficiency (<10 ng/mL) N = 215	Moderate Deficiency (10–19.9 ng/mL) N = 175	Sufficient (≥20 ng/mL) N = 110	P Value
Fracture Type				
Hip Fractures	45.1%	31.4%	18.2%	<0.001
Vertebral Fractures	23.3%	15.4%	13.6%	0.003
Peripheral Fractures	31.6%	53.2%	68.2%	<0.001
Clinical Outcomes				
30-Day Mortality	7.4%	4.0%	2.1%	0.009
Hospital Stay (Mean Days)	9.6 ± 3.4	7.2 ± 2.8	6.1 ± 2.1	<0.001
Pneumonia	18.1%	9.7%	5.5%	0.005
Delirium	15.8%	7.4%	4.5%	0.004
Pressure Ulcers	12.6%	5.7%	2.7%	0.001
Functional & Mobility				
Barthel Index (90 Days)	55.2 ± 18.6	67.3 ± 16.9	72.8 ± 14.5	<0.001
Gait Speed (m/s)	0.48 m/s	0.61 m/s	0.72 m/s	<0.001
Timed Up and Go (Seconds)	19.8	15.4	12.2	<0.001
Recurrent Falls	62.3%	41.1%	28.7%	<0.001

Abbreviations: N = Number, m/s = Meters per second.

* P Values based on Chi Square or ANOVA.

P1084

DELAYED HIP FRACTURE SURGERY IN PUBLIC HOSPITALS. IMPACT ON MORTALITY, MOBILITY, AND SYSTEM LEVEL BARRIERS IN A LOW RESOURCE SETTING

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Background

Hip fracture surgery within 48.0 hours reduces mortality, complications, and disability. In public hospitals of low resource settings, most patients experience surgical delay. You evaluated clinical impact, system drivers, and policy relevant consequences of delay.
Objective

You assessed the effect of surgical delay on mortality, mobility, complications, and costs and identified modifiable hospital level barriers.
Methods

You conducted a prospective cohort study including patients aged 60.0 years and above admitted with low energy hip fractures. Time from admission to surgery was recorded. Patients were grouped into early surgery within 48.0 hours and delayed surgery beyond 48.0 hours. You recorded fracture type, procedure, ASA grade, and Charlson Comorbidity Index. Outcomes included 30.0 day mortality, mobility at 3.0 months using Parker Mobility Score, length of stay, complications, readmission, and reoperation. Multivariable regression adjusted for age, sex, fracture type, ASA grade, and comorbidity. You performed process mapping of in hospital delays and estimated excess bed days and cost burden.
Results

You included 420 patients. Mean age was 72.4 years plus minus 7.8 years. Females accounted for 62.1 percent. Mean Charlson Comorbidity Index was 4.1. ASA grade III or IV was present in 58.6 percent. Fracture pattern included intertrochanteric fractures in 56.2 percent and femoral neck fractures in 43.8 percent. Hemiarthroplasty was performed in 44.0 percent and internal fixation in 56.0 percent.
Early surgery occurred in 109 patients, 26.0 percent. Mean time to surgery was 32.6 hours in the early group and 96.8 hours in the delayed group. Thirty day mortality was 6.4 percent versus 14.9 percent. Adjusted odds ratio for mortality with delay beyond 48.0 hours was 2.41. Mortality increased by 3.2 percent for each additional 24.0 hour delay.
At 3.0 months, mean Parker Mobility Score was 6.1 in early surgery patients and 3.9 in delayed patients. Independent or assisted ambulation was achieved in 68.3 percent versus 41.2 percent. Mean hospital stay was 6.2 days versus 11.4 days, adding 5.2 excess bed days per delayed patient. Thirty day readmission was 18.6 percent in delayed cases compared to 9.8 percent in early cases. Chest infection occurred in 23.1 percent versus 9.2 percent. Pressure sores occurred in 16.7 percent versus 4.6 percent.
System related factors accounted for 71.0 percent of delays. Operating room unavailability contributed 34.2 percent. Delayed medical clearance accounted for 18.3 percent. Implant unavailability accounted for 12.1 percent. Financial constraints accounted for 6.4 percent. Weekend admissions had a mean delay of 28.0 additional hours compared to weekday admissions.
Delayed surgery generated an estimated 1617 excess bed days annually, translating into a substantial avoidable cost burden for the public hospital. Modeling showed that achieving surgery within 48.0 hours in 80.0 percent of patients could prevent 8.3 deaths per 100.0 hip fractures.
Conclusion

Delayed hip fracture surgery in public hospitals doubles mortality risk, worsens functional recovery, increases complications, and imposes a major economic burden. You demonstrate that delay is predominantly driven by modifiable system failures. Implementing protected trauma operating time, standardized clearance pathways, assured implant supply, and early geriatric co management can produce immediate survival and mobility gains in low resource healthcare systems.

Fracture Patterns and Outcomes by Vitamin D Status

Variable	Severe Deficiency (<10 ng/mL) N = 215	Moderate Deficiency (10–19.9 ng/mL) N = 175	Sufficient (≥20 ng/mL) N = 110	P Value
Fracture Type				
Hip Fractures	45.1%	31.4%	18.2%	<0.001
Vertebral Fractures	23.3%	15.4%	13.6%	0.003
Peripheral Fractures	31.6%	53.2%	68.2%	<0.001
Clinical Outcomes				
30-Day Mortality	7.4%	4.0%	2.1%	0.009
Hospital Stay (Mean Days)	9.6 ± 3.4	7.2 ± 2.8	6.1 ± 2.1	<0.001
Pneumonia	18.1%	9.7%	5.5%	0.005
Delirium	15.8%	7.4%	4.5%	0.004
Pressure Ulcers	12.6%	5.7%	2.7%	0.001
Functional & Mobility				
Barthel Index (90 Days)	55.2 ± 18.6	67.3 ± 16.9	72.8 ± 14.5	<0.001
Gait Speed (m/s)	0.48 m/s	0.61 m/s	0.72 m/s	<0.001
Timed Up and Go (Seconds)	19.8	15.4	12.2	<0.001
Recurrent Falls	62.3%	41.1%	28.7%	<0.001

Abbreviations: N = Number, m/s = Meters per second.

* P Values based on Chi Square or ANOVA.

P1085

ROUTINE X RAY BASED PREDICTION OF OSTEOPOROSIS IN THE ABSENCE OF DXA. FEMORAL CORTICAL THICKNESS AND SINGH INDEX AS PRACTICAL SCREENING TOOLS

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Background

Limited access to DXA in low resource health systems delays osteoporosis diagnosis until after a fragility fracture. Routine plain radiographs are widely available and may provide objective markers for early identification of bone fragility.
Objective

To determine the diagnostic performance of femoral cortical thickness and Singh index measured on routine X rays for predicting osteoporosis and fragility fractures in adults aged fifty years and above.
Methods

This observational study included four hundred adults aged fifty years or older presenting to a public sector hospital with hip, distal radius, or vertebral fractures. Two hundred and sixty patients had fragility fractures and one hundred and forty had non fragility fractures. Standard anteroposterior pelvic and femoral radiographs were obtained in all cases. Femoral cortical thickness was measured bilaterally at a standardized level two centimeters below the lesser trochanter and averaged for analysis. Trabecular bone pattern was graded using the Singh index from grade one to six. DXA scanning was available in one hundred and twenty patients and used for validation. Interobserver reliability was assessed

in fifty randomly selected radiographs following brief focused training. Statistical analysis evaluated associations with fracture type and DXA defined osteoporosis.
Results

Mean femoral cortical thickness was significantly lower in fragility fracture patients compared to non fragility fracture patients, 5.1 ± 0.9 mm versus 6.8 ± 1.1 mm. Mean Singh index grade was also lower in the fragility fracture group, 2.8 ± 0.7 versus 4.1 ± 0.8. A femoral cortical thickness cutoff of less than 6 mm predicted DXA defined osteoporosis with sensitivity of 82 percent and specificity of 74 percent. Singh index grades of three or below showed sensitivity of 76 percent and specificity of 70 percent for osteoporosis. Combined use of cortical thickness and Singh index improved diagnostic accuracy with an area under the curve of 0.85 compared to 0.78 for cortical thickness alone and 0.72 for Singh index alone. Interobserver agreement was good with an intraclass correlation coefficient of 0.81 for cortical thickness and a kappa value of 0.76 for Singh index grading. All measurements were completed within routine radiograph reporting time without additional cost.
Conclusion

Femoral cortical thickness and Singh index derived from routine X rays demonstrate good diagnostic accuracy for identifying osteoporosis and fragility fracture risk in settings without DXA. These simple markers enable early recognition of bone fragility using existing imaging. Their integration into routine radiograph reporting can support timely initiation of osteoporosis treatment and strengthen secondary fracture prevention strategies in resource limited healthcare systems.

P1086

SECONDARY FRACTURE PREVENTION FAILURE AFTER FIRST FRAGILITY FRACTURE IN A LOW RESOURCE SETTING, MAGNITUDE, CONSEQUENCES, AND SYSTEM DETERMINANTS

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Background

A first fragility fracture markedly increases the risk of subsequent fractures, disability, and mortality. International guidelines recommend immediate osteoporosis assessment and treatment after the index fracture. In low resource health systems, this step is frequently missed, leading to preventable recurrent fractures and increased healthcare burden.
Objective

To quantify the secondary fracture prevention gap after a first fragility fracture, evaluate clinical and economic consequences, and identify patient and system level predictors of missed osteoporosis care.
Methods

This prospective observational study included adults aged 50.0 years and above presenting with a first low energy fragility fracture involving the hip, distal radius, or spine. Osteoporosis assessment and initiation of calcium, vitamin D, and anti osteoporotic therapy within 3.0 months were recorded. Time to assessment, treatment delays, recurrent fractures, mortality, functional outcomes, and readmissions were documented over 12.0 months. Provider specialty, care setting, and referral patterns were analyzed. Direct hospital costs were estimated. Multivariable regression identified predictors of missed care.
Results

A total of 600.0 patients were enrolled. Mean age was 67.4 ± 8.9 years. Females comprised 406.0 patients, 67.7 percent. Hip fractures accounted for 264.0 patients, 44.0 percent, distal radius fractures for 202.0 patients, 33.7 percent, and vertebral fractures for 134.0 patients, 22.3 percent.
Only 108.0 patients, 18.0 percent, received any osteoporosis assessment within 3.0 months. Dual energy X ray absorptiometry was performed in 46.0 patients, 7.7 percent. Serum vitamin D was measured in 62.0 patients, 10.3 percent. Median time to osteoporosis assessment was 84.0 days. At 12.0 months, 385.0 patients, 64.2 percent, had never undergone any assessment.
Anti osteoporotic therapy was initiated in 84.0 patients, 14.0 percent. Bisphosphonates were prescribed in 61.0 patients, 10.2 percent, denosumab in 15.0 patients, 2.5 percent, and teriparatide in 8.0 patients, 1.3 percent. Calcium and vitamin D supplementation was prescribed in 186.0 patients, 31.0 percent. Median time to treatment initiation was 96.0 days.
Assessment rates were 11.2 percent in emergency or trauma units compared to 31.6 percent in outpatient clinics. Treatment initiation was lowest in hip fracture patients at 9.8 percent, compared to 16.9 percent in vertebral fractures and 19.3 percent in distal radius fractures. Orthopedic services initiated anti osteoporotic therapy in 12.4 percent compared to 26.8 percent in medical clinics.
At 12.0 months, recurrent fragility fractures occurred in 72.0 patients, 12.0 percent. Mean time to second fracture was 7.2 ± 2.1 months. Recurrent fractures occurred in 14.6 percent of untreated patients compared to 4.8 percent of treated patients. One year mortality after hip fracture was 18.9 percent in untreated patients compared to 9.4 percent in treated patients. Loss of independent ambulation occurred in 35.6 percent of untreated patients versus 19.2 percent of treated patients. Fracture related readmissions occurred in 16.3 percent of untreated patients.
Mean hospital cost for index fracture care was 480.0 United States dollars compared to 960.0 United States dollars for recurrent fracture care. Annual cost of calcium, vitamin D, and oral bisphosphonate therapy was 35.0 United States dollars per patient.
On multivariable analysis, management in emergency or trauma units, odds ratio 2.84, lack of outpatient referral, odds ratio 3.12, absence of documented osteoporosis counseling, odds ratio 3.67, and no scheduled follow up appointment, odds ratio 4.01, independently predicted missed osteoporosis care.
Conclusion

Secondary fracture prevention after the first fragility fracture is severely inadequate in this low resource setting. Missed assessment and treatment result in higher fracture recurrence, mortality, disability, and healthcare costs. A simple hospital based fracture liaison pathway could substantially reduce preventable recurrent fractures at minimal cost and should be prioritized in developing health systems.

P1087

REFRACTORY DERMATOMYOSITIS TREATED WITH ANIFROLUMAB: A CASE REPORT AND REVIEW OF THE EVIDENCE

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Objective.

To describe the clinical course of a patient with dermatomyositis refractory to multiple therapeutic lines and to review the available evidence on the use of anifrolumab in dermatomyositis.
Material and Methods

We report the case of a patient diagnosed in 2024 with dermatomyositis according to the 2017 ACR/EULAR classification criteria. Disease activity was assessed longitudinally using the Myositis Disease Activity Assessment Tool (MDAAT). The patient showed refractoriness to multiple off-label therapeutic targets. A targeted literature search was conducted in updated scientific databases to identify published evidence on anifrolumab in dermatomyositis.
Results

A 65-year-old woman presented in 2024 with extensive cutaneous involvement, dysphagia, weight loss and progressive muscle weakness. She was refractory to high-dose glucocorticoids, methotrexate, mycophenolate mofetil and intravenous immunoglobulins. Due to persistent disease activity, off-label treatment with anifrolumab was initiated. From the first infusion, clinical improvement was observed in myalgias, dysphagia and fatigue, with recovery of independence in basic activities of daily living. Prednisone was progressively tapered until complete withdrawal. MDAAT scores demonstrated sustained improvement across all disease domains. Published literature reports isolated cases of refractory dermatomyositis, including juvenile, paraneoplastic and antisynthetase syndrome-associated forms, showing rapid and sustained response to anifrolumab. Ongoing clinical investigation includes a multicenter phase III trial and the JASMINE study evaluating its use in adult dermatomyositis and polymyositis.
Conclusion.

Anifrolumab is a fully human IgG1 kappa monoclonal antibody that blocks type I interferon signaling, a key pathogenic pathway in dermatomyositis. It has demonstrated efficacy in systemic lupus erythematosus and is currently under investigation for other connective tissue diseases. In our patient, type I interferon blockade resulted in clinically meaningful and sustained improvement, consistent with previously published cases. Although these findings are promising, controlled clinical trials are required to establish the efficacy and safety of anifrolumab in dermatomyositis.

P1088

MAJOR ADVERSE CARDIOVASCULAR EVENTS IN PSORIATIC ARTHRITIS TREATED WITH IL-17 INHIBITORS: ROLE OF HYPERURICEMIA AND CARDIOVASCULAR REFERRAL IN A SOUTHERN SPAIN COHORT

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Objective(s):

To determine the incidence of major adverse cardiovascular events (MACEs) in patients with psoriatic arthritis treated with interleukin-17 inhibitors in Almería (southern Spain), and to evaluate cardiovascular risk profile, prevalence and management of hyperuricemia, and referral to specialized cardiovascular risk consultation.
Material and Methods:

Retrospective case series of adult patients (≥18 years) with psoriatic arthritis (CASPAR criteria) receiving IL-17 inhibitors with ≥1 year of follow-up. Patients with previous MACEs, other concomitant biologic DMARDs, severe independent comorbidities, or insufficient follow-up were excluded. Collected variables included demographics, IL-17 inhibitor type, classical and non-classical cardiovascular risk factors (including hyperuricemia defined as uric acid >7 mg/dL), inflammatory activity (DAPSA, CRP, ESR), corticosteroid use, referral to cardiovascular risk clinic, and occurrence of MACEs (myocardial infarction, stroke, cardiovascular death). Descriptive analysis was performed.
Results:

Twenty-nine patients were included (69% male), mean age at IL-17 initiation 51.6 years. Treatments were secukinumab (55.2%), ixekizumab (31%), and bimekizumab (13.8%). Baseline disease activity was moderate-high (mean DAPSA 24.5). The most frequent comorbidities were obesity (65.5%), dyslipidemia (41.4%), hypertension (31%), type 2 diabetes (27.6%), and active smoking (24.1%). Hyperuricemia was present in 20.7%, with no patients receiving urate-lowering therapy. No patients were referred to a specialized cardiovascular risk clinic. Inflammatory activity significantly decreased (final mean DAPSA 4.5), with corticosteroid withdrawal in 57.1% of baseline users. One MACE occurred (3.4%) in a patient with multiple cardiovascular risk factors and untreated hyperuricemia.
Conclusion(s):

IL-17 inhibitors showed a low incidence of MACEs and effective inflammatory control in this real-world cohort. However, the high burden of cardiovascular risk factors, untreated hyperuricemia, and absence of cardiovascular referral highlight a clear need for integrated multidisciplinary cardiovascular assessment in psoriatic arthritis, beyond inflammatory disease control.

P1089

IL-33 PLASMA LEVELS ARE ASSOCIATED WITH MUSCLE MASS AND BODY COMPOSITION IN POSTMENOPAUSAL WOMEN

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Objective: Interleukin-33 (IL-33) is a pleiotropic cytokine released predominantly by stromal cells and has gained increasing attention in osteoporosis research (1). Experimental and clinical studies suggest that IL-33 may exert protective effects on bone and could play a role in bone–muscle crosstalk (1,2). This study aimed to investigate the relationship between IL-33, bone mineral density, and muscle mass in postmenopausal women with and without osteoporosis.

Materials and Methods: This cross-sectional study included 55 postmenopausal women (30 with osteoporosis undergoing treatment and 25 controls; mean age 66.5 ± 7.4 years). Muscle function was assessed using handgrip strength and gait speed. Muscle mass was evaluated by rectus femoris ultrasonography and bioelectrical impedance analysis, with appendicular skeletal muscle mass estimated using a validated predictive equation. Bone mineral density (BMD) was measured by dual-energy X-ray absorptiometry, and fracture risk was assessed using FRAX. Plasma IL-33 concentrations were measured using a sandwich enzyme-linked immunosorbent assay.

Results: Plasma IL-33 levels differed significantly between postmenopausal women with osteoporosis and controls in unadjusted analyses (21.3 [IQR 45.07] vs 7.99 [IQR 14.3], p=0.038); however, this association was attenuated after adjustment for BMI. IL-33 levels showed significant positive correlations with rectus femoris cross-sectional area (rho=.288, p=0.035) and appendicular skeletal muscle mass (rho=.352, p=0.009). No significant correlations between IL-33 levels and BMD were found. In bootstrapped multivariable linear regression models adjusted for age, BMI, and bone mineral density, higher IL-33 levels (β=0.26, p<0.034) were independently associated with greater muscle mass.

Conclusion: In postmenopausal women, higher circulating IL-33 levels were associated with greater skeletal muscle mass, suggesting a potential role in muscle maintenance and bone–muscle crosstalk.

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P1090

INFLUENCE OF MACS PROTOCOL ISOLATION TRAITS ON NEUTROPHIL ACTIVATION AND NET FORMATION IN SLE

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Objective: NET formation is a fairly recently discovered mechanism for elimination of large antigen structures. NETs may also participate in SLE pathogenesis as a target or as a priming factor for antinuclear and antinucleosome antibody formation. Accurate assessment of this phenomenon requires the use of a neutrophil isolation method that minimizes cell activation during isolation.

Methods: We analyzed blood samples from healthy individuals and patients with SLE. Neutrophils were isolated from buffy coats using MACS with in-house synthesized magnetic polyacrylamide beads. Either mixture of mouse monoclonal antibodies for negative selection of neutrophils or mouse monoclonal IgG to human CD16b for the positive selection were immobilized on the particles. Viability was assessed by trypan blue exclusion, and activation was assessed using the standard NBT assay. NETs were induced with PMA and visualized by fluorescence microscopy using SYBR green and RPE conjugated anti- myeloperoxidase antibodies.

Results: 28 healthy volunteers were enrolled in efficiency assessment of neutrophil isolation as a control group. Neutrophil fractions positively selected with immobilized anti-CD16b antibodies from control samples were almost coincided with those purified by negative selection in average yield, average purity, and average viability. Mean non-activated cell fraction was somewhat higher in negatively selected neutrophils (98,9 (94,0-100,0)%) than in positively selected ones (89,6 (81,3-97,9)%), but the difference was not significant. Average spontaneous NET production was 7,8 (3,3-12,3)% for positive selection and 5,0 (3,1-6,9)% for negative selection. PMA induced NET frequency was 28,9 (22,0-35,8)% and 39,3 (31,7-46,9)%, respectively. SLE patients were divided in two consecutively composed groups, 27 patients were applied to positive selection, and 12 patients were applied to negative selection. Average spontaneous NET production was 22,1 (14,6-29,6)% and 11,3 (6,2-16,4)%, respectively. PMA induced NET frequency was 40,4 (27,9-52,9)% and 53,5 (38,2-68,8)%, respectively.

Conclusion: Neutrophil fractions isolated by negative selection using magnetic polyacrylamide beads exhibited a significantly lower proportion of cells with signs of activation compared to fractions isolated by positive selection with immobilized anti-CD16b. Both approaches demonstrated high yield, viability, and purity of neutrophils. We evaluated the feasibility of using the developed isolation methods to study NETs ex vivo. Parameters of NET formation were different for neutrophils obtained using the negative and by positive selection with immobilized anti-CD16b antibodies. In healthy controls neutrophils isolated by negative selection were characterized by a slightly lower proportion of spontaneous NET formation and a somewhat higher proportion of cells with PMA-induced NET formation. Both differences were however not significant. This trend was most pronounced in SLE, where we found statistically significant increase in the proportion of cells with induced NETs in SLE compared to controls using negative selection. We believe these differences may be related to the binding of CD16b to its ligand, monoclonal antibodies immobilized on the beads.

P1091

IMPROVING QUALITY OF LIFE WITH APPLICATION OF RADIAL EXTRACORPOREAL SHOCKWAVE THERAPY IN PATIENTS WITH CALCIFIC TENDINITIS OF THE SHOULDER ROTATOR CUFF

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Introduction: Most common disorder of the shoulder is calcific tendinitis of the rotator cuff. It is commonly treated with various physical treatment modalities where extracorporeal shockwave therapy (ECTUB) is emerging as an effective new method.
Objective: The main objective of this clinical study is to evaluate the quality of life of ECTUB treatment in patients with calcific tendinitis of the shoulder rotator cuff.
Material and method: The research was a prospective, monocentric clinical study that included 40 patients who received ECTUB and performed shoulder exercises. The efficacy of the treatment was evaluated using the Questionnaire for quality of life in patients with shoulder rotator cuff disease (RC-QOL). Clinical findings were evaluated at the same time in four time points: before starting physical therapy, immediately after the end of the therapy, after the third month and after the sixth month after starting physical therapy.
Results: After the treatment all patients had statistically significantly better results in the RC-QOL.
Conclusion: Extracorporeal shockwave therapy combined with exercises is a safe and non-invasive treatment that improves quality of life in patients with calcifying tendinitis of the shoulder rotator cuff.
Keywords: extracorporeal shockwave therapy, quality of life, calcifying tendinitis of the shoulder rotator cuff

P1092

INTEGRATED ANALYSIS OF GENETIC VARIANTS IN BONE METABOLISM GENES AND BIOCHEMICAL MARKERS IN OSTEOPOROSIS

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Biochemical markers of bone metabolism reflect dynamic processes of bone remodeling and may provide earlier and more sensitive indicators of osteoporosis (OP) progression than densitometric measures. Understanding the genetic determinants underlying inter-individual variation in these biomarkers is therefore essential for improving risk stratification and personalized management of OP.

The aim was to identify associations between polymorphic variants and haplotypes in bone-remodeling genes and key biochemical markers in Belarusian patients with OP and to evaluate whether it enhances biologically and clinically relevant signals.
Material and Methods. A case-control cohort of 456 individuals (251 OP, 205 controls) recruited at the 1st Minsk City Hospital was analysed. Targeted sequencing of 68 bone-metabolism genes was performed on DNA from peripheral blood (Illumina). Association testing with biochemical traits used linear regression models; Benjamini-Hochberg correction was applied for multiple testing. Haplotype and multilocus interaction analyses were performed to increase power and reveal combined effects.
Results. Variants and haplotypes in the *VDR* locus showed the strongest biochemical associations: rs731236 displayed a gene-dose effect on serum 25(OH)D (G/G vs A/A: β = +6.7 ng/mL; P = 0.0016, Figure), while rs11568820 and combined haplotypes (notably A-T-G-C) were significantly associated with increase (haplotype A-T-G-C: β=+4.1 ng/mL; P=0.001), suggesting genotype-dependent vitamin D status and response to supplementation. *VDR* rs7975232 C/C and rs2228570 G/G were associated with modest reductions in total serum calcium in OP (P=0.019 and 0.017).

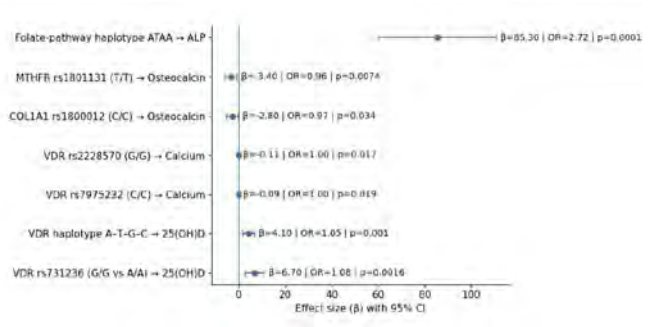


Figure: Forrest plot of revealed genetic associations
COL1A1 rs1800012 C/C and *MTHFR* rs1801131 T/T were linked to lower osteocalcin (P = 0.034 and P = 0.0074). Multilocus folate-pathway haplotypes (e.g., ATAA) associated with markedly increased alkaline phosphatase in OP (difference up to +85.3 U/L vs reference; P < 0.0001), indicating combined genetic influence on bone turnover markers.
Conclusion. Targeted sequencing and integrated haplotype analysis reveal robust, biologically plausible associations. Findings support a model of genotype-dependent vitamin D metabolism and differential biochemical phenotype in OP, with potential implications for genetically informed monitoring and personalized supplementation strategies.

P1093

ATYPICAL FEMORAL FRACTURES IN A WOMAN WITH UNTREATED DECOMPENSATED HYPOTHYROIDISM - A CASE REPORT

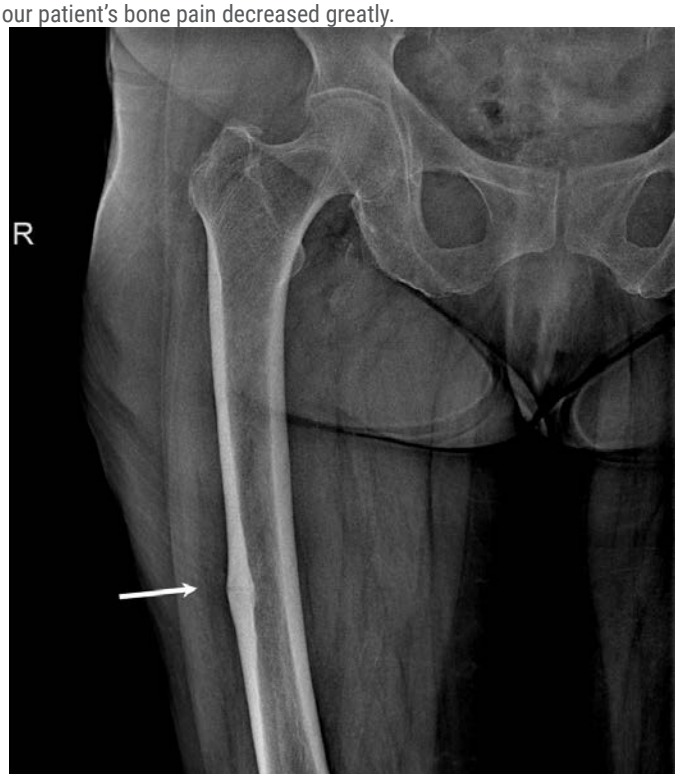
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Objective. To present the case of a woman with newly diagnosed hypothyroidism and an atypical femoral fracture who has never received therapy for osteoporosis before the fracture.

Materials and methods. A 86-year-old female patient who had a history of a spontaneous fracture of the left femoral shaft and a Looser zone in the middle of the right femoral shaft

Results. A 86-year-old female patient presented with complaints of pain in her right thigh. X-ray revealed a Looser zone in the lateral cortex in the middle of the right femoral shaft (figure). 6 months earlier, the patient had experienced similar pain in her left thigh, after which she suffered a spontaneous fracture of the left femoral shaft. She underwent internal fixation of fracture with an intramedullary rod. The patient disclosed that she never used glucocorticoids or medications to treat osteoporosis. Laboratory tests showed elevated TSH 25.68 μIU/mL, normal levels of PTH, 25(OH)D, and low levels of serum P1NP and Beta Cross Laps. Hypothyroidism was diagnosed. Therapy with levothyroxine and teriparatide was prescribed. Within 6 weeks of starting teriparatide, our patient's bone pain decreased greatly.



Conclusion. An atypical femoral fracture is an unusual type of fracture that occurs without trauma. This condition usually emerges as a complication of long-term use of antiresorptive therapy for osteoporosis. We presented the case of a woman with newly diagnosed hypothyroidism and an atypical hip fracture who has never received therapy for osteoporosis before the fracture.

P1094

WHAT PROPORTION OF WOMEN EXPERIENCE SIGNIFICANT TRANSMENOPAUSAL BONE LOSS?

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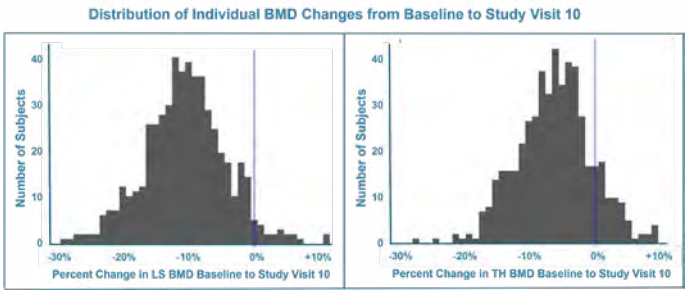
The relatively rapid bone loss that occurs during the menopausal transition is an important determinant of the subsequent development of postmenopausal osteoporosis. The Study of Women Across the Nation (SWAN) followed more than 3000 women across the menopausal transition. Reports from SWAN have described the average changes in bone mineral density (BMD) with average losses from 5 years before the final menstrual period (FMP) until 5 years after FMP of 10.6% in the lumbar spine and 9.1% at the femoral neck. Knowing the proportion and characteristics of women who experience significant bone loss during the menopausal transition would aid the development of appropriate strategies to prevent that bone loss in women at high risk for developing osteoporosis.

Objective: To evaluate the distributions of lumbar spine and total hip BMD changes in individual women in SWAN from baseline to Visit 10.

Design: A secondary analysis was conducted using the publicly available SWAN dataset, from baseline through 10 years of annual assessments. The analysis was limited to women undergoing natural menopause without exposure to bone-active drugs (estrogens, osteoporosis medications, tamoxifen, and chemotherapy).

All subjects who had BMD results at baseline and 10 years were evaluated. Menopause status at each visit was categorized as pre-, early peri-, late peri- or post menopause. Percentage change in lumbar spine (LS) and total hip (TH) BMD from baseline to 10 years was calculated. Analyses were conducted in RStudio, version 2024.12.1.

Results: 516 women met inclusion criteria. Mean age was 46.2 years; mean years of menopause 4.5; mean BMI 27.6. Average BMD values at baseline corresponded to T-scores of 0.18 at LS and 0.08 at TH. The average % changes in BMD were 10.4% at LS (almost 1 T-score) and 6.1% at TH. Distributions of individual changes in LS BMD are shown in the Figure. 88% and 72% of women had losses of at least 3% at LS and TH, respectively, while 83% and 57% had losses of 5% or greater. Maximum individual losses exceeded 25% at both the spine and hip.



Conclusion: Almost all women experience significant bone loss during the menopausal transition, and many would benefit from therapy to prevent bone loss and osteoporosis.

Disclosures: None

P1095

COMPARING HYDROTHERAPY AND LAND-BASED EXERCISES ON WALKING PERFORMANCE IN KNEE OSTEOARTHRITIS: A SYSTEMATIC REVIEW OF RANDOMISED CONTROLLED TRIALS

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Objective: This systematic review assessed the impact of aquatic therapy on gait and functional outcomes in knee osteoarthritis (KOA) compared with land-based exercises.

Materials and Methods: Following PRISMA guidelines, electronic databases (PubMed, Scopus, Web of Science, ScienceDirect, SpringerLink, and PEDro) were queried for papers dating from 2015 to 2025, using terms related to KOA, aquatic exercises or hydrotherapy, land-based training, and gait, walking, or functional performance. Randomised controlled trials (RCTs) assessing the effects of aquatic interventions on gait or mobility outcomes such as the 6-minute walking test (6MWT), Time Up and Go (TUG), Five Times Sit to Stand (5TSS) and Stair Climb Test (SCT) or gait kinematics, kinetics or temporo-spatial parameters were searched for inclusion. Studies involving combined treatments, surgical patients or non-human subjects were excluded. Data extraction focused on patients' characteristics, intervention protocols, control groups and walking-related outcomes.

Results: Five RCTs met the inclusion criteria. Both aquatic and land-based programs generated significant within-group improvements, particularly regarding walking distance and 6MWT's speed. However, studies reported no statistically significant differences between groups (1, 2, 3). Kinematic analysis indicated greater increases in knee flexion and range of motion during the early stance phase after hydrotherapy than in the control group (4). Functional mobility outcomes (TUG, 5TSS, SCT) showed significantly better results after 6 weeks of intervention in the study group, whereas the referees (land-based therapy) improved only the 5TSS value (5). Additional observation was the benefits of water walking (2) and dance-based aquatic exercise (3) on functional capacity and gait performance in elderly postmenopausal women with KOA.

Conclusions: Hydrotherapy and land-based exercise are effective treatment options that improve gait in KOA patients, many of whom have comorbid conditions that may restrict other rehabilitation approaches (6).

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P1096

RELIABILITY OF ULTRASOUND ASSESSMENT OF MEDIAL AND LATERAL MENISCAL EXTRUSION IN SUPINE AND WEIGHT POSITIONS, IN KNEE OSTEOARTHRITIS: A PILOT STUDY

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Objective: This pilot study aimed to assess the validity of musculoskeletal ultrasound (MSUS) for evaluating meniscal extrusion in knee osteoarthritis (KOA), a common disease with a significant impact on quality of life, by quantifying inter- and intra-observer reliability in supine and weight-bearing conditions, given that previous studies have mainly focused on non–weight-bearing assessments (1,2).

Materials and Methods: Twenty patients with KOA (forty knees) underwent MSUS assessment of medial and lateral meniscal extrusion in supine, bilateral, and single-leg standing positions. Two independent evaluators with similar experience performed two measurements 48 hours apart. Statistical analysis was performed using SPSS Statistics 26 software. Inter- and intra-rater reliability were assessed using intraclass correlation coefficients (ICC, two-way random-effects model, absolute agreement). Measurement precision was quantified using the standard error of measurement (SEM) and the minimal detectable change at the 95% confidence level (MDC95). Changes in extrusion from supine to single-leg standing (Δ extrusion) were compared with MDC95 to identify true loading-related changes exceeding measurement error.

Results: Inter-rater reliability was strong to very strong across all positions and both menisci, with ICC values ranging from 0.857 to 0.954. SEM values ranged from 0.176 to 0.346 mm, yielding MDC95 values of 0.49-0.96 mm. The increase in meniscal extrusion from supine to single-leg standing exceeded the MDC95 in 27 (67.5%) knees for the medial meniscus and 19 (47.5%) knees for the lateral meniscus, indicating true loading-related changes in a substantial proportion of cases. Intra-rater reliability for both evaluators was similarly high (ICC range: 0.837–0.962), with higher MDC95 values observed in single-leg standing and for the lateral meniscus.

Conclusions: Ultrasound assessment of medial and lateral meniscal extrusion demonstrates a high inter- and intra-rater reliability and sufficient precision to detect true, load-dependent structural changes in KOA. Weight-bearing ultrasound, particularly in single-leg standing, is a reliable and sensitive method for evaluating meniscal extrusion in both clinical and research settings.

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P1097

HUMERUS STRENGTH IN WHITE RATS AFTER IMPLANTATION OF HYDROXYLAPATITE SATURATED WITH ZINC IN VARIOUS CONCENTRATIONS INTO THE TIBIA

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Objective of the study is to test the strength of the humerus in rats after implantation of hydroxylapatite material OC-015 saturated with zinc in concentrations of 0.20%, 0.50% and 1.00% into the tibia.
Material and methods. 252 white male rats weighing 135-145 g were used, divided into: group 1 – control, group 2 – rats with tibial defect, in group 3 the defect was filled with OC-015 without zinc. In groups 4-6, the defect was filled with OC-015 saturated with 0.20%, 0.50% and 1.00% zinc. The strength of the humerus was determined when bending at a loading rate of 0.25 mm/min before fracture.
Results. The minimum work of destruction of the humerus (MWD) from 7 to 180 days after surgery was lower in group 2, than in group 1 by 7.22%-14.82%. In group 3 the MWD exceeded the values of group 2 by 7.12% and 9.26%. In group 4 the MWD was higher than the values of group 3 on day 7 by 25.74%. In group 5, the modulus of elasticity was lower than in group 3 from days 15 to 90 by 22.69%, 18.58%, 16.39% and 12.12%. The MWD exceeded the indicators of group 3 from 7 to 90 days by 22.37%, 5.60%, 17.53%, 11.69%, 19.14% and 7.31%. In group 6 the MWD exceeded the values of group 3 from 7 to 180 days by 30.14%, 8.41%, 26.23%, 12.30%, 22.23% and 9.34%.
Conclusion. The implantation of OC-015 into the tibia is accompanied by a decrease in the strength of the humerus; saturation of the OC-015 material with zinc smooths out the negative effect. The optimal zinc concentration is 1.00%.

P1098

HALLUX RIGIDUS IN ATHLETES: BIOMECHANICAL IMPLICATIONS AND THE ROLE OF IMAGING

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Objective:
To analyze the functional limitations and biomechanical implications of hallux rigidus in athletes, with particular focus on dancers and sports practitioners, for whom first metatarsophalangeal joint mobility is critical. The role of imaging in supporting clinical management and monitoring disease progression is also evaluated.

Material and Methods:
Hallux rigidus, or osteoarthritis of the first metatarsophalangeal joint, leads to progressive reduction of range of motion and pain, impairing athletic performance and increasing compensatory injury risk. Imaging evaluation included conventional radiography to assess joint space narrowing, osteophyte formation, and bone deformities (Fig 1). MRI, both in elective and follow-up settings, was used to detect early inflammatory changes and soft tissue alterations surrounding the joint. Functional limitations and biomechanical impact were correlated with imaging findings.
Results:
Radiographic and MRI assessment allowed precise grading of disease severity and identification of features predictive of progression. Early recognition of hallux rigidus, combined with integrated functional evaluation, informed decisions on conservative versus surgical management and guided adaptation of training programs. In athletes, particularly dancers, imaging findings were essential to prevent secondary biomechanical complications, optimize joint function, and minimize disability risk.
Conclusion:
Management of hallux rigidus in athletes requires a multidisciplinary approach in which imaging plays a central role. Accurate interpretation of radiographic and MRI findings, integrated with clinical and functional assessment, enables tailored treatment strategies, preservation of long-term joint function, and reduction of impact on athletic careers.
Limitations:
The study is limited by its observational design and lack of long-term follow-up. Functional assessment was not quantitatively standardized in all athletes, and imaging results may vary according to technique and operator, potentially affecting generalizability of the findings.

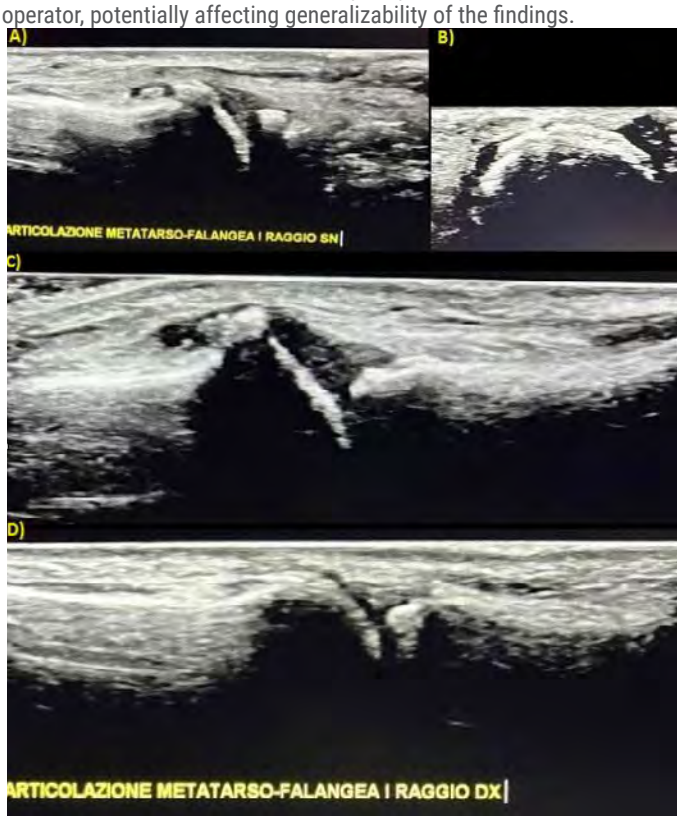


Fig. 1 Ultrasound images of the left first metatarsophalangeal joint (pathologic side):

a) Longitudinal scan showing joint space narrowing, capsular thickening, and osteophytic formation;

b) Transverse scan highlighting osteophytes and signs of periarticular inflammation;
c) Second longitudinal scan demonstrating joint effusion and synovial tissue alterations;
d) Comparative image of the right side (healthy), showing normal joint morphology and preserved joint space.

P1099

PERTHES DISEASE AND SPORTS ACTIVITY: BIOMECHANICAL IMPLICATIONS AND THE ROLE OF IMAGING IN FUNCTIONAL HIP ASSESSMENT

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Objective:

To evaluate functional limitations and biomechanical risks in athletes with Perthes disease, emphasizing the predictive role of imaging in guiding clinical management and preserving long-term hip function.

Material and Methods:

Perthes disease, a pediatric avascular necrosis of the femoral head, causes progressive morphological changes that increase susceptibility to deformity and early osteoarthritis. High-impact or unilateral-loading sports (e.g., football, gymnastics) may compromise femoral head remodeling, while low-impact activities (e.g., swimming, cycling) are generally recommended. Radiography and CT assessed femoral head shape, joint congruence, and structural integrity (Fig 1-3). MRI allowed early detection of cartilage lesions, subchondral sclerosis, and subtle soft tissue changes. Imaging findings were integrated with functional evaluation to guide activity modification and anticipate biomechanical complications.

Results:

Multimodal imaging enabled precise characterization of femoral head morphology and early degenerative changes. Patients with early structural alterations were identified for targeted interventions, including training adjustments and rehabilitation. Radiography and CT provided robust bone assessment, while MRI detected predictive markers of unfavorable outcomes, supporting proactive management. Integration with functional evaluation allowed optimization of load, reduction of compensatory stress, and mitigation of long-term hip degeneration.

Conclusion:

Management of Perthes disease in athletes requires a multidisciplinary, imaging-informed approach. Radiologists play a key role in detecting early structural and soft tissue changes predictive of adverse progression, enabling clinicians to define sport-specific activity limits. Accurate interpretation of imaging, contextualized with patient activity, facilitates long-term joint preservation, reduces the risk of degenerative sequelae, and optimizes functional outcomes into adulthood.

Limitations:

Observational design, variable follow-up, and non-standardized functional assessment limit generalizability. Imaging interpretation may vary with operator experience, and results may not extend to older or non-pediatric populations.



Fig. 1.3D Volume Rendering of the pelvis: The left hip demonstrates femoral head flattening and subtle irregularity of the acetabular contour, consistent with sequelae of Perthes disease. The contralateral hip appears normal.

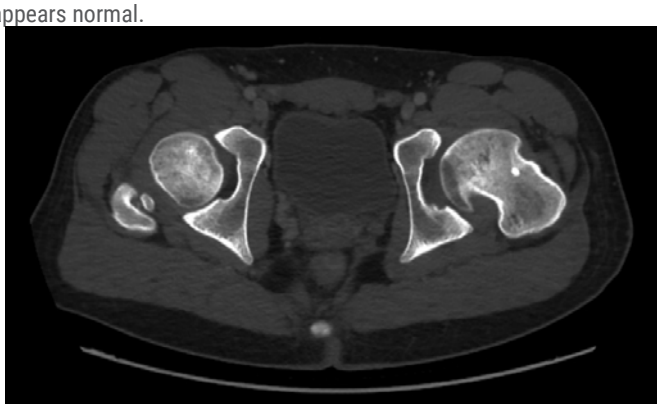


Fig. 2.Axial CT with bone window: The left femoral head shows areas of subchondral sclerosis, reduced sphericity, and early osteophyte formation. Joint space narrowing is more pronounced compared to the right, unaffected hip.



Fig. 3.Coronal CT reconstruction: Morphological assessment highlights lateral and superior flattening of the left femoral head with mild acetabular incongruence. The right hip maintains normal contour and joint congruence, providing an internal control.

P1100

TENNIS ELBOW AND ELBOW KINEMATICS IN TENNIS: COMPARATIVE STUDY WITH BIOMECHANICAL ANALYSIS AND RADIOLOGICAL CORRELATION

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Objective: To investigate elbow flexion-extension kinematics during the tennis serve in professional and amateur players, identifying patterns associated with increased risk of lateral epicondylitis (1-5). We hypothesize that irregular, low-fluidity movements correlate with overuse injury susceptibility, with radiological correlates in tendon and joint structures.

Material and Methods: Fifty tennis players were divided into four groups: healthy professionals, healthy amateurs, professionals with epicondylitis, and amateurs with epicondylitis. Pathology was confirmed by multimodal imaging, including ultrasound, CT, and MRI. Elbow motion during the serve was captured using OpenCap, a markerless motion capture system. Kinematic data were analyzed with OpenSim and MATLAB, focusing on the jerk index as a quantitative measure of movement smoothness (6-7). Imaging findings were correlated with kinematics to assess structural-functional relationships.

Results: Significant differences in elbow kinematics were observed between professionals and amateurs. Players with epicondylitis showed higher jerk values, indicating abrupt, low-fluidity motion. Flexion-extension velocities exceeding critical thresholds were associated with increased injury incidence. A significant correlation ($p < 0.05$) was found between irregular motion and imaging evidence of tendon overload or early degenerative changes. Subtle biomechanical deviations thus appear predictive of musculoskeletal stress in tennis players (Fig. 1-5).

Conclusion: Markerless motion capture identifies kinematic signatures linked to lateral epicondylitis, with radiological support. Integrating biomechanical analysis and imaging allows early detection of tendon overload, personalized training adaptation, and injury prevention in both elite and recreational athletes (8-10).

Limitations: The sample size limits generalizability. Markerless systems, while practical, have reduced precision for complex joint kinematics and are sensitive to environmental conditions. Long-term imaging follow-up is constrained by ethical and logistical considerations. Alternative systems (inertial sensors or marker-based capture) offer higher accuracy but reduced practicality in dynamic sports settings. Future larger-scale, longitudinal studies are needed to validate predictive kinematic markers.

Acknowledgment:

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Declarations:

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- Ethical approval: No ethical approval was required.

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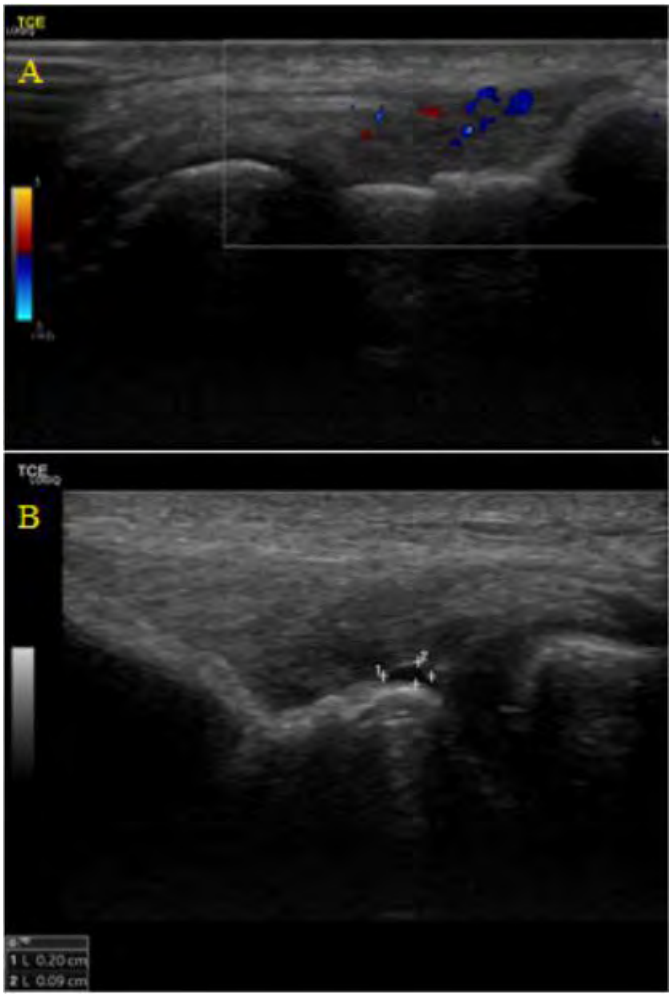


Fig. 1: *Ultrasound images of a patient with lateral epicondylitis. At the lateral epicondyle, the common extensor tendon appears thickened and hypoechoic with heterogeneous texture. Power Doppler shows increased vascularity (A), and tiny calcifications are present. A small anechoic defect (2 × 1 mm) is visible within the deep tendon fibers (B), consistent with a partial-thickness tear.*

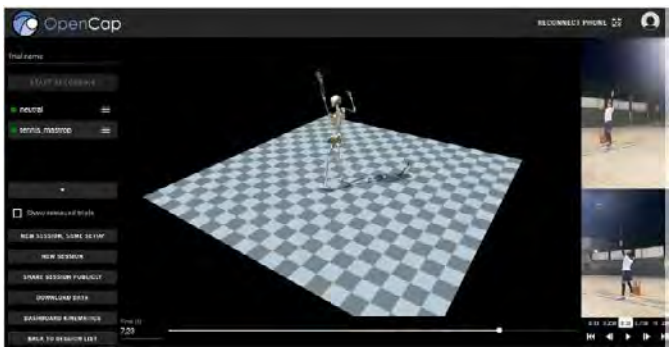


Fig. 2: *OpenCap Data Acquisition Interface After Camera Calibration Once the camera calibration is complete, OpenCap transitions to the data acquisition phase, displaying a real-time preview of the subject's movements. The interface is user-friendly, allowing the operator to monitor camera alignment and ensure optimal positioning of the subject. Key features include:*
1. Real-Time Tracking: Live feedback on the subject's position ensures proper alignment during capture.
2. Positioning Guidelines: Visual cues assist in placing the subject within the camera's view.
3. Motion Capture Monitoring: The system tracks and highlights body parts, ensuring no key movements are missed.
4. Data Visualization: Graphical overlays show the body's movement and joint angles in real time.
5. Calibration Confirmation: The system checks camera alignment and flags errors for correction.
6. Data Storage: Collected data is saved for further analysis in compatible formats.
The interface is designed for efficient and accurate motion capture, streamlining the process and enhancing biomechanical analysis.

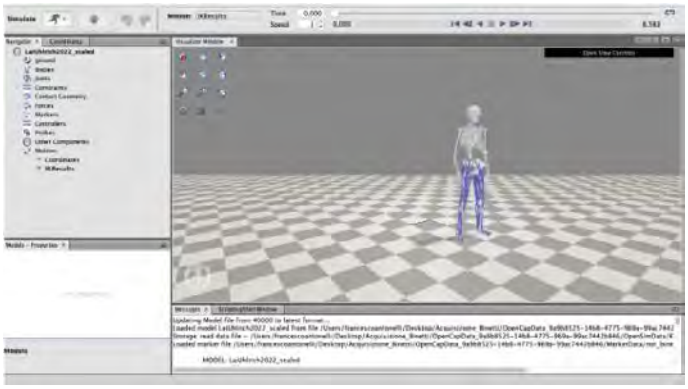


Fig.3: *OpenSim interface with the scaled model obtained from OpenCap, ready for kinematic* analysis.

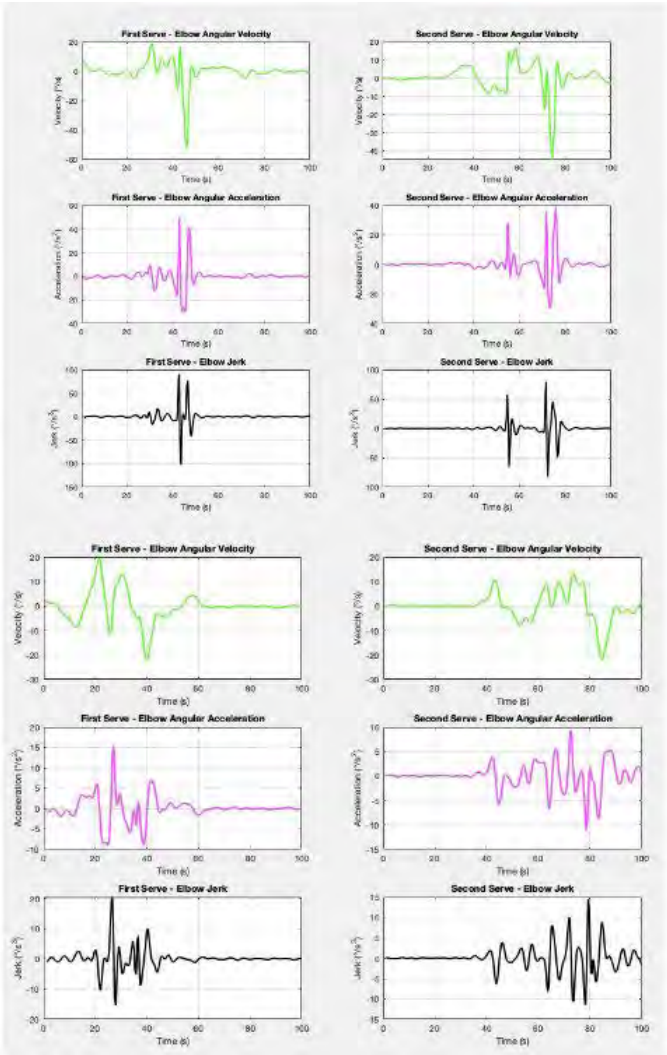


Fig. 4: *a) e b) Comparison of movement fluidity between professional and amateur tennis* players using jerk analysis. Lower jerk values indicate smoother, more continuous movements in professionals.

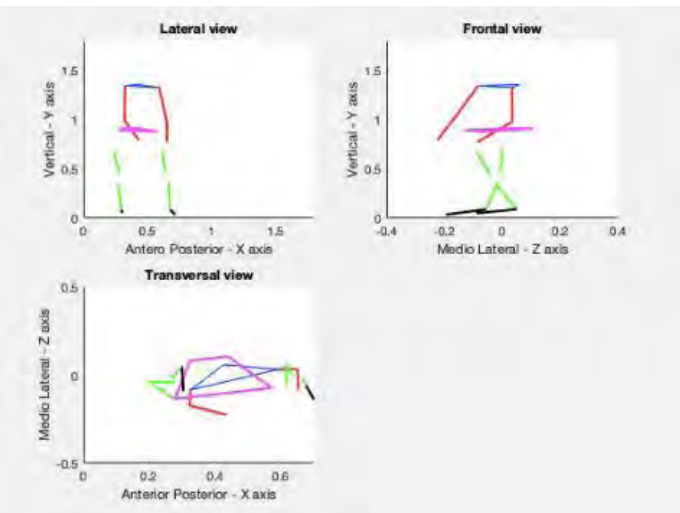


Fig. 5: *Reconstruction of the Tennis Serve Through Kinematic Analysis in the Three Planes of Space.*

P1101

BONE HEALTH ASSESSMENT IN PATIENTS WITH PROSTATE CANCER: ROLE OF REMS TECHNOLOGY

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Objective:
Prostate cancer (PCa) and its treatments, particularly androgen deprivation therapy (ADT), accelerate bone loss and increase fracture risk. Early detection of skeletal fragility is crucial. This study evaluates femoral neck bone mineral density (BMD) using Radiofrequency Echographic Multi-Spectrometry (REMS), a non-ionizing, ultrasound-based technique validated for osteoporosis diagnosis and fracture risk prediction (1-6).

Material and Methods:
Fifty-one Caucasian men with PCa and an age-, BMI-, and ethnicity-matched healthy control group underwent REMS scans of the femoral neck to obtain BMD, T- and Z-scores. Statistical differences were evaluated using t-tests. Literature-based evidence was integrated to contextualize REMS findings regarding ADT exposure, fracture risk, and comparison with DXA outcomes.

Results:
Groups were comparable for age (73.5 ± 7.3 vs. 73.4 ± 7.2 years) and BMI (25.3 ± 2.9 vs. 25.3 ± 3.1 kg/m²). PCa patients showed significantly lower femoral neck BMD, T- and Z-scores than controls (BMD reduction: -3.4%, $p < 0.05$). REMS identified early bone deterioration not always detected by DXA, demonstrating high reproducibility and precision. These results corroborate ADT-induced skeletal fragility and suggest REMS as a sensitive tool for fracture risk prediction (7-8) (Table 1).

Conclusion:
REMS enables early detection of bone loss in PCa patients, supporting personalized preventive strategies and monitoring, particularly for those receiving ADT (Fig. 1). Its non-ionizing nature, bedside applicability, and validated predictive accuracy make REMS a valuable addition to routine skeletal assessment, potentially improving long-term outcomes and reducing fracture incidence (9-10).

Limitations:
The study is limited by sample size and single-center design, which may affect generalizability. REMS is operator-dependent, and while reproducibility is high, standardization of scanning technique is crucial. Longitudinal fracture outcome data were not available, and future multicenter, prospective studies are needed to confirm predictive value and cost-effectiveness compared with DXA in PCa populations.

Group	Measurement site	BMI	BMD (g/cm²)	T-score	Z-score
Prostate Cancer	Lumbar Spine	25.6 ± 2.9	0.885 ± 0.08	-1.9 ± 0.8	-0.7 ± 0.7
	Femoral Neck	25.3 ± 2.9	0.691 ± 0.08	-1.8 ± 0.7	-0.7 ± 0.6
Healthy Control	Lumbar Spine	25.7 ± 2.7	0.945 ± 0.11	-1.3 ± 1.0	-0.2 ± 0.9
	Femoral Neck	25.3 ± 3.1	0.715 ± 0.1	-1.5 ± 0.7	-0.2 ± 0.9

Table 1.*Comparison of BMI, Bone Mineral Density (BMD), T-score, and Z-score between Prostate Cancer Group and Healthy Control Group: there is the summarize the BMI, BMD, T-score, and Z-score measurements at the lumbar spine and femoral neck in two groups: PCa patients undergoing ADT and healthy controls. The PCa group shows significantly lower BMD values at both measurement sites compared to the healthy control group, with a more pronounced decrease observed in the femoral neck.*
Additionally, the T-scores for both the lumbar spine and femoral neck in the PCa group indicate lower bone mineral density compared to the average young adult population, reflecting the osteoporotic effects of ADT. Z-scores show that the PCa group has reduced bone density relative to age-matched controls. These differences highlight the impact of ADT on bone health in PCa patients.



Figure 1 .*Acquisition method: REMS technology assesses bone health using a simple ultrasound scan of the spine and femur. The probe is placed on the abdomen to scan the lumbar vertebrae (L1-L4) (A) or on the hip to scan the femoral neck (B). The scans are performed using a dedicated device (EchoStation, Echolight Spa, Lecce, Italy) with a 3.5 MHz convex transducer. For the lumbar spine, the probe is placed in a trans-abdominal position, with each vertebra scan taking 20 seconds, totaling 80 seconds for the entire L1-L4 region. For the femur, the probe is aligned with the femoral head, neck, and trochanter, and the scan lasts 40 seconds.*
After scanning, the data is processed automatically to analyze the bone structure and compare it to reference models based on gender, age, site, and BMI, providing a patient-specific bone health profile (Figures used came from the article: Gifuni R, Montatore M, Et al. Radiofrequency Echographic Multi-Spectrometry in the Diagnosis of Metabolic Bone Disease. Semin Musculoskelet Radiol. 2024 Oct;28(5):547-556. doi: 10.1055/s-0044-1788885).

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Ethical approval: Standard institutional board ethics approval.

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P1102

CASE REPORT OF AN ISOLATED STERNAL FRACTURE AFTER LOW-ENERGY TRAUMA IN A PATIENT

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Objectives: The aim of this paper is to present a case of an isolated sternal fracture following minor trauma, with an emphasis on the diagnostic approach and therapeutic modalities.
Material and Methods: A 60-year-old female patient, a pharmacist by profession, experienced sudden severe pain in the sternal region while entering the water prior to swimming. She went to the emergency department due to intense chest pain that worsened with breathing. A chest X-ray and electrocardiogram (ECG) were performed and showed no pathological abnormalities. She was referred to the Department of Thoracic Surgery, where a chest CT scan revealed a fracture of the sternal body. Subsequent examination performed by a physiatrist revealed severe pain on gentle palpation of the sternal region, with exacerbation of pain during both inspiration and expiration. The examination also noted spinal deformities in the form of kyphoscoliosis and an asthenic body constitution, which prompted referral for bone densitometry. Bone densitometry results revealed a T-score of −3.9 in the lumbar spine and −3.0 in the hip, which, together with the sternal fracture, indicated severe osteoporosis. The patient was administered pharmacological therapy for osteoporosis, including subcutaneous denosumab and vitamin D supplementation (4,000 IU). In addition, the patient was enrolled in a physical therapy program, consisting of cryomassage of the painful area, magnetotherapy, laser therapy, and treatment with polarized light.
Results
After 10 days of physical therapy, combined with pharmacological treatment for osteoporosis, the patient reported a significant reduction in sternal pain, with no pain during respiration. Tenderness over the sternal region was minimal on palpation. A follow-up CT scan of the sternum showed findings consistent with a healed fracture, indicating successful bone consolidation.

Conclusion
In cases of low-energy trauma with isolated fractures, after the physical examination of a patient, bone densitometry should be considered to detect osteoporosis. Early initiation of physical therapy is essential to optimize pain control, preserve mobility, and prevent further functional decline.

P1103

ESTIMATED MRI-BASED MUSCLE COMPOSITION FROM HIP DXA SCANS IS RELATED TO PHYSICAL ABILITY AND FALL RISK

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Objective Magnetic Resonance Imaging (MRI)-derived measures of muscle composition including fat free muscle volume (FFMV) and muscle fat infiltration (MFI) may improve fall risk prediction but are rarely used due to high cost. Leveraging routinely captured hip Dual-Energy X-Ray Absorptiometry (DXA) images and machine learning (ML) models we sought to estimate the FFMV and MFI of the thigh muscle measured by MRI and explore associations with physical ability and fall risk in the UK Biobank participants.
Material and Methods A dataset of 34,637 samples containing DXA scans of the right hip from the UK Biobank Imaging Study were used to train and evaluate a Convolutional Neural Network (CNN) to estimate thigh FFMV and MFI measured by MRI. The dataset was split into training, validation, and test set in a five-fold cross-validation. For both MRI- and ML-derived measures, age- and sex-adjusted logistic regression models were used to determine the association with ground truth and ML-derived muscle composition values with weak hand grip strength defined by the European Working Group on Sarcopenia in Older People and self-reported walking pace adjusted by age and sex. Similarly, Cox Proportional-Hazards were used to assess the relationship between ground truth and ML-derived muscle composition values and incident falls.
Results FFMV and MFI were predicted with correlations of r > 0.7 and mean absolute percentage errors of 7.5% and 12.4%, respectively. For each one–standard deviation decrease in FFMV and increase in MFI, the odds of weak grip strength increased by approximately 60% and 30%, whereas only higher MFI was associated with slow walking pace. Similarly, both measures were associated with a higher risk of incident falls (Table 1). ML-derived phenotypes demonstrated similar odds and hazard ratios to traditional MRI measures.
Conclusion Machine learning-derived muscle composition measures estimated from hip DXA scans can be used to estimate thigh muscle quality to identify people with an increased risk for functional decline and falls during routine osteoporosis screening.
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Table 1 Cross-sectional association between muscle composition adjusted by age and sex and odds (OR 95%CI) for weak grip strength, slow walking pace, and hazard ratios (HR 95%CI) for incident falls per standard deviation increase and binary exposure.

Outcome		OR (95%CI) Per SD increase
Low grip strength	Prevalence (%)	3132 (9.2)
	FFMV	**0.37 (0.34, 0.40)**
	MFI	**1.30 (1.26, 1.35)**
	ML-FFMV	**0.41 (0.38, 0.45)**
	ML-MFI	**1.33 (1.28, 1.39)**
Slow walking pace	Prevalence (%)	1482 (4.3)
	FFMV	0.91 (0.82, 1.00)
	MFI	**2.20 (2.11, 2.31)**
	ML-FFMV	1.07 (0.95, 1.20)
	ML-MFI	**2.19 (2.09, 2.30)**
		HR (95%CI) Per SD increase
Falls	Incidence (%)	754 (2.3)
	FFMV	0.89 (0.77, 1.05)
	MFI	**1.13 (1.06, 1.22)**
	ML-FFMV	**0.81 (0.69, 0.96)**
	ML-MFI	**1.14 (1.06, 1.23)**

Fat Free Muscle Volume (FFMV) 1 SD = 2.53 L;
Machine Learning FFMV (ML-FFMV) 1 SD = 2.36 L;
Muscle Fat Infiltration (MFI) 1 SD = 1.85%;
Machine Learning MFI (ML-MFI) 1 SD = 1.37%;
Low grip strength <16kg for females, <27kg for males;
Slow walking pace self-reported "slow pace"

P1104

SIMULTANEOUS BILATERAL ATYPICAL FEMORAL FRACTURE FOLLOWING OSTEOPOROSIS TREATMENT WITH DENOSUMAB

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INTRODUCTION: Antiresorptive therapies such as denosumab or bisphosphonates (BPs) reduce the risk of vertebral, non-vertebral and hip fractures, which are major causes of mortality, disability and economic burden.

However, concerns have been raised about rare but potentially severe adverse events such as atypical femoral fractures (AFFs). Some authors report an estimated incidence of 0.8 per 10,000 patient-years of AFFs in patients under denosumab.

CASE REPORT: We present the case of a 67-year-old woman with a medical history of left hip replacement surgery due to osteoarthritis, dyslipidemia, and nephrolithiasis. She had a relevant family history of osteoporosis in both parents and her son was diagnosed with a mild phenotype of osteogenesis imperfecta.

She was referred to our osteoporosis clinic after a 5-year course of IV zoledronic acid (5mg/year) due to vertebral fragility fractures (L1 and L2). Despite bone mineral density (BMD) improvement and no recurrence of fractures, she maintained vertebral osteoporosis and was hence started on denosumab 60mg every 6 months in 2022.

In January 2025 she developed an ill-defined bilateral thigh pain, without reported trauma, with progressive functional impairment requiring the use of a walking aid.

Bilateral hip radiographs, computed tomography, and bone scintigraphy were obtained, confirming bilateral incomplete AFFs (Figure 1). Denosumab was discontinued and a conservative treatment approach with teriparatide was attempted. However, patient ended up needing bilateral fracture fixation.

DISCUSSION: To the best of our knowledge, this is the third reported case of simultaneous bilateral AFF in a patient treated with denosumab. This patient fulfills all criteria (4 major and 6 minor) for AFF established by the 2010 ASBMR Task Force.

The clinical features of the patient described are highly consistent with those reported in the literature. In the two previously reported cases of bilateral AFFs, both patients were women of similar age and had undergone long-term bisphosphonate therapy, such as our patient. One of them was describe with symptomatic recurrent bilateral AFFs. This patient received 18 months of teriparatide to promote remodeling after the first episode of fractures, but experienced recurrent fractures six months after starting denosumab. The remaining reported cases of unilateral AFFs also share key features with our case, including female sex, advanced age, long-standing osteoporosis and previous bisphosphonate use.

While the occurrence of this rare type of fracture does not provide conclusive evidence of a causal relationship between denosumab and AFFs, it seems to be clear that the risk of AFF is higher in patients with prior bisphosphonates use. More research is needed to improve understanding about AFF risk and defining appropriate screening strategies.

CONCLUSIONS: AFFs are a rare adverse event and only a few cases have been reported with the use of denosumab. However, we must keep in mind that prescribing denosumab to a patient previously treated with bisphosphonates may increase such risk.

We emphasize previous guidance which states that the screening of radiographs of femurs should be considered in such cases where the patient has received treatment with multiple antiresorptive drugs.





P1105

EARLY ADULTHOOD BONE MINERAL DENSITY FOLLOWING ATTENDENCE AT SPORTS COMPARED WITH CONVENTIONAL SCHOOLS

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Objectives: to evaluate long-term effect of attending sports compared to conventional schools on attained bone mineral density (BMD) in early adulthood.

Material and Methods: In 2008, Svendborg municipality converted 6 primary public schools to be sports schools, while 4 remained conventional schools. All children who went to 0 to 6th grade in one of the involved schools were invited to participate in the study (age 6 to 13 years). More schools joined the sport school program over the study period, as 3 additional schools were included in 2013. The study covers up to 10 comprehensive clinical examinations over a 15-year period, with key data collection periods in 2008 (baseline), 2009, 2010, 2012, 2015 and 2022-2024. The study design is a natural experiment comparing individuals who went to the sports schools with individuals attending the conventional schools using targeted maximum likelihood estimation (TMLE). The treatment model was based on a random forest and included sex, class, school, distance to school, maternal education, and height and the Q-model was a mixed effect model including sex, maternal education and the random slope of the given person. Outcome were Dual-energy X-ray Absorptiometry (DXA) measured BMD at age 18-25 years (total, body, spine and hip). The analysis was conducted in R.

Results: The sample comprised of 2162 individuals. TMLE revealed no difference in the average treatment effect on total body BMD (-0.005 g/cm^2 (95% CI: -0.006; -0.005) between individuals from sports schools when compared to individuals from conventional schools at age 18-25 years. In spine and hip, the average treatment effects on BMD were 0.023 g/cm^2 (95% CI: 0.021; 0.024) and 0.027 g/cm^2 (95% CI: 0.025; 0.029) higher in the individuals from sports schools, which is equivalent to clinical z-scores of 0.23 and 0.25, respectively.

Conclusion: When estimating the effect of attending sports school compared to conventional schools, there were no clinically relevant differences at age 18-25 years on attained total body BMD. The attained BMD at spine and hip in this study population represents an approximately 10–15% relative osteoporotic fracture risk reduction, assuming risk is BMD-mediated.

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P1106

OSTEOPOROSIS BURDEN AND PREDICTIVE FACTORS IN PRIMARY BILIARY CHOLANGITIS: INSIGHTS FROM A PORTUGUESE COHORT

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OBJECTIVES: To assess osteoporosis (OP) prevalence in a Portuguese primary biliary cholangitis (PBC) cohort and identify associated factors and predictors.

METHODS: Retrospective observational study including PBC patients with ≥1 DEXA scan. Clinical, demographic and laboratory data at the time of DEXA were analysed. OP was evaluated as a dichotomous outcome (bivariate analyses and multivariate logistic regression). Femoral neck (FN) and lumbar spine (LS) BMD were also analysed as continuous variables using correlations and multiple linear regressions. Significance was set at $p<0.05$.

RESULTS: Sixty-five patients were included (mean age 58±1.6; 90.8% women; 72.2% postmenopausal). Thirty patients (46.2%) had OP, of whom 6 (20.0%) were referred to Rheumatology, and 10 (15.4%) had previous fragility fracture.
OP was more frequent in menopausal women and those with previous fracture, also being associated with older age, longer PBC duration and lower platelets. The multivariate model (including age, PBC duration, and platelets) was significant, with PBC duration as the sole independent predictor (p=0.043; OR=1.11).
Significantly lower FN BMD values were associated with menopause, previous fracture, splenomegaly and cirrhosis, as well as older age, longer PBC duration, lower platelet count, lower albumin and lower BMI; only previous fracture independently predicted LS BMD (β=-0.35; p=0.005).
Significantly lower FN BMD values were associated with menopause, previous fracture, splenomegaly, cirrhosis, older age, PBC duration, lower platelets, lower albumin and lower BMI. Age and cirrhosis remained independent predictors (β=-0.28, p=0.029; β=-0.32, p=0.013, respectively) in the multivariate model.
CONCLUSION: To the best of our knowledge, this is the first study exploring OP in Portuguese PBC patients, revealing a high prevalence in this cohort. Age and PBC duration consistently associated with OP presence and lower BMD, while variables potentially related to more advanced liver disease - such as cirrhosis, platelets and albumin - also showed association with worse bone health. These results emphasize the importance of targeted bone health surveillance in this population (particularly with more severe disease), with early assessment, adequate supplementation and timely OP treatment.

P1107

DENOSUMAB-ASSOCIATED MRONJ IN ADVANCED CKD: CLINICAL CHALLENGES AND THERAPEUTIC LIMITATIONS

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Case Description: A 73-year-old woman with a history of pulmonary lymphangiomatosis, left lung transplantation (2013) and chronic kidney disease (CKD) stage 3b was referred in 2015 for severe osteoporosis (OP) (DEXA showing T-score −4.2 lumbar spine, −3.6 femoral neck). Laboratory studies were normal, and radiography suggested a D7 vertebral fracture. She had been on weekly alendronate for 2 years; given renal deterioration and severe OP, treatment was switched to denosumab.
She maintained regular treatment until 2024, with stable densitometry. After a dental extraction in May 2024, she developed a painful mandibular lesion with swelling and purulent drainage. Evaluation by Maxillofacial Surgery revealed bone exposure, and she was admitted in December 2024 for suspected medication-related osteonecrosis of the jaw (MRONJ). CT and MRI showed extensive mandibular and maxillary involvement compatible with MRONJ, with possible osteomyelitis. Microbiology identified mandibular actinomycosis with *Staphylococcus warneri* superinfection. She completed 14 days of intravenous amoxicillin/clavulanic acid followed by prolonged oral therapy, with favourable evolution.
Denosumab was definitively discontinued, and she remains without pharmacological anti-osteoporotic therapy, given the limitation imposed by CKD, currently at stage 4 (transitioning to stage 5), and the absence of safe pharmacological alternatives available in Portugal.
Discussion/Conclusions: MRONJ is a rare but potentially serious complication described in patients receiving antiresorptive therapy. Denosumab is a key first-line therapeutic option for the treatment of severe OP in patients with contraindications to bisphosphonates, particularly in the presence of advanced CKD. The risk of MRONJ is generally low at doses used for OP, but the presence of multiple predisposing factors (prolonged treatment, renal insufficiency, chronic immunosuppression, and recent dental procedure) seen in this case likely contributed to its development. Definitive discontinuation of denosumab was necessary, leaving the patient without active anti-osteoporotic therapy, highlighting the therapeutic gap existing in this clinical context and the urgent need for safer and effective treatment options for this population.

P1108

TRENDS IN THE BURDEN OF OSTEOPOROTIC HIP FRACTURE, BEFORE, DURING, AND AFTER THE COVID-19 PANDEMIC

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Summary: Globally, the incidence of hip fractures (HF) has declined in recent decades. The impact of the COVID-19 pandemic on HF continues to be actively evaluated in literature.
Objective: We analyzed and compared the incidence, prevalence, and years lived with disability (YLDs) attributable to HFs before, during, and after the COVID-19 pandemic in adults of both sexes aged 50 years and older in the period 2010–2023.
Methods: We used data from the 2023 Global Burden of Disease (GBD) study, focusing on trend changes and stratified characteristics of the HF burden. We assessed incidence, prevalence, and years lived with disability (YLDs), as well as the corresponding crude and age-standardized rates of incidence (ASIR), prevalence (ASPR), and YLDs (ASYR).
Results: In 2023, there were 19,274 incident cases of HF, 36,850 prevalent cases, and 5,202 YLDs. Between 2010 and 2023, the incidence increased from 5,207 to 7,178 cases (1.4 times), the prevalence from 9,977 to 13,286 (1.3 times), and the YLDs from 1,664 to 1,855 (1.1 times). The age-standardized incidence rate (ASIR) in 2023 was 138.1 per 100,000 population, representing an increase (1.2 times) from 2010 (Average annual percentage change, AAPC 0.23; p<0.05), the ASPR was 230 (AAPC 0.22; p<0.05), and the ASYR was 32 (AAPC −1.15; p<0.05). Table 1.

Table 1. Age Standardized Rate * of incidence, prevalence, and YLDs of Hip Fracture (50+years) from 2010 to 2023.

Year	2010			2023		
	ASIR	ASPR	ASYR	ASIR	ASPR	ASYR
Both	111.8 (153–77.9)	189.0 (210.1–168.1)	32.6 (43.4–22.3)	138.1 (187.9–97.1)	230.3 (260.6–202.6)	33.2 (45.2–23.2)
Male	114.5 (159.9–78.1)	176.2 (197.7–156.8)	31.0 (41.8–21.1)	118.2 (166–82.3)	177.5 (199.6–157.5)	26.3 (35.8–18.5)
Female	106.5 (146.2–73.7)	196.7 (220.5–170.6)	33.3 (44.1–23.2)	151.8 (204.9–106.4)	271.6 (306.9–234.9)	38.5 (53.4–26.9)

*per 100,000 inhabitants (95 % UI); ASIR, Age-standardized Incidence Rate; ASPR, Age-standardized Prevalence Rate; ASYR, Age-standardized YLDs Rate

Conclusion: Between 2010 and 2023, the disease burden of HF increased significantly before, during, and after the COVID-19 pandemic, at the expense of older adults and women. In contrast to the global trend, the incidence has been steadily increasing in Ecuador over the last decade.

P1109

ARTIFICIAL INTELLIGENCE FOR SARCOPENIA ASSESSMENT IN ADULTS: A SYSTEMATIC REVIEW OF MULTIMODAL APPROACHES AND VALIDATION GAPS

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Objectives: To synthesise evidence on artificial intelligence (AI) approaches for adult sarcopenia assessment across imaging, routinely collected clinical and laboratory data, ultrasound and wearable/sensor modalities, and to summarise performance, validation strategies and translational evidence gaps.

Materials and Methods: PubMed, Embase, Scopus and IEEE Xplore were searched (2015–2026). We screened 2,970 records; 1,814 remained after deduplication. Eligible studies applied AI or machine learning to explicitly defined/classified sarcopenia in adults. Ninety-six papers proceeded to full-text screening. We extracted modality, model type, sarcopenia reference standard, validation approach and performance metrics, with synthesis by modality and use-case.

Results: AI approaches clustered into assessment using routinely acquired imaging, structured clinical and laboratory data, ultrasound-based classification and wearable/sensor-enabled functional assessment. Imaging deep learning most frequently targeted automated muscle segmentation/quantification with high agreement against manual labels (e.g., Dice 0.95 for skeletal muscle in CT, reflecting near-complete overlap between automated and reference segmentations). Clinical models commonly used readily available features and achieved good discrimination in representative studies (area under the receiver operating characteristic curve (AUC) 0.94). Where independent external validation was performed, performance often attenuated (e.g., AUC 0.862 internally vs 0.785 externally), highlighting generalisability as a key barrier alongside heterogeneous sarcopenia reference standards.

Conclusions: AI methods for sarcopenia assessment demonstrate strong technical performance for imaging-based assessment using routinely acquired scans and promising discrimination for scalable screening using routinely collected clinical data. The key gap is robust, multi-site external validation against harmonised reference standards, supported by prospective evaluation and transparent reporting, to enable safe clinical implementation.

Disclosures: NF consults for DocHQ.

P1110

SYSTEMIC MASTOCYTOSIS PRESENTING AS OSTEOPOROSIS WITH FRAGILITY FRACTURES

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INTRODUCTION

Systemic mastocytosis (SM) is characterised by abnormal proliferation of neoplastic mast cells. Bone involvement is common and may manifest as reduced bone mineral density (BMD) and fragility fractures, particularly vertebral fractures.

CLINICAL CASE

A 59-year-old woman with SM was referred to the Rheumatology Department for evaluation of vertebral pain and fragility fractures. Osteoporosis (OP) risk factors included smoking (20 pack-years) and a maternal history of proximal femur fracture. She reported pruritic maculopapular skin lesions with a positive Darier's sign and flushing episodes. The diagnosis of SM was confirmed by bone marrow biopsy, showing hypercellular marrow with mast cell infiltration, increased CD25 expression, KIT D816V mutation and elevated serum tryptase levels (>20 ng/mL). Physical examination revealed a 4 cm height loss and dorsal hyperkyphosis. Calcium–phosphate metabolism was normal. Radiography showed fragility fractures, including bilateral humeral head, ischiopubic rami and vertebral fractures (D3, D6, D10–D12, L2, L4 and L5) (Figure 1). Dual-energy X-ray absorptiometry showed osteopenia, with a lumbar spine T-score −2.1 and a femoral neck T-score −2.3. Despite six monthly doses of intravenous zoledronate (5 mg) combined with calcium and vitamin D, an additional left humeral head fracture occurred. Treatment was switched to denosumab (60 mg every 6 months) and midostaurin (50 mg twice daily), after which no further fragility fractures have occurred to date.

CONCLUSION

Bone fragility in SM results from mast cell-mediated disruption of bone metabolism, preferentially affecting trabecular bone. SM should be considered in the differential diagnosis of OP, as early recognition is crucial to optimise treatment and reduce fracture-related morbidity.



Figure 1. Multiple low-impact fractures on computed tomography

P1111

ACETABULAR PROTRUSION AS DIAGNOSTIC CLUE TO OSTEOGENESIS IMPERFECTA TYPE V

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Introduction

Osteogenesis imperfecta type V (OI type V) is defined by characteristic radiological and histological findings and the absence of typical extraskeletal manifestations such as blue sclerae and dentinogenesis imperfecta. These atypical features may contribute to delayed recognition, underscoring the diagnostic value of specific radiological patterns.

Case Report

A 42-year-old woman was referred to the Rheumatology Department after pelvic radiography revealed marked bilateral acetabular protrusion. As advanced degenerative joint disease was absent, this finding raised suspicion of an underlying systemic bone disorder. The patient reported a history of bone fragility with multiple low-impact fractures in childhood involving the elbows, tibia, left ankle and vertebrae. No further fractures occurred in adulthood and there was no family history of fragility fractures. Physical examination showed short stature (153 cm), pectus carinatum, dorsal hyperkyphosis, limited elbow flexion, brittle nails and severe restriction of hip mobility. There was no evidence of scleral discoloration or dentinogenesis imperfecta. Biochemical assessment of bone metabolism, including calcium, phosphate, parathyroid hormone, vitamin D, osteocalcin, and beta-crosslaps, was normal. Dual-energy X-ray absorptiometry revealed a lumbar spine Z-score of −2.1 SD, below the expected range for age. Radiographic review demonstrated previous fractures, fish-shaped vertebrae, calcification of interosseous membranes, radial head dislocation and marked bilateral acetabular protrusion. The coexistence of these findings strongly suggested OI type V. Molecular analysis identified a heterozygous pathogenic IFITM5 variant (c.−14C>T) confirming the diagnosis. Calcium and vitamin D supplementation was initiated and no new fractures occurred during follow-up.

Conclusion

Diagnosis of OI type V relies on clinical and radiological evaluation, with genetic testing providing definitive confirmation. In this patient, acetabular protrusion was a valuable radiological clue for OI type V. Awareness of this finding, particularly alongside interosseous membrane calcification and fracture history, may facilitate earlier diagnosis and appropriate management in adults without classical extraskeletal signs.

P1112

DENOSUMAB-INDUCED SEVERE HYPOCALCAEMIA IN OSTEOPOROSIS

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Introduction

Denosumab is used in the treatment of osteoporosis (OP) in postmenopausal women and reduces vertebral, non-vertebral and hip fractures. Although generally well tolerated, hypocalcaemia is a potentially serious adverse effect.

Clinical cases

Case 1: A 65-year-old woman with stage 3a chronic kidney disease (CKD), secondary hyperparathyroidism and premature menopause was referred to the Rheumatology Department for the management of OP after sustaining a femoral neck fragility fracture (FF) while receiving zoledronic acid with calcium and vitamin D supplementation. Therapy was switched to denosumab 60 mg every six months. One month later the first administration, she presented to the emergency department (ED) with a generalised tonic–clonic seizure. Laboratory evaluation revealed severe hypocalcaemia (6.6 mg/dL; previously 8.6 mg/dL), hypophosphataemia (1.7 mg/dL; previously 3.5 mg/dL), vitamin D deficiency (7.52 ng/mL; previously 21.8 ng/mL) and elevated parathyroid hormone (PTH) levels (630 pg/mL; previously 287 pg/mL). She was admitted an treated with intravenous calcium gluconate, oral calcium carbonate and vitamin D. After nine days, biochemical parameters normalised (calcium 9.4 mg/dL and phosphate 4.0 mg/dL) and she was discharged.

Case 2: A 76-year-old woman with stage 5 CKD and secondary hyperparathyroidism was referred for OP management following a femoral neck FF. Denosumab 60 mg every six months was initiated with calcium and vitamin D supplementation, although adherence was suboptimal. Two days after the first administration, she developed

generalised polyarthralgia and profound weakness, presenting to the ED approximately one month later. Investigations showed severe hypocalcaemia (4.9 mg/dL; previously 9.2 mg/dL), hypomagnesaemia (0.9 mg/dL; previously 1.6 mg/dL), vitamin D level of 39.7 ng/mL (previously stable), and markedly elevated PTH (633 pg/mL; previously 266 pg/mL). She was hospitalised for three weeks, with correction of electrolyte disturbances.

Conclusion

Denosumab-associated hypocalcaemia may be more prevalent than previously recognised, particularly in patients with CKD. Optimisation of calcium and vitamin D supplementation and regular biochemical monitoring are essential to prevent serious adverse effects.

P1113

HOW DOES NUTRITION AFFECT THE COURSE OF RHEUMATOID ARTHRITIS?

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Objectives. The objective of this study was to analyze whether nutrition can affect the level of inflammatory markers and subjective symptoms in people with rheumatoid arthritis, as well as the frequency of exacerbations.

Materials and methods. A double-blind study was conducted in Egypt, it consisted of compliance with the protocol on nutrition (anti-RA). Neither the participants nor the researchers knew which of the 60 people were in the main group of "anti-RA" nutrition, and who was in the control group, until the results of the study came in. All 60 patients aged 25-55 years had a history of rheumatoid arthritis from 2 to 15 years. The study was conducted between December 2024 and March 2025. During the experiment, all patients filled out a food diary that recorded each meal, in addition, venous blood was taken from patients before and after the experiment for: C-reactive protein (CRP), interleukin-6 (IL-6), tumor necrosis factor (TNF-α), rheumatoid factor (RF) . The VAS scale (a visual analog scale of joint pain from 0 to 10) was used for the subjective assessment of pain syndrome. All patients were divided into two groups of 30 people (main and control). In the main group, patients ate a daily menu according to the "anti-RA" model (fish 3 ×/week, vegetables >400 g, nuts 30 g, olive oil 1 tbsp. l., kefir 200 ml, turmeric /ginger). prohibited: red meat, sugar > 20 g/day, trans fats. In the control group, patients followed their usual diet, and all foods in normal quantities were allowed without recommendations. Both groups continued to lead their usual lifestyle, vitamins were not added. In addition, all patients during the experiment noted the frequency of taking nonsteroidal anti-inflammatory drugs (NSAIDs).

Results. At the end of the study: in the main group, the average C-reactive protein decreased from 5.8 to 3.2 mg/l, while in the control it remained at 5.7 mg/l. Interleukin-6 decreased by 22% in the main group (from 4.1 to 3.2 pg/ml), while in the control group the decrease was only 3%. TNF-α levels in the main group decreased by 19% (from 8.3 to 6.7 pg/ml), while in the control group there was an increase of 2%. Rheumatoid factor decreased in 18 (60%, 18/30) participants of the main group (by an average of 28%), no changes were recorded in the control group. Subjective pain on a 10-point scale decreased from 4.2 to 2.1 points, morning stiffness decreased from 42 to 19 minutes. The control group showed only a slight improvement in pain (by 0.3 points) and an increase in stiffness for 3 minutes. 24 subjects (80%, 24/30) from the main group noted a decrease in the frequency of taking nonsteroidal anti-inflammatory drugs, while in the control group only 5 (16%, 5/30) of the subjects revealed this fact.

Conclusion. A 16-week anti-inflammatory diet significantly reduced systemic inflammation and clinical symptoms (pain) in people with rheumatoid arthritis. The decrease in CRP, IL-6, and TNF-α confirms that nutritional factors modulate the immune response. The data obtained support the concept of "food as medicine" and allow us to recommend the described diet as a safe, affordable and effective strategy for secondary prevention of RA. 24 subjects (80%, 24/30) from the main group noted a decrease in the frequency of taking nonsteroidal anti-inflammatory drugs, while in the control group only 5 (16%, 5/30) of the subjects revealed this fact. Therefore, the authors of the article believe that following a diet (anti-RA) can be used as a secondary prevention method that has a positive effect on the course of this disease. This is evidenced by the results obtained.

P1114

SHOULD I USE ANTIDEPRESSANTS FOR RHEUMATOID ARTHRITIS?

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Objective. Rheumatoid arthritis (RA) is a chronic autoimmune inflammatory disease characterized not only by pain, but also by progressive functional loss. Also, a significant proportion of patients suffer from depression, which can exacerbate the perception of pain, reduce drug adherence and worsen the quality of life. Traditionally, antidepressants are prescribed to treat depression in patients with RA along with nonsteroidal anti-inflammatory drugs (NSAIDs). However, the extent to which the use of antidepressants affects the quality of life of patients with RA remains a matter of debate. The objective was to evaluate the effect of antidepressants on the quality of life of patients with rheumatoid arthritis.

Methods and materials. The study was conducted in Egypt, from November 2023 to April 2024. All patients were at the outpatient stage of treatment. The patient group consisted of 100 people with a verified diagnosis of rheumatoid arthritis (RA) lasting more than five years. The gender distribution showed the predominance of women, characteristic of this pathology: 72 patients (72%, 72/100) and 28 male patients (28%, 28/100) participated in the study. The average age of the patients was 49 [47;51] years. The exclusion criteria were acute mental disorders, severe uncompensated somatic diseases, as well as intolerance to prescribed medications.

All subjects were divided into two groups: experimental and control, with 50 patients in each group. The groups were comparable in terms of basic demographic and clinical indicators. Patients from the experimental group, along with basic antirheumatic therapy (HDL), received antidepressants according to an individual regimen: sertraline at a dose of 50-100 mg /day or venlafaxine at a dose of 75-150 mg / day. The choice of the drug and its dosage depended on the profile of side effects, concomitant diseases, and patient preferences. Patients from the control group received only standard basic therapy without the appointment of psychotropic drugs. The duration of the follow-up and treatment period was six months.

To assess the effectiveness of the intervention, all patients underwent a comprehensive psychometric examination before the start of the study and six months later using the SF-36 quality of life assessment questionnaire (The Short Form-36 Health Survey). This tool provides an integrated picture of physical and mental well-being across eight main domains.

Statistical processing of the obtained quantitative data was carried out in Statistical Analysis Software 17.0 using analysis of variance (ANOVA) to compare intergroup differences and dynamics of indicators. The level of statistical significance was set at $p<0.05$.

Resuts. The most pronounced positive dynamics in the experimental group was observed in the field of mental health. The indicator "Role functioning due to emotional state" (RE) increased from 34.8 [22.4; 47.2] to 69.0 [57.2; 80.8] points. The Mental Health (MH) scale, which reflects the level of anxiety and depression, improved from 40.9 [31.3; 50.5] to 66.1 [57.2; 75.0] points. A significant increase was also noted on the scale of "Vital activity" (VT) — from 39.1 [29.0; 49.2] to 61.0 [51.5; 70.5] points, which indicates a decrease in asthenia and an improvement in energy tone.

Positive dynamics was also recorded in the field of physical health, although less pronounced than in the mental components. The General Health index (GH) increased from 46.2 [37.5; 54.9] to 59.5 [50.3; 68.7] points. The "Physical pain" (BP) scale, despite the persistence of the underlying disease, improved from 29.8 [18.5; 41.1] to 43.2 [32.6; 53.8] points, which may indirectly indicate a change in pain perception. "Physical functioning" (PF) increased from 39.7 [29.9; 49.5] to 50.5 [41.8; 59.2] points.

In the control group, where patients received only basic antirheumatic therapy, the results of the six-month follow-up showed no significant changes in quality of life. The SF-36 assessment revealed the absence of statistically significant dynamics in both mental and physical well-being. In particular, the key parameters of the mental component of health remained almost at the initial level. The Psychological Health Scale (MH) showed a slight increase from 41.8 [32.9; 50.7] to 44.2 [34.9; 53.5] points, which did not reach the threshold of statistical significance ($p=0.205$). A similar situation was observed in the field of role functioning due to emotional state (RE), where values ranged from 35.8 [22.6; 49.0] to 37.5 [24.8; 50.2] points ($p=0.325$), as well as on the scale of vital activity (VT), which increased from 40.1 [29.6; 50.6] to only 41.0 [30.9; 51.1] points ($p=0.395$). These minimal changes, which fit within the standard measurement error, indicate the persistence of psychoemotional distress, fatigue, and related limitations in everyday life.

Indicators reflecting physical health also showed no clinically significant improvements. The functional capabilities assessed on the physical functioning scale (PF) remained virtually unchanged, demonstrating an increase from 42.4 [33.9; 50.9] to 43.9 [35.8; 52.0] points ($p=0.165$). Pain intensity perception (BP) remained at a comparable level, slightly shifting from 32.0 [21.2; 42.8] to 33.2 [22.8; 43.6] points ($p=0.285$).

Conclusion. The authors of the article believe that antidepressants should be used for rheumatoid arthritis, as this leads to a reduction in pain and an improvement in the quality of life of patients. Thus, in the experiment, it was shown that the 24-week use of antidepressants for rheumatoid arthritis led to an improvement in the quality of life of patients (questionnaire SF-36), namely, the changes were in the following sections: Physical Functioning (PF), pain (Body Pain, BP), general health (General Health Perceptions, GH), mental Health (MH). It is also necessary to systematize data on the effectiveness and safety of antidepressants and integrate psychological support and rehabilitation into routine clinical practice.

P1115

HOW TO REDUCE THE PAIN OF RHEUMATOID ARTHRITIS AT HOME?

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Objective. Rheumatoid arthritis (RA) is a chronic autoimmune inflammatory disease characterized by polyarthritis and systemic manifestations. Pain is a leading symptom that significantly reduces the quality of life and functionality of patients. Modern RA therapy includes pharmacological (nonsteroidal anti-inflammatory drugs, biological replacement agents, DMARDs) and non-pharmacological approaches. In recent years, there has been increasing interest in self-management of pain and self-management of symptoms at home, which can reduce the need for medications, reduce the risk of side effects, and increase satisfaction with treatment. The objective was to analyze the effectiveness of rheumatoid arthritis pain treatment at home.

Materials and methods. The study was conducted on the basis of outpatient facilities in Egypt in the period from October 2024 to January 2025. The study included a group of 90 patients with a diagnosis of rheumatoid arthritis that meets the modern ACR/EULAR classification criteria, aged 30 to 75 years. The gender distribution in the general sample showed the predominance of women, characteristic of this pathology: 62 patients (69%, 62/90) versus 28 male patients (31%, 28/90). Age characteristics revealed that the average age of patients was 52.4 [48.1; 56.7] years old. The group distribution was comparable: in the experimental group, the average age was 51.8 [47.3; 56.3] years, in the control group — 53.0 [48.9; 57.1] years. All patients were randomly divided into two groups: experimental and control, with 45 people each. The patients of the experimental group, along with standard pharmacotherapy (basic anti-inflammatory drugs), used a set of non-medicinal methods: individual breathing exercises during episodes of pain syndrome (5-6 times a week for 5-7 minutes) and local heat therapy to reduce pain (thermal compresses at home for 15-20 minutes, 3-4 times a week). Patients in the control group received only standard pharmacotherapy and were instructed to lead a normal lifestyle without additional non-drug interventions. The duration of the observation period and the application of the techniques was 16 weeks. A Visual Analog Scale (VAS) of joint pain from 0 to 10 points was used to subjectively assess the dynamics of pain syndrome. Statistical processing of the obtained quantitative data was carried out in Statistical Analysis Software 17.0 using Analysis of Variance (ANOVA) to compare intergroup differences and dynamics of indicators. The level of statistical significance was set at $p<0.05$.

Results. At the end of the 16-week study, the subjective pain assessment

on a 10-point VAS scale in the experimental group showed a statistically significant decrease from 4.7 [4.1; 5.3] to 2.5 [2.0; 3.0] points (p<0.001). An analysis of the distribution of patients by total pain scores showed that 38 patients (84%, 38/45) in this group achieved a minimal clinically significant difference (improvement of ≥2 points according to VAS), and in 15 of them (33%, 15/45) pain decreased to a level of < 2 points. Gender dynamics analysis revealed that marked improvement (pain reduction by ≥3 points) was more often observed in women: 18 patients (64%, 18/28) versus 5 male patients (29%, 5/17) in this group. In parallel, a reduction in the average duration of morning stiffness was recorded in the experimental group from 45 [38; 52] to 20 [15; 25] minutes (p<0.001). In the control group, which received only standard therapy, the dynamics were minimal and statistically insignificant. The subjective assessment of pain by VAS decreased by only 0.2 points: from 4.5 [3.9; 5.1] to 4.3 [3.7; 4.9] points (p=0.325). Morning stiffness did not decrease, but increased slightly by 2 minutes: from 43 [36; 50] to 45 [38; 52] minutes (p=0.285). A clinically significant improvement in pain (≥2 points) in the control group was observed in only 3 patients (7%, 3/45).

Conclusion. The results of this study showed that at home, the pain of rheumatoid arthritis can be reduced using breathing exercises and heat therapy. They are an effective addition to pharmacotherapy to reduce pain and improve functional status in patients with rheumatoid arthritis. This approach is easily scaled and available outside the clinic, which increases its practical value. The authors of this article aim to conduct further research with a long follow-up period and an assessment of the long-term stability of the analgesic effect.

P1116

CHANGES IN BODY COMPOSITION AND MUSCLE STRENGTH WITH A HIGH-PROTEIN NUTRITIONAL PLAN IN PATIENTS WITH OSTEOPOROSIS AND FRAGILITY FRACTURES AT A HOSPITAL IN BOGOTÁ

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Objective: To evaluate changes in body composition and muscle strength following a three-month high-protein nutritional intervention in patients with osteoporosis and fragility fractures enrolled in the Fracture Liaison Services (FLS) program at Hospital Universitario de San José, Bogotá, Colombia.

Materials and Methods: A quasi-experimental study was conducted including 36 patients over 50 years of age with fragility fractures. Each participant received an individualized nutritional plan with a protein intake of 1.2 g/kg/day, evenly distributed across three main meals for three months. Body composition was assessed using bioelectrical impedance analysis, and handgrip strength was measured with dynamometry before and after the intervention. The Shapiro–Wilk test was applied to assess normality, and paired Student's t-tests were used for pre–post comparisons. Statistical significance was set at $p < 0.05$.

Results: Thirty-six patients were analyzed, with a mean age of 81.5 ± 6.74 years; 72.2% were women, and the mean BMI was 23.1 ± 4.2 kg/m². After the intervention, a significant increase was observed in muscle mass percentage (28.9 ± 4.2 vs. 29.4 ± 4.1; $p = 0.03$) and handgrip strength (13.2 ± 5.1 kg vs. 14.8 ± 5.3 kg; $p = 0.004$), along with a trend toward reduced body fat percentage. Body weight and BMI remained stable.

Conclusions: The high-protein nutritional intervention improved muscle mass and handgrip strength in older adults with osteoporosis. Previous studies have highlighted that the combination of protein intake and exercise enhances bone and muscle health, thereby reducing the risk of falls and fractures (1). These findings are consistent with international literature supporting nutrition as a cornerstone in the management of osteoporosis.

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P1117

IMPACT OF A HIGH-PROTEIN NUTRITIONAL PLAN ON FRAILTY AND FUNCTIONALITY SCALES IN PATIENTS WITH OSTEOPOROSIS AT A HOSPITAL IN BOGOTÁ

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Objective: To evaluate changes in frailty and functionality following a three-month high-protein nutritional intervention in patients with osteoporosis and fragility fractures enrolled in the Fracture Liaison Services (FLS) program at Hospital Universitario de San José, Bogotá, Colombia.

Materials and Methods: A quasi-experimental study was conducted including 36 patients over 50 years of age with fragility fractures. Each participant received an individualized nutritional plan with a protein intake of 1.2 g/kg/day, evenly distributed across three main meals for three months. Frailty was assessed using the FRAIL scale, and functional independence was evaluated with the Barthel Index before and after the intervention. Normality was tested with the Shapiro–Wilk test; the Wilcoxon test was applied to non-normally distributed variables (FRAIL), and paired Student's t-tests were used for normally distributed variables (Barthel). Statistical significance was set at $p < 0.05$.

Results: Thirty-six patients were analyzed, with a mean age of 81.5 ± 6.74 years; 26 were women (72.2%). The mean T-score was −2.6 ± 0.8 SD at the femoral neck and −3.18 ± 0.6 SD at the lumbar spine. FRAIL scores decreased from 2.24 ± 1.65 to 1.88 ± 1.56, with the median shifting from 2 to 1 ($p = 0.014$; $r = 0.40$), indicating a statistically significant reduction in frailty with a moderate effect size. The Barthel Index showed improved functionality, with the mean increasing from 81.86 ± 14.98 to 89.03 ± 13.83 and the median from 85 to 95 ($p < 0.001$; $d = 0.82$), reflecting a moderate-to-large effect size.

Conclusions: Recent studies have confirmed that targeted nutritional programs can improve frailty status in older adults, reducing the risk of disability and dependence (1). Our findings, which demonstrate a significant improvement in the Barthel Index, reinforce this evidence and suggest that nutrition may be a key component in functional rehabilitation.

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P1118

SEVERE PRIMARY HYPERPARATHYROIDISM WITH MISDIAGNOSIS AS FIBROUS DYSPLASIA: A CASE REPORT

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Objective. The objective was to report a case of severe primary hyperparathyroidism in a young patient, initially misdiagnosed as polyostotic fibrous dysplasia.

Case Description

A 21-year-old male with normal growth and development until age 17 presented with a pathological fracture of the right femur. Over the following years, he sustained additional fractures of the right tibia, right humerus, and left femur, requiring multiple orthopedic surgeries and resulting in progressive skeletal deformities and functional impairment. Histopathological evaluation of femoral and tibial lesions was initially interpreted as polyostotic fibrous dysplasia.

Two years later, metabolic evaluation revealed markedly elevated parathyroid hormone levels (>3000 pg/mL), increased alkaline phosphatase, mild intermittent hypercalcemia, low–normal phosphorus levels, and severe vitamin D deficiency. Lumbar spine assessment by radiofrequency echographic multi-spectrometry showed preserved bone mineral density, while magnetic resonance imaging demonstrated multiple lytic vertebral lesions with compression fractures. Bone scintigraphy revealed diffuse increased skeletal uptake.

Parathyroid scintigraphy identified a focal hyperfunctioning lesion at the left superior thyroid pole, consistent with a parathyroid adenoma, confirming the diagnosis of severe primary hyperparathyroidism. Next-generation sequencing for genes associated with hereditary hyperparathyroidism showed no pathogenic variants. In the absence of syndromic features, the skeletal lesions were retrospectively reinterpreted as brown tumors.

Discussion. This case illustrates a severe and atypical presentation of primary hyperparathyroidism in a young patient with extensive skeletal involvement and recurrent pathological fractures, initially misdiagnosed as fibrous dysplasia. Sustained parathyroid hormone excess leads to high bone turnover and brown tumor formation, which can mimic other fibro-osseous lesions and delay diagnosis.[1] The discordance between preserved bone mineral density and marked skeletal fragility highlights the limitations of densitometric techniques in high-turnover metabolic bone diseases.[1,2]

Conclusion. Primary hyperparathyroidism should be considered in young patients presenting with pathological fractures or lytic bone lesions, even when bone mineral density appears preserved. Early biochemical evaluation is essential to prevent misdiagnosis and irreversible skeletal damage.2

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P1119

CORRELATION BETWEEN BONE MINERAL DENSITY AND PARASPINAL MUSCLE THICKNESS IN POSTMENOPAUSAL PATIENTS WITH AND WITHOUT VERTEBRAL FRACTURES

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Objective

To investigate the relationship between paraspinal muscle thickness and lumbar total bone mineral density (BMD) in patients with and without vertebral fractures, and to evaluate the influence of lumbar degenerative changes on this relationship.

Material and Methods

This cross-sectional study included 65 postmenopausal women aged 51–88 years (mean age 68,45±8,78 years). Participants were classified into three groups: patients with vertebral fractures (n = 24), patients without vertebral fractures (n = 24), and controls without osteoporosis or vertebral fractures (n = 17). Total lumbar spine and proximal femur BMD were measured by dual-energy X-ray absorptiometry (DXA; Hologic QDR 4500SL). Bilateral paraspinal muscle thickness was measured by ultrasonography transversely, at L3 vertebral level. Paraspinal muscle strength was measured using a hand-held dynamometer. Lumbar degenerative changes (osteophyte formation, endplate sclerosis, aortic calcification, facet sclerosis) were recorded based on x-ray findings. Statistical analyses were performed to assess the relationships between paraspinal muscle parameters and BMD.

Results

Mean right and left paraspinal muscle thicknesses were 40.94 ± 5.48 mm and 41.34 ± 5.23 mm, respectively. Lumbar degenerative changes were present in 75.4% of patients. No significant correlation was found between lumbar BMD and paraspinal muscle thickness ($p>0.05$). Paraspinal muscle thickness did not differ significantly between vertebral fracture, non-fracture, and control groups ($p>0.05$). In contrast, paraspinal muscle strength differed significantly between groups, with lower values observed in patients with vertebral fractures ($p=0.002$).

Conclusion

Paraspinal muscle thickness was not associated with lumbar BMD, regardless of the presence of lumbar degenerative changes. These findings suggest that ultrasonographic muscle thickness alone may be insufficient to reflect musculoskeletal function, highlighting the importance of functional muscle assessment in elderly populations.

P1120

STUDY OF BONE MICROARCHITECTURE IN LUNG TRANSPLANT PATIENTS: PRE-TRANSPLANT ANALYSIS

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Objectives: To evaluate bone microarchitecture using Trabecular Bone Score (TBS) in lung transplant (LT) candidates and assess its relationship with fracture risk.

Material and methods: Retrospective study of 250 patients evaluated for LT between 2022-2025. Bone mineral density (BMD) was assessed by DXA and microarchitecture by TBS. All patients underwent a standardized clinical history and spinal radiography. Glucocorticoid therapy was defined as a dose ≥ 5mg for more than 3 months or more than three courses/year.

Results: The cohort included 154 men and 96 women (mean age 57.9±8.2 years). Degraded bone microarchitecture was found in 28.4% of patients, partially degraded in 36.8%, and normal in 34.8%. Osteoporosis prevalence was 31.2%, and 30 patients (12%) presented at least one fracture, 14 of which were thoracic vertebral fractures. Patients with fractures had a higher prevalence of family history of femoral fracture (23.3% vs 7.3%; p=0.004). Furthermore, fractured patients showed lower performance in the walking test (277.4 vs 339.0 meters; p=0.017).

No significant differences were observed in absolute TBS values between patients with and without fractures (1.26±0.19 vs 1.28±0.14; p=0.51). However, patients receiving glucocorticoids showed a significantly higher proportion of degraded TBS (<1.200) compared to those untreated (34.0% vs 19.1%; p=0.034), and glucocorticoid therapy itself was associated with a higher risk of fracture (OR=2.6; p=0.03). Fractured patients had significantly lower BMD at the lumbar spine (0.98 vs 1.08 g/cm²; p=0.020), femoral neck (0.76 vs 0.88 g/cm²; p<0.001), and total femur (0.80 vs 0.91 g/cm²; p=0.005). FRAX scores (major and hip), both with and without TBS, were significantly higher in the fractured group (p<0.001).

Conclusions: Impaired bone microarchitecture is highly prevalent in LT candidates, particularly those receiving glucocorticoid therapy. Although BMD and FRAX effectively identified patients with fractures, TBS did not show a significant association with fracture risk in this specific population.

P1121

CLINICAL PROFILE OF EARLY-ONSET OSTEOPOROSIS: INSIGHTS FROM A PORTUGUESE TERTIARY CENTER

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Objective

To describe the clinical characteristics of patients with early-onset osteoporosis (EOOP) followed at a Portuguese tertiary center and compare primary and secondary EOOP.

Materials and Methods

A retrospective study including patients diagnosed with osteoporosis before age 50 at a Rheumatology Unit. Data comprised demographics, etiology, bone mineral density (BMD), fracture history, treatments, lifestyle factors, laboratory parameters, and genetic findings.

Results

Thirty-nine patients were included (70% female), with a mean age at diagnosis of 37.7 ± 9.4 years. EOOP was secondary in 64% (n=25). Drug-induced osteoporosis accounted for 26% (n=10), mainly due to corticosteroids (n=7) and cancer-related hormone therapy (n=3). Other secondary causes (38%, n=15) included gastrointestinal disease (n=3), premature menopause (n=3), genetic disorders (n=3), primary hyperparathyroidism (n=2), low body weight (n=2), and rheumatic disease (n=1). Primary EOOP represented 36% (n=14), including one case of osteogenesis imperfecta.

Mean lumbar spine T-scores were −2.98 ± 1.07 (primary) vs. −2.69 ± 0.70 (secondary); femoral neck T-scores −1.96 ± 0.91 vs. −2.14 ± 1.09; and total femur T-scores −2.16 ± 0.62 vs. −1.94 ± 0.71. Before treatment, fifteen patients (38%) sustained low-impact fractures (10 primary, 5 secondary), with seven experiencing multiple fractures. Two patients (5%) had fractures during or after treatment, both in the secondary group. Pharmacological therapy was initiated in 51% of patients: bisphosphonates (28%), denosumab (8%), teriparatide (5%), and sequential therapy (10%). Bisphosphonates were first-line in 71% of primary vs. 20% of secondary EOOP. Treatment changes were driven by reproductive planning, adverse events, or insufficient response. E18% were active smokers, and 41% reported adequate calcium intake. Routine laboratory parameters, including calcium, phosphate, vitamin D, parathyroid hormone, and magnesium, were within normal ranges. Genetic testing (n=8) identified Turner syndrome, CHARGE syndrome, osteogenesis imperfecta, and an X chromosome anomaly.

Conclusion

EOOP is frequently secondary. Fractures before diagnosis were common, supporting the need for earlier recognition and individualized management in younger patients.

Variable	Primary	Secondary
Number of Patients	14	25
Mean Age at Diagnosis (years)	38.85 ± 9.57	37.04 ± 9.40
Lumbar Spine BMD (g/cm²)	0.82 ± 0.15	0.83 ± 0.10
Femoral Neck BMD (g/cm²)	0.76 ± 0.13	0.68 ± 0.16
Total Femur BMD (g/cm²)	0.75 ± 0.08	0.77 ± 0.09
Lumbar Spine T-score	-2.98 ± 1.07	-2.69 ± 0.70
Femoral Neck T-score	-1.96 ± 0.91	-2.14 ± 1.09
Total Femur T-score	-2.16 ± 0.62	-1.94 ± 0.71
Smokers (n, %)	4 (29%)	3 (12%)
Adequate Calcium Intake	4 (29%)	12 (48%)

Table 1. Baseline characteristics of Primary/ Idiopathic EOOP and Secondary EOOP groups

Variable	Primary	Secondary
Patients with fractures during treatment (n, %)	0 (0%)	2 (8%)
≥1 fracture before treatment (n, %)	10 (70%)	5 (20%)
>1 fracture before treatment (n, %)	6 (43%)	1 (4%)
First line treatment with:		
Bisphosphonates (n, %)	10 (71%)	5 (20%)
Denosumab (n, %)	1 (7%)	4 (16%)
Teriparatide (n, %)	1 (7%)	1 (4%)
>1 treatment (n, %)	4 (29%)	0 (0%)

Table 2. Fracture history and treatments in Primary/Idiopathic EOOP and Secondary EOOP groups

P1122

ASSOCIATIONS OF VISCERAL ADIPOSITY INDEX AND LIPID ACCUMULATION PRODUCT WITH BONE HEALTH STATUS IN MEN AGED 50 AND OVER: A CROSS-SECTIONAL ANALYSIS OF BUSHEHR ELDERLY HEALTH (BEH) PROGRAM

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Objectives

The association of obesity- related markers such as Visceral Adiposity Index (VAI) and Lipid Accumulation Product (LAP) with bone health is controversial (1,2). This study aimed to evaluate this association among men using data from the second recruitment of the Bushehr Elderly Health (BEH) program.

Methods

A cross-sectional analysis was conducted on 851 men aged 50 years and older on the data from BEH program (3). Demographic information, laboratory data, bone mineral density (BMD) and trabecular bone score (TBS) were collected. Participants with a T-score ≤ −2.5 at the lumbar spine, total hip, or femoral neck were classified as having osteoporosis, while others were not. Low BMD (osteopenia/osteoporosis), was defined as a T-score ≤ −1 at any of these sites. Associations of adiposity measures and bone health were investigated using linear and logistic regression analyses.

Results

The mean age of the participants was 62.9± 0.2 years and 151 (17.7%) were diagnosed with osteoporosis. Compared to individuals without osteoporosis, those with osteoporosis had lower mean of VAI (2.3 vs. 2.7, p=0.001) and LAP (44.5 vs. 61.6, p< 0.001). After adjusting for known and measured confounders, VAI exhibited a positive association with BMD at total hip and LAP exhibited a negative association with TBS. Each one unit increases in VAI was associated with 0.0192 gr/cm^2 increase in lumbar spine BMD, while one-unit increase in LAP was associated with 0.0011 gr/cm^2 decrease in TBS (Table 1). Moreover, in logistic regression analysis, VAI was related with lower odds of having low BMD (odds ratio = 0.725, p = 0.041) (Table 2).

Conclusion

These findings highlighted that some adiposity parameters may serve as valuable markers in evaluating bone health in older adult men. A deeper understanding of these associations may improve clinical approaches for the prevention and management of osteoporosis in this population.

Keywords Bone mineral density, trabecular bone score, lipid accumulation product, visceral adiposity index, osteoporosis, Iran

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Table 1. The association of VAI and LAP with bone mineral density and TBS among study participants

Outcome	Exposure	Crude model		Adjusted model*	
		ß (%95 CI)	p-value	ß (%95 CI)	p-value
Lumbar spine (L1-L4) BMD	VAI	0.012(0.003, 0.021)	0.007	0.003(-0.0054, 0.0114)	0.482
	LAP	0.0008(0.0005, 0.0011)	<0.001	0.00002(-0.0003, 0.0004)	0.884
Total hip BMD	VAI	0.015(0.007, 0.022)	<0.001	0.0192(0.0034, 0.035)	**0.017**
	LAP	0.0008(0.0006, 0.0010)	<0.001	0.00003(-0.0002, 0.0003)	0.803
Femoral neck BMD	VAI	0.013(0.006, 0.019)	<0.001	0.0032(-0.0031, 0.0097)	0.318
	LAP	0.0007(0.0005, 0.0009)	<0.001	-0.00001(-0.0002, 0.0002)	0.900
TBS (L1-L4)	VAI	-0.0002(-0.005, 0.005)	0.949	0.001(-0.003, 0.006)	0.645
	LAP	-0.0004(-0.0005, -0.0002)	<0.001	-0.0011(-0.0016, -0.0007)	**<0.001**

*Adjusted for Age, BUN, ALP, FBS, LDL-C, Cholesterol, vitamin D, education, smoking, BMI (except for VAI), HDL-C (except for VAI).
Abbreviations: CI, Confidence interval; VAI, Visceral adiposity index; LAP, lipid accumulation product

Table 2. Logistic regression analysis assessed the association of LAP and VAI with osteoporosis and low BMD

Outcome	Exposure	Crude model		Adjusted model*	
		OR (%95 CI)	p-value	OR (%95 CI)	p-value
Osteoporosis	VAI	0.763(0.645, 0.902)	0.002	0.863(0.723, 1.03)	0.102
	LAP	0.985(0.978, 0.990)	<0.001	0.996(0.990, 1.004)	0.385
Low BMD	VAI	0.888(0.795, 0.993)	0.036	**0.725(0.533, 0.987)**	**0.041**
	LAP	0.992(0.989, 0.996)	<0.001	1.002(0.997, 1.007)	0.404

*Adjusted for Age, BUN, ALP, FBS, LDL-C, Cholesterol, vitamin D, education, smoking, BMI (except for VAI), HDL-C (except for VAI).
Abbreviations: CI, Confidence interval; OR, Odds ratio; VAI, Visceral adiposity index; LAP, lipid accumulation product

P1123

THE ASSOCIATION OF THE TYG INDEX-RELATED PARAMETERS AND BONE HEALTH STATUS IN MEN AGED 50 AND OVER: A CROSS-SECTIONAL ANALYSIS OF BUSHEHR ELDERLY HEALTH (BEH) PROGRAM

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Objectives

The triglyceride-glucose (TyG) index and its related parameters (TyG-BMI, TyG-WC, and TyG-WHtR) have emerged as sensitive and cost-effective markers of insulin resistance (1). However, limited research has investigated the association between these parameters with bone health with controversial findings (2,3). This study aimed to evaluate the association between TyG and its related parameters with bone mineral density (BMD), as surrogate markers of IR and bone health among men over 50 years living in Bushehr, Iran, utilizing data from the Bushehr Elderly Health (BEH) program (4).

Methods

This cross-sectional analysis utilized data from the BEH Program involving 851 older adult men aged 50 years or more. Bone health was assessed using BMD measurements at the lumbar spine, total hip, and femoral neck, and trabecular bone score (TBS). Low BMD (osteopenia/osteoporosis) and osteoporosis were defined as a T-score lower than 1 SD below the reference mean (−1 or lower) and 2.5 SD or more below reference mean (−2.5 and lower) in at least one site, respectively.

Results

The mean age of the study participants was 62.9 ± 0.2 years, of whom 151 (17.74%) had osteoporosis. Through multivariate linear and logistic regression analysis, TyG and its related parameters (except TyG-WHtR) exhibited a significant positive association with BMD and a negative association with osteoporosis/ low BMD at each bone site. Conversely, TyG-BMI and TyG-WHtR showed negative associations with TBS ($p< 0.001$) after adjustment for confounding factors (Table 1 and Table 2).

Conclusions

These findings highlighted that TyG index-related parameters may serve as valuable markers in evaluating bone health in older adult men.

Keywords TyG, BMD, TBS, Bone health, Osteoporosis, Iran

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Table 1. The association of TyG-index related parameters with bone mineral density and trabecular bone score among study participants

		crude		adjusted*	
		ß (%95 CI)	p-value	ß (%95 CI)	p-value
Lumbar spine (L1-L4)	TyG	0.042(0.024, 0.059)	<0.001	**0.0661(0.0355, 0.0967)**	**<0.001**
	TyG-BMI	0.0012(0.001, 0.0015)	<0.001	**0.0012(0.001, 0.0014)**	**<0.001**
	TyG-WC	0.0004(0.0003, 0.0005)	<0.001	**0.0002(0.0001, 0.0003)**	**0.004**
	TyG-WHtR	0.060(0.046, 0.074)	<0.001	0.0082(-0.0146, 0.0311)	0.480
Total hip	TyG	0.038(0.023, 0.054)	<0.001	**0.0499(0.0248, 0.0750)**	**<0.001**
	TyG-BMI	0.0012(0.001, 0.0014)	<0.001	**0.001(0.0008, 0.0012)**	**<0.001**
	TyG-WC	0.0003(0.0002, 0.0004)	<0.001	**0.0001(0.00004, 0.0002)**	**0.007**
	TyG-WHtR	0.048(0.036, 0.060)	<0.001	0.0029(-0.0157, 0.0217)	0.756
Femoral neck	TyG	0.033(0.018, 0.047)	<0.001	**0.0373(0.0139, 0.0607)**	**0.002**
	TyG-BMI	0.001(0.0008, 0.0012)	<0.001	**0.0008(0.0006, 0.001)**	**<0.001**
	TyG-WC	0.0003(0.0002, 0.0004)	<0.001	**0.0001(0.00002, 0.0002)**	**0.015**
	TyG-WHtR	0.038(0.026, 0.049)	<0.001	-0.0039(-0.0214, 0.0134)	0.654
TBS (L1-L4)	TyG	0.005(-0.005, 0.015)	0.345	**0.0129(0.0027, 0.0231)**	**0.013**
	TyG-BMI	-0.0004(-0.0006, -0.0003)	<0.001	**-0.0005(-0.0006, -0.0004)**	**<0.001**
	TyG-WC	-0.00017(-0.00022, -0.00012)	<0.001	-0.00004(-0.0001, 0.00003)	0.240
	TyG-WHtR	-0.034(-0.042, -0.025)	<0.001	**-0.0454(-0.0549, -0.0359)**	**<0.001**

*Adjusted for Age, BUN, ALP, HDL-C, LDL-C, Cholesterol, vitamin D, education, smoking, BMI (except for TyG-BMI).
Abbreviations: CI, Confidence interval; TyG, Triglyceride-glucose; BMI, body mass index; WC, Waist circumference; WHtR, Waist-to-height ratio; TBS, Trabecular bone score

Table 2. Logistic regression analysis assessed the association between TyG-index related parameters with osteoporosis and low BMD

		crude		adjusted*	
		OR (%95 CI)	p-value	OR (%95 CI)	p-value
Osteoporosis	TyG	0.537(0.391, 0.737)	<0.001	**0.676(0.482, 0.949)**	**0.024**
	TyG-BMI	0.982(0.977, 0.986)	<0.001	**0.982(0.977, 0.987)**	**<0.001**
	TyG-WC	0.994(0.992, 0.996)	<0.001	**0.996(0.994, 0.999)**	**0.018**
	TyG-WHtR	0.512(0.398, 0.658)	<0.001	1.004(0.651, 1.546)	0.985
Low BMD	TyG	0.693(0.551, 0.874)	0.002	**0.433(0.269, 0.696)**	**0.001**
	TyG-BMI	0.987(0.984, 0.991)	<0.001	**0.987(0.983, 0.991)**	**<0.001**
	TyG-WC	0.996(0.995, 0.997)	<0.001	**0.995(0.994, 0.997)**	**<0.001**
	TyG-WHtR	0.638(0.525, 0.776)	<0.001	1.079(0.765, 1.521)	0.663

*Adjusted for Age, BUN, ALP, HDL-C, LDL-C, Cholesterol, vitamin D, education, smoking, BMI (except for TyG-BMI).
Abbreviations: OR, Odds ratio; CI, Confidence interval; TyG, Triglyceride-glucose; BMI, Body mass index; WC, Waist circumference; WHtR, Waist-to-height ratio; BMD, Bone mineral density

P1124

CAN MASS SPECTROMETRY ELUCIDATE THE ROLE OF PTH PEPTIDES IN SKELETAL HYPORESPONSIVENESS TO PTH IN CHRONIC KIDNEY DISEASE?

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Objective: This research project aims to develop a liquid chromatography-tandem mass spectrometry (LC-MS/MS) method for quantifying parathyroid hormone (PTH) fragments and to use this approach to investigate their role in skeletal hyporesponsiveness to PTH in patients with chronic kidney disease (CKD).

Material and Methods: We developed an LC-MS/MS method to quantify four of the eight currently identified PTH fragments (PTH (38-77), PTH (38-84), PTH (37-84), and PTH (34-84)). A proof-of-concept study was then conducted by quantifying these four fragments in pooled serum samples from patients stratified according to estimated glomerular filtration rate (eGFR: <15, 15-30, 30-45, and 45-60 mL/min/1.73 m²).

Results: As reported by Kritmetapak et al.[1], serum concentrations of C-terminal PTH fragments increased as eGFR decreased. However, substantial interindividual variability was observed among patients with similar eGFR values. For example, the highest concentration of PTH (34-84) was up to 13-fold higher than the lowest observed concentration, whereas the concentration of PTH (1–84) in the same patient was only threefold higher at maximum. These findings suggest that PTH fragments concentrations depend not only on eGFR but may also reflect varying degrees of skeletal resistance to PTH. This observation indicates that PTH (1-84) alone lacks sufficient precision for reliable monitoring, as no correlation was observed between PTH fragments and PTH (1–84).

Conclusion: In conclusion, thanks to our LC–MS/MS method, we were able to observe large variability in PTH peptides concentrations in CKD patients across different eGFR levels. This research project paves the way for elucidating the mechanisms underlying skeletal resistance to PTH, which may ultimately lead to more effective patient care, help prevent fractures that are often fatal, and significantly reduce associated healthcare costs.

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P1125

COMPARATIVE ASSESSMENT OF VITAMIN D STATUS IN PREGNANT WOMEN AND NEONATES USING LC-MS/MS AND ROCHE TOTAL II ASSAY: INSIGHTS FROM THE PREG-D TRIAL

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Objective:
We compared the performance of Roche Elecsys Vitamin D Total II immunoassay with a CDC standardized liquid chromatography–tandem mass spectrometry (LC–MS/MS) assay, for 25(OH)D concentrations, in maternal-neonatal dyads from the Preg-D trial.

Methods:
We measured 25(OH)D in serum from 199 pregnant women and 170 cord blood samples collected at early second-trimester (10–14 weeks), and at delivery (37–41 weeks) after vitamin D supplementation, using both assays. We evaluated agreement using paired t-tests, linear regression, Bland–Altman plots, and Cohen's κ for vitamin D status classification. We assessed analytical accuracy through comparison with CDC reference materials and NIST SRM 1949 samples.

Results:
The two assays correlated strongly (R^2 = 0.65–0.73) but demonstrated systematic differences. LC–MS/MS reported higher maternal 25(OH)D values at delivery (mean bias +6 ± 6 ng/mL, p < 0.001)s,), whereas the Roche assay yielded higher cord blood values (mean bias −8 ± 6 ng/mL, p < 0.001 relative to LC–MS/MS). Classification concordance declined across time points substantial at baseline (κ = 0.66), moderate at delivery (κ = 0.56), and fair in cord blood (κ = 0.26). Against CDC and NIST reference materials, LC–MS/MS displayed minimal proportional bias, while the Roche assay underestimated 25(OH)D, with concentration-dependent deviations.

Conclusions:
Our study underscores LC–MS/MS superior accuracy, and the pressing need for vitamin D immunoassay standardization, particularly in pregnancy and early life, to ensure appropriate clinical management.

P1126

BIOFEEDBACK TRAINING IN PATIENTS WITH SYSTEMIC SCLEROSIS

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Background

Microcirculation disorders are the most important sign of Systemic Sclerosis (SS) and can be used to assess the effectiveness of therapy for this disease based on nail plate capillaroscopy. Our attention was drawn to the possibilities of using temperature biofeedback training for therapeutic effects on Raynaud's syndrome in patients with SS.

Objectives

The aim of our study was to evaluate the possibility of using temperature biofeedback training to treat Raynaud's syndrome in patients with SS.

Methods

The study population consisted of 70 SS patients. Patients were randomly divided into two groups: a control group (n = 30) and a main group (n = 40), whose patients received additional biofeedback procedures in addition to conventional therapy. The aim of the temperature-myographic biofeedback was to normalize blood flow in the peripheral vessels by teaching relaxation skills. Wide-field capillaroscopy of the nail bed of SS patients was performed. A qualitative (capillary shape, tortuosity, kinks, blood filling completeness, etc.) and quantitative assessment (capillary length and diameter, density per unit area, capillary network volume, etc.) of the detected changes were performed.

Results

The effectiveness of biofeedback was analyzed based on the dynamics of nail capillaroscopy parameters by comparing the data obtained from patients in the main and control groups.

Table 1. Dynamics of capillaroscopy signs in SS patients with Raynaud's syndrome

Signs	Main group (n = 40)		Control group (n = 30)	
	Before treatment	After treatment	Before treatment	After treatment
Skin count, M±SD	22.56 ± 10.24	14.98 ± 9.45*	21.05 ± 12.02	20.02 ± 9.89
Active type of capillaroscopy pattern, %	28 (70)	21 (52.5)	20 (66.7)	16 (53,3)
Capillary dilation, %	34 (85)	16 (40)*	24 (80)	17 (56.7)
Morphological changes in capillaries, %	36 (90)	22 (55)*	22 (73,33)	10 (33.33)*
Haemorrhages, %	25 (62.5)	10 (25)*	12 (40)	7 (23.33)
Avascular fields, %	26 (65)	24 (60)	13 (43.33)	13 (43.33)

Note: M – mean value, SD – standard deviation, (*) – p < 0.05.

The results indicate that the positive effect of therapy was higher in the main group of SS patients. Successful attempts at self-regulation contribute to improved well-being and mood, and reduced hypochondria and depression.

Conclusions

Thus, biofeedback is a complex, multi-component therapeutic method that combines physiological, psychological and behavioral mechanisms. The use of temperature-based biofeedback in patients with SS and Raynaud's syndrome leads to an improvement in microcirculation and capillary blood flow, which has a positive effect on the results of conventional pharmacotherapy.

P1127

THE EFFECTIVENESS OF USING TWO-COMPONENT INDICES OBTAINED FROM A COMPLETE BLOOD COUNT TO MONITOR INFLAMMATION IN PATIENTS WITH ANKYLOSING SPONDYLITIS AND RHEUMATOID ARTHRITIS

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Objectives

Accurate monitoring of inflammation intensity and disease status is important for patients with ankylosing spondylitis (AS) and rheumatoid arthritis (RA). Various indices obtained from complete blood counts (CBC) can be added to the list of non-invasive markers for use in various inflammatory and autoimmune diseases. The aim of the study was to investigate the dynamics of integral markers of inflammation obtained from CBC during inpatient treatment of these patients.

Methods

Data from standard clinical and laboratory examinations of 48 AS patients and 52 patients with RA were supplemented with the results of single-component and integral index assessments obtained using automated hematological analyzers. The analysis of biomarkers from CBC included the determination of the number of leukocytes, neutrophil granulocytes, lymphocytes, monocytes, and platelets. Standard methods were used to calculate the neutrophil-to-lymphocyte ratio (NLR), platelet-to-lymphocyte ratio (PLR), and monocyte-to-lymphocyte ratio (MLR).

Results

In AS patients, a positive correlation was found between NLR and age ($p=0.036$) and between MLR and ASDAS scores ($p=0.006$). No statistically significant correlation was found between ESR, CRP and two-component inflammatory markers obtained from CBC ($p>0.05$). In group with moderate AS activity, ASDAS scores correlated positively with MLR and monocytes ($p=0.037$ and $p=0.042$, respectively), and in group with high AS activity – only with MLR ($p=0.03$). Only MLR showed a significant decrease during treatment in the general group of AS patients ($p=0.011$). In patients with RA, markers obtained from CBC were not associated with either age or gender of the subjects ($p>0.05$), in contrast to commonly accepted markers of inflammation (ESR and CRP), for which a positive correlation with patient age was established. Of all the indices studied, only TLR correlated significantly with ESR and CRP ($p<0.05$). The TLR index should be considered as an additional (to CRP) marker when assessing the effectiveness of therapeutic interventions in patients with highly active RA in a hospital setting.

Conclusions

Biomarkers obtained from clinical blood tests may be useful for monitoring inflammation in AS patients (MLR) and in patients with highly active RA (TLR in conjunction with ESR and CRP).

P1128

VITAMIN D LEVELS AND DEXA SCAN FINDINGS IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Objective:

Patients with rheumatoid arthritis exhibit significantly lower bone mineral density compared with the healthy population. Vitamin D deficiency is highly prevalent in this group of patients and is associated with lower bone mineral density and higher disease activity. Vitamin D supplementation, particularly when combined with anti-osteoporotic therapy, has been associated with improvement in BMD values measured by DEXA. The objective was to evaluate the relationship between vitamin D levels and DEXA scan findings in patients with rheumatoid arthritis, as well as their clinical significance.

Materials and Methods:

This was a cross-sectional study that included 100 patients with rheumatoid arthritis treated at a tertiary care level. Bone mineral density was assessed using DEXA scan at the lumbar spine and femoral neck and was compared with serum levels of 25-hydroxyvitamin D.

Results:

In our study, among analyzed patients with rheumatoid arthritis, with the average age 50.94±5.7, the mean serum vitamin D level was 15.86±3.4. Using Pearson correlation analysis, a positive correlation was found between vitamin D levels and metabolic bone disorder derived by T-score values at the lumbar spine ($r = 0.28$) and the femoral neck ($r = 0.33$). A strong positive correlation ($r = 0.7$) was observed between bone mineral density values of the lumbar spine and the femoral neck regions.

Conclusions:

Regular assessment of bone mineral density using DEXA scan and monitoring of vitamin D levels are important components of the long-term management of patients with rheumatoid arthritis. Identification and correction of vitamin D deficiency may contribute to reducing the risk of osteoporosis and fractures in this population.

P1129

CHARACTERISTICS AND TREATMENT OPTIONS OF 272,152 GERIATRIC PATIENTS WITH VERY HIGH AND HIGH FRACTURE RISK

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Objective: The German osteoporosis guideline defines high and very high fracture-risk based on quantifiable evidence-based risk-factors, recommending bone anabolic treatment as first-line therapy for the latter. Given age as a major risk factor, we investigated the proportion of geriatric patients with very high fracture risk, their characteristics, and the percentage suitable for bone anabolic treatment considering contraindications.

Material and Methods: Data from the Geriatrics in Bavaria-Database (GiB-DAT, Geriatrie in Bayern Datenbank) included 272,152 participants (mean age 82±7 years) between 2013 and 2023. Risk-factors and contraindications were evaluated using ICD-10- (International Statistical Classification of Diseases) and ATC-codes (Anatomical Therapeutical Chemical Classification). We analyzed the proportion in the high-risk and very high-risk group, their characteristics, and the share with a contraindication for specific anti-osteoporotic treatments.

Results: >75% of the patients qualified for specific anti-osteoporotic treatment, with the majority (54%) at very high-risk equiring bone anabolic treatment. Patients in the very high-risk group had the lowest mini mental status examination (MMSE) (23±5 points) and activities of daily living (ADL) scores (45±20 points). Contraindications for bone anabolic treatments were found in 20% of women and 8% of all very high-risk patients. 70% of the total study population had no contraindication for any specific anti-osteoporotic medications.

Conclusion: The majority of geriatric patients is at a very high-risk for osteoporotic fractures, characterized by cognitive impairment, ADL limitations, and increased vulnerability. While some patients had contraindications, most were eligible for anti-osteoporotic and particularly bone anabolic treatments. Timely risk-assessment and treatment initiation is crucial and barriers need to be addressed.

P1130

EVALUATING CHATGPT FOR OSTEOPOROSIS PATIENT EDUCATION IN GERIATRIC MEDICINE

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Objective: Large language models (LLMs) such as ChatGPT are increasingly used by patients and caregivers to obtain medical information, particularly for chronic conditions in older adults such as osteoporosis. The aim of this study was to systematically evaluate the quality of AI-generated responses to frequently asked patient questions on osteoporosis. Beyond assessing absolute ratings of accuracy, relevance, and potential harm, this study specifically examined uncertainty in expert judgments and agreement regarding the clinical prioritization of osteoporosis-related information.

Materials and Methods: In this cross-sectional expert evaluation study, ten geriatricians independently assessed ten ChatGPT-generated responses to common patient questions addressing key aspects of osteoporosis, including diagnostic, etiologic, therapeutic, risk-related, and prognostic domains. Accuracy, relevance, and potential harm were rated using a 5-point Likert scale. Non-parametric comparisons were performed across content domains. Uncertainty in expert ratings was quantified using interquartile ranges (IQR), while agreement on relative prioritization of statements was assessed using Kendall's coefficient of concordance (W).

Results: No statistically significant differences were observed between content domains in absolute ratings, indicating a high degree of consistency in expert evaluations across osteoporosis-related topics. Overall uncertainty was low to moderate. The highest IQR values were found for therapeutic statements related to osteoporosis with respect to potential harm, as well as for risk-related osteoporosis statements. The lowest levels of agreement (lowest Kendall's W) were observed in risk-related domains pertaining to osteoporosis. These findings suggest that expert disagreement was primarily driven by differences in clinical prioritization rather than by fundamental disagreement regarding the correctness or relevance of the AI-generated statements.

Conclusion: The increased variability observed in therapeutic and risk-related osteoporosis statements is clinically plausible, reflecting areas characterized by heterogeneous evidence, diverse patient populations, and nuanced risk–benefit considerations. The combination of low uncertainty in absolute ratings and low agreement in relative prioritization suggests that AI-generated information on osteoporosis is generally accurate and acceptable but lacks sufficient differentiation to support consistent expert prioritization. From a clinical and patient education perspective, these findings highlight the importance of clearer contextualization and prioritization of osteoporosis-related information when AI-generated content is used.

P1131

ROMOSOZUMAB AND MICROARCHITECTURE: TBS LUMBAR T-SCORE DETECTS CHANGE BEYOND BMD

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Objective: Trabecular Bone Score (TBS) provides microarchitectural information complementary to bone mineral density (BMD). However, evidence on the responsiveness of TBS to romosozumab in real-world clinical settings remains limited. The objective was to evaluate and compare the sensitivity to change of TBS (index and lumbar T-score) and lumbar BMD after 12 months of romosozumab in a real-life cohort.

Methods: Postmenopausal women with osteoporosis who completed 12 months of romosozumab and underwent paired baseline and annual DXA scans were included. Outcomes were absolute and percentage changes in: (1) TBS index, (2) TBS lumbar T-score, and (3) lumbar BMD. Responsiveness was assessed using paired t-tests and Standardized Response Means (SRM). Correlations between change in TBS and change in BMD were evaluated using Pearson's r. Ethical approval and written informed consent were obtained.

Results: A total of 47 participants had paired TBS index values, 48 had paired TBS T-scores and 45 had paired lumbar BMD measurements. TBS index increased modestly (+0.016; +1.7%), without statistical significance (p=0.295) and with low responsiveness (SRM=0.15). TBS lumbar

T-score showed a markedly greater improvement (+1.03), reaching high responsiveness (SRM=1.43, p<0.001). Lumbar BMD increased by +0.070 g/cm² (+10.5%), demonstrating strong responsiveness (SRM=1.34, p<0.001). Correlation between change in TBS index and change in lumbar BMD was minimal (r≈0.01), whereas change in TBS T-score correlated moderately with BMD improvement (r≈0.53). A summary table with descriptive changes are provided.

Metric	Absolute change	Percent change	SRM
TBS index change	0,016	0,017	0,15
TBS T-score change	1,03		1,43
BMD lumbar change	0,07	0,105	1,34

Conclusions: In this real-world analysis, romosozumab produced robust increases in lumbar BMD and TBS lumbar T-score, while the TBS index showed limited sensitivity to change. TBS lumbar T-score exhibited strong responsiveness and appears to be a more reliable parameter for monitoring microarchitectural effects of romosozumab in clinical practice.

P1132

TRANSFORMING OSTEOPOROSIS CARE: MEASURABLE BENEFITS OF IMPLEMENTING A FRACTURE LIAISON SERVICE IN A REGIONAL HOSPITAL

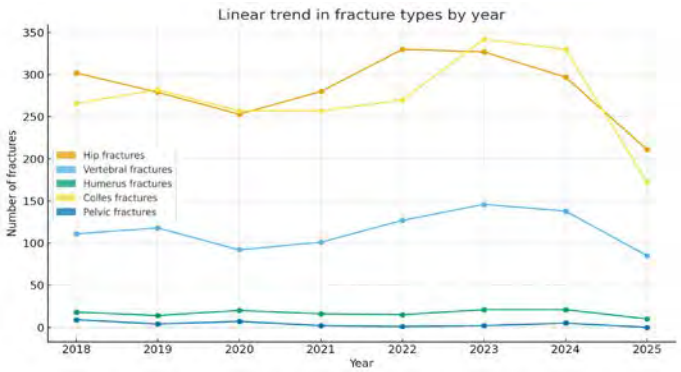
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Objectives: Fracture Liaison Services (FLS) have demonstrated effectiveness in reducing secondary fractures, improving treatment initiation, and optimizing follow-up of patients at high fracture risk. The FLS of Hospital Universitario de la Plana was implemented 18 months ago, providing an opportunity to evaluate early changes in fracture epidemiology and osteoporosis-related risk profiles. The objective was to describe temporal trends in patient characteristics, fracture types, and clinical risk factors before and after FLS implementation, using a stratified analysis by year in patients who presented and osteoporotic fracture.

Methods: A retrospective cohort was constructed from the hospital emergency registry covering **2018–2025**. **Only patients presenting with a clinical osteoporotic fracture** (hip, vertebral, humeral, Colles, or pelvic) were included. Patients <45 years were excluded. Annual strata were analyzed using descriptive statistics for continuous and dichotomous variables. Fracture incidence patterns were compared across years, with specific assessment of trends during the **18-month post-FLS period** (June 2024–December 2025).

Results: A total of **5,538 patients** were evaluated (4,602 pre-FLS; 936 post-FLS). Demographic and functional profiles remained stable across years. Documentation of classical osteoporosis risk factors improved after FLS implementation. Fracture distributions showed a relative reduction in hip and vertebral fractures post-FLS, alongside increased detection of peripheral fractures. Early indicators suggested lower-severity presentations and shorter hospital stays, consistent with strengthened secondary prevention pathways.



Conclusions: Introducing an FLS in June 2024 was associated with better risk-factor documentation, shifts in fracture patterns, and early signals of reduced major osteoporotic fractures. These findings support the positive early impact of the FLS and reinforce the need for continued long-term monitoring.

P1133

INTEGRATING BONE QUALITY AND SYSTEMIC HEALTH: ROMOSOZUMAB-DRIVEN MICROARCHITECTURAL GAINS AND THEIR RELATIONSHIP WITH INFLAMMATION AND CARDIOVASCULAR RISK

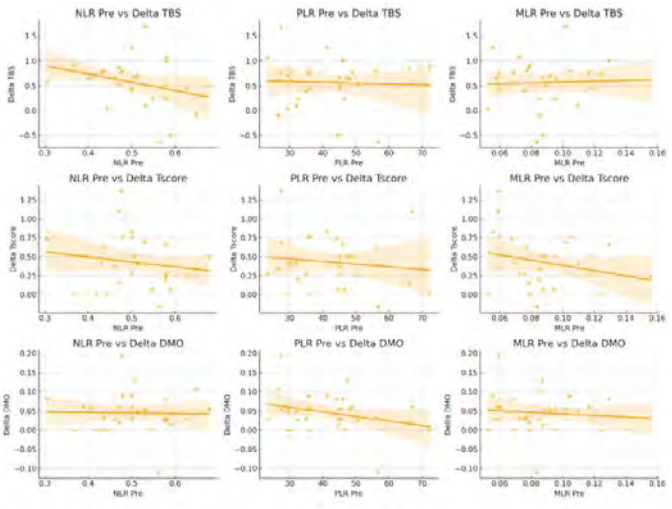
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Objective Trabecular Bone Score (TBS) provides complementary information on trabecular microarchitecture, whereas bone mineral density (BMD) reflects bone quantity. Inflammatory ratios such as neutrophil-to-lymphocyte (NLR), platelet-to-lymphocyte (PLR), and monocyte-to-lymphocyte (MLR) are recognised biomarkers of subclinical inflammation and surrogate indicators of cardiovascular risk (CVR). Given ongoing debate about the cardiovascular safety of romosozumab, it is relevant to determine whether this anabolic agent modifies inflammatory markers linked to vascular risk. No previous real-world study has evaluated changes in these biomarkers under romosozumab. The objective was to assess changes in TBS, BMD, densitometric T-scores and inflammatory ratios after 12 months of romosozumab, and to determine whether treatment influences markers of subclinical inflammation associated with CVR.

Methods: A total of 60 postmenopausal women with paired baseline and 12-month DXA scans were included. Mean age was 66.6 ± 9.5 years. Comorbidities included hypertension (43%), dyslipidaemia (38%), diabetes mellitus (3%) and inflammatory diseases (17%). Previous fractures were present in 42%. Prior osteoporosis treatments included bisphosphonates (52%), denosumab (23%), and teriparatide (8%). Outcomes were changes in TBS index, lumbar TBS T-score, lumbar and femoral BMD, and corresponding T-scores; NLR, PLR and MLR were assessed at baseline and at 12 months.

Results: Lumbar BMD increased from 0.699 to 0.771 g/cm² (+10.2%), lumbar TBS T-score improved by +1.04, and TBS index increased by +1.7%. Baseline inflammatory ratios did not showed associations with ΔT-score or ΔBMD but baselina NLR moderately correlated with ΔTBS (r≈−0.63). Importantly, inflammatory ratios remained stable over 12 months, showing no evidence of systemic inflammatory activation.



Linear regression models showed **low predictive capacity** of NLR, PLR, or MLR on changes in TBS, T-score, or BMD ($R^2 < 0.1$ in all models)

Conclusions: Romosozumab produced substantial anabolic effects on bone without altering inflammatory ratios linked to CVR. These findings support that romosozumab exerts a purely anabolic mechanism, maintains stable subclinical inflammation, and shows a neutral cardiovascular profile in real-world practice.

P1134

ROMOSOZUMAB IN PATIENTS WITH CHRONIC KIDNEY DISEASE AND VERY HIGH FRACTURE RISK: REAL-WORLD EVIDENCE TO GUIDE THERAPEUTIC DECISION-MAKING

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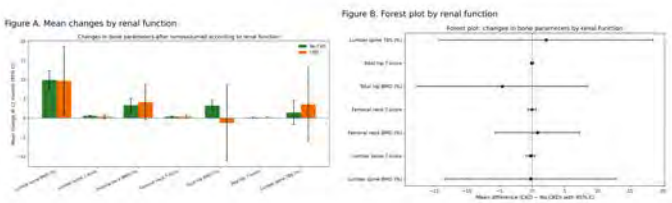
Objective: Chronic kidney disease (CKD) is associated with a markedly increased fracture risk, particularly vertebral fractures, which are frequently underdiagnosed and contribute to increased morbidity and mortality. Bone fragility in CKD results from the coexistence of traditional osteoporosis risk factors and CKD-related disturbances in bone and mineral metabolism, with predominant involvement of cortical bone. Although the predictive value of bone mineral density (BMD) in CKD was previously debated, recent evidence supports the use of BMD and Trabecular Bone Score (TBS) for fracture risk assessment and therapeutic decision-making. Nevertheless, concerns regarding efficacy and safety contribute to persistent undertreatment. Real-world data on the skeletal response to romosozumab according to renal function remain scarce. The objective was to evaluate the impact of baseline renal function on densitometric response, changes in T-score, and TBS after 12 months of romosozumab treatment in patients with osteoporosis at very high fracture risk.

Methods: Longitudinal observational real-world study including patients who completed 12 months of romosozumab and had baseline and follow-up densitometry. CKD was defined as estimated glomerular filtration rate <60 mL/min/1.73 m². Absolute and percentage changes in BMD at the lumbar spine, femoral neck, and total hip were analysed, together with changes in T-score and TBS. Comparisons between patients with and without CKD were adjusted for age, baseline densitometric values, vitamin D levels, baseline parathyroid hormone, and prior bisphosphonate exposure.

Results: Fifty patients were included, of whom 12% had CKD. Baseline parathyroid hormone levels were similar between groups, with a non-significant trend toward higher values at 12 months in CKD patients. After treatment, significant BMD increases were observed at all skeletal sites, particularly at the lumbar spine. Changes in BMD, T-score, and TBS were comparable between patients with and without CKD, with no significant between-group differences.

Descriptive analysis of clinical and analytical variables

Variable	Result
Age (years)	66.2 ± 7.9
Early menopause	9/51 (17.6%)
Diabetes mellitus	2/51 (3.9%)
Current smoking	6/51 (11.8%)
Alcohol consumption	1/51 (2.0%)
Family history of hip fracture	5/49 (10.2%)
History of vertebral fracture	14/51 (27.5%)
History of hip fracture	5/49 (10.2%)
History of proximal humerus fracture	4/51 (7.8%)
History of Colles' fracture	10/51 (19.6%)
Glucocorticoid therapy	4/51 (7.8%)
Inflammatory disease	8/51 (15.7%)
Previous bisphosphonate treatment	28/51 (54.9%)
Baseline 25(OH)D (ng/mL)	28.9 ± 9.3
Baseline calcium (mg/dL)	9.47 ± 0.44
Calcium at 12 months (mg/dL)	9.45 ± 0.44
eGFR <60 mL/min/1.73 m²	6/51 (11.8%)
eGFR 30–59 mL/min/1.73 m²	6/51 (11.8%)
eGFR 15–29 mL/min/1.73 m²	0/51 (0.0%)
PTH ≤65 pg/mL	51/51 (100.0%)
PTH >65 pg/mL	0/51 (0.0%)
FRAX major osteoporotic fracture risk (%)	8.66 ± 4.78
FRAX hip fracture risk (%)	3.05 ± 2.81



P1135

BASELINE HYPERPARATHYROIDISM AND PRIOR BISPHOSPHONATE EXPOSURE IDENTIFY A CLINICAL PROFILE ASSOCIATED WITH RESPONSE TO ROMOSOZUMAB IN PATIENTS AT VERY HIGH FRACTURE RISK

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Objective: Romosozumab (ROMO) is an anabolic therapy with a dual mechanism of action, with beneficial effects on both trabecular and cortical bone and proven antifracture efficacy. In contrast, hyperparathyroidism (hyperPTH) is associated with cortical bone deterioration (reduced cortical thickness and strength), while its effects on trabecular bone are more variable. It is clinically relevant to assess

whether hyperPTH modulates the skeletal response to ROMO in patients with osteoporosis (OP). The objective was to evaluate the influence of hyperPTH on changes in bone mineral density (BMD), T-score, and Trabecular Bone Score (TBS) after 12 months of ROMO treatment, and to explore the modulatory role of prior bisphosphonate (BP) therapy in real-world practice.

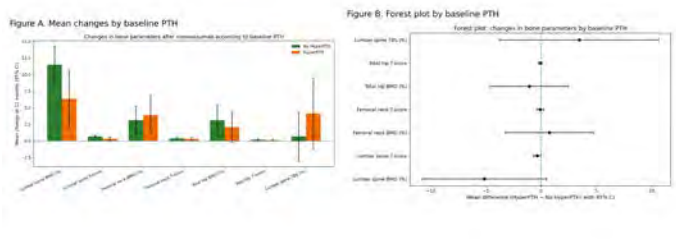
Methods: This longitudinal observational real-world study included patients with OP at very high fracture risk who completed 12 months of ROMO treatment. HyperPTH was defined as baseline parathyroid hormone (PTH) >65 pg/mL. Absolute and percentage changes in BMD at the lumbar spine (LS), femoral neck (FN), and total hip (TH), as well as changes in T-score and TBS, were analysed. Unadjusted comparisons and multivariable linear regression models adjusted for age, baseline densitometric values, renal function, vitamin D levels, and prior BP treatment were performed, including interaction terms.

Results: Fifty women were included. In unadjusted analyses, patients with hyperPTH showed lower gains in LS BMD and T-score compared with those with normal PTH levels, while differences at FN, TH, and in TBS were smaller and not significant. In adjusted models, hyperPTH remained associated with a reduced LS response, although this effect was attenuated after accounting for prior BP treatment. Interaction analyses suggested a greater negative impact of hyperPTH in BP-naïve patients, without reaching statistical significance.

Conclusions: In patients with OP treated with romosozumab, BMD gains are observed, but their magnitude is modulated by the presence of hyperPTH compared with patients without this condition, particularly at LS. Prior BP treatment appears to attenuate this effect. Assessment of baseline PTH status and treatment history may help identify patients with complex OP in whom romosozumab represents an appropriate therapeutic option.

Descriptive analysis of clinical and analytical variables

Variable	Result
Age (years)	66.2 ± 7.9
Early menopause	9/51 (17.6%)
Diabetes mellitus	2/51 (3.9%)
Current smoking	6/51 (11.8%)
Alcohol consumption	1/51 (2.0%)
Family history of hip fracture	5/49 (10.2%)
History of vertebral fracture	14/51 (27.5%)
History of hip fracture	5/49 (10.2%)
History of proximal humerus fracture	4/51 (7.8%)
History of Colles' fracture	10/51 (19.6%)
Glucocorticoid therapy	4/51 (7.8%)
Inflammatory disease	8/51 (15.7%)
Previous bisphosphonate treatment	28/51 (54.9%)
Baseline 25(OH)D (ng/mL)	28.9 ± 9.3
Baseline calcium (mg/dL)	9.47 ± 0.44
Calcium at 12 months (mg/dL)	9.45 ± 0.44
eGFR <60 mL/min/1.73 m²	6/51 (11.8%)
eGFR 30–59 mL/min/1.73 m²	6/51 (11.8%)
eGFR 15–29 mL/min/1.73 m²	0/51 (0.0%)
PTH ≤65 pg/mL	51/51 (100.0%)
PTH >65 pg/mL	0/51 (0.0%)
FRAX major osteoporotic fracture risk (%)	8.66 ± 4.78
FRAX hip fracture risk (%)	3.05 ± 2.81



P1136

BLOOD CELL COUNT–DERIVED INFLAMMATORY RATIOS AND SKELETAL RESPONSE TO ROMOSOZUMAB: A MULTICENTER REALWORLD COHORT

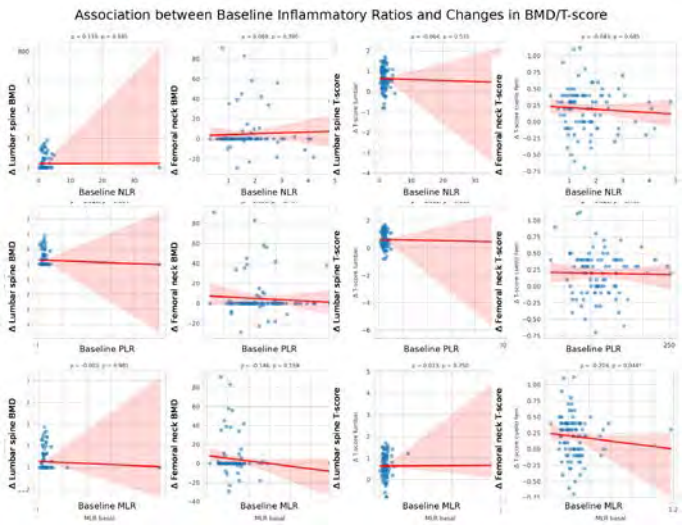
A. Zúñiga-Vera[1], M. Sanabria-Hernández[1], L. Gifre-Sala[2], A. Naranjo-Hernández[3], S. Ojeda[3], E. Naveda[3], R. Durán-Rodríguez[2], M. Robustillo-Villarino[1]

[1]HOSPITAL UNIVERSITARIO DE LA PLANA, VILA-REAL, Spain; [2]Hospital Universitari Trias i Pujol, Badalona, Spain; [3]Hospital universitario de Gran Canaria Dr Negrín, Gran Canaria, Spain

Objectives:
To assess whether baseline complete blood count (CBC)–derived inflammatory ratios—neutrophiltolymphocyte ratio (NLR), platelettolymphocyte ratio (PLR), and monocytetolymphocyte ratio (MLR)—are associated with 12month changes in bone parameters (BMD, Tscore and trabecular bone score [TBS]) in patients treated with romosozumab.

Material and Methods:
Retrospective, multicenter observational study including osteoporotic patients treated with romosozumab 210 mg monthly for 12 months at three Spanish hospitals. CBCderived ratios (NLR, PLR, MLR) were calculated at baseline and month 12. DXA outcomes included lumbar spine (LS), femoral neck (FN) and total hip (TH) BMD (g/cm²) and Tscores; lumbar TBS was analyzed when available. Pre–post changes were evaluated with paired Wilcoxon tests. Associations between baseline ratios and changes in bone outcomes were tested using Spearman correlation. Subgroups were explored by NLR tertiles and by NLR >3 vs ≤3.

Results:
A total of 154 patients were included (98.7% women; mean age 65.9±8.8 years). Baseline ratios were: median NLR 1.42 (IQR 1.05–1.87), PLR 113.6 (87.7–147.7) and MLR 0.24 (0.18–0.30). At 12 months, significant gains were observed in LS BMD (+11.5±8.7%, p<0.001), LS Tscore (+0.64±0.54, p<0.001) and FN Tscore (+0.23±0.42, p<0.001). Lumbar TBS increased modestly and did not reach conventional significance (+0.016±0.10, p=0.055). No significant correlations were found between baseline inflammatory ratios and changes in BMD, Tscore or TBS (Spearman ρ −0.04 to 0.14; all p>0.05). Bone responses did not differ across NLR tertiles or by NLR >3 (all p>0.05). CBCderived ratios did not change significantly over 12 months (all p>0.05).



Conclusions:
Baseline CBCderived inflammatory ratios (NLR, PLR, MLR) did not predict the magnitude of skeletal response to romosozumab in this realworld cohort. These findings support a predominantly direct anabolic effect of romosozumab on bone, consistent with the rapid BMD gains reported in pivotal trials, with no measurable modulation by lowgrade systemic inflammation.

P1137

TBS FOR MONITORING OSTEOPOROSIS DURING ROMOSOZUMAB: FEASIBILITY, RESPONSIVENESS AND LEAST SIGNIFICANT CHANGE IN A MULTICENTER COHORT

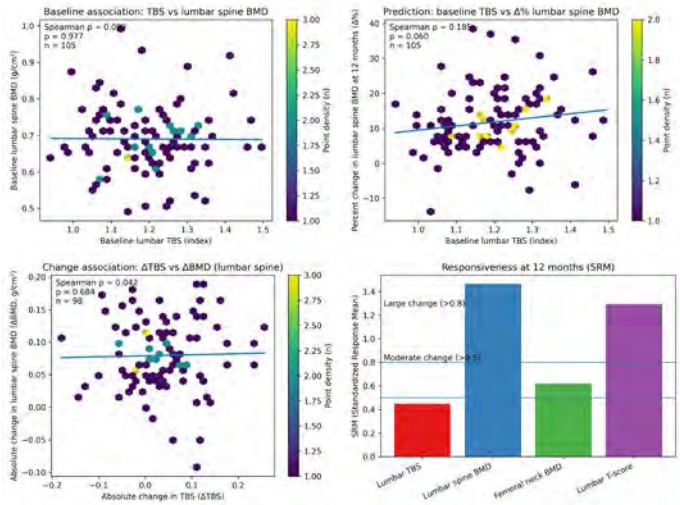
M. Robustillo-Villarino[1], A. Zúñiga-Vera[1], M. Sanabria-Hernández[1], A. Naranjo-Hernández[2], L. Gifre-Sala[3], R. Durán-Rodríguez[3], E. Naveda[2], S. Ojeda[2]

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Objectives:
To evaluate the feasibility and longitudinal performance of lumbar trabecular bone score (TBS) versus BMD and Tscores during 12 months of romosozumab, using an individuallevel interpretation based on the least significant change (LSC).

Material and Methods:
Retrospective, multicenter study of women treated with romosozumab for 12 months. DXA was performed at baseline and followup to obtain lumbar spine (LS; L1–L4) and proximal femur outcomes, including LS, femoral neck (FN) and total hip (TH) BMD (g/cm²) and Tscores. Lumbar TBS was derived from LS DXA images using dedicated software (TBS iNsight®). Changes were expressed as absolute (Δ) and percent (Δ%) change, and responsiveness was quantified by the standardized response mean (SRM = mean change/SD of the change). Using a "detectable change" approach, TBS response was categorized by whether changes exceeded the 95% LSC, and the proportions with |Δ%| ≥3.0% and ≥5.8% were estimated. Bone turnover markers (BTM) P1NP and βCTX were analyzed when available. Spearman correlations assessed relationships between baseline TBS and baseline LS BMD, between baseline TBS and %Δ LS BMD, and between ΔTBS and ΔLS BMD.

Results:
One hundred eleven women were included (mean age 68.4±8.6 years); 4.5% had diabetes, 40.5% hypertension, and 87.4% prior fracture. At 12 months, LS BMD increased by 11.5% (SRM 1.47; p<0.001), FN BMD by 3.7% (SRM 0.62; p<0.001) and TH BMD by 4.0% (SRM 0.58; p<0.001). LS Tscore improved by +0.67 (SRM 1.29; p<0.001). Lumbar TBS increased by +0.035 (Δ% 3.10; SRM 0.45; p<0.001). TBSadjusted LS Tscore increased by +0.81 (SRM 1.00; p<0.001). P1NP showed no significant change (p=0.837) and βCTX tended to decrease (p=0.142). No correlation was observed between baseline TBS and baseline LS BMD (ρ=0.003; p=0.977) or between ΔTBS and ΔLS BMD (ρ=0.042; p=0.684). Baseline TBS showed a nonsignificant trend with %Δ LS BMD (ρ=0.185; p=0.060).



Conclusion:
In routine clinical practice, lumbar TBS is feasible and demonstrates modest but statistically robust responsiveness to romosozumab (SRM 0.45 at 12 months). While BMD remains the primary monitoring parameter, TBS may provide complementary information for individual followup when interpreted against LSC thresholds, consistent with an anabolic treatment profile as shown in pivotal romosozumab trials.

P1138

POSTMENOPAUSAL OSTEOPOROSIS AND COMORBID PATHOLOGY

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Objective. When treating patients with postmenopausal osteoporosis, it is important to assess the impact of comorbid pathology on the progression of the disease.
Material and methods. A retrospective analysis of the management of 86 women with primary osteoporosis and a history of one or more fractures was conducted. An analysis of the medical documentation of outpatient patients at the rheumatologist's office at the Osteoporosis Prevention Center, and outpatient and inpatient patients at the city rheumatology center was performed.
Results. In first place (72.5%) in frequency in patients with osteoporosis, concomitant cardiovascular pathology was identified, its nosological distribution is as follows: arterial hypertension - 41%; coronary heart

disease – 26%, a combination of hypertension and coronary heart disease – 27%, other diseases (congenital or acquired heart disease, myocarditis, rhythm and conduction disorders) – 6%. At the same time, of the patients with cardiovascular pathology, the number of patients with CHF was 83%.
In second place is osteoarthritis with predominant damage to the joints of the lower extremities – 68%. Damage to the joints of the lower extremities leads to loss of stability when walking; degenerative changes in the ligamentous apparatus and muscles contribute to loss of balance and increase susceptibility to falls, which are an independent risk factor for osteoporotic fractures. Moreover, 73% of patients with a combination of osteoarthritis and osteoporosis belong to the age group over 70 years.
The third most common nosology is bronchial asthma and/or chronic obstructive pulmonary disease (COPD) – 17.5%.
Other comorbid conditions in patients with postmenopausal osteoporosis amounted to 13.5%. Combinations of major comorbid diseases were distributed as follows: hypertension and osteoarthritis is 53.6%, ischemic heart disease and hypertension in combination with osteoarthritis is 21.3%, ischemic heart disease and asthma is 2.8%, osteoarthritis and asthma are 6.1%, respectively, osteoarthritis and in combination with ischemic heart disease is 18.9%.
Conclusions. Patients with complicated osteoporosis are characterized by polymorbidity. The most common are osteoarthritis and diseases of the cardiovascular system, complicated by chronic heart failure.

P1139

ADHERENCE TO THERAPY IN PATIENTS WITH OSTEOPOROSIS: ANALYSIS OF FACTORS AND DYNAMICS

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Objective. Assessment of treatment adherence in patients with osteoporosis and identification of associated factors determine prognosis and quality of life.
Materials and methods. The prospective study included 94 patients with a verified diagnosis of osteoporosis. Patients were stratified into two groups: 32 patients without a history of fractures and 62 patients with a history of low-energy fractures.
The last group included patients with fractures: Collis (n=30), ribs (n=3), proximal femur (n=8), sternum (n=2), vertebral compression fractures (n=17) and ankle (n=2). The following number of patients were prescribed oral bisphosphonates as primary therapy: weekly oral bisphosphonates - 36, monthly - 24, quarterly intravenous - 15, intravenous annual - 9, strontium ranelate - 2, denosumab - 7. Treatment adherence was assessed at 12 and 24 months from the start of therapy.
Results. Dynamics of adherence after 12 months: among patients without anamnestic fractures, 14 people (34.4%) stopped therapy. In the group of patients who suffered fractures, refusal of treatment was noted in 12 people (24.1%).
Dynamics of adherence after 24 months: the proportion of patients who stopped treatment increased: among patients without fractures - up to 17 people (53.1%), among patients with fractures - up to 21 people (65.6%). It is important to note that among the patients who discontinued therapy, there were no patients with a history of femur or ankle fractures.
Analysis of the dynamics of therapy discontinuation in the period from 12 to 24 months: the largest increase in the number of patients who stopped therapy was observed in the groups receiving oral bisphosphonates. In the group of monthly administration of bisphosphonates, the proportion of those who stopped treatment increased from 12.5% to 41.6% (10 people), and in the group of weekly administration of bisphosphonates - from 13.8% to 58.3% (21 people).
The reasons for discontinuing medications include inconvenience of administration, poor tolerability, high cost.
Conclusions. Adherence to therapy was statistically significantly higher in patients with a history of fractures, especially fractures of the lower extremities. Discontinuation of intravenous bisphosphonates during the first year of therapy was associated with high drug costs and adverse events.

P1140

MENTAL DISORDERS IN GERIATRIC PATIENTS WITH SARCOPENIA AND SARCOPENIC OBESITY

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Objective. To study the incidence of depression, sleep disorders, fatigue and loneliness in geriatric patients with sarcopenia and sarcopenic obesity.
Materials and methods. 73 patients took part in the study. The level of depression, loneliness, fatigue and sleep disturbances was assessed using standardized instruments. Diagnosis of sarcopenic syndromes was carried out in accordance with the criteria of EWGSOP (2018) and ESPEN and EASO (2022). Depression was assessed using the Geriatric Depression Scale (GDS-15). The level of loneliness was determined using the UCLA Loneliness Scale. Clinically significant fatigue was defined as 36 or more points on the FSS (Fatigue Severity Scale).
Results. The average age of the patients was 77.51±5.31 years, women predominated (71.46%). Various NS sleep disorders were observed in 72.65% of respondents, high and average levels of loneliness – in 57.54%. Clinically significant fatigue was detected in 68.15%, increased levels of depression – in 48.29% of patients. Direct statistically significant correlations were established between fatigue and depression ($r=0.41$, $p<0.001$), as well as loneliness and depression ($r=0.45$, $p<0.001$).
After additional examination, the patients were divided into three groups: with sarcopenia (n=13), with sarcopenic obesity (n=41) and a control group (without signs of sarcopenia) (n=19). Fatigue was most pronounced in patients with sarcopenia (56 (36.25; 62) points) and sarcopenic obesity (50 (37.75; 54.25) points), $p=0.32$, compared with the control group (31 (27.5; 51.25) points), $p<0.05$. The largest number of patients with clinically significant fatigue belonged to the sarcopenic obesity group (79.49%). In the same group, a moderate direct correlation between fatigue and depression was revealed ($r=0.37$, $p=0.01$).
Conclusions. The high incidence of mental disorders in patients with sarcopenic syndromes indicates the need for early diagnosis and timely correction of these conditions in geriatric practice. The findings highlight the importance of a comprehensive approach to the management of geriatric patients, including assessment of both physical and mental health.

P1141

RISK FACTORS FOR OSTEOPOROSIS IN PATIENTS WITH CALCIUM PYROPHOSPHATE DEPOSITION DISEASE

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Objective. To determine the prognostic significance of individual factors in the development of osteoporosis in patients with calcium pyrophosphate deposition disease (CPDD).

Materials and methods. An open prospective study was conducted with the participation of 90 patients. The main group consisted of 61 patients with a verified diagnosis of calcium pyrophosphate deposition disease (CPDD) (33 men and 28 women). The control group consisted of 28 patients with osteoarthritis (8 men and 20 women). The diagnosis of calcium pyrophosphate deposition disease (CPDD) was established according to the McCarty criteria. All study participants underwent densitometry at the initial stage and at the end of the study to assess bone mineral density (BMD) in the lumbar spine, femoral neck, and forearm bones.

Results and discussion. The baseline characteristics of the patients in terms of gender, age and disease duration did not reveal statistically significant differences between the groups. At the end of the follow-up period, osteoporosis was diagnosed in 22 (36%) of 61 patients with calcium pyrophosphate deposition disease (CPPD) (13 men and 9 women) and in 8 (28.6%) of 28 patients with osteoarthritis (2 men and 6 women).

The analysis of risk factors revealed the following associations with the development of osteoporosis in patients with calcium pyrophosphate crystal deposition disease (CDPC): age over 55 years in women RR=5.1; 95% CI=1.019–24.29; p=0.047); age over 65 years in men (RR=3.8; 95% CI=1.25–11.5; p=0.013); hyperparathyroidism (RR=14.28; 95% CI=1.65–136.8; p=0.015); increased erythrocyte sedimentation rate (ESR) > 20 mm/h (RR=3.37; 95% CI=1.12–10.1; p=0.025); elevated C-reactive protein (CRP) values > 5.0 mg/L (RR=5.21; 95% CI=2.03–19.04; p=0.002).

In a multivariate analysis using logistic regression (model sensitivity of 71%, specificity of 82%), the only significant factor associated with the development of osteoporosis in patients with calcium pyrophosphate deposition disease (CPDD) was hyperparathyroidism (RR=13.64; 95% CI=1.04–193.03; p=0.038).

Conclusions. Hyperparathyroidism is associated with the development of osteoporosis in patients with calcium pyrophosphate crystal deposition disease.

P1142

VERTEBRAL FRACTURE MORTALITY: AN OVERLOOKED HIGH-RISK ENTITY IN A MIDDLE EASTERN FRAGILITY FRACTURE COHORT

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Objective:

Fragility fractures, particularly of the hip, are known predictors of excess mortality. However, mortality data specifically for vertebral fractures remains scarce in the Middle East. This study evaluated mortality across fragility fracture types, focusing on vertebral fractures, and assessed current gaps in osteoporosis assessment and treatment.

Methods:

We conducted a retrospective cohort study of adults presenting with fragility fractures to a tertiary care center between February 2021 and July 2025. Fractures were categorized as hip, vertebral, femoral shaft, or others. Outcomes included all-cause mortality, bone mineral density (BMD) testing, and initiation of osteoporosis therapy. Mortality rates were compared using Fisher's exact test. Multivariable logistic regression was performed to identify predictors of treatment initiation.

Results:

Among 227 patients, overall mortality was 11.0% (n=25). Mortality following vertebral fractures was 17.3% (9/52), with no significant difference observed compared to hip fracture mortality at 14.1% (13/92; p=0.64) and substantially higher than femoral shaft fractures (3.8%; 3/79). Our observed vertebral fracture mortality rates were aligned with those reported in international cohort studies. Despite this risk, major care gaps were identified. Among patients with hip or vertebral fractures, 71.5% (103/144) did not receive osteoporosis therapy. Furthermore, 89.3% (92/103) of untreated hip or vertebral fracture patients lacked BMD testing following fracture. Female sex was the strongest independent predictor of treatment initiation (OR 8.58, 95% CI 2.4–37.0; p=0.0017), indicating marked undertreatment of men independent of age, fracture type, and endocrine follow-up.

Conclusions:

In this Middle Eastern cohort, vertebral fractures were associated with a mortality burden statistically equivalent to hip fractures, challenging their perception as lower-risk events. Despite this, over two-thirds of patients with hip or vertebral fractures remained untreated, with major diagnostic and therapeutic gaps, particularly among men. These findings highlight vertebral fractures as a an improtant yet under-recognized target for Fracture Liaison Services to reduce post-fracture mortality.

P1143

GYNECOLOGICAL PROFILE OF NON-MENOPAUSAL WOMEN WITH RHEUMATOID ARTHRITIS

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Objective: Rheumatoid arthritis (RA) is the most common chronic inflammatory rheumatism and predominantly affects women of childbearing age. Despite the stakes in reproductive health, the gynecological profile of patients with RA remains understudied.
Our objective was to evaluate the prevalence of fertility disorders, vaginal dryness, and endometriosis in this population and to study their associations with the characteristics of RA.

Methods: A cross-sectional, descriptive, and observational study, including women aged 18 years or older, non-menopausal, diagnosed with RA according to the ACR 1987 or ACR/EULAR 2010 criteria.
The socio-demographic, clinical, and biological data were collected in a standardized manner. The gynecological profile was evaluated by searching for fertility issues, vaginal dryness, and endometriosis.
Endometriosis was screened by the ENDOL4D score and pelvic ultrasound.

Results: Fifty patients were included, with an average age of 39 years, and an average duration of RA evolution of 8.5 years. RA was immuno-positive in 27% of cases.
A fertility disorder was observed in 31% of the patients, including subfertility in 19% and infertility in 12%. Vaginal dryness was reported by 22%, associated with dyspareunia in 9%. A high probability of endometriosis was identified in 20%.
The duration of RA evolution was significantly longer in patients with fertility issues, with an optimal predictive threshold of 6 years (Se 84.2%, Sp 55.2%).
Vaginal dryness was associated with VAS pain scores >5, EGP >7, and high activity according to CDAI.
ACPA was significantly more frequent in patients with a high probability of endometriosis (p=0.02).

Conclusion: Fertility issues, vaginal dryness, and endometriosis are common among non-menopausal women with RA. Their screening should be systematic, especially if the RA has been evolving for more than six years for fertility issues, high activity for vaginal dryness, and ACPA positivity for

P1144

RHEUMATOID ARTHRITIS AND FEMALE FERTILITY: WHAT IS THE IMPACT OF THE DISEASE?

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Objective. Infertility is defined as the absence of conception after 12 months of unprotected sexual intercourse. It may be primary or secondary. Its prevalence in the general population is estimated between 16.5% and 17.8% [1]. Subfertility is defined either as a conception delay exceeding 12 months or a history of at least one unsuccessful pregnancy in a nulliparous woman. The objective was to determine the frequency and type of fertility disorders (infertility or subfertility) among women with RA of reproductive age, and to identify associated factors.

Methods. A cross-sectional study was conducted including women aged ≥18 years with RA according to the ACR/EULAR 2010 classification criteria. A fertility disorder was defined as the presence of infertility or subfertility. The population was divided into two groups:
• Group A: patients with a fertility disorder
• Group B: patients without a fertility disorder
A comparison of sociodemographic and RA-related characteristics was performed between the two groups.
Results. Forty-two patients were included. The mean age was 39 ± 5.6 years, the median RA duration was 8 years [8–14], and the median age at RA diagnosis was 33 years [25.75–37.25]. Fertility disorder was identified in 31% of patients: subfertility in 19% (conception delay >12 months: 10%; unsuccessful pregnancy: 9%) and infertility in 12% (80% of which was primary).
Comparative analysis showed that disease duration was significantly longer in patients with a fertility disorder (11 years [8–19] vs 5 years [4–13], p=0.04). ROC analysis confirmed its predictive role: AUC = 0.7 (p=0.049), with an optimal threshold >6 years (Se = 84.2%, Sp = 55.2%, PPV = 45.8%, NPV = 88.9%). No significant differences were found regarding age, RA serology, erosive status, disease activity, or composite scores (CDAI, SDAI, DAS28-CRP).

Conclusions. In women with RA, screening for fertility disorders is recommended, especially when disease duration exceeds 6 years.

References

[1]AFFAIRS UNDFEAS. WORLD FERTILITY 2024. S.l.: UNITED NATIONS; 2025.

P1145

ENDOMETRIOSIS AND RHEUMATOID ARTHRITIS: EXPLORING POSSIBLE LINKS

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Background
Current literature suggests a potential association between endometriosis and rheumatoid arthritis (RA), possibly through immune dysregulation or a shared genetic susceptibility.

Objectives
To identify patient-related or RA-related factors associated with endometriosis among women with RA.

Methods
This was a cross-sectional study including women with RA (according to ACR/EULAR 2010 classification criteria) aged ≥18 years. Endometriosis was screened using the ENDOL4D score, which estimates the probability of the disease (low, moderate, or high), and by transvaginal and/or pelvic ultrasound. The population was divided into two groups (A and B). Group A included patients considered potentially affected by endometriosis, defined by at least one of the following criteria: high probability on ENDOL4D score, ultrasound signs of external endometriosis (sliding sign or endometrioma) or adenomyosis (globular adenomyotic uterus).

Results
Fifty patients were included. The mean age was 39 ± 7 years. Regarding marital status, 64% were married, 16% divorced, 16% single, and 2% widowed. The most frequent educational level was primary school (38%). More than half were unemployed (62%), and 66% had a middle socioeconomic status. Only 4% were smokers. The mean BMI was 26.78 ± 5.56kg/m². RA was diagnosed at 31 ± 9 years, with a median disease duration of 8 [4–14] years. It was seropositive in 70.7%, immunopositive in 27%, and erosive in 80% of cases, with moderate mean disease activity. DMARDs were prescribed in 90% of cases (80% conventional, 24% biologics), and corticosteroids in 76%.
The median ENDOL4D score was 2 [1–61], indicating a low probability in 74% and moderate in 26%. Ultrasound signs of endometriosis or adenomyosis were identified in 20% of patients. Thus, 20% were classified as potentially affected by endometriosis.
Comparison between groups A and B showed no significant sociodemographic differences.Regarding RA-related factors, only anti–citrullinated peptide antibody (ACPA) positivity was significantly associated with potential endometriosis (p=0.02).

Conclusions
Among women with RA, endometriosis appears to be associated with ACPA positivity, suggesting a possible immunological contribution to its pathophysiology.

P1146

GYNECOLOGIC AND OBSTETRIC PROFILE OF WOMEN WITH RHEUMATOID ARTHRITIS

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Objective. Rheumatoid arthritis (RA) is a chronic inflammatory rheumatic disease that predominantly affects women between 40 and 60 years of age. Gynecologic and obstetric manifestations in these patients remain poorly studied. The objective was to describe the gynecologic and obstetric profile of women with RA during reproductive age.
Methods. This was a cross-sectional study including non-menopausal women aged over 18 years who met the ACR/EULAR 2010 classification criteria. Gynecologic and obstetric data were collected using a standardized questionnaire.
Results. The mean age was 39 ± 7 years, and the median RA duration was 8.5 years [4–14]. The median age at menarche was 12 years [12–14]. Most patients had regular menstrual cycles (94%), normal menstrual flow (66%), and a mean duration of menstruation of 5 days [2–8]. Short cycles were rare (2%), and 4% presented with oligomenorrhea. Regarding menstrual flow, oligomenorrhea was observed in 6% and polymenorrhea in 28%. Duration of menstruation was mostly normal; hypomenorrhea was found in 4%, with no cases of hypermenorrhea reported. Excluding single women (8%), 57% used contraception: oral hormonal contraception (42%), condoms (33%), intrauterine device (42%), or natural methods (13%). Infertility was identified in 12% of patients, and 19% were nulliparous. The median gravidity was 2.5 [0.75–4], with a median number of living children of 2 [0–3]. Spontaneous miscarriages or early pregnancy losses were reported in 48% of cases. No cases of elective termination or ectopic pregnancy were noted. Among women who had delivered, 2% reported preterm birth, 5% gestational hypertension, and 17% gestational diabetes.
Conclusions. Women with RA of reproductive age show a higher rate of spontaneous miscarriages compared with the general population, highlighting the need for close gynecologic and obstetric monitoring, particularly during the peri-conceptional period.

P1147

OBSTETRICAL OUTCOMES IN WOMEN WITH RHEUMATOID ARTHRITIS: A CROSS-SECTIONAL STUDYC

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Objective. Rheumatoid arthritis (RA) predominantly affects women during their reproductive years. Beyond fertility impairment, pregnancy outcomes in women with RA may be influenced by chronic systemic inflammation, immune dysregulation, and long-term exposure to disease-modifying treatments. The objective was to describe obstetrical outcomes and pregnancy-related complications in women with RA of reproductive age.

Methods. We conducted a cross-sectional study including non-menopausal women with RA. Obstetrical outcomes were analyzed in 37 women with a history of at least one pregnancy. Pregnancy history and obstetrical complications were collected through standardized interviews and medical records when available.

Results. Among the 37 women with prior pregnancies, a history of pregnancy loss was reported in 20 patients (54.1%), including spontaneous miscarriage or arrested pregnancy. Intrauterine fetal death occurred in 2 patients (5.4%), while voluntary pregnancy termination was reported in 8 patients (21.6%). No cases of ectopic pregnancy or therapeutic termination were observed.

Regarding obstetrical complications, preterm delivery was reported in 1 patient (2.7%), hypertensive disorders of pregnancy in 2 patients (5.4%), and gestational diabetes in 7 patients (18.9%).

Conclusion. Women with RA who achieved pregnancy exhibited a substantial burden of adverse obstetrical outcomes, particularly pregnancy loss and gestational complications. These findings underscore the need for early reproductive counseling and close multidisciplinary collaboration between rheumatologists and obstetricians to optimize pregnancy outcomes in women with RA.

P1148

DISCONNECT BETWEEN CLINICAL SCREENING TOOLS AND ULTRASOUND FINDINGS FOR GYNECOLOGICAL ABNORMALITIES IN RHEUMATOID ARTHRITIS

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Objective. Rheumatoid arthritis (RA) is a systemic inflammatory disease predominantly affecting women of reproductive age. Gynecological involvement may remain clinically silent, and screening often relies on symptom-based questionnaires. However, the concordance between clinical screening tools and imaging findings in this population remains uncertain. The objective was to evaluate the agreement between clinical screening tools and pelvic ultrasonography in detecting gynecological abnormalities in women with RA of reproductive age.

Methods. We conducted a cross-sectional study including non-menopausal women with RA. All participants underwent standardized gynecological assessment, including clinical examination and symptom-based screening using the ENDOL4D questionnaire, followed by pelvic ultrasonography (endovaginal or suprapubic as appropriate). Ultrasound abnormalities suggestive of endometriosis or adenomyosis were systematically recorded. Clinical, reproductive, and RA-related characteristics were collected.

Results. Fifty women with RA were included (mean age 39.1 ± 6.9 years). According to the ENDOL4D questionnaire, no patient had a high probability of endometriosis, while 1 patient (2%) had a previously known diagnosis. Clinical gynecological examination revealed no deep bluish nodules suggestive of endometriosis.

In contrast, pelvic ultrasonography identified gynecological abnormalities in 10 patients (20%), including ultrasound features suggestive of adenomyosis in 6 patients (12%), positive sliding sign in 3 patients (6%), and ovarian endometrioma in 1 patient (2%). Importantly, all patients classified as having potential gynecological involvement were detected exclusively by ultrasonography, with no overlap with clinical screening tools or symptom-based assessment.

Conclusion. A marked disconnect exists between clinical screening tools and pelvic ultrasound findings in women with RA of reproductive age. Symptom-based questionnaires and clinical examination alone failed to identify a substantial proportion of patients with ultrasound-detected gynecological abnormalities. These findings highlight the added value of pelvic ultrasonography as a complementary tool in the comprehensive assessment of women with RA.

P1149

ENDOMETRIOSIS-LIKE ULTRASOUND FEATURES IN WOMEN WITH RHEUMATOID ARTHRITIS

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Objective. Rheumatoid arthritis (RA) is a systemic immune-mediated inflammatory disease predominantly affecting women of reproductive age. Chronic inflammation and immune dysregulation may influence hormonally responsive pelvic connective tissues, potentially promoting endometriosis-related structural changes. Pelvic ultrasonography may detect such abnormalities, even in the absence of overt gynecological symptoms. The objective was to assess the prevalence of endometriosis-like ultrasound features in women with RA of reproductive age and to describe their clinical context.

Methods. We conducted a cross-sectional study including non-menopausal women with RA. All patients underwent standardized gynecological evaluation and pelvic ultrasonography (endovaginal or suprapubic, according to sexual status). Ultrasound features suggestive of endometriosis or adenomyosis were systematically recorded. Clinical, reproductive, and disease-related characteristics were collected.

Results. Fifty women with RA were included, with a mean age of 39.1 ± 6.9 years. A previous diagnosis of endometriosis was reported in 1 patient (2%). Pelvic ultrasonography revealed endometriosis-like abnormalities in 10 patients (20%),despite the absence of high clinical suspicion in most cases. Ultrasound findings included signs of adenomyosis in 6 patients (12%), a positive sliding sign in 3 patients (6%), and ovarian endometrioma in 1 patient (2%). Notably, none of

the patients had a high probability of endometriosis according to the ENDOL4D questionnaire, and no deep bluish nodules were detected on clinical gynecological examination. Thus, all patients classified as having potential endometriosis were identified exclusively through ultrasonographic findings. These women were subsequently referred for specialized gynecological assessment, highlighting the ability of ultrasound to detect subclinical pelvic involvement.
Conclusion. Endometriosis-like ultrasound features are frequently detected in women with RA of reproductive age, affecting one in five patients, often in the absence of suggestive symptoms or positive clinical screening tools. Pelvic ultrasonography may represent a valuable adjunct in the systemic assessment of women with RA, supporting the concept of shared immuno-inflammatory connective tissue vulnerability.

P1150

DO FEMALE DOCTORS ADOPT A DIFFERENT DIAGNOSTIC APPROACH TO LOW BACK PAIN AND SCIATICA?

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Background

Low back pain (LBP), with or without sciatica, is one of the most common reasons for consultation in primary care and represents a major public health concern. Despite the availability of evidence-based guidelines, considerable variability persists in diagnostic practices. Physician-related factors, including sex, may influence clinical decision-making and contribute to these variations.

Objectives

To compare diagnostic management strategies for LBP and sciatica between male and female primary care physicians.

Methods

A national cross-sectional study was conducted among primary care physicians using a self-administered online questionnaire. The survey assessed diagnostic practices, including screening for red flags and signs of severity, imaging prescriptions, laboratory investigations, and referral criteria. Diagnostic practices for LBP and sciatica, including screening for red flags and signs of severity, imaging prescription, and laboratory testing, were compared according to physician sex, with reference to the 2019 French National Authority for Health (HAS) recommendations [1].

Results

A total of 252 primary care physicians were included, of whom 72.6% were women. No significant differences were observed between male and female physicians with regard to age, professional status, or practice setting.

Screening practices differed significantly according to physician sex. Male physicians more frequently screened for red flags than female physicians (78.3% vs 51.4%, p = 0.001). In contrast, female physicians more often assessed signs of severity requiring surgical management compared with male physicians (84.2% vs 68.1%, p = 0.009).

Sex-related differences in imaging prescription were observed only in specific clinical contexts. In acute LBP, female physicians prescribed lumbar spine imaging less frequently than male physicians (41% vs 56.5%, p = 0.027), whereas no difference was found for pelvic radiography prescription. In chronic LBP, imaging practices did not differ significantly between male and female physicians for either lumbar spine or pelvic radiographs (all p > 0.05).

Laboratory testing practices differed only in specific clinical situations. Women were more likely than men to request laboratory investigations at initial presentation (6% vs 0%, p = 0.037). In contrast, laboratory tests prompted by the presence of red flags were more frequently prescribed by male physicians compared with female physicians (88.4% vs 71%, p = 0.04). No significant sex-related differences were observed for laboratory testing in cases of resistance to medical treatment, severe pain, neurological signs, patient request, prior to referral to a specialist, or before epidural infiltration (all p > 0.05).

Conclusion

Sex-related differences were observed in selected aspects of diagnostic management of LBPsciatica, indicating that physician characteristics may influence clinical decision-making in primary care.

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P1151

SEX-RELATED DIFFERENCES IN THERAPEUTIC APPROACH TO LOW BACK PAIN AND SCIATICA AMONG PRIMARY CARE PHYSICIANS

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Objective

Optimal therapeutic management of LBP and sciatica relies on a combination of pharmacological and non-pharmacological approaches, as recommended by international guidelines. However, real-world practice often diverges from these recommendations. The influence of physician sex on therapeutic decision-making in primary care remains insufficiently explored. The objective is to evaluate differences in therapeutic management of LBP and sciatica between male and female primary care physicians.

Methods

This national cross-sectional survey included primary care physicians who completed an online questionnaire evaluating their therapeutic practices for LBP and sciatica. Assessed outcomes included pharmacological prescriptions (analgesics, NSAIDs, opioids, corticosteroids, muscle relaxants), non-pharmacological management (physiotherapy, physical activity advice, lumbar brace use), sick leave prescription, and screening for psychosocial risk factors (yellow flags). Therapeutic strategies were compared according to physician sex.

Results

The study included 252 primary care physicians, of whom 72.6% were women. No significant differences were observed between male and female physicians with regard to age, professional status, or practice setting.

Therapeutic practices differed between male and female physicians in selected aspects of management. Male physicians prescribed sick leave less frequently than female physicians (30.4% vs 72.7%, p < 0.001). They were also more likely to recommend physical therapy (69.6% vs 47.5%, p < 0.001) and to screen for psychosocial risk factors associated with chronicity (yellow flags) (33.3% vs 23%, p < 0.001).
In contrast, no significant sex-related differences were observed in the prescription of analgesics, NSAIDs, muscle relaxants, corticosteroids, lumbar bracing, or advice on physical activity (all p > 0.05).

Conclusion

While pharmacological treatment strategies for low back pain and sciatica appear broadly comparable between male and female physicians, differences emerge in work-related decisions, physical therapy referral, and screening for chronicity risk factors. These findings suggest selective rather than global sex-related variations in therapeutic practice.

P1152

ECOSYSTEM DESIGN FOR THE PREVENTION OF FRACTURES CAUSED BY OSTEOPOROSIS IN SMART HEALTH BASED ON ONTOLOGY

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Objective: Smart health, due to its capacity in disease prevention, is a suitable solution for providing osteoporosis fracture prevention services. Also, the existence of close relationships between active organizations for the prevention of this disease requires this area to be examined from the perspective of the ecosystem. Therefore, the purpose of this study is to identify the elements and players of the ecosystem for preventing osteoporosis-related fractures in smart health, and then to outline the ontology of this ecosystem and the relationship between its players and to determine the key players.
Materials and Methods: A grounded theory guided method that includes three sources of literature review, interviews, and document review was used to identify elements and players. Interviews were conducted with 31 people active in the management and operational levels of osteoporosis prevention and treatment in the health and other fields (social, cultural, and educational) as well as people with fractures or at risk of fractures; at this stage, the documents and agreements concluded were also reviewed to identify elements and players; data analysis was performed using open, axial, and selective coding. The ontology was also drawn based on the data obtained from the grounded theory guided using Protege software. Subsequently, social network analysis was performed using Gephi software and key players were determined.
Results: Based on the findings from the guided database, 38 final codes, 13 sub-concepts for elements and 50 final codes and 11 sub-concepts for players were identified. Elements were classified into four categories: lifestyle modification, clinical, technological, and contextual; players were also classified into three layers: core, complementary, and facilitator based on the Moor model. By drawing an ontology, elements were identified and players and the relationships between them were depicted. The Ministry of Health and the Osteoporosis Research Center were identified as two key players in the ecosystem.
Conclusion: This study showed that the fracture prevention ecosystem in smart health, in addition to technological and clinical elements, requires lifestyle and contextual factors for fracture prevention. Also, in order to prevent fractures, it is necessary to cooperate with players from other fields, including cultural, social, economic, educational, and political, in addition to the health sector, and the relationship between health sector players and these fields should be strengthened.

P1153

FALL PREVALENCE IN THE EASTERN MEDITERRANEAN REGION (EMRO): A SYSTEMATIC REVIEW AND META-ANALYSIS

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Objectives

Falls are a leading cause of fractures, disability, and mortality among older adults worldwide. As the population ages, the burden of falls is expected to rise. In the Eastern Mediterranean Region (EMRO), data on fall prevalence are fragmented and methodologically heterogeneous, which makes regional comparisons and policy planning challenging. We performed a systematic review and meta-analysis to estimate the prevalence of falls in EMRO countries.

Methods

This systematic review and meta-analysis were performed in accordance with PRISMA guidelines. PubMed, Scopus, and Web of Science were searched from inception to 2025. Population-based observational studies reporting fall prevalence among adults in EMRO countries were included. Study quality was assessed using the Newcastle Ottawa Scale. Pooled estimates were calculated using a random effects model. Heterogeneity was assessed with the I^2 statistic, and publication bias was evaluated through funnel plots and Egger's test.

Results

A total of 73 studies from 10 EMRO countries were included. The pooled prevalence of falls was 31% (95% CI: 27-34%, P<0.001). Considerable heterogeneity was observed across studies (I^2 =99.54%). Subgroup analyses revealed higher fall prevalence among adults aged ≥70 years (32%, 95% CI: 31-43%, P<0.001) and among females (37%, 95% CI: 31-

43%, P<0.001). Several EMRO countries lacked nationally representative data, highlighting critical gaps in regional fall surveillance.

Conclusion

Falls reflect a major public health challenge in the EMRO region. These findings emphasize the need for standardized epidemiological studies, improved regional surveillance, targeted fall prevention strategies integrated with aging, osteoporosis care, and fracture prevention programs.

P1154

ASSOCIATION BETWEEN THE TREATMENT-RELATED CHANGE IN BONE MINERAL DENSITY AND FRACTURE RISK REDUCTION ACCORDING TO THE PRE-TREATMENT BMD: ANALYSIS FROM THE FNIH-ASBMR SABRE PROJECT

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Objective

In December 2025, the FDA has qualified the use of total hip BMD (TH BMD) as a surrogate endpoint for future trials of anti-osteoporosis therapies. This was based on analyses and evidence from the FNIH-ASBMR SABRE (Study to Advance BMD as a Regulatory Endpoint) project. However, if future trials do not have to demonstrate anti-fracture efficacy, they may enrol lower-risk subjects. Thus, it is essential to determine whether baseline BMD levels affect the relationship between changes in TH BMD and fracture risk reduction.

Methods

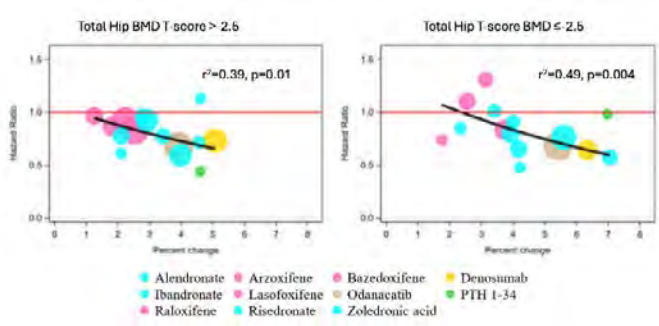
Using the SABRE database, we separated participants into those with a TH BMD T-score ≤ -2.5 and those with a TH BMD T-score> -2.5. We performed trial-level meta-regressions comparing the association between the 24-month between-treatment difference in TH BMD per cent change and clinical fracture risk reduction across baseline TH BMD T-score subgroups. We calculated the r^2 (95% CI) for each group. The clinical fracture category was defined as non-vertebral + clinical vertebral fractures.

Results

Data from 15 trials were included in the meta-regression. There were 20,474 participants in the T-score ≤ -2.5 group and 54,196 in the T-score > -2.5 group. The meta-regression results were similar across groups, with r^2 (95% CI) for the T-score ≤ -2.5 group of 0.49 (0.08 to 0.70), p = 0.004, and for the T-score > -2.5 group, r^2 = 0.39 (0.02 to 0.64), p = 0.01. The p value for the r^2 interaction term was 0.66.

Conclusion

Notably, the range of BMD per cent change was greater in the low-BMD group. This was because the results were expressed as a percentage, however, the absolute changes in BMD were similar. The higher BMD group had more trials from less potent medications. These findings suggest that, in future trials of new osteoporosis treatments where efficacy will be judged by total hip BMD change, participants can be included independently of their baseline total hip T-score, as the association between bone mineral density per cent change and fracture risk reduction is similar.



P1155

INFLUENCE OF LIVING ENVIRONMENT STIMULATION ON KEY COMPONENTS OF AUTONOMY IN OLDER ADULTS

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Objective : (1) To examine whether the stimulating nature of the living environment (home and neighborhood) is associated with two key predictors of autonomy in older adults: physical activity and sleep, and (2) to test whether physical activity mediates the association between environmental stimulation and sleep.

Material and Methods: We conducted a cross-sectional study among community-dwelling adults aged 75 years and over. Auto-administered questionnaires collected data on socio-demographic, general health, quality of life (SF-12), risk of sarcopenia (SARC-F), physical activity (PASE), sleep quality, timing and sleepiness (PSQI, µMCTQ, and ESS). The stimulating nature of the living environment was measured using a weighted questionnaire developed by the HabitAge team (ULiège). Regarding the analyses, multiple logistic regressions are currently being conducted. In addition, given the potential mediating role of physical activity in the relationship between living environment's stimulation and sleep, mediation analyses are being realized.

Results : A total of 150 older participants completed the auto-administered questionnaires. Analyses are currently ongoing, and results will be presented at the conference. We hypothesize that higher living environment's stimulation score will be positively associated with better levels of physical activity and sleep. We further hypothesize that physical activity will mediate the relationship between living environment's stimulation and sleep quality.

Conclusion : These findings will highlight how the stimulating nature of the living environment can support autonomy among older adults, addressing an aspect that has received little attention compared to the influence of safety-related housing factors on health.

P1156

IMPACT OF PHARMACOTHERAPY NON-PERSISTENCE ON OSTEOPOROTIC FRACTURE RISK IN OSTEOPOROSIS: LANDMARK ANALYSIS OF 20,940 PATIENTS FROM REAL-WORLD DATABASE

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Objective
Longterm treatment persistence is essential for achieving optimal outcomes in chronic diseases, particularly asymptomatic conditions such as osteoporosis. The aim of this study was to evaluate the impact of non-persistence on subsequent fracture risk using a large real-world administrative database.

Methods
From the administrative database of a health insurance company in Slovakia (1.77 million insurees in 2024), all patients initiating osteoporosis pharmacotherapy between 2018 and 2023 were retrospectively identified. A 1year landmark analysis was applied, excluding patients who experienced an osteoporotic fracture within the first year. Persistence at 1 year was assessed based on missing prescription for more than 60 days, and subsequent fracture incidence was analysed using Cox regression. The effects of age, sex, initial medication, and 1year persistence were evaluated.

Results
A total of 20,940 patients initiated osteoporosis treatment and were fracture-free at landmark. During a mean followup of 3.6 years (SD 1.9), 3,051 patients experienced an osteoporotic fracture. Fracture rates were independent of sex, and initial medication. Compared to patients aged 40–64 years, older patients had 58% higher fracture risk (95% CI: 1.47–1.70, p<0.001). Oneyear treatment persistence was associated with a 16% lower fracture risk (95% CI: 0.78–0.90, p<0.001). The 5year postlandmark fracture rate was 17.1% (95% CI: 16.3–18.0) in persistent patients and 19.8% (95% CI: 18.8–20.8) in nonpersistent patients. Persistence rates varied substantially across medications ranging from 32% (SD 0.7) on risedronate to 65% (SD 0.4) on denosumab (Figure 1).

Conclusion
Oneyear treatment persistence was significantly associated with a lower subsequent fracture risk. While fracture incidence did not differ by sex or initial drug, persistence rates varied substantially across medications, highlighting opportunities to optimize treatment selection and improve longterm adherence in osteoporosis management.

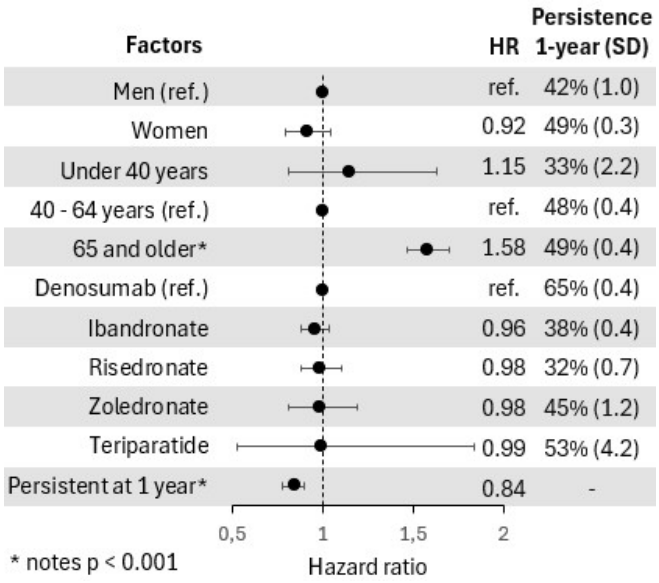


Figure 1 Osteoporotic fracture-free survival analysis results and 1-year persistence rates

P1157

REIMAGINING ROUTINE HEALTH INFORMATION SYSTEMS TO DETECT FRACTURE RISK AND OSTEOPOROSIS: A POLICY BRIEF PREPARED FOR THE WORLD HEALTH ORGANISATION (WHO)

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Introduction: Fragility fractures impose major economic and social burdens, yet wide global variation in health data systems limits the

translation of data into actionable insights and a global fracture risk registry. This policy brief was commissioned and prepared for WHO to advise Ministries of Health on leveraging health data to improve osteoporosis screening, monitoring, diagnosis and prevention, to reduce fracture-related morbidity and mortality.

Methods: Twenty-five global experts were identified with 21 invitations from 16 countries accepted. A total of 11 x one-hour virtual interviews were conducted in October-November 2025. A thematic analysis was conducted, beginning with 15 initial codes derived from the WHO Building Blocks and the PRISM framework, with four additional codes added as new themes emerged. Findings were synthesised into barriers and mutually reinforcing policy opportunities.

Results: Five key barriers consistently identified included (1) low public awareness and competing health priorities, gaps in (2) diagnosis and clinical care, and (3) workforce capability, (4) fragmented and low-quality data, and (5) implementation complexity and sustainability constraints. To address these barriers and challenges, four mutually reinforcing policy opportunities were presented to increase the profile of osteoporosis and fragility fractures (Figure). Experts provided recommendations around (1) importance of local osteoporosis management guidelines, (2) minimum dataset and principles needed for local fracture risk registries, and (3) facilitation and integration of resources including digital solutions (e.g., AI, risk prediction algorithms) to bridge workforce and health equity gaps, including opportunistic case finding.

Conclusion: Findings provide practical, feasible, equitable and scalable recommendations to strengthen data systems, workforce capability and governance for Ministries of Health and stakeholders. Emphasising local context-appropriate guidelines, registries and digital solutions appear key to improving awareness of bone health to prevent fragility fractures.



Figure. Four mutually reinforcing policy opportunities to improve data generation, quality and use for the prevention and earlier detection of osteoporosis and fragility fractures, as well as patient risk assessment. These recommendations are designed to collectively work towards increasing the global profile of osteoporosis and fragility fracture, which is ultimately required for sustainable improvements in patient outcomes.

P1158

THE DUAL EFFECT OF HIGH-DOSE GLUCOCORTICOIDS AND TYROSINE KINASE INHIBITORS ON BONE FRAGILITY AND FRACTURE RISK

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Objective: To illustrate the severe skeletal consequences of combined high-dose glucocorticoids, active rheumatoid arthritis (RA), and Tyrosine Kinase Inhibitor (TKI) therapy for metastatic gastrointestinal stromal tumor (GIST). While glucocorticoids are known to induce osteoblast apoptosis, Imatinib targets c-KIT and PDGFR—signaling pathways crucial for mesenchymal stem cell differentiation and osteoblast proliferation. We present a clinical case where this "double hit" mechanism led to severe bone loss and very high fracture risk.

Case Presentation: A 54-year-old male (BMI 18.9 kg/m², active smoker) referred for skeletal assessment due to acute back pain. Medical history included stage III seropositive RA (on Methylprednisolone 16 mg/day>1 year) and small bowel GIST with resected hepatic metastasis, currently under Imatinib therapy. Phenotypic evaluation revealed sarcopenia, significant dorsal kyphosis, and pallor. Imaging confirmed multiple prevalent vertebral fractures (T5-T12 mild compressions; L1, L2 severe compressions). Dual-energy X-ray absorptiometry (DXA) showed very low bone density: lumbar spine (L1-L3) T-score -3.1 SD, and left femoral neck T-score -4.5 SD (Z-score -3.9), confirming the very high fracture risk. Laboratory assessment revealed iatrogenic adrenal suppression (serum cortisol 37 nmol/L), consequent to chronic exogenous glucocorticoid exposure, suppressed bone formation (osteocalcin 6.2 ng/mL; ref: 14-46), normocalcemia (8.6 mg/dL), normal PTH levels (65.3 pg/ml), hypophosphatemia (2.3 mg/dL), with optimal Vitamin D status (39.8 ng/mL). This profile suggests a dual suppression of osteoblast function mediated by both glucocorticoids and TKI therapy. While current guidelines advocate for anabolic treatment given the severe fracture profile, the recent history of metastatic GIST represented a major contraindication. Therefore, management prioritized oncologic safety, and intravenous Zoledronic Acid was initiated.

Conclusion: Osteoporosis management in oncologic patients with comorbid autoimmune diseases represents a major clinical challenge. This case highlights a drug-drug interaction with a significant impact on bone metabolism. Clinicians must recognize that Imatinib can potentiate glucocorticoid-induced osteoporosis by blocking compensatory osteoblast recovery and causing hypophosphatemia. Therefore, fracture risk stratification must be implemented at the very onset of oncologic and antirheumatic therapy. In such "double-hit" patients, early skeletal protection is mandatory to prevent bone decay.

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P1159

SEVERE BONE FRAGILITY AND HIGH FRACTURE RISK ASSOCIATED WITH LONG-STANDING UNTREATED HYPOGONADISM IN JUVENILE PANHYPOPITUITARISM

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Objective: Male hypogonadism is associated with low bone mass and fragility fractures. Panhypopituitarism is a rare cause of hypogonadotropic hypogonadism that requires early evaluation of bone density by Dual-energy X-ray absorptiometry (DXA) and adequate testosterone replacement therapy.

Case Presentation: We report the case of a 57-year-old man diagnosed in another endocrinology department with Panhypopituitarism at the age of 7. Despite the early diagnosis, the patient did not receive androgen replacement therapy or skeletal evaluation until the age of 47. In the last

decade, he reported chronic mechanical pain in the lumbar spine and hip region. DXA revealed very low bone density: Lumbar Spine (L1-L3) T-score -4.3 SD, Left Femoral Neck T-score -4.7 SD (Z-score -3.8), and Right Femoral Neck T-score -4.2 SD (Z-score -3.6), confirming the very high fracture risk. Laboratory analysis showed osteocalcin 10.2 ng/mL (ref: 14-46), hypocalcemia (8.2 mg/dL), normal PTH levels (55.2 pg/mL), and elevated alkaline phosphatase (231 U/L), with low Vitamin D (19.8 ng/mL). Hormonal profile confirmed hypogonadism: Testosterone level at 5.2 pg/ml (ref: 6.3 – 17.8), FSH 2,1 mUI/mL (ref: 1.5 – 12.4), and LH 1,9 mUI/mL (ref: 1.7 – 8.6). Pituitary MRI confirmed Empty Sella, stable over a 20-year follow-up. We decided to treat our patient with transdermal Testosterone 16,2 mg/g and Risedronic acid 35 mg/ week. At the 6-month follow-up, the patient reported significant alleviation of bone pain.

Conclusion: Osteoporosis management in hypopituitarism is complex and should be performed as early as possible. The role of androgens in the acquisition of peak bone mass during puberty and its maintenance thereafter is of high importance for patients with hypogonadism and high risk for fragility fractures.

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P1160

THE ASSOCIATION BETWEEN SERUM URIC ACID AND BONE MINERAL DENSITY ACROSS MENOPAUSAL STATUS IN WOMEN: A CROSS-SECTIONAL STUDY USING THE TAIWAN BIOBANK

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Objective: Uric acid, the end product of purine metabolism, has both antioxidant and pro- inflammatory properties. Although moderate serum uric acid (SUA) levels may benefit bone health, the point at which SUA becomes harmful remains unclear, especially in postmenopausal women who face higher osteoporosis risk. This study used data from the Taiwan Biobank to examine the relationship between SUA levels and bone mineral density (T-score) in Asian women, and to clarify how this association differs between premenopausal and postmenopausal groups.

Methods: This study utilized data from the Taiwan Biobank, including 103,090 Asian female participants. We conducted a cross-sectional analysis to evaluate the association between SUA and BMD, as measured by T-scores obtained via quantitative ultrasound (QUS). Subgroup analyses were performed for premenopausal and postmenopausal women. Multiple linear and logistic regression models were used to assess the relationship between SUA and BMD, adjusting for age, BMI, comorbidities, relevant blood test parameters, and lifestyle factors.

Results: A significant positive association was found between SUA and BMD. Each 1 mg/dL increase in SUA was associated with a 0.030 increase in T-score ($p < 0.001$) in all women. This effect was stronger in postmenopausal women ($\beta = 0.159$, $p < 0.001$) than in premenopausal women ($\beta = 0.067$, $p = 0.003$). Logistic regression indicated that women with SUA levels between 4.2 and 8.0 mg/dL had significantly lower odds of osteoporosis, with the strongest protective effect observed at 7.0–8.0 mg/dL (OR = 0.652). However, SUA levels above 8.0 mg/dL showed no further benefit.

Conclusion: Moderate SUA levels (4.2–8.0 mg/dL) appear to be associated with increased BMD and reduced risk of osteoporosis in women, particularly after menopause. Excessively high SUA levels may attenuate this protective effect. These findings highlight the need for nuanced clinical management of SUA levels, especially among postmenopausal women at high risk of bone loss.

P1161

COMPARISON OF PHYSICAL PERFORMANCE AND EMOTION REGULATION SKILLS IN OBESE INDIVIDUALS WITH AND WITHOUT KNEE OSTEOARTHRITIS

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Objective(s): Knee osteoarthritis is a common degenerative joint disease, and obesity is a major risk factor that increases mechanical load and inflammatory processes, affecting physical and emotional functioning. This study aimed to compare physical performance and emotion regulation skills in obese individuals with and without knee osteoarthritis.

Material and Methods: A total of 118 obese individuals participated in the study. 78 participants were diagnosed with knee osteoarthritis according to the Kellgren–Lawrence grading scale (stages 2–3), while 40 participants had no knee osteoarthritis. Sociodemographic and clinical characteristics were recorded. Knee pain severity was assessed using the Visual Analog Scale. Physical performance was evaluated using the Timed Up and Go Test, 5-Repetition Sit-to-Stand Test, Weighted Forward Reach Test, and 10-Repetition Trunk Flexion Test. Emotion regulation skills were assessed using the Emotion Regulation Skills Questionnaire. Group comparisons and correlation analyses were performed using appropriate statistical methods.

Results: Obese individuals with knee osteoarthritis demonstrated poorer performance in the Timed Up and Go Test and the 5-Repetition Sit-to-Stand Test compared to those without osteoarthritis ($p<0.05$). Knee pain severity was higher in the osteoarthritis group ($p<0.01$). Participants with knee osteoarthritis showed lower scores in the emotion regulation subdimensions of attending to emotions, bodily perception of emotions, and modification ($p<0.05$). A moderate negative correlation was observed between bodily perception of emotions and Timed Up and Go Test performance, while a weak negative correlation was found between attending to emotions and the 5-Repetition Sit-to-Stand Test ($p<0.05$).

Conclusion(s): Obese individuals with knee osteoarthritis exhibit impairments in physical performance and emotion regulation skills compared to obese individuals without osteoarthritis. Reduced awareness of emotions is associated with poorer physical performance. These findings highlight the importance of biopsychosocial approaches, including emotion regulation interventions, in managing knee osteoarthritis.

P1162

THE UTILITY OF DXA ASSESSMENT FOLLOWING INCIDENT VERTEBRAL FRACTURE

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Objectives
Those with incident vertebral fractures may be recommended a DXA (dual-energy X-ray absorptiometry) scan as part of fracture risk assessment. Although DXA is the gold standard in determining bone mineral density (BMD), it may give spuriously high BMD results. Our aim is to assess the utility of DXA in BMD assessment following incident vertebral fracture.
Methods
We identified patients who had an incident vertebral fracture between January and July 2023. Patients were identified through a digital automated fracture liaison service tool. We retrospectively reviewed demographic data and DXA results. T-scores were classified as normal (≥ −1.0), osteopenia (−2.5 to −1.0) or osteoporosis (≤ −2.5). Bone density was measured at three sites: lumbar spine, femoral neck and total hip.
Results
Of 322 patients, DXA was undertaken in 200. Lumbar spine measurements were available in all individuals. Femoral neck T-scores were missing in 4.0% of cases and total hip T-scores in 5.0%.
Of these 200 patients, 44.5% met densitometric criteria for osteoporosis at one or more skeletal sites, while 55.5% did not have a T-score ≤ −2.5 at any site.
By skeletal site, osteoporosis was present in 31.5% of patients at the femoral neck, 26.0% at the total hip and 30.5% at the lumbar spine. When hip sites were considered together, 35.5% met densitometric criteria for osteoporosis.
Among females (n = 144), 49.3% met densitometric criteria for osteoporosis at at least one skeletal site, compared with 18 of 56 males (32.1%). Females had significantly higher odds of densitometric osteoporosis than males (Fisher's exact p=0.039; odds ratio 0.49, 95% CI 0.24, 0.97).
Conclusions
In this audit of patients with incident vertebral fracture, hip and lumbar spine measurements detected unique subsets of patients, with neither site demonstrating statistical superiority, supporting the continued use of multi-site DXA assessment in this population.
However, more than half of patients with vertebral fracture did not meet densitometric criteria for osteoporosis at any site. Females were significantly more likely than males to meet densitometric criteria for osteoporosis, while age was not independently associated with osteoporosis prevalence in this cohort.

P1163

THE STRUCTURE OF THE ALVEOLAR BONE OF THE MAXILLA IN RATS DURING THE ADMINISTRATION OF ALLOGENEIC MESENCHYMAL STEM CELLS INTO THE TIBIAL DEFECT AFTER SURGERY

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Objective of the study is to test the structure of the interradicular alveolar bone of the maxilla (IAB) in white rats after the administration of allogeneic mesenchymal stem cells (allo-MSCs) into the tibial defect at different times after surgery.
Material and methods. 162 white rats weighing 190-225 g were divided: 1 group – control, in group 2 rats suffered a defect in both tibiae, in groups 3-7 5 million allo-MSCs were injected into the defect on days 3, 10, 15, 24, and 45 after surgery. Histological sections of the region of the first upper molar with a thickness of 6-8 microns were stained with hematoxylin-eosin.
Results. In group 2 the bone volume fraction (BVF) was lower than the values of group 1 from 15 to 90 days after surgery by 4.95-7.43%, and the trabecular thickness (Tb.Th.) from 7 to 90 days – by 4.48-8.33%; the width of the intertrabecular spaces (WITS) increased by 5.57-9.58% from days 7 to 90. In group 3, compared with group 2, the BVF and the Tb.Th. by 60 and 90 days after surgery were higher by 5.31% and 4.98% and by 5.48% and 5.69. In group 4, compared with group 2, the Tb.Th. from days 15 to 90 was 4.26%, 4.77%, 6.05% and 5.32% higher, and the BVF from days 30 to 90 was 5.60%, 5.80% and 5.21%. In group 5, the BVF by 30 and 60 days was 4.87% and 5.31% larger, and the Tb.Th. by 60 days was 5.67%.
Conclusion. The administration of allo-MSCs into the tibial defect is accompanied by the restoration of the structure of the IAB. The most effective is the administration of allo-MSCs on the 10th day after tibia injury.

P1164

EARLY MOBILIZATION AFTER HIP SURGERY: PRELIMINARY DATA FROM THE ORTHOPAEDIC CLINIC OF THE GENERAL UNIVERSITY HOSPITAL OF PATRAS IN GREECE

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Objective. The aim of this study was to record data regarding early mobilization (within 24 hours) after hip fracture surgery of Greek patients.
Material and Methods. The study contains data on all hospitalizations following hip fracture surgeries within Orthopedic Clinic of the University

Hospital of Patras in Greece, including admission and discharge dates, fracture type, surgical procedure, cognitive function, ongoing medications for bone treatment, and early mobilization for each admission. Data from 2022 to 2024 were collected and analyzed.

Results. 367 patients (mean age: 79.8±13.1 years) with hip fractures were recorded. Of these, 228 (62.1%) were female. The largest proportion was treated with intramedullary nail and spinal anesthesia was most used. The average waiting time for surgery was 5±2.7 days (ranging 1-19 days). 192 (52.3%) patients did not receive physiotherapy or mobilization the first 24 hours post-surgery. Regression analysis showed that early mobilization was associated with better cognitive status, better mobility before surgery, less days of hospitalization and waiting until surgery and increased likelihood of post-operative death.

Conclusions. Despite early mobilization being suggested as a key component of enhanced recovery after hip surgery, only one out of two Greek patients received mobilization the first post-operative day. Further work on the factors underlying delayed mobilization and post-operative outcomes is required.

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P1165

SARCOPENIA PREVALENCE AND ASSOCIATED FACTORS IN PATIENTS WITH HYPERTENSION: A CROSS SECTIONAL STUDY

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Objective: The aim of this study is to investigate the prevalence rate of sarcopenia and associated factors associated among older adults with hypertension.

Material and Methods: This was a cross-sectional study of 102 older patients with hypertension aged ≥60 years. Hypertension was defined by self-reporting of a physician diagnosis or the use of antihypertensive medication. All participants were evaluated for sarcopenia using the European Working Group on Sarcopenia in Older People 2 (EWGSOP2) criteria. Sociodemographic characteristic, of the participants were obtained through a questionnaire. Anthropometric assessments were performed to measure the patients' weight, height and body mass index (BMI). Body composition was evaluated by bioimpedance analysis (Tanita BC-601). Handgrip strength was assessed via a hand held dynamometer (Saehan, Seoul, Korea). Gait speed, and chair stand test were evaluated also. The association between variables was calculated using Pearson-r correlation coefficients. A logistic regression analysis was performed in order to determine associated risk factors. The research study was approved by the committee for Ethics in Research at the University of Patras.

Results: The overall prevalence of sarcopenia among older adults with hypertension was 24.5% (n=25). The mean age of the study population was 70.2 ± 5.6 years (age range, 60–93 years). Patients with sarcopenia were older than those without sarcopenia. Patients with concurrent hypertension and sarcopenia had a significantly lower SMMI, handgrip strength, walking speed and a higher incidence of osteoporosis, and fall history ($p < 0.05$) compared to non sarcopenic older adults. The following factors were associated with a greater risk of sarcopenia: age of ≥70 years (OR, 5.65; 95% CI, 2.38–13.39; $p < 0.001$), osteoporosis, BMI.

Conclusions: This study revealed a high prevalence of sarcopenia among older adults with hypertension (22.4%). Current research confirms that sarcopenia is associated with hypertension. These results may have significant impact in both prevention and treatment techniques for older adults with sarcopenia and hypertension. Future studies should investigate more factors that could influence older adults with hypertension and sarcopenia.

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P1166

PHYSIOTHERAPY STUDENTS' ATTITUDES TOWARDS AND KNOWLEDGE OF OLDER PEOPLE

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Objective: To evaluate the knowledge and attitudes of Greek physiotherapy students regarding knowledge and geriatric rehabilitation of older patients.

Material and Methods: The present cross-sectional study was carried out on a sample of 243 undergraduate physiotherapy students attending the Department of Physiotherapy, University of Patras, Greece. Students, were recruited during the academic year 2024–2025. Three tools were used to collect data. I) A list of demographic characteristics; age, gender, level of education, ii) Kogan's attitude towards old people scale (KAOP) and iii) Facts of ageing quiz (FAQ1). The research study was approved by the committee for Ethics in Research at the University of Patras. Informed consent was obtained from all participants. To assure anonymity, students were asked not to place their names on the questionnaire.

Results: Two hundred and forty-three (243) physiotherapy students with a mean age of 20.5±4.4 years (164 women, 79 men) participated in this study. The largest number of students were in their first year (n=134,55.1%). and second year (n = 38, 15.6%) of studies. The KAOP mean attitude score of the students was 124.8 ± 8, indicating a neutral score. More than one third (32%) of respondents had poor to average knowledge. The majority of students believe they will work with older adults in the future. Significant statistical differences in negative attitudes were found between first and fourth year students ($p \leq 0.05$).

Conclusions: In general, physical therapist students in this study showed slightly positive attitudes and beliefs about older adults as measured by total positive Kogan score. Further investigation is needed to identify the level of knowledge on ageing and attitudes toward older people,

in larger samples. The number of fourth-year students was small and future research should investigate whether students' attitudes towards and knowledge of older people changes throughout the physiotherapy undergraduate programme.

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P1167

TRANSLATION AND CROSS-CULTURAL ADAPTATION OF THE GERIATRIC PAIN MEASURE IN GREEK OLDER ADULTS

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Objective: This study aimed to translate, culturally adapt, and evaluate the psychometric properties of the Greek version of the Geriatric Pain Measure (GPM) in Greek older adults.

Materials and Methods: The cross-cultural adaptation was carried out according to internationally recognized guidelines to ensure both linguistic accuracy and cultural appropriateness. The translation and adaptation of the questionnaire was carried out in five stages: (a) forward translation by two professionals with excellent knowledge of English. b) Synthesis, c) Back-translation into English, d) Creation of the pre-final version of the instrument, e) Pilot testing of the instrument. Then, a reliability (test-retest reliability) and validity check was performed in older adults. For the purposes of the study, a demographic questionnaire, the McGill Pain Questionnaire, and the Numerical Rating Scale (NRS) were used. The sample consisted of 20 Greek participants (aged > 60). Participation was voluntary, and participants had the option to withdraw at any time. The research study was approved by the Research Ethics Committee of the University of Patras.

Results: The translation was completed without any difficulties. The questionnaire was found to be user-friendly and easy to administer. Twenty (20) individuals (mean age: 76.05 years,17 women, 3 men) participated in this research study. The Greek version of the GPM had excellent reliability of repeat measurements (ICC = 0.9) and high internal consistency (Cronbach alpha = 0.91). Significant correlations between GPM scores, McGill (r=0.8;p≤0.001)), NRS (r=0.82; p≤0.001) showed good convergent validity.

Conclusions: The Greek version of the Geriatric Pain Measure is available and can be used for both clinical and research purposes in Greek-speaking individuals. Further research is needed to investigate the psychometric characteristics of the GPM in a larger sample.

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P1168

THE RELATIONSHIP AND THE DIFFERENCES OF KINESIOPHOBIA AND PAIN BETWEEN REHABILTATION PHASES IN PATIENTS AFTER TOTAL KNEE REPLACEMENT

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Objectives

To examine (a) the relationship between kinesiophobia and pain and (b) the differences in kinesiophobia and pain between (a) the 1st postsurgical day, (b) the day of hospital discharge, (c) the 15th day of hospital discharge day and (d) the 4 weeks of the hospital discharge.

Material and Methods

The sample was consisted of 41 patients (8 men, 33 women), aged 65 to 85 years (M=70,66 SD=5.60), with knee osteoarthritis diagnosed in the mean of the 7,8 years (SD=5,4) with symptoms of pain, stiffness and oedema. After the Total Knee Replacement (TKR), the participants completed two validated instruments: (a) the Greek version of Tampa Scale of Kinesiophobia, (b) the VAS of pain in the 4 aforementioned phases. The participants followed the standard physiotherapy session from the 1st surgical day until the hospital discharge. The data were non parametric; thus, we performed (a) a Friedman test with Kendall W for effect size, (b) a Wilcoxon post hoc analysis with Bonferroni correction, (c) a Spearman r to assess correlation between the 2 aforementioned variables in the 4 phases by a SPSS 30.00 (α=0.05).

Results

Spearman r showed positive significant correlations between kineshiophobia and pain in all the phases (r=0,27; p=0,09, r=0,56; p=0,001, r=0,56; p=0,001, r=0,47; p=0,002), respectively. The Friedman test showed significant differences in kinesiophobia between all the phases $\chi^2(3) = 76,40$, $p < 0,001$, with an average effect size (Kendall's W = 0,62). Regarding pain, Friedman test showed similar reduction in all the phases $\chi^2 (3) = 89,60$; $p <0,001$, with large effect size (Kendall's W = 0,73). The Wilcoxon post hoc analysis with Bonferroni correction showed significant results in all the phases (p<0,001) confirming the reduction of kinesiophobia and pain 4 weeks after the hospital discharge day after a TKR.

Conclusions

Kineshiophobia correlated with pain in all the phases. The kinesiophobia and pain had reductions until the 4th week of hospital discharge after TKR. No other studies had been conducted with the present aim of the study. More research should verify the present results with larger sample

of men. Further studies should correlate range of motion, strength and patient satisfaction after TKR.

P1169

FRAILTY AND MENOPAUSE: A SCOPING REVIEW

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Objective: The aim of this scoping review was to explore existing literature on menopause and frailty, identify key concepts and evidence gaps, and summarize findings related to prevalence, determinants, biological mechanisms, and health outcomes in women.

Materials and Methods: Web of Science, PubMed, EMBASE, and the Cochrane Library were searched. Two reviewers independently screened records and extracted data on study characteristics, menopausal assessment, frailty operationalization, main findings, and research gaps. Findings were synthesized descriptively. Hormonal changes—particularly reductions in estrogen—were linked to alterations in body composition, bone health, inflammation, and mitochondrial function, which may underlie increased vulnerability. Longitudinal data indicate that early menopause and longer duration of postmenopausal life are associated with higher frailty risk later in life. However, studies varied widely in design, frailty definitions, and adjustment for confounders, limiting comparability.

Results. The review included 16 studies. Existing studies suggest that menopause is associated with frailty. Evidence suggests that postmenopausal status is associated with higher prevalence of frailty and accelerated decline in muscle strength, physical function, and metabolic health compared to premenopausal women. Early menopause, hysterectomy, hormonal changes, low-free testosterone levels, and high Creactive protein levels may increase the likelihood of frailty among postmenopausal women

Conclusions: Current evidence highlights a potentially important relationship between menopause and frailty, with hormonal and physiological changes contributing to vulnerability in later life. Standardization of frailty assessment tools and menopausal status definitions is essential to improve comparability across studies. Future studies are required to adopt longitudinal and mechanistic designs to elucidate causal pathways linking menopausal transition to frailty trajectories in later life.

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P1170

NON-INVASIVE BRAIN STIMULATION METHODS FOR THE MANAGEMENT OF MOTOR DYSFUNCTION AND FATIGUE IN INDIVIDUALS WITH MULTIPLE SCLEROSIS: A SYSTEMATIC REVIEW

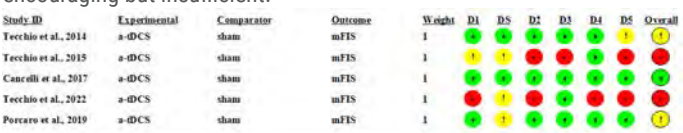
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Objective: Motor dysfunctions and fatigue are among the most frequently reported symptoms in individuals with Multiple Sclerosis (MS) (1)(2). In recent years, interest in non- invasive brain stimulation methods has increased due to the need for non-pharmacological interventions (3). The purpose of the present study is the systematic presentation of non-invasive brain stimulation methods—repetitive transcranial magnetic stimulation (rTMS), intermittent theta burst stimulation (iTBS), transcranial random noise stimulation (tRNS), and transcranial direct current stimulation (tDCS) in the management of motor dysfunctions and fatigue in individuals with MS.

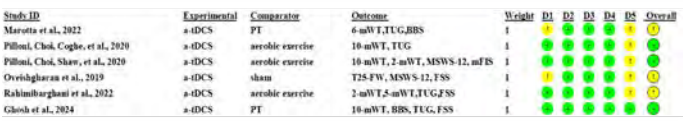
Materials and Methods: A systematic review of the literature was conducted in the PubMed, EBSCO, Web of Science, ScienceDirect, and Cochrane Library databases from 2000 to October 2024. A total of thirty-three (33) randomized clinical trials including 812 individuals with MS of any type and regardless of sex were included, in which brain stimulation was applied either as a stand alone intervention or in combination with exercise and physiotherapy programs. Methodological quality was assessed by two independent reviewers using the Cochrane Risk of Bias 2 (RoB 2) tool, and data synthesis was performed based on the Best Evidence Synthesis approach.

Results: Bilateral tDCS applied to the somatosensory cortex (S1) demonstrated the most consistent positive effects on fatigue, while targeting the left dorsolateral prefrontal cortex (F3) was also effective, particularly when combined with physiotherapy. Stimulation of the primary motor cortex (M1) with tDCS showed consistent benefits for gait and balance when combined with exercise or rehabilitation. Cerebellar tDCS improved balance with a more long-lasting effect when combined with exercise or physiotherapy. HF-rTMS demonstrated positive effects on fatigue, showing superiority over iTBS, while data regarding gait and balance were limited. Evidence for cerebellar iTBS and for tRNS was encouraging but insufficient.



Study ID	Experimental	Comparator	Outcome	Weight	D1	D5	D2	D3	D4	D5	Overall
Tecchio et al., 2014	a-tDCS	sham	mFIS	1	+	+	+	+	+	!	!
Tecchio et al., 2015	a-tDCS	sham	mFIS	1	!	!	-	-	+	-	-
Cancelli et al., 2017	a-tDCS	sham	mFIS	1	+	+	!	!	!	!	!
Tecchio et al., 2022	a-tDCS	sham	mFIS	1	-	!	-	+	-	-	-
Porcaro et al., 2019	a-tDCS	sham	mFIS	1	+	!	+	+	!	!	!

Fig. 1. Results of risk of bias assessment (RoB 2) for studies investigating the effects of tDCS, over the somatosensory cortex (S1), on fatigue



Study ID	Experimental	Comparator	Outcome	Weight	D1	D2	D3	D4	D5	Overall
Marotta et al., 2022	a-tDCS	PT	6-mWT,TUG,BBS	1	!	+	+	+	!	!
Pilloni, Choi, Coghe, et al., 2020	a-tDCS	aerobic exercise	10-mWT, TUG	1	+	+	+	+	!	+
Pilloni, Choi, Shaw, et al., 2020	a-tDCS	aerobic exercise	10-mWT, 2-mWT, MSWS-12, mFIS	1	+	+	+	+	!	+
Ovrishgharan et al., 2019	a-tDCS	sham	T25-FW, MSWS-12, FSS	1	!	+	+	+	!	!
Rahimibarghani et al., 2022	a-tDCS	aerobic exercise	2-mWT,5-mWT,TUG,FSS	1	+	+	+	+	!	!
Ghosh et al., 2024	a-tDCS	PT	10-mWT, BBS, TUG, FSS	1	+	+	+	+	+	+

Fig. 2. Results of risk of bias assessment (RoB 2) for studies investigating the effects of tDCS, over the primary motor cortex (M1), on gait

Conclusions: Non-invasive brain stimulation constitutes a promising intervention for individuals with MS, particularly when combined with physiotherapy. However, the strength of the conclusions remains limited due to protocol heterogeneity and the limited number of high-quality

studies. Further standardized and methodologically rigorous research is required to document the clinical effectiveness of these interventions.

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P1171

CORRELATIONS BETWEEN KINETIC AND KINEMATIC GAIT PARAMETERS AND MINI-BESTEST PERFORMANCE IN ADULTS AGED ≥50 YEARS DURING OBSTACLE CROSSING

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Objective

Timely and valid assessment of balance and gait in adults aged ≥50 years is critical for fall prevention, particularly under challenging walking tasks such as obstacle negotiation (3). The mini Balance Evaluation Systems Test (mini-BESTest) is widely used to clinically assess dynamic balance and has demonstrated reliability across different populations (1). The present study aims to examine the concurrent clinical validity of the mini-BESTest by investigating its correlations with kinetic and kinematic gait parameters recorded with reliable three-dimensional motion analysis during obstacle crossing in adults aged ≥50 years (2).

Materials and Methods

Ten healthy adults participated (8 women, 2 men; 59 ± 5 years). Biomechanical data were collected using a Vicon Nexus 2.16 motion capture system (8 cameras, 200 Hz) and AMTI/Bertec force plates (2000 Hz) under two conditions: (a) level walking and (b) obstacle crossing (23 cm), with the dominant limb leading, along a 12 m walkway. Three trials were performed per condition. Kinematic variables included single-support time, step length, and step width. Kinetic variables included peak vertical ground reaction force (GRF) at initial contact (landing) and at push-off during obstacle crossing for the dominant limb (Figure 1). The mini-BESTest was administered in the same session according to standard procedures. The mean of three trials per condition was used for analysis. Correlation coefficients (r) were computed in IBM SPSS Statistics 29.0.1, with statistical significance set at $p<0.05$.

Results

Higher mini-BESTest total scores were significantly associated with lower peak vertical GRF during obstacle crossing, both at landing ($r=-0.68$, $p=0.03$) and at push-off ($r=-0.65$, $p=0.04$). The Anticipatory Postural Control subscore was also negatively correlated with step width ($r=-0.76$, $p=0.01$) and with push-off force ($r=-0.63$, $p=0.05$). Overall, these findings support the hypothesis that better clinical performance in dynamic balance is accompanied by lower loading peaks and distinct lateral stability control during obstacle negotiation.

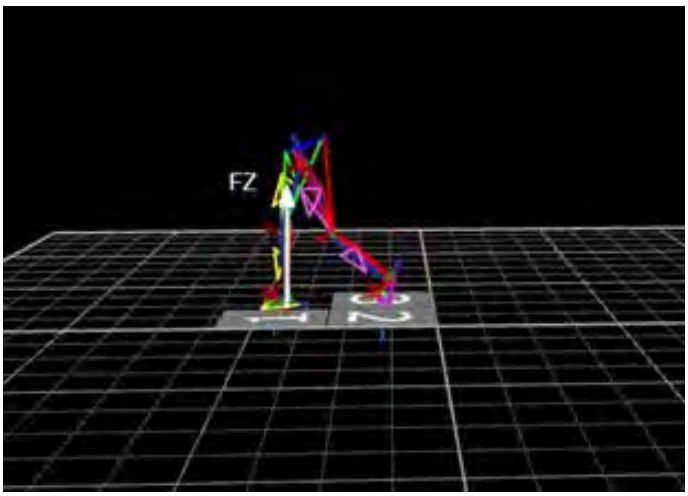


Figure 1. *3D kinematic model immediately after obstacle clearance, during landing (initial contact) of the leading/dominant limb on the force plate. The label FZ denotes the vertical ground reaction force (GRF) component recorded at landing (white arrow indicates the direction of the vertical loading peak).*

Conclusion

Correlations between the mini-BESTest and kinetic and kinematic gait parameters during obstacle crossing provide evidence of concurrent clinical validity in adults aged ≥50 years. However, the small sample size underscores the need for confirmation in larger cohorts.

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P1172

COMPARISON OF THE MINI BALANCE EVALUATION SYSTEM TEST (MINI-BESTEST) WITH THE SHORT PHYSICAL PERFORMANCE BATTERY IN RELATION TO WALKING SPEEDAND FEAR OF FALLING IN COMMUNITY-DWELLING OLDER ADULTS

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Objective

In recent years, a growing body of research has focused on the effects of aging, with most studies addressing impairments in balance (1), reductions in physical activity (2), decreased gait speed (3), and fear of falling. However, the combined assessment of these parameters with the aim of deriving prognostic value appears to be limited within the scientific community. The purpose of the study is to investigate the relationship between balance and physical performance with walking speed in community-dwelling older adults.

Materials and Methods

A cross-sectional study was conducted with a sample of elderly individuals (≥60 years old) without significant pathology or neurological deficits. Balance was assessed using the mini-Balance Evaluation

System Test (mini-BESTest) scale, physical performance using the Short Physical Performance Battery (SPPB) scale, and walking speed using the 10-meter walk test (10mWT). Statistical analysis was performed using IBM SPSS Statistics software, with a statistical significance level of p< 0.05.

Results

Thirty-two healthy elderly individuals (25 women, 7 men) aged 69±5 years participated in the study. Normal walking speed was found to be lower than expected normal values in both women (1.09±0.3 m/s vs. 1.13 m/s) and men (1.14±0.3 m/s vs. 1.26 m/s). Both the total mini-BESTest and SPPB scores were statistically significantly correlated with normal walking speed in the 10mWT (r=0.51 and r=0.56, respectively, p<0.05) (Fig. 1). In addition, the compensatory control of the mini-BESTest was significantly correlated with normal speed (r=0.46, p<0.05) and walking time (r=-0.38, p<0.05) in the 10mWT. The SPPB test of 5 repeated chair rises was also significantly correlated with walking speed (r=0.44, p<0.05). The comparison of independent samples between slow and fast walkers revealed statistically significant differences in the preparatory and somatosensory control scores of the mini-BESTest (p<0.05), as well as in the total score, balance activities, and repeated sit-to-stand tests of the SPPB (p<0.05).

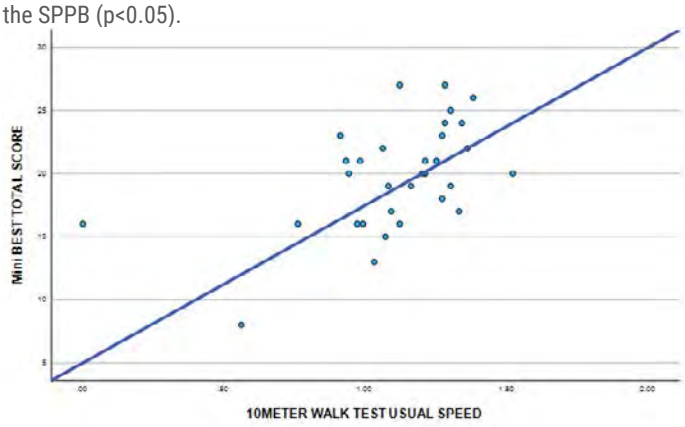


Figure 1. Correlation between the mini-Balanace Evaluation Systems Test (mini-BESTest) and the normal speed at the 10 meters walking test

Conclusions

The results suggest that mini-BESTest shows a comparable correlation with SPPB in terms of speed and walking time over 10 meters. Reduced balance and physical performance are associated with slower walking speed in older adults, highlighting the importance of using these two tools in combination in clinical assessment.

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P1174

DEVELOPMENT AND VALIDATION OF A DIAGNOSTIC TOOL FOR PREDICTING OSTEOPOROSIS USING KNEE RADIOGRAPH AND PATIENT CHARACTERISTICS

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Objective: Advanced-stage knee osteoarthritis (KOA) may comorbid with osteoporosis, and increase the risk of fragility fracture and complicating patients who undergoing total knee arthroplasty (TKA) such as periprosthetic fracture or aseptic loosening. Although Dual-energy X-ray absorptiometry is the gold diagnostic standard, its accessibility is still limited in some clinical settings. The previous study showed a significant correlation between bone thickness of distal femur in knee radiographic and bone mineral density. To develop and validate a diagnostic tool for predicting osteoporosis based on knee radiograph and clinical characteristics.

Material and Methods: In a retrospective observational cohort study, data of 385 women aged ≥60 years with knee osteoarthritis (Kellgren-Lawrence classification grade 2–4) were retrieved. Diagnostic determinants included the distal femoral cortical index (DFCI), age, body mass index (BMI), and menopausal age. The primary outcome was an osteoporosis diagnosis based on criteria that was T score of hip or spine ≤-2.5 or FRAX scores ≥ 3%. A multivariable logistic regression model was developed, from which an integer-based clinical risk score was derived. Model performance was assessed for discrimination, calibration, and internal validity.

Results: Of 385 participants, 200 (52%) were diagnosed with osteoporosis, and 185 (48%) had non-osteoporosis. The model included 1. DFCI <0.65, 0.65-0.75, and ≥0.75; 2. age <65, 65-70, and >70 years; 3. BMI <25 and ≥25 kg/m²; 4. menopause age ≤45 and >45. Discrimination was good (AuROC 76.5; 95% CI: 71.9 to 81.2), and calibration was excellent (calibration-in-the-large 0.00, 95% CI: -0.23 to 0.23; slope 1.00, 95% CI: 0.77 to 1.23). Internal validation with bootstrap replications yielded AuROC 76.7, calibration-in-the-large -0.00, and slope 1.01 with a bootstrap shrinkage of 1.009. Risk scores were categorized as low (<3.5), moderate (3.5 to 11), and high (>11), with corresponding positive likelihood ratios of 0.16, 0.90, and 4.08, respectively.

Conclusion: The knee radiograph and clinical characteristics can be applied as a risk-stratified diagnostic approach for osteoporosis. This diagnostic prediction model shows good discrimination and calibration for osteoporosis in elderly women with KOA.

P1175

THE ASSOCIATION BETWEEN SOLUBLE TOLL-LIKE RECEPTOR 2 (STLR2) LEVELS AND VITAMIN D STATUS IN PATIENTS WITH JOINT AND EXTRA-ARTICULAR MANIFESTATIONS OF RHEUMATOID ARTHRITIS

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Objective: Toll-like receptor 2 (TLR2) is a key component of innate immunity, recognizing both pathogen-associated and endogenous (damage-associated) molecular patterns. In rheumatoid arthritis (RA), increased TLR2 expression in the synovium and immune cells promotes pro-inflammatory pathway activation (NF-κB), which is associated with disease severity. Vitamin D has immunomodulatory properties, suppressing Th1/Th17 differentiation and pro-inflammatory cytokine production. Research suggests vitamin D may inhibit TLR expression. Vitamin D deficiency is a common comorbidity in RA and correlates with disease activity. Aim: To study the relationship between serum levels of soluble TLR2 (sTLR2) and 25(OH)D in patients with joint and extra-articular forms of RA.

Material and Methods: A single-center study included 94 RA patients meeting the ACR/EULAR 2010 criteria. Patients were divided into 2 groups: 1) with joint form (n=53) and 2) with extra-articular manifestations (nodulosis, vasculitis, Felty's syndrome; n=41). The control group consisted of 30 age- and sex-matched healthy donors. Serum concentrations of sTLR2 and 25(OH)D were measured by ELISA using commercial kits (specify manufacturer, e.g., R&D Systems, USA for sTLR2 and Dia-Service, Russia for 25(OH)D). Statistical analysis was performed using SPSS 23.0. The Mann-Whitney U test was used for group comparisons, and Spearman's rank correlation coefficient was used for correlation analysis. Data are presented as median (Me) and interquartile range (Q1-Q3). Differences were considered statistically significant at $p<0.05$.

Results: Patients with extra-articular RA had significantly lower vitamin D levels [16.3 (12.1–20.8) ng/ml] ($p=0.032$) than those with the joint form [19.8 (15.9–23.1) ng/ml], and in both groups levels were below the optimal threshold (>30 ng/ml). The sTLR2 concentration was significantly higher ($p=0.008$) in the extra-articular group [35.4 (18.2–59.1) ng/ml] compared to the joint form group [15.8 (9.4–24.7) ng/ml]. In the total RA cohort, a moderate negative correlation was found between 25(OH)D and sTLR2 levels ($r = -0.41$; $p<0.001$).

Conclusions: 1. Patients with extra-articular RA exhibit more severe vitamin D deficiency and statistically significant higher serum sTLR2 levels compared to patients with only joint involvement. 2. The identified inverse correlation between 25(OH)D and sTLR2 concentrations suggests that vitamin D deficiency may be associated with the activation of TLR2-dependent pro-inflammatory pathways, potentially contributing to systemic manifestations of RA. 3. These findings justify further research to evaluate the impact of vitamin D deficiency correction on TLR2 pathway activity and the clinical course of extra-articular RA forms.

P1176

CONTRIBUTION OF INFECTIONS AND ORAL MICROBIOME TO THE DEVELOPMENT OF RHEUMATOID ARTHRITIS

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Objective: Rheumatoid arthritis (RA) is an immune-inflammatory disease resulting from a dysregulated response in genetically predisposed individuals to environmental triggers. The role of infections and microbiome dysbiosis in RA pathogenesis is of considerable interest, with oral pathogens like Porphyromonas gingivalis implicated in breaking immune tolerance via citrullination.

Material and Methods:

Study Cohorts: We analyzed 461 patients with early RA (ERA, DMARD-naïve), 247 individuals at pre-RA stages (at-risk individuals with arthralgia but no clinical arthritis), and 398 healthy controls (HC) without family history of RA.

Infection Assessment: Data on the frequency and duration of common infections (respiratory tract infections, herpes simplex virus (HSV) reactivations, etc.) in the year preceding enrollment were collected. All participants were examined in an infection-free state and were not receiving immunomodulatory therapy.

Microbiome Analysis: Oral microbiome profiling via 16S rRNA gene sequencing (NGS platform) was performed in subgroups: ERA (n=14), established RA (n=45), pre-RA (n=52), and HC (n=26). Alpha-diversity was assessed using the Shannon Index (SI) and Operational Taxonomic Unit (OTU) count.

Laboratory Tests: Standard inflammatory markers, anti-citrullinated protein antibody (ACPA) status, and serum cytokine levels (multiplex Luminex assay) were evaluated.

Results:

1. Infections: Approximately 15% of patients linked RA onset/pre-RA symptoms to a specific infection. The ERA group had a higher frequency/duration of infections vs. HC.

ACPA-positive RA was associated with exacerbations of chronic tonsillitis and HSV infection. HSV reactivations influenced the course of tonsillitis.

ACPA-negative RA was characterized by bacterial upper respiratory tract infections (URTI), acute/chronic bronchitis, and combinations of viral and bacterial URTI.

A history of active tuberculosis (TB) was more frequent in RA. Prior TB was associated with longer exacerbations of chronic tonsillitis.

2. Oral Microbiome: Common infections increased oral bacterial alpha-diversity. SI correlated with the total number of annual infection episodes ($\rho=0.32$, $p<0.01$). A strong positive correlation was found between SI/OTU and the cumulative duration of episodes in the "viral + bacterial URTI" cluster ($\rho=0.41$, $p<0.001$).

Individuals with a history of TB had significantly higher SI and OTU values ($p<0.05$, Mann-Whitney U test).

Both SI and OTU showed a weak but highly significant inverse correlation with serum IL-4 levels ($\rho=-0.28$, $p<0.01$).

Alpha-diversity indices (SI and OTU) were significantly elevated in the established RA and pre-RA groups compared to HC ($p<0.05$). A similar trend was observed in the ERA group.

Conclusions:

1. The development of RA is preceded by frequent and prolonged common infections. Specific patterns are associated with ACPA status: HSV/tonsillitis in ACPA-positive RA and respiratory tract infections in

ACPA-negative RA.
2. These infections are associated with increased alpha-diversity of the oral microbiome.
3. A history of tuberculosis is more common in RA and is linked to altered infection course and increased oral microbiome diversity.
4. Elevated oral microbiome alpha-diversity in pre-RA and RA stages, along with its inverse correlation with IL-4, suggests a shift in microbial community structure potentially relevant to early disease mechanisms.

P1177

SERUM LEPTIN IS ASSOCIATED WITH PAIN AND RADIOGRAPHIC SEVERITY IN KNEE OSTEOARTHRITIS: EVIDENCE FOR A METABOLIC PHENOTYPE

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Objectives: 1. Measurement and analysis of serum levels of leptin in healthy people and knee osteoarthritis (KOA) patients with different BMIs. 2. To determine the relationship between serum leptin levels and the severity of clinical symptoms and radiographic findings in KOA patients.
Methods: Cross-sectional study conducted on 242 subjects, including 164 KOA patients (case group) and 78 healthy people (control group). Demographic data, Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) scores, radiographic findings, and serum leptin levels were collected. Serum leptin concentrations were measured using an enzyme-linked immunosorbent assay (ELISA) with monoclonal human antibodies.
Results: 59 (36%) obese KOA patients and 105 (64%) non-obese KOA patients. Mean serum leptin level in the obese KOA group (15.6 ng/mL ± 10.6) and the non-obese KOA group (9.3 ng/mL ± 7.6) was significantly higher than that in the control group (0.54 ng/mL ± 0.37) ($p<0.05$). There was a statistically significant positive correlation between leptin level and pain severity, with a correlation coefficient of 0.22 – 0.24 ($p<0.05$). Leptin levels were highest in patients with grade 4 KOA. Across all radiographic grades, obese KOA patients had higher leptin levels than non-obese patients.
Conclusion: Serum leptin levels were significantly elevated in patients with KOA compared to healthy controls. Higher leptin levels were associated with increased pain severity and more advanced radiographic stages of KOA, suggesting a potential role of leptin in disease severity and progression.

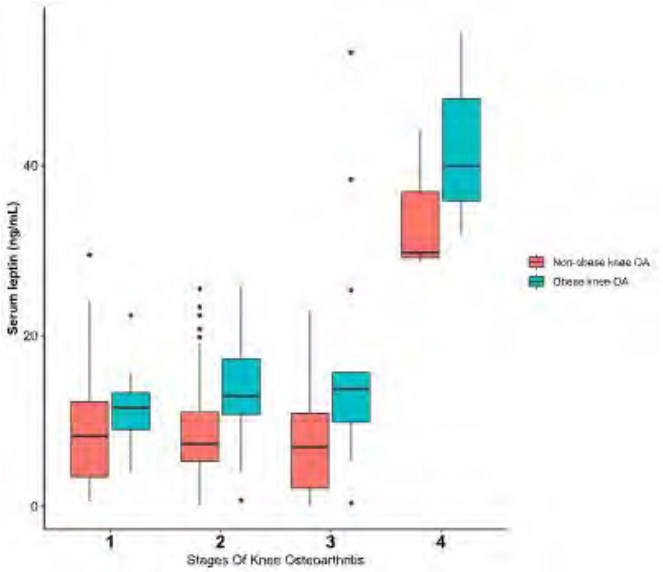


Figure 1. Mean serum leptin levels across radiographic stages of knee osteoarthritis in obese and non-obese patients.

P1178

ULTRASOUND-DERIVED RECTUS FEMORIS MUSCLE THICKNESS IDENTIFIES SARCOPENIA IN PATIENTS WITH KNEE OSTEOARTHRITIS

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Objectives: 1. To compare ultrasonographic characteristics of the rectus femoris muscle in patients with primary knee osteoarthritis (KOA) with and without sarcopenia. 2. To determine cut-off values of rectus femoris ultrasound parameters for sarcopenia screening in patients with primary KOA.

Methods: This cross-sectional study was conducted at Bach Mai Hospital and included 95 patients with primary KOA. Sarcopenia was diagnosed according to the Asian Working Group for Sarcopenia (AWGS) 2019 criteria. Sixty-eight patients (71.6%) had sarcopenia and 27 patients (28.4%) served as the non-sarcopenic control group. Bilateral ultrasound examination of the rectus femoris muscle was performed. Skeletal muscle mass index (SMI) and ultrasonographic parameters—including muscle thickness, cross-sectional area, fascicle length, and pennation angle—were recorded.

Results: The mean SMI in KOA patients with sarcopenia was significantly lower than in controls (4.8 ± 0.6 vs. 6.4 ± 0.5 kg/m², $p < 0.05$). Ultrasonographic parameters of the rectus femoris muscle in the sarcopenia group were significantly reduced compared with the control group: muscle thickness (11.6 ± 2.7 mm), cross-sectional area (3.4 ± 1.0 cm²), fascicle length (16.7 ± 3.8 mm), and pennation angle (12.9 ± 2.4°) (all $p < 0.05$). Receiver operating characteristic (ROC) curve analysis demonstrated that muscle thickness had the highest diagnostic accuracy for sarcopenia (AUC = 0.946), whereas fascicle length showed the lowest (AUC = 0.794). Using a muscle thickness cut-off value of 15.1

mm, sensitivity and specificity for sarcopenia screening were 86.8% and 96.3%, respectively.

Conclusion: KOA patients with sarcopenia exhibit significantly reduced ultrasonographic parameters of the rectus femoris muscle compared with non-sarcopenic patients. Rectus femoris muscle thickness showed a strong association with sarcopenia and demonstrated excellent diagnostic performance, suggesting its potential utility as a simple and non-invasive screening tool for sarcopenia in patients with KOA.

Table 1. Summary receiver operating characteristic curves (ROC) of different ultrasound measurements for diagnosing sarcopenia

Parameter	Cut-off	AUC	Sensitivity %	Specificity %
Thickness (mm)	15.1	0.946	86.8	96.3
Cross-sectional area (cm^2)	3.6	0.901	67.6	99.4
Fascicle length (mm)	18.8	0.794	61.8	98.9
Pennation angle	16.0	0.903	88.2	92.6

AUC: the area under the curve

P1179

REPRODUCTIVE HEALTH CHALLENGES AND THEIR IMPACT ON BONE METABOLISM IN GENETICALLY CONFIRMED COL1A1 OSTEOGENESIS IMPERFECTA: A CASE-BASED MULTIDISCIPLINARY FRAMEWORK

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Objective

Osteogenesis imperfecta (OI) is a systemic collagen type I disorder. Beyond skeletal fragility, collagen type I is a key structural component of the endometrial stromal matrix and uteroplacental vasculature. Reproductive challenges in women with OI become increasingly clinically relevant in late reproductive age, when lactation-associated prolactin–PTHrP-mediated bone loss and declining bone remodeling capacity may converge. Data addressing reproductive outcomes and postpartum skeletal protection in this population remain limited.

Case presentation

We report a 36-year-old woman with childhood-onset OI who sustained a left tibial plateau fracture treated by Ilizarov circular external fixation on 17 July 2023. Genetic testing confirmed a heterozygous pathogenic COL1A1 frameshift variant (c.274del; p.Cys92ValfsTer173), consistent with autosomal dominant OI. Longitudinal densitometry documented severe bone material deficit from childhood (L1–L4 Z-score −4.2 at 12 years; −2.8 at 14 years) with persistent low bone mass in adulthood (L1–L4 Z-score −2.5 at 28 years; −3.3 at 37 years).

The patient had received oral alendronate (70 mg weekly) between 2014 and 2019. During bisphosphonate treatment in 2018, bone turnover markers demonstrated markedly suppressed bone formation (P1NP 8.6 ng/mL) and low resorption (CTX 76 pg/mL), consistent with a low-turnover collagen phenotype. She delivered a healthy child on 20 September 2022 and was actively breastfeeding at the time of fracture, corresponding to the highest physiological prolactin–PTHrP-mediated bone resorption window. The external fixator was removed on 21 December 2023. She is currently 38 years old and experienced two consecutive spontaneous miscarriages within the last year, and now expresses a desire for further conception. Targeted testing of her child did not detect the familial COL1A1 variant.

Management and proposal

Given the systemic collagen deficiency and low-turnover phenotype, a multidisciplinary reproductive–endocrine pathway was proposed before assisted reproduction, integrating metabolic priming, skeletal risk stratification, and genetic counseling with preimplantation genetic testing (PGT-M). A postpartum bone-protection plan was emphasized to address lactation-associated skeletal vulnerability.

Conclusion

This case highlights OI as a systemic reproductive collagen disorder with a distinct lactation-associated fracture-risk window. Proactive endocrine optimization, genetic guidance, and structured postpartum bone protection may improve both reproductive and skeletal outcomes in women with COL1A1-related OI.

P1180

SEVERE JUVENILE-ONSET CORTICAL OSTEOPOROSIS ASSOCIATED WITH A DE NOVO COPB2 VARIANT MIMICKING INFLAMMATORY BONE DISEASE: A CASE REPORT

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Objective(s)

To describe a diagnostic challenge in a child with severe juvenile-onset osteoporosis mimicking inflammatory bone disease and to highlight the role of integrated densitometric and genetic assessment in guiding therapy.

Material and Methods

We report the clinical course of a 9-year-old girl presenting with chronic lower limb pain, gait impairment and recurrent low-trauma fractures. The patient underwent comprehensive clinical evaluation, laboratory assessment of mineral metabolism, imaging including magnetic resonance imaging, dual-energy X-ray absorptiometry (DXA), and whole genome sequencing.

Results

DXA demonstrated severe reduction in bone mineral density predominantly affecting cortical bone, with a femoral neck Z-score of −4.4 and total hip Z-score of −2.6, while lumbar spine Z-score was −1.3. Laboratory parameters of calcium-phosphate metabolism were within age-adjusted reference ranges, with adequate vitamin D levels and mildly elevated parathyroid hormone. Inflammatory markers were normal. Magnetic resonance imaging showed bone marrow edema without signs of active inflammation. Genetic analysis identified a heterozygous de novo nonsense variant in the COPB2 gene (c.10C>T; p.Arg4*), classified as a variant of uncertain significance. The clinical and densitometric phenotype strongly overlapped with recently described COPB2-associated childhood-onset osteoporosis. Based on the severity of bone loss and fragility fractures, intravenous bisphosphonate therapy was initiated.

Conclusion(s)
This case emphasizes that COPB2-associated juvenile osteoporosis may closely resemble inflammatory bone disorders, leading to misdiagnosis and delayed appropriate treatment. Severe cortical bone involvement on DXA should prompt consideration of primary bone fragility disorders. Therapeutic decisions should rely on clinical severity rather than genetic classification alone, with intravenous bisphosphonates representing an effective treatment strategy.

P1181

GLUCOCORTICOID IMPACT ON BONE DENSITY IN INFLAMMATORY BOWEL DISEASE PATIENTS

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Objective: Inflammatory bowel diseases (IBD) are chronic diseases of the intestines, etiologically unclear, with complications such as osteoporosis. A lot of factors can cause osteoporosis in IBD patients, but one of the most significant ones is glucocorticoid (GC) therapy application. The aim was to determine bone density in IBD patients, as well as what effect glucocorticoid therapy has on bone density in these patients.
Material and methods: This retrospective study involved 60 patients who have IBD or other diseases of the intestines. Bone mineral density (BMD) was measured via DXA in the lumbar spine and the hip. Diagnosis was based on T and Z scores, depending on age. Height, weight and body mass index were measured. Data about the type of IBD, duration of the disease, application of GC, duration of menopause, presence of fractures and life habits such as smoking were taken.
Results: In IBD patients, 63% had osteoporosis and 20% had osteopenia. In postmenopausal women with IBD, 77% had osteoporosis and 18% had osteopenia. Among the premenopausal women, each third had normal bone density, osteopenia or osteoporosis, respectively. Menopause is a significant factor for low BMD in IBD women (p=0.036). Bone density deficit was noticed in 90% of IBD patients on GC (n=35). Among the patients who were not on GC (n=10), 50% had low BMD. A significant difference in BMD was noticed in patients who were on GC therapy (p=0.04). Average BMD of femoral neck of IBD patients who were on GC therapy was lower compared to patients who were not on GC (p=0.031). Patients who had been ill for 12 months or longer had a significantly lower BMD (p=0.02).
Conclusion: The application of GC in IBD patients reduces BMD, particularly in the femoral neck. Postmenopausal women and patients who have been ill for 12 months or longer are at higher risk.

P1182

GENTAMICIN-COATED TIBIAL NAILS IN REDUCING FRACTURE-RELATED INFECTIONS AND NON-UNION RATES: A SYSTEMATIC REVIEW OF OUTCOMES IN LOWER LEG TRAUMA

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Objective
Open tibial fractures remain at high risk of fracture-related infection (FRI) and impaired healing despite advances in fixation and systemic antibiotic therapy. Biofilm formation on implant surfaces is a key contributor to infection and non-union. Gentamicin-coated intramedullary nails have been introduced to provide local antimicrobial protection; however, comparative clinical evidence remains limited and fragmented. The aim was to evaluate whether gentamicin-coated intramedullary tibial nails are associated with reduced infection rates and improved bone healing compared with uncoated implants in adult patients with fresh open or revision tibial fractures.
Methods
A systematic review was conducted in accordance with PRISMA 2020 guidelines. PubMed, ScienceDirect, and the Cochrane Library were searched (January 2010–August 2025). Eligible studies included adults (≥18 years) undergoing fixation with gentamicin-coated tibial nails for fresh open fractures (FF) or revision surgery (RS). Outcomes included infection, union, delayed union, and non-union. Study quality was assessed using the Newcastle-Ottawa Scale and MINORS criteria. Due to heterogeneity, data were synthesised descriptively.
Results
Across included studies, infection rates in FF averaged approximately 5%, with union rates exceeding 80% and non-union rates around 10%. In RS for aseptic non-union or previous infection, union rates similarly exceeded 80%, with reinfection rates of approximately 10%. No statistically significant differences were observed between FF and RS groups for infection or healing outcomes ($p > 0.05$). Reoperation rates were approximately 18%, reflecting predominantly planned procedures in FF and complication-related interventions in RS. Overall, gentamicin-coated nails were consistently associated with favourable infection and healing outcomes, particularly in high-grade open fractures.
Conclusions
Gentamicin-coated intramedullary nails appear to reduce fracture-related infection and support bone healing in both primary and revision tibial fracture management. However, heterogeneity in study design, follow-up duration, and sample size limits definitive conclusions. Large, multicentre randomised trials using standardised FRI and union criteria are required to confirm clinical benefit.

P1183

FROM HOSPITAL TO THE PUBLIC: THE FIRST INTEGRATED OSTEOPOROSIS AND SARCOPENIA CARE NETWORK PROGRAM IN TAIWAN

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Objective: Osteoporosis and sarcopenia are prevalent age-related conditions in Taiwan, driven by rapid population aging. Both disorders contribute to increased risks of fractures, disability, falls, and mortality. Integrated prevention and management strategies focusing on early screening, nutrition, exercise, and multidisciplinary care are essential to reduce healthcare burden and improve healthy aging outcomes. As one of the most rapidly aging areas in Taiwan with relatively limited healthcare resources, Chiayi County has an even greater need for an integrated prevention and care program.
Methods: Over the past two years, two FLS hospital cooperated with Chiayi County public health bureau and has expanded community health screening through mobile healthcare services. By integrating AI-assisted DXA screening with fracture liaison services, the county is establishing Taiwan's first integrated osteoporosis and sarcopenia care network linking public health centers and hospitals to enhance early detection, prevention, and long-term care.
Results: Sixteen of 18 local public health centers have been evaluated by the Capture the Fracture® Governance and been rated as Bronze in the map of the best practice. From April 2023 to December 2025, a total of 28,670 participants were screened. Approximately over 76% of participants were assessed as having osteopenia or worse. The proportion of individuals with a major osteoporotic fracture risk >20% was 8.4%. The proportion with a hip fracture risk >3% was 41.8%. About 7.7% of participants had experienced a low-energy fracture. The proportion with a STEADI fall risk score >4 was 10.7%. 7.7% participants had SARC-F questionnaire ≥4 and 18.9% had an abnormal response in one SARC-F item. Individuals identified with abnormalities were enrolled by trained professionals, provided with relevant information, and referred to appropriate hospitals for further evaluation and treatments.
Conclusion: These findings highlight the high prevalence of bone fragility, fall risk, and sarcopenia indicators in this population, emphasizing the need for early identification, preventive strategies, and targeted interventions to reduce fracture risk, falls, and functional decline. Through this integrated program, we are confident that implementing a similar initiative in other public agencies can enable more comprehensive and effective screening of local residents.

P1184

FRACTURE RISK PREDICTION IN DIALYSIS PATIENTS: A SYSTEMATIC REVIEW

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Objective: The primary objective is to investigate the accuracy of available models and variables predicting fracture risk among chronic kidney disease stage 5D (CKD5D) patients. **Material and Methods:** This systematic review was conducted in accordance with methodological standards, and the protocol was registered in PROSPERO (CRD42024503688). A systematic search was conducted in MEDLINE, EMBASE, Cochrane Central, Cochrane Database of Systematic Reviews, CINHAL, the Web of Science Core Collection, IEEE Xplore, and in gray literature sources. Prospective and retrospective observational studies were included. The target population was adults with CKD stage 5 receiving dialysis (5D: hemodialysis (HD) or peritoneal dialysis (PD)). Studies addressing fracture prediction (discrimination or calibration) were included. Eligibility assessment (first and second screening) as well as extraction of articles were performed independently by two authors (MJB, AH) in a standardized manner (κ = 0.82). PROBAST was used to assess the risk of bias. Descriptive statistics were used to report and discuss results. **Results:** From the 6427 citations retrieved from literature search, 24 addressed fracture prediction in CKD5D and were included: 8 cross-sectional, 8 retrospective cohort and 8 prospective cohort studies. Several studies have examined the performance of bone mineral density (BMD) in predicting fracture risk or fracture status in patients undergoing chronic HD, no data specific to PD patients is available. Reported AUC for BMD in HD patients varies considerably from 0.50-0.85 in the literature included. Discrimination ability of FRAX with and without BMD for major osteoporotic fracture is reported to be fairly good in HD and PD patients (Table 1). In CKD5D population, the HRpQCT appears to have good discrimination ability for fracture status with AUCs of 0.66-0.90 depending on the parameter used. Different serum biomarkers have been studied with variable performance, particularly good AUC are reported for alkaline phosphatase and FGF-23. Most studies had a high or unclear risk of bias. **Conclusion:** This analysis highlights the potential gap in the evidence regarding fracture prediction tools in CKD5D population. FRAX score appears to have greater discriminatory potential than BMD alone.

Table 1. Discrimination (AUC) of FRAX for fracture prediction in dialysis patients

Population	Study	FRAX, outcome	AUC (95% CI)
Hemodialysis	Chang 2016, n=136	FRAX without BMD, MOF FRAX with BMD, MOF	0.715 (0.631-0.789) 0.697 (0.613-0.773)
	Przedlacki 2018, n=718	FRAX without BMD, hip fx FRAX without BMD, MOF	0.70 (0.563–0.832) 0.76 (0.69-0.84)
	Jafari 2021, n=109	FRAX with BMD, MOF + FN T-score FRAX with BMD, hip fx + FN T-score	0.73 (0.63-0.83) 0.78 (0.69-0.88)
	Jirasirirak 2022, n=80	FRAX without BMD, MOF FRAX without BMD, hip fx	0.64 (0.47-0.81) 0.62 (0.46-0.79)
Peritoneal dialysis	Diz Lopez 2025, n= 184	FRAX without BMD, MOF	0.755 (0.651-0.858)

AUC: area under the curve (Receiver Operating Characteristic analysis), BMD: bone mineral density, CI: confidence intervals, FN: femoral neck, hip fx: hip fracture, MOF: major osteoporotic fracture

P1185

WHOLE SLIDE IMAGING USED FOR HISTOMORPHOMETRIC ANALYSIS OF BONE BIOPSY: DIGITAL TRANSITION AND EXPLORATION OF ARTIFICIAL INTELLIGENCE APPLICATION

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Histomorphometric analysis (HA) of undecalcified bone biopsies is the gold standard for diagnosing complex bone disorders. Traditionally, HA is performed through microscopic observation of glass slides and computerized semi-automated image analysis systems (SAIAS). Advances in digital pathology and artificial intelligence (AI) have expanded slide evaluation. Since 2019, our center has adopted whole slide imaging (WSI)-based digital pathology, initiating the digital transition of HA.

Objectives: To report our experience with the digital transition of HA and to explore the use of AI-based tools.

Material and Methods: Goldner's trichrome slides were digitalized with a Hamamatsu NanoZoomer XR brightfield scanner (226 nm/pixel) and unstained slides were digitalized by a Leica Aperio Versa fluorescent scanner (446 nm/pixel). Digital HA validation was performed through comparison with a standard microscope-based method. Eight patients with bone fragility were included in the exploratory AI analysis. Bone volume (BV/TV) and osteoid volume (OV/BV) values measured by AI-based tools (CaloPix®) were compared with two SAIAS (OsteoMetrics® and Bioquant®).

Results: The use of WSI for HA provides a seamless digital workflow that enables efficient navigation across multiple magnifications. This enhances visualization, improves tissue and cellular assessment, and supports more precise, reproducible measurements. WSI offers key advantages, including facilitating expert collaboration through highresolution image sharing, supporting remote mentoring, and promoting research and education. Digital archiving, particularly for fluorescent labeling, ensures longterm preservation. AI-based tools refine tissue segmentation by combining color information with pixel-level features such as texture and edges, enabling accurate differentiation of bone, osteoid, and marrow. Repeated-measures ANOVA and Friedman test revealed a non-significant difference (p>0.05) between the two SAIAS and AI tools for BV/TV and OV/BV.

Conclusions: The adoption of digital pathology is a paradigm shift in HA and should be encouraged. It will facilitate collaboration, teaching and research. Furthermore, it will help development of AI-based tools to support analysis and improve phenotyping of complex bone disorders.

P1186

FRACTURE RISK PREDICTION IN KIDNEY TRANSPLANT RECIPIENTS: A SYSTEMATIC REVIEW

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Objective: The primary objective is to investigate the accuracy of available models and variables predicting fracture risk among kidney transplant recipients (KTR). **Material and Methods:** A systematic search was conducted in MEDLINE, EMBASE, Cochrane Central, the Cochrane Database of Systematic Reviews, CINHAL, the Web of Science Core Collection, IEEE Xplore, and in gray literature sources, in accordance with methodological standards, until November 2025. The protocol was registered in PROSPERO (CRD42024503688). Prospective and retrospective observational studies addressing fracture prediction (discrimination or calibration) were included. The target population was adults with chronic kidney disease; this subgroup analysis included only KTR. Eligibility assessment (first and second screening) as well as

extraction of articles were performed independently by two authors (MJB, AH) in a standardized manner (κ = 0.82). PROBAST was used to assess the risk of bias. Descriptive statistics were used to report and discuss results. **Results:** From the 6427 citations retrieved from literature search, four studies involving KTR were included. Two retrospective population-based Canadian studies evaluated bone mineral density (BMD), FRAX and trabecular bone score (TBS) (n=458/327), one retrospective cohort study assessed the impact of BMD on incident fractures (n=48), and finally one study analyzed BMD and Calcaneal Trabecular Bone Structure (CTBS) predicting fracture in a cross-sectional design (n=357). The mean time elapsed since KT was 0.3, 1.1, 4.3 and 12.6 years and weighted average age was 47.1 years. Discrimination capacity of BMD in KTR seems poor to moderate, with AUC varying between 0.541 and 0.680. FRAX with or without BMD for major osteoporotic fracture, as well as TBS, had moderate predictive value (AUC 0.62-0.64). CTBS seems to have interesting discrimination ability (AUC 0.87) (Table 1). Most studies had a high risk or unclear risk of bias. **Conclusion:** Limited data are available in KTR to stratify high fracture risk patients after transplant. Discrimination capacity of BMD and FRAX appears to be lower than in the general population. In KTR, development and validation of fracture prediction models specific to their risk factors are needed to better guide fracture prevention management.

Table 1. Discrimination (AUC) of different variables/models for fracture prediction in kidney transplant recipients

Variable	Study	BMD site	AUC (95% CI)
BMD	Naylor 2014 n=458	Lumbar spine (T-score) Femoral neck (T-score) Total hip (T-score)	0.60 (0.49-0.71) 0.64 (0.53-0.75) 0.58 (0.47-0.68)
	Link 2002 n=48	Femoral neck (g/cm^2)	0.64
	Hori 2022 n=357	Lumbar spine (g/cm^2) Total hip (g/cm^2) 1/3 Radius (g/cm^2)	0.680 (0.592-0.767) 0.590 (0.497-0.684) 0.541 (0.440-0.643)
FRAX score	Naylor 2014 n=458	FRAX without BMD, MOF FRAX with BMD, MOF	0.62 (0.49-0.75) 0.62 (0.50-0.74)
TBS	Naylor 2016 n=327	TBS	0.64 (0.53-0.74)
Calcaneal Trabecular Bone Structure	Link 2002 n=48	All structural measures	0.87

AUC: area under the curve (Receiver Operating Characteristic analysis), BMD: bone mineral density, CI: confidence intervals, MOF: major osteoporotic fracture, TBS: trabecular bone score

P1187

SEX-SPECIFIC ASSOCIATIONS OF GRIP STRENGTH WITH LONG-TERM CARDIOVASCULAR AND CEREBROVASCULAR OUTCOMES: FINDINGS FROM THE 16-YEAR KOREAN LONGITUDINAL STUDY OF AGING

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OBJECTIVE(S)
Handgrip strength is a simple measure of muscle function linked to health outcomes in older adults. This study investigated whether higher grip strength is associated with a lower risk of cardiovascular (CVD) and cerebrovascular (CeVD) disease in middle-aged and older adults, focusing on sex-specific associations and the potential protective role of grip strength in women.
MATERIAL AND METHODS
We analyzed data on approximately 9,500 participants of the Korean Longitudinal Study of Aging (aged ≥45 years, free of CVD/CeVD at baseline). Grip strength was measured in multiple waves and treated as a time-varying exposure. Cross-sectional logistic regression was used to evaluate baseline associations, and Cox regression models with time-varying grip strength were used to assess the 16-year incidences of CVD and CeVD after adjusting for major confounders. The analyses were stratified according to sex.
RESULTS
Higher handgrip strength was inversely associated with prevalent CVD and CeVD at baseline (p<0.001). Over a 16-year follow-up, each 1-kg grip strength increase predicted a lower hazard of CeVD (hazard ratio [HR] ~0.98), driven by a significant protective effect in women (HR ~0.95), with no association in men. Similarly, higher grip strength predicted a lower CVD risk in women (HR ~0.97), but not in men.
CONCLUSION(S)
Greater grip strength is associated with reduced risks of CVD and CeVD later in life, with particularly pronounced benefits in older women. These findings suggest that preserving muscle strength may help reduce the risk of cardiovascular and cerebrovascular disease in this population.

P1188

ASSOCIATION OF ANTHROPOMETRIC FACTORS AND BONE MINERAL DENSITY WITH KNEE OSTEOARTHRITIS IN HAKKA WOMEN AGED 50 YEARS AND OLDER: A COMMUNITY-BASED STUDY

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Objective
This study aimed to investigate the risk factors and relationship between osteoporosis and osteoarthritis (OA) in ethnic-specific Hakka women.
Materials and Methods
We conducted a retrospective study of community-dwelling Hakka women aged ≥50 years in Northwest Taiwan. Anthropometric data (age, height, weight, BMI) and bone mineral density (BMD) using dual-energy X-ray absorptiometry (DXA) were obtained. Radiographic knee OA was defined by Kellgren–Lawrence grade ≥3.
Results
1,429 participants with available radiographic knee OA status were analyzed. In the multivariable logistic regression model adjusting for all anthropometric factors, age and body weight are significant risk factors, while greater height showed a protective effect of knee OA. Specifically, each additional year of age increased the odds of knee OA by 6% (OR 1.06, 95% CI 1.05–1.08), and each kilogram of weight increased the odds by 8% (OR 1.08, 95% CI 1.06–1.09). Conversely, each centimeter increase in height reduced the odds of knee OA by approximately 5% (OR 0.95, 95% CI 0.93–0.98). In addition, BMI was strongly correlated with knee OA ($r = 0.263$, $p < 0.001$), each 1 kg/m² increase in BMI was associated with a 19% higher odds of knee OA (OR 1.19, 95% CI 1.14–1.23, $p < 0.001$). BMD at the lumbar spine and hips was further examined. In the multivariable logistic regression model, lumbar spine BMD was significantly associated with increased risk of knee OA (OR 1.25, 95% CI 1.11–1.42, $p < 0.001$). In contrast, BMD at the hip showed no significant associations with knee OA. When age was included as a covariate, lumbar spine BMD remained independently associated with knee OA. In the multivariable logistic regression model, each 1-unit decrease in lumbar spine T-score increased the odds of knee OA by 31% (OR 1.31, 95% CI 1.19–1.43, $p < 0.001$).
Conclusions
In this study of 1,429 Hakka women, knee osteoarthritis was strongly influenced by age, body weight, and BMI, whereas greater height was protective. Lumbar spine BMD, but not hip BMD, remained independently associated with knee OA even after adjusting for age, with lower T-scores markedly increasing risk. These findings highlight age, body composition, and lumbar spine bone loss as key determinants of knee OA in this ethnic-specific population.

P1189

ACCURACY OF A TAIWAN-SPECIFIC DEMOGRAPHIC MODEL FOR PREDICTING FEMORAL AND TIBIAL COMPONENT SIZES IN TOTAL KNEE ARTHROPLASTY

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Objective
Total knee arthroplasty (TKA) demand is increasing rapidly in aging Asian populations. Accurate implant sizing is essential to optimize surgical efficiency and outcomes, yet conventional radiographic templating shows limited exact-size accuracy and may not adequately account for ethnic and anthropometric differences. Demography-based prediction models have shown promise, but population-specific validation remains limited in East Asian cohorts.
Methods
We conducted a retrospective study of consecutive patients aged ≥40 years who underwent primary TKA at a single institution between January 2022 and December 2024. Demographic variables (age, sex, height, weight, body mass index) and implanted femoral and tibial component sizes were collected. All patients received the same implant system. Univariable and multivariable linear regression analyses were performed to identify predictors of component size. Model performance was evaluated using exact match and ±1 size accuracy, calibration analyses, and sex-stratified assessments. Predicted sizes were converted to discrete implant sizes using a standardized clinical rounding rule.
Results
A total of 633 patients (461 females, 172 males) were included. Height, weight, and sex were the strongest independent predictors of both femoral and tibial component sizes. Multivariable models explained approximately two-thirds of the variance in implanted sizes (femur: $R^2 = 0.666$; tibia: $R^2 = 0.689$). Exact match accuracy was 69.2% for femoral and 52.9% for tibial components, while ±1 size accuracy exceeded 95% for both. Calibration analyses demonstrated good agreement between predicted and actual sizes. Sex-stratified analyses showed consistent performance in female and male patients, with no clinically meaningful sex-related bias.
Conclusions
A demography-based prediction model tailored to Taiwanese patients can accurately estimate femoral and tibial component sizes in TKA. Although exact match accuracy was moderate, high ±1 size accuracy better reflects clinically acceptable performance. This population-specific approach may enhance preoperative planning, optimize implant inventory management, and improve workflow efficiency in Asian arthroplasty practice.

P1190

RADIOGRAPHIC KNEE OSTEOARTHRITIS IS ASSOCIATED WITH HIGHER LUMBAR SPINE BONE MINERAL DENSITY BUT NOT REDUCED FRACTURE RISK IN OLDER WOMEN

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Objective
Osteoarthritis and osteoporosis commonly coexist in older adults, yet the relationship between radiographic knee osteoarthritis, site-specific bone mineral density, and fracture risk remains controversial. Degenerative changes associated with osteoarthritis may influence dual-energy X-ray absorptiometry measurements, particularly at the lumbar spine, potentially obscuring true skeletal fragility.
Methods
This retrospective cross-sectional study included community-dwelling women aged 50 years and older who underwent knee radiography and bone mineral density assessment. Radiographic knee osteoarthritis was defined as Kellgren–Lawrence grade ≥2. Bone mineral density T-scores at the lumbar spine and hip were measured using dual-energy X-ray absorptiometry. Vertebral, hip, and distal radius fractures were identified using radiographic and clinical records. Multivariable logistic regression models were applied to evaluate independent associations between knee osteoarthritis, bone mineral density, and fracture outcomes after adjustment for age and body mass index.
Results
A total of 2,036 women were included, of whom 27.0% had radiographic knee osteoarthritis. Women with knee osteoarthritis were older and had higher body mass index than those without osteoarthritis. Lumbar spine bone mineral density T-scores were significantly higher in women with knee osteoarthritis, whereas hip bone mineral density showed no independent association after adjustment. Vertebral fractures were more prevalent among women with knee osteoarthritis in unadjusted analyses; however, this association was fully attenuated after adjustment for age and body mass index. No independent associations were observed between knee osteoarthritis and hip or distal radius fractures.
Conclusions
Radiographic knee osteoarthritis is independently associated with higher lumbar spine bone mineral density but does not confer protection against vertebral or non-vertebral fractures. These findings suggest that elevated spine bone mineral density in individuals with knee osteoarthritis likely reflects degenerative artifacts rather than improved bone strength. Emphasizing hip bone mineral density and clinical fracture history may provide a more reliable assessment of skeletal health in osteoarthritic populations.

P1191

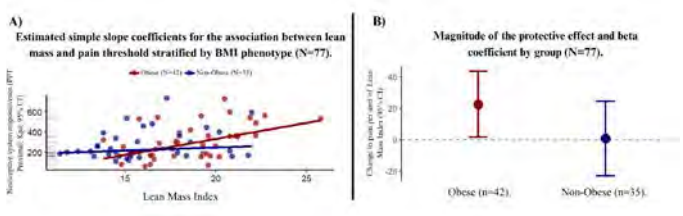
THE PROTECTIVE EFFECT OF LEAN MASS ON NOCICEPTIVE SYSTEM RESPONSIVENESS IN KNEE OSTEOARTHRITIS IS RESTRICTED TO OBESITY: A MODERATION ANALYSIS.

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Objective: Obesity appears to negatively influence nociceptive modulation in individuals with Knee Osteoarthritis (KOA). However, the protective role of lean mass regarding pain in obese and non-obese subjects with KOA remains uncertain in the literature. We hypothesized that the Lean Mass Index would exert a more effective protective role against knee pain in obese individuals with KOA. The aim of this study was to investigate the interaction between obesity and Lean Mass Index on nociceptive system responsiveness in obese and non-obese individuals with KOA
Materials and Methods: Seventy-seven participants aged >40 years, of both sexes, with a clinical diagnosis of KOA according to the American College of Rheumatology criteria, were selected and divided into two groups based on Body Mass Index (BMI): (1) non-obese or overweight KOA and (2) obese KOA. Nociceptive system responsiveness was assessed based on the stimulus-response function, obtained via a psychophysical direct scaling protocol using a pressure algometer. A moderation analysis was performed using quantile regression with simple slopes decomposition to investigate the interaction between obesity and Lean Mass Index.
Results: Our results indicate a significant interaction between obesity and Lean Mass Index on nociceptive system responsiveness. Simple slopes analysis revealed that in the obese group, lean mass acted as a strong protective factor (β = 22.5; p = 0.034). For every unit increase in Lean Mass Index, the pain threshold significantly increased. Conversely, in the non-obese group, lean mass showed no protective effect (β = 0.68; p = 0.95) regarding pain in KOA.
Conclusion: Our results indicated that lean mass exhibited a protective effect on nociceptive pain in obese individuals with KOA, but not among non-obese subjects. These findings highlight the importance of muscle mass gain for obese individuals with KOA as part of the treatment for this condition.

Figure *1* - Quantile Regression Estimates of Lean Mass and Pain Threshold by BMI Phenotype (N=*77*).
Figure 1 – (A) Quantile regression demonstrating divergent slopes: lean mass increases the pain threshold in the obese, but not in the non-obese. (B) Magnitude of effects (simple slopes) confirming significant protection only under the condition of obesity.



P1192

DIVERGENT EFFECTS OF BODY COMPOSITION ON BONE MASS IN KNEE OSTEOARTHRITIS: A PRELIMINARY 8-MONTH LONGITUDINAL STUDY

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Objective: Knee osteoarthritis (KOA) is frequently accompanied by alterations in body composition that may influence bone health; however, longitudinal evidence remains limited. This preliminary study aimed to evaluate 8-month trajectories of bone mineral density (BMD) and examine their associations with body mass index (BMI), body fat percentage (PFAT), pain catastrophizing (PCS), and clinical variables in adults with KOA.

Material and methods: Adults aged ≥40 years with clinically diagnosed KOA underwent assessments including BMI, PFAT and BMD via dual-energy X-ray absorptiometry (Hologic DEXA). Demographic variables (age, sex) and PCS were also collected. BMD was repeatedly measured across several time points over an 8-month follow-up. Linear mixed-effects models were used to examine associations between BMD and BMI, PFAT, PCS, age, sex, and time. Statistical analyses were performed in RStudio, with significance set at $p < 0.05$.

Results: Forty-two participants were included (40.5% obese; 64.3% women; mean age 58 years). Overall, BMD remained stable over time, with no significant monthly change (β = 0.006 g/month; p = 0.408), despite substantial interindividual variability (ICC ≈ 0.94). Higher BMI was significantly associated with greater BMD (β = 0.109 g; p = 0.038), consistent with a potential osteoprotective effect of mechanical loading. In contrast, higher PFAT showed a nonsignificant inverse trend with BMD (β = −0.082 g; p = 0.114), suggesting a possible adverse metabolic influence. Age, sex, and PCS were not associated with BMD. Predicted trajectories (Fig. 1) indicated overall BMD stability while reinforcing the divergent associations of BMI and PFAT.

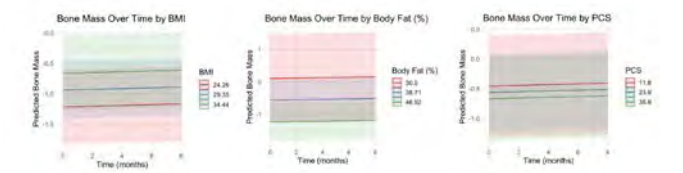


Figure 1 - Predicted bone mass trajectories over 8 months according to BMI, body fat percentage, and pain catastrophizing (PCS). Each panel displays the estimated bone mass over time derived from the linear mixed-effects model. Colored lines represent predicted trajectories for representative values of each variable.

Conclusion: In this preliminary longitudinal cohort of individuals with KOA, BMD remained stable over 8 months. BMI was positively associated with bone mass, whereas PFAT showed an opposite tendency, highlighting divergent effects of body composition components on bone health in KOA.

P1193

ADIPOSITY IS ASSOCIATED WITH PERIPHERAL PAIN SENSITIVITY IN INDIVIDUALS WITH KNEE OSTEOARTHRITIS - COMPARISON BETWEEN APPENDICULAR FAT MASS AND THE KNEE REGION OF INTEREST

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Objective: Obesity contributes to knee osteoarthritis (KOA) pain through mechanical and metabolic–inflammatory pathways; however, the role of regional fat distribution in peripheral and central pain sensitization remains unclear. This study investigated associations between regional adiposity and peripheral and central pressure pain thresholds (PPT) in obese and non-obese individuals with KOA.

Material and methods: Thirty-six individuals with clinically and radiographically confirmed KOA (Kellgren & Lawrence grades II–IV) were categorized as obese or non-obese. Peripheral and central PPT were assessed using a digital algometer (Algomed, Medoc) at the medial joint line of the most painful knee and at the contralateral thenar eminence, respectively. Total body and appendicular fat percentages were assessed by dual-energy X-ray absorptiometry (DXA; Hologic). Periarticular knee fat mass was quantified using a predefined region-of-interest (ROI). Multivariable linear regression models were applied to examine associations between adiposity measures and PPT outcomes, adjusting for relevant covariates ($p < 0.05$).

Results: The sample included 20 obese and 16 non-obese participants (mean age 60.1 years; mean BMI 30.5 kg/m²). Mean peripheral and central PPT values were 199.1 kPa and 249.9 kPa, respectively. Participants exhibited marked regional adiposity (mean quadriceps fat area 1618.4 mm²; thigh fat percentage 46.1%). In adjusted models, central PPT was not associated with systemic or regional adiposity (adjusted $R^2 = 0.004$; p = 0.439). Conversely, peripheral PPT showed a modest but significant association with periarticular knee fat (β = 0.19; p = 0.036), whereas BMI and total body fat percentage were not associated with PPT. Predicted plots indicated weak inverse trends between systemic adiposity and PPT, while local adiposity showed a site-specific relationship restricted to peripheral pain sensitivity (Fig. 1).

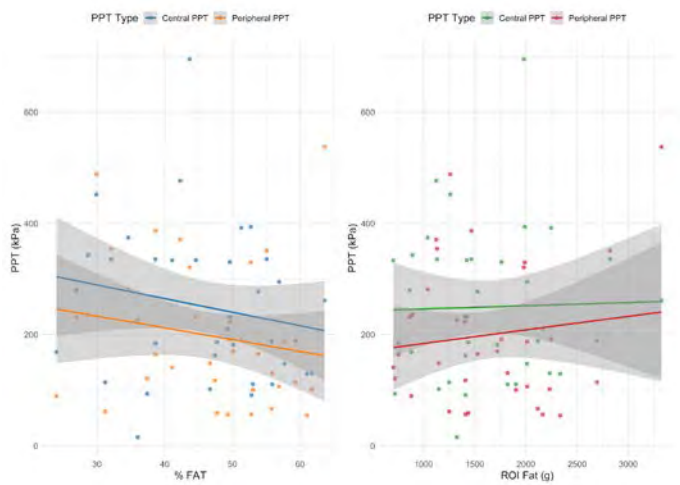


Figure 1. Associations between body fat measures and PPTs

Conclusion: In KOA, systemic adiposity does not appear to meaningfully

influence pressure pain sensitivity or central sensitization. In contrast, periarticular knee fat shows a modest, site-specific association with peripheral PPT, suggesting a localized influence of fat accumulation on nociceptive processing.

P1194

TRENDS IN ALCOHOL-ATTRIBUTABLE FALL-RELATED INJURY BURDEN IN THE NORTH AFRICA AND MIDDLE EAST REGION, 1990–2023

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Objective: To assess trends in the burden of fall-related injuries attributable to alcohol use in the North Africa and Middle East region between 1990 and 2023.

Material and Methods: Age-standardized DALY and mortality rates for falls attributable to alcohol use were extracted from Global Burden of Disease 2023 estimates for 1990–2023 in the region, stratified by sex.

Results: The alcohol-attributable falls burden showed a steady decline over the study period. The total age-standardized DALY rate dropped from 1.44 per 100,000 in 1990 to 1.01 in 2023. This burden was predominantly shouldered by men, whose DALY rates fell from 2.62 to 1.82 (with fall-related deaths decreasing from 0.023 to 0.014 per 100,000), whereas women's rates remained minimal, declining from 0.19 to 0.12 (deaths from 0.0011 to 0.000054).

Conclusions: The marked reduction in alcohol-related fall injuries indicates progress in mitigating this risk, likely reflecting effective public health policies or changing alcohol use patterns. However, the persistent male predominance in this burden highlights a need for targeted interventions focusing on men. Strengthening alcohol control measures and fall-prevention strategies — especially among high-risk male populations — should remain a priority to further reduce this preventable injury burden.

P1195

BURDEN OF FALLS ATTRIBUTABLE TO LOW BONE MINERAL DENSITY IN THE NORTH AFRICA AND MIDDLE EAST REGION, 1990–2023

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Objective: To evaluate the burden and temporal trends of fall-related injuries attributable to low bone mineral density (BMD) in the North Africa and Middle East region from 1990 to 2023.

Material and Methods: Age-standardized DALY and mortality rates for falls due to low BMD were obtained from Global Burden of Disease 2023 data for 1990–2023 in the region, with stratification by sex.

Results: The overall falls burden attributable to low BMD remained largely stable over the study period. Total age-standardized DALY rates plateaued, changing only slightly from 85.62 to 83.50 per 100,000. Women consistently experienced a higher DALY burden (maintaining ~88 per 100,000) than men (~79–83 per 100,000) throughout 1990–2023. Meanwhile, fall-related mortality due to low BMD showed a modest decline: the combined death rate fell from 2.87 to 2.39 per 100,000 (men from 2.99 to 2.60; women from 2.78 to 2.24).

Conclusions: The persistently high burden of falls linked to low BMD — especially among women — emphasizes the ongoing need for robust osteoporosis prevention and bone health strategies in the region. Despite a slight improvement in mortality, the stable disability rates suggest that current efforts in fracture prevention and osteoporosis management have plateaued. Policymakers should bolster initiatives (e.g., wider bone density screening, calcium/vitamin D supplementation, fall prevention programs) to reduce BMD-related fall injuries and address the gender gap in bone health.

P1196

TOBACCO USE AS A DETERMINANT OF LOW BACK PAIN BURDEN IN THE NORTH AFRICA AND MIDDLE EAST REGION, 1990–2023

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Objective: To examine the long-term trends in low back pain attributable to tobacco consumption across the North Africa and Middle East region from 1990 to 2023.
Material and Methods: Age-standardized disability-adjusted life years (DALYs) for low back pain linked to tobacco use were obtained from the Global Burden of Disease 2023 dataset. Data were stratified by sex and analyzed over the 1990–2023 period to assess temporal and gender-specific patterns.
Results: The total regional burden of tobacco-related low back pain showed a gradual reduction. DALY rates declined from 122.41 to 107.49 per 100,000 over the study period. This burden was consistently higher in men, with DALYs dropping from 195.68 to 167.51 per 100,000, while women exhibited a significantly lower and more stable trend (from 45.43 to 42.53 per 100,000)
Conclusions: Tobacco use remains a modifiable contributor to the musculoskeletal disease burden in the region, particularly among men. Despite a modest decline, the persistently high burden in males calls for strengthened tobacco cessation policies integrated with musculoskeletal health initiatives. Policymakers should consider embedding spine health messages into smoking cessation campaigns and enhancing gender-sensitive interventions to reduce the disability impact of smoking-related low back pain.

P1197

RELATIONSHIP BETWEEN BODY MASS INDEX AND SARCOPENIA RISK IN THE BIRJAND LONGITUDINAL AGING COHORT IN IRAN

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Objective: To investigate the relationship between body mass index (BMI) and sarcopenia risk among older participants in the Birjand Longitudinal Aging Cohort.

Material and Methods: This analysis included 1,348 elderly participants from the Birjand Longitudinal Aging Study (BLAS). Body Mass Index (BMI) was categorized into three groups: Normal/Underweight (<25 kg/m²), Overweight (25–29.9 kg/m²), and Obese (≥30 kg/m²). Sarcopenia status was classified as either 'Robust'; or 'Probable Sarcopenia' based on muscle strength criteria. The association between BMI categories and sarcopenia risk was evaluated using chi-square tests, while mean BMI differences between robust and sarcopenic groups were compared using independent sample t- tests in Stata.

Results: BMI was significantly associated with sarcopenia in this cohort (P=0.001). Older adults with a normal or underweight BMI (<25 kg/m²) had the highest prevalence of probable sarcopenia (47.5%), whereas those in the overweight range (25–29.9) exhibited the lowest prevalence (36.5%). Obese participants (BMI ≥30) had a similarly lower prevalence (38.3%), suggesting that higher body mass might confer some protection against sarcopenia in late life. Consistently, the mean BMI of non-sarcopenic individuals was slightly higher than that of those with sarcopenia (26.71 vs 26.02, respectively; P=0.020).

Conclusions: In this elderly population, lower BMI was associated with greater sarcopenia risk, while being overweight (or mildly obese) appeared to be protective against muscle loss. This paradoxical finding highlights the importance of avoiding undernutrition in older adults: maintaining an adequate BMI and muscle mass is crucial for healthy aging. Geriatric care strategies should carefully balance weight management goals with the need to preserve muscle, rather than promoting weight loss indiscriminately in all seniors. Public health programs must focus on nutritional support and resistance training for at-risk, lean older individuals to reduce sarcopenia and its associated adverse outcomes.

P1198

REVISITING THE ADFR CONCEPT: CLINICAL USE OF CYCLIC ROMOSOZUMAB

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Objective: Evaluation of novel osteoporosis medication approaches to maximize BMD is reasonable. A bone remodeling-based approach, i.e., activate, depress, free and repeat (ADFR) has been proposed. We hypothesized that short course romosozumab (Romo) followed by denosumab (Dmab) may be an advantageous ADFR strategy. Here we report data from a clinical cohort treated with monthly Romo for six months followed by a Dmab dose, then repeated. FRAME data were used as a BMD change referent.
Methods: Women at very high fracture risk were offered cyclic therapy by bone health practitioners. DXA was obtained at baseline, 1 and 2 years. Data from 41 women treated for 1, and 11 for 2, years are reported. BMD change from baseline was evaluated by ANOVA.
Results: Cyclic (C) patient demographics were similar to FRAME (F) subjects; mean age 68.8 C/70.9 F years, BMI 25.6 C/24.7 F kg/m², FN T-score -2.6 C/-2.8 F; 90% of C patients had prior fractures. After one cycle, mean (SD) % BMD increase (all p < 0.001) from baseline at LS, TH and FN was 12.6 (6.6), 5.9 (5.3) and 4.4 (5.9) respectively, similar to 12 months of Romo in FRAME (Figure 1a). After two years of cyclic

treatment BMD mean (SD) increase from baseline was LS 17.5% (6.5), TH 9.0% (5.9) and FN 5.5% (4.2) also similar to FRAME (Figure 1b). In a subset (n = 6) CTX was suppressed (all ≤ 80 pg/mL) prior to the second Romo course. No major adverse cardiac events occurred.

Conclusion: At one year, six doses of Romo then one Dmab dose increased BMD comparably to 12 months of Romo in FRAME. A second Romo/Dmab course further increased BMD, but the response was blunted perhaps reflecting persistent turnover suppression. Evaluation of novel Romo dosing approaches is indicated.

Figure 1a

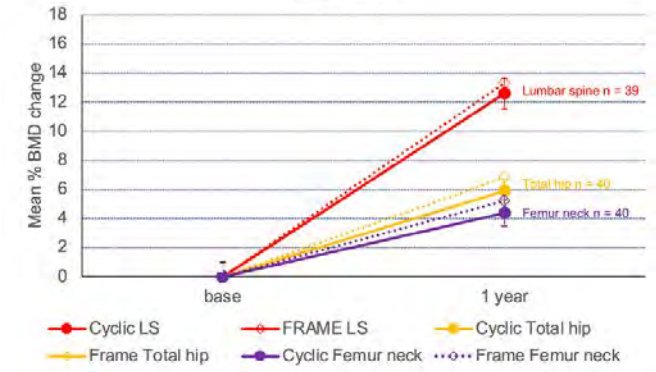
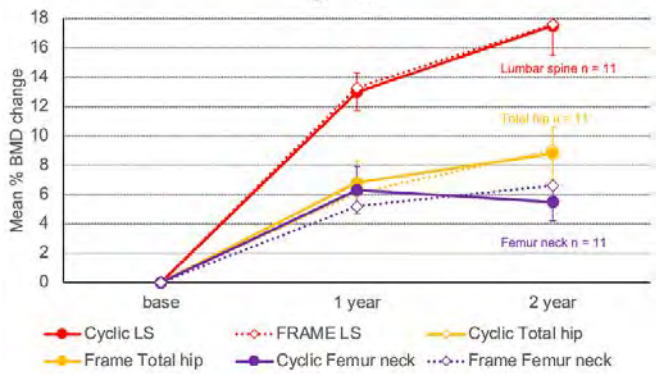


Figure 1b



P1199

HEMOPHILIC ARTHROPATHY: A REPORT OF FOUR CASES

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Introduction: In major hemophilia, chronic arthropathy is responsible for severe functional disability.

Case Reports: We describe the cases of four men who have suffered from hemophilic arthropathy for several years. For each patient, various epidemiological, clinical, radiological, and management aspects were investigated.

Discussion: The results show that severe hemophilia patients on prophylaxis, even in the absence of clinical hemarthrosis, can develop arthropathy, primarily affecting the ankles. Furthermore, patients who have developed aloimmunization against their replacement factor are particularly at risk of hemophilic arthropathy, especially in cases of immune tolerance failure.

Conclusion: Although replacement prophylaxis with coagulation factors helps limit the risk of spontaneous hemarthrosis in hemophilia patients, hemophilic arthropathy remains a significant concern and can be disabling for many.

P1201

FRACTURE MANAGEMENT AND HEALING OUTCOMES IN OSTEOPOIKILOSIS: A SYSTEMATIC REVIEW AND SYNTHESIS WITHOUT META-ANALYSIS (SWIM)

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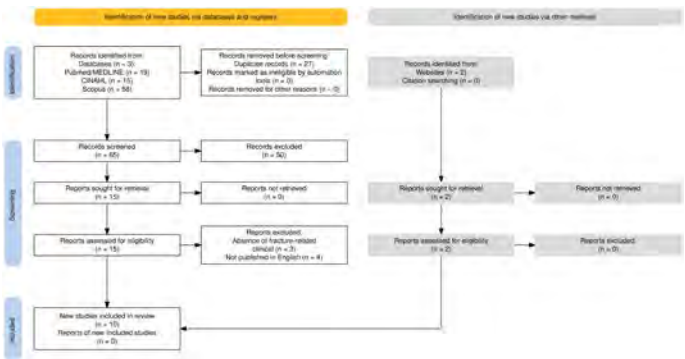
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Objective(s): Fractures in patients with Osteopoikilosis (OPK) pose a unique challenge due to the unknown biomechanical quality of the sclerotic bone islands. Surgeons often face uncertainty regarding implant anchorage and healing potential. This study aims to synthesize current evidence on fracture characteristics, management strategies, and healing outcomes in OPK patients to provide clinical recommendations.

Material and Methods: This systematic review was conducted in accordance with PRISMA 2020 and Synthesis Without Meta-analysis (SWiM) guidelines. The protocol was registered with PROSPERO. We searched PubMed/MEDLINE, CINAHL, and Scopus for studies reporting fractures in OPK patients up to December 2025. Data on patient demographics, fracture sites, fixation methods, and healing complications were extracted and synthesized qualitatively.

Results: A total of 10 studies were included in the review, representing 9 unique cases from the literature. There was a male predominance (78%), with ages ranging from 17 to 37 years. Fractures involved both the appendicular skeleton (femur, tibia, humerus, radius, hand) and the axial skeleton (cervical spine). Management strategies included surgical fixation (intramedullary nailing, plating, tension band wiring) and conservative care (traction, casting). Fracture union was consistently achieved in all reported cases. Time to union (8–26 weeks) was comparable to the general population. No instances of delayed union, nonunion, implant failure, or difficulty in drilling/screw insertion through sclerotic lesions were reported.

Conclusion(s): Despite the radiographically alarming appearance of "spotted bones," the literature confirms that biological healing potential in OPK is preserved. The sclerotic lesions do not compromise implant stability or impede callus formation. Orthopedic surgeons can confidently apply standard surgical principles and fixation techniques, as outcomes are consistently excellent without the need for modified protocols.



P1202

MICROSTRUCTURAL DEFECTS IN BONE TRABECULAE OF GENETICALLY HYDRONEPHOTIC MICE: A NANOSCALE X-RAY MICROSCOPY STUDY

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Massive dilation of the renal pelvis and calyces, as observed in bilateral hydronephrosis, profoundly deteriorates renal function, including calcium and phosphate handling and 1,25-dihydroxyvitamin D production. Herein, we aimed to investigate bone microarchitecture in a genetically hydronephrotic Imprinting Control Region (ICR) mouse strain, namely ICR/Mlac-*hydro* mice (Hydro), to elucidate how bilateral hydronephrosis is associated with osteopenia and trabecular fragility. Histopathological analyses revealed that Hydro mice exhibited marked enlargement of the renal pelvicalyceal system and distortion of Bowman's capsule and tubular architecture, accompanied by an elevated serum blood urea nitrogen-to-creatinine ratio. Volumetric bone mineral density (vBMD) was significantly lower in Hydro mice compared with age-matched wild-type controls, presumably due to the presence of adynamic bone disease characterized by reduced activities of both osteoblasts and osteoclasts. Ultra-high-resolution E-Class VECTor6 micro-computed tomography demonstrated a reduction in trabecular thickness and increased trabecular separation in the femora of Hydro mice, which in turn resulted in a decreased bone volume fraction. Nanoscale X-ray microscopy using a Bruker Skyscan 2214 revealed multiple losses of trabecular connectivity, suggesting microstructural defects or trabecular microfractures on the order of several micrometers. In addition, tibial mineral apposition and bone formation rates in Hydro mice were reduced by more than 60% compared with wild-type mice, as determined by dynamic bone histomorphometry. In conclusion, bilateral hydronephrosis in Hydro mice is apparently associated with trabecular microstructural defects in long bones, characterized by pronounced trabecular separation and impaired bone formation, ultimately leading to reduced vBMD and osteopenia.

P1203

HIGH HEMOGLOBIN LEVELS AS AN INDEPENDENT PREDICTOR OF OSTEOPOROSIS IN POSTMENOPAUSAL WOMEN

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Introduction: Emerging evidence suggests a complex interplay between erythropoiesis and bone remodeling within the bone marrow niche. While anemia is a known risk factor for fractures, the impact of high-normal hemoglobin (HGB) levels on bone health remains less clear. This study aimed to evaluate whether HGB levels are independently associated with osteoporosis (OP) in postmenopausal women, regardless of conventional risk factors.

Methods: This cross-sectional study included 438 postmenopausal women. Osteoporosis was defined by a T-score ≤ -2.5 at the lumbar spine or hip via dual-Xray absorptiometry (DXA). HGB levels were analyzed as a continuous variable, in tertiles, and using a clinical cut-off of >14 g/dL. Multivariate logistic regression models adjusted for age, body mass index (BMI), smoking status, and metabolic comorbidities to isolate the specific impact of HGB.

Results: Out of 438 participants, 197 (45%) were diagnosed with osteoporosis. In the multivariate logistic regression analysis, after adjusting for all potential confounders, HGB was identified as a significant independent predictor of OP. Specifically, each 1 g/dL increase in HGB level was associated with a 23.4% increase in the risk of developing osteoporosis (OR: 1.234, 95% CI: 1.016–1.500, p=0.034).

The study demonstrated a clear dose-response relationship; women in the highest HGB tertile exhibited a 2.16-fold higher risk of OP compared to those in the lowest tertile (OR: 2.160, p=0.024). Threshold analysis reinforced these findings, showing that women with HGB levels >14 g/dL had an 1.82-fold increased risk of OP (OR: 1.821, p=0.009) compared to those below this cutoff. Regarding other covariates, advanced age significantly increased risk (OR: 1.071, p<0.001), while higher body weight remained a protective factor (OR: 0.959, p<0.001).

Conclusion: Our results demonstrate that higher hemoglobin levels are robustly and independently associated with an increased risk of osteoporosis in postmenopausal women. This positive correlation suggests that the "EPO-bone axis" or iron-mediated oxidative stress may play a dominant role in accelerated bone resorption. The persistence of HGB as a risk factor highlights its potential utility as a novel clinical biomarker. Clinicians should consider high-normal HGB levels in postmenopausal women as a potential indicator of bone density deterioration.

Keywords: Osteoporosis, Hemoglobin, Postmenopausal Women, Bone Mineral Density

Table 1. Clinical characteristics of the participants (N=438)

Parameter	Osteoporosis Group (n=197)	Control Group (n=241)	p
Age (Years, Mean±SD)	62.37 ±7.49	59.20 ±7.70	**<0.001**
BMI (kg/m²)	28.35 ±4.60	30.48 ±4.79	**<0.001**
Duration of Menopause	16.24 ±9.59	11.70 ±8.84	**<0.001**
Prevalence of Diabetes	53 (26.9%)	95 (39.4%)	**0.006**
Duration of Diabetes (Years)	3.18±6.66	4.73±8.10	**0.004**
Insulin Use	12 (6.1%)	36 (14.9%)	**0.003**
Family History of OP	65 (33.0%)	56 (23.2%)	**0.023**
Smoker	32 (16.2%)	40 (16.6%)	>0.05

Table 2. Multivariate Logistic Regression Analysis for Osteoporosis Risk Factors

Parameter	Odds Ratio (OR)	95% Confidence Interval (CI)	P
Hemoglobin (continuous)	1.233	1.034 – 1.472	**0.020**
Hemoglobin (>14 g/dL)	1.821	1.163 – 2.850	**0.009**
HGB 3rd Tertile (Ref: 1st)	2.160	1.109 – 4.209	**0.024**
Age	1.062	1.030 – 1.096	**<0.001**
Weight (kg)	0.958	0.940 – 0.976	**<0.001**
Diabetes Mellitus (Yes)	0.589	0.367 – 0.946	**0.028**
Height (cm)	0.989	0.952 – 1.028	0.583
Smoking (Yes)	0.861	0.486 – 1.524	0.607
Exercise (Yes)	0.962	0.735 – 1.259	0.776

P1204

THE ASSESSMENT OF KINESIOPHOBIA AND RELATING FACTORS IN OFFICE WORKERS WITH CHRONIC SHOULDER PAIN

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Objective: To determine the level of kinesiophobia in office workers with chronic shoulder pain and to analyze its relationship with pain intensity, functional disability, handgrip strength, depression, and job satisfaction in comparison with a healthy control group.

Methods: This cross-sectional study included 55 office workers with shoulder pain lasting >3 months and 56 age- and sex-matched healthy controls. Assessments included the Tampa Scale for Kinesiophobia (TSK), Visual Analog Scale (VAS), Leeds Assessment of Neuropathic Symptoms and Signs (LANNS), Shoulder Pain and Disability Index (SPADI), Beck Depression Inventory (BDI), and Minnesota Satisfaction Questionnaire (MSQ). Physical examination and MRI findings were recorded. Handgrip strength was measured using a hydraulic dynamometer. Statistical analysis was performed using Student's t-test, Pearson correlation, and logistic regression (Kolmogorov-Smirnov for normality).

Results: No significant differences were found between groups regarding age, sex, and BMI (p>0.05) (Table 1). In the patient group, shoulder range of motion (ROM) was restricted at mid-range in 45% and at end-range in 55% of participants. Patients exhibited significantly lower handgrip strength (26.2±8.1 vs 33.5±9.7 kg, p=0.001) and higher BDI scores (10.0±3.8 vs 5.2±1.9, p<0.001) compared to controls. TSK scores correlated positively with VAS (p=0.018), all SPADI subscales (p<0.01), and BDI scores (p<0.05). No significant correlation was found between MSQ scores and kinesiophobia (p>0.05). Although a negative trend was observed between handgrip strength and TSK scores, it did not reach statistical significance (p>0.05). In the logistic regression analysis, no single independent factor was identified as a unique predictor of high kinesiophobia (p>0.05), suggesting a multifactorial etiology.

Conclusion: Kinesiophobia in office workers with chronic shoulder pain emerges as a complex interaction of pain intensity, functional impairment, and depressive symptoms. The significant reduction in handgrip strength suggests that shoulder-related kinesiophobia may impact distal upper extremity performance. The absence of a single dominant predictor in regression analysis supports the multidimensional nature of movement fear. Rehabilitation programs should integrate functional restoration with psychosocial strategies to optimize clinical outcomes.

Keywords: Chronic shoulder pain, TAMPA, SPADI, Handgrip strength, Office workers.

Table 1. Analysis of Demographic and Clinical Parameters

Parameter	Patient Group (n=55)	Control Group (n=56)	p-value
Age (years) (±SD)	46.1 ± 11.2	45.9 ± 9.18	0.921
Gender (n, %)			0.912
Male	32 (58.2)	32 (57.1)	
Female	23 (41.8)	24 (42.9)	
BMI (kg/m²) (±SD)	27.5 ± 4.3	26.7 ± 5.7	0.071
Affected Side (n, %)			
Right	31 (56.4)	-	-
Left	24 (43.6)	-	-
Pain Duration (months)	7.09 ± 3.72	-	-
VAS Pain (±SD)	6.47 ± 2.08	0	0.000
LANNS Score (±SD)	4.2 ± 5.5	0	<0.001
Handgrip Strength (kg) (±SD)	26.2 ± 8.1	33.5 ± 9.7	**0.001***
SPADI Pain (±SD)	56.6 ± 22.3	0	-
SPADI Disability (±SD)	49.7 ± 23.0	0	-
SPADI Total (±SD)	52.4 ± 22.3	0	-
TSK (Tampa) (±SD)	37.0 ± 6.7	-	-
Kinesiophobia Level (n, %)			
Low (≤37)	29 (52.7)	-	-
High (>37)	26 (47.3)	-	-
Minnesota Satisfaction (±SD)	72.1 ± 13.1	69.1 ± 15.0	0.390
Beck Depression (±SD)	10.0 ± 3.8	5.2 ± 1.9	**<0.001***

SD: Standard Deviation; **BMI:** Body Mass Index; **VAS:** Visual Analog Scale; **LANNS:** Leeds Assessment of Neuropathic Symptoms and Signs; **SPADI:**

Shoulder Pain and Disability Index; **TSK:** Tampa Scale for Kinesiophobia. **p < 0.05 indicates statistical significance.*

Table 2. MRI Findings of the Patient Group (n=55)

MRI Finding	n (%)
Supraspinatus (SS) partial rupture	25 (45.5)
Supraspinatus (SS) tendinitis	20 (36.4)
Subdeltoid bursitis	4 (7.2)
Supraspinatus (SS) total rupture	3 (5.5)
Biceps tendinitis	3 (5.5)

P1205

ANTHROPOMETRIC AND MORPHOLOGICAL ALTERATIONS PRECEDE FUNCTIONAL IMPAIRMENT IN POSTMENOPAUSAL OSTEOPOROSIS

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Objective: To investigate whether alterations in body composition and muscle morphology occur before the onset of functional and strength deficits in postmenopausal women with osteoporosis (OP).

Material and Methods: This cross-sectional study included 441 postmenopausal women (OP+: n=203, OP−: n=238). Anthropometric measures (BMI, waist/hip circumference) and ultrasound-based morphological assessments (abdominal fat, abdominal muscle, and quadriceps muscle thickness) were obtained. Functional performance was evaluated using the chair stand test (CST), six-minute walk test (6MWT), and balance tests, while strength was measured via handgrip dynamometry.

Results: Despite being older (62.1 vs 59.5 years, p=0.002), the OP+ group exhibited significantly lower BMI (28.3 vs 30.4 kg/m², p<0.001) and abdominal fat thickness (40.0 vs 42.9 mm, p=0.02) compared to the OP− group. Notably, a selective thinning was observed in the quadriceps muscle of OP+ patients (32.3 vs 33.6 mm, p=0.02), while trunk muscle (abdominal) thickness remained preserved (p=0.09). Crucially, these morphological changes did not translate into functional deficits, as no significant differences were found in handgrip strength (p=0.93), CST (p=0.08), 6MWT (p=0.94), or balance performance between groups.

Conclusion: Our findings suggest that postmenopausal osteoporosis is characterized by an early body composition phenotype where peripheral muscle thinning and reduced adiposity precede measurable declines in physical function or strength. The significant reduction in quadriceps thickness despite preserved abdominal muscle morphology and physical performance indicates a selective, compartmental deterioration. This "morphology-first" decline highlights the importance of early screening for muscle and fat distribution changes, even in patients who appear functionally intact, to allow for early intervention before overt musculoskeletal failure occurs.

Keywords: Postmenopausal osteoporosis, Muscle morphology, Body composition, Physical performance, Ultrasonography

Table 1. Comparison of Body Composition, Muscle Architecture, and Physical Function According to Osteoporosis Status

Parameter	Osteoporosis (OP+) (n=203)	Control (OP-) (n=238)	p
Age (Years)	62.1 ± 7.4	59.5 ±8.0	0.002
Body Mass Index (BMI) (kg/m²)	28.3 ±4.6	30.4 ±4.8	<0.001
Waist Circumference (cm)	93.1 ±11.5	96.0 ±11.4	0.300
Hip Circumference (cm)	108.4 ±10.3	112.7 ±10.8	0.030
Abdominal Fat Thickness (mm)	40.0 ±13.8	42.9 ±13.5	0.020
Abdominal Muscle Thickness (mm)	6.9 ±1.8	7.2 ±2.0	0.090
Thigh Muscle Thickness (mm)	32.3 ±6.1	33.6 ±6.0	0.020
Handgrip Strength (kg)	21.5 ±4.9	22.0 ±5.1	0.930
Chair Stand Test (seconds)	10.3 ±2.4	10.1 ±2.1	0.080
6-Minute Walk Test (m/sec)	1.03 ±0.1	1.04 ±0.1	0.940

P1206

PREVALENCE OF SARCOPENIA IN RURAL COMMUNITY-DWELLING MEXICAN OLDER ADULTS

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Introduction: Sarcopenia, defined as the loss of muscle mass, strength, and function, is a global health issue with significant implications for older adults.

Material and Methods: A cross-sectional study involving 306 participants aged 60 and above was conducted in Xochitepec, Morelos, Mexico. The survey included: demographics, chronic diseases, quality of life, nutritional status, mental status, dependence in activities of daily living, disability, physical measurements, health behaviors. Sarcopenia was defined using the SARC-F questionnaire. The instrument includes 5 components: Strength, Assistance in walking, Rising from a chair, Climbing stairs, and Falls.

Results: The median age of the participants was 62.6 years (SD 18.2), and 206 (67.3%) were women. Sarcopenia was identified in 79 individuals (25.8%), while 227 (74.2%) did not present this condition. The prevalence of sarcopenia was significantly higher in women (29.6%) compared to men (18%) (p < 0.05). Older age, female sex, and potential interactions with other geriatric syndromes, such as frailty and disability, were observed in those with sarcopenia.

Conclusion: These results align with prevalence rates reported in similar studies across Asia, Europe, and North America, these findings underscore the importance of early prevention strategies, can and should be addressed prior to the sixth decade of life.

P1207

DETERMINANTS AND CONSEQUENCES OF FALLS IN AN ADULT POPULATION: INSIGHTS FROM THE PROSPECTIVE FOLLOW-UP OF THE PARTICIPANTS IN THE IRANIAN MULTICENTER OSTEOPOROSIS STUDY (IMOS), 2021-2022

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Objective: Using data from a population-based cohort of Iranian adults aged ≥50 years, this study aimed to assess fall occurrence, identify associated risk factors, and evaluate fear of falling post-fall.
Material and Methods: In this prospective cohort study, 1,410 adults were followed for one year. Data were collected on fall incidents, including their causes, complications, and subsequent fear of falling. We evaluated associated factors such as demographics, BMI, osteoporosis, dizziness, visual impairment, gait speed, and history of falls. Cox proportional hazards models were employed to identify determinants of falls.
Results: During follow-up, 265 participants (18.7%) experienced at least one fall. Most falls were person-related (54.3%), 32.5% were attributed to extrinsic factors, and 13.2% involved a combination of both. Complications occurred in 75% of fallers, and 57.7% reported fear of falling after the event. Nearly half of falls occurred inside the home. Fallers were more often female (64.1% vs. 35.9%, p = 0.001), had higher BMI (29.0 vs. 28.2 kg/m², p = 0.024), and showed a higher prevalence of osteoporosis (35.6% vs. 28.9%, p = 0.034), dizziness (18.5% vs. 11.6%, p = 0.003), visual impairment (27.9% vs. 18.3%, p < 0.001), and previous fall history compared with non-fallers. Lifetime history of falls was strongly associated with subsequent falls (HR = 2.32; 95% CI: 1.74–3.11; p < 0.001). Low gait speed and dizziness showed borderline significance in multivariable analyses.
Conclusions: This study indicated that Falls affect a substantial portion of adults (nearly one in five) and often lead to complications and post-fall fear. Regular screening for key risk factors may help identify high-risk individuals and guide preventive health policies.

P1208

OSTEOPOROSIS, TRABECULAR BONE SCORE AND ANGINA PECTORIS: EVIDENCE FROM BUSHEHR ELDERLY HEALTH (BEH) PROGRAM

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Objective(s)
To evaluate the association between osteoporosis (overall and site-specific) and trabecular bone score (TBS) with Rose Angina Questionnaire (RAQ)–defined angina pectoris in an elderly population.
Material and Methods
This cross-sectional study included 2,001 community-dwelling adults aged ≥50 years from the Bushehr Elderly Health (BEH) Study. Angina was assessed using the Rose Angina Questionnaire. Lumbar spine, total hip, and femoral neck bone mineral density (BMD) along with TBS were measured by dual-energy X-ray absorptiometry. Osteoporosis was defined according to World Health Organization criteria; a T-score ≤ -2.5 at any of the aforementioned sites. Multivariable logistic regression, adjusted for potential confounders, was used to investigate the associations between osteoporosis and TBS with RAQ-defined angina.

Results
The mean age of participants was 62.1±8.1 years, and 57.1% were women. RAQ positivity was observed in 10.2% of participants, while the overall prevalence of osteoporosis was 27.5%. After multivariable adjustment, RAQ-defined angina was not independently associated with overall osteoporosis.(p=0.932) An inverse association between RAQ positivity and lumbar spine osteoporosis observed in crude analyses was attenuated after adjustment.(p=0.354) Participants diagnosed with angina (RAQ-positive) had a significantly higher mean lumbar spine BMD compared to angina negative participants (p < 0.001); no significant differences were found at the total hip or femoral neck. In sex-stratified multivariable analyses, RAQ positivity was independently associated with higher odds of femoral neck osteoporosis among men (OR=2.17; 95% CI 1.07–4.38; p=0.032), whereas no such association was observed among women. RAQ-defined angina was not associated with TBS across crude, stratified, interaction, or stepwise multivariable models (adjusted OR=0.86; 95% CI 0.61–1.19; p=0.36). Across all analyses, age, sex, BMI, smoking, and SES were the dominant determinants of skeletal outcomes.
Conclusion(s)
RAQ-defined angina was not independently associated with overall osteoporosis or trabecular bone score in this elderly population; nevertheless, a site- and sex-specific significant positive association was observed between femoral neck osteoporosis and angina among men only.
These findings indicate heterogeneity in the relationship between cardiovascular symptoms and bone health, highlight the importance of skeletal site-specific and sex-specific analyses and suggest that RAQ, as a symptom-based cardiovascular instrument, does not adequately capture the complexity of generalized bone loss or compromised bone quality.

P1209

THE OSTEOPOROSIS DIAGNOSIS AND TREATMENT GAPS IN IRANIAN OLDER ADULTS: BUSHEHR ELDERLY HEALTH (BEH) PROGRAM

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Objective Despite the availability of diagnostic and therapeutic facilities for osteoporosis, a significant proportion of older adults remain undiagnosed and untreated. This care gap may stem from various barriers and understanding the underlying reasons for these disparities is crucial for developing targeted interventions. This study aimed to investigate the gaps in osteoporosis diagnosis and treatment among older adults in Iran and to identify the key factors contributing to these gaps. Methods This cross-sectional study analyzed data from two phases of the Bushehr Elderly Health (BEH) Program. Participants were selected using multistage cluster random sampling. The first phase, conducted between 2015 and 2017, included 2,424 residents aged 60 and above. The second phase, from 2018 to 2021, involved 1,721 residents aged 50 and above. Bone mineral density (BMD) was measured using the Dual-energy X-ray absorptiometry method and T-score≤-2.5 in either of the femoral neck, total hip, or spinal sites was defined as osteoporosis. Participants reported whether a doctor had diagnosed them with osteoporosis and if they received treatment. Those diagnosed via bone densitometry but unaware of their condition were considered underdiagnosed. Those diagnosed through BMD tests but not on osteoporosis medication were considered undertreated. Multiple logistic regression was used to identify determinant factors of the underdiagnosis and undertreatment of osteoporosis. Results A total of 4145 elder adults with a mean age of 65.5 (54.40% female) participated in this study. Underdiagnosis and undertreatment in the participants who underwent DXA were estimated at 1050 (73.06% (and 1328 (92.41), respectively. The undertreatment rate was 666 (91.98%), 836(90.96%) and 868 (92.53%) based on the intervention thresholds of FRAX without BMD, MOF-FRAX with BMD and FRAX with TBS for MOF, respectively. A statistically significant association was found between osteoporosis underdiagnosis and variables including male (OR=0.57, P<0.001), age (OR:1.05, P<0.001), asset in quartile 4 (OR=0.79, P=0.028), and years of education (OR:0.96, P<0.001). Male sex (OR:0.37, P<0.001), age (OR:1.07, P<0.001), years of education (OR:0.95, P<0.001), marital status (OR:0.78, P:0.013), and being disable in IADL (OR:1.28, P:0.003) were significantly associated with undertreatment. Conclusion This study highlights significant gaps in the diagnosis and treatment of osteoporosis among participants, with significant disparities linked to demographic and socioeconomic factors. Further research is needed to investigate the causes and extensive interventions at the population level should be taken to fill the gap and raise awareness on osteoporosis as a growing public health concern and provide access to the treatment of the disease. Key words: osteoporosis, diagnosis, treatment, care gap, older adults, Iran

P1210

OSTEOPOROSIS DIAGNOSIS AND TREATMENT GAP IN THE EASTERN MEDITERRANEAN REGION (EMRO): A SYSTEMATIC REVIEW AND META-ANALYSIS

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Objective: Osteoporosis is highly prevalent in the EMRO region. Fractures contribute to hospitalization, disability, and mortality, driving substantial costs for patients and health systems. Early diagnosis and timely treatment are critical to prevent these adverse outcomes. This study synthesizes EMRO-region evidence to estimate the prevalence of underdiagnosis and undertreatment rate of osteoporosis.

Material and Method: A comprehensive search of PubMed, Scopus, and Web of Science was conducted through January 2025 to identify relevant studies from EMRO. Eligible study designs included observational studies and randomized controlled trials that addressed diagnosis or treatment gaps in osteoporosis care. Data were extracted by a single reviewer using a pre-piloted form, capturing study characteristics and outcomes. Methodological quality was appraised with the Newcastle–Ottawa Scale (NOS). A meta-analysis estimating underdiagnosis and undertreatment rates was performed using metaprop in Stata 17.0 under a random-effects model, with meta-regression to explore heterogeneity sources. Publication bias was evaluated with funnel plots and tests for asymmetry (Egger's and Begg's), with a two-sided p-value < 0.05 considered significant; results were presented with 95% prediction intervals.

Results: This meta-analysis identified 89 articles, of which 7 studies (2019–2025) from Iran, Saudi Arabia, Egypt, and Kuwait met criteria for analysis. Study quality (NOS) was generally good for sample selection and outcome assessment, though comparability was suboptimal in several studies. Substantial between-study heterogeneity was observed ($p < 0.001$; $I^2 = 99.6\%$). Meta-regression identified age, sex, year of sampling, and study design as significant predictors of heterogeneity in underdiagnosis ($p < 0.05$). mPooled estimates showed an underdiagnosis rate of 53% (95% CI, 28%–80%; $p < 0.001$) and an undertreatment rate of 75% (95% CI, 65%–86%; $p < 0.001$). Assessments for publication bias found no evidence of bias (Begg's: underdiagnosis $p = 0.2673$, undertreatment $p = 0.4694$; Egger's: underdiagnosis $p = 0.9950$, undertreatment $p = 0.8567$).

Conclusion: Our findings indicate a significant gap in osteoporosis care across EMRO countries. Policy-level actions are essential to embed osteoporosis care into national health strategies and to identify and target high-risk populations.

P1211

INVESTIGATING THE RELATIONSHIP BETWEEN SARCOPENIA AND ANGINA PECTORIS: EVIDENCE FROM BUSHEHR ELDERLY HEALTH (BEH) PROGRAM

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Objective(s): This study was conducted to examine the association between sarcopenia and its components with angina pectoris in an elderly Iranian population.

Material and Methods: This descriptive-analytical cross-sectional study included 1088 adults aged≥60 years from the Bushehr Elderly Health (BEH) program. Using European working group on sarcopenia in older people (EWGSOP-2) criteria, sarcopenia was defined by low skeletal muscle index (SMI) plus either reduced muscle strength (hand grip) or slowed gait speed. Low SMI cut-offs were 7.0 kg/m² for men and 5.4 kg/m² for women. Low muscle strength was defined as hand grip <26 kg in men and <18 kg in women. A low physical performance threshold was gait speed <0.8 m/s for both sexes, based on Iranian cut-off points. SMI was measured using dual-energy X-ray absorptiometry (DXA). Muscle strength and gait speed were measured using digital dynamometer and chronometer respectively. Angina was assessed using the Rose angina questionnaire (RAQ). All analyses were conducted using Stata statistical software (Release 14; StataCorp LP). A p-value of less than 0.05 was considered significant.

Results: 1088 participants with a mean age of 68.07 ± 5.93 years and a male-to-female ratio of 0.81:1 were included. Angina was observed in 12.2% of participants. Total prevalence of sarcopenia was 20.37%. Crude analyses revealed that RAQ positivity was not associated with overall sarcopenia or low SMI but was more frequent among participants with low gait speed (13.97% of participants with low gait speed vs 9.11% of

those not in the low gait speed group) (p=0.015).
Furthermore, sex-stratified analyses demonstrated consistent female-specific functional associations. In multivariable models adjusted for age, body mass index (BMI), hypertension, diabetes, physical activity, protein intake adequacy, and adiposity measures, RAQ positivity remained independently associated with low gait speed (OR: 2.04, 95% CI: [1.06-3.92]; p=0.032) and low hand grip strength (OR: 1.70, 95% CI: [1.02-2.85]; p=0.043) among women only. RAQ was not independently associated with SMI or overall sarcopenia.
Conclusion(s): The study found that RAQ positivity is independently linked to low gait speed and reduced hand grip strength in women, with no association with SMI or overall sarcopenia. These sex-specific functional associations highlight a need for targeted attention to RAQ-positive women to mitigate functional decline.

P1212

ASSOCIATION BETWEEN BREASTFEEDING DURATION AND BONE MINERAL DENSITY AND OSTEOPOROSIS IN IRANIAN POSTMENOPAUSAL WOMEN: RESULTS FROM THE IRANIAN MULTICENTER OSTEOPOROSIS STUDY (IMOS)

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Objective. The long-term relationship between breastfeeding and postmenopausal bone health remains uncertain. This study examined the association between breastfeeding duration and bone mineral density (BMD), as well as osteoporosis, among Iranian postmenopausal women using data from the Iranian Multicenter Osteoporosis Study (IMOS).
Methods. This cross-sectional analysis included women aged ≥50 years recruited between January 2021 and December 2022. BMD at the lumbar spine (LS), total hip (TH), and femoral neck (FN) was measured using dual-energy X-ray absorptiometry (DEXA). Osteoporosis was defined as a T-score ≤−2.5. Participants were categorized according to cumulative breastfeeding duration into ≥5 years (study group) and <5 years (control group). Univariable and multivariable logistic regression models (backward stepwise model) were used to assess associations between breastfeeding duration and BMD as well as osteoporosis, adjusting for relevant confounders.
Results. A total of 781 postmenopausal women (mean age 61.8 ± 7.7 years) were included; 381 had breastfed for ≥5 years and 400 for <5 years. BMD at the LS, TH, and FN was significantly lower among women with prolonged breastfeeding. Osteoporosis was more prevalent in the prolonged breastfeeding group compared with controls (44.5% vs 29.5%, p<0.001). In univariable analysis, breastfeeding duration ≥5 years was associated with higher odds of osteoporosis (OR 2.41, 95% CI 1.73–3.37). After adjustment for age, time since menopause, vitamin D status, kidney function, BMI, calcium intake, physical activity, and socioeconomic status, this association remained significant (adjusted OR 1.88, 95% CI 1.26–2.80).
Conclusion. In this national cohort of Iranian postmenopausal women, longer breastfeeding duration was associated with lower BMD at the lumbar spine, total hip, and femoral neck, as well as higher odds of osteoporosis. These findings underscore the importance of incorporating reproductive history into osteoporosis risk assessment. Prospective studies are warranted to further clarify these associations.

P1213

FREQUENCY AND SEVERITY OF RADIOGRAPHIC COXITIS IN PATIENTS WITH AXIAL SPONDYLOARTHRITIS: COMPARATIVE ANALYSIS OF ANKYLOSING SPONDYLITIS AND AXIAL PSORIATIC ARTHRITIS

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Objective: Hip involvement (coxitis) is a common and disabling manifestation of spondyloarthritis (SpA). In ankylosing spondylitis (AS), radiographic coxitis is reported in up to 40% of cases. However, robust epidemiological data on its frequency in patients with axial psoriatic arthritis (axPsA) are scarce. This study aimed to assess and compare the prevalence, radiographic severity, and associated clinical features of coxitis in patients with AS and axPsA.
Material and Methods: We conducted a cross-sectional study of 222 patients with axial SpA.
Group 1 (AS): 108 patients meeting the modified New York criteria (1984) for AS or the ASAS classification criteria for axial SpA (2009).
Group 2 (axPsA): 114 patients satisfying the CASPAR criteria for PsA with confirmed axial involvement (radiography/MRI).
The mean age at disease onset was 26.3±20.3 years; 54% were HLA-B27 positive. Radiographic coxitis was assessed using the BASRI-hip index. Disease activity was evaluated by BASDAI and ASDAS-CRP, functional status by BASFI. Statistical analysis was performed using Mann-Whitney U and Chi-square tests (p<0.05 significant).
Results: Radiographic coxitis was detected in 52 of 222 patients (overall prevalence 23.4%): in 22/108 (20.4%) AS patients and in 30/114 (26.3%) axPsA patients.
Comparative analysis of these 52 patients revealed significant intergroup differences. Patients with axPsA and coxitis were older than AS patients (45.0 ± 10.3 vs. 32.0 ± 8.1 years, p<0.05), had a higher prevalence of BMI >25 kg/m² (73.3% vs. 36.4%, p<0.05), and a more even gender distribution (50.0% vs. 81.8% males, p<0.05).
Disease activity was significantly higher in the axPsA group, as measured by BASDAI (6.1 ± 2.0 vs. 4.5 ± 1.8, p<0.05) and ASDAS-CRP (3.2 ± 0.9 vs. 2.1 ± 0.7, p<0.05). Functional impairment (BASFI) was also more severe in axPsA (5.2 ± 2.4 vs. 3.8 ± 2.1, p<0.05). No significant differences were found in acute-phase reactants (CRP, ESR) or the prevalence of peripheral

arthritis between the groups (p>0.05).
Conclusions: In our cohort, radiographic coxitis was present in about a quarter of patients with axial SpA, being more frequent in axPsA (26.3%) than in AS (20.4%). These rates exceed previously reported averages, likely reflecting a referral bias towards more severe cases in a tertiary center. Coxitis in axPsA is associated with a distinct phenotype (older age, higher BMI, balanced gender ratio), significantly higher disease activity, and greater functional disability compared to AS. These findings underscore the clinical importance of systematic hip assessment in axPsA.

P1214

FREQUENCY AND SEVERITY OF RADIOGRAPHIC COXITIS IN PATIENTS WITH AXIAL SPONDYLOARTHRITIS: COMPARATIVE ANALYSIS OF ANKYLOSING SPONDYLITIS AND AXIAL PSORIATIC ARTHRITIS

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Objective: Hip involvement (coxitis) is a common and disabling manifestation of spondyloarthritis (SpA). In ankylosing spondylitis (AS), radiographic coxitis is reported in up to 40% of cases. However, robust epidemiological data on its frequency in patients with axial psoriatic arthritis (axPsA) are scarce. This study aimed to assess and compare the prevalence, radiographic severity, and associated clinical features of coxitis in patients with AS and axPsA.
Material and Methods: We conducted a cross-sectional study of 222 patients with axial SpA from a tertiary rheumatology center. The study was approved by the local Ethics Committee.
Group 1 (AS): 108 patients meeting the modified New York criteria (1984) for AS or the ASAS classification criteria for axial SpA (2009).
Group 2 (axPsA): 114 patients satisfying the CASPAR criteria for PsA with confirmed axial involvement (radiography/MRI).
The mean age at disease onset was 26.3±20.3 years; 54% were HLA-B27 positive. Radiographic coxitis was assessed using the BASRI-hip index. Disease activity was evaluated by BASDAI and ASDAS-CRP, functional status by BASFI. Statistical analysis was performed using Mann-Whitney U and Chi-square tests (p<0.05 significant).
Results: Radiographic coxitis was detected in 52 of 222 patients (overall prevalence 23.4%): in 22/108 (20.4%) AS patients and in 30/114 (26.3%) axPsA patients.
Comparative analysis of these 52 patients revealed significant intergroup differences. Patients with axPsA and coxitis were older than AS patients (45.0 ± 10.3 vs. 32.0 ± 8.1 years, p<0.05), had a higher prevalence of BMI >25 kg/m² (73.3% vs. 36.4%, p<0.05), and a more even gender distribution (50.0% vs. 81.8% males, p<0.05).
Disease activity was significantly higher in the axPsA group, as measured by BASDAI (6.1 ± 2.0 vs. 4.5 ± 1.8, p<0.05) and ASDAS-CRP (3.2 ± 0.9 vs. 2.1 ± 0.7, p<0.05). Functional impairment (BASFI) was also more severe in axPsA (5.2 ± 2.4 vs. 3.8 ± 2.1, p<0.05). No significant differences were found in acute-phase reactants (CRP, ESR) or the prevalence of peripheral arthritis between the groups (p>0.05).
Conclusions: In our cohort, radiographic coxitis was present in about a quarter of patients with axial SpA, being more frequent in axPsA (26.3%) than in AS (20.4%). These rates exceed previously reported averages, likely reflecting a referral bias towards more severe cases in a tertiary center. Coxitis in axPsA is associated with a distinct phenotype (older age, higher BMI, balanced gender ratio), significantly higher disease activity, and greater functional disability compared to AS. These findings underscore the clinical importance of systematic hip assessment in axPsA.

P1215

NUTRITIONAL STATUS IN GERIATRIC PATIENTS WITH AND WITHOUT OSTEOPOROSIS: A COMPARATIVE STUDY

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Objective: This study aimed to compare the nutritional status of geriatric patients with and without osteoporosis using GNRI, CONUT, MNA scores, and laboratory parameters.
Material/Methods: A cross-sectional study was conducted including 120 geriatric outpatients (60 with osteoporosis and 60 without). Patients with active infection, malignancy, or advanced dementia were excluded; demographic and clinical characteristics, laboratory parameters, and nutritional status assessed by GNRI, CONUT and MNA were evaluated.
Results: Female sex was significantly more frequent in the osteoporosis group compared to non-osteoporotic patients, whereas mean age, number of comorbidities, and history of falls did not differ between groups. The number of medications was significantly higher in osteoporotic patients. Serum folate, vitamin B12, and vitamin D levels were significantly higher in the osteoporosis group, while other parameters showed no significant differences. In the osteoporosis group, the majority of patients were receiving antiresorptive therapy (96.7%). Anabolic therapy was administered in 3.3% of the patients, and antiresorptive treatment modification was implemented in 16.7%. A history of fragility fracture was present in 26.7% of osteoporotic patients. GNRI, CONUT, MNA scores and their categorical classifications did not differ significantly between groups; however, osteoporotic patients tended to have lower MNA scores and a higher risk of malnutrition. Within the osteoporosis group, CONUT scores ≥2were observed in 16.7% of patients, GNRI values ≤98 in 11.7%, and 35.0% were classified as being at risk of malnutrition or malnourished according to the total MNA score. In multivariable logistic regression analyses, female sex remained the strongest independent predictor of osteoporosis across all models, while only MNA showed an independent association when nutritional scores were evaluated simultaneously.
Conclusions: In this population, nutritional status assessed by GNRI, CONUT, and MNA did not differ significantly between patients with and without osteoporosis; however MNA demonstrated a relatively stronger and independent association with osteoporosis, while female sex remained the most consistent determinant.
Disclosures: The authors declare no conflicts of interest.

P1217

HISTOMORPHOMETRIC INDICATORS OF TIBIA IN INFANTILE RATS DURING 90-DAY CAFFEINE OVERCONSUMPTION AND CORRECTION WITH MEXIDOL

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Objective of the study is to investigate changes in the structure of the proximal epiphyseal cartilage (PEC) of tibiae in infantile male rats during 90-day excessive caffeine administration and correction with Mexidol.
Material and methods. The experiment was conducted on 72 male rats weighing 70-75 g. Intact animals were in group 1 (K-90). In group 2 (C-90), animals received caffeine intragastrically at a dose of 120 mg/kg/day. In group 3 (CM-90) animals received caffeine in the same manner as animals from the second group and additionally subcutaneously injected Mexidol at a dose of 50 mg/kg/day. The histomorphometric study was performed on a morphometric complex.
Results. The C-90 group showed 8.37%, 9.63% and 9.09% narrowing of the PEC, width of the proliferating cartilage and tibial osteogenesis zone when compared to group K-90 at 90 days. The width of the indifferent, definitive cartilage zone decreased by 8.39%, and 7.18%, and the width of the destruction zone decreased by 7.36%. Also, the specific number of primary spongiosa and osteoblasts decreased by 8.50% and 10.66% in the osteogenesis zone. Total PEC width and osteogenesis zone width increased by 6.55% and 7.91% at 90 days of experiment in CM-90 group when compared with C-90. The width of the zone of indifferent, proliferating and definitive cartilage was increased by 7.11%, 7.55% and 5.53% and the width of the zone of destruction by 4.89%. In the osteogenesis zone, the proportion of primary spongiosa and the number of osteoblasts were increased by 7.51% and 9.79%.
Conclusion. In infantile male rats, excessive caffeine administration depressed bone-forming function of the PEC of tibiae. When Mexidol was administered, the detected changes were restored.

P1218

BONE MINERAL DENSITY, VITAMIN D STATUS, AND BONE TURNOVER MARKERS IN WAR VETERANS AFTER LOWER LIMB AMPUTATION

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Objective: The study aimed to evaluate bone mineral density (BMD), vitamin D status, and bone turnover markers in war male veterans with unilateral lower limb amputation caused by mine-blast injuries.
Methods: This study included 64 men aged 20–54 years, divided into two groups: 32 healthy controls and 32 patients with transfemoral (TF) or transtibial (TT) amputations. The median post-amputation period (PAP) was 5.0 [4.0–7.0] months. BMD was measured by dual-energy X-ray absorptiometry (Hologic). Laboratory assessments included calcium–phosphorus metabolism parameters, bone turnover markers, and the serum 25-hydroxyvitamin D (25(OH)D) level.
Results: BMD at the hip and femoral neck on the amputated side was significantly lower than in controls (hip: 0.78±0.22 vs. 1.00±0.20 g/cm², p=0.0002, respectively), whereas no significant differences were observed between the contralateral limb and controls. Low BMD (Z-score ≤ −2 SD) on the amputated side was confirmed in 39–42% of patients. Bone loss in the amputated limb increased with longer PAP and was more pronounced in TF than in TT amputations. Vitamin D deficiency or insufficiency was present in 81% of amputees. Serum P1NP levels were higher in amputees than in controls, and β-CTX levels were significantly elevated only in the TF amputations group.
Conclusions: War veterans with traumatic unilateral lower limb amputations exhibit significantly reduced BMD in the amputated limb, while the contralateral limb remains comparable to controls. Bone loss is greater after TF than TT amputations and progresses with time since amputation. The high prevalence of vitamin D deficiency or insufficiency, along with elevated bone turnover markers, underscores the importance of bone health assessment and management in rehabilitation programs for this population.
Disclosures: The authors declared no competing interests.

P1219

BONE MINERAL DENSITY AND DXA-BASED 3D ANALYSIS OF THE HIP CORTICAL AND TRABECULAR BONE IN POSTMENOPAUSAL WOMEN WITH OSTEOSARCOPENIA

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Objective: The study aimed to assess the bone mineral density (BMD), Trabecular Bone Score (TBS), and DXA-derived 3D hip cortical and trabecular bone indices in postmenopausal women with osteosarcopenia (OSP).
Methods: In a case-control study, 60 postmenopausal women aged 60-89 years were examined and divided into two groups: the first group consisted of 30 females with OSP, and the second group consisted of 30 patients with osteoporosis (OP). OSP was defined as a combination of sarcopenia (SP, confirmed by EWGSOP2 criteria) and OP (BMD T-score < -2.5 SD, confirmed by dual-energy X-ray absorptiometry [DXA]). Anthropometric measurements were performed using standard clinical methods. Muscle strength was determined using hand dynamometry and the "sit-to-stand" test. BMD of the lumbar spine (LS), total hip (TH), and femoral neck (FN), appendicular lean mass, TBS, and 3D hip cortical and trabecular bone indices were evaluated by DXA (Hologic). The 3D-Shaper Research software (v2.14, 3D-Shaper Medical, Barcelona, Spain) was used to derive 3D analysis from hip DXA scans.
Results. Women did not differ in age and menopausal status. However, subjects with OSP had significantly lower height, body mass, and body mass index (BMI) than the OP group (p<0.05 for all indices). Additionally, their BMD indices were lower than in subjects with OP (p<0.001 for all indices), but TBS did not differ between groups. Women with OSP have significantly lower total cortical sBMD index than women with OP (124.48±15.87 vs. 133.94±14.41 mg/cm2, p<0.05), whereas no significant difference was observed in total trabecular vBMD, suggesting that BMD in patients with OSP is mainly driven by the cortical compartment.

Conclusion. To our knowledge, this is the first study to assess DXA-derived 3D hip parameters in postmenopausal women with OSP. Analysis of large cohorts using DXA-derived 3D measurements could confirm our results and establish the negative impact of SP on bone density and microarchitecture in patients with OP.
Disclosures: The authors declared no competing interests.

P1220

PARADOXICAL INCREASES IN BONE RESORPTION AFTER ROMOSOZUMAB IN BARIATRIC SURGERY PATIENTS

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Objective: Bariatric surgery is associated with accelerated bone remodeling and increased fracture risk. Romosozumab (RMZ), a monoclonal antibody against sclerostin, typically induces a marked increase in bone formation markers and suppression of bone resorption in postmenopausal osteoporosis. However, its bone biochemical effects in post-bariatric patients remain unknown. The objective was to describe bone mineral density (BMD) and bone turnover marker responses to RMZ in patients with osteoporosis after Roux-en-Y gastric bypass (RYGB).
Methods: We report a case series of six patients (4 women, 2 men; age range 39–77 years) with prior RYGB and densitometric osteoporosis treated with RMZ. Serial measurements of BMD and bone turnover markers (CTX and P1NP) were analyzed. Data were analyzed descriptively (mean ± SD) and Spearman correlation was used to assess associations between early marker changes and BMD response. Due to the small sample size and non-normal distribution, nonparametric methods were used and no inferential hypothesis testing was performed.
Results: Baseline CTX levels were elevated, with a mean of 487.5 ± 210.2 pg/mL. After romosozumab initiation, a paradoxical increase in bone resorption was observed, with mean CTX values of 947.7 ± 829.1 pg/mL at 1 month and 1,721.7 ± 1,552.6 pg/mL at 3 months. When early post-treatment values (1–3 months) were combined, mean CTX was 1,334.7 ± 1,191.2 pg/mL. P1NP increased consistently in all patients during the first three months (mean increase +115.5%). Spearman correlation between early P1NP increase and final lumbar spine BMD gain (12 months) was moderate, although statistical significance was not achieved ($r = 0.400$, $p = 0.600$). At the total hip, no significant correlations were observed between changes in P1NP ($r = -0.300$, $p = 0.624$) or CTX ($r = 0.738$, $p = 0.262$) and densitometric response. Early changes in CTX showed a strong positive correlation with lumbar spine BMD gain ($r = 0.949$, $p = 0.051$), suggesting that, in this cohort, greater early increases in CTX were paradoxically associated with a more robust anabolic response.
Conclusions: In post-bariatric patients, RMZ induces significant gains in BMD despite an atypical biochemical response characterized by persistent elevation of bone resorption markers. These findings suggest that conventional bone turnover markers may not reliably reflect anabolic response in this population. Prospective studies are needed to clarify bone remodeling dynamics and optimize monitoring strategies in patients with osteoporosis after bariatric surgery.

P1221

BRIDGING THE "KNOWLEDGE GAP" IN OSTEOPOROSIS: THE CRUCIAL ROLE OF OSTEOPOROSIS MANAGERS IN ENHANCING PATIENT ADHERENCE AT A PRIMARY CARE CLINIC

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. Introduction

• **The Global Challenge:** One-year drop-out rates for osteoporosis medication reach ~50%.

• **The "Liaison Gap":** Despite ICT systems (e.g., "VitalLink"), treatment often stops when patients transition to primary care.

• **Objective:** To identify barriers to treatment persistence and evaluate the impact of Osteoporosis Manager (OM) interventions.

1. **Methods**

• **Analysis:** Retrospective study of 80 patients at Oda Orthopedic Rheumatology Clinic.

• **Key Metrics:** * Comparison of Lumbar BMD change rates across treatment groups.

• Patient knowledge survey using the McNemar test.

• Patient satisfaction via Net Promoter Score® (NPS®).

1. **Results (Main Data)**

2. **The "Knowledge Doughnut" Phenomenon**

Knowledge Category	Awareness Rate (%)
Disease Name Recognition	**85.0%**
Dietary Knowledge (Calcium)	76.3%
Necessity of Testing	**55.0%***
($p < 0.001$ compared to Disease Recognition)	

• **Insight:** Patients "know" the disease name but lack "core" understanding of diagnosis and long-term risk.

1. **BMD Change Rates (Average %)**

• **Romosozumab:** +22.56%

• **Teriparatide (PTH):** +18.06%

• **Denosumab:** +9.77%

• Untreated/Vit.D only: -1.55%

(Significant gains observed with anabolic agents)

1. **Patient Satisfaction**

• **NPS® Score: 82.5%**

• **OM Guidance:** 85% of patients desired continued support from an OM.

1. **Discussion**

• **Barriers in the 50s-60s:** High dropout rates due to work-life balance and the misconception that "healing of a fracture" equals "cure of osteoporosis."

• **Role of OM:** Bridging the gap by shifting the focus from "doctor's orders" to "patient's personal health priority."

• **Multidisciplinary Collaboration:** Collaboration with dentists is crucial for total patient care (e.g., prevention of ONJ).

1. **Conclusion**

To prevent secondary fractures, we must foster a **"Community Culture of Support."** The personalized approach of Osteoporosis Managers is essential for bridging the "Knowledge Gap" and ensuring long-term treatment success in primary care.

P1222

CHARACTERISTICS AND CIRCUMSTANCES LEADING TO FRAGILITY FRACTURES – A MULTICENTER CROSS-SECTIONAL STUDY FROM INDIA

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Objective
Several factors beyond osteoporosis may lead to the development of a fragility fracture. Identification of these region-specific circumstances may help develop policies and practices that reduce fracture risk in high-risk individuals, in addition to treating underlying osteoporosis. This study describes where, when, and how fractures occurred in Indian adults across different centers.
Material and Methods
This study characterized the types and circumstances of fractures among individuals recruited from 10 centers in India. Details of fracture characteristics and circumstances were recorded by the treating endocrinologist using a standardized questionnaire. Medical and lifestyle history, including self-reported physical activity, was also obtained. The study was approved by a central ethics committee, and informed consent was taken from each individual.
Results
214 adults with a median age of 67.4 years and a recent history of fragility fracture were included. Hip fractures were the most commonly reported fragility fractures in this population. Most fractures occurred following a fall (74.9%), at home (54%), in the evening/nighttime (57%), and during the winter season(63%). Although 15% were known to have osteoporosis and only 11% were on anti-osteoporotic agents, about a third were on calcium and vitamin D supplementation. Descriptive analyses revealed usage of long traditional clothes, poor choice of footwear, dim lighting, walking in haste, lack of rails and physical support systems, were the key circumstances cited as a reason for sustaining a fragility fracture
Conclusion
Falls are a leading cause of fractures among Indian adults. Guidelines to prevent fractures need to include population-specific strategies to reduce the risk of falls and subsequent fragility fractures during activities of daily living.

P1223

PREVALENCE AND DETERMINANTS OF SARCOPENIA IN GYNAECOLOGICAL MALIGNANCY SURVIVORS FROM A TERTIARY CARE CENTRE IN SOUTH INDIA- A CROSS-SECTIONAL STUDY

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Objective Gynecological malignancies are among the most common neoplasms affecting women, and the co-presence of osteoporosis and sarcopenia in them has been shown to have a lower progression-free survival and poor quality of life. The aim of the study was to investigate the prevalence of sarcopenia in patients with gynecological cancer in accordance with the current diagnostic criteria of sarcopenia.
Methods A series of patients with gynecological cancer who came for follow-up after surgery were recruited in this study. Eligible patients underwent dual-energy X-ray absorptiometry and a handgrip strength test, and a gait speed evaluation. Furthermore, we also evaluated metabolic parameters and their relation to sarcopenia in this cohort.
Results 50 Individuals with different gynecological malignancies were recruited. The mean (SD) age was 41.9 (6.1) years. 22% had osteoporosis at any DXA site (neck, hip, lumbar spine/LS, forearm).
The frequencies of patients with low skeletal muscle mass index, low hand grip strength, and low gate speed were 24%, 14%, and 14%, respectively. Sarcopenia was identified in 12% of individuals. Furthermore, sarcopenia was more prevalent among older individuals (≥55 years), those with a lower BMI level (<23 kg/m2), lower physical activity, or those with diabetes mellitus.
Discussion Our study is the first prevalence study using DXA analysis in Indian patients with gynecological cancers. Sarcopenia was detected to be notably prevalent in 12% of individuals. Given the likely negative outcomes of sarcopenia reported in the literature (treatment failure, increased complications, and impaired survival), it is important to know the presence of sarcopenia in these individuals. such that appropriate measures can be initiated,

P1224

A NEW DIGITAL THORACIC KYPHOSIS–BASED APPROACH FOR VERTEBRAL FRACTURE ASSESSMENT (VFA) IN WOMEN WITH OSTEOPOROSIS

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Objective:
Thoracic kyphosis is an important feature of osteoporosis and can be assessed using vertebral fracture assessment (VFA) imaging, typically via standard radiography or lateral Dual-Energy X-ray Absorptiometry (DEXA) scans. VFA is recommended for individuals with a T-score below −1.0 SD and at least one risk factor (age ≥70 years for women or ≥80 years for men, height loss >4 cm, self-reported vertebral fracture or prolonged glucocorticoid therapy). This study aimed to develop and validate an automated method for measuring thoracic kyphosis using a You Only Look Once (YOLO) deep learning model applied to lateral DEXA images.
Material and Methods:
A total of 116 women with a T-score < −1.0 SD and at least one additional risk factor (age ≥70 years, height loss >4 cm, self-reported vertebral fracture or long-term glucocorticoid therapy) were included to develop an automated thoracic kyphosis measurement method using a YOLO deep learning model on lateral scans. The YOLO–based artificial intelligence model automatically identified thoracic vertebrae on morphometric images. The kyphosis angle was calculated using a circular fitting method between the centroids of thoracic vertebrae 4 to 12. Lumbar spine bone mineral density and T-scores were recorded.
Results:
The mean age was 54.3 ± 10.7 years and mean body mass index (BMI) was 27.1 ± 4.5 kg/m². Mean lumbar T-score was −1.5 ± 0.9 SD. Among the participants, 70% had osteopenia and 30% had osteoporosis. The AI-derived mean kyphosis angle was 46.2° ± 8.0°, showing strong agreement with manual Cobb measurements (Pearson r = 0.89, p < 0.001; MSE = 3.8°). Clinically relevant kyphosis (≥40°) was detected with 0.90 sensitivity and 0.92 specificity. Over two years, 7% of patients exhibited kyphosis progression ≥5°, often accompanied by a parallel decline in T-scores, indicating coupled deterioration of spinal alignment and bone density.
Conclusion:
Thoracic kyphosis can be readily assessed using VFA imaging. The YOLO-based approach reliably measures thoracic kyphosis on DEXA VFA scans and correlates strongly with manual Cobb angles. This method enables efficient evaluation of kyphosis progression over time and holds potential as a practical digital biomarker for osteoporosis monitoring and management.

P1225

SKELETAL STEM AND PROGENITOR SPECIFIC DELETION OF BASIGIN AUGMENTS BONE MASS AND RESCUES STEROID-INDUCED OSTEOPOROSIS

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Glucocorticoids (GCs) are widely used to treat autoimmune diseases but come at the expense of noticeable side effects, in particular significant deterioration of skeletal health. GC supplementation has been linked to muscle wasting, reduced mineral bone density, and increased bone-marrow adipose tissue. There is an estimated 30 – 50% of patients receiving GCs that experience osteoporotic fractures. GC-supplemented mouse models have demonstrated impaired bone formation and pathological alterations in bone vasculature. We demonstrated that Basigin, a transmembrane glycoprotein, is markedly upregulated in skeletal stem cells (SSCs) upon GC treatment. We also observed an age-related increase of Basigin in the bone marrow space with a more pronounced phenotype in female mice. In vitro, studies showed that overexpression of Basigin significantly hinders osteogenic differentiation and compromises endothelial cell function. Monoclonal antibody-treatment against Basigin prevented GC-induced osteoporosis (GIOP) and reversed age-related bone loss. Here, we generated an inducible conditional knockout mouse for Basigin in *Col2a1* expressing cells (Col2a1-Cre^{ERT} x Bsg$^{fl/fl}$; Bsg-iKO), targeting the mesenchymal lineage which includes SSCs and progenitors. While young adult mice displayed low baseline levels of Basigin, a significant reduction of Basigin expression could be observed in heterozygous and homozygous Bsg-iKO mice. Both, heterozygous and homozygous Bsg-iKO mice doubled volumetric trabecular bone mass 4 weeks after induction compared to Cre-negative controls as determined by DEXA and microCT measurements. Accordingly, when Basigin expression was removed immediately before administration of methylprednisolone (MP) slow-release pellets, Bsg-iKO mice exhibited resistance to steroid-mediated bone loss after 4 weeks of GC exposure with trabecular bone volume comparable to placebo treated controls. Intriguingly, bone marrow adipogenic progenitor cell populations assessed via FACS and bona marrow fat measured by histology were also significantly diminished in Bsg-iKO mice indicating potential protection from GIOP-associated osteonecrosis. Preliminary studies additionally found that aged mice are significantly more sensitive to GC-induced skeletal changes. Future studies will explore if pharmacological and genetic interventions mitigating high Basigin levels are sufficient to prevent these phenotypes. These findings support Basigin as a promising therapeutic target for counteracting GC- and age-induced skeletal deterioration.

P1226

LIGAND-ENGINEERED M-CSF AND SCLEROSTIN VARIANTS AS BALANCED BONE REMODELING THERAPEUTICS

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Objective: Macrophage colony-stimulating factor (M-CSF)/c-FMS, αvβ3 integrin, and sclerostin–LRP4/5/6 pathways are central regulators of bone remodeling, yet current osteoporosis therapies mainly suppress bone turnover rather than restoring balanced coupling between resorption and formation. In a series of experimental studies, our group engineered and validated ligand-based protein antagonists that selectively modulate these pathways to prevent osteoporotic bone loss while preserving or enhancing bone formation.

Materials and methods : Using structure-guided design and combinatorial yeast display, we converted human M-CSF into a monomeric high-affinity c-FMS antagonist and into bispecific variants ($MCSF_{RGD}$, $MCSF_{RGD}$–HSA) targeting both c-FMS and αvβ3, followed by biophysical characterization, osteoclast/osteoblast assays, pharmacokinetic profiling, and efficacy testing in mouse models of osteoporosis. In parallel, we mapped the sclerostin–LRP4 interface and engineered a competitive LRP4selective mutant (ScIN93AFc) that antagonizes sclerostin-mediated inhibition of Wnt signaling and was evaluated in vivo in developing mice.

Results: Experimentally, monomeric MCSF (MCSFC31S,M27R) retained nanomolar c-FMS binding but failed to dimerize, converted c-FMS signaling into potent antagonism, and dosedependently inhibited osteoclast differentiation in murine bone marrow macrophages and human CD14+ monocytes. Bispecific MCSFRGD variants bound c-FMS and αvβ3 with nanomolar–submicromolar affinity, disrupted osteoclast actin organization, and strongly suppressed differentiation and resorptive function, while HSA fusion markedly prolonged halflife, enhanced bone targeting, and prevented ovariectomyinduced trabecular bone loss without suppressing the bone formation marker PINP compared with alendronate. ScIN93AFc bound LRP4 but not LRP6 with high affinity, relieved sclerostin-mediated inhibition of Wnt3a signaling in osteoblasts, and increased trabecular bone volume, trabecular number, bone formation rate, and femur length while reducing osteoclast surface in vivo.

Conclusion: Collectively, we demonstrate that ligandengineered MCSF and sclerostin variants constitute experimentally validated, highly specific antiresorptive and anabolic biologics that restore balanced bone remodeling and provide modular scaffolds for targeting additional osteoclast and Wnt coreceptor axes in skeletal disease.

P1227

ORAL MANIFESTATIONS AS DIAGNOSTIC INDICATORS OF ADDISON'S DISEASE

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Objective: Addison's disease, or primary adrenocortical insufficiency, is a rare endocrine disorder characterized by the inadequate production of cortisol and aldosterone. While the systemic symptoms - such as fatigue, hypotension, and weight loss - are often non-specific and insidious, oral manifestations frequently serve as the first clinical sign of the disease, providing a critical window for early diagnosis. The most salient oral feature is mucocutaneous hyperpigmentation, presenting as solitary or confluent bluish-brown to black macules and patches, most commonly on the buccal mucosa, gingiva, lips, and lateral borders of the tongue. This pigmentation results from elevated levels of adrenocorticotropic hormone (ACTH) and its precursor pro-opiomelanocortin (POMC), which stimulate melanocytes in basal epithelial layers. This abstract explores the prevalence, pathophysiology, and clinical significance of oral lesions associated with Addison's disease, emphasizing the role of the dental professional in the multidisciplinary management of the condition.

Methods: A review of current clinical literature and case studies was conducted to identify the most common oral presentations and the biochemical pathways leading to their development.

Results:

- Hyperpigmentation: The hallmark oral sign is diffuse or focal hyperpigmentation of the mucous membranes, most commonly affecting the buccal mucosa, gingiva, tongue, and lips.
- Pathophysiology: This occurs due to the loss of negative feedback on the pituitary gland, leading to excess secretion of Adrenocorticotropic Hormone (ACTH) and Melanocyte-Stimulating Hormone (MSH), which share a precursor molecule (POMC).
- Clinical Presentation: These "bronzing" or "smoky" patches often appear prior to systemic crisis and do not disappear with local treatment.
- Secondary Effects: Patients may also present with delayed wound healing or an increased susceptibility to oral infections due to impaired immune response and metabolic imbalances.

Conclusion: Oral hyperpigmentation is a sensitive, though not exclusive, marker for Addison's disease. Because these changes often precede severe systemic failure (Addisonian crisis), dentists and oral health professionals play a vital role beeing uniquely positioned to identify these early signs, facilitating timely referral for endocrine evaluation and potentially preventing life-threatening adrenal crises. Recognition of these signs, followed by prompt referral for endocrine evaluation, is essential for reducing morbidity and mortality. This review underscores

the essential role of the dentist and periodontist as frontline observers in the healthcare system, capable of identifying these systemic sentinel signs. In conclusion, oral manifestations, particularly mucosal hyperpigmentation, serve as valuable diagnostic clues in Addison disease. An awareness of this oral-systemic link is essential for comprehensive patient care, reinforcing the dentist's role within the interdisciplinary diagnostic team.

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P1228

BONY LANDMARKS AND ORAL SIGNS: A REVIEW OF THE ORAL MANIFESTATIONS OF HYPERPARATHYROIDISM

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Objective: Hyperparathyroidism (HPT) is a clinical disorder characterized by the excessive secretion of parathyroid hormone (PTH), leading to significant disruptions in calcium and phosphate homeostasis. While the systemic effects on the renal and skeletal systems are well-documented, the oral cavity often serves as a critical site for the early detection and diagnosis of the disease. This article explores the diverse spectrum of oral manifestations associated with primary, secondary, and tertiary hyperparathyroidism.

Methods: A review of current clinical literature and case studies was conducted to identify the most relevant issues concerning the oral manifestations that can be encountered in hyperparathyroidism .

Results. Key clinical and radiographic findings include:

- The central giant cell granuloma historically termed a "brown tumor": giant cell lesions that appear as expansive, non-neoplastic radiolucencies in the mandible or maxilla, representing the "terminal" stage of HPT-related bone remodeling.
- Loss of Lamina Dura: A classic early radiographic sign characterized by the disappearance of the cortical bone lining the tooth sockets.
- "Ground-Glass" Bone Pattern: A generalized demineralization of the alveolar bone, resulting in a granular, trabecular appearance similar to fibrous dysplasia.
- Dental Abnormalities: Including tooth mobility, drifting, and, in chronic cases, pulp calcifications or root resorption, as well as delayed healing of extraction sockets due to altered bone metabolism.
- Soft Tissue Changes: Vague symptoms such as xerostomia (dry mouth) or paresthesia may also be reported.
- While primary HPT is the most common etiology, secondary HPT related to chronic kidney disease presents a more complex picture, often compounded by renal osteodystrophy and metastatic soft tissue calcifications, which can appear as firm, yellow-white nodules on the tongue or buccal mucosa.

Conclusion: Because these oral markers often precede systemic symptoms, dental professionals play a pivotal role in the multidisciplinary management of HPT. Early recognition of these "silent" skeletal changes through routine dental radiography can facilitate timely biochemical screening and prevent severe systemic complications such as pathological fractures or renal failure.

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P1229

HYPERINSULINEMIA AS A MEDIATOR: THE INFLUENCE OF INSULIN LEVELS ON THE PATHOGENESIS AND PROGRESSION OF PERIODONTITIS

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Objective: Periodontitis is a chronic inflammatory disease characterized by the destruction of the tooth-supporting structures. Emerging evidence suggests a bidirectional relationship between periodontal health and systemic metabolic conditions, with insulin levels—specifically hyperinsulinemia and insulin resistance—serving as a critical mechanistic link. This paper examines the physiological and molecular pathways through which fluctuations in serum insulin levels influence the onset, severity, and progression of periodontal disease.
Pathophysiology: Elevated insulin levels, often associated with Type 2 Diabetes Mellitus and Metabolic Syndrome, promote a systemic pro-inflammatory state. This environment exacerbates the host immune response to dental plaque biofilms. High insulin concentrations are linked to the overproduction of pro-inflammatory cytokines (such as TNF-α IL-6, and IL-1β) and the activation of oxidative stress pathways, which accelerate alveolar bone resorption and collagen degradation.
Clinical Implications: Conversely, periodontitis-induced systemic inflammation can impair insulin signaling, creating a feedback loop that worsens glycemic control.4 Clinical data indicate that patients with hyperinsulinemia exhibit deeper periodontal pockets and greater clinical attachment loss compared to normo-insulinemic individuals.
Conclusion: Insulin levels are a potent modulator of the periodontal inflammatory landscape. Understanding this relationship is vital for integrated medical-dental care, suggesting that managing insulin sensitivity may be a requisite component for successful long-term periodontal therapy.

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P1230

THE STRESS-PERIODONTIUM AXIS: A REVIEW OF THE ASSOCIATION BETWEEN CORTISOL LEVELS AND PERIODONTITIS

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Objective: Periodontitis is a chronic inflammatory disease characterized by the destruction of the tooth-supporting structures. While bacterial biofilm is the primary etiological factor, host response modifiers - specifically psychological stress - have been increasingly implicated in disease progression. Chronic psychological stress activates the hypothalamic-pituitary-adrenal (HPA) axis, leading to sustained elevation of serum and salivary cortisol. This hypercortisolemia exerts potent immunomodulatory effects, including the suppression of neutrophil and lymphocyte function and the upregulation of pro-inflammatory cytokines (e.g., IL-1β, TNF-α, PGE2), which synergistically amplify the local inflammatory response to periodontal biofilm. Furthermore, cortisol can directly influence bone metabolism by altering the RANKL/OPG balance, thereby promoting osteoclastic alveolar bone resorption. This study investigates the correlation between cortisol, a primary glucocorticoid biomarker of the hypothalamic-pituitary-adrenal (HPA) axis, and clinical periodontal parameters. The objective was to evaluate whether elevated levels of cortisol in saliva and serum correlate with the severity of chronic periodontitis and to determine if stress-induced cortisol secretion serves as a reliable systemic indicator of periodontal tissue destruction.
Methods: A cross-sectional analysis was conducted on patients categorized into three groups: healthy periodontium, mild-to-moderate periodontitis, and severe periodontitis. Clinical measurements included Probing Depth (PD), Clinical Attachment Loss (CAL), and Gingival Index (GI). Cortisol levels were measured using Enzyme-Linked Immunosorbent Assay (ELISA) from morning saliva samples collected under standardized conditions to account for diurnal variations.
Results: Data indicated a statistically significant positive correlation between elevated cortisol levels and increased PD and CAL ($p < 0.05$). Patients in the severe periodontitis group exhibited significantly higher mean salivary cortisol concentrations compared to the healthy control

group. These findings suggest that hypercortisolemia may suppress the immune response, leading to increased susceptibility to pathogenic bacteria and impaired wound healing in the periodontium.
Conclusion: The findings support the hypothesis that cortisol is a biological link between psychological stress and periodontal breakdown. Elevated cortisol levels may serve as a potential biochemical marker for identifying individuals at higher risk for aggressive periodontal disease. Cortisol acts as a key biological mediator translating psychosocial stress into a heightened risk for periodontal tissue destruction. Integrating stress management into periodontal therapy may be beneficial for long-term clinical outcomes. This underscores the importance of a holistic, biopsychosocial approach to periodontal management, where stress assessment and coping strategies may be considered adjunctive components of therapy for susceptible patients.
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P1231

THE INFLUENCE OF HYPOTHYROIDISM PHARMACOTHERAPY ON ORAL HEALTH OUTCOMES: A REVIEW OF CLINICAL MANIFESTATIONS AND MANAGEMENT STRATEGIES

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Objective: Hypothyroidism manifests with systemic symptoms that extend significantly into the oral cavity, affecting tissues from the mucosa to the alveolar bone. While the disorder itself poses challenges to oral health, the pharmacological management of hypothyroidism - primarily with thyroid hormone replacement therapy - plays a decisive role in modulating these outcomes. This medication exerts a profound influence on oral health, creating a complex clinical landscape where both the drug itself and the physiological state it targets interact with the oral cavity. Achieving and maintaining a euthyroid state is not merely an endocrinological goal but a foundational prerequisite for optimal oral health. This review examines the impact of thyroid replacement therapy on the oral cavity, distinguishing between the effects of the disease state and the consequences of its treatment.
Methods: This article synthesizes current clinical perspectives on oral manifestations associated with hypothyroidism pharmacotherapy, including salivary gland function, periodontal integrity, and drug-drug interactions relevant to dental practice.
Results : The influence of hypothyroidism medication on oral health is largely dependent on the accuracy of the dosage. Optimal titration is essential; however, iatrogenic fluctuations frequently occur. Supra-therapeutic doses (over-medication) can induce a state of artificial hyperthyroidism, which is linked to accelerated bone turnover, potentially leading to mandibular osteoporosis and increased susceptibility to periodontal bone loss. Conversely, sub-therapeutic levels maintain hypothyroid symptoms such as macroglossia, delayed wound healing, and dysgeusia. Furthermore, Levothyroxine therapy is frequently associated with xerostomia (dry mouth), which significantly elevates the risk of dental caries and oral candidiasis. Clinical management is further complicated by significant drug interactions, particularly with calcium and iron supplements commonly used in dental or nutritional contexts, which can inhibit the absorption of thyroid hormones.
Conclusion: Hypothyroidism pharmacotherapy plays a dual role in oral health, acting as both a restorative agent for oral homeostasis and a potential source of secondary oral complications. Effective clinical outcomes require an interdisciplinary approach between endocrinologists and dental professionals to monitor salivary flow, bone density, and precise medication adherence to mitigate adverse oral effects.
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P1232

THE RELATIONSHIP BETWEEN HYPOTHYROIDISM MEDICATION AND PERIODONTITIS

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Objective: Periodontitis is a chronic inflammatory condition characterized by the destruction of supporting periodontal tissues. Emerging evidence suggests a bidirectional relationship between systemic endocrine disorders and oral health. Hypothyroidism, primarily managed through Levothyroxine (a synthetic form of thyroxine) replacement therapy, has been implicated in altered bone metabolism and immune dysfunction. However, the specific impact of hypothyroidism medication on the prevalence and severity of periodontitis remains a subject of clinical debate. The objective was to evaluate the association between hypothyroidism medication (Levothyroxine) and periodontal health status, including its influence on disease severity, clinical attachment loss (CAL), and pocket probing depth (PPD).
Methods: This review synthesizes findings from recent cross-sectional and case-control studies examining hypothyroid patients on hormone replacement therapy. Clinical parameters such as PPD, CAL, and bleeding on probing (BoP) were compared between medicated hypothyroid subjects and euthyroid controls. Additionally, the effects of medication dosage and duration of therapy on periodontal destruction were analyzed.
Results: Current literature indicates that patients with hypothyroidism, even those undergoing hormone replacement therapy, exhibit a significantly higher prevalence of moderate-to-severe periodontitis compared to healthy controls.
Results. Key findings include:
- Disease Severity: Patients on levothyroxine often present with deeper periodontal pockets and greater clinical attachment loss.
- Dose-Response Relationship: Recent data suggest a significant correlation between higher medication doses, longer duration of therapy, and increased periodontal tissue destruction. This may reflect the severity of the underlying hormonal deficiency or the impact of subclinical hormonal fluctuations on bone remodeling.
- Inflammatory Synergy: Hypothyroidism appears to amplify the systemic inflammatory cascade, which, when combined with microbial plaque, accelerates the breakdown of the periodontium through increased matrix metalloproteinase activity.
Conclusion: The relationship between hypothyroidism medication and periodontitis is fundamentally one of systemic management influencing local inflammatory disease. Hypothyroidism and its pharmacological management are significantly associated with increased periodontitis severity. While hormone replacement therapy is essential for systemic homeostasis, it may not fully mitigate - and in high doses may correlate with - periodontal bone loss. These findings underscore the necessity for interdisciplinary collaboration between endocrinologists and dental professionals. Routine periodontal screening should be integrated into the standard of care for patients receiving hypothyroidism medication to preserve oral and systemic health.

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P1233

AN UNDERRECOGNIZED LINK: A REVIEW OF THE ASSOCIATION BETWEEN PERIODONTAL DISEASES AND HYPOTHYROIDISM

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Objective: Periodontal disease is a chronic inflammatory condition characterized by the destruction of the tooth-supporting tissues. While its primary etiology is microbial, systemic health significantly modulates its progression. Hypothyroidism, an endocrine disorder resulting from a deficiency in thyroid hormones (T_3 and T_4), has been increasingly linked to oral health complications, yet the specific association with periodontitis remains an emerging area of clinical interest. Hypothyroidism induces systemic effects - including metabolic slowdown, microvascular alterations, and impaired fibroblast function - that can compromise the periodontium's health and healing capacity. This paper evaluates the clinical and biological relationship between hypothyroidism and periodontal status, focusing on how thyroid hormone deficiency

influences periodontal tissue destruction and treatment outcomes.
Methods: A review of cross-sectional and case-control studies was conducted to analyze periodontal parameters - including Probing Pocket Depth (PPD), Clinical Attachment Level (CAL), and bone mineral density - in patients with varying degrees of thyroid dysfunction compared to euthyroid controls.
Results. Key Findings
- Increased Disease Severity: Clinical data indicates that patients with hypothyroidism exhibit a higher prevalence of moderate-to-severe periodontitis. Specifically, hypothyroid individuals often present with significantly higher mean PPD and CAL values, even after adjusting for age and oral hygiene.
- Bone Remodeling & Metabolism: Thyroid hormones are essential for bone homeostasis. A deficiency leads to decreased bone turnover and may exacerbate alveolar bone loss by increasing the activity of tartrate-resistant acid phosphatase (TRAP)-positive cells, which are markers of bone resorption.
- Systemic Inflammation & Immune Response: Hypothyroidism is associated with an elevated systemic pro-inflammatory state (increased IL-1β, TNF-α and IL-6) and impaired wound healing. This compromised immune response facilitates the progression of subgingival dysbiosis and limits the tissue's capacity for repair.
- Treatment Correlation: Emerging evidence suggests a correlation between the dose and duration of hormone replacement therapy (levothyroxine) and periodontal health, highlighting the importance of metabolic stability in managing oral disease.
Conclusion: There is a significant positive association between hypothyroidism and the complexity of periodontal diseases. The deficiency in thyroid hormones acts as a systemic modifier that accelerates periodontal destruction. These findings suggest that dentists should consider thyroid screening for patients with recalcitrant periodontitis, while endocrinologists should prioritize periodontal evaluations as part of standard care for hypothyroid patients. Further research is needed to elucidate causal pathways and explore the impact of thyroid hormone replacement therapy on periodontal outcomes.
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P1234

THE SYSTEMIC-INFLAMMATORY NEXUS: A REVIEW OF THE ASSOCIATION BETWEEN PERIODONTAL DISEASES, METABOLIC SYNDROME, AND OBESITY

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Objective: Periodontal disease, a chronic inflammatory condition of the supporting structures of the teeth, has increasingly been recognized as more than a localized oral health issue. Emerging evidence suggests a bidirectional and complex relationship between periodontal health and systemic metabolic disorders, specifically obesity and metabolic syndrome (MetS). This association is primarily driven by systemic inflammation and the dysregulation of metabolic pathways. This paper examines the clinical and biological links between periodontal diseases and the cluster of conditions defining metabolic syndrome, with a specific focus on the role of adipose tissue-derived inflammation in the progression of oral bone loss.
Methods: A comprehensive review of recent epidemiological studies, longitudinal cohorts, and mechanistic research was conducted to evaluate how obesity-induced systemic changes influence the risk and severity of periodontitis, and conversely, how periodontal pathogens contribute to metabolic dysfunction.
Results. Key Findings:
- Systemic Inflammation: Obesity functions as a pro-inflammatory state where adipose tissue, particularly visceral fat, acting as an active endocrine organ, releases excess cytokines (e.g., TNF-α, IL-6) and adipokines. These mediators exacerbate the inflammatory response in the gingival tissues, accelerating periodontal destruction.
- Metabolic Synergy: Individual components of MetS - including hyperglycemia, dyslipidemia, and hypertension - show a dose-response relationship with periodontal pocket depth and clinical attachment loss. Insulin resistance, in particular, acts as a primary mediator in this tripartite association. Epidemiological studies consistently demonstrate a significant association, with individuals with obesity or MetS having a higher prevalence and greater severity of periodontitis. Conversely, the chronic inflammatory burden of periodontitis contributes to systemic inflammation and oxidative stress, which can exacerbate insulin resistance, dyslipidemia, and endothelial dysfunction, perpetuating the cycle of MetS.
- Microbial Alterations: Evidence suggests that metabolic changes may alter the subgingival microbiome, favoring the growth of virulent periodontopathogens that further fuel systemic low-grade inflammation.

Conclusion: The association between periodontal disease, obesity, and metabolic syndrome underscores the need for an integrated approach to patient care. Managing periodontal inflammation through professional care and improved oral hygiene may serve as a critical adjunct in improving metabolic profiles, while weight management and metabolic control are essential for successful periodontal therapy outcomes. Conversely, medical strategies for weight loss and MetS control, including dietary modification and exercise, may positively influence periodontal status. Recognition of this bidirectional link is essential for developing comprehensive, patient-centered prevention and treatment strategies.

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P1235

PATHOPHYSIOLOGICAL INTERCONNECTIVITY BETWEEN METABOLIC SYNDROME AND ENDODONTIC PATHOLOGY: A COMPREHENSIVE ANALYSIS OF SYSTEMIC INFLAMMATORY CASCADES AND CLINICAL OUTCOMES

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Background: Metabolic Syndrome (MetS) - a cluster of conditions including obesity, insulin resistance, hypertension, and dyslipidemia - is increasingly recognized as a systemic determinant of oral health. While the link between MetS and periodontal disease is well-established, emerging evidence suggests a profound pathophysiological interconnectivity between systemic metabolic dysfunction and endodontic outcomes, specifically chronic apical periodontitis and pulp vitality.

Pathophysiological Mechanisms: The nexus between MetS and endodontic pathology is primarily mediated by low-grade systemic inflammation and oxidative stress. Hyperglycemia and visceral adiposity trigger the release of pro-inflammatory adipose-derived cytokines, such as TNF-α, IL-6, and CRP, which prime the dental pulp's immune response and the host's immunoinflammatory response to endodontic infection. This systemic "priming" can exacerbate the inflammatory cascade within the endodontic system when challenged by microbial biofilms.

Furthermore, MetS-induced microvascular changes - including atherosclerosis and impaired vasodilation - compromise the terminal circulation of the dental pulp. Reduced blood flow limits the delivery of immune cells and nutrients, potentially accelerating pulp necrosis and impairing the periapical healing process following endodontic therapy.

Clinical Implications: patients with MetS frequently exhibit:

- increased prevalence and size of periapical lesions.
- reduced success rates in conventional root canal treatments.
- a heightened risk of systemic inflammatory "spillover" from untreated endodontic infections, further aggravating insulin resistance.

Successful endodontic treatment of chronic apical periodontitis has been shown to reduce systemic inflammatory markers and improve key metabolic indicators, such as HbA1c and lipid profiles, suggesting that clearing local infection helps improve systemic metabolic health. Dentists are increasingly advised to consider screening for HbA1c during oral exams, while physicians are encouraged to check for periodontal and endodontic infections when treating MetS.

Conclusion: The relationship between MetS and endodontic pathology is bidirectional. Integrating metabolic screening into endodontic assessment is essential for managing patient expectations and improving clinical outcomes. Understanding these molecular pathways allows for a more holistic approach to endodontic medicine, treating the tooth not as an isolated entity, but as part of a complex, metabolically integrated system.

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P1236

A SYSTEMATIC REVIEW OF OSTEOPOROSIS AS A MODIFYING FACTOR IN PERIAPICAL LESION PREVALENCE AND HEALING

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Objective:
Osteoporosis is a systemic skeletal disorder characterized by decreased bone mass and the deterioration of bone microstructure, leading to increased fragility. Apical periodontitis (AP), manifests as periapical lesions, is a chronic inflammatory response to microbial infection within the root canal system, resulting in localized alveolar bone resorption. While the relationship between osteoporosis and marginal periodontitis is well-documented, the impact of systemic bone mineral density (BMD) on the prevalence and progression of periapical pathology remains a subject of emerging clinical interest. The objective was to evaluate the association between osteoporosis and the prevalence, severity, and healing of periapical lesions in adult populations.
Methods: A systematic review of literature was conducted across major databases (PubMed, EMBASE, Cochrane Library). Studies were included if they utilized dual-energy X-ray absorptiometry (DXA) for osteoporosis diagnosis and radiographic indices (such as the Periapical Index) to assess periapical status.
Results: Current evidence suggests a positive correlation between systemic osteoporosis and the prevalence of periapical lesions. Large-scale hospital-based studies have indicated that osteoporotic patients may have a significantly higher risk (OR ≈ 3.36) of presenting with periapical lesions compared to non-osteoporotic controls. Mechanistically, estrogen deficiency - a primary driver of osteoporosis - is associated with increased levels of pro-inflammatory cytokines (e.g., IL-1β, TNF-α) and higher expression of the RANKL/OPG ratio, which may accelerate periapical bone destruction. Furthermore, while endodontic treatment remains the standard of care, evidence suggests that systemic bone loss may impair or delay the quality of newly formed bone during the healing phase. Notably, the use of bisphosphonates for osteoporosis treatment appears to modulate this risk, with some studies showing a reduction in periapical lesion prevalence among patients on antiresorptive therapy, though clinicians must remain vigilant regarding the risk of medication-related osteonecrosis of the jaw (MRONJ).
Conclusion: Osteoporosis appears to be a significant systemic modifier that may increase the prevalence and severity of periapical lesions. While further high-quality longitudinal studies are required to establish definitive causality, the current data underscores the importance of a multidisciplinary approach. Dentists should consider a patient's systemic bone health when planning endodontic treatments and assessing long-term periapical healing prognoses.

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P1237

THE IMPACT OF ANTIDIABETIC AGENTS ON PERIAPICAL TISSUE HOMEOSTASIS AND REPAIR

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Background: Diabetes mellitus is a systemic metabolic disorder characterized by chronic hyperglycemia, which significantly impairs the healing of periapical lesions and increases the prevalence of apical periodontitis (AP). While the bidirectional relationship between diabetes and oral inflammation is well-documented, recent evidence suggests that specific antidiabetic medications may exert pleiotropic effects on periapical pathology independent of their glucose-lowering capabilities. This study evaluates the influence of primary diabetes medications - Metformin, GLP-1 receptor agonists (GLP-1RAs), and Insulin - on the evolution and resolution of apical pathology.
Pathophysiological Mechanisms: Hyperglycemia promotes the formation of Advanced Glycation End-products (AGEs), increases oxidative stress, and upregulates pro-inflammatory cytokines such as TNF-α and IL-1β. In the periapical environment, these factors increase the RANKL / OPG ratio, thereby accelerating osteoclastogenesis and alveolar bone resorption.
Impact of Medications:
- Metformin: Research indicates that metformin may attenuate periapical bone destruction. Its mechanism involves the activation of the AMPK signaling pathway, which inhibits the NF - kB and mTOR pathways in macrophages, effectively reducing the synthesis of pro-inflammatory

cytokines and suppressing monocyte recruitment to the lesion site.
- GLP-1 Receptor Agonists (e.g., Liraglutide): Emerging data suggest these agents promote the osteogenic differentiation of periodontal ligament stem cells (PDLSCs) via the Wnt/β - catenin pathway. They demonstrate potent anti-inflammatory effects that may limit the expansion of periapical lesions even in poorly controlled glycemic states
- Insulin Therapy: While essential for systemic control, the direct impact of insulin on apical healing is complex. While it can mitigate the detrimental effects of hyperglycemia on bone, some clinical studies show a slightly higher persistence of apical lesions in insulin-dependent patients, likely reflecting the increased severity and longer duration of the underlying disease rather than a negative drug effect
- DPP-4 Inhibitors: These agents appear to inhibit osteoclast formation by suppressing TNF-α expression, potentially slowing the rate of periapical bone loss.
Conclusion: Antidiabetic medications, particularly metformin and GLP-1RAs, show promise in shifting the periapical environment from a pro-inflammatory, resorptive state toward one that favors tissue repair. Understanding these drug-specific influences is crucial for dental clinicians to establish more accurate prognoses and tailored treatment plans for diabetic patients undergoing endodontic therapy.
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NOVEL ANTIDIABETIC MEDICATIONS AS ADJUVANT THERAPY FOR GINGIVITIS MANAGEMENT IN INDIVIDUALS WITH DIABETES

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Objective: The management of gingival inflammation in individuals with diabetes presents a significant clinical challenge, necessitating strategies that address both localized infection and systemic metabolic dysregulation. This review examines the emerging rationale for utilizing newer classes of antidiabetic medications - particularly Glucagon-Like Peptide-1 Receptor Agonists (GLP-1 RAs) and Sodium-Glucose Cotransporter-2 (SGLT2) inhibitors - as potential adjuvant agents in the control of gingivitis in diabetic patients.
Results: Beyond their primary glycemic and cardiovascular benefits, these drugs demonstrate significant pleiotropic effects, including systemic anti-inflammatory, anti-oxidative, and endothelial function-improving properties. By mitigating the hyperinflammatory state characteristic of diabetes, these medications may effectively downregulate the exaggerated gingival inflammatory response to plaque biofilm, thereby reducing clinical signs of gingivitis such as bleeding on probing and gingival index scores. This review synthesizes current evidence from mechanistic studies and preliminary clinical observations, proposing a shift towards a more integrated treatment model. In this model, systemic pharmacotherapy for diabetes concurrently supports periodontal health by modifying the host's inflammatory milieu, potentially preventing the progression of gingivitis to periodontitis.
Conclusion: While direct clinical evidence in gingivitis is still evolving, the profound systemic impact of these medications positions them as promising tools in a comprehensive oral-systemic healthcare approach for the diabetic population.
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P1239

SYSTEMIC OSTEOPOROSIS AND PERIAPICAL PATHOLOGY: A REVIEW OF PATHOGENESIS AND CLINICAL IMPLICATIONS

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Objective. Osteoporosis is a systemic skeletal disorder marked by reduced bone mineral density (BMD) and microarchitectural deterioration, while periapical lesions are localized inflammatory responses to endodontic infection. Emerging evidence suggests a bidirectional or synergistic relationship where systemic bone metabolism significantly influences the progression and healing of periapical disease. This study aims to synthesize current research regarding the impact of systemic osteoporosis on the prevalence, severity, and healing potential of periapical lesions, as well as the underlying biological mechanisms linking the two conditions.

Methods: A comprehensive review of recent observational studies, systematic reviews, and meta-analyses (2013–2025) was conducted. Key focus areas included the correlation between DEXA-measured T-scores and periapical radiolucencies, the role of pro-inflammatory cytokines, and the influence of anti-resorptive medications (e.g., bisphosphonates) on endodontic outcomes.

Results: Evidence indicates that patients with osteoporosis exhibit a significantly higher prevalence of periapical lesions compared to normodense individuals (Odds Ratios ranging from 1.9 to 4.2). The systemic "hyper-resorptive" state associated with estrogen deficiency appears to accelerate periapical bone destruction through the up-regulation of the RANKL/OPG signaling pathway and elevated levels of pro-inflammatory cytokines. Furthermore, osteoporotic patients may experience delayed or lower-quality periapical bone repair following endodontic therapy. Conversely, dental radiographs - specifically indices like the Mandibular Cortical Index (MCI) - demonstrate potential as screening tools for identifying undiagnosed systemic bone loss.

Conclusion: Osteoporosis is a significant modifying factor in the course of periapical disease. Clinicians should consider systemic bone health when assessing endodontic prognosis and lesion progression. Integrating dental radiomorphometric analysis into routine care may facilitate earlier detection of osteoporosis, particularly in postmenopausal populations.

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P1240

OSTEOPOROSIS AND PERIODONTAL STATUS: A REVIEW OF THE INTERRELATIONSHIP BETWEEN SYSTEMIC BONE LOSS AND PERIODONTAL HEALTH

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Objective: Osteoporosis and periodontitis are prevalent chronic diseases characterized by bone resorption. While osteoporosis is a systemic skeletal disorder resulting in compromised bone strength, periodontitis is a localized inflammatory condition leading to the destruction of the tooth-supporting apparatus. Osteoporosis has been widely investigated as a potential risk factor for periodontal disease. Emerging evidence suggests a bidirectional relationship between these two conditions, mediated by shared risk factors and biological pathways. This study aims to evaluate the extent to which systemic bone mineral density (BMD) affects periodontal status, specifically examining whether osteoporosis exacerbates the progression of alveolar bone loss and attachment level changes.

Methods: A comprehensive review of clinical and radiographic parameters was conducted, comparing postmenopausal women with diagnosed osteoporosis to a control group with normal BMD. Key indicators of periodontal health - including Probing Depth (PD), Clinical Attachment Level (CAL), and Radiographic Alveolar Bone Loss (ABL) - were assessed alongside systemic Dual-energy X-ray Absorptiometry (DEXA) scores.

Results: The analysis indicates a significant correlation between low systemic BMD and increased severity of periodontal destruction. Patients with osteoporosis exhibited higher rates of clinical attachment loss compared to healthy counterparts and reduced alveolar bone density, suggesting that systemic skeletal weakness may predispose the mandibular and maxillary bone to more rapid resorption during inflammatory insults. Increased Pro-inflammatory Cytokines (such as IL-1, IL-6, and TNF-α) in the gingival crevicular fluid, which may be exacerbated

by estrogen deficiency. Clinical and radiographic studies also indicate that individuals with osteoporosis, especially postmenopausal women, tend to exhibit deeper periodontal pockets, and increased alveolar bone loss compared to those with normal bone mineral density. This association appears to be independent of traditional local risk factors, though its strength is modulated by the severity of osteoporosis and the presence of other comorbidities. Furthermore, the systemic inflammation associated with periodontitis may, in turn, negatively impact bone metabolism, potentially creating a deleterious cycle.

Conclusion: Osteoporosis is a significant risk factor for the progression of periodontal disease. While a direct causal link remains complex, substantial evidence supports osteoporosis as a modifying factor that can accelerate periodontal tissue destruction. The systemic reduction in bone mass appears to lower the threshold for periodontal bone loss, particularly in postmenopausal populations. These findings underscore the importance of an interdisciplinary approach, where dental professionals and primary care physicians collaborate to monitor the oral health of patients with diagnosed metabolic bone diseases.

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P1241

THE RELATIONSHIP BETWEEN CHRONIC GINGIVITIS AND DIABETES MELLITUS: A REVIEW OF PATHOPHYSIOLOGICAL MECHANISMS AND CLINICAL IMPLICATIONS

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Objective: The association between periodontal health and systemic metabolic disorders has become a focal point of integrated medicine. Chronic gingivitis, characterized by persistent inflammation of the gingival tissues, is increasingly recognized not merely as a localized oral ailment but as a significant contributor to systemic inflammatory burden. This abstract explores the correlation between chronic gingivitis and diabetes mellitus, emphasizing the "two-way street" relationship that defines their interaction. The objective was to analyze the physiological and immunological links between gingival inflammation and glycemic control, and to evaluate how each condition exacerbates the progression of the other.

Methods: A comprehensive review of current clinical literature and longitudinal studies was conducted, focusing on biomarkers of inflammation, such as C-reactive protein (CRP) and Interleukin-6 (IL-6), and clinical markers of diabetes, specifically HbA1c levels.

Results: The correlation is underpinned by a synergistic inflammatory cycle. Persistent hyperglycemia in diabetic patients drives a state of systemic inflammation and immune dysfunction. Diabetes increases the risk and severity of gingivitis through the accumulation of Advanced Glycation End-products (AGEs), which induce oxidative stress and impair the regenerative capacity of oral tissues. Conversely, chronic gingivitis introduces periodontal pathogens and pro-inflammatory cytokines into the systemic circulation. This systemic "leakage" promotes insulin resistance by interfering with insulin receptor signaling, thereby making blood glucose levels more difficult to regulate in diabetic patients. Clinical evidence suggests that the effective treatment of gingival inflammation can lead to a statistically significant reduction in HbA1c levels.

Conclusion: There is a robust, positive correlation between chronic gingivitis and diabetes mellitus. This study consistently reports a higher prevalence and greater severity of gingival inflammation in individuals with poorly controlled diabetes compared to those without diabetes or with well-controlled disease. This correlation underscores the importance of integrated patient care. Chronic oral inflammation serves as both a complication of and a risk factor for poor glycemic control. These findings underscore the necessity for a multidisciplinary approach to patient care, where dental professionals and endocrinologists collaborate to manage systemic inflammation.

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P1242

THE INFLUENCE OF OSTEOPOROSIS PHARMACOTHERAPY ON THE CLINICAL PROGRESSION AND MANAGEMENT OF CHRONIC GINGIVITIS: A REVIEW

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Objective: Osteoporosis and chronic gingivitis are highly prevalent conditions that frequently co-occur in aging populations. The inflammatory bone resorption in gingivitis is primarily driven by local biofilm, but systemic medications have been proven to significantly modify the host response and tissue homeostasis. While the systemic impact of bone mineral density (BMD) loss on alveolar bone is well-documented, the specific influence of osteoporosis medications - particularly bisphosphonates and RANKL inhibitors - on the inflammatory dynamics of chronic gingivitis remains a subject of clinical scrutiny. This abstract explores the bidirectional relationship between osteoporosis pharmacotherapy and gingival inflammation, evaluating how systemic bone-modifying agents alter the clinical presentation and treatment response of chronic gingivitis.

Methodq: A review of current clinical trials and observational studies was conducted to assess parameters such as Gingival Index (GI), Bleeding on Probing (BOP), and crevicular fluid cytokine levels in patients receiving antiresorptive or anabolic osteoporosis treatments.

Results:

- anti-inflammatory potential: evidence suggests that nitrogen-containing bisphosphonates may exert a protective effect on the periodontium by inhibiting pro-inflammatory mediators and matrix metalloproteinases (MMPs), potentially reducing the clinical severity of gingival inflammation.
- alveolar integrity: improved systemic BMD correlates with enhanced alveolar bone density, which may indirectly stabilize the gingival attachment apparatus and modify the host response to dental plaque.
- clinical complications: antiresorptive drugs, notably Bisphosphonates and Denosumab, may attenuate alveolar bone loss secondary to inflammation by suppressing osteoclastic activity; conversely, the risk of Medication-Related Osteonecrosis of the Jaw (MRONJ), although primarily associated with invasive procedures, necessitates a cautious approach to managing chronic gingivitis to prevent progression to more severe periodontal disease.

Conclusion: Osteoporosis medication significantly influences the oral microenvironment. While these agents may mitigate some inflammatory markers of gingivitis, they also necessitate specialized dental monitoring. Understanding this interplay is vital for developing integrated treatment protocols that optimize both systemic bone health and oral inflammatory control.

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P1243

THE INTERPLAY BETWEEN DIABETES MELLITUS AND ENDODONTIC PATHOLOGY

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Objective. Diabetes mellitus (DM) is a systemic metabolic disorder characterized by chronic hyperglycemia, which significantly impacts oral health. While the relationship between diabetes and periodontal disease is well-established, its influence on endodontic pathology - specifically the health of the dental pulp and the periradicular tissues - has emerged as a critical area of clinical concern. This paper explores the pathophysiological mechanisms by which diabetes affects the initiation, progression, and healing of endodontic lesions, while evaluating the clinical success rates of root canal treatments in diabetic patients.

Methods: A comprehensive review of current literature was conducted, focusing on the immune response alterations, vascular changes, and inflammatory markers present in diabetic individuals with apical periodontitis.

Results:

- enhanced Inflammation: hyperglycemia leads to the accumulation of Advanced Glycation End-products (AGEs), which trigger a pro-inflammatory state. This results in an exaggerated immune response within the dental pulp.
- impaired healing: diabetes impairs the function of neutrophils and fibroblasts, leading to a reduced capacity for periapical bone healing following endodontic intervention.
- prevalence: diabetic patients exhibit a higher prevalence of periapical

radiolucencies and a greater likelihood of asymptomatic infections compared to non-diabetic controls.
- success rates: while endodontic therapy is generally successful in controlled diabetics, patients with poor glycemic control show a significantly higher risk of endodontic failure and post-operative complications.
Conclusions: Diabetes mellitus serves as a significant modifier of endodontic disease. The systemic environment in diabetic patients not only predisposes the dental pulp to infection but also complicates the resolution of periapical lesions. For the clinician, strict glycemic monitoring and tailored treatment protocols are essential to optimize outcomes and prevent tooth loss in this high-risk population.
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P1244

THE INFLUENCE OF HYPERTHYROIDISM ON THE PROGRESSION AND HEALING OF APICAL PERIODONTITIS: A REVIEW OF PATHOPHYSIOLOGICAL MECHANISMS AND CLINICAL IMPLICATIONS

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Objective: Hyperthyroidism, characterized by the excessive production of thyroxine (T_4) and triiodothyronine (T_3), significantly alters systemic metabolism and immune regulation. While its impact on marginal periodontitis is well-documented, its specific influence on apical periodontitis (AP) - a chronic inflammatory disease of the periradicular tissues - is an emerging area of clinical interest. This study examines how elevated thyroid hormones modulate the pathogenesis, bone destruction, and healing potential of periapical lesions.

Methods: A review of current literature and clinical data was conducted to evaluate the relationship between thyroid dysfunction and periapical health. Key parameters included the expression of pro-inflammatory cytokines, bone turnover markers (RANKL/OPG), and the rate of periapical bone resorption in hyperthyroid versus euthyroid states.
Results: Hyperthyroidism appears to exacerbate the progression of apical periodontitis through several mechanisms:
- Accelerated Bone Resorption: Excess thyroid hormones stimulate osteoclast activity, leading to faster expansion of periapical radiolucencies.
- Immunological Dysregulation: Elevated levels of pro-inflammatory cytokines and mediators associated with hyperthyroidism, alongside a potential dysregulation of the RANKL/OPG pathway, could synergistically amplify the local inflammatory and osteoclastogenic response to pulpal pathogens, potentially leading to more extensive periapical lesions.
- Impaired Healing: Despite a high metabolic rate, the "high-turnover" state often results in poor quality of bone repair, potentially leading to delayed healing or persistent lesions following endodontic treatment. The implied pathophysiological mechanisms suggest that hyperthyroidism may act as a modifying factor, aggravating the bony destruction of apical periodontitis and possibly impairing post-treatment healing.
- Microbiological Shifts: Some evidence suggests hyperthyroidism may alter oral microbiome diversity, potentially increasing the virulence of endodontic pathogens.
Conclusion: Hyperthyroidism acts as a systemic modifier that may increase the prevalence and severity of apical periodontitis. The hypermetabolic state and cytokine imbalance favor bone catabolism over repair in the periradicular region. Clinicians should consider a patient's thyroid status as a risk factor for endodontic treatment prognosis and emphasize the importance of hormonal stabilization to improve healing outcomes.
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P1245

THE INFLUENCE OF ANTI-DIABETIC MEDICATION ON THE EVOLUTION OF APICAL PERIODONTITIS: A SCOPING REVIEW OF PATHOPHYSIOLOGICAL INTERACTIONS AND CLINICAL IMPLICATIONS

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Objective: Apical periodontitis (AP) is an inflammatory disease of periradicular tissues primarily caused by bacterial infection of the root canal system. Diabetes mellitus (DM), particularly when poorly controlled, is a well-established risk factor for increased prevalence, severity, and delayed healing of AP due to hyperglycemia-induced impaired immune response, microangiopathy, and chronic inflammation. The widespread use of anti-diabetic medications necessitates an understanding of their specific impact on AP pathogenesis beyond glycemic control alone. This review synthesizes current evidence on how anti-diabetic medications modulate the evolution of apical periodontitis, focusing on pleiotropic drug effects on bone metabolism, immune cell function, and the inflammatory milieu.
Results: Emerging evidence suggests that anti-diabetic agents exert divergent effects on AP evolution. Metformin, beyond hypoglycemia, demonstrates anti-inflammatory and osteo-protective properties, potentially attenuating periapical bone destruction and promoting healing. Incretin-based therapies (GLP-1 agonists, DPP-4 inhibitors) may reduce pro-inflammatory cytokine production (e.g., TNF-α, IL-6) in the periapical lesion. Conversely, sodium-glucose cotransporter-2 (SGLT2) inhibitors have been associated with potential risks, such as a higher incidence of diabetic ketoacidosis and related acidosis, which could theoretically exacerbate osteoclast activity and bone resorption. Insulin therapy, while crucial for glycemic normalization, may have complex site-specific immunomodulatory effects. The overall impact appears contingent on achieving glycemic control, but direct pharmacologic actions are increasingly recognized.
Conclusion: The progression and resolution of apical periodontitis in diabetic patients are not solely dictated by glycemic levels but are also influenced by the specific anti-diabetic pharmacotherapy. A paradigm shift is emerging from viewing DM as a monolithic risk factor towards a nuanced understanding where medication choice may actively shape the host response to endodontic infection. Further clinical and translational research is essential to guide integrated treatment planning between endodontists and physicians, optimizing both diabetic and periapical health outcomes.

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THE INFLUENCE OF ANTIRESORPTIVE OSTEOPOROSIS MEDICATIONS ON THE PATHOGENESIS AND HEALING OF PERIAPICAL PATHOLOGY: A LITERATURE REVIEW

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Objective: Osteoporosis is a systemic skeletal disorder characterized by reduced bone mineral density and microarchitectural deterioration. Osteoporosis medications and apical periodontitis (AP) have a complex relationship, as these drugs primarily target bone remodeling processes that are also central to the development and healing of periapical periodontitis. Emerging evidence suggests a bidirectional link between systemic bone health and inflammatory periapical pathology (apical periodontitis). While the microbial etiology of periapical lesions is well-established, host systemic factors - specifically the use of antiresorptive medications such as Bisphosphonates (BPs) and Denosumab - significantly modulate the inflammatory bone remodeling process. This review aims to evaluate the impact of common osteoporosis medications on the prevalence, progression, and healing dynamics of periapical lesions in patients undergoing endodontic therapy.
Methods: A comprehensive review of clinical trials, systematic reviews, and retrospective studies (up to 2024-2025) was conducted. Key focus areas included the pharmacological mechanisms of Bisphosphonates and RANKL inhibitors – Denosumab - on osteoclast activity within the periapical microenvironment.

Results: Current data indicate that osteoporosis itself may predispose patients to more rapid progression of periapical bone destruction. However, the administration of antiresorptive drugs presents a dual-natured impact:
- healing dynamics: bisphosphonates may paradoxically support the reduction of periapical lesion size by suppressing osteoclast-mediated bone resorption. Some studies report a lower prevalence of periapical lesions in osteoporotic patients taking oral BPs compared to those untreated.
- treatment outcomes: conversely, long-term use of high-potency antiresorptives (especially intravenous formulations) is associated with delayed healing of periapical tissues post-endodontic treatment. In some cases, persistent periapical infections serve as a localized "trigger" for Medication-Related Osteonecrosis of the Jaw (MRONJ), particularly if surgical intervention is pursued.
- success rates: while overall endodontic success remains high, patients on denosumab or long-term BP therapy may exhibit lower radiographic healing scores in root-canal-treated teeth compared to healthy controls.
Conclusions: Osteoporosis medications significantly alter the periapical host response. While they may limit the expansion of inflammatory lesions by inhibiting bone turnover, they also necessitate a cautious, non-surgical approach to endodontic treatment to minimize MRONJ risks. Clinicians must prioritize the elimination of periapical infections in these patients to maintain systemic and localized bone stability.
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P1247

DIABETES MELLITUS AND ENDO-PERIODONTAL LESIONS: FROM NECROSIS TO APICAL PERIODONTITIS

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Introduction: Diabetes mellitus and periodontitis have a bidirectional relationship, with reciprocal effects on inflammation and metabolic control. In the endodontic field, the main concern is whether hyperglycemia increases the risk of apical periodontitis and delays periapical healing after root canal treatment.

Objective: To provide a clinical synthesis of the associations between type 2 diabetes mellitus (T2DM), glycemic status, and endodontic pathology (apical periodontitis), within the framework of the endo-periodontal continuum.

Methods:A narrative synthesis of recent clinical studies and meta-analyses evaluating the association between T2DM, HbA1c levels, and apical periodontitis, integrated into the inflammatory endo-periodontal model.

Results: In a hospital-based case–control study, T2DM was independently associated with a higher prevalence of apical periodontitis (OR 2.05), while HbA1c levels above 8.0% were associated with an even higher prevalence (OR 2.46). The use of metformin (OR 0.82) and statins (OR 0.70) was associated with a lower prevalence of apical periodontitis. A meta-analysis cited in the same context reported a higher prevalence of apical periodontitis after endodontic treatment in diabetic patients compared with controls, both at the tooth level (OR 1.51) and at the patient level (OR 3.38). These findings support the hypothesis that metabolic dysregulation may amplify chronic inflammation within the endo-periodontal unit.

Conclusions: In patients with T2DM, HbA1c represents a clinically useful marker for endodontic and periodontal risk stratification. Collaboration between the endocrinologist, endodontist, and periodontist is particularly relevant when HbA1c levels exceed 8%.

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P1248

PERIODONTAL THERAPY AS AN ADJUNCTIVE INTERVENTION FOR GLYCEMIC CONTROL: IMPLICATIONS FOR ENDOCRINOLOGY

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Introduction: Periodontitis is associated with low-grade systemic inflammation and impaired glycemic control in patients with diabetes, within a bidirectional relationship. From this perspective, periodontal treatment emerges as a potential adjunctive intervention in metabolic management.

Objective: To assess the effect of periodontal therapy on HbA1c levels, with a focus on the magnitude of the effect and the clinical factors that may modify it.

Methods: Comparison of HbA1c values in patients with diabetes and periodontitis who received periodontal treatment versus control groups.

Results: One meta-analysis (11 studies) demonstrated significant reductions in HbA1c at 3 months (−0.64%) and at 6 months (−0.33%), accompanied by decreases in C-reactive protein (CRP), suggesting a reduction in systemic inflammation. Another meta-analysis (23 randomized controlled trials) reported reductions in HbA1c at 3 months (weighted mean difference [WMD] −0.514%) and at 6 months (WMD −0.548%), with substantial heterogeneity, partially explained by baseline HbA1c levels. The effect tended to be more pronounced in patients with poorer initial glycemic control.

Conclusions: The integration of periodontal evaluation into the clinical pathway of patients with diabetes is supported by meta-analytic evidence, showing a modest but clinically relevant average effect, particularly in subgroups with elevated baseline HbA1c levels

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THYROID DYSFUNCTION AND PERIODONTAL DISEASE: SYNTHESIZED EVIDENCE AND CLINICAL RELEVANCE

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Introduction: Thyroid dysfunction may alter immune responses and bone metabolism, representing plausible mechanisms for the exacerbation of periodontal inflammation. Clinical evidence addressing this association has recently been evaluated in meta-analyses.

Objective: To synthesize the association between thyroid dysfunction (hypothyroidism or hyperthyroidism) and clinical periodontal indices, with an emphasis on relevance for endocrinology practice.

Methods:A summary of findings from recent meta-analyses and systematic reviews assessing periodontal status in patients with thyroid diseases.

Results: One meta-analysis identified significantly higher periodontal indices in patients with thyroid dysfunction compared with controls (standardized mean difference [SMD] 0.369; 95% confidence interval [CI] 0.194–0.545), with effects reported mainly for clinical attachment loss (CAL) and probing pocket depth (PPD). In a systematic review with meta-analysis, patients with thyroid diseases—particularly hypothyroidism—exhibited poorer periodontal status than controls, and in cross-sectional studies, 5.74% of patients with periodontitis reported thyroid comorbidity.

Conclusions: The available data support an association between thyroid dysfunction and periodontal impairment, with implications for bidirectional clinical screening. Standardization of disease definitions and improved control of confounding factors remain necessary to obtain more robust estimates.

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BONE METABOLISM, VITAMIN D, AND PARATHYROID HORMONE: ENDOCRINE INTERSECTIONS RELEVANT TO PERIODONTAL ATTACHMENT LOSS

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Introduction: Periodontal bone loss is influenced by systemic bone status and by the endocrine axes that regulate bone metabolism (estrogen, vitamin D, parathyroid hormone [PTH], glucocorticoids). Within this framework, periodontitis can be interpreted as a local disease with important systemic determinants.

Objective: To synthesize the relationship between postmenopausal osteoporosis, vitamin D status, hyperparathyroidism, and clinical periodontal parameters, with reference to endo-periapical involvement where data are available.

Results: In postmenopausal osteoporosis, a meta-analysis reported lower bone mineral density (BMD) compared with non-osteoporotic individuals (mean difference [MD] −0.41), with the overall conclusion that women with postmenopausal osteoporosis are more prone to periodontitis and disease progression. Regarding vitamin D, a meta-analysis concluded that patients with periodontitis have lower serum concentrations, and that the combination of scaling and root planing (SRP) with vitamin D supplementation resulted in greater reductions in clinical attachment loss (CAL) compared with SRP alone (weighted mean difference [WMD] −0.13).In primary hyperparathyroidism, patients with the highest preoperative ionized calcium levels had an increased risk of tooth extractions (incidence rate ratio [IRR] 1.85). In an observational study, certain subgroups of patients with primary hyperparathyroidism exhibited higher probing depth, greater clinical attachment loss, and increased gingival bleeding. In states of glucocorticoid excess (Cushing syndrome), the literature describes maxillary bone loss, tooth loss, and periodontal disease as potential manifestations.

Conclusions: Endocrine markers of bone metabolism, including vitamin D and PTH, may support periodontal risk stratification and guide integrated management strategies. With respect to the association between osteoporosis and endodontic pathology, systematic reviews are available; however, the direction and magnitude of the effect cannot be confirmed here due to the lack of full access to the underlying data in those studies.

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P1251

POLYCYSTIC OVARY SYNDROME AND PERIODONTITIS: A BIDIRECTIONAL INFLAMMATORY MODEL

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Introduction: Polycystic ovary syndrome (PCOS) is associated with low-grade chronic inflammation and metabolic disturbances that may influence the gingival–periodontal response. Conversely, periodontitis may amplify systemic inflammatory burden, which is relevant to the PCOS phenotype.

Objective: To present the available evidence regarding the bidirectional association between PCOS, periodontitis, and the severity of clinical periodontal parameters.

Results:A meta-analysis indicated that women with PCOS have a 28% higher risk of periodontal disease, while women with periodontitis have a 46% higher risk of having PCOS. In addition, women with both PCOS and periodontitis exhibited greater gingival bleeding, increased probing pocket depths, and more severe clinical attachment loss compared with women without PCOS but with periodontitis. The authors emphasized the need for prospective and interventional studies to clarify causality and to evaluate the impact of periodontal therapy on PCOS-related markers.

Conclusions: In clinical practice, the association between PCOS and periodontitis supports the implementation of periodontal screening in patients with PCOS, particularly in the presence of metabolic phenotypes. From a periodontal perspective, PCOS may be considered a potential systemic risk factor for increased inflammatory severity and periodontal attachment loss.

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P1252

ENDODONTIC TREATMENT OF APICAL PERIODONTITIS AND METABOLIC MARKERS: LONGITUDINAL METABOLOMIC DATA

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Introduction: Apical periodontitis (AP) is a chronic periradicular inflammatory disease associated with systemic inflammatory burden and increased cardiometabolic risk.

Objective: To evaluate systemic metabolic changes associated with successful endodontic treatment in patients with apical periodontitis.

Methods:A longitudinal, self-controlled cohort study conducted over 2 years in 65 patients with apical periodontitis. Serum metabolomic analysis was performed using nuclear magnetic resonance (NMR) spectroscopy at five time points: preoperative, 3 months, 6 months, 1 year, and 2 years post-treatment.

Results: Significant postoperative changes were identified in 24 of the 44 analyzed metabolites (54.5%). The metabolic profile suggested improvements in glucose and lipid metabolism and a reduction in inflammatory burden. These changes included a reduction in branched-chain amino acids at 3 months, decreased glucose and pyruvate levels at 2 years, short-term reductions in cholesterol, choline, and fatty acids, and a progressive increase in tryptophan levels. Associations were observed between the metabolic profile, clinical indicators of metabolic syndrome, inflammatory markers, and preoperative microbiome data. Dynamic Bayesian modeling identified tricarboxylic acid (TCA) cycle metabolites as key regulators of longitudinal metabolic changes.

Conclusions: Successful endodontic treatment of apical periodontitis is associated with favorable systemic metabolic changes and reduced inflammation, supporting the inclusion of chronic endodontic infections in cardiometabolic risk assessment.

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P1253

HYPOESTROGENISM AND THE ENDO-PERIODONTAL UNIT: THE ROLE OF THE NLRP3 INFLAMMASOME IN APICAL PERIODONTITIS AND PERIODONTAL IMPLICATIONS

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Introduction: The physiological decline in estrogen levels after menopause may alter inflammatory responses and bone remodeling, with potential effects on both periodontal tissues and periapical lesions.

Objective: To evaluate the association between estrogen deficiency and the progression of apical periodontitis as well as periodontal pathology, from an odontogenic–endo-periodontal perspective.

Results: In a clinical study, infected apical tissues from postmenopausal women showed increased expression of the NLRP3/caspase-1/IL-1β axis compared with tissues from premenopausal patients, suggesting involvement of this pathway in apical periodontitis under conditions of estrogen deficiency. An ovariectomized animal model confirmed upregulation of the same pathway in infected areas, along with aggravated bone loss as lesion progression advanced. A preclinical systematic review including 12 studies reported that estrogen deficiency consistently increased the progression of apical periodontitis lesions in animal models (moderate certainty of evidence according to GRADE).

Regarding periodontal tissues, a systematic review concluded that reduced estrogen levels are associated with increased periodontal pathology, although more robust clinical studies are required. At the odontogenic level, a meta-analysis reported a higher DMFT index in postmenopausal women (mean difference 3.13; 95% confidence interval 2.12–4.15).

Conclusions: Menopausal status may be clinically relevant in assessing the risk of apical periodontitis and periodontal disease. Inflammatory markers such as IL-1β and the NLRP3 inflammasome may represent a biological link between endocrinology and endo-periodontal pathology.

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P1254

PERIODONTITIS AND GESTATIONAL DIABETES MELLITUS: RISK ESTIMATION FROM META-ANALYSES AND PRACTICAL IMPLICATIONS

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Introduction: Chronic periodontal inflammation may amplify systemic inflammatory responses during pregnancy, a physiological state already characterized by increased insulin resistance.

Objective: To synthesize quantitative evidence on the association between periodontitis and gestational diabetes mellitus (GDM), with relevance for integrated dentistry–endocrinology–obstetrics screening strategies.

Methods: Comparison of the risk of GDM in pregnant women with and without periodontitis, including analyses adjusted for potential confounders.

Results:A meta-analysis reported that, in studies adjusted for confounders, the odds of GDM were more than twofold higher in women with periodontitis (adjusted odds ratio [aOR] 2.08; 95% confidence interval [CI] 1.21–3.58), with evidence of heterogeneity across studies and recommendations for standardized definitions and prospective study designs. A more recent analysis reported an odds ratio of 1.83 (95% CI 1.25–2.69) for the association between periodontal disease and GDM, confirming the signal of increased risk. Consensus-type evidence indicates that non-surgical periodontal therapy during the second trimester is considered safe, although its effect on pregnancy outcomes remains variable across studies.

Conclusions: Periodontitis is associated with an increased risk of gestational diabetes mellitus in meta-analyses. Periodontal evaluation during pregnancy and early interventions may therefore be justified as part of a multidisciplinary care pathway.

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P1255

OSTEOPOROSIS TREATED WITH BISPHOSPHONATES OR DENOSUMAB: MRONJ RISK AND ENDODONTIC/PERIODONTAL DECISION-MAKING TO AVOID SURGICAL INTERVENTION

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Introduction: Antiresorptive therapy for osteoporosis raises concerns regarding medication-related osteonecrosis of the jaw (MRONJ), a rare but clinically significant adverse event in dental practice.

Objective: To provide a pragmatic synthesis of MRONJ risk estimates and relevant recommendations guiding endodontic and periodontal treatment choices in patients with osteoporosis receiving bisphosphonates or denosumab.

Results: The American Association of Oral and Maxillofacial Surgeons (AAOMS) reports that, in patients treated for osteoporosis, the risk of MRONJ ranges from 0.02–0.05% for bisphosphonates and from 0.04–0.3% for denosumab. Following tooth extraction, estimated risks are 0–0.15% for bisphosphonates and approximately 1% for denosumab. For procedures such as endodontic or periodontal treatment, AAOMS states that the risk remains unknown due to insufficient data.

The American Association of Endodontists (AAE) notes that there are no reports directly implicating non-surgical endodontic treatment in the development of MRONJ. Accordingly, it recommends caries control, conservative periodontal and restorative treatments, and appropriate endodontic therapy to avoid extractions whenever possible. Surgical procedures, including extractions and endodontic surgery, should be avoided if feasible.

Conclusions: In patients with osteoporosis receiving antiresorptive therapy, tooth-preserving strategies—including non-surgical endodontic treatment—may reduce the need for extractions, the primary reported trigger for MRONJ. Such approaches should be implemented within a framework of coordinated dental–endocrinological care.

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P1256

OBESITY AND THE ODONTO-PERIODONTAL BURDEN: QUANTITATIVE SYNTHESIS OF PERIODONTAL RISK AND RADIOLOGICAL DATA ON CARIES AND TOOTH LOSS

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Introduction: Obesity is associated with low-grade chronic inflammation and has been investigated as a risk factor for periodontal disease and deterioration of oral health.

Objective: To assess the association between obesity and periodontal disease, as well as odontogenic parameters (dental caries and tooth loss) relevant to the continuity of the odonto-endo-periodontal unit.

Methods:A synthesis of an updated meta-analysis on obesity and periodontitis, complemented by a comparative radiological study across body mass index (BMI) groups.

Results: In the updated meta-analysis, obesity was associated with increased odds of periodontal disease (odds ratio [OR] 1.35; 95%

confidence interval [CI] 1.05–1.75), with heterogeneity across studies and subgroup-specific variations. In the radiological study involving 352 patients, BMI groups differed significantly with respect to dental caries, alveolar bone loss, and tooth loss, whereas the incidence of periapical lesions did not differ significantly between groups.

Conclusions: The data support obesity as a factor associated with periodontal disease and with odontogenic indicators such as caries, edentulism, and alveolar bone loss. Integrating the assessment of body weight status into dental anamnesis may aid risk stratification and facilitate bidirectional referral for metabolic management.

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P1257

A TRAIN MAY HIDE ANOTHER: A CASE OF PANCOAST-TOBIAS SYNDROME ASSOCIATED WITH A BLADDER TUMOR

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Objective

Chronic neck pain is a common reason for consultation in rheumatology and is often attributed to chronic inflammatory rheumatic diseases. However, neoplastic processes may mimic inflammatory presentations and lead to diagnostic delay. Pancoast-Tobias syndrome is a rare entity characterized by an apical lung lesion with locoregional extension, sometimes responsible for Horner's syndrome. Its association with a synchronous tumor, particularly of the bladder, remains exceptional. This report describes a case of Pancoast-Tobias syndrome associated with synchronous urothelial carcinoma.

Material and methods

77-year-old man, chronic smoker with a history of hypertension, was admitted in January 2025 for right inflammatory cervicobrachial neuralgia evolving over six weeks. The symptoms were associated with fatigue, anorexia, weight loss, and were refractory to conventional analgesics. On clinical examination, there was cervical stiffness, right-sided ptosis, miosis and enophthalmos consistent with Horner's syndrome, as well as mild motor weakness of the right upper limb. Laboratory tests revealed an inflammatory syndrome with a C-reactive protein level of 45 mg/L, and microscopic hematuria. Standard radiography demonstrated an osteolytic lesion of the posterior arch of T1. Cervical MRI confirmed the diagnosis of Pancoast-Tobias syndrome. Thoraco-abdomino-pelvic CT scan showed a T4N1M1a stage with a right adrenal metastasis, and a focal thickening of the bladder wall consistent with synchronous urothelial carcinoma. The patient received multimodal analgesic treatment including morphine, tramadol and pregabalin, and was referred to pulmonology and urology for further work-up and multidisciplinary management.

Results

Pancoast-Tobias syndrome is a rare condition, accounting for 3 to 5% of lung tumors (1), and is most often related to non-small cell lung carcinoma. It is underdiagnosed because of its misleading presentation mimicking rheumatologic disease, with a reported mean diagnostic delay of up to 18 months (2). Horner's triad, present in only 18 to 27% of cases, represents an important warning sign (3,4). MRI is the imaging modality of choice, as it accurately delineates locoregional extension and provides better prognostic assessment (5,6). In the present case, the synchronous bladder involvement illustrates the possibility of dual primary malignancies. This situation is reported in less than 1% of bladder cancers and is probably explained by the shared carcinogenic effect of tobacco smoking, which is implicated in more than 90% of Pancoast tumors and in about 60% of bladder tumors (7,8). The advanced T4N1M1a stage conferred a poor prognosis, justifying a palliative therapeutic approach. Pain management was a major issue, as neuropathic pain is frequent in this syndrome; the pregabalin–tramadol combination has shown synergistic analgesic benefit in some studies, supporting its use in this context (9,10).

Conclusions

Pancoast-Tobias syndrome, although rare, is a severe condition that requires a high level of diagnostic vigilance in order to avoid therapeutic wandering. Its unprecedented association with a synchronous

bladder tumor underlines the importance of a comprehensive and multidisciplinary approach.
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P1258

CARBOXYMETHYL-CHITOSAN FOR MODERATE-ADVANCED HIP OSTEOARTHRITIS: CASE SERIES OF 12 PATIENTS NON-RESPONDERS TO HYALURONIC ACID

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Objectives: Hip OA non-responsive to intra-articular hyaluronic acid (HA) and conventional treatments often necessitates surgical intervention. Carboxymethyl-chitosan (CM-C), an emerging compound with lubricating and anti-inflammatory properties, has already shown promise for refractory knee OA. This study aimed to evaluate the efficacy of a single intra-articular CM-C injection associated with 40 mg triamcinolone acetonide (TAA) in patients with hip OA non-responsive to HA.

Material and Methods: Retrospective study of 12 patients (mean age 68.0 ± 11.64 years, range 56–82) with symptomatic hip OA and radiographic Kellgren–Lawrence grade III–IV, previously unsuccessfully treated with intra-articular HA, who received a single injection of CM-C (60 mg/3 mL) associated with 40 mg TAA from November 2022 to March 2025. Pain and functional outcomes were assessed using the Visual Analogue Scale (VAS) and Oxford Hip Score (OHS) at baseline (T0), one month (T1), three months (T2), and six months (T3) post-injection. Changes over time are described in terms of percentage improvement from baseline.
Results: A single CM-C injection produced heterogeneous clinical responses in this cohort. In 2 out of 12 patients no relevant improvement in pain or hip function was observed. In 4 out of 12 patients, pain and function improved by approximately 40% at T1 from baseline, but this benefit was limited to T2. In the remaining 6 out of 12 patients, pain and functional scores improved by around 60% at T1 compared with baseline, with a perceived benefit persisting at T3. No serious adverse events were reported; mild transient arthralgia was observed in 3 patients.
Conclusions: A single CM-C injection showed early and sustained pain relief and functional improvement in moderate-advanced hip OA for non-responders to HA. Although the small sample size, these preliminary findings suggest CM-C may represent an additional conservative therapeutic option to improve quality of life before recommending surgery. Larger prospective randomized controlled trials are warranted to confirm these results and to better identify patients who are most likely to benefit from this approach.

P1259

RETROSPECTIVE ANALYSIS OF THE RESULTS OF PERCUTANEOUS VERTEBROPLASTY OF COMPRESSION FRACTURES OF BODIES ON THE BACKGROUND OF OSTEOPOROSIS

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Objective. Analyzing the condition of spines of the patients suffering from compression fractures of vertebral bodies on the background of osteoporosis after the performed Percutaneous vertebroplasty (PVP).
Material and Methods. 553 patients who underwent hospital treatment at the spine pathology clinic of the Sytenko Institute of Spine and Joint Pathology (2005–2022) and underwent PVP were examined. The patients were divided into three groups depending on the number of damaged vertebrae. The 1st group included the patients with compression fractures of one vertebra (185 — 33.4 %); the 2nd group included the patients having 2 or 3 deformed vertebrae (216 — 39 %); and the 3rd group included the patients with 4–5 damaged vertebrae (152 — 27.4 %). Stages of compression of vertebral bodies during the X-ray morphometry was as follows before the surgery: I — 349 (24 %) vertebrae; II — 494 (34 %); III — 552 (38 %); and IV — 58 (4 %)
Results. We achieved the reduction of the level of compression of vertebral bodies as a result of PVP in 20 % of cases (patients who noticed the manifestation of the pain syndrome within 2 weeks mostly suffered from these deformations). Additionally, we achieved a reduction in pain syndrome in 90% of patients in the first group, 74% in the second group, and 48% in the third group. The analysis of PVP of 553 patients with composite material and bone cement in the near and far future provide us an opportunity to state that this surgical treatment is an efficient and safe treatment method (despite the materials used). 40 (24 %) patients out of 165 patients of the group I, 52 (33 %) patients out of 157 patients

of the group II and 54 (44 %) patients our of 133 patients of the group III were diagnosed with repeated compression fractures.
Conclusions. Summarizing all the above, we should note that the more compression fractures the patient has, the higher the risk of further augmentation of other deformations of vertebral bodies is.
Conflict of interest. The authors declare that there is no con-flict of interest.

P1260

TOPOGRAPHIC PREDICTION OF REPEATED OSTEOPOROTIC FRACTURES OF THE THORACIC AND LUMBAR VERTEBRAE

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Objective. To analyze the topographic patterns of occurrence of postoperative recurrent vertebral compression fractures (RVCF) depending on the location of the primary fracture after percutaneus vertebroplasty (PVP).
Materials and Methods. 520 case histories of patients with osteoporotic fractures of the thoracic and lumbar spine of various locations were analyzed. The total number of treated vertebral bodies was 1,458 (thoracic 596 — 40.88 %, lumbar 862 — 59.12 %). Most often, compression fractures of the spine occurred in the thoracolumbar junction (784 — 53.77 %). RVCF was diagnosed in 64 (12.31 %) people (95 % CI: 9.94–14.68 %) during follow-up examinations, after 1, 3, 6 or 12 months. since the operation. The study was carried out by 3 methods of forecasting: assessment of conditional probabilities, study of the significance of a primary fracture as a predictor of repeated fracture in a specific vertebra, analysis of associative rules and relationships
Results. According to the 1st method, all conditional probabilities do not exceed 0.4 and the highest of them are the probabilities LI and LIV RVCF (0.39) with a primary ThVI fracture, and the probability of ThVIII RVCF (0.38) with a ThV primary fracture. Method II found only two regularities that allow an interpretation that corresponds to the purpose of our research. The third method revealed the associative rules and connections of the primary fracture of ThV with RVCF LI, ThXII; according to ThVI with RVCF LI, LII; in the case of ThVIII with RVCF LI, ThXII; ThX fracture with ThX, ThXI, ThXII, LII RVCF; under ThXI conditions with ThV, ThVII, ThVIII, ThIX, ThX, ThXII RVCF; for ThX with RVCF ThIX, ThXI, ThXII, LII; ThX fracture with ThX, ThXI, ThXII, LII RVCF.
Conclusions.The prediction of recurrent osteoporotic fractures remains one of the most relevant challenges in modern vertebrology. The conducted study identified the most distinct patterns characteristic of the general patient sample: with a primary fracture at ThXI, a new deformation of ThVIII may occur; with ThVII injury, new fractures of ThIX, ThXII, and LI are possible; with ThXII — damage to ThXI; and with a primary fracture of LI — new deformations of ThXII, LIV, and LV.
We believe that in the future, larger-scale studies involving a greater number of patients and extended follow-up periods will be conducted, which will allow the identification of new and more detailed regularities in the development of recurrent vertebral compression fractures. Such research will provide a foundation for the further advancement of preventive and predictive medicine in vertebrology, aimed at individualized risk forecasting, early intervention, and reduction of complication rates in patients with osteoporosis.
Conflict of interest. The authors declare that there is no con-flict of interest.

P1261

RECURRENT VERTEBRAL COMPRESSION FRACTURES AFTER PERCUTANEOUS VERTEBROPLASTY IN OSTEOPOROTIC PATIENTS: RISK FACTORS AND CLINICAL OUTCOMES — A SYSTEMATIC REVIEW AND META-ANALYSIS

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Objective. To synthesize clinical data and quantitatively assess the impact of demographic, morphometric, and technical factors on recurrent vertebral compression fractures (RVCF) incidence post percutaneus vertebroplasty.
Methods. A search was conducted in PubMed, Scopus, Medline, and Google Scholar (2010–2024) using MeSH terms: «vertebroplasty», «compression fractures», «osteoporosis», «risk factors», «recurrence». Twenty cohort studies (7,923 patients) were included. Continuous variables were pooled using the Sidik–Jonkman random-effects model (Cohen's d), and categorical variables using the Paule–Mandel model (odds ratio, OR). Heterogeneity was assessed with I^2 and prediction intervals; sensitivity analyses were performed. Evidence certainty was evaluated using GRADE.
Results. Significant risk factors for rVCFs included absence of anti-osteoporotic therapy (AOT) (OR = 1.97, I^2 = 40 %), cement leakage (OR = 1.92, I^2 = 68 %), and low bone mineral density (BMD) (d = −0.55, I^2 = 72 %), with moderate GRADE certainty. Female sex (OR = 1.30, I^2 = 39 %) and older age (d = 0.24, I^2 = 62 %) showed weaker associations with low certainty. Cement volume, body mass index, kyphotic angle, its correction, vertebral height restoration, and thoracolumbar junction involvement were not associated with rVCFs.
Conclusions. The most significant RVCF risk factors are absence of AOT, cement leakage, and low BMD, nearly doubling the risk. Female sex increases risk by approximately one-third, and older age has a minor effect. These findings highlight the importance of AOT and technical precision in PVP to prevent rVCFs.
Conflict of interest. The authors declare that there is no con-flict of interest.

P1262

BIOCHEMICAL CHANGES IN BLOOD AND URINE IN OSTEOPOROTIC PATIENTS WITH RECURRENT VERTEBRAL COMPRESSION FRACTURES

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Objective
To determine the biochemical parameters of blood and urine in patients with new vertebral compression fractures in adjacent and distant spinal segments.
Materials and Methods
The study was conducted at the State Institution "Sytenko Institute of Spine and Joint Pathology of the National Academy of Medical Sciences of Ukraine" during 2023–2025. The diagnosis of osteoporosis was confirmed by densitometry. The age of patients in Group I ranged from 55 to 72 years, in Group II from 55 to 73 years, and in Group III from 56 to 72 years. The T-score values for the groups were as follows: Group I — −0.8 ± 0.2; Group II — −2.63 ± 0.3; Group III — −2.8 ± 0.26. Statistical analysis of the data was performed using Microsoft Excel XP and StatSoft Statistica 6.0 software packages.
Results
In patients of Group II, who, compared with Group I, had concomitant osteoporosis, new vertebral compression fractures developed after spinal surgery on the background of osteoporosis. These changes were reflected in biochemical markers of bone and cartilage metabolism. Specifically, there was an increase in the blood levels of glycoproteins (markers of systemic inflammation) and chondroitin sulfates (indicators of bone and cartilage tissue destruction); an increase in the activity of alkaline phosphatase (due to its bone isoenzyme) and acid phosphatase (markers of bone metabolism); an elevation in ionized calcium levels (a marker of mineral matrix degradation); and increased urinary excretion of hydroxyproline (a marker of collagen catabolism) and uronic acids (metabolites of proteoglycans in bone and cartilage tissues).
Conclusions
The conducted laboratory studies indicate the potential use of a complex of biochemical markers for assessing the risks of progressive bone and cartilage tissue destruction after fractures in osteoporotic patients. Such markers may serve as valuable predictors for identifying patients at increased risk of recurrent vertebral fractures and the possible need for repeated surgical interventions.
Conflict of interest. The authors declare that there is no con-flict of interest.

P1263

PREDICTIVE MODEL FOR NEW VERTEBRAL COMPRESSION FRACTURES AFTER PERCUTANEOUS VERTEBROPLASTY USING RADIOGRAPHIC MORPHOMETRY

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Objective: To identify prognostic radiographic morphometric parameters of vertebrae following percutaneous vertebroplasty (PVP) that may be associated with the risk of developing new vertebral compression fractures (NVCF) after the PVP, and to develop a mathematical model for predicting such fractures.
Material and Methods: A retrospective cohort study (2023–2025) was conducted at the Institute of Spine and Joint Pathology, Ukraine, involving 26 patients (24 females, 2 males; mean age 69.04 ± 2.04 years) with osteoporotic vertebral compression fractures treated with PVP. Morphometric parameters of 99 vertebrae were assessed on digital radiographs (frontal/sagittal, RadiAnt DICOM Viewer, precision 0.1 mm/0.1°): anterior (Ha), middle (Hm), posterior (Hp) heights, relative compression (%), wedge index, local kyphotic angle, thoracic kyphosis, lumbar lordosis, and scoliosis (Cobb's angles). Statistical analysis (Statistica 13, easyROC) included Shapiro–Wilk's normality test, Mann–Whitney's test for comparisons, multivariate discriminant analysis (backward stepwise), and ROC analysis.
Results: NVCF occurred in 46.2% of cases (45 fractures in 12 patients). Significant differences between NVCF and non-NVCF groups were observed for Ha compression (20.69 ± 1.16 mm vs. 23.89 ± 0.78 mm, p=0.0338), Hm (17.84 ± 1 mm vs. 21.31 ± 0.61 mm, p=0.0021), Hp (26.97 ± 0.81 mm vs. 29.61 ± 0.51 mm, p=0.0073), lumbar lordosis (44.4 ± 1.52° vs. 38.28 ± 1.46°, p=0.01), and scoliosis (7.53 ± 0.56° vs. 5.90 ± 0.48°, p=0.022). The linear discriminant functions model, based on Hm (canonical correlation = −0.863) and relative Ha compression (canonical correlation = 0.139), achieved Wilks' Λ = 0.8 (χ^2 = 15.77, p=0.000376), classification accuracy of 76.25% (sensitivity 76.9%, specificity 75.9%), and AUC = 0.754 ± 0.058. Adjusted function: D = −2.197 * Hm + 0.095 * Ha(%) − 17.133; D > −1.955 indicates NVCF risk. Other parameters were excluded due to low discriminatory power or collinearity.
Conclusion: This two-parameter model, using Hm and relative Ha compression, offers moderate predictive accuracy for NVCF post-PVP. Its simplicity suits resource-limited Ukrainian clinics. External validation and inclusion of confounders (e.g., BMD, therapy) are required for broader adoption.

Conflict of interest. The authors declare that there is no con-flict of interest.

P1264

AGE-RELATED FEATURES OF GROWTH AND SHAPING OF THE MANDIBLE IN WHITE RATS UNDER CONDITIONS OF CHRONIC RENAL FAILURE

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Objective of the study was to establish age-related features of growth and shaping of the mandible in white rats under conditions of chronic renal failure.
Material and methods. The experiment included 144 white male rats. CRF was modeled using subtotal nephrectomy. The mandibles were isolated and their osteometry was performed.
Results. Under conditions of CRF in infantile rats, the height of the mandibular ramus from day 15 to day 90 of the experiment lagged behind the values of the Int group by 5.80%, 8.65% and 7.86%, and the maximum length of the mandible by days 30 and 90 – by 6.59% and 4.45%. The height of the alveolar process from day 15 to day 90 was less than the values of the Int group by 5.38%, 7.67% and 8.86%. In sexually mature animals, the height of the mandibular ramus by 30 and 90 days after the operation lagged behind the values of the Int group by 6.44% and 6.34%, and the maximum length of the mandible - by 5.33% and 6.70%. The height of the alveolar process by 30 and 90 days was less than the values of the Int group - by 7.85% and 6.03%. In old rats with CRF, the height of the mandibular ramus by 90 days after the operation lagged behind the values of the Int group by 3.19%. The height of the alveolar process of the mandible with CRF from the 15th to the 90th day was less than the values of the Int group by 6.37%, 8.01% and 8.12%.
Conclusion. CRF is accompanied by inhibition of growth processes in the mandible. These changes are observed earlier in senile rats on the 7th day after surgery, and later in sexually mature rats on the 30th day.

P1265

MANGANESE DISTRIBUTION TO THE UNDAMAGED BONES AFTER IMPLANTATION OF MANGANESE-ENHANCED HYDROXYAPATITE IMPLANTS INTO THE DEFECTS OF THE TIBIAE

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Objective of the study is to test manganese distribution in the undamaged skeletal bones after implantation of manganese-enhanced hydroxyapatite implants into the tibia.
Material and methods. In the study we used grounded bone ash taken from the mandibular rami of the rats with the defects in the tibiae filled with manganese-enhanced hydroxyapatite material. Manganese shares in the implants were 0.1%, 0.25%, and 0.5%. Intact animals, animals with empty defects, and animals with pure HA implants were added for comparison purposes. Observation terms were 7, 15, 30, 60, 90, and 180 days. Manganese levels in ash were detected by atomic emission spectroscopy. The data were analyzed by ANOVA methods.
Results. In animals with 0.1% share of manganese in the implants as compared to the animals with pure HA implants, manganese levels significantly increased by the 15th and the 30th days of the experiment – by 11.36% and 8.35% respectively. With manganese share in the implants increase to 0.25%, manganese levels growth was observed in the period from the 7th to the 90th day – by 4.63%, 9.55%, 9.37%, 6.35%, and 4.04% respectively. After implantation of 0.5% manganese implants, manganese levels began increasing from the 15th day of the experiment and lasted up to the 180th day. Manganese levels in this group increased by 11.36%, 11.61%, 7.50%, 5.32%, and 5.74% respectively.
Conclusion. During resorption of manganese containing bone implants manganese is likely to spread to undamaged bones and thus improve bone structure restoration after systemic bone loss that follows fracture or bone tissue removal. Its effects depend on manganese concentration in the implants. 0.25% share of manganese is optimal for concentration maintenance.

P1266

MAGNESIUM CONTENT OF BONE REGENERATE MINERAL IN DIABETIC RATS WITH INTACT BONES AND AFTER SECONDARY FRACTURE OF THE TIBIA

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Objective of the study is to test magnesium levels in rats with type 2 diabetes (T2D) with intact bones and after modeling of secondary fracture in the tibia after healing of fracture the femur.
Material and methods. Bone samples were collected from 72 female rats. Group 1 (n=24) comprised intact animals, group 2 (n=24) comprised rats with T2D modeled by means of 60-day high-fat and saccharose diet, and group 3 (n=24) comprised animals with secondary fracture modeled as consecutive openings in the femur and the tibia separated by 60-day period assigned for femur healing. Observation terms were 7, 15, 30, and 60 days after tibia surgery. Ashed and grounded specimens collected from callus area were used for measuring of magnesium level in bone mineral. In animals without fractures, bone specimens were collected from the area corresponding to fracture area in operated animals.
Results. Diabetic animals without fractures as compared to the intact ones exhibited magnesium level increase in the period from the 15th to the 60th day of the experiment – by 6.54%, 6.53%, and 7.03% respectively. In diabetic animals with secondary fracture of the tibia also in comparison with the intact animals, magnesium level increase was more pronounced. In the period from the 7th to the 30th day magnesium level increased by 8.61%, 12.01%, and 12.44%.
Conclusion. It is known that in T2D serum magnesium levels decrease. In our study magnesium release from the bone mineral in diabetic animals suggest that low serum magnesium does not significantly affect magnesium stored in apatite crystals. Such a release is possibly caused by impaired apatite crystal formation in diabetes accompanied by increased bone resorption. As far as in fracture bone resorption becomes more intense, combined action of diabetes and fracture may affect bone formation by derangement of magnesium content in bone mineral.

P1267

ASSOCIATION BETWEEN DIABETES AND BONE MINERAL DENSITY IN PATIENTS WITH HIP FRACTURES

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Objective:Although diabetes mellitus increases fracture risk, bone mineral density (BMD) in patients with diabetes has been reported to be preserved or even increased, and the relationship between the two remains unclear.
Methods:We conducted an observational study of patients admitted with hip fractures between November 2024 and October 2025. Diabetes was defined as the use of antidiabetic medications or an HbA1c level ≥6.5%. Patients were classified into diabetes and non-diabetes groups. Lumbar spine and femoral neck BMD were measured by dual-energy X-ray absorptiometry. Multivariable linear regression analyses were performed adjusting for age, sex, body mass index (BMI), steroid use, use of osteoporosis medications, use of anticonvulsants, and estimated glomerular filtration rate (eGFR). Additional analyses were conducted among patients with diabetes to evaluate the association between HbA1c and BMD.
Result:The study included 75 patients with diabetes (mean age 86 years) and 171 patients without diabetes (mean age 85 years); 63 women in the diabetes group and 131 women in the non-diabetes group. Lumbar spine BMD was higher in patients with diabetes than in those without diabetes (0.82 ± 0.069 vs. 0.74 ± 0.20 g/cm²), while femoral neck BMD was 0.46 ± 0.038 and 0.43 ± 0.066 g/cm², respectively. Multivariable analysis showed that diabetes was significantly associated with higher lumbar spine BMD (β = 0.058, p = 0.013), but not with femoral neck BMD (β = 0.017, p = 0.19). Among patients with diabetes, HbA1c was not associated with lumbar spine BMD (β = −0.01, p = 0.64), whereas higher HbA1c was significantly associated with lower femoral neck BMD (β = −0.03, p = 0.048).
Conclusions:In patients with hip fractures, diabetes was associated with higher lumbar spine BMD but not with femoral neck BMD. In contrast, in analyses restricted to patients with diabetes, HbA1c showed a negative association with femoral neck BMD, suggesting that the effects of diabetes and glycemic control on bone mineral density may differ by skeletal site.

P1268

BONE TISSUE STATUS IN ADOLESCENTS DEPENDING ON GROWTH INTENSITY AND BSML POLYMORPHISM OF THE VDR GENE

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Objective: To determine the characteristics of the bone tissue condition of adolescents based on the study of densitometry indicators, BSML polymorphism of the VDR gene, and growth intensity.
Materials and methods: 292 children aged 10-17 years were examined. They were divided into two groups depending on gender: 159 boys and 133 girls. Criteria of inclusion: absence of chronic somatic and endocrine pathology, genetic diseases. Adolescent presented to University Pediatric Clinic for general clinical examination, ultrasound densitometry (QUS) (Sonost-2000, Korea) and dual-energy X-ray absorptiometry (DXA) (HOLOGIC QDR W Explorer, USA) were performed according to indications, molecular diagnostics - BSML polymorphism of the VDR gene. The criterion for reducing bone mineral density according to the recommendations of The International Society For Clinical Dencitometry, 2019, was considered to be BMD Z-score ≤ -2.
Results: Low bone mineral density was diagnosed in 66 boys (41.5%) and 52 girls (39.1%) according to the results of QUS and confirmed by DXA. The average Z-score in boys was -2.28±0.302, in girls – -2.41±0.291. In children with a growth spurt, a decrease in BMD was diagnosed in 50.3% of boys and 60.2% of girls, which is significantly higher than the average indicators for the groups. Pathological mutations (heterozygous and homozygous) of the BSML polymorphism of the VDR gene were detected in 47.2% of boys and 57.1% of girls. In children with a growth spurt, pathological mutations (heterozygous and homozygous) of the BSML polymorphism of the VDR gene were found in 47.8% of boys and 58.3% of girls, which does not significantly differ from the general group of children.
Conclusion: Decreased of bone mineral density was shown in 41.5% of the examined boys and 39.1% of the girls, while in girls in the group with a growth spurt, low bone mineral density was detected more often (60.2%) than in boys (50.3%). Also, pathological mutations of the BSML polymorphism of the VDR gene dominate in the examined children, which lead to a violation of mineral metabolism and requires preventive measures to maintain the health of the bone tissue. But at the same time, during the period of intensive growth, pathological mutations of the BSML polymorphism of the VDR gene did not affect the level of bone mineralization and the percentage of children with low BMD did not become significantly higher, which affects other mechanisms of the formation of a transient decrease in BMD during the growth spurt.

P1270

SECONDARY HYPERPARATHYROIDISM AND BONE HEALTH *BMD AND TBS)): BUSHEHR ELDERLY HEALTH PROGRAM

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Objective: Although the adverse skeletal effects of prolonged, untreated primary hyperparathyroidism (PHPT) are well established, data on the impact of secondary hyperparathyroidism (SHPT) on skeletal health in the general population remain limited. This study investigated the

associations between SHPT and bone mineral density (BMD) as well as trabecular bone score (TBS) in adults aged ≥50 years from a population-based cohort in southern Iran.
Methods: This cross-sectional population-based study used data from the second recruitment phase of the Bushehr Elderly Health Program (BEHP). Participants with low parathyroid hormone (PTH) levels or elevated PTH accompanied by hypercalcemia were excluded. The final analysis included 1,774 individuals, comprising 425 (24%) with SHPT and 1,349 with normal PTH levels. Associations between SHPT and BMD or TBS were assessed using univariable and multivariable linear and logistic regression models, adjusting for relevant confounders.
Results: SHPT was independently associated with lower BMD at predominantly cortical skeletal sites, including the femoral neck (FN; adjusted β = −0.021, 95% CI: −0.034 to −0.009, p = 0.001) and total hip (TH; adjusted β = −0.020, 95% CI: −0.033 to −0.006, p = 0.003). No significant association was observed between SHPT and lumbar spine (LS) BMD. While SHPT was significantly associated with lower TBS in crude analyses (β = −0.023, 95% CI: −0.035 to −0.011, p < 0.001), this relationship attenuated to borderline significance after multivariable adjustment (β = −0.009, 95% CI: −0.020 to 0.001, p = 0.08).
Conclusion: In this population-based cohort, SHPT was associated with reduced BMD at cortical bone sites (FN and TH), whereas LS BMD appeared relatively preserved. However, the observed decline in TBS suggests potential impairment of trabecular bone microarchitecture. Reliance on BMD alone may therefore underestimate skeletal fragility in individuals with SHPT. Integrating TBS with BMD may provide a more comprehensive evaluation of bone health and fracture risk. Early detection and management of SHPT may play an important role in preserving skeletal integrity.

P1271
HYPERURICEMIA IN KNEE OSTEOARTHRITIS

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Purpose: to study the relationship between hyperuricemia (HU) and clinical and laboratory parameters in patients with osteoarthritis (OA) of the knee joint (KJ).

Methods. The study included 255 patients aged 40–75 years with a reliable diagnosis of knee OA, stages I–III according to Kellgren-Lawrence, who signed informed consent. The mean age was 53.0±10.5 years, body mass index (BMI) was 28.8±6.7 kg/m2, and the median disease duration was 2 [0.8; 7] years. An individual card was completed for each patient. All patients underwent standard radiography and laboratory examination.

Results: GU was detected in 16.9% of cases. Patients were divided into two groups based on the presence of GU. However, the group of patients with HU had a higher BMI and waist circumference (WC). In this regard, an adjustment for BMI and WC was made, after which the difference in the group of patients with HU, higher medians of the following parameters were still recorded: triglycerides (TG), creatinine, ALP, 25-OH vitamin D, and lower HDL (Table 1).

Table 1 – Comparative clinical, instrumental, and laboratory characteristics of patients with OA with and without HU

Indicator	Patients with OA and HU (n=42)	Patients with OA without HU (n=109)	p
TG, mmol/L, Me	1.59 [1,26; 2,23]	1.14 [0.86; 1.71]	**0.001**
HDL, mmol/L, Me	1.3 [1.17; 1.62]	1.63 [1.29; 1.89]	**0.003**
Creatinine, μmol/l, Me	71.6 [64,4; 82]	65 [56; 71.1]	**<0.0001**
ALP, ед/л, Me	84.2 [73.8; 94.2]	75 [63.4; 89.4]	**0.02**
25-OH vitamin D, ng/ml, Me	22 [16.8; 28.3]	28.1 [22.1; 35.4]	**0.05**
CRP, mg/l, Me	3.1 [1.6; 5.4]	2 [0.9; 4]	**0.001**

Subsequently, during a simple regression analysis, the relationships between HU and TG (β = 0.13, p = 0.0003), HDL (β = -0.11, p < 0.0001), ALP (β = 0.16, p < 0.0001), and creatinine (β = 0.12, p < 0.0001) were confirmed; at the same time, no relationship was observed between HU and CRP (p > 0.05).

Conclusions. This study provides new insights into the relationship between HU and knee OA, demonstrating that the negative impact of the former is mediated by the patient's metabolic status, thereby integrating HU into the context of metabolic syndrome.

P1272
HYPERURICEMIA AND MRI-DETECTED STRUCTURAL CHANGES IN KNEE OSTEOARTHRITIS

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Purpose: To investigate the associations between hyperuricemia (HU) and structural changes in MRI in patients with knee osteoarthritis (OA).

Methods. The study included 255 patients aged 40–75 years with a confirmed diagnosis of knee OA (ACR) stage I–III according to Kellgren-Lawrence radiographic classification and who signed informed consent. The mean age was 53.0±10.5 years, body mass index (BMI) – 28.8±6.7 kg/m2, median disease duration – 2 [0.8; 7] years. All patients underwent standard radiography, ultrasound of the knee joints, and MRI of the target joint.

Results: HU was detected in 43 patients (16.9%). Depending on the presence of HU, patients were divided into two groups. The group of patients with HU was characterized by more pronounced changes in instrumental examination: an advanced radiographic stage was detected more often (III - 13.95 versus 7.08, II - 53.49 versus 38.68, I - 32.56 versus 54.25%, p < 0.05), thicker synovial membrane dimensions according to ultrasound (3.0 [2.5; 3.3] versus 2.7 [2.0; 3.1] mm, p = 0.008). According to MRI of the knee (WORMS system), patients with HU were significantly more likely to have osteitis in the medial condyle and central tibia (TC), osteophytes in the femur (FC) and TC, and collateral ligament damage

(Table 1). However, the group of patients with HU had a higher BMI and WC. Therefore, after adjustment for BMI and WC, the differences in radiographic stage, ultrasound, and MRI parameters were eliminated (p>0.05).

Table 1. Comparative characteristics of MRI data of knee joints in patients with OA depending on the presence/ absence of HU

Indicator	Patients with OA and HU (n=43)	Patients with OA without HU (n=212)	p
Osteitis in the medial condyle TC, %	31.3	10.6	**0.031**
Osteitis in the central sections TC, %	31.25	7.5	**0.004**
Osteophytes in the medial condyle FC, %	56.25	30.1	**0.009**
Osteophytes in the lateral condyle FC, %	56.25	27.5	**0.011**
Osteophytes in the medial condyle TC, %	56.25	33	**0.01**
Osteophytes in the lateral condyle TC, %	56.25	31	**0.007**
Medial collateral ligament injury, %	25	7	**0.033**
Lateral collateral ligament injury, %	18.57	5	**0.03**

Conclusions. The identified relationship between HU and the severity of structural changes in joints in OA is not independent and is due to the influence of concomitant abdominal obesity and excess body weight.

P1273

ASSOCIATION OF MR T2 RELAXATION TIMES IN DIFFERENT CARTILAGE LAYERS WITH CLINICAL, LABORATORY, AND IMAGING PARAMETERS IN KNEE OSTEOARTHRITIS

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Purpose: to study the relationship between MR T2 cartilage relaxation time and clinical, laboratory and instrumental parameters in patients with osteoarthritis (OA) of the knee joint (KJ).

Methods. A prospective study included 96 patients aged 40–75 years with a confirmed diagnosis of knee OA, stages I–III according to Kellgren-Lawrence, who signed informed consent. The average age was 52.7±10.5 years, body mass index (BMI) was 29.0±6.5 kg/m². Each patient underwent MRI of the target knee with determination of T2 cartilage relaxation time (T2) in the total, deep, and superficial layers.

Results: The T2 value in the total cartilage layer was 36.05 [34.2; 39.45] ms, in the deep layer – 35.4 [33.35; 38.45] ms, in the superficial layer – 39.3 [35.6; 43.6] ms. Spearman's rank correlation analysis revealed statistically significant positive relationships ($p < 0.05$) between T2 in various cartilage layers and body weight, BMI, synovitis (clinical), radiographic stage, synovial thickness by ultrasound, and the level of C-terminal telopeptide of type I collagen (CTX-I) (Table 1).

Table 1 – Correlation coefficients between T2 and various clinical, instrumental, and laboratory parameters

Indicator	r	p
Total cartilage layer		
Radiographic stage	0.42	<0.0001
Body weight, kg	0.33	0.007
BMI, kg/m2	0.24	0.049
Synovial thickness on ultrasound, mm	0.29	0.045
CTX-I, ng/ml	0.45	0.047
Deep cartilage layer		
Radiographic stage	0.28	0.022
Body weight, kg	0.26	0.039
Superficial cartilage layer		
Radiographic stage	0.44	<0.0001
Body weight, kg	0.31	0.013
Synovitis (clinically)	0.25	0.047
CTX-I, ng/ml	0.48	0.033

Conclusions. The established positive correlations between T2 in different layers of cartilage and anthropometric (body weight, BMI), clinical (synovitis), instrumental (radiographic stage, synovial thickness according to ultrasound) parameters and the bone resorption marker CTX-I confirm the relationship between the structural degradation of the cartilage matrix with metabolic factors, inflammatory activity and the intensity of bone resorption.

P1274

COMPARATIVE ASSESSMENT OF THE EFFICACY AND SAFETY OF TOPICAL TENOXICAM AND DICLOFENAC THERAPY IN PATIENTS WITH KNEE OSTEOARTHRITIS

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OBJECTIVE: To evaluate the efficacy and safety of tenoxicam 1% gel compared with diclofenac 1% gel in patients with knee osteoarthritis (OA) in a prospective randomized comparative study.
MATERIALS AND METHODS: The study included 60 patients (91.7% women) with knee OA, Kellgren–Lawrence grade II–III. Mean age was 62.5±8.0 years, mean body mass index (BMI) 24.9±4.7 kg/m², and disease duration 5.7 (3–15) years. Patients were randomly assigned to two groups: Group 1 received tenoxicam 1% gel (5 cm twice daily for 14 days), and Group 2 received diclofenac 1% gel using the same regimen.
Pain intensity (VAS), WOMAC index, quality of life (EQ-5D), and time to onset of effect were assessed. Three visits were performed: baseline (V1), day 7 (V2), and day 14 (V3).
RESULTS: At baseline, groups were comparable in age (63.2±7.6 vs 61.8±8.5 years), BMI (24.8±4.1 vs 25.0±5.2 kg/m²), OA duration (8.5 [3;17] vs 6.5 [3;10] years), and pain VAS (60.1±11.7 vs 57.3±11.4 mm; p>0.05).
After 7 days, both treatments significantly reduced pain (Figure 1). In Group 1, pain decreased by 23.2% at V2 (to 45.7±14.7 mm; p<0.0001) and by 32.5% at V3 (to 40.2±15.8 mm; p<0.0001). In Group 2, pain reduction was 19.2% at V2 (46.3±17.0 mm; p=0.0008) and 28.0% at V3 (41.1±17.1 mm; p<0.0001). Similar trends were observed for WOMAC total score and subscales (pain, stiffness, physical function).
EQ-5D significantly improved in Group 1 (V1: 0.52 [0.52;0.59], mean 0.47; V2: 0.52 [0.52;0.59], mean 0.55; p=0.04; V3: 0.59 [0.52;0.69], mean 0.59; p=0.01 vs baseline), while no significant changes were observed in Group 2. No serious adverse events were reported.

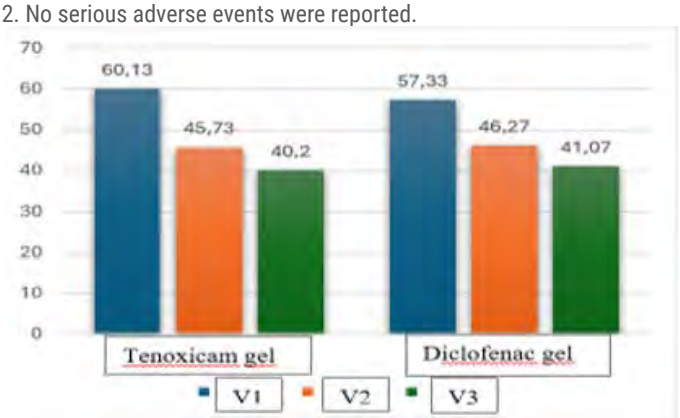


Figure 1. Changes in knee pain intensity (VAS) during walking during topical therapy.

CONCLUSIONS:The study demonstrated high clinical efficacy and a favorable safety profile of topical tenoxicam and diclofenac in patients with knee OA.

P1275

KEY FACTORS OF KNEE OSTEOARTHRITIS PROGRESSION: INSTRUMENTAL CHARACTERISTICS (RESULTS OF A LONG-TERM PROSPECTIVE STUDY)

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OBJECTIVE: To identify risk factors for radiographic progression of knee osteoarthritis (KOA) based on instrumental imaging findings.
MATERIALS AND METHODS: The study included 110 women with KOA, Kellgren–Lawrence grade I–III, who provided informed consent. Mean age was 59.1±9.0 years, body mass index 31.5±5.9 kg/m², and disease duration 8 [3;20] years. Individual case records included anthropometric data, medical history, clinical examination, standard radiography, ultrasound (US), magnetic resonance imaging (MRI) of the knee joints, and densitometry of subchondral regions of the femur and tibia.
RESULTS: After 5 years of follow-up, radiographic progression (increase in Kellgren–Lawrence grade) was observed in 40 patients (Group 1), while 70 patients (Group 2) showed no progression. The groups were comparable in age (59.2±9.5 vs 59.0±8.1 years) and disease duration (11.1±10.6 vs 13.7±9.9 years).
Compared with Group 2, patients in Group 1 more frequently had synovitis on US (62.5% vs 34.3%; p=0.004). MRI revealed a higher prevalence of bone marrow edema in the medial femoral and tibial compartments (70% vs 20% and 80% vs 24.3%, respectively; p=0.001), subchondral cysts in the medial femur and tibia (52.5% vs 12.9% and 55.5% vs 18.6%, respectively; p=0.001), and severe medial meniscal damage with displaced tears or complete destruction (55% vs 24.3%; p=0.003).
Densitometry showed higher bone mineral density (BMD) in the medial tibial condyle (0.90 [0.69–1.10] vs 0.78 [0.69–0.86]; p=0.003) and across subchondral tibial regions (0.82 [0.66–0.97] vs 0.74 [0.66–0.83]; p=0.013) in Group 1.
Spearman correlation analysis confirmed significant associations between OA progression and synovitis on US (R=0.49), bone marrow edema in medial compartments (R=0.38), and medial meniscal damage on MRI (R=0.34; p<0.05 for all). Additional associations were found with BMD of subchondral tibial regions overall and the medial tibial condyle (R=0.28 and R=0.37, respectively; p<0.05).
CONCLUSIONS: Synovitis, bone marrow edema, severe medial meniscal damage, and higher BMD of the medial tibial condyle and subchondral tibial regions are associated with radiographic progression of knee osteoarthritis.

P1276

EFFECT OF COMBINATION THERAPY WITH GLUCOSAMINE HYDROCHLORIDE AND CHONDROITIN SULFATE ON MARKERS OF SYSTEMIC INFLAMMATION IN PATIENTS WITH KNEE OSTEOARTHRITIS

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Objective: To study the effect of combination therapy of glucosamine hydrochloride (500 mg) and chondroitin sulfate (500 mg) on markers of systemic inflammation in patients with knee osteoarthritis (OA).
Methods. The study included 70 patients aged 41 to 74 years with a confirmed diagnosis of Kellgren–Lawrence stage II-III OA of the knee joint and a walking pain level of ≥4 points on the Numerical Rating Scale (NRS). The duration of the disease ranged from 1 to 25 years. All patients gave informed consent.
Results: During the three-month study, statistically significant positive dynamics of clinical indicators were recorded: the median pain intensity according to the NRS decreased from 5 [5; 6] to 3 [2; 4] points ($p < 0.0001$); according to the WOMAC index: pain - from 9 [7; 11] to 5 [3; 8] points, stiffness - from 4 [3; 5] to 3 [1; 4] points, functional impairment - from 36 [24; 41] to 23.5 [12; 32] points ($p < 0.0001$ for all indicators); 3) the general assessment of patient health (GAHP) increased from 50 [50; 70] to 65 [58; 75] mm ($p<0.0001$) (Figure 1). In addition, a decrease in the proportion of patients with clinically detectable synovitis ($p=0.04$) and limited knee motion ($p<0.0001$) was noted. A significant result was a decrease in tumor necrosis factor-α (TNF-α) levels (0.5 [0.1; 0.9] at baseline and 0.3 [0; 0.8] pg/ml at the end of the study, $p=0.04$), confirming the anti-inflammatory effect of the combination of chondroitin sulfate and glucosamine hydrochloride.

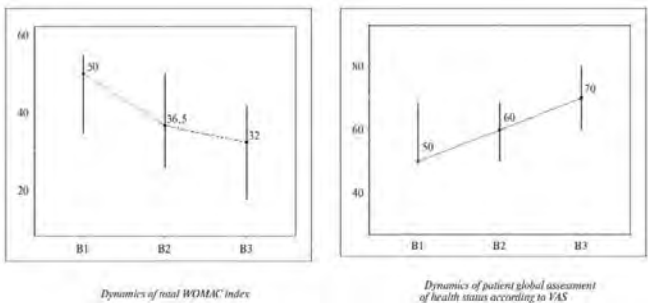


Figure 1. Dynamics of total WOMAC and GAHP indicators during the use of combination therapy with glucosamine hydrochloride and chondroitin sulfate.

Conclusions. A single-center study demonstrated that combination therapy with glucosamine hydrochloride and chondroitin sulfate in patients with knee OA resulted not only in rapid symptomatic improvement but also in a consistent increase in clinical efficacy throughout the entire observation period. This study expands our understanding of the molecular pathways underlying the efficacy of the chondroitin sulfate and glucosamine hydrochloride combination, focusing on the reduction of TNF-α levels.

P1277

MR T2 RELAXATION TIME IN PATIENTS WITH METABOLIC PHENOTYPE OF OSTEOARTHRITIS

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Purpose: To study MR T2 relaxation time of cartilage in patients with metabolic phenotype (MP) of osteoarthritis (OA).
Methods. The prospective study included 96 patients aged 40–75 years with a confirmed diagnosis of knee OA, stages I–III according to Kellgren-Lawrence, who signed informed consent. The mean age was 52.7±10.5 years, body mass index (BMI) was 29.0±6.5 kg/m2. Each patient underwent MRI of the target knee with determination of T2 cartilage relaxation time (T2) in the total, deep, and superficial layers. MP was established if the patient had a waist circumference > 80 cm and two or more of the following symptoms: hypertension/elevated triglyceride levels over 1.7 mmol/l/decreased HDL levels — less than 1.0 mmol/l in men and less than 1.2 mmol/l in women/fasting hyperglycemia/impaired glucose tolerance.
Results: MP OA was detected in 41% of cases. Depending on the presence of MP, patients were divided into two groups. No differences in T2 values were found in the total and deep layers: (36.5 [34.1; 43.3] vs. 35.7 [34.5; 38.6] ms, $p=0.07$) and 35.5 [33.7; 38.5] vs. 35.3 [32.9; 38.0] ms, $p=0.28$), respectively. However, patients with MP had significantly higher T2 levels in the superficial cartilage layer (40.7 [36.0; 43.3] vs. 38.9 [35.3; 41.3] ms, $p=0.04$) (Figure 1). Spearman's correlation analysis also demonstrated a positive relationship between these indicators ($r=0.23$, $p<0.04$).

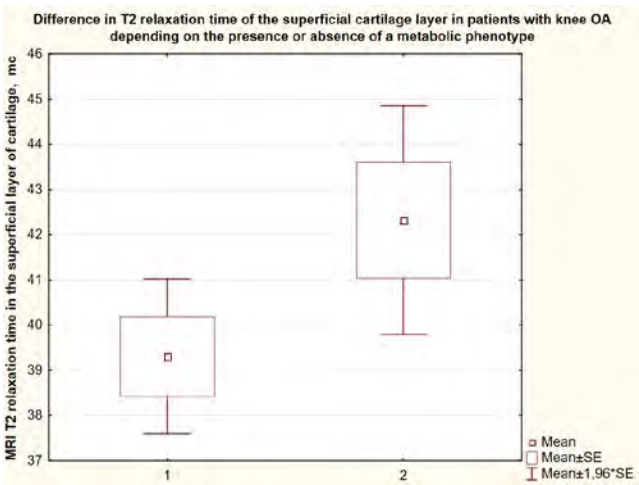


Figure 1. Difference in T2 relaxation time of the superficial cartilage layer in patients with knee OA depending on the presence or absence of a metabolic phenotype

Conclusions. The results of the study may indicate a significant influence of metabolic disorders on the processes of degradation of the cartilage matrix, mainly in its superficial layer.

P1278

A COMPARATIVE STUDY OF THE PREVALENCE OF ABNORMAL LOW MUSCLE MASS BETWEEN THAI OLDER ADULTS WHO CONSUME A PLANT-BASED DIET AND MEAT-INCLUSIVE DIET

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Objective: Sarcopenia involves the age-related loss of muscle mass and strength, increasing mortality and injury risks. While animal proteins support muscle synthesis, the rising popularity of plant-based diet for chronic disease prevention raises concern of potential muscle wasting. This study investigates the concern by comparing the prevalence of low muscle mass and sarcopenia, muscle strength and physical performance between Thai elderly following plant-based versus meat-inclusive diet.
Material & methods: This cross-sectional study, conducted from October to December 2025, compares low muscle mass between Thai elderly individuals following plant-based versus meat-inclusive diet. Participants, age > 60 years, maintained same dietary pattern for at least 2 years. We recruited plant-based subjects from dhamma retreats and meat-inclusive subjects from the prior study[1]. Data collection involved appendicular skeletal muscle mass (ASM) measurement, muscle strength and physical performance assessments. Low muscle mass and sarcopenia were diagnosed under both criteria from Asian Working Group for Sarcopenia (AWGS) 2019 and 2025.
Results: A total of 198 plant-based and 301 meat-inclusive participants were included. Although higher ASM was found in meat-inclusive group, prevalence of low muscle mass under AWGS 2019 criteria between groups were not significantly different (17.2% in plant-based group and 17.3% in meat-inclusive group, p=0.976). According to the new cut-off for low muscle mass in AWGS 2025, prevalence of low muscle mass increased and were still not significantly different. In contrast, plant-based participants performed better in physical performance tests. Prevalence of sarcopenia and muscle strength were the same in both groups.
Conclusion: From this study, same prevalence of low muscle mass between groups according to both criteria were found. Also, sarcopenia prevalence and muscle strength were similar. However, plant-based group performed better in physical performance assessments.
Reference:

1. Vanitcharoenkul E, Unnanuntana A, Chotiyarnwong P, et al. Sarcopenia in Thai community-dwelling older adults: a national, cross-sectional, epidemiological study of prevalence and risk factors. *BMC Public Health*. 2024;24(1):311.

P1279

DEFINITION OF THE JOINT AS AN ORGAN OF THE MUSCULOSKELETAL SYSTEM

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Introduction.
The majority of anatomy and orthopaedic textbooks, both in Russia and internationally, define a joint as a “movable connection between bones,” thereby excluding soft tissues as integral components. The concept of the joint as an independent hollow organ composed predominantly of soft tissues remains largely overlooked in clinical practice, where an outdated, bone structures -centred definition is still widely used.
Objective.
To elucidate the developmental process of the joint and to characterize its morphology as an independent organ based on embryological and anatomical investigations.
Materials and Methods.
A morphological study was conducted using aborted human fetal material. Preparations of 36 joints (20 knee and 18 hip joints) from embryos at gestational ages of 5–20 weeks were examined. Staining was performed with hematoxylin and eosin. Anatomical dissection was carried out on cadaveric material (3 knee and 3 hip joints). The joints were isolated from surrounding bone and muscle tissue and tendons using blunt and sharp dissection techniques, including rotary instruments.
Results and Discussion.
A joint is defined as a hollow connective tissue organ, the obligatory components of which are the capsule, articular cartilage, and synovial membrane. Optional components include ligaments, articular discs, menisci, and bursae. The primary functions of the joint are the connection of bones and facilitation of mobility; additional functions include load bearing, shock absorption, congruence, and wear resistance.
Integrated embryological, molecular, and biomechanical data demonstrate that the joint forms as a distinct organ, developing prior to and independently of adjacent bones. Its cells possess a unique molecular profile, distinct from growth plate chondrocytes, and are governed by specific regulatory mechanisms. This fundamental concept has direct clinical implications: joint pathologies (including osteoarthritis) should be regarded not as “bone wear,” but as primary disorders of an independent organ, requiring appropriate diagnostic and therapeutic strategies.
Conclusions.
The joint develops as an independent organ, the primordium of which arises prior to and outside the bone anlagen. Its components have a unique cellular origin, molecular profile, and dependence on external signals. Recognition of this independence is fundamental for understanding the pathogenesis of osteoarthritis and for developing organ-preserving treatment strategies. Dissection and isolation of the joint constitute a labor-intensive process even in vitro.
In this context, experimental research aimed at developing methods for isolating and mobilizing joints in vitro and in vivo, as well as designing joint-preserving surgical procedures with conservation of bone tissue, appears promising.

P1280

SKELETAL MUSCLE STRENGTH AND ASSOCIATED FACTORS IN FEMALE RHEUMATOID ARTHRITIS PATIENTS

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Objective: To estimate the skeletal muscle strength and determine the factors affecting it in women with rheumatoid arthritis (RA).
Materials and methods. 202 people with rheumatoid arthritis were included in the study. The mean age was 59.3±9.1 years. Clinical and laboratory studies were conducted, among them an assessment of muscle strength. Using dual-energy X-ray absorptiometry (DXA), the appendicular lean mass (ALM) was evaluated, followed by the calculation of the appendicular lean mass index (ALMI).
Results. Among the patients with RA 28.7 % had low ALM and 19.3 % - low ALMI. The frequency of low muscle strength and physical performance was 76.2% and 45.5% accordingly. Univariate logistic regression revealed an association between low hand grip strength and low muscle strength of the legs with DAS28 (OR 1.66; 95% CI 1.21-2.28, p=0.002 and OR 1.66; 95% CI 1.24-2.22, p=0.001 accordingly) and DAS28-based RA activity level (OR 1.99; 95% CI 1.12-3.56, p=0.020 and OR 2.11; 95% CI 1.24-3.60, p=0.006 accordingly). Hand grip strength also associated with CRP (OR 1.04; 95% CI 1.01-1.07, p=0.018), ALM and ALMI (OR 0.84; 95% CI 0.75-0.94, p=0.003 and OR 0.65; 95% CI 0.48-0.89, p=0.007 accordingly) and presence of erosive arthritis (OR 4.75; 95% CI 1.99-11.36, p=0.001). Limb muscle strength was associated with the use of proton pump inhibitors (OR 3.56; 95% CI 1.85-6.84, p<0.001).
Conclusion. The frequency of sarcopenia in women with RA was 30.7%. Low muscle strength associated with the activity of the disease, assessed by DAS 28, the presence of erosive arthritis and muscle mass.

P1281

OSTEOSARCOPENIA: FOCUS ON BIOMARKERS OF MUSCLE, BONE, AND FAT TISSUES

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Objective: to determine the association of muscle, fat, and bone tissue markers with osteosarcopenia versus normal body composition in women with rheumatoid arthritis (RA).
Materials and Methods. 102 women with RA (aged 40-75 years) enrolled in the study, including 45 women with osteosarcopenia and 57 with normal body composition. Osteosarcopenia was diagnosed by osteopenia/osteoporosis or low bone mineral density (WHO criteria) and sarcopenic phenotype (appendicular muscle mass or index < 15 kg or <5.5 kg/m2 respectively). Dual-energy X-ray absorptiometry (Lunar prodigy, GE, USA) was performed to assess the body composition. Serum levels of myostatin, insulin-like growth factor 1(IGF-1), leptin, adiponectin, resistin, interleukin 6, irisin, and sclerostin were measured using Enzyme linked immuno sorbent assay (ELISA). The sensitivity and specificity of biomarkers for osteosarcopenia diagnostics were determined using ROC-analysis. The cut-off-points were determined by the Youden index.
Results. The levels of IGF-1, leptin, resistin, sclerostin were less and adiponectin levels were more in patients with osteosarcopenia than in women with normal body composition (p<0.05). In logistic regression, the following markers are significantly associated with osteosarcopenia: IGF-1 (OR 0.97 [95% CI 0.95; 0.99]), adiponectin (OR 1.23 [95% CI 1.02; 1.48]), and sclerostin (OR 0.92 [95% CI 0.87; 0.96]. IGF-1 showed the best result in ROC-analysis: the area under the curve (AUC) was 0.850 (95% confidence interval (CI) 0.733-0.929, p<0.001). The cut-off-point was ≤38,4 ng/ml with sensitivity of 53.5%, specificity of 100.0%, and positive predictive value 100.0%.
Conclusion. Associations of osteosarcopenia with IGF-1, adiponectin, and sclerostin levels have been determined. For IGF-1, the positive prognostic value was 100% at the found cut-off point. This biomarker can be considered as a diagnostic (confirming) test of osteosarcopenia in women with RA.

P1282

SARCOPENIA AND BIOMARKERS OF MUSCLE, BONE, AND FAT TISSUES

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Objective: to study the association of muscle, fat, and bone tissue markers with sarcopenia in women with rheumatoid arthritis (RA).
Materials and Methods. 163 women were examined with confirmed RA. All patients underwent dual-energy X-ray absorptiometry (Lunar prodigy, GE, USA) to assess the body composition. Serum levels of myostatin, insulin-like growth factor (IGF) 1, leptin, adiponectin, resistin, interleukin 6, irisin, and sclerostin were measured using ELISA method. The cut-off-points in ROC-analysis were determined by the Youden index.
Results. Only 12 women had isolated sarcopenia according to EWGSOP 2 criteria, 49 patients had osteoporosis, 45 – osteosarcopenia and 57 persons had normal body composition. Median age in women with sarcopenia and normal body composition was 49.0 [47.0; 56.5] and 56.0 [50.0; 62.0] years (p>0.05). IGF-1 level in persons with normal body composition (81.9 [45.0; 122.3] ng/ml) was more than in women with SP (17.0 [15.5; 18.0] ng/ml), p=0.001. Other marker's levels did not significantly differ between these groups. In univariate logistic regression IGF-1 level were associated with SP (OR 0.94 [95% CI 0.89- 0.99], p<0.05). The area under the curve in ROC-analysis was 0.914 (95% CI 0.727-0.989, p<0.001). The cut-off-point was ≤18.0 ng/ml with sensitivity of 87.5%, specificity of 100%, and positive predictive value 100%.
Conclusion. Among the studied markers, only IGF-1 was associated with sarcopenia. Sensitivity, specificity and positive predictive value at the found cut-off point was 87.5%, 100% and 100% respectively. IGF-1 can be considered as a prognostic marker of sarcopenia.

P1283

MID-UPPER ARM CIRCUMFERENCE AS A SCREENING TOOL FOR LOW MUSCLE MASS IN WOMEN WITH RHEUMATOID ARTHRITIS

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Objective: To re-evaluate the suitability of mid-upper arm circumference (MUAC) as a screening marker of low muscle mass in women with rheumatoid arthritis (RA). The impact of obesity and age on the screening efficacy of MUAC for low muscle mass was also evaluated.
Materials and Methods. The study included 205 women (mean age 59.2±9.1 years) with confirmed RA. All patients underwent a routine clinical examination, as well as MUAC measurements and dual-energy X-ray absorptiometry (Lunar Prodigy, GE, USA) to analyze body composition. The sensitivity and specificity of MUAC for screening low muscle mass were determined using ROC analysis.
Results. The appendicular muscle index (AMI) <5.5 kg/m2 was determined in 39 (19.0%) patients. MUAC had a direct correlation with AMI (r=0.60, p<0.001). The correlation depending on age (<65 and ≥65 years) was 0.62 and 0.45 respectively, p<0.001. The correlation depending on overfat (<35% and ≥35%) was 0.73 and 0.55 respectively, p<0.001. The cut-off-point for MUAC was ≤26.0 cm, it was detected according to the Jouden index (sensitivity and specificity were 64.1% and 84.3%, respectively). The area under the curve (AUC) was 0.809 (95% confidence interval (CI) 0.748-0.860, p<0.001). At the specified cut-off-point depending on age (<65 and ≥65 years) sensitivity was 85,7% and 81.8% respectively, depending on overfat (<35% and ≥35%) – 92.1% and 94.1% respectively.
Conclusion. MUAC demonstrated high sensitivity, independent of age and overfat status. Therefore, it may be considered a potential screening tool for low muscle mass in women with with RA.

P1284

ASSOCIATION OF TRABECULAR BONE SCORE WITH IMMUNOLOGICAL PARAMETERS IN WOMEN WITH RHEUMATOID ARTHRITIS

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Objective: to establish the frequency of damaged bone microarchitecture according to trabecular bone score (TBS) and to evaluate the relationship with immunological parameters in postmenopausal women with rheumatoid arthritis (RA).
Material and methods: 124 women with a confirmed RA (mean age 60.3±10.0 years) were included. Questionnaires, dual-energy X-ray absorptiometry (DXA) of the lumbar spine were performed. TBS calculation of was done using TBS iNsight software, version 3.0. Laboratory assessments included serum rheumatoid factor (RF), antibodies to cyclic citrullated peptide (ACCP) and serum C-reactive protein (CRP) all using the nephelometric method on the Atellica® NEPH 630 system analyzer (Siemens Healthineers, Germany).The study was approved by the local ethics committee.
Results: Median duration of RA was 8 [3,2; 13,0] years. 95 (76.6%) patients were RF seropositive, and 90 (72.6%) women were ACCP positive. Median RF serum level was 50.6 [9.6; 197.5] IU/ml, ACCP - 72.7 [7.3; 218.1] U/ml, and CRP -5.5 [1.3; 12.5] mg/l. According to TBS data, vertebral microarchitecture was normal in 44.3% women, partially degraded in 21.8%, and degraded in 33.9% individuals. Negative associations were found between TBS and RF (r=-0.20, p=0.001), ACCP (r=-0.22, p=0.020). No association between TBS and CRP was found. Univariate linear regression analysis confirmed the relationship between TBS and ACCP (β = -0.19, p=0.037), at the same time, the association with the RF value was not confirmed (p>0.05).
Conclusion. Normal microarchitecture was found only in 44.3% RA patients. Bone microarchitecture as measured by TBS was negatively associated with ACCP.

P1285

URIC ACID LEVEL, BONE MINERAL DENSITY AND TRABECULAR BONE SCORE IN RHEUMATOID ARTHRITIS PATIENTS

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Objective: to study the relationship of uric acid (UA) level with bone mineral density (BMD) and trabecular bone score (TBS) in postmenopausal women with rheumatoid arthritis (RA).
Material and methods: 140 women (mean age 65,0±10.2 years) with a confirmed RA were included. All patients were interviewed and laboratory examination, dual-energy X-ray absorptiometry (DXA) of femur and lumbar spine (L1-L4) with determination of TBS were done. The bone microarchitecture was assessed depending on TBS: degraded - TBS ≤1.23, partially degraded – TBS 1.23 - <1.31, normal microarchitecture - TBS≥1.31. The study was approved by the local ethics committee.
Results: mean level UA was 273.9±73.7 mkmol/L and hyperuricemia (UA level≥360 mkmol/L) was diagnosed in 13.6% of persons. Mean BMD L1-L4 was 0,998±0,206 g/cm2, total hip (TH) - 0,832±0,149 g/cm2, femoral neck (FN) - 0,783±0,132 g/cm2. Osteoporosis (OP) was detected in 47.9% of women. Low TBS was detected in 40.7% patients, partially degraded microarchitecture had 24.3% and normal - 35% of the examined women. A positive association was established between UA level and BMD L1-L4 (r=0.025, p=0.003), BMD TH (r=0.23, p=0.007), as well as an inverse association with TBS (r=-0.18, p=0.035). Univariate linear regression analysis an independent association between UA level and BMD L1-L4, TH and TBS were found (β=0.18, p=0.021; β=0.19, p=0.016; β=-0.19, p=0.027, respectively), while with BMD FN it was not detected (p>0.05).
Conclusion. Hyperuricemia was diagnosed in 13.6% of persons. Osteoporosis was detected in 47.9% of women. Degraded bone microarchitecture was found in 40.7% of patients with RA. Our study showed that in postmenopausal women with RA, UA level was positively correlated with BMD L1-L4 and TH, but negatively with TBS.

P1286

SYSTEMIC SCLEROSIS IN POSTMENOPAUSAL WOMEN: FOCUS ON BONE MINERAL DENSITY

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Objective: to study the frequency of low bone mineral density (BMD) and factors affecting it in postmenopausal women with systemic sclerosis (SSc)

Material and Methods: 125 postmenopausal women with SSc (median age –60,0 [54,0; 64,0] years) according to the criteria of ACR/EULAR criteria (2013) were included. All women were interviewed; a laboratory and instrumental examination was conducted. BMD of lumbar spine (LS), femoral neck (FN) and total hip (TH) was measured by dual energy X-ray absorptiometry (DXA). To identify the factors associated with low BMD, linear regression analysis was performed.

Results: 113 (90,4%) patients had OP or osteopenia in at least one of measurement area (59 (47.2%) and 54 (43.2%) women, respectively). Univariate linear regression revealed a negative association between BMD LS and daily dose of glucocorticoids (GCs) (b= -0,19; p=0,04) and a positive with 25-hydroxy calciferol level (25(OH)D) (b=0,28; p=0,01). Body mass index (BMI) (b=0,38; p<0,001), glomerular filtration rate (b=0.31; p<0.001), 25(OH)D level (b=0,23, p=0,04) positively and the duration of postmenopause (b=-0,25; p=0,005), duration of SSc (b=-0,28; p=0,002), GCs cumulative dose (b=-0,33, p<0,001), the duration of proton pump inhibitors using (b=-0,25, p=0,04) negatively affected the BMD FN. BMD TH positively associated with BMI (b=0.26; p=0,04), 25(OH)D (b=0,24, p=0,04) and negatively with duration of SSc (b=-0,21; p=0,02) and GCs cumulative dose (b= -0,24, p<0,001).

Conclusion: 90,4% of postmenopausal women with SSc had low BMD. Associations between BMD and both traditional and SSc-related factors have been identified.

P1287

MUSCLE MASS IN WOMEN WITH SYSTEMIC SCLEROSIS: FOCUS ON SARCOPENIA

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Objective: to study the frequency of sarcopenia (SP) and factors affecting appendicular lean mass (ALM) in women with systemic sclerosis (SSc)

Material and Methods: The study included 64 women with SSc: 20 (31,2 %) fertile and 44 (68,8%) in postmenopause. All women were interviewed; Mini Nutritional assessment (MNA), laboratory and instrumental examination were conducted. BMD of lumbar spine, femoral neck (FN), total hip (TH) and whole-body was measured using dual-energy X-ray absorptiometry. The appendicular muscle index (AMI) was calculated (ALM)/height, kg/m2). SP was defended according to EWGSOP2 criteria: both low muscle quantity (ALM <15 kg or AMI <5.5 kg/m2) and low muscle strength (handgrip strength <16 kg or chair stand test >15 s for five rises). Linear regression analysis was performed to identify factors associated with ALM.

Results: 24 (37.5%) women had low grip strength and 25 (39.1%) had low lower limb muscle strength. The low ALM/AMI had 27 (42.2%) patients: 13 (32.5%) women with a limited form of SSc and 14 (58.3%) patients with a diffuse form (p = 0.043). The frequency of confirmed SP according to EWGSOP2 was 34,4 %, with no differences depending on the form of the disease. Univariate linear regression revealed a relationship between ALM and BMI (b= 0.77; p<0.001), MNA (b=0.51; p<0.001), BMD FN and BMD TH (b=0.52; p<0.001 and b=0.50; p<0.001, respectively), the Rodnan skin score (b=-0.40; p=0.005) and the cumulative dose of glucocorticoid (GC) (b=-0,39; p=0,001).There was no association with the age of the women. Multivariate linear regression revealed a negative relationship between ALM and the Rodnan skin score (b=-0.19; p=0.047), GC cumulative dose (b= -0.22; p=0.021), and a positive relationship with BMI (b=0.65; p<0.001).
Conclusion: 1/3 observed women with SSc had SP. ALM depended on BMI, Rodnan skin score and GC cumulative dose.

P1288

VITAMIN D STATUS IN YOUNG PATIENTS WITH SYSTEMIC SCLEROSIS

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The processes of absorption and metabolism of vitamin D in patients with systemic sclerosis (SSc) are often disrupted due to the clinical features of the disease.

Objective: to assess the level of vitamin D (25(OH)D) in fertile women and men <50 years of age with SSc.

Material and Methods: 84 patients with SSc according to the 2013 ACR/EULAR criteria were included: 69 (82.2%) fertile women and 15 (17.9%) men < 50 years. The median age of the patients was 36.5 [31.5; 44.5] years. The level of 25(OH)D was determined in all patients by immunochemiluminescence method.

Results: The median 25(OH)D level was 13.4 [13.9; 22.6] ng/ml. 25(OH) D adequate level (≥30 ng/ml) was found in 6 (7.1%) patients, insufficient (20-29 ng/ml) - in 20(23.8%), deficiency (<20 ng/ml) - in 47 (56.0%), and a severe deficiency (<10 ng/ml) – in 11 (13.1%) persons. 25 (OH)D level was comparable among women and men (p>0.05). Among patients with inadequate levels of 25(OH)D, only 11 (14.1%) people received vitamin D supplements at a dose of 800 IU, among them hypovitaminosis was detected in 3 (27.3%), and deficiency in 8 (72.7%) patients.

Conclusion: Among the examined men under 50 years of age and fertile women with SSc, adequate vitamin D level was diagnosed in only 7.1% of patients. Thus, 92.9% of patients needed additional intake of supplements of cholecalciferol, while the dose of 800 IU was insufficient to maintain a level of more than 30 ng/ml.

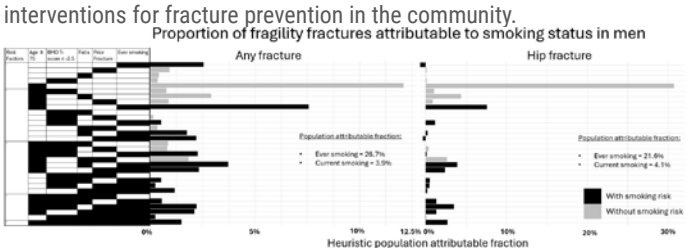
P1289

REVERSIBLE IMPACT OF CIGARETTE SMOKING ON FRAGILITY FRACTURES

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Objectives: To investigate the reversible effect of cigarette smoking on fracture risk and quantify the proportion of fractures preventable in a population via smoking cessation.
Materials and Methods: We analysed online data of 5992 men from the Osteoporotic Fractures in Men Study in the USA. Smoking status (current, past, or never smoking), cumulative smoking exposure (tertiles of pack-years) and time since smoking cessation (<10, 10-30, >30 years) were self-reported, and fractures were confirmed via medical records. A cause-specific Cox regression was used to quantify the association between smoking conditions and fracture risk, adjusted for competing risk of death and confounders (age, BMD, history of falls or prior fractures and lifestyle factors). We calculated the heuristic population-attributable fraction to quantify the proportion of fractures preventable if smoking was eliminated.
Results: Over a median follow-up of 12.4 (IQR: 7.0-18.2) years, 1084 participants sustained a fragility fracture, including 237 hip fractures, yielding the incidence of 14.5 fractures (95% CI: 13.7-15.4) and 3.2 hip fractures (2.8-3.6) per 1000 person-years. Cigarette smoking had a dose-response association with fracture risk. Compared to nonsmokers, current smokers were independently associated with two-fold greater fracture risk (adjusted hazard ratio: 1.85, 95% CI: 1.35-2.54), whereas past smokers within the highest tertile of smoking exposure or less than 10 years of smoking cessation tended to have a 20-30% greater fracture risk (1.17, 0.90-1.39, and 1.29, 0.96-1.74, respectively). Past smokers who had smoked less or quit for more than 10 years were not associated with fracture risk. A similar dose-response relationship was found between smoking conditions and hip fractures. Importantly, if current smokers quit, future fractures would be reduced by 4%; and a quarter of fractures would have been prevented had no individuals ever smoked.
Conclusions: The effect of cigarette smoking on bone fragility is reversible, suggesting that quitting smoking could substantially lower fracture risk. This emphasizes the importance of smoking cessation interventions for fracture prevention in the community.



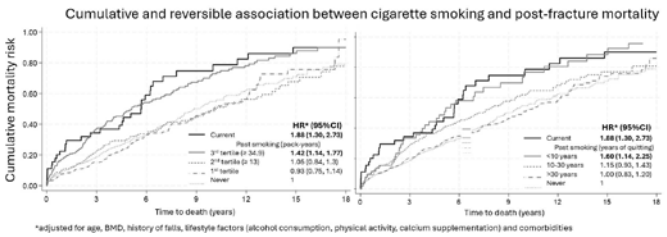
P1290

"SKELETAL AGE" FOR CUMULATIVE IMPACT OF CIGARETTE SMOKING ON POST-FRACTURE MORTALITY

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Objectives: To quantify the cumulative and reversible effect of cigarette smoking on post-fracture mortality risk and communicate this effect using "Skeletal Age" to improve doctor-patient risk communication.
Material and Methods: We analysed online prospective data of 1084 individuals who had fractured at an average age of 82.6±6.6 years from the Osteoporotic Fractures in Men Study in the USA. Smoking status (current, past or never), cumulative smoking exposure (tertiles of pack-years) and time since smoking cessation (<10, 10-30 or >30 years) were self-reported close to fracture time, and deaths were confirmed via death certificates. We quantified the association between smoking conditions and post-fracture mortality, using Cox regression, adjusted for known confounders. *"Skeletal Age"* is defined as the age of an individual's skeleton resulting from a fracture and/or fracture risk factor, computed as chronological age plus the estimated years of life lost associated with that risk factor.
Results: Over a median follow-up of 5.1 years (IQR: 2.1-9.3), 639 fracture patients died, yielding the rate of 10.2 deaths/100 person-years (95% CI: 9.5-11.0). We found a dose-response association between cigarette smoking and post-fracture mortality. Current smokers and past smokers within the highest tertiles of smoking exposure or less than 10 years of smoking cessation were independently associated with 90%, 42% and 60%-greater risk of post-fracture mortality than non-smokers, respectively. Past smokers who had smoked less or quit for over 10 years were not associated with mortality risk, suggesting that smoking's impact on post-fracture mortality is reversible. Additionally, a 60-year-old fracture patient who was currently smoking had a *"Skeletal Age"* of 65.1 years, suggesting 5 years of life lost related to current smoking. Similarly, past smokers who had either smoked heavily or quit within 10 years would lose 3 and 4 years of life, ~ *"Skeletal Age"* of 62.9 and 63.8 years old, respectively.
Conclusion: Cigarette smoking-associated risk of post-fracture mortality is reversible. *"Skeletal Age"* provides a novel metric that facilitates risk communication between doctors and patients.



P1291

IMPACT OF SARCOPENIC OBESITY ON THE CLINICAL COURSE OF KNEE OSTEOARTHRITIS IN POSTMENOPAUSAL WOMEN

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Aim

The study aimed to determine whether knee pain intensity and quality of life differ between postmenopausal women with knee osteoarthritis (KOA) with sarcopenic obesity (SPO) and those with KOA and obesity (OB) without sarcopenia (SP).

Methods

The study included 68 women (mean age 65.2±7.3 years) with Kellgren–Lawrence grade 2–3 KOA, who were stratified into two groups. Group I consisted of 21 women with SPO (mean age 64.4±8.2 years) (cut-off values for the Ukrainian female population, 2023), and group II – 47 participants (mean age 65.5±6.9 years) with OB (WHO criteria 1998) without SP (EWGSOP2, 2019). Height, weight and body mass index (BMI) were measured using standardized procedures. Muscle strength was assessed by handgrip dynamometry and the five-times sit-to-stand test. Body composition (used for SPO diagnosis) was determined by dual-energy X-ray absorptiometry. Pain intensity and quality of life were assessed using the KOOS-12 questionnaire.

Results

Women in Groups I and II did not differ significantly in age, height, weight or BMI. Pain intensity was significantly higher in women with SPO (40 [30.0–50.0] points) compared to women with OB without SP (50 [40.0–60.0] points) (p=0.004). Quality of life scores were also significantly lower in women with SPO (40 [30.0–47.5] points) than in those with OB without SP (50 [40.0–52.5] points, p=0.04). Handgrip strength of both dominant and nondominant hands was lower in patients with KOA and SPO (13.5 [10.0-23.0] vs 20.0 [17.5-26.0] kg and 10.0 [9.5-15.0] vs 22.0 [19.0-26.5] kg, respectively, p<0.001 for both parameters). However, no statistically significant difference was observed in the sit-to-stand test results between the two groups (15 [13.5-16.0] vs 13.5 [12.0-15.0] sec., respectively; p=0.07).

Conclusion

Women with KOA and SPO exhibited significantly higher knee pain intensity, poorer quality of life, and reduced muscle strength as measured by handgrip dynamometry.

Disclosures: The authors declared no competing interests.

P1292

PREVENTION OF OSTEOPOROSIS CANCER PATIENTS ON THE BACKGROUND OF HORMONE THERAPY

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Relevance. Hormone therapy for breast cancer reduces estrogen levels and increases the risk of bone loss and osteoporosis with subsequent fractures. Bisphosphonates can limit bone resorption and reduce the incidence of fractures. Given the insufficient monitoring of bone mineral density in oncological practice, the study of the effectiveness of bisphosphonates in patients receiving hormone therapy is of great clinical importance.

The aim is to evaluate the effect of taking bisphosphonates on the prevention of osteoporosis in breast cancer patients receiving hormone therapy.

Materials and methods. The study was performed at the Cheboksary Republican Clinical Oncology Hospital from April to November 2025. The study included 72 patients of reproductive age 29-43 years (mean age 35.9±4.8) with a verified diagnosis of stage I–IIIa breast cancer after radical surgical treatment, radiation and systemic therapy, who were on hormone therapy. The participants were randomized into four groups of 18 people: Group A received anastrozole, group B received tamoxifen, group C received tamoxifen + zoledronate, and group D received anastrozole + zoledronate. All patients underwent osteoscintigraphy to exclude bone metastases. Primary multiple tumors, a history of fractures, confirmed bone metastases, and prolonged use of glucocorticosteroids (>90 days) were excluded. Examinations were performed before the start of therapy and after 6 months. The statistical significance of the differences in the mean values was determined using a ttest; for nonparametric data, the Wilcoxon criterion was used for dynamic observation. The significance level was taken at p<0.05. Data processing was performed in Statistica 10.0.

Results and discussion. After 6 months, generalized grade 2-3 osteoporosis was detected in 15 patients in group A (83%, 15/18) according to densitometry. Grade 2-3 focal/regional osteoporosis was detected in group B in 13 patients (72%, 13/18). The incidence of severe bone loss in groups with the addition of zoledronate was lower: in group C, 6 patients (33%, 6/18) had grade 1-2 osteoporosis; in group D, 5 patients (28%, 5/18) — grade 1-2 osteoporosis; no significant joint dysfunction was detected.

Conclusions. The results of the study confirm the effectiveness of bisphosphonates in the prevention of bone mineral density loss in patients on hormone therapy and indicate a reduction in the risk of fractures with combination therapy.

P1293

A MIMIC OF ANKYLOSING SPONDYLITIS, OCHRONOSIS: CASE REPORT

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Ochronosis is a rare hereditary autosomal recessive dis order and generally presents after the fourth decade, although alkaptonuria may be identified in childhood. The disorder is caused by a deficiency of homogentisate 1,2-dioxygenaze, an enzyme which catalyzes the conver sion of homogentisic acid (HGA)tomaleylacetoacetic acid. Renal clearance of HGA is maintained very effectively in youth. With aging, the efficiency of the process decreases and the steady level of plasma HGA slowly increases. High levels of HGA lead to deposition in effected joints in articular cartilage as well as in periarticular, collagen-rich ligaments and menisci. Wereport herein a detailed description of a disease of the spine in a woman with late onset ochronosis.

A 50-year-old woman presented to the rheumatology outpatient clinic with a complaint of low back pain. Her rheumatologic review of systems was unremarkable. Physical examination revealed bluish-black pigmentation of the ear cartilage (Figure 1). Laboratory findings showed that erythrocyte sedimentation rate and C-reactive protein levels were within normal limits. Liver function tests demonstrated elevated transaminases: AST 72 U/L (0–35), ALT 92 U/L (0–35), GGT 50 U/L (0–38), while alkaline phosphatase was within the normal range at 76 U/L (33–88). Her x-ray findings also revealed typical wafer-like cal cifications and radiolucent spaces in the vertebral discs, which can be seen definitely in the presence of ochronotic arthropathy (Figure 2).

X-ray features of spinal ochronosis resemble ankylosing spondylitis; therefore, SpA is considered as one of the differentials in the diagnosis.

P1294

A BODY SHAPE INDEX AS A SURROGATE MARKER FOR SARCOPENIA RISK IN POSTMENOPAUSAL WOMEN: A CROSS-SECTIONAL ANALYSIS

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Background: Hormonal changes and increased central adiposity in postmenopausal women contribute to a disproportionately higher rate of sarcopenia, a condition characterized by the progressive loss of skeletal muscle mass (SMM) and function. Primary care requires simpler screening methods, despite the availability of standard diagnostic tools like imaging and functional testing. A Body Shape Index (ABSI), which uses waist, height, and body mass index (BMI), might reflect central fat accumulation and mortality risk, but its role in sarcopenia prediction remains unclear. To analyze the connection between ABSI and sarcopenia in postmenopausal women, using demographic, metabolic, and body composition data categorized by ABSI quartiles.

Methods: A total of 296 postmenopausal women participated in this cross-sectional study. Sarcopenia was defined according to the EWGSOP2 definition. ABSI was calculated and analyzed in quartiles. Logistic regression identified predictors of high ABSI.

Results: The prevalence of sarcopenia was 43.9% among participants. Participants in the highest ABSI quartile showed significantly older, slower gait speed, and higher rates of osteoporosis and sarcopenia (all $p<0.05$). In the total sample, older age, lower SMMI and slower gait speed were associated with the probability of being Q4 ABSI group ($p<0.05$). In addition, lower SMM and slower gait speed were independent predictors of higher ABSI in women over 65.

Conclusion: Postmenopausal women with high ABSI show a significant association with poor musculoskeletal and metabolic health. In clinical and community settings, ABSI may offer a cost-effective and simple anthropometric marker for early sarcopenia risk assessment.

P1295

ORAL FRAILTY AND OROPHARYNGEAL DYSPHAGIA IN COMMUNITY-DWELLING OLDER ADULTS: EVIDENCE FROM EAT-10 AND OFI-8

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Background: Frailty, a multidimensional geriatric syndrome, is related to adverse health outcomes. Declining chewing, swallowing, and tongue function, termed oral frailty, is now recognized as a factor in systemic vulnerability. Oropharyngeal dysphagia (OD) represents a major pathway linking oral decline to frailty, yet evidence from non-Asian populations remains limited. This study aimed to examine the relationship between OD risk, oral frailty, and systemic frailty in older adults.

Methods: A cross-sectional study was conducted among 447 individuals aged ≥65 years recruited from geriatric outpatient clinics. The Eating Assessment Tool-10 (EAT-10) was used to evaluate swallowing function; a score of ≥3 indicating OD risk. Oral frailty was identified by the Oral Frailty Index-8 (OFI-8), where scores ≥4 defined oral frailty. Independent frailty predictors were identified using multivariate logistic regression.

Results: The mean age was 73.6 ± 7.8 years; 75.6% were female. OFI-8 classified 56.6% as frail and 31.3% as OD risk based on EAT-10. Individuals at risk of OD had significantly lower handgrip strength, lower albumin and vitamin D levels, and more cases of osteoporosis (all p<0.05). Frail individuals had higher FRAIL scores and a greater prevalence of osteoporosis (all p<0.05). Logistic regression revealed that OD risk independently predicted frailty, increasing odds nearly sixfold (Odds ratio [OR] range 5.83–6.34, all p<0.001), even after adjusting for age, sex, FRAIL score, and osteoporosis.

Conclusions: OD risk, as assessed by the EAT-10, is a robust predictor of frailty in older adults. Incorporating the EAT-10 and OFI-8 in complete geriatric assessments may enable early detection of vulnerable individuals and inform multidisciplinary.

Table 1. Multivariate logistic regression models for factors associated with frailty based on OFI-8

Variable	Model 1		Model 2		Model 3	
	OR (95% CI)	p-value	OR (95% CI)	p-value	OR (95% CI)	p-value
Oropharyngeal dysphagia risk (based on EAT-10)	6.19 (3.96–9.70)	**<0.001**	6.34 (4.03–9.98)	**<0.001**	5.83 (3.68–9.25)	**<0.001**
Age	0.98 (0.96–1.01)	0.179	0.97 (0.94–0.998)	**0.033**	0.98 (0.95–1.01)	0.107
Sex (male)	1.33 (0.83–2.13)	0.243	1.12 (0.68–1.83)	0.663	1.34 (0.80–2.23)	0.266
FRAIL score			1.31 (1.07–1.61)	**0.009**	1.32 (1.08–1.63)	**0.008**
Osteoporosis					2.44 (1.56–3.81)	**<0.001**

Notes: CI: Confidence Interval, EAT-10: Eating Assessment Tool-10, FRAIL: Fatigue, Resistance, Ambulation, Illnesses, Loss of weight (frailty score), OR: Odds Ratio.

P1296

POPULATION-SPECIFIC REFERENCE DATA FOR BONE MINERAL DENSITY AND TRABECULAR BONE SCORE (TBS V4) IN HEALTHY QATARI ADULTS

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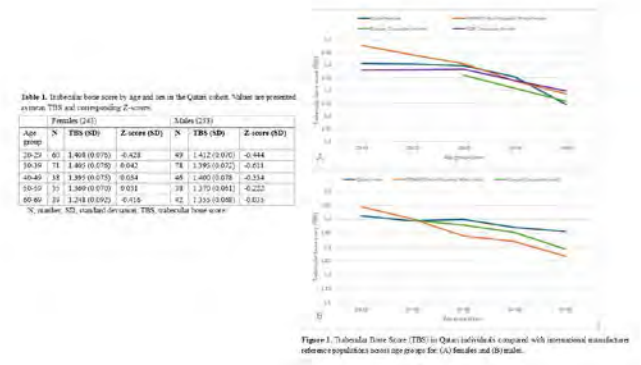
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Objectives: Bone mineral density (BMD) and trabecular bone score (TBS) provide complementary assessments of bone mass and microarchitecture for osteoporosis and fracture risk assessment within the same DXA scan. However, reference data for both measures are largely derived from Western populations, and their applicability to Middle Eastern populations remains uncertain. This study aimed to establish normative BMD and TBS version 4 reference data in healthy Qatari adults and to compare these values with manufacturer-provided US NHANES reference standards.

Materials and Methods: This analysis included healthy Qatari men and women aged 20–69 years selected from the Qatar Biobank. Participants with medical conditions or medication use known to affect bone metabolism were excluded. BMD at the lumbar spine, femoral neck, and total hip was measured using GE Lunar iDXA systems and interpreted by ISCD-certified clinicians. TBS was derived from lumbar spine DXA using TBS Osteo Advanced version 4.0, incorporating correction for soft-tissue thickness. Mean BMD and TBS values were compared with US NHANES reference data using two-tailed t-tests.

Results: 477 lumbar spine scans and 497 hip scans were analysed. Lumbar spine BMD did not differ significantly between sexes across age groups, whereas hip BMD was consistently lower in women than men, particularly after age 50. Compared with NHANES, Qatari women aged 20–29 years exhibited significantly lower BMD with site- and age-specific differences persisting in older female age groups. In contrast, BMD in Qatari men was largely comparable to NHANES, with significantly higher total hip BMD observed in those aged 50–69 years. Mean BMD T-scores were predominantly within the normal range, with osteopenic mean values observed only at the femoral neck in women aged 60–69 years. TBS was generally within the normal range across all groups. Relative to NHANES, Qatari women demonstrated lower TBS at younger and older ages, while Qatari men showed higher TBS values in older age groups (40–69 years).

Conclusions: This study provides normative BMD and TBS v4 reference data for a healthy adult Qatari population. These data describe age- and sex-specific patterns of bone density and trabecular microarchitecture and may serve as a population-specific reference for future clinical and research applications.



P1297

LIPID-MUSCLE INTERACTIONS IN AGING: THE RELATIONSHIP BETWEEN TOTAL CHOLESTEROL AND PROBABLE SARCOPENIA

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INTRODUCTION: Sarcopenia is a significant health issue that occurs as a result of the decrease in skeletal muscle mass and function with aging and increases the risk of frailty, falls and mortality in elderly individuals. The effects of lipid metabolism on muscle health are increasingly being investigated . It has been suggested that low cholesterol levels may be associated with the development of sarcopenia.
OBJECTIVES: This study aimed to investigate the relationship between total cholesterol levels and probable sarcopenia, as well as the effects of lipid metabolism on muscle health.
METHODS: Data from 328 patients aged ≥60 years who applied to a university geriatrics outpatient clinic between March 2018 and October 2023 were retrospectively analyzed. Demographic characteristics, history of chronic diseases, frailty status, probable sarcopenia assessment, and total cholesterol levels were obtained from patient records. Basic activities of daily living (ADL) were assessed using the KATZ Index, and instrumental ADL were evaluated using the LAWTON-BRODY scale. Frailty was assessed with the FRAIL scale, and nutritional status was evaluated with the Mini Nutritional Assessment–Short Form (MNA-SF). Body mass index (BMI) was calculated by dividing body weight (kg) by the square of height (m²). Handgrip strength was measured using a hand dynamometer, and low values were defined as probable sarcopenia. Low handgrip strength was determined according to cut-off values specific to the Turkish population (35 kg for men / 20 kg for women) . The association was evaluated using multivariable logistic regression analysis. The cholesterol level predicting probable sarcopenia was calculated via ROC analysis, and patients were divided into two groups based on the determined threshold value.
RESULTS: The mean age of the participants was 74.5 ± 6.8 years, and among the 147 patients (44.8%) identified with probable sarcopenia, 55.8% were women. In univariate analyses, male sex, frailty, malnutrition, dependence in instrumental activities of daily living (IADL), low BMI, and low cholesterol levels were significantly associated with probable sarcopenia ($p < 0.001$). In ROC analysis, the area under the curve (AUC) was 0.617 (95% CI: 0.562–0.670, $p = 0.0002$), with a sensitivity of 70.5% and specificity of 49.7%. The optimal cut-off value was determined as 216 mg/dL. In multivariable analyses including age, sex, BMI, and frailty, low cholesterol levels (≤216 mg/dL) remained an independent risk factor for probable sarcopenia [OR: 1.729, 95% CI (1.017–2.939), $p = 0.043$].
CONCLUSİON: Low total cholesterol levels were independently associated with probable sarcopenia. The findings support the role of lipid metabolism in muscle health and suggest that low cholesterol levels may be an important risk factor for probable sarcopenia.
Keywords: Sarcopenia, cholesterol, older adults

P1298

A SIMULTANEOUS EVALUATION OF MUSCLE AND BONE HEALTH IN PATIENTS WITH OBESITY USING REMS TECHNOLOGY

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Objective(s): Muscle and bone are closely interconnected tissues that ensure structural integrity, mobility and functional capacity. Alterations in this interplay contribute to musculoskeletal disorders, such as osteoporosis and sarcopenia, which often coexist, increasing frailty and fracture risk. In patients affected by obesity, bone mineral density (BMD) may appear preserved or increased, while bone quality is often compromised, contributing to increased fracture risk. Early assessment of musculoskeletal health is therefore crucial. This study aimed to evaluate bone and muscle health in patients with obesity using Radiofrequency Echographic Multi-Spectrometry (REMS), a non-invasive, radiation-free technology.
Materials and Methods: Caucasian individuals of both sexes, with a diagnosis of obesity (BMI ≥30 kg/m²) were enrolled and underwent REMS evaluation to assess both bone and muscle. Bone status at femoral site was assessed by the evaluation of bone density (BMD, T-score and Z-score) and quality (Fragility Score (FS), a dimensionless parameter ranging from 0 to 100 reflecting microarchitecture and skeletal fragility) parameters. Muscle status was evaluated at thigh through the REMS-Muscle Quality Index (MQI), which increases with muscle impairment.
Results: A total of $n = 38$ patients with obesity was included (mean age = 50.6 ± 13.4 years, BMI 33.19 ± 6.89 kg/m²). Patients with obesity showed higher BMD at femoral neck in comparison to controls (0.890 ± 0.120 g/cm²*vs*. 0.850 ± 0.100 g/cm²; $p < 0.05$). Although not statistically significant, a trend toward increased FS values was observed, suggesting worse bone quality in the obese group (31.84 ± 11.22 *vs*. 29.30 ± 10.66; $p = 0.3$). Interestingly, patients with obesity also showed higher MQI value at both the right (67.29 ± 14.13) and left thigh (65.5 ± 15.79), strongly suggesting impaired muscle quality.
Conclusion(s): These preliminary results suggest that REMS enables simultaneous assessment of bone and muscle using a single device, providing an integrated evaluation of musculoskeletal health. The presence of impaired muscle quality together with a trend toward reduced bone quality supports the concept of a coupled muscle-bone unit, with clinical relevance for early diagnosis and management.

P1299

VITAMIN D SUPPLY IN REHABILITATION AFTER TOTAL JOINT REPLACEMENT AND REVISION SURGERY

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It is well known that vitamin D deficiency can have a negative impact on bone metabolism, bone healing, bone quality, and thus also on the healing of an endoprosthesis.
In cases of deficiency, infections are more common and rehabilitation is delayed due to impaired strength and coordination, an increased risk of falls, higher levels of pain, and thus poorer function.
Materials and methods:
In an orthopedic rehabilitation clinic, vitamin D levels were determined 1-3 days after admission for follow-up treatment after total joint replacement over a period of 1 year.
Throughout 2025, the vitamin D levels of 1027 patients were recorded after primary total joint replacement and implant revision surgery procedures. The average age was 67.3 years. Vitamin D levels were measured on average 12 days postoperatively for hip and knee surgeries and 36.7 days for shoulder and ankle surgeries. Thirty-nine percent of all rehabilitation patients were taking a vitamin D supplement at the time of admission.
Results:
Male Female
< 12 ng/ml 16,3% 11,8%
12 bis <20 ng/ml 31,4% 19,4%
20 bis <30 ng/ml 33,6% 33,2%
30 - 51 ng/ml 18,7% 35,0%
>50 ng/ml 4,1%
Conclusion: Despite the known negative effect of vitamin D deficiency on outcomes after joint replacement surgery, in 2025, 394 of 1,027 patients (38.4%) still had vitamin D deficiency (values < 20 ng/ml) for postoperative rehabilitation, 144 (14.0%) of whom had severe deficiency (below 12 ng/ml). Taking 30 ng/ml as the threshold value (insufficient <30), 81.3% of men and 64.4% of women were affected.
Based on the study results presented, a recommendation for preoperative vitamin D supplementation must be made. Vitamin D levels should be determined 4-6 weeks prior to surgery (especially in the case of revision surgery) and supplementation should be initiated if necessary. Vitamin D monitoring during postoperative rehabilitation is also advisable. In addition, all patients who have to undergo bone surgery should have their levels determined and balanced at the hospital where they are being treated.

P1300

EFFECT OF ENZYME ANTIBODIES ON ENZYMATIC ACTIVITY IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Autoantibodies to enzymes are detected in rheumatic diseases, but their pathological significance is unclear. Antibody formation to superoxide dismutase (SOD), glutathione reductase (GR), and catalase (CAT) in RA is currently a poorly understood problem. Considering the hyperproduction of reactive oxygen species in RD, one can expect a compensatory increase in the synthesis of antioxidants, which should lead to the inhibition of free radicals. However, in RA, there is an accumulation of secondary toxic products of free radical reactions, thus an imbalance between the production and utilization of oxygen is noted. The causes of this imbalance are unclear. One of the causes of this functional deficiency of enzymes is believed to be the formation of antibodies (AT) to them.
Objective: to study the effect of antibodies to superoxide dismutase, glutathione reductase and catalase on enzymatic activity in RA.
Materials and methods: The serum of 30 practically healthy individuals and 84 patients with RA undergoing inpatient treatment was studied. The activity was determined (according to the method of E. Dubinina, 1983) of SOD, GR and CAT, the level of antibodies (AT) to the enzymes was determined by the enzyme immunoassay method using magnetosorbents, which are granules of polyacrylamide gel with the inclusion of magnetic material and the corresponding antigen.
Results: SOD activity in the blood of donors was 40±2.5 units, GR - 115±3.9 units, CAT - 22.6±1.6 units. The level of AT to SOD in the serum of donors was 0.06±0.004 units, AT to GR - 0.055±0.004 units and AT to CAT - 0.048±0.003 units. It was found that in patients with stage I RA activity, there is a slight increase in the activity of SOD and GR ($p<0.05$), and CAT ($p<0.01$), as well as an increase in the content of AT to SOD and GR (p<and a decrease in the activity of CAT ($p<0.05$). In patients with stage II disease activity, a decrease in the activity of SOD, GR and CAT ($p<0.05$) and an increase in the number of AT to them ($p<0.01$) are observed. At stage III RA activity, compared with the parameters of patients with stage II RA activity, an increase in AT to SOD ($p<0.01$), GR ($p<0.05$), CAT ($p<0.05$) was noted, against the background of an increase in the activity of GR ($p<0.01$), SOD ($p<0.05$) and a decrease in the activity of CAT ($p<0.01$).
Conclusion: The activity of SOD, GR and CAT and the level of antibodies to them can serve as an additional criterion for expressing the degree of disease activity, reflecting the state of oxidative stress in rheumatoid arthritis.

P1301

COMPARISON OF PAIN, CENTRAL SENSITIZATION, FUNCTIONAL STATUS, AND QUALITY OF LIFE ACCORDING TO STENOSIS SEVERITY IN INDIVIDUALS WITH CHRONIC NECK PAIN

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Objective:
This study aimed to evaluate central sensitization, functional status, proprioception, sensory function, and quality of life according to the severity of cervical spinal stenosis in individuals with chronic neck pain.
Materials and Methods:
This study included patients with chronic neck pain who attended the Physical Medicine and Rehabilitation Clinic and had undergone cervical MRI. Pain intensity was assessed using the Visual Analog Scale (VAS),

pressure pain threshold was measured with an algometer, and cervical range of motion was evaluated using a CROM device. Sensory function was assessed with the Semmes–Weinstein Monofilament Test, and proprioception was evaluated using the CROM device by measuring joint position error during target head position and neutral head position tests. Cervical stenosis severity was classified using the Kang grading system. Central sensitization was evaluated using the Central Sensitization Inventory, functional status with the Copenhagen Neck Functional Disability Scale, and quality of life with the SF-36 questionnaire.

Results:

Eighty-nine patients were included (mean age 49.7±14.1 years; 86.4% female). Increasing cervical stenosis severity was associated with reduced cervical rotation range of motion ($p<0.05$) and impaired proprioception, reflected by increased joint position error in flexion ($p=0.032$) and in the total joint position error calculated as the sum of errors across all movement directions ($p=0.030$). Sensory impairment was observed in the right C8 ($p=0.006$) and left C7 ($p=0.033$) dermatomes. Quality-of-life scores deteriorated with stenosis severity in the SF-36 energy/fatigue ($p=0.024$), emotional role limitations ($p=0.014$), general health ($p=0.012$), and emotional well-being ($p=0.037$) domains. No significant differences were observed between stenosis groups for the remaining clinical and functional parameters (all $p>0.05$).

Conclusion:

Greater severity of cervical spinal stenosis is associated with worsening sensorimotor function, reduced cervical mobility, and impaired quality of life in patients with chronic neck pain, highlighting the need for multidimensional assessment and rehabilitation strategies beyond structural imaging findings alone.

P1305

STRUCTURAL AND FUNCTIONAL STATUS OF PERIODONTAL TISSUES IN ADOLSCENTS WITH IDIOPATHIC SCOLIOSIS

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Introduction. Osteoporosis is a systemic skeletal disease characterized by a reduction in bone mass per unit volume and disruption of bone microarchitecture. For a long time, osteoporosis was regarded as a disease of older age groups. It is now known that the origins of this condition lie in childhood and adolescence. Therefore, monitoring bone mass accumulation during childhood, adolescence, and the teenage years is of critical importance. Osteoporosis of the alveolar process is one of the many factors contributing to the development of periodontal diseases. Changes in periodontal tissues occur as a result of biochemical, endocrine, and immunological reactions. These same reactions underlie the pathogenesis of idiopathic scoliosis (IS). According to the literature, an increase in periodontal tissue diseases is observed during puberty. The World Health Organization reports that 100% of children at the age of 14 have gingivitis. The prevalence of localized and generalized periodontitis at the age of 15 is reported in 5–20% of cases and reaches 45% by the age of 19–20 years. During adolescence, idiopathic scoliosis also progresses (by 4–5 times). This age period corresponds to the main increase in bone mass (the final growth spurt) in both females and males. Therefore, this age interval is crucial for the prevention and treatment of inflammatory and dystrophic periodontal diseases.

Aim of the study. To investigate the condition of periodontal tissues in adolescents with grade I idiopathic scoliosis.

Materials and methods. A clinical and radiographic examination was performed in 38 adolescents aged 15–16 years (34 females and 14 males). Periodontal tissue status was assessed based on clinical findings and radiographic evaluation.

Results. An intact periodontium was identified in 3 individuals (7.89%). Chronic catarrhal gingivitis of varying severity was diagnosed in 27 individuals (71.05%). Chronic hypertrophic gingivitis, granulating form, was detected in 3 individuals (7.89%). Generalized chronic periodontitis, stage I severity, was found in 5 individuals (13.18%). Radiographic examination in cases of gingivitis revealed indistinct contours of the cortical plate of the interalveolar septa and, in some cases, osteoporosis of the cancellous bone at the apices of the interdental septa. In generalized periodontitis of stage I severity, osteoporotic changes of the interalveolar septa were observed, along with widening of the periodontal ligament space at the cervical regions of the teeth, indistinct contours of the compact bone plate, destruction of the cortical plate at the apices of the interalveolar septa, and destruction of the interalveolar septa up to one quarter of their height.

Conclusion. Adolescents aged 15–16 years with grade I idiopathic scoliosis require comprehensive diagnostic evaluation of periodontal tissue status. Timely preventive and therapeutic dental measures can help prevent the progression of periodontal diseases.

P1306

PREVALENCE OF DENTOFACIAL ANOMALIES IN ADOLESCENTS WITH GENERALIZED PERIODONTITIS ASSOCIATED WITH IDIOPATHIC SCOLIOSIS

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Introduction. Contemporary scientific studies demonstrate a structural and functional interrelationship between the condition of the maxillofacial skeletal tissues and the axial skeletal system. It is well established that during childhood and adolescence approximately 45% of genetically determined bone mass is accumulated. By the end of puberty, this accounts for about 86% of total adult bone mass. During the same age period, 17-21% of genetically determined dentofacial anomalies are recorded, as well as up to 40% of cases of idiopathic scoliosis (IS).

Aim of the study. To investigate the prevalence of dentofacial anomalies in adolescents with generalized periodontitis of initial to stage I severity, depending on the degree of spinal deformity.

Materials and methods. A total of 152 adolescents (mean age 15.26 ± 0.04 years) with generalized periodontitis were examined and classified according to posture disorders: IS-0 (spinal curvature angle up to 5°, n = 44), IS grade I (curvature angle 5-10°, n = 69), IS grade II (curvature angle 11-30°, n = 25), and IS grade III (curvature angle 31–60°, n = 14). Dental status was assessed in all participants.

Results. The prevalence of soft tissue attachment anomalies was as follows: IS-0 – 34.09% (n = 15), IS-I – 46.38% (n = 32), IS-II – 72% (n = 18), IS-III – 78.57% (n = 11), overall – 50% (n = 76). A shallow oral vestibule

was identified in: IS-0 – 31.82% (n = 14), IS-I – 40.58% (n = 28), IS-II – 60% (n = 15), IS-III – 71.43% (n = 10), overall – 44.08% (n = 67). Tooth position anomalies were detected in: IS-0 – 68.18% (n = 30), IS-I – 82.61% (n = 57), IS-II – 92% (n = 23), IS-III – 100% (n = 14), overall – 81.58% (n = 124).

Conclusion. The prevalence of dentofacial anomalies in adolescents increases with the severity of spinal deformity. The findings indicate a predominant role of dentofacial anomalies and anatomical-topographical disturbances in the development of generalized periodontitis in adolescents with idiopathic scoliosis. This patient population requires an orthodontic component as part of comprehensive dental treatment.

P1307

LEVELS OF MOLECULAR REGULATORS OF BONE METABOLISM (OPG/RANKL) IN PATIENTS WITH JUVENILE RHEUMATOID ARTHRITIS

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Introduction. In modern medicine, prevention, early diagnosis, and treatment of childhood diseases remain important priorities. Autoimmune diseases in children present particularly challenging problems. Over recent decades, there has been an increase in cases of juvenile rheumatoid arthritis (JRA). This disease is difficult to treat, tends to worsen over time, and can lead to disability. Therefore, once diagnosed, it's crucial to predict how the disease will progress – both overall and specifically regarding bone health. Two key factors that control the breakdown of bone cells are OPG and RANKL.

Objective. To study how bone metabolism is regulated by measuring OPG and RANKL levels.

Materials and methods. We examined 307 patients with JRA (average age: 11.09±3.08 years) using clinical and X-ray assessments. We measured OPG concentration in blood serum using a laboratory technique called enzyme-linked immunosorbent assay (ELISA), specifically using the "Human Osteoprotegerin Instant ELISA" test kit (eBioscience, Austria). RANKL levels in blood serum were determined using the "ampli-s-RANKL" reagent kit (Biomedica, Germany).

Results. The measurements of signaling mechanisms that regulate bone breakdown at the system level in JRA patients showed reduced normal bone formation activity. Specifically, we found decreased concentrations of OPG (43% lower, statistically significant) and RANKL (9.89% lower, not statistically significant), as well as a reduced OPG/RANKL ratio (41.7% lower, not statistically significant).

Conclusion. The imbalance we found in molecular regulators of bone metabolism indicates a disruption in the RANK/RANKL/OPG system. The sharp decrease in OPG reflected weak activity of this regulatory protein in eliminating mature bone-breakdown cells and reduced blocking of the connection between RANK and RANK-ligand. These negative changes in the natural bone remodeling process suggest a tendency toward osteoporosis (bone weakening) development in JRA patients.

P1308

CASE REPORT: STATIN-INDUCED NECROTIZING AUTOIMMUNE MYOPATHY(SINAM) IN A PATIENT WITH OSTEOPOROSIS

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Introduction: Statins are widely prescribed for the prevention of cardiovascular disease and are generally well tolerated. However, rare immune-mediated adverse effects such as statin-induced necrotizing autoimmune myopathy have been increasingly recognized. SINAM is associated with anti–HMG-CoA reductase antibodies and requires immunosuppressive treatment. The coexistence of osteoporosis complicates management due to the risks associated with long-term corticosteroid therapy.

Case Report: In this case report, we present a 68-year-old female patient with with a history of hyperlipidemia She had been receiving atorvastatin 20 mg daily for the past 3 years.She presented diffuse musculoskeletal pain for approximately two years, associated with poor nocturnal rest, which significantly limited her ability to perform normal daily activities. The patient reported progressive difficulty swallowing, noted over the recent period .Past medical history was notable for a previous right humeral fracture treated surgically, thyroid nodules, and left parathyroid hyperplasia. Surgical history included tonsillectomy and appendectomy. Thyroid and major salivary gland ultrasonography showed normal glandular architecture, with no locoregional macroadenopathy. There was a family history of autoimmune diseases (HSP) .Laboratory investigations revealed a significant rise in creatinine kinase (CK) 9872 IU (normal <170 IU/L), aspartate aminotransferase (AST) 75 U/L, alanine aminotransferase (ALT) 61 U/L, lactic dehydrogenase (LDH) 416 U/L. Inflammatory markers were mildly elevated. Despite discontinuation of statin therapy, CK levels and muscle weakness persisted. Densitometry: T-Score L1-L4 -3.2 T-Score neck f -3.2 T-Score tot -2.3. Physical examination revealed symmetric proximal muscle weakness in both upper and lower limbs, without sensory deficits. Electromyography demonstrated a myopathic pattern. Muscle biopsy revealed necrotic muscle fibers with minimal inflammatory infiltrates. Serological testing was positive for anti–HMG-CoA reductase antibodies,Ab anti-HMGCR (287),confirming the diagnosis of statin-induced necrotizing autoimmune myopathy.The patient was started on high-dose oral corticosteroids (prednisone 1 mg/kg/day) followed by intravenous immunoglobulin (IVIG) at 0.4 gm/kg daily for 5 days. She showed significant improvement of muscle strength. It was also,decided to initiate therapy with Denosumab, for osteoporosis, with careful monitoring and to continue vitamin D supplementation at 25,000 IU every two weeks.Over the following months, the patient showed significant improvement in muscle strength and gradual normalization of CK levels.

Conclusion:This case underscores the importance of considering statin-induced necrotizing autoimmune myopathy in patients with persistent muscle weakness and elevated CK levels despite statin cessation. Special attention should be given to comorbid conditions such as osteoporosis when planning long-term immunosuppressive therapy.

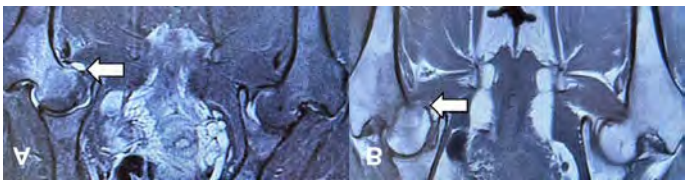
P1309

TRANSIENT OSTEOPOROSIS OF THE HIP COMPLICATED BY FEMORAL NECK FRACTURE DURING LACTATION: A CASE REPORT

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Objective(s):
Transient osteoporosis of the hip (TOH) is a rare, self-limiting disorder that typically occurs during late pregnancy or the early postpartum period. It presents with acute hip pain, functional limitation, and characteristic diffuse bone marrow edema on magnetic resonance imaging (MRI). The risk of insufficiency fracture may increase when lactation is accompanied by vitamin D deficiency.
Material and Methods:
We present the case of a 38-year-old woman who developed sudden inability to walk and severe right hip pain 11 months after her second delivery while actively breastfeeding. The patient reported no history of trauma or fall. She had no chronic illnesses and was not taking any medication. Written informed consent was obtained from the patient.
Results:
At presentation, her body mass index was 27 kg/m² and serum 25(OH) vitamin D level was 11.4 ng/mL. MRI revealed a nondisplaced femoral neck fracture with diffuse bone marrow edema involving the femoral head and neck, without subchondral collapse, findings highly suggestive of transient osteoporosis of the hip. Dual-energy X-ray absorptiometry (DEXA), performed 11 months after the fracture, showed preserved lumbar spine bone mineral density (L2-L4 Z-score: +1.2) but relatively lower femoral neck BMD (Z-score: −0.6) compared with lumbar spine, supporting a regional rather than systemic process. Serum calcium, phosphorus, alkaline phosphatase, and parathyroid hormone levels were within normal limits. The patient was managed conservatively with vitamin D supplementation and hip-protective exercises without antiresorptive therapy. After two months of supplementation, serum 25(OH) vitamin D level increased to 37 ng/mL. At 10-year follow-up, she remained asymptomatic with no additional fractures.
Conclusion(s):
This rare case illustrates transient osteoporosis of the hip during lactation complicated by femoral neck fracture and vitamin D deficiency. The regional pattern of bone involvement, characteristic MRI findings, absence of trauma, and benign long-term clinical course support the diagnosis of TOH rather than pregnancy- and lactation-associated osteoporosis. Selected patients may be successfully managed conservatively. Clinicians should consider TOH in lactating women presenting with acute hip pain and evaluate for modifiable risk factors such as vitamin D deficiency.
Figure 1 (A) Coronal T2-weighted fat-suppressed MRI showing diffuse hyperintense bone marrow edema involving the right femoral head and neck, without subchondral collapse. (B) Coronal T1-weighted MRI of the pelvis demonstrating diffuse hypointense signal in the right femoral head and neck, consistent with bone marrow edema.



P1310

CALF CIRCUMFERENCE IS INDEPENDENTLY ASSOCIATED WITH PRE-FRAILTY IN NON-SARCOPENIC, NON-MALNOURISHED OLDER ADULTS

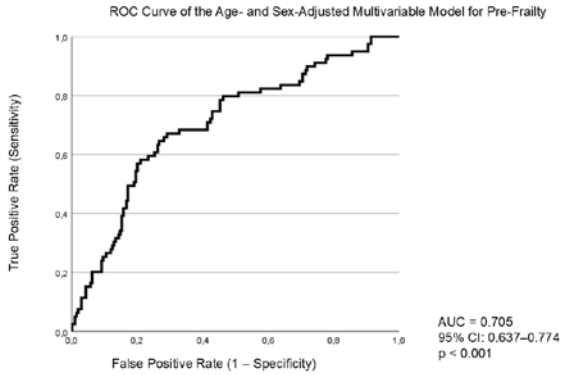
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Objective
To evaluate the independent associations between anthropometric measures (peripheral and central) and pre-frailty among older adults without sarcopenia or malnutrition.
Materials and Methods
This is a retrospective observational study conducted in a community-dwelling older adult population. Individuals with sarcopenia (defined according to EWGSOP2 criteria) and malnutrition (based on the Mini Nutritional Assessment) were excluded.
Frailty status was assessed using the Turkish-validated version of the FRAIL Scale. Participants were categorized as robust (score = 0), pre-frail (score = 1–2), or frail (score ≥3), and individuals classified as frail were excluded from the analysis.
Data on age, sex, Charlson Comorbidity Index, waist-to-height ratio (as a marker of central adiposity), handgrip strength, arm circumference, and calf circumference were collected. A total of 600 individuals were screened. After applying exclusion criteria, 296 participants with complete data were included in the final analysis. Multivariable logistic regression analysis was used to identify independent associations, and the discriminative performance of the final model was evaluated using ROC curve analysis.
Results
Calf circumference was significantly higher in pre-frail participants compared with robust individuals (37.8 ± 4.6 cm vs 36.4 ± 3.3 cm, p = 0.011), whereas the difference in arm circumference was smaller and did not remain significant in multivariable analysis (31.2 ± 5.4 cm vs 29.7 ± 6.2 cm, p = 0.041).
In a multivariable logistic regression model including age, sex, comorbidity burden, central adiposity, muscle strength, and peripheral anthropometric measures, only calf circumference was independently associated with pre-frailty (OR 1.07 per cm, 95% CI 1.00–1.15, p = 0.046). ROC curve analysis showed acceptable discriminative performance (AUC = 0.705, 95% CI 0.637–0.774, p < 0.001).
Conclusion
Our findings suggest that the independent association between increased calf circumference and pre-frailty may not reflect preserved muscle mass, but rather early qualitative alterations in body composition, such as peripheral fat accumulation or reduced muscle quality.
Calf circumference is a simple, objective bedside measurement that may complement subjective frailty tools such as the FRAIL Scale and

help identify early vulnerability. Prospective studies which incorporate objective body composition methods are needed.

Figure 1. ROC curve of the age- and sex-adjusted multivariable model for predicting pre-frailty (AUC = 0.705).



P1311

CLINICAL AND ELECTROPHYSIOLOGICAL EFFECTS OF DOWNHILL TREADMILL WALKING IN PATIENTS WITH ISCHEMIC STROKE: A RANDOMIZED CONTROLLED STUDY

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ABSTRACT

Objective: Downhill walking on the treadmill has been shown to reduce the excitability of the spinal reflex arc. This study aimed to investigate the clinical and electrophysiological effects of downhill treadmill walking at different inclines in patients with ischemic stroke.

Material and Methods: This single-center, randomized, controlled, prospective, and single-blind study included 35 stroke patients, who were able to ambulate independently and had ankle flexor muscle spasticity levels between 1 and 3 according to the Modified Ashworth Scale (MAS). Participants were randomized into three groups: without inclination (control) group, a 7.5% incline group, and a 15% incline group . The intervention program consisted of a total of five rehabilitation sessions, administered five days a week. Clinical assessments (MAS, Fugl-Meyer Lower Extremity Scale, 2-Minute Walk Test, Timed Sit-to-Stand Test, Berg Balance Scale) were performed before and after five sessions. Electrophysiological measurements (Hmax/Mmax) were evaluated before, after one session, and after five sessions. The study has been registered at the ClinicalTrials.gov with the number NCT05833295.

Results: A total of 30 patients with a mean age of 50.3 ± 9.8 were included in the final analyses. After a single session of walking, a significant depression in the Hmax/Mmax ratio was observed only in the paretic lower extremities of patients walking on a -15% incline. Following the five-session intervention, statistically significant depression in the Hmax/Mmax ratios was observed in the paretic legs of patients in both the -7.5% and -15% incline groups, while no significant change was observed in the control group. Statistically significant improvements were observed in the 2-MWT and TUG scores in all groups, but this improvement was more pronounced in the -15% incline group compared to the control group.

Conclusion: Walking at a -15% incline stands out as an effective neurorehabilitation approach for modulating spasticity secondary to upper motor neuron damage after stroke.

Groups		Before Treatment			After Single Session			After Five Sessions		
	Min-Max	Mean ± SD	Median	Min-Max	Mean ± SD	Median	Min-Max	Mean ± SD	Median	P*
Hmax/Mmax – Paretic Side										
Control Group	0.3-0.9	0.54±**0.19**	0.5	0.3-0.8	0.50±**0.16**	0.45	0.3-0.8	0.49±**0.17**	0.4	0.102* 0.059**
-7.5% Group	0.3-0.7	0.44±**0.13**	0.4	0.3-0.6	0.41±**0.09**	0.4	0.2-0.6	0.37±**0.11**	0.35	0.083* 0.020**
-15% Group	0.3-0.6	0.42±**0.10**	0.4	0.2-0.5	0.37±**0.09**	0.4	0.1-0.5	0.29±**0.13**	0.25	0.025* 0.009**
Hmax/Mmax – No Paretic Side										
Control Group	0.1–0.5	0.25 ± 0.14	0.2	0.1–0.3	0.18 ± 0.07	0.2	0.1–0.3	0.16 ± 0.08	0.1	**0.038*** **0.024****
-7.5% Group	0.1–0.3	0.23 ± 0.06	0.2	0.1–0.3	0.19 ± 0.05	0.2	0.1–0.2	0.16 ± 0.05	0.2	**0.046*** **0.008****
-15% Group	0.1–0.3	0.24 ± 0.06	0.25	0.1–0.3	0.19 ± 0.07	0.2	0.1–0.3	0.14 ± 0.06	0.1	**0.025*** **0.023****

P1312

SARCOPENIA AND PELVIC FLOOR DYSFUNCTION IN ELDERLY WOMEN: THE RELATIONSHIP AND IMPACT ON SEVERITY

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Objective: Sarcopenia, characterized by loss of muscle mass and strength, may be linked to pelvic floor dysfunction, yet few studies have investigated this association. This study aimed to evaluate the relationship between sarcopenia and pelvic floor dysfunctions (PFD), including urinary incontinence (UI), pelvic organ prolapse (POP), fecal incontinence (FI), and constipation in elderly women.

Materials and Methods: This cross-sectional observational study included 182 female patients aged ≥65 years. Risk of sarcopenia (SARC-F), muscle strength (grip strength), muscle mass (dual-energy X-ray absorptiometry), physical activity levels (Short Physical Performance Battery [SPPB] and gait speed) and presence of sarcopenia were compared between participants with and without urinary incontinence (self-report and ICIQ-SF), pelvic organ prolapse (POP-Q), fecal incontinence (self-report) and constipation (Rome IV).

Results: UI was present in 132 women. Among participants, 73.1% had probable sarcopenia and 5.4% had sarcopenia (2.7% confirmed, 2.7% severe). No significant association was found between sarcopenia and UI or its subtypes. Reduced muscle strength, gait speed, and SPPB scores were significantly associated with UI, and regression analysis identified lower muscle strength as an independent risk factor. Lower gait speed, SPPB scores, and appendicular skeletal muscle mass (ASM) were associated with UI severity. No relationship was observed between sarcopenia or its markers and POP, FI, or constipation. SARC-F scores were significantly associated with UI and showed a low positive correlation with UI severity (ICIQ-SF).

Table 1: Sarcopenia and related parameters according to urinary incontinence status

	Elder Women With UI (n=132)	Elder Women Without UI (n=50)	p
SARC-F score	3.53 ± 1.93	2.44 ± 1.79	0.001
Handgrip strength (kg)	17.06 ± 5.15	19.64 ± 5.34	0.004
Gait speed (m/s)	1.01 ± 0.26	1.10 ± 0.24	0.036
SPPB score	9.91 ± 2.08	10.76 ± 1.44	0.003
Sarcopenia	6 (4.5%)	4 (8%)	0.361

Conclusion: Sarcopenia markers may be valuable clinical indicators of UI and PFD in elderly women. Low hand grip strength appears to be a significant indicator for UI, suggesting that screening may be clinically useful. Muscle strength and physical performance may decline before muscle mass and could play a greater role in the development of UI and PFD. The SARC-F questionnaire also shows potential to predict UI, PFD, and UI severity.

Keywords: sarcopenia, pelvic floor dysfunction, urinary incontinence, pelvic organ prolapse

P1313

CALCIFICATION MARKERS, FGF23 AND SALT TRANSPORT: COMMON PATHWAYS IN NEPHROLITHIASIS, CRYSTALLURIA AND BONE METABOLISM

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Objectives

Nephrolithiasis (NL) is a common polyetiological urological disease that is frequently associated with reduced bone mineral density (BMD). One of the shared key factors contributing to both osteoporosis (OP) and NL is the activation of calcification factors, including osteopontin (OPN), osteocalcin (OC), and fibroblast growth factor 23 (FGF23). The aim was evaluating indices of salt transport, calcification markers (OPN, OC), and FGF23 in patients with nephrolithiasis and crystalluria.

Materials and Methods: The study was conducted at the Department of Urology, Bogomolets National Medical University. The assessment of salt transport, osteopontin, and FGF23 was carried out in a certified laboratory (Medical Laboratory "DILA," Kyiv, Ukraine). Osteocalcin measurement was carried out based on the Ukrainian Osteoporosis Center of the State Institution "Institute of Gerontology named after D.F. Chebotarev of the National Academy of Medical Sciences of Ukraine", Kyiv, Ukraine (Chief of the Center Prof. N.V. Grygorieva).

A total of 104 patients were enrolled: 21 men (20.19%) and 83 women (79.81%), with a mean age of 57 years [23–83]. Patients were divided into three groups: Group I: 41 participants without NL or crystalluria (28 women [68.3%], 13 men [31.7%]); mean age 58 years [50–65]. Group II: 39 participants with NL (22 women [56.4%], 17 men [43.6%]); mean age 55 years [52–61.5]. Group III: 24 participants with crystalluria (20 women [83.3%], 4 men [16.7%]); mean age 57.5 years [52.5–63.75].

Data processing was carried out using MS Excel and Statistica EZR version 1.62-2023 statistical programs.

Results: Higher rates of oxaluria were observed in patients with NL and crystalluria, which was predominant in the study groups compared to other indicators studied. The levels of calcification markers (OPN, OC) and FGF23 were significantly lower in patients Group I compared with those with NL and crystalluria. The level of FGF23 showed a positive association with serum phosphate levels, which is consistent with its physiological mechanism of action.

Conclusion: rising calcification markers (OPN, OC) and FGF23 might contribute to the mechanism of stone formation. Further study is needed to determine the specific changes these markers undergo in relation to changes in BMD.

P1314

BONE METABOLISM MARKER LEVELS IN ADOLESCENTS WITH IDIOPATHIC SCOLIOSIS, DEPENDING ON THE SEVERITY OF SPINAL CURVATION

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Objective: Early prevention of idiopathic scoliosis (IS) requires a thorough understanding of the disease's pathogenesis. Modern bone metabolism diagnostic methods offer the potential for predicting the development and progression of IS and for tailoring treatment and prevention to an individualized approach.

Material and Methods: We observed 152 adolescents aged 15-16 years (62 boys and 90 girls) with varying degrees of spinal deformity, including poor posture, grade 1 scoliosis, grade 2 scoliosis, and grade 3 scoliosis. The average age was 15.26±0.04 years. Levels of bone metabolism markers were measured: serum osteocalcin (OC) (an indicator of osteosynthesis) and urinary deoxypyridinoline (DPD) (an indicator of osteoresorption). The control group (CG) consisted of 20 apparently healthy peers.

Results: Depending on the degree of IS in the group of subjects, the level of OKC gradually decreased in comparison with the age norm (93.4 ± 14.1 ng / ml) and with the CG (96.66 ± 2.17 ng / ml) ($p < 0.001$) and was: with NO - 81.41 ± 0.98 ng / ml, scoliosis of the first degree - 77.34 ± 0.98 ng / ml, scoliosis of the second degree - 70.84 ± 0.82 ng / ml, scoliosis of the third degree - 66.41 ± 0.69 ng / ml When assessing bone resorption depending on the degree of IS, the level of DPD in case of posture disorders was within the age norm (41.55 ± 1.78 nmol DPD / mmol Cr), but higher in comparison with the CG ($p < 0.05$). In grades I and II scoliosis, the values approached the normal range (53.21 ± 1.08 nmolDPD/mmolCr and 58.55 ± 2.61 nmolDPD/mmolCr, respectively), but were also significantly higher compared to the control group ($p < 0.001$). In grade III scoliosis, the DPD concentration was 64.74 ± 4.21 nmolDPD/mmolCr, which is significantly higher than the age-appropriate norm and the control group ($p < 0.001$).

Conclusions: Biochemical indicators of bone remodeling, osteocalcin and deoxypyridinoline, are early markers of processes occurring in bone tissue. Studying their levels can be used in a differentiated approach to developing treatment and preventive programs for idiopathic scoliosis, as well as for comorbid conditions.

P1315

PERIODONTAL TISSUE CONDITION IN HIV-INFECTED PATIENTS AFTER COVID-19

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Objective: Processes occurring in bone tissue are reflected in the condition of dental hard tissues and periodontal tissues. A strong correlation between laboratory parameters of bone metabolism and paraclinical periodontal indices has been repeatedly described in scientific studies. Currently, periodontal pathology is considered by authors to be a comorbid condition associated with arthropathies, dorsopathies, and other musculoskeletal disorders. Furthermore, studying the condition of periodontal tissues in HIV-infected patients is relevant. This category of patients has varying degrees of impaired bone remodeling. These changes are undoubtedly characteristic of both the musculoskeletal system in general and periodontal tissues in particular. Osteoclast activity and osteoblast apoptosis are known to increase with prolonged infection and viremia.

Material and Methods: A dental examination was conducted on 103 HIV-infected patients aged 35-44 years who had recovered from COVID-19 (the study group). The comparison group (CG) consisted of 27 HIV-infected patients with no history of coronavirus infection. The community periodontal index (CPI) was used in accordance with WHO recommendations.

Results: The prevalence of periodontal pathology in both study groups was 100%. In the primary group, the following were recorded: codes 1 and 2 (gingival bleeding, tartar, and periodontal pocket up to 3 mm) – in 7.77% of cases (n=8); code 3 (periodontal pocket up to 4-5 mm deep) – 23.3% (n=24); code 4 (periodontal pocket more than 6 mm) – 68.93% (n=71). In the primary group, the following were noted: codes 1 and 2 – in 14.81% of cases (n=4); code 3 – in 70.38% (n=19); code 4 – in 14.81% (n=4).

Conclusions: HIV-infected patients who recovered from COVID-19 show progression of periodontal pathology, which is registered by an increase in the depth of periodontal pockets. This is a direct sign of a decrease in the height of the interalveolar septum of the jaw bone. This category of patients requires a differentiated approach in the treatment of periodontal tissue pathology, taking into account the underlying pathology, secondary and opportunistic infections.

P1316

INFLUENCE OF LUMBAR SPINAL STENOSIS ON FUNCTIONAL RECOVERY AFTER HIP FRACTURE SURGERY

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Background

Fragility hip fractures in the elderly are associated with high mortality and a decline in functional outcome. Vertebral fractures are the most common osteoporotic fractures in the elderly population. Many previous studies identified the association of hip fracture and osteoporotic vertebral compression fracture (OVCF), particularly regarding recovery and functional outcomes. Generally, the umbar spinal stenosis (LSS) frequently coexists with hip fractures in older adults and may impair postoperative recovery. However, data is lacking on the functional outcome in those patients with hip fracture and LSS. We evaluated whether concomitant LSS adversely affects functional outcomes after hip fracture surgery and explored LSS-related subgroups.

Methods

We retrospectively analyzed 270 patients undergoing hip fracture surgery (Non-LSS=184; LSS=86). Outcomes included Harris Hip Score (HHS) at 3, 6, and 12 months; Timed Up and Go (TUG) at 2 weeks, 6 months, and 12 months; and Oswestry Disability Index (ODI) at preoperative, 3, 6, and 12 months. Group comparisons used Welch's t-tests. Subgroup analyses within LSS evaluated stenosis level (single vs multi-level) and severity (Lee grade 1-3).

Results

Compared with Non-LSS, the LSS group had significantly lower HHS at 3 and 6 months [70.8 ± 9.6 vs 75.9 ± 8.8 (p = 0.0004), 79.9 ± 8.9 vs 83.7 ± 8.3 (p = 0.0011), respectively] and higher ODI at 6 months [28.4 ± 7.9 vs 24.3 ± 6.8 (p = 0.0001)], while differences attenuated by 12 months [88.4 ± 8.1 vs 89.6 ± 7.5 (p = 0.282)]. TUG at 6 months was significantly slower in LSS [17.2 ± 3.8 vs 15.1 ± 3.5, p = 0.002)], with no significant difference at 2 weeks or 12 months. Within LSS, multi-level stenosis showed poorer HHS at 6 months versus single-level, and higher Lee grade was associated with worse HHS, indicating a dose–response pattern. Age and ASA classification were comparable between groups.

Conclusions

The presence of coexisting Lumbar Spinal Stenosis (LSS) in hip fracture patients was associated with significantly poorer functional recovery in the early to-mid-term following hip fracture surgery, particularly noted between 3 and 6 months post-operation. Crucially, this difference was not sustained at the 12-month follow-up. Furthermore, factors such as multi-level spinal involvement and a higher Lee grade served to identify patients at greatest risk, underscoring the necessity for early recognition and tailored rehabilitation strategies.

P1317

RELIGIOUS PRACTICES IN PATIENTS WITH KNEE OSTEOARTHRITIS: ASSOCIATED FACTORS AND IMPACT ON PATIENT OUTCOMES

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Introduction: Knee osteoarthritis (OA) is a chronic condition with diverse therapeutic strategies. Since spirituality and religion contribute to psychological resilience in chronic diseases, examining factors associated with religious practices among knee OA patients remains important.

Objective: To evaluate the impact of knee OA on religious practices and beliefs, and to identify the main associated factors.

Material and Methods: A cross-sectional study including symptomatic knee OA patients. Socio-demographic, disease characteristics and imaging data were collected. Health status and psychological impact were assessed using SF-36 and HADS for anxiety and depression. Religious aspects were evaluated using a 25-item self-developed questionnaire assessing four dimensions: religious beliefs, religious and spiritual practices, assistance-seeking, and feelings.

Results: Forty-one knee OA patients were included. Male-to-female ratio was 6/35. The mean age was 58 ± 10 years [37-78].Most patients had mild to moderate radiographic changes. Regarding religious practices, 30 patients reported frequent practice. Thirty five experienced difficulties. The most affected practice was prayer, 27 patients reported praying while seating. During Ramadan, 11 patients reported difficulty to fast. To cope with these difficulties, 17 patients asked for help from doctors, 5 turned to family or friends, and 10 remained silent. Patients who practiced religion more frequently had lower pain intensity and Patient Global Assessment scores (**p = 0.001 and 0.01**), as well as lower anxiety, depression, and pain PCS scores (**p = 0.003, 0.002, and 0.005**, respectively). No significant associations were found between frequency of religious practice and age, sex, time to diagnosis, disease duration, or radiographic stage of knee OA. Functional rehabilitation was linked to fewer changes in religious practices (**p = 0.04**), particularly with fewer difficulties in performing prayer (**p = 0.05**). Radiographic stage of knee OA was not associated with difficulties in performing prayer. Difficulties in religious practices were associated with poorer quality of life assessed with SF-36 scores < 50; (**p = 0.01**) and higher HADS anxiety (**p = 0.05**) and PCS scores (**p = 0.04**).
Conclusion: Difficulties in religious practices were related to psychological distress more than to structural joint damage itself, so that considering spiritual dimensions is crucial for optimal care.

P1318

AUTOIMMUNITY TO CERULOPLASMIN IN PATIENTS WITH RHEUMATOID ARTHRITIS AND SYSTEMIC LUPUS ERYTHEMATOSUS

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The primary role of free radicals in rheumatoid arthritis is their ability to damage proteins, lipids, and DNA, imparting autoantigen properties to them and triggering antibody production. This is achieved by increasing the production of reactive oxygen species (ROS), which, in turn, oxidize proteins, cause lipid peroxidation, stimulate the release of proteolytic enzymes and vasoactive amines, and are responsible for enzyme inactivation and transformation, as well as suppression of the functional activity of immune cells. The body's antioxidant system (AOS), which includes enzymatic and non-enzymatic components, naturally prevents the pathological effects of ROS on its own tissues. The main enzymatic components of the AOS are glutathione peroxidase (GP), superoxide dismutase (SOD), glutathione reductase (GR), catalase (CAT), and ceruloplasmin (CP). They neutralize highly active superoxide anions, hydrogen peroxide, and fatty acid hydroperoxides, preventing the accumulation of particularly toxic secondary lipid peroxidation products. The formation of antibodies to these enzymes is believed to be one of the causes of antioxidant enzyme deficiency in rheumatoid arthritis and systemic lupus erythematosus.
OBJECTIVE: To study the formation of autoantibodies to antioxidant defense system enzymes and ceruloplasmin in rheumatoid arthritis and systemic lupus erythematosus.
MATERIALS AND METHODS: The serum of 75 patients with RA and 68 patients with systemic lupus erythematosus (SLE) treated in the rheumatology department of Volgograd City Clinical Hospital No. 25 served as a control. Thirty apparently healthy individuals, donors from the blood transfusion center, served as a control. Commercially available antigens were used: CP- "Diagnostic Purified Liquid Human Ceruloplasmin," St. Petersburg, Russia. Antibodies to the enzymes were determined by enzyme immunoassay with antigen fixation in magnetically controlled sorbents using the Gontar method. Resultswere expressed as optical density units (ODU).
RESULTS: In the sera of 75 patients with RA, elevated levels of antibodies to CP were found in 74.6% (56 patients). In patients with grade I activity, 11 patients (68.7%) had an elevated level of AT to CP. With grade II, in 36 people (75%). In the third group, in 9 people (81.8%). In patients of the first group, the antibody level was 0.097±0.014 U.O.P., in group II 0.139±0.011 U.O.P., in group III 0.182±0.02 U.O.P. The antibody level in the control group was 0.02±0.06 U.O.P. Out of 68 patients with SLE, 32 patients had an elevated level of antibodies to ceruloplasmin. Of the 14 patients with minimal activity, two (14.3%) had a significant increase in the level of antibodies to CP. With a moderate activity, 10 out of 21 patients (47.6%) had a moderate activity. Of the 33 patients with a high activity, 20 (60.6) had an increased level of antibodies to CP. The level of AB to CP in the first group was 0.389±0.432 U.O.P., in the second group 0.705±0.596 U.O.P., in the third group 0.886±0.556 U.O.P.
CONCLUSIONS: In RA and SLE, the formation of antibodies to antioxidant enzymes is observed, depending on disease activity. Detection of antibodies can serve as an additional criterion for expressing the degree of disease activity.
CONCLUSION: The study revealed elevated levels of antibodies to ceruloplasmin, which significantly differed from those in healthy individuals. A statistically significant relationship was found between the level of antibodies to enzymes and disease activity

P1319

VDMT FOR NEUROMA PREVENTION IN TRANSTIBIAL AMPUTATION AFTER MINE-BLAST INJURY

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Background: Mine-blast injuries often result in the destruction of the distal parts of the lower extremity and are among the most common causes of below-knee amputations (BKA) in combat-related trauma. Such amputations are associated with a high risk of both early and late complications. One of the most frequent late complications is the formation of symptomatic neuromas, which may lead to PLP and RLP. According to current data, the incidence of symptomatic neuromas following BKA ranges from 14% to 35%. The superficial peroneal nerve (SPN) is most commonly affected (up to 89.7% of cases). Reinnervation techniques such as RPNI, VDMT, and TMR have demonstrated high efficacy in both the treatment and prevention of neuroma formation.
Material and methods: From 2022 to 2023, 64 patients with mine-explosive injuries underwent transtibial amputations. All patients were divided into two equal groups (32 patients each). In the main group, traction neurectomy was performed on the tibial, deep peroneal, sural, and saphenous nerves, while the SPN was treated using the VDMT method. A muscle flap from the anterior tibial muscle, excised below the level of amputation and raised on the anterior tibial vessels, was used to envelop the cut end of the SPN and placed in the deep, non-load-bearing surface of the residual limb. In the control group, traction neurectomy was performed on all listed nerves without the VDMT technique. Outcomes were assessed at 12 and 24 months postoperatively.
Results: Pain levels in both groups were assessed using the Visual Analog Scale (VAS). At 12 months, the mean VAS score in the main group was 2.12 ± 0.60, compared to 3.94 ± 0.82 in the control group. At 24 months,

the scores were 1.68 ± 0.41 and 5.74 ± 0.96, respectively. Ultrasound examination of the residual limbs at 24 months revealed no neuromas of the SPN in the main group, whereas 15 patients (48.0%) in the control group had such neuromas, 9 of whom (28.1%) had symptomatic neuromas requiring surgical intervention.
Conclusion: The VDMT technique is an effective method for preventing the formation of symptomatic neuromas of the SPN during transtibial amputation. Its application significantly reduces pain intensity, improves limb function and quality of life, and decreases the need for reoperations.

P1320

VITAMIN D AND BONE METABOLISM IN NON-ALCOHOLIC, NON-VIRAL LIVER CIRRHOSIS

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Background.
Chronic liver diseases and liver cirrhosis (LC) are associated with an increased risk of mineral and bone disorders, including hepatic osteodystrophy, impaired bone quality, and fractures. The liver plays a central role in vitamin D metabolism, protein synthesis, and calcium homeostasis, and disruption of these functions may contribute to skeletal complications. Although reduced bone mineral density (BMD) has traditionally been used to assess bone involvement in LC, accumulating evidence suggests that alterations in bone microarchitecture may occur early and are not always accompanied by a decrease in BMD. Data on vitamin D metabolism, parathyroid hormone (PTH), and bone microarchitecture assessed by trabecular bone score (TBS) in patients with non-alcoholic, non-viral LC remain limited, particularly in relatively young patients without classical osteoporosis risk factors.
Aim.
To evaluate mineral metabolism, vitamin D metabolism, and bone tissue characteristics in patients with non-alcoholic, non-viral liver cirrhosis and to identify clinically relevant markers of bone impairment in this population.
Materials and Methods.
This cross-sectional pilot study included 45 patients with liver cirrhosis and 20 age- and sex-matched healthy volunteers. All participants underwent anthropometric assessment and comprehensive laboratory evaluation of mineral and bone metabolism, including measurements of total and ionized calcium, phosphate, magnesium, PTH, and insulin-like growth factor-1 (IGF-1). A detailed panel of vitamin D metabolites, including 25-hydroxyvitamin D and its downstream metabolites, was measured using liquid chromatography–tandem mass spectrometry. Bone mineral density was assessed by dual-energy X-ray absorptiometry at the lumbar spine, proximal femur, and distal radius. Bone microarchitecture was evaluated using trabecular bone score (TBS), and screening for vertebral compression fractures was performed using spinal radiography.
Results.
Patients with LC demonstrated significant disturbances of mineral metabolism compared with healthy controls, including lower levels of total and ionized calcium, PTH, and IGF-1. A pronounced deficiency of 25-hydroxyvitamin D was observed in the LC group, accompanied by significantly reduced concentrations of 24,25-dihydroxyvitamin D, while levels of 1,25-dihydroxyvitamin D were comparable between groups. Despite the absence of significant differences in absolute BMD values, patients with LC exhibited a markedly lower TBS, indicating impaired bone microarchitecture. Correlation analysis revealed positive associations between TBS and several vitamin D metabolites, whereas no significant correlations were identified between BMD and PTH levels.
Conclusion.
Non-alcoholic, non-viral liver cirrhosis is associated with complex disturbances of mineral metabolism, including vitamin D deficiency, hypocalcemia, reduced PTH and IGF-1 levels, and deterioration of bone microarchitecture despite preserved BMD. Trabecular bone score appears to be a sensitive marker of early bone involvement in this population and may complement standard BMD assessment in patients with liver cirrhosis.
Funding.
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P1321

A BIBLIOMETRIC ANALYSIS OF THE TOP 100 MOST-CITED ARTICLES IN FIELD OF MACHINE LEARNING AND BONE FRACTURE DETECTION

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Objective: Recently, it has more emphasis on the role of artificial intelligence in early detection of bone fractures. We aimed in current bibliometric study to analysis the top 100 most-cited published papers on this topic to map the field's structure and influence. We especially want to identify subject area of these papers, the most productive countries, institutions, the first top cited paper and its citation number, and main journals.
Material and Methods: We performed a comprehensive search in the Scopus database up to 4 Nov 2025. After excluding book chapters, and non-English language papers, we assessed the top 100 most-cited papers. The bibliometric metrics were analyzed using the "analyze results" tool in Scopus.
Results: Among, 100 top-cited papers, the first top-cited study was published in 2018, with 751 citations out of a total 29284 citation number (2.56%). This paper entitled "Deep learning algorithms for detection of critical findings in head CT scans: a retrospective study" was an original study published in "The Lancet", impact factor (IF): 88.50, and CiteScore 87.60. Research articles were the most common type of publications (n=81, 81.0%). The main subject area of the papers was medicine (n=84, 84.0%). The US was the most productive country (n=35, 35.0%), followed by China (n=13, 13.0%). The main journals were "Radiology" (IF: 15.2), "European Radiology" (IF: 4.7), "Scientific Reports" (IF: 3.9), and "Acta Orthopaedica" (IF: 2.4), each contributing 6 papers. The top three affiliations were from US; "Massachusetts General Hospital" (5 papers), followed by "Harvard Medical School", and "NYU Grossman School of Medicine", each contributing 4 studies.

Conclusions: Our results showed the US and China as the top-ranked countries in terms of publications, but the US as top-institutions in affiliations of the researchers. Moreover, "The Lancet" was the main journal for publishing top-cited paper in this field.
Keywords: Artificial intelligence, Fracture, Bibliometric

P1322

IMPACT OF STATINS ON BONE HEALTH; A BIBLIOMETRIC ANALYSIS OF THE SCIENTIFIC PUBLICATIONS OF MENA COUNTRIES

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Objective: It is shown beneficial effects of statins on bone health. We aimed to conduct a bibliometric analysis of scientific publications from countries in the Middle East and North Africa (MENA) region over the past 15 years in this field.
Material and Methods: We carried out a bibliometric study through a comprehensive search of Scopus database up to 12 Nov. 2025. We identified publication trend, the most productive countries and institutions, main journals, and the most prominent research topics in the field. Bibliometric analysis was conducted by "analyze results" tool available in Scopus, and VOSviewer 1.6.20.
Results: After assessing 169 records, 80 relevant studies were included in the analysis. A time trend in publications was shown with the highest number in 2025 (n=13, 16.25%). Main type of the papers was original articles (n=62, 77.5%). Top three productive countries were Iran (n=38, 47.5%), Egypt (n=21, 26.25%), and Saudi Arabia (n=15, 18.75%). The majority of the published papers appeared in dental and pharmacology-related journals (n=27, 33.75%). The total citation number was 1,163. The highest cited paper (138) was a review article entitled "Potential mechanisms and applications of statins on osteogenesis: Current modalities, conflicts and future directions", published in "J Control Release", impact factor: 11.5. Top three ranked institutes in producing these documents were "Tehran University of Medical Sciences", Iran (n=10, 12.5%), followed by "Ain Shams University" (n=7, 8.75%) Egypt, and then "Cairo University" (n=6, 7.5%) Egypt. Top keywords included "bone density", "bone regeneration", "osteoporosis", "osteoblast", "bone development", and "bone metabolism".
Conclusions: There is a large research output in field of impact of statins on bone health among MENA countries. We found a leading position for Iran as top productive country, supported by its prominent institutes. Pharmacology- and dental-related journals were the main sources for disseminating of influential publications in the studied field.
Keywords: Statin, Bone, Bibliometric.

P1323

ARTIFICIAL INTELLIGENCE–BASED DETECTION OF BONE BIOMARKERS IN OSTEOARTHRITIS: A BIBLIOMETRIC ANALYSIS

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Objective: Currently, it has shown the role of artificial intelligence in diagnosis of osteoarthritis. We assessed in current study the bibliometric status of the published scientific papers in this topic to identify their subject areas, the most productive countries/institutions, total citation number of the studies, the highest-cited paper, and main journal for dissemination of the studies.
Material and Methods: We conducted a comprehensive search in the Scopus database up to 20 Dec. 2025. After excluding book chapters, non-related subject area, and non-English language published papers, we assessed the bibliometric characteristics of the remaining papers using the Scopus "analyze results" tool.
Results: Out of the 127 records retrieved, 60 documents were relevant to our topic. The highest-cited paper was published in 2022, and had 100 citation number of the 769 total citations (13.0%). This was an observational study entitled "Osteoarthritis endotype discovery via clustering of biochemical marker data", published in "Annals of the Rheumatic Diseases", with an impact factor: 20.6, and CiteScore: 33.20. The majority of the papers was published in 2025 (n=17, 28.3%), indicating with an increasing time trend in publications. Research and review articles were the most common type of publications, respectively (n=37, and 12). The main subject area was "Medicine" (n=44, 73.3%), followed by "Biochemistry, Genetics and Molecular Biology" (n=14, 23.3%). The top three productive countries were the US (n=20, 33.3%), China (n=13, 21.7%), and UK (n=9, 15.0%). The main journal was " Osteoarthritis and Cartilage " (impact factor: 9.0), contributing 4 papers. The top three affiliations were from the US: "The University of North Carolina at Chapel Hill" (5 papers), "Harvard Medical School" (4 papers), and "UNC School of Medicine" (4 papers).
Conclusions: Our results showed that the US, China, and UK were as the top-ranked countries in terms of publications, and the US institutions also dominated researcher affiliations. Moreover, "Annals of the Rheumatic Diseases" was the main journal for publishing the highest-cited paper in this field.
Keywords: Artificial intelligence, Osteoarthritis, Bibliometric

P1324

CARDIOVASCULAR DISEASE AND RISK OF FALLS AMONG IRANIAN ADULTS: EVIDENCE FROM A NATIONAL FOLLOW-UP COHORT STUDY

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Objective(s): Assessment the association between cardiovascular disease and the risk of falls among Iranian adults.
Method: This study used data from the STEPS follow-up study, a nationally representative longitudinal prospective cohort established four years after the 2021 STEPwise Approach to Noncommunicable Disease Risk Factor Surveillance. Participants aged 18 years and older who completed both baseline and follow-up assessments were included. Cardiovascular disease at baseline was defined based on self-reported physician diagnosis of heart attack, angina (chest pain from heart disease), or stroke (cerebrovascular accident). History of falls outcome on the follow-up study during the preceding four years was assessed through standardized telephone interviews. Incidence of falls was estimated separately for participants with and without cardiovascular disease. Group differences were examined using the chi-square test. Statistical analyses were conducted using Stata version 17.
Results: Among 8,655 eligible participants, 637 reported a history of cardiovascular disease. The study population consisted of 55.10% females (95% confidence interval [CI]: 53.93–56.27) and 44.90% males (95% CI: 43.73–46.07). Overall, the incidence of falls was higher among individuals with cardiovascular disease compared with those without. The incidence of falls among individuals with cardiovascular disease was 7.21% (95% CI: 5.25–9.83), whereas the corresponding estimate among participants without cardiovascular disease was 4.08% (95% CI: 3.62–4.60). This difference was statistically significant (P value < 0.001), indicating a higher risk of falls in the cardiovascular disease group.
Conclusion: Cardiovascular disease is associated with a significantly increased risk of falls among Iranian adults. Given the clinical and public health consequences of falls, particularly in ageing populations, these findings underscore the importance of integrating fall risk assessment and prevention strategies into the management of individuals with cardiovascular disease.

P1325

A CROSS-SECTIONAL STUDY OF DAIRY CONSUMPTION AMONG NEWLY ADMITTED STUDENTS AT TEHRAN UNIVERSITY OF MEDICAL SCIENCES

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Objective(s): This study aimed to evaluate dairy consumption status and its sociodemographic and lifestyle association among newly admitted students at Tehran University of Medical Sciences. Methods: This secondary analysis included 391 newly admitted students of Tehran University of Medical Sciences, from an initial sample of 422 after excluding those with missing outcome data. Mean ± standard deviation (SD) daily dairy intake (servings/day) was evaluated as a continuous variable and as a binary outcome, defined as adequate (≥2 servings/day) versus inadequate (<2 servings/day). Sociodemographic characteristics included sex, self-reported socioeconomic status (SES), and living status (home vs. dormitory). Leisure-time physical activity (LPA) was also assessed. Descriptive statistics were calculated, and group comparisons were performed using independent t-tests, one-way ANOVA, and chi-square tests, as appropriate. Results: The mean ±SD daily dairy intake was 1.52 ±1.29 servings. Overall, only 119 of the students (30.4%) achieved adequate dairy consumption. Mean ± SD dairy intake was higher in males than females (1.64±1.40 vs. 1.40±1.19 servings/day), although the difference was not statistically significant (p=0.07). Significant differences in mean dairy intake were observed across self-reported SES levels (3rd tertile: 1.71 ±1.37, 2nd tertile: 1.52 ±1.34, and 1st tertile: 1.11 ±0.69; p=0.022). Students with higher levels of LPA had significantly greater mean of dairy intake compared with those with low LPA (1.67 ±1.31 vs. 1.31±1.24 servings/day; p=0.006) and higher proportion of them meet adequacy criteria (81 (36.3%) vs. 37 (22.8%), p=0.005). Students living at home tended to have higher mean of dairy intake than those residing in dormitories (1.58 ± 0.10 vs. 1.43 ± 0.10), although this difference did not reach statistical significance (p=0.25). Conclusion: Dairy consumption among newly admitted medical sciences students was suboptimal, with fewer than one-third meeting recommended intake levels. Targeted nutrition promotion strategies focusing on physically inactive and socioeconomically disadvantaged students may contribute to improved bone health during early adulthood.

P1326

ANTIDIABETIC MEDICATIONS AND FALL RISK IN PATIENTS WITH DIABETES: A PROSPECTIVE NATIONAL COHORT STUDY

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Objective(s): This study aimed to examine the association between anti-diabetes medication use and fall risk among adults with diabetes in a prospective national cohort.
Methods: This analysis included 1,128 adults with diabetes, which are subpopulation of STEPS 2021 survey, identified using standard clinical criteria (HbA1c ≥6.5% or fasting plasma glucose ≥126 mg/dL, or self-reported use of anti-diabetic medication). Participants were classified based on current use of anti-diabetes medications, including oral agents and insulin. Incidence of falling was assessed by self-report of at least one fall within the previous four years (STEPS 2021 follow-up). Fall incidence with 95% confidence intervals (CI) were calculated, and differences between medication users and non-users were evaluated using chi-square.
Results: Among the total diabetic population, 647 (57.1%) were female, and 481 (42.9%) were male. Overall, 71 (6.92%) participants reported a fall in the past four years. Anti-diabetes medication use was reported by 549 (48.7%) participants. The incidence of falls was 7.36% among medication users and 6.42% among non-users. No statistically significant difference in fall incidence was observed between the two groups (p = 0.63).
Conclusion: In this national cohort study, the incidence of falls did not differ significantly between adults with diabetes using anti-diabetic medications and those not using them. These findings highlight that fall occurrence in this population may be multifactorial, emphasizing the need to consider comorbidities, functional status, and other non-pharmacologic factors in prevention strategies.

P1327

HYPERTENSION AND RISK OF FALLS AMONG IRANIAN ADULTS: FINDINGS FROM A NATIONAL FOLLOW-UP COHORT STUDY

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Objective(s): Determination the risk of falls among Iranian adults with hypertension. Method: This study utilized data from the Iran STEPS follow-up study, a nationally representative, prospective cohort initiated four years after the 2021 STEPwise Approach to Noncommunicable Disease Risk Factor Surveillance. The analysis included adults aged 18 years and older who completed both baseline and follow-up evaluations. Hypertension at baseline study was defined as a systolic blood pressure of at least 140 mmHg, a diastolic blood pressure of at least 90 mmHg, or self-reported use of antihypertensive medications. Information on history of falls during the four-year follow-up was collected through standardized telephone interviews. Fall incidence was estimated separately for participants with and without hypertension, and between-group differences were assessed using the chi-square test. All statistical analyses were performed using Stata version 17. Results: A total of 8,626 individuals were included in the analysis, of whom 2,889 met the criteria for hypertension. Females comprised 55.12% of the study population (95% confidence interval [CI]: 53.95–56.30), while males accounted for 44.88% (95% CI: 43.70–46.05). The incidence of falls was higher among participants with hypertension compared to those without. Specifically, the fall incidence was 6.36% (95% CI: 5.42–7.45) in the hypertensive group, versus 3.29% (95% CI: 2.81–3.84) in the non-hypertensive group. This difference was statistically significant (P < 0.001), indicating a substantially increased risk of falls associated with hypertension Conclusion: Hypertension is significantly associated with an increased risk of falls among Iranian adults. These findings underscore the importance of integrating fall risk assessment and prevention strategies into hypertension management and support the need for targeted interventions, particularly in ageing populations.

P1328

PREVALENCE OF PHYSICAL ACTIVITY AND ITS ASSOCIATED FACTORS AMONG NEWLY ADMITTED MEDICAL SCIENCES STUDENTS: A SEX-SPECIFIC ANALYSIS IN TEHRAN, IRAN

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Objective(s): This study aimed to assess the prevalence of sufficient physical activity (PA) among newly admitted medical sciences students and to examine sex-specific associations with selected sociodemographic factors and dairy intake. Methods: This study is a secondary analysis of cross-sectional data collected from 422 newly admitted students at Tehran University of Medical Sciences. After excluding 18 students due to missing outcome data, 404 participants were included in the analysis. Total weekly PA was calculated in minutes and classified as insufficient (<150 min/week) or sufficient (≥150 min/week) based on WHO recommendations. Data on sex, living status (home vs. dormitory), socioeconomic status (SES), and dairy intake were assessed. Daily dairy intake was categorized as adequate (≥2 servings/day) or inadequate

(<2 servings/day). Descriptive analyses, sex-stratified cross-tabulations, and chi-square tests were conducted using Stata version 17. Results: Of the 404 students included, 217 (53.8%) were female. Overall, 58.7% of students met the recommended level of PA, while only 30.4% reported adequate dairy intake. Among females, 114 of 217 (48.1%) achieved sufficient PA. The prevalence of sufficient PA was higher among females living at home compared with those residing in dormitories (59.4% vs. 42.7%; $\chi^2 = 5.86$, p= 0.016). Similarly, a higher prevalence of sufficient PA was observed among females with adequate dairy intake compared to those with inadequate intake (59.0% vs. 46.9%) (p=0.112). Among males, 123 of 187 (51.9%) achieved sufficient PA. Males living in dormitories showed higher prevalence of PA than those living at home (70.0% vs. 61.9%), although this difference was not statistically significant (p= 0.241). Among males, the prevalence of sufficient PA was higher in those with adequate dairy intake (78.9%) compared with those with inadequate intake (60.5%) (p=0.015). Differences in the prevalence of sufficient PA were observed across SES groups in both females and males, but these differences were not statistically significant. Conclusion: Many newly admitted medical sciences students, particularly females, had insufficient PA and inadequate dairy intake, highlighting the need for early sex-sensitive preventive interventions.

P1329

THE BURDEN OF FALLS IN IRAN: TRENDS, AGE-SEX DISPARITIES, AND RISK FACTORS (GBD 2023)

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Background: Falls represent a significant, yet often preventable, cause of morbidity and mortality globally. Understanding the burden of falls, stratified by age, sex, and over time, is crucial for targeted public health interventions in the Islamic Republic of Iran.
Methods: This study analyzed data from the Global Burden of Disease (GBD) 2023 study for the location "Iran (Islamic Republic of)". We examined trends in age-specific incidence, prevalence, Deaths, and Disability-Adjusted Life Years (DALYs) rates, and the contribution of major risk factors for falls between 1990 and 2023. Age-standardized rates were used to compare overall burden across the study period.
Results: In Iran, the age-specific incidence rate of falls was notably higher in young males, peaking in the 20-24 years age group (Figure 1). A distinct sex divergence was observed in older age: incidence rates in females surpassed those in males starting in the 70-74 years age group, peaking in the 90-94 years category. DALY rates increased with advancing age in both sexes, with higher rates observed in males in age groups below 80-84 years, after which the burden became female-dominant. Overall, the age-standardized DALY rate exhibited a decreasing trend from 1990 to 2023 for both sexes (Figure 2). This overall reduction was largely attributable to a significant decrease in the burden driven by occupational injuries, especially among males. Major risk factors contributing to the remaining burden included low bone mineral density, occupational injuries, smoking, and high alcohol use.
Conclusion: While Iran has successfully reduced the age-standardized DALY rate due to falls since 1990, particularly by addressing occupational hazards, significant disparities remain across the life course. Public health strategies should maintain a dual focus: preventing occupational falls in young males and implementing comprehensive strategies—targeting low bone mineral density—to mitigate the disproportionately rising burden in the oldest populations, predominantly affecting females.

P1330

COMPERISON OF THE EFFECTIVENESS OF SELECTIVE NERVE ROOT INJECTION UNDER X-RAY AND ULTRASOUND CONTROL IN PATIENTS WITH NEUROCOMPRESSIVE PAIN SYNDROMES IN THE LUMBAR SPINE

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Objective: Considering the extreme prevalence of pain syndromes in the back, doctors of many specialties face this problem every day. Most often, such patients turn to a family doctor, neurologist, neurosurgeon, rheumatologist, so doctors must differentiate radiculopathy, inflammatory back pain, mechanical and reflex pain syndromes. Radicular pain syndrome is characterized by symptoms that spread to the innervation zone of the affected root, the innervation zones of which are well known. Recently, pain medicine (pain management) has been actively developing, especially considering the fact that no more than 1-3% of patients with neurocompressive pain syndromes are subject to surgical treatment. The effectiveness of selective root injection under X-ray control is generally recognized, but recently such manipulations are performed under ultrasound control, especially with the advent of portable ultrasound devices.
We aimed to determine the effectiveness of selective root injection guided by ultrasound in patients with radicular neurocompressive pain syndromes in the lumbar spine.
Methods: A study was conducted of patients in whom clinical manifestations of radicular neurocompressive pain syndromes in the lumbar spine were confirmed using radiological examination methods (CT, MRI). The level of pain syndrome was assessed on the VAS scale before the start of treatment, one day after the manipulation, one week and 1 month after the start of treatment. Along with traditional treatment (NSAIDs, muscle relaxants, etc.), selective root injection was performed under X-ray or ultrasound control.
Results: 50 patients (22 women and 28 men) were included. The average age was 43.54±0.65 years. 38% of patients were overweight. 86% of patients had L5 or S1 radiculopathy. Patients were divided into 2 groups of 25 people. Patients of both groups were prescribed drug therapy with NSAIDs and muscle relaxants. A solution of corticosteroid and local anesthetic was injected into the affected areas in the patients of the first group under X-ray, the patients of the second group - under ultrasound control. Before the procedure, the average pain level according to VAS in patients of the 1st group was 88±1.5 mm, in the 2nd group - 85±2.7 mm. After 1 day, the level of pain in patients of the 1st group was 31±4.3 mm, and in the 2nd group - 35±3.7 mm. 7 days after the start of treatment and manipulation, the level of pain was 27±2.5 mm in the 1st group and 32±3.5 mm in the second group of patients. After 30 days, the level of pain in patients of the 1st group was 30±3.4 mm, and in the 2nd group - 37±3.8 mm.
Conclusion: despite the increasing popularity of ultrasound-guided

injections, the X-ray-guided blockades method shows better results, which are achieved due to better visualization and more accurate targeting.

P1331

CALF CIRCUMFERENCE PERCENTILES ARE ASSOCIATED WITH GASTROCNEMIUS MUSCLE ARCHITECTURE IN OLDER ADULTS

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Objective(s)
Calf circumference (CC) is widely used as a simple screening tool for sarcopenia; however, its association with underlying muscle architectural characteristics is not well established. This study aimed to evaluate the relationship between CC percentile categories and gastrocnemius muscle thickness, fascicle length, and pennation angle in older adults.
Material and Methods
This cross-sectional study included 152 community-dwelling older adults (mean age 74.1 ± 5.7 years; 61.2% women). CC was categorized into four percentile groups: >50th, 25–50th, 5–25th, and <5th percentile. Gastrocnemius muscle thickness, fascicle length, and pennation angle were assessed using B-mode ultrasonography. Differences and ordered trends across CC categories were analyzed using the Jonckheere–Terpstra test. Additionally, logistic regression models adjusted for age and sex were used to examine the independent association between ultrasound-derived muscle parameters and low CC status.
Results
Median gastrocnemius muscle thickness progressively decreased across descending CC categories (13.9 mm in >50th percentile vs. 10.6 mm in <5th percentile). Similarly, median pennation angle declined from 26.2° to 21.3° across the same categories. Jonckheere–Terpstra analysis demonstrated a significant negative trend between CC categories and gastrocnemius muscle thickness (standardized J-T = 3.915, $p < 0.001$) as well as pennation angle (standardized J-T = 3.060, $p = 0.002$). No significant ordered trend was observed for fascicle length (standardized J-T = 0.553, $p = 0.580$). In multivariable logistic regression analyses adjusted for age and sex, lower gastrocnemius muscle thickness (OR 0.78, 95% CI 0.68–0.90, $p = 0.001$) and lower pennation angle (OR 0.92, 95% CI 0.86–0.99, $p = 0.023$) were independently associated with low CC (<5th percentile).
Conclusion(s)
Lower calf circumference percentiles are significantly associated with reduced gastrocnemius muscle thickness and pennation angle in older adults, reflecting unfavorable muscle architectural characteristics. These findings indicate that declining calf circumference percentiles are associated with unfavorable changes in gastrocnemius muscle architecture, supporting the use of calf circumference percentiles as a clinically meaningful indicator of muscle structural deterioration in older adults.

P1332

STRUCTURAL AND FUNCTIONAL STATE OF BONE TISSUE IN CHILDREN WITH BRONCHIAL ASTHMA DEPENDING ON AGE

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Objective: The aim is to study the structural and functional state of bone tissue in children with bronchial asthma depending on the age of the children.
Material and Methods: 103 children observed (aged 7 to 15 years) with remitted bronchial asthma and manifestations of osteopenic syndrome, diagnosed by ultrasound osteodensitometry using the "Achilles+" diagnostic device. The average age of the patients was 11.70 ± 0.15. The study population included 63 (61.1%) boys and 40 (38.9%) girls.
Results: In children with bronchial asthma, ultrasound parameters with age do not reach those of healthy children in any age group, and the greatest lag in bone tissue condition (decreased elasticity and strength) was found in boys aged 9, 12, and 14 years, and in girls aged 8, 9, and 14 years. The greatest changes were detected during periods of intensive growth and development of the child, as well as during puberty. Before entering puberty, bone tissue had the worst characteristics: in the group of 7-10-year-old boys, density index was reduced by 20% of the norm, and in girls by 16%. In the group of children aged 11-14 years, density index was reduced by 17% in boys, and by 12% in girls. A study of other ultrasound densitometry parameters revealed a uniform decrease with a persistent difference in accordance with the age-related trend by gender (by 18% in girls and 17% in boys). Thus, in children with bronchial asthma, both boys and girls, the formation of peak bone mass is critically impaired.
Conclusions: According to the final examination of the structural and functional state of bone tissue in children with bronchial asthma, a decrease in the formation of peak bone mass was noted.

P1333

ISOLATED LOW LUMBAR SPINE BONE MINERAL DENSITY: FRACTURE RISK AND THERAPEUTIC EFFECTS IN A MONOCENTRIC COHORT

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Objectives:
Current guideline-based osteoporosis risk assessment mainly focuses on hip BMD, potentially underestimating risk in (predominantly female) patients with isolated low lumbar spine (LS) BMD. We aimed to assess the clinical relevance of isolated LS osteoporosis by analyzing fracture outcomes in a real-world cohort.
Material and Methods:
This retrospective cohort study included 169 patients selected from over 1000 individuals, meeting criteria for osteoporosis on lumbar spine and hip DXA and a minimum follow-up of 5 years (IOZ, 2014–2024). Patients received basic therapy (vitamin D/calcium) with or without specific anti-osteoporotic medication. Descriptive statistics and logistic regression were applied.
Results:
Isolated LS BMD was present in 105 of 169 patients (62.1%). The cohort was predominantly female (159/169); sex-specific analyses were not performed due to the small number of men (n=10). Patients with isolated LS osteoporosis were significantly less likely to receive current specific anti-osteoporotic therapy than those with combined LS and hip involvement (74.0% vs. 90.7%; p=0.014). Mean age was comparable between groups (64 vs. 63 years). Patients with at least one fracture prior to DXA (n=112) showed a higher cumulative incidence of ≥1 fracture during the entire follow-up period (mean 8.6 years) compared with patients without baseline fractures (n=50): 42.0% vs. 28.0% . Baseline fractures were independently associated with major osteoporotic fractures (vertebral, femoral, or humeral) after adjustment for age and follow-up duration (OR 3.82, 95% CI 1.25–11.69), whereas age showed no independent association (OR 0.98, p=0.54). Median per-patient fracture rates (fractures/patient-year) were higher in patients with prior fractures (0.091 vs. 0.000; p=0.033).
Conclusions:
Isolated low lumbar spine osteoporosis was common and associated with lower use of specific therapy despite a clinically relevant fracture risk. Baseline fractures were the strongest independent predictor of future and major osteoporotic fractures. These findings were observed in a real-world cohort with a high proportion of patients receiving basic and/or specific anti-osteoporotic therapy. Fracture risk in patients with isolated LS BMD may be underestimated in routine clinical practice.

P1334

LONG-TERM SKELETAL CONSEQUENCES OF THYROID STIMULATING HORMONE SUPPRESSIVE THERAPY FOR DIFFERENTIATED THYROID CANCER

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Background/Objective: Postmenopausal patients under Thyroid Stimulating Hormone suppressive therapy (TSH-ST) have a higher fracture risk related to thyroxine-induced bone loss [1-10]. We aim to introduce such case.
Method: case report. Ethical approval: no. 33 from 22/09/2025.
Results: A 75-year-old female with a history of total thyroidectomy for papillary thyroid carcinoma at age 42, followed by radioiodine therapy (75 mCi), and TSH-ST, entered menopause at 50. Osteopenia was found at DXA at 65: femoral neck bone mineral density (BMD) 0.899 g/sqcm, T-score -1.1; lumbar BMD 1.087 g/sqcm, T-score -0.8; total hip BMD 0.978 g/sqcm, T-score -0.2. One decade later, under TSH-ST (with negative thyroglobulin), she presented normal 25-hydroxyitamin D 41.73 ng/mL (Normal>30) under cholecalciferol 1000 IU/day and parathormone 53.94 pg/mL (Normal: 17.3-74.1). DXA showed a small BMD decrease at lumbar BMD 1.034 g/sqcm, T-score -1.2 and stationary femoral neck BMD 0.896 g/sqcm, T-score -0.7, total hip BMD 0.957 g/sqcm, T-sore -0.4 and an incidental asymptomatic vertebral fracture at spine X-Ray. 10-year fracture risk assessment was 5.2%, respectively, 1.1% for major osteoporotic fractures, respectively, hip fracture. She continued TST-ST, vitamin D replacement and started oral risendronate.
Conclusion: Long-term surveillance of skeletal health is essential under TSH-ST, noting the age and hypo-estrogenic-related influence over time.

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P1335

DECISION OF ANTI-OSTEOPOROTIC THERAPY RE-INITIATION AFTER DRUG HOLIDAY: SHOULD HIGH VITAMIN D-RELATED LOW PTH COUNT?

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Background: Bisphosphonates holiday requires a close surveillance of bone turnover markers (BTM), bone mineral density (BMD) and incidental fractures [1-10].
Objective: We aim to introduce a tailored decision in a patient with drug holiday-related bone loss.
Method: case report. Ethical approval: no. 33 from 22/09/2025.
Results: This is 79-year-old female with osteoporosis diagnosed at 65 due a left forearm fracture. After two years of IV ibandronate, and another two of annual zoledronate 5 mg (ZOL), BTMs were suppressed [osteocalcin 6.9 ng/mL (Normal: 15-46), P1NP 22 ng/mL (Normal: 20.25-76.31), CrossLaps 0.1 ng/mL (Normal: 0.152-0.858)]. DXA showed lumbar BMD 0.934g/sqcm, T-score -2.2; femoral neck BMD 0.729 g/sqcm, T-score -2.2, and total hip BMD 0.738 g/sqcm, T-score -2.1. A delay of next ZOL was recommended, then a drug holiday was decided for 6 years, until a femoral neck BMD loss was registered (not at lumbar spine): 0.667 g/sqcm, T-score -2.6, associated with a reduced TBS 1.187, without incidental fractures. BTMs remained suppressed (osteocalcin 11.4 ng/mL) or normal (P1NP 32.1 ng/mL, CrossLaps 0.2 ng/mL). High 25-hydroxyvitamin D of 61 ng/mL (Normal >30) under daily cholecalciferol 2000 UI associated a suppressed parathormone (PTH) 13.4 pg/mL (Normal: 17.3-74.1) with normal blood calcium and phosphorus levels. ZOL was re-administered with an initial reduction of cholecalciferol doses to 1000 UI/day due to PTH values.
Conclusion: Drug holiday helps postponing bisphosphonates re-administration even in cases with a history of fracture and stationary BTMs profile. An optimum vitamin D replacement ensures a better outcome. Over-supplementation might be reflected by PTH suppression.
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P1336

VERTEBRAL FRACTURE IN A MALE WITH NEWLY DETECTED THYROTOXICOSIS, TYPE 2 DIABETES MELLITUS AND A HISTORY OF SURGICALLY MANAGED GASTRIC MALIGNANCY

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Background/Objective: Uncontrolled hyperthyroidism is associated with an accelerated bone loss even in males and additional contributors may be co-found (e.g. diabetes) [1-10]. We aim to introduce such case.
Method: case presentation. Ethical approval no. 33 from 09/22/2025.
Results: A 68-year-old male with a history of total gastrectomy for gastric adenocarcinoma at age of 55 and type 2 diabetes mellitus under diet was admitted for neck compressive symptoms and recent weight loss. Basedow disease-related hyperthyroidism is confirmed by low Thyroid Stimulating Hormone (TSH) 0.003 µIU/mL (Normal: 0.35-4.94), high

free levothyroxine 26.16 pmol/L (Normal: 9-19) and positive anti-TSH receptor antibodies 2.08 IU/L (Normal <1.75). A 4-cm nodule is detected in the left thyroid lobe at ultrasound. Lab findings showed normal glycated hemoglobin A1, low 25-hydroxyvitamin D 11.7 ng/mL (Normal <30) and normal parathormone 26.94 pg/mL (Normal: 15-65); abnormally high bone turnover markers P1NP 140.4 ng/mL (Normal: 20.25-76.31), and CrossLaps 0.83 ng/mL (Normal: 0.104-0.504); osteopenia at DXA: L1-L4 lumbar BMD 1.119 g/sqcm, T-score -0.9; femoral neck BMD 0.871 g/sqcm, T-score -1.7, normal TBS (1.355) and a L2 vertebral fracture at X-Ray. He underwent methimazol 20 mg/day to control the thyroid function, followed by successful total thyroidectomy, in addition to zoledronate 5 mg/day and vitamin D replacement.

Conclusion: This case highlights the interplay between thyrotoxicosis, type 2 diabetes, gastric surgery-related malabsorption and hypovitaminosis D to potentially impact the skeletal health.

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P1337

TAILORED OSTEOPOROSIS MANAGEMENT IN A PATIENT WITH PREMATURE OVARIAN INSUFFICIENCY AND ORAL BISPHOSPHONATES INTOLERANCE

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Objective: Premature ovarian insufficiency leads to loss of the protective effect that estrogens have on the skeletal health, being associated with an increased fracture risk. Non-adherence to the hormonal replacement therapy (HRT) enhances these bone health consequences [1-10]. We aim to introduce such a case.

Method: case report. Retrospective data collection was approved by the university hospital no. 33 from 22/09/2025.

Results: A 53-year-old female with premature ovarian insufficiency since the age of 38 refused HRT and was confirmed with osteoporosis since the age of 52: L1-4 lumbar DXA-based BMD 0.879 g/sqcm, T-score -2.5; femoral neck BMD 0.806 g/sqcm, T-score -1.7; total hip BMD 0.907 g/sqcm, T-score -0.8. Oral bisphosphonates (ibandronate 150 mg/month) was initiated and immediately stopped due to gastrointestinal complains, and she further refused other anti-osteoporotic medication. 18 months later, she presented a normal 25-hydroxyvitamin D level 31.1 ng/mL (Normal >30) under daily cholecalciferol 2000 UI with normal parathormone 28.59 pg/mL (Normal: 17.3-74.1), serum bone formation markers [osteocalcin 20.97 ng/mL (Normal: 15-46), P1NP 52.28 ng/mL (Normal: 20.25-76.31)], and bone resorption marker CrossLaps 0.49 ng/mL (Normal: 0.33-0.782). No incidental fracture was detected, despite decreasing BMD at lumbar site 0.871 g/sqcm (T-score -2.6) and total hip 0.872 g/sqcm (T-score -1.1). Bone microarchitecture was partially degraded (TBS 1.272). The patient agreed for IV medication (zoledronate 5 mg/year) plus vitamin D supplements.

Conclusion: Periodic bone quantity and quality assessment is mandatory for patients with early untreated estrogen deficiency.

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P1338

DECISION OF RE-STARTING THERAPY AFTER BISPHOSPHONATES DRUG HOLIDAY IN A POSTMENOPAUSAL PATIENT WITH A HISTORY OF TOXIC MULTINODULAR GOITER

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Objective: Drug holiday is recommended in selected patients with improved bone mineral density (BMD) after prolonged bisphosphonates exposure, depending on the overall fracture risk profile, which should be carefully followed. [1-10].
Method: case presentation (ethical approval no. 33, date 22/092025).
Results: This was a 77-year-old female with surgically-induced menopause at age 45 for a uterine leiomyoma (she received no estrogens replacement). She underwent a total thyroidectomy for toxic multinodular goiter at age 66, after experiencing thyrotoxicosis for a few years. Osteoporosis was confirmed at 70 years: lumbar DXA-BMD 0.864 g/sqcm, T-score -2.5; femoral neck BMD 0.753 g/sqcm, T-score -2.1. After 4 years of oral risedronate, BMD increased: lumbar BMD 0.949 g/sqcm (T-score -1.9), femoral neck BMD 0.752 g/sqcm (T-score -2.1). No prevalent fractures were found and drug holiday was initiated. After 2 years, an asymptomatic single thoracic vertebral fracture at X-Ray associated stationary BMD: lumbar BMD 0.955 g/sqcm, T-score -1.9, femoral neck BMD 0.764 g/sqcm, T-score -1.8; total hip BMD 0.967 g/sqcm, T-score -0.3 and low TBS 1.199. Vitamin D was normal: 25-hydroxyvitamin D 35.88 ng/mL (Normal >30). Bone formation markers were normal [osteocalcin 15.11 ng/mL (Normal: 15-46), P1NP 35.9 ng/mL (Normal: 20.25-76.31)]. Despite suppressed bone resorption marker CrossLaps 0.31 ng/mL (Normal: 0.33-0.782), bisphosphonates re-initiation was decided (zoledronate 5 mg/year).
Conclusion: The decision to resume anti-osteoporotic treatment should be tailored to each patient's fracture risk status, taking into consideration the incidental fractures, DXA-BMD changes, and bone turnover markers dynamics.

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P1339

INTERVENTIONAL STRATEGY AGAINST MENOPAUSAL OSTEOPOROSIS: DOES THE CO-PRESENCE OF AN APPARENTLY NON-FUNCTIONAL ADRENAL TUMOUR MATTER?

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Background/Objective: Osteoporosis in menopausal women confirmed with non-functional adrenal tumors (NFATs) might represent a complication of mild cortisol secretion impairment (either an intermittent excess or the current suboptimal diagnosis criteria do not accurately reflect the hormonal imbalance across lifespan) in addition to age and hypo-estrogenic status [1-10].
Method: case presentation (ethical approval no. 33 from 22/09/2025).
Results: A 78-year-old female (menopause duration of 32 years) was confirmed 3 years prior with a right NFAT of 1.8 cm and osteoporosis at DXA: lumbar BMD 0.906 g/sqcm, T-score -2.3; femoral neck BMD 0.681 g/sqcm, T-score -2.5; total hip BMD 0.724 g/sqcm, T-score -2.3. She had a L2 lumbar vertebral fracture. The tumor was conservatively managed. After 3 years of risendronate, she experienced a novel thoracic vertebral fracture, and lumbar BMD decreased to 0.763 g/sqcm (T-score -3.5); femoral neck 0.703 g/sqcm (T-score -2.4); total hip 0.695 g/sqcm (T-score -2.5). 25-hydroxyvitamin D was normal (33.83 ng/mL), and serum bone turnover markers. The tumor was stationary at computed tomography, so was post-1 mg dexamethasone suppression test cortisol 1.03 µg/dL (Normal <1.8), with low-normal ACTH 14.66 pg/mL (Normal: 7.2-63.3). Adrenalectomy was postponed, and the anti-osteoporotic medication was switched to IV zoledronate 5 mg/year.
Conclusion: In NFATs, adrenalectomy might be an alternative to a

suboptimal response to anti-osteoporotic strategy, which is not guideline-based so far. A non-secretor adrenal profile was found to associate a higher cardio-metabolic risk, and even a higher fracture risk in certain population groups, such as menopausal females and elderly.

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P1340

MUSCULOSKELETAL INVOLVEMENT IN A MALE WITH ACROMEGALY: THE RELATIONSHIP WITH THE PITUITARY DISEASE CONTROL

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Objective: Acromegaly is associated with bone microarchitecture, joints anomalies and increased fracture-risk underlying multiple mechanisms, thus they are not directly correlated with IGF1-GH normalization. We aim to introduce such a case [1-10].

Method: case presentation.

Results: A 68-year-old male was diagnosed with pituitary macroadenoma-related acromegaly at 59, which was controlled after hypophysectomy, gammaknife, and 3-year octreotide LAR 30 mg/month plus cabergoline 1 mg/week until present. At 61, osteoporosis complicated with lumbar vertebral fractures required zoledronate 5 mg/year after 6 years of risedronate 75 mg/bimonthly. Currently, 25-hydroxyvitamin D and parathormone are normal, with suppressed bone biomarkers [osteocalcin 11.66 ng/mL (Normal: 15-46), P1NP 19.89 ng/mL (Normal: 20.25-76.31), CrossLaps 0.09 ng/mL (Normal: 0.33-0.782)]. DXA-BMD improved: lumbar 0.983 g/sqcm, T-score -1.9; femoral neck 0.891 g/sqcm, T-score -1.4; total hip 0.98 g/sqcm, T-score -0.8 with low TBS 1.225 and no incidental fracture. Despite disease control [IGF1 209 ng/mL (Normal: 31-243)], he developed acromioclavicular osteoarthritis and supraspinatus tendinopathy (MRI aspect) causing pain; a right posterior cervical lump (1.8 cm-lipoma at ultrasound); multiple lipomas adjacent to parietal, occipital bone and within subscapular muscle (CT aspect). Zoledronate 5 mg/year, cholecalciferol 2000 IU/day, cabergoline were continued adding a rehabilitation program.

Conclusion: Osteoarthritis, lipomas, osteoporosis might not be the hallmark of acromegaly, especially in well-controlled disease, but they belong to the overall disease burden.

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P1341

PITFALLS OF ADHERENCE TO THE ANTI-OSTEOPOROSIS MEDICATION ACROSS REAL-LIFE SETTING

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Background/Objective: Delayed osteoporosis diagnosis and lack of compliance/adherence to anti-osteoporotic therapy represents significant aspects of real-life settings in the field of menopausal osteoporosis [1-10]. We aim to introduce such a case.
Method: case report.
Results: A 70-year-old female suffered a low-trauma right knee fracture at the age of 46 that was treated surgically (she entered menopause at 45). At 63, DXA highlighted osteoporosis: lumbar BMD 0.743 g/sqcm, T-score -2.7; femoral neck BMD 0.734 g/sqcm, T-score -1.6; total hip BMD 0.794 g/sqcm, T-score -1.6. She still refused anti-osteoporotic treatment and presented for a check-up only 6 years later. Low 25-hydroxyvitamin D 21 ng/mL (Normal >30), normal PTH and bone markers [osteocalcin 21.33 ng/mL (Normal: 15-46), P1NP 49.82 ng/mL (Normal: 20.25-76.31), CrossLaps 0.429 ng/mL (Normal: 0.33-0.782)] were pointed out. DXA revealed BMD loss at lumbar spine 0.852 g/sqcm (T-score -2.8); femoral neck 0.756 g/sqcm (T-score -1.9), and total hip 0.76 g/sqcm (T-score -2) with reduced TBS 1.316. No incidental fracture was detected. FRAX showed a 10-year probability of major osteoporotic fractures 10% and hip fracture 2.7% that increased to 11%, respectively, 2.9% after adjusting for lumbar BMD (FRAXplus). IV zoledronate 5 mg /year was administered and supplementation with cholecalciferol 2000 IU/day.
Conclusion: Early intervention against osteoporosis prevents further bone mass loss. However, the medication is limited to the patient's compliance and decision to start and follow the medication.

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P1342

PELVIC FRACTURES AFTER LOSS TO FOLLOW-UP IN A PATIENT WITH LONG-TERM HISTORY OF OSTEOPOROSIS

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Background/Objective: Close surveillance is essential in the management of patients with long-standing menopausal osteoporosis and loss to follow-up represents an important challenge to solve the risk fracture assessment and medication strategy [1-10]. We aim to introduce such a case.
Method: case report.
Results: A 70-year-old female with premature menopause at 43 years was diagnosed with osteoporosis since the age of 52. After 2 years of raloxifene followed by another 5 years of risedronate 35 mg/week, she was lost to follow-up for the next 5 years. Then, DXA showed a bone mineral density (BMD) improvement: L1-L4 lumbar BMD 0.892 g/sqcm, T-score -2.4; femoral neck BMD 0.741 g/sqcm, T-score -2.1; total hip BMD 0.729 g/sqcm, T-score -2.2. She presented low-normal osteocalcin 18 ng/mL (Normal: 15-46), normal P1NP 37.02 ng/mL (Normal: 20.25-76.31). Suppressed CrossLaps 0.287 ng/mL (Normal: 0.33-0.782) and lack of incidental fractures were adequate for a drug holiday. The subject was again lost to follow-up for 7 years. Recently, risedronate 35 mg/week was re-initiated by her primary care physician after suffering fractures of ilio-ischiopubic ramus and sacrum. DXA-BMD decreased only at femoral neck 0.674 g/sqcm (T-score -2.5) and remained stationary at the other central sites, associating a partially degraded microarchitecture based on low DXA-derived trabecular bone score 1.236. Bone turnover markers and 25-hydroxyvitamin D were normal. Noting a low compliance to endocrine check-up over time, IV zoledronate 5 mg/year was administered.
Conclusion: In patients with a long history of poor compliance to annual check-ups, IV medication addresses this issue and the high fracture risk amid real-life practice.

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P1343

RECURRENT RIB FRACTURES UNDER SUBCUTANEOUS MEDICATION AGAINST OSTEOPOROSIS IN A PATIENT WITH SYSTEMIC SCLEROSIS: THE ISSUES OF SEVERE CALCINOSIS CUTIS

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Objective: Patients with systemic sclerosis/scleroderma present major challenges in the management of osteoporosis, especially when skin and gastrointestinal involvements are co-present. We aim to introduce such a case [1-10].
Method: case report.
Results: This was a 57-year-old female with severe systemic sclerosis affecting the skin (calcinosis cutis), blood vessels, lung and esophagus. She had premature ovarian failure since the age of 39 (no hormone replacement therapy) and was diagnosed with osteoporosis at 44 when anti-resorptive treatment was initiated (sequential therapy with risedronate, IV ibandronate, followed by teriparatide with premature dropout due to recurrent rib fractures and no response as a consequence to ineffective subcutaneous administration in relationship with calcinosis cutis). She started denosumab 60 mg/6 months, but experienced recurrent rib fractures and further BMD loss. Subsequently, zoledronate 5 mg/year (ZOL) was initiated at a lumbar DXA-BMD 0.95 g/sqcm (T-score -1.9), femoral neck BMD 0.643 g/sqcm (T-score -2.8), total hip BMD 0.756 g/sqcm (T-score -2). After 3 years, no incidental fracture was detected and DXA-BMD showed a mild decrease: lumbar 0.906 g/sqcm (T-score -2.3), femoral neck 0.618 g/sqcm (T-score -3), total hip 0.772 g/sqcm (T-score -1.9), associated with a normal TBS 1.403. Suppressed bone turnover markers [osteocalcin 11.69 ng/mL (Normal: 15-46), P1NP 18.77 ng/mL (Normal: 20.25-76.31), and CrossLaps 0.187 ng/mL (Normal: 0.183-1.06)] reflected ZOL effects, which was further continued.
Conclusion: In this particular instance of severe skin ailments, subcutaneous anti-osteoporotic medication did not prove to be an adequate strategy.
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P1344

OSTEOPOROSIS IN PATIENTS WITH PSORIATIC ARTHRITIS: A CLINICAL ASSESSMENT IN A RHEUMATOLOGY UNIT

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Introduction: Psoriatic arthritis (PsA) is a chronic inflammatory disease that affects the joints and skin, occurring in individuals with psoriasis. Osteoporosis (OP), on the other hand, is characterized by decreased bone mineral density, increasing the risk of fractures. Recent studies suggest that PsA patients have an increased risk of developing OP due to chronic inflammation and prolonged corticosteroid use.
Objective: This study aims to analyze the prevalence of OP in patients with PsA followed in a Rheumatology Unit, in Beira Interior (Portugal).
Methods: Observational, cross-sectional, retrospective, and monocentric study conducted with 36 patients diagnosed with PsA using CASPAR criteria and followed in the Rheumatology outpatient clinic of the Local Health Unit of Castelo Branco (ULSCB). Variables such as age, sex, comorbidities, smoking habits, treatments, laboratory parameters, and dual-energy X-ray absorptiometry (DEXA) results were analyzed. Statistical analysis was performed using descriptive statistics with Microsoft Excel.
Discussion: The results showed a low prevalence of OP (8,33%) and

osteopenia (11,11%) in the sample, values lower than those reported in the literature. The low rate of DEXA screening (27,78%) suggests a possible underdiagnosis of the disease. Corticosteroid (PDN<10mg/day) use was high (63,89%), which may negatively impact bone density. Additionally, biological therapy, used by 66.67% of patients, may have protective effects on bone mass, requiring further studies. The presence of only one patient identified with fractures contrasts with studies indicating a higher risk of fractures in PsA, highlighting the need for improved imaging screening.
Conclusion: OP may be underdiagnosed in patients with PsA, reinforcing the need for early screening with DEXA. The high rate of corticosteroid use may negatively impact bone density, while biological therapy may act as a protective factor. Future studies should explore the influence of disease activity and therapy on boné remodeling, allowing for the implementation of more effective preventive strategies.

P1345

OSTEOARTICULAR MANIFESTATIONS IN TYPE 2 DIABETIC PATIENTS: A CLINICAL STUDY

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Introduction: Rheumatic complaints are common in patients with diabetes. Type 2 generally occurs in people over 40 and is characterised by insulin resistance. Maintaining good glycaemic control with non-pharmacologic and pharmacologic treatments improves or prevents the development of rheumatic conditions.
Objectives: Evaluate the prevalence of MSK manifestations in patients with type 2 diabetes (T2D)
Materials and Methods: Retrospective, transversal and descriptive study carried out in 2025 involving all patients with documented T2D, adults (age 18 and above), searching for MSK manifestations. Demographics, diabetes history, glycated haemoglobin (HbA1c), treatment modalities were collected.
Results: Of 85 patients with T2D, MSK manifestations were observed in 74,12%. 50.6% were men and 49.4% women. Mean age: 72.25 years (ranging from 50-92). Mean IMC 29.1Kg/m2. Mean reading of Hb A1C was 7.21%. Osteoarthritis (OA) of vertebral column (38.82%) was the common manifestation, followed OA of the knee (23.53%), osteoporosis (12.94%) and shoulder tendinopathy (11.76%). Carpal tunnel syndrome and Dupuytren's contracture were found only in 1 patient, each.
Conclusions: This study reported a higher prevalence of MSK manifestations among people with T2D. Clinical findings may be associated with overweight, advanced age, longer duration of disease and poor metabolic control (high HbA1c levels). For prevention and management of chronic disabilities due to these disorders, it would help a regular examination of the musculoskeletal system and better glycemic control of diabetes.

P1346

DIABETES AND THE SKELETON: EXPLORING BONE AND JOINT COMPLICATIONS – STUDY IN A FAMILY HEALTH UNIT

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Introduction: Diabetes mellitus (DM) is one of the most common diseases worldwide. Patients with DM are prone to develop multiple musculoskeletal (MSK) manifestations, which may lead to disability and an impact on patient's quality of life.
Objective: Assess the prevalence of MSK disorders in diabetic patients in a Family Health Unit (FHU) of Beira Interior-Portugal.
Materials and Methods: This is a retrospective, transversal and descriptive study carried out between 2023 and 2024 involving all patients with DM (type I, type II and LADA), between the age of 10 and 93, looking for those who were diagnosed with MSK manifestations.
Results: A total of 518 patients were found to have DM but only 482 were included int the study (476 type II, 5 type I and 1 LADA). 54.1% were men and 45.9% women. In this group, 65.4% had MSK manifestations. The average age of patients was 70.5 years old ranging from (10-93). 80.3% had IMC≥25 (2.9% with obesity grade III). The mean reading of A1C was 7.14%. Axial and peripheral osteoarthritis (OA) were the most prevalent pathologies, followed by periarticular pathology (shoulder tendinopathy). Carpal tunnel syndrome was found only in 8 patients (1.7%). Clinical findings may be more associated with excess weight, the time of disease progression and poor metabolic control.
Conclusions: MSK manifestations are common among diabetic patients. OA was the most frequently seen disorder. Physicians should be aware of the high prevalence and the huge impact on patients when treating patients with type II DM. The early recognition and management can improve quality of life and physical function.

P1347

THE RISK OF PERONEAL NERVE INJURY IN ALL-INSIDE LATERAL MENISCAL REPAIR THROUGH THE POPLITEUS TENDON USING FIVE DIFFERENT CURVATURES OF ALL-INSIDE MENISCAL REPAIR DEVICES: A CADAVERIC STUDY

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Background: All-inside meniscal repair through the popliteus tendon (PT) has been proposed to enhance fixation of posterior horn tears of the lateral meniscus. However, the proximity of the common peroneal nerve (PN) raises concerns regarding potential iatrogenic injury during suture placement.
Objectives: To assess the risk of PN injury and to evaluate the effectiveness of different needle curvatures and lengths in safely achieving capsular penetration during all-inside lateral meniscal repair

through the PT.

Methods: Twenty-six knees from 13 cadaveric specimens underwent simulated arthroscopic meniscal repair using TrueSpan devices with five needle curvatures (straight, 12°-curved, 24°- curved, 12°-reverse-curved, 24°-reverse-curved) and three lengths (14 mm, 18 mm, 20 mm). Suture deployment was performed at both the upper and lower thirds of the lateral meniscus. Key outcomes included incidence of PN injury, incidence of capsular underpenetration, distances from the needle tip to the PN, and excess needle lengths beyond the capsule.
Results: No PN injury was observed in any of the repair attempts. Needle tip distances to the PN were not significantly different among all the devices. The 20-mm straight needle achieved 100% capsular penetration at the upper third of the meniscus, while the other needle types showed variable degrees of underpenetration.

Conclusion: All-inside lateral meniscal repair through the PT appeared safe with no risk of PN injury in the cadaveric specimens. A 20-mm straight needle offered the most reliable capsular penetration at the upper third of the meniscus.

P1348

COMPARATIVE EFFECTS AND MECHANISMS OF BOTULINUM TOXIN TYPE A VERSUS HYALURONIC ACID ON CHONDROCYTES

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Objective: This study aimed to investigate the signaling pathways underlying the effects of botulinum toxin type A (BTXA) on chondrocytes and compare its chondrogenic potential with hyaluronic acid (HA).
Material and methods: Following dosage optimization via cell death ELISA, the ATDC5 chondrocytes were treated with or without BTXA, or with HA. The expression of Matrix metallopeptidases (MMPs), SOX9, and ROCK I & II was evaluated using RT-PCR and Western blot analysis.
Results: Western blot analysis revealed that BTXA treatment reduced ROCK I & II in a dose-dependent manner and reduced MMP-9. RT-PCR showed that HA treatment induced higher SOX9 mRNA levels than BTXA. Notably, BTXA decreased while HA increased MMP-3 expression, both in a dose-dependent manner.
Conclusion: BTXA exerts potential chondroprotective effect via inhibition of Rho-signaling pathway, a mechanism distinct from that of HA.

P1349

KNOWLEDGE, LIFESTYLE HABITS, AND PERCEPTIONS ABOUT BONE HEALTH AMONG MEXICAN LATE ADOLESCENTS AND YOUNG ADULTS ENTERING HEALTH CAREERS

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Objective: To explore the knowledge and perspectives about bone health in late adolescent/young Mexican adults.
Material and Methods: A transversal survey to explore knowledge about bone health. The survey was conducted during the "2° Feria de Salud Integral" at the Universidad Nacional Autónoma de México (UNAM) School of Medicine, an event that gathered new information on science and medicine careers of individuals aged 17 to 40.
Results: The survey gathered responses from 1,292 students, of whom 66.6% were women. Nearly half of the respondents (49.8%) were aged 18–20 years. Most students (94.7%) considered it important to take care of their bone health at their age, and 87.6% had heard about the relationship between bone health and osteoporosis. Regarding physical activity, 68.1% reported engaging in moderate-to-vigorous exercise at least twice per week, and 75.7% reported engaging in strength- or impact-based activities. Regarding nutrition, 69.7% reported consuming calcium-rich foods at least once daily. More than half of the students reported sun exposure without sunscreen for over 15 minutes per day. Caffeine intake was relatively low (15.2%), while 32.4% reported consuming carbonated beverages, mainly soft drinks. Smoking and vaping use were uncommon (5.4% and 2.9%, respectively).
Conclusion: Medical sciences students showed a high awareness of bone health and generally favorable lifestyle habits. Despite potential response bias, these findings provide a baseline for understanding perceptions regarding bone health among future health professionals.
Acknowledgments: The authors thank the students for their collaboration. We thank the IOF for its support in the application of the survey, as well as the students of the Clinical Epidemiology Research Unit for their support on-site. The intervention was a result of a collaboration between IOF and UNAM School of Medicine within the framework of IOF University Network.
Disclosures: M.C. and V.B. are IOF employees. D.MO., P.C., and B.A. report no conflict of interest.

P1350

TRABECULAR BONE SCORE AND AREAL BONE MINERAL DENSITY ACCRUAL IN RELATION TO PEAK BONE MASS IN CHILDREN AND ADOLESCENTS FROM MEXICO CITY

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Objective: Peak bone mass acquisition is a key determinant of lifelong skeletal health. Bone mineral accumulation and trabecular microarchitectural development may follow different biological patterns during growth. Trabecular bone score (TBS) is a DXA-derived index reflecting trabecular bone microarchitecture and provides information complementary to areal bone mineral density (BMD). This study compared age- and sex-specific patterns of lumbar spine TBS and BMD in a healthy pediatric population from Mexico City within the context of peak bone mass development.
Material and Methods: This cross-sectional analysis included lumbar spine DXA scans from 1,552 healthy participants aged 5–18 years. Scans were acquired using a GE Lunar iDXA system. TBS was derived using TBS Osteo Advanced (version 4), incorporating correction for soft-tissue thickness. BMD and TBS values were stratified by sex and analysed across the age range.
Results: A total of 1,533 participants (781 females, 752 males) were included. Both BMD and TBS were higher at older ages; however, distinct age-related patterns were observed. BMD showed a pronounced pubertal pattern, with the steepest age-associated differences at approximately 12–13 years in females and 13–14 years in males, followed by attenuation toward late adolescence. In contrast, TBS demonstrated smaller age-associated differences and greater variability across age groups. In females, higher TBS values were observed at younger ages relative to the age at which BMD values were highest, whereas in males, higher TBS values were observed at older ages relative to BMD. A moderate positive association between BMD and TBS was observed in females (Spearman r = 0.651) and males (r = 0.644).
Conclusion: TBS and areal BMD exhibited age- and sex-dependent patterns consistent with different components of skeletal development relevant to peak bone mass. While BMD primarily reflects mineral accumulation, TBS provides complementary information on bone microarchitectural status. Sex-specific differences in the timing of higher TBS values align with known patterns of pubertal maturation and underscore the importance of age- and sex-appropriate reference data. Together, these findings support the combined use of TBS and BMD to improve characterization of bone health during the critical period of peak bone mass development.

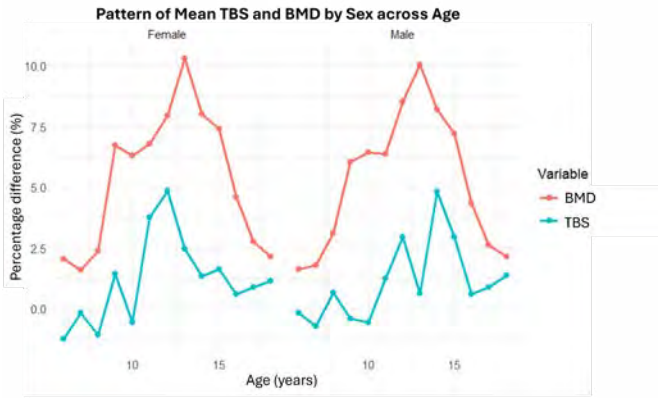


Figure 1 Sex-specific mean trabecular bone score (TBS; blue) and areal bone mineral density (BMD; red) across ages 5 to 18

P1351

TRABECULAR BONE SCORE BY TANNER STAGE IN CHILDREN AND ADOLESCENTS FROM MEXICO CITY

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Objective: Trabecular bone score (TBS) is a DXA-derived index reflecting trabecular bone microarchitecture and may provide complementary information to bone mineral density during growth. Skeletal development during childhood and adolescence is strongly influenced by pubertal maturation, yet pediatric TBS reference data stratified by pubertal stage are limited. This study aimed to establish sex-specific TBS reference curves in Mexican children and adolescents and to evaluate the influence of pubertal development, defined by Tanner stage, on TBS.
Material and Methods: Lumbar spine DXA scans (GE Lunar iDXA) from 1,552 healthy participants (age 5–18 years, 781 females, 752 males) were analysed using TBS Osteo Advanced (version 4), incorporating correction for abdominal soft-tissue thickness. TBS values were stratified by sex and Tanner stage (Sexual Maturity Rating 1–5). Smoothed Tanner stage and age-specific percentile curves were generated using Generalized Additive Models for Location, Scale, and Shape (GAMLSS).
Results: TBS increased significantly across pubertal development in both sexes, with the most pronounced gains observed between Tanner stages 2 and 3 (13.2% in girls and 9.9% in boys). Females demonstrated an earlier and steeper rise in TBS beginning at Tanner stage 2–3, with peak values reached by stage 4 (mean TBS 1.28), whereas males exhibited a more gradual increase extending from Tanner stages 3 to 5. Sex- and Tanner stage–specific TBS percentile curves and corresponding age-based reference curves were established.
Conclusion: Trabecular bone score shows clear, sex-specific pubertal trajectories in Mexican children and adolescents, with marked increases during mid-puberty. These findings underscore the value of considering

pubertal stage, in addition to chronological age, when interpreting TBS in young people. The provision of Tanner stage–specific reference data supports the use of TBS as a complementary tool for assessing bone microarchitecture during growth and skeletal maturation.

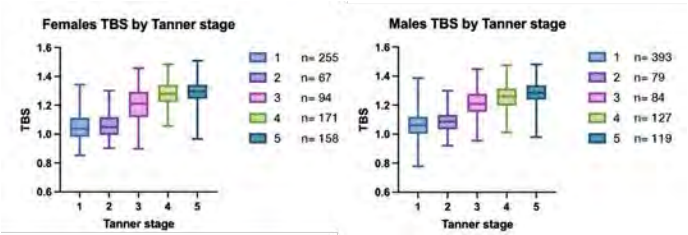


Figure 1 Boxplot representing TBS distributions by Tanner stage for males and females.

P1352

TRABECULAR BONE SCORE (TBS) AT THE HIP REFLECTS 3D BONE MICROARCHITECTURE: A MICRO-CT VALIDATION STUDY

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Objectives: Hip fractures are the most burdensome osteoporotic fracture, associated with significant morbidity and a 20-30% mortality rate within one year post fracture. Resilience to fracture depends on both density and microarchitecture. Trabecular bone score (TBS) provides an established surrogate of bone microarchitecture at the lumbar spine and predicts fracture independent of bone mineral density (BMD). The aim of this study was to validate TBS Hip with micro-computed tomography (micro-CT)-derived 3D bone microarchitecture.
Methods: Thirty dry human cadaveric proximal femurs were imaged using micro-CT (42 µm isotropic voxel size). A standardized trabecular region within the femoral neck was segmented (Figure 1), and microarchitectural parameters were quantified: bone volume fraction (BV/TV), connectivity density (Conn.D), trabecular thickness (Tb.Th), trabecular separation (Tb.Sp), and trabecular number (Tb.N). Specimens then underwent DXA scanning with TBS analysis. A femoral neck mask was registered to ensure anatomical correspondence between modalities (Figure 1). To account for soft tissue, additional DXA scans were acquired with simulated tissue (16 cm high-density polyethylene and 9 mm polyvinyl chloride).
Results: TBS of the femoral neck showed strong correlations with all micro-CT parameters, including BV/TV ($r = 0.86$), Tb.N ($r = 0.85$), Tb.Sp ($r = -0.87$), Tb.Th ($r = 0.70$), and Conn.D ($r = 0.62$; all $p < 0.001$). When simulated soft tissue was applied, TBS maintained significant positive correlations with BV/TV ($r = 0.66$), Tb.N ($r = 0.66$), Tb.Th ($r = 0.57$), and Conn.D ($r = 0.53$), as well as a negative correlation with Tb.Sp ($r = -0.68$; all $p < 0.001$). After adjusting for BMD, correlations remained moderate and significant for Conn.D ($r = 0.53$, $p = 0.003$), Tb.N ($r = 0.51$, $p = 0.004$), BV/TV ($r = 0.43$, $p < 0.001$), and Tb.Sp ($r = -0.66$, $p < 0.001$).
Conclusions: TBS at the hip demonstrates strong associations with three-dimensional trabecular microarchitecture. Correlations remained moderate and significant after adjustment for BMD, indicating that TBS captures bone microarchitecture independent of density. These findings validate TBS as a measure of bone quality at the hip, a critical osteoporotic fracture site.



Figure 1. TBS Hip region of interest (ROI)

P1353

TRABECULAR BONE SCORE (TBS) AT THE HIP DEMONSTRATES HIGH EX-VIVO AND IN-VIVO REPRODUCIBILITY

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Objectives: Trabecular bone score (TBS) at the hip has the potential to extend assessment of bone microarchitecture beyond the lumbar spine. Clinical implementation requires robust reproducibility within International Society for Clinical Densitometry (ISCD) standards. This study aimed to evaluate the ex-vivo and in-vivo reproducibility of DXA-derived TBS Hip, and to define precision error and least significant change (LSC) thresholds relevant for clinical and longitudinal use.
Methods: Reproducibility of TBS Hip was assessed in both ex-vivo and in-vivo settings. For ex-vivo analysis, 30 proximal femur bone specimens underwent two repeated DXA acquisitions to evaluate measurement stability under controlled conditions. In-vivo reproducibility was assessed in 30 individuals, each undergoing two repeated DXA scans with bilateral hip acquisitions (120 acquisitions in total). TBS Hip values were analysed using a defined femoral neck mask to ensure consistent anatomical localisation of the trabecular region of interest. Measurement precision was quantified using the root mean square (RMS) coefficient of variation (CV) in accordance with ISCD recommendations. LSC was calculated at the 95% confidence level ($2.77 \times CV$).
Results: Ex-vivo analysis demonstrated high measurement stability, with an RMS-CV of 0.58% and a corresponding 95% LSC of 1.60%. In the clinical cohort, in-vivo reproducibility remained robust, with an RMS-CV of 1.73% and a 95% LSC of 4.79%. Although in-vivo precision was reduced compared with ex-vivo conditions, values remained within the ISCD-recommended LSC threshold of 5.1% for clinical applicability.
Conclusions: TBS Hip demonstrates high reproducibility in both ex-vivo and clinical settings. Precision and LSC values meet established ISCD

criteria, supporting the technical robustness of the algorithm. These findings confirm that TBS Hip is suitable for longitudinal assessment of bone microarchitecture at the proximal femur.

P1354

A NOVEL PHEX VARIANT UNDERLYING X-LINKED HYPOPHOSPHATEMIC RICKETS

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Background: X-linked hypophosphatemic rickets (XLH) is a rare inherited disorder of phosphate metabolism, characterized by renal phosphate wasting, impaired bone mineralization, and variable skeletal involvement. Although usually diagnosed in childhood, XLH can show clinical heterogeneity, even within the same family. We report a family in which evaluation of an affected proband led to the identification of a previously unreported PHEX variant.
Case presentation: The index case is a male patient, currently 20 years old, followed for XLH diagnosed in childhood. Genetic testing performed early in the evaluation identified a hemizygous PHEX variant, c.2039A>C (p.Asn680Thr), classified as a variant of uncertain significance and not previously reported in the literature. He initially presented with recurrent knee pain and progressive genu valgum, requiring corrective orthopedic surgery. Dental involvement was also documented, with multiple devitalized teeth. Biochemical evaluation consistently demonstrated hypophosphatemia. The patient has been managed with conventional therapy and is currently with oral phosphate supplementation (six tablets per day) and calcitriol 0.5 µg daily. During follow-up, mild medullary nephrocalcinosis and a small non-obstructive renal calculus were identified, without impairment of renal function. At present, he is asymptomatic, with normal final height and no musculoskeletal pain. Family evaluation revealed the same variant in his mother, sister, and maternal uncle. The mother is asymptomatic. The sister presents persistent hypophosphatemia but no overt musculoskeletal manifestations. In contrast, the maternal uncle exhibits a more severe phenotype, with short stature and significant skeletal deformities, having undergone multiple orthopedic surgeries.
Conclusion: This family illustrates a broad clinical spectrum associated with a novel PHEX gene variant, ranging from asymptomatic or biochemically mild disease to clinically significant XLH. These findings emphasize the need for high clinical suspicion to identify affected individuals, and the reporting of novel variants in international databases. Such vigilance is crucial to enhance understanding of this rare disorder, refine genotype–phenotype correlations, and optimize patient management.

P1355

FULLY DIGITAL PLATFORM FOR FRACTURE LIAISON SERVICE AND OSTEOLOGY - A PILOT PROJECT

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Objective: Solutions to identify, investigate and treat patients after an osteoporotic fracture have been locally successful in significantly reducing the rate of new fractures in the first two years after a major osteoporotic fracture. However, broader use and meaningful improvement have failed despite information campaigns and promotion. In Switzerland there remains an overall treatment gap of 83 % according to the SCOPE 2019 analysis. The consequences are persisting high suffering and costs to society. Because the adoption of fracture liaison service (FLS) standards has been shown to be effective, the aim of the current project is to study the impact of a fully digital program to identify, investigate and to include patients in an FLS that complies with the International Osteoporosis Foundation (IOF) standards and to document their treatment.
Methods: At aarReha, discharge reports from referring institutions for in-house or ambulatory care are scanned for entry into the clinical information system as an electronic PDF file with optical character recognition. Potential fracture cases will be ranked according to the number of fracture-related terms recognized. Identified cases will be flagged for inclusion in an FLS or at a specialist osteology care facility for investigation and treatment. A list of items according to the IOF FLS specifications and for routine osteology care will be implemented in a structured data entry format and tested in a clinical routine setting. A real-time, automated report generator will compile the entered clinical data, osteodensitometry values and lab results in a patient report as the basis for standardized communication to patients and their basic and specialist health care providers. The FLS follow-ups will be documented likewise. All data points will be stored in an addressable format for continuous statistical evaluation and monitoring.
Results and Conclusions: Broad implementation of FLSs and achieving its benefits has been elusive. With the described system we aim to assess the practicability and performance of an innovative, comprehensive and scalable digital approach to FLS and post-fracture care.
Acknowledgments: This project is funded as a Pilot Project by the Health Department of the Canton Aargau, Aarau, Switzerland.

P1356

BEFORE AND AFTER A HIP FRACTURE: ARE WE PROPERLY MANAGING OSTEOPOROSIS?

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Objectives:
To evaluate the therapeutic management following osteoporotic hip fractures, as well as associated mortality and subsequent fracture rates, in order to determine whether establishing a fracture unit coordinated by a specialist in bone metabolism could offer a clinical benefit for these patients.
Methods:
A retrospective observational study was conducted at a tertiary care center (Hospital Santa Lucía, Cartagena) including patients with osteoporotic hip fracture. Data were systematically collected between January 2017 and January 2023.
Results:
We collected 1,068 patients with a mean age of 81.4 ± 10.5 years.
The 22.3% of patients had a history of previous osteoporotic fracture, being hip fracture the most frequent (9.2%), followed by vertebral fractures (4.6%). Despite this, only 2.6% of individuals in our sample had received anti-osteoporotic treatment and just the 10.5% of individuals had been treated with calcium and vitamin D supplements prior to sustaining the hip fracture.
After the fracture, 20.4% of patients received osteoporosis treatment, and among these, denosumab was the most frequently prescribed drug (12.2%), followed by bisphosphonates (2.25%). Calcium and vitamin D supplementation was prescribed in 41.3% of patients.
At 5 years of follow-up, the mortality rate was 45% (23.1% within the first year, 18.1% at 3 years, and 3.8% at 5 years), and 9.4% experienced a new fragility fracture, being hip fracture the most common.
Only 4.5% of these individuals were followed after the fracture by a rheumatology service, 23.8% were followed by a rehabilitation specialist service, and 18.1% by a geriatrics service.
Conclusions:
Our study shows a high mortality rate after suffering an osteoporotic hip fracture. Despite a substantial proportion of patients having a history of prior osteoporotic fractures, the vast majority was not receiving anti-osteoporotics. Although the proportion of patients receiving anti-osteoporotic treatment increased following the fracture, it remained suboptimal. Moreover, less than half of the patients were followed by a specialist in bone disease after the event.
These findings underscore the need of implementing a fracture liaison service (FLS) led by an expert in bone metabolism, aiming to increase the specialist follow-up rates and enhance the proportion of patients receiving osteoporosis treatment.

P1357

DESIGN AND CHARACTERIZATION OF LUMINESCENT NANOPARTICLES FOR THEIR APPLICATION IN BONE REGENERATION AND ANGIOGENESIS

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Objective: Bone tissue is a dynamic and highly vascularized structure with an inorganic matrix composed primarily of hydroxyapatite (HAp) crystals, Ca5(PO4)3OH. Synthetic Hap is osteoconductive, facilitating cartilage formation, hard tissue deposition, and blood vessel proliferation. These properties make it useful in nanomedicine for treating musculoskeletal disorders resulting from imbalances in the bone remodeling process, such as those caused by mechanical stress. The Eu3+ ion is a particularly promising activator for the apatite family due to its stable luminescence, high thermal and chemical stability, biocompatibility, and applications in bioimaging. The purpose of this work was the synthesis and biological characterization of calcium phosphates doped with europium ions (Eu3+) using hydrothermal and combustion methods, selected for their efficiency in obtaining particles with controlled structural and optical properties, as well as biocompatibility.
Materials & Methods: Physicochemical characterization was carried out using techniques such as scanning electron microscopy (SEM), transmission electron microscopy (TEM), X-ray diffraction (XRD), Fourier transform infrared spectroscopy (FTIR), energy-dispersive X-ray spectroscopy (EDS), photoluminescence (PL) and cathodoluminescence (CL) spectroscopy. For biological evaluation, *in vitro* assays were performed on different cell lines, including osteoblasts, using colorimetric cell viability tests, cellular internalization observed by confocal microscopy, and measurement of reactive oxygen species (ROS). Additionally, live studies were done using zebrafish (Danio rerio) at early stages of development, using both wild type and Fli strains.
Results: Luminescent nanoparticles presented the expected physicochemical characteristics, including size and luminescence. They were safe to use in vitro, got internalized in the cells, and induced ROS. They were detected in Fli-zebra fish, and at low doses, they did not induce mortality and malformations in embryonic development, as demonstrated by the internalization of the nanomaterials using confocal microscopy. The materials did not generate significant toxic effects, supporting their potential use in biomedical applications.
Conclusion: the synthesized luminescent materials exhibited optimal structural and optical properties, as well as biocompatibility in both *in vitro* and *in vivo* models. These results suggest that the developed materials are promising candidates for applications in regenerative medicine, particularly in bone tissue engineering (BTE) and angiogenesis promotion.

P1358

CARDIAC TROPONINS, PROGNOSTIC BIOMARKERS FOR AFTER-FALL MORTALITY IN OLDER ADULTS

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Osteoporosis and cardiovascular disease (CVD) are highly prevalent age-related conditions that share overlapping risk factors and frequently coexist. Their concurrence substantially increases the risk of falls and fall-related fractures in older adults. Despite this, falls remain an underrecognized clinical consequence of CVD, with reported rates approaching 60% in hospitalized patients and 25–40% among those with stroke or heart failure.

Cardiac biomarkers, particularly high-sensitivity cardiac troponins, are routinely measured in older adults, yet their clinical significance in the context of falls is not well established. We performed a systematic review of PubMed using the terms "high-sensitivity cardiac troponin T (hs-cTnT) or I (hs-cTnI)," "falls, fall-related hospitalization, functional performance, and mortality," and "older adults or the elderly." Of 90 identified articles, 60 met inclusion criteria. Outcomes of interest included myocardial infarction, mortality, and fall-related clinical outcomes.

Across studies, elevations in cardiac troponins following falls were frequently reported and consistently associated with increased short- and long-term mortality. Importantly, elevated hs-cTnT and hs-cTnI levels were often observed following falls in the absence of acute myocardial infarction or other overt cardiovascular events. Mortality within one year after a fall was significantly higher in individuals with elevated troponin levels, independent of underlying cardiovascular disease. In addition, a community-based cohort study of 1,179 women aged over 70 years demonstrated that higher subclinical hs-cTnI levels were independently associated with increased fall-related hospitalizations over 14.5 years (hazard ratio 1.46, 95% CI 1.08–1.98) and impaired functional performance, as assessed by the Timed Up-and-Go test.

Overall, the available evidence suggests that elevated cardiac troponins in older adults presenting after falls are rarely indicative of acute coronary syndromes. Instead, they appear to function as prognostic biomarkers of increased mortality, frailty, functional decline, and fall-related hospitalization. Incorporating high-sensitivity troponin measurements into clinical assessment may enhance risk stratification and inform management strategies for older adults at risk of falls and adverse outcomes.

P1359

INCREASED BONE MINERAL DENSITY IN THE LUMBAR SPINE IN PATIENTS WITH RHEUMATOID ARTHRITIS DURING LONG-TERM OBSERVATION

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Introduction. Chronic inflammation in rheumatoid arthritis (RA) is one of the causes of activation of bone resorption, occurrence of erosive changes, disruption of microarchitecture, bone mineral density (BMD) decrease and increased risk of vertebral and peripheral bone fractures.

The aim – to study the dynamics of bone mineral density, vertebral deformations and degenerative changes in the lumbar spine in patients with rheumatoid arthritis during long-term prospective observation.

Materials and methods. A prospective multi-year cohort study, the duration of which was 9.7 ± 1.7 years, included 151 women with RA aged 53.9 ± 9.2 years with a reliable diagnosis established at the age of 41.9 ± 12.5 years. All patients underwent clinical, laboratory and radiological examination (X-ray densitometry of the lumbar spine (L1–L4), femoral neck (FN) and total hip (TH), X-ray morphometry of the spine using the Genant method, assessment of degenerative changes in the lumbar spine) in dynamics.

Results. A BMD decrease in FN and TH and stabilization in L1–L4 were established; in patients over 55 years of age it was an increase in BMD in L1–L4 and a decrease in FN and TH; a decrease in BMD in all studied skeletal regions in patients under 55 years of age. The appearance or increase in deformations (fractures) of the vertebrae in the thoracic spine was observed in 50 (33%) patients, in the lumbar spine –in 4 (2.6%) patients; a relationship between deformations (fractures) of the vertebrae and an increase in BMD was not established. An increase in degenerative changes in all segments of the lumbar spine was established in patients with pain and a significant increase in L1–L4 BMD. Long-term monotherapy with DMARDs, as well as with biologics, did not have a positive effect on the BMD.

Conclusions. A long-term prospective cohort study revealed stabilization of the BMD in L1–L4; its increase in the group of patients with RA over 55 years of age against the background of the appearance or intensification of the initial deformation (fractures) of the vertebrae; and an increase in degenerative changes in all segments of the lumbar spine.

P1360

RATE OF RADIOGRAPHIC PROGRESSION OF RHEUMATOID ARTHRITIS. RESULTS OF LONG-TERM OBSERVATION

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Introduction. Radiographic progression (RP) of rheumatoid arthritis (RA) is one of the main signs of the disease and a key factor in assessing the effectiveness of therapy. RP is accompanied by an increase in the number of erosions, narrowed joint spaces, and radiographic stage (Rg stage).
Objective. To compare the characteristics of RA patients with rapid and slow rates of radiographic progression during long-term follow-up.
Materials and Methods. A prospective cohort study lasting 9.7 ± 1.7 years included 151 women with RA, aged 53.9 ± 9.2 years. All patients underwent clinical, laboratory, and radiographic examinations. RP was analyzed consideringchanges in the Steinbrocker RA stage, the number of erosions, and the degree of joint space narrowing using the Sharp method.
Results. An increase in the erosion count according to SVH was detected in 66 (53%) patients, and narrowed clefts – in 81 (65%) patients. The number of patients with Rg1, Rg2, and Rg3 decreased; those with Rg4 increased from 29 (19%) to 54 (36%) people ($p<0.05$). Slow RP (Rg1-Rg2 in dynamics) was observed in 63 (42%) patients, and rapid RP (increase in Rg stage) – in 32 (21%) patients. In 56 (37%) patients, the Rg stage did not change. Rapid RP is associated with a younger age at RA onset and inclusion in the study, with a longer duration of RA, with a higher MMP-3 index and IL-6 level above normal in dynamics, with a lower dose of methotrexate both in monotherapy and in combination with other agents; with a higher average daily and cumulative dose of GC.
Conclusions. A long-term prospective study demonstrated RP despite achieving remission and decreasing activity in the majority of RA patients. The rate of RP depends on many factors, both RA-related and non-RA-related. Distinguishing phenotypes of RA patients with rapid and slow RP will enable a personalized approach to patient management.

P1361

EFFICACY AND SAFETY OF INJECTION THERAPY WITH A DOMESTIC BIOPOLYMER MICROHETEROGENEOUS COLLAGEN-CONTAINING HYDROGEL OF LOW, MEDIUM, AND HIGH DENSITY IN PATIENTS WITH KNEE OSTEOARTHRITIS

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Introduction. Orthobiology (OB) is a new approach to osteoarthritis (OA) treatment. OB promotes natural restoration of joint structures without surgical intervention.
Objective. To present a comparative assessment of the efficacy and safety of therapy with a domestic biopolymer microheterogeneous collagen-containing hydrogel of low, medium, and high density in patients with knee OA.
Materials and Methods. This open-label, post-registration, randomized, observational, prospective, comparative, single-center study in three groups using a low, medium, and high-density hydrogel included 60 women and men aged 40 to 75 years diagnosed with knee OA stages II-III according to Kellgren and Lowrence. Pain and patient condition were assessed using a visual analog scale (VAS), the Lequesnealgofunctional index, and the WOMAC, KOOS, and EQ-5D-3L questionnaires. Statistical analysis was performed using Statistika 10 for Windows.
Results. Three treatment groups were formed: low-, medium-, and high-density hydrogel. After one month of therapy, all studied parameters improved: the proportion of patients with a pain VAS score <40 mm increased to 63%, 95%, and 58%, respectively. The EQ-5D-3L score, compared with baseline, improved by 81%, 35%, and 37%, respectively. The need for NSAIDs decreased in all groups. After 6 months of follow-up, there were no differences between the groups in VAS pain scores, WOMAC, KOOS, and EQ-5D-3L scales.
Conclusions. Comparable efficacy and safety of low-, medium-, and high-density hydrogels were established after 6 months of follow-up. There were no serious adverse reactions. Joint pain and stiffness after intravenous injection, primarily of high-density hydrogel, were relieved with nonsteroidal anti-inflammatory drugs. The use of hydrogel is a promising method of orthobiological therapy of OA.

P1362

A COMPARATIVE STUDY OF PREVALENCE OF ANTERIOR KNEE PAIN AND FUNCTIONAL OUTCOME BETWEEN TOTAL KNEE REPLACEMENT WITH PATELLAR RESURFACING, WITH OR WITHOUT CIRCUMFERENTIAL PATELLAR DENERVATION: A RANDOMIZED CONTROLLED TRIAL

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Objective(s):
To compare the incidence and severity of anterior knee pain and functional outcomes between total knee arthroplasty with patellar resurfacing with or without circumferential patellar denervation.

Material and Methods:
This double blinded, randomized controlled trial studied patients with knee osteoarthritis who underwent total knee arthroplasty with patellar resurfacing. Knees were randomized to receive circumferential patellar denervation or no denervation. Denervation was done by using a monopolar coagulation diathermy set to 45 W to a depth of no more than 1 mm around the patellar rim. Baseline patient data were collected. Outcomes included the incidence of anterior knee pain, anterior knee pain score, and Knee Society Score. Clinical assessment was performed at 6 weeks, 3 months, and 6 months after surgery.

Results:
A total of 102 knees were analyzed, with 51 knees in each group. Baseline demographic characteristics were similar between groups. At 3 months postoperatively, the incidence of anterior knee pain was identical

between the denervation and non-denervation groups (15/51 [29.41%] vs 15/51 [29.41%], p=0.999). The mean anterior knee pain score did not differ between the denervation and non denervation groups (0.63±1.33 vs 0.61±1.30, p=0.821). Knee Society Score improved significantly from the preoperative period in both groups across all follow up visits. No significant difference in functional outcome was observed between groups at any time point.

Discussion:
These findings indicate that circumferential patellar denervation does not add measurable benefit when patellar resurfacing is already performed. Pain related to the patellofemoral joint may be adequately addressed by resurfacing alone, reducing the potential impact of additional nerve ablation. The neutral effect observed in this trial aligns with previous randomized studies reporting limited or inconsistent benefit of patellar denervation when combined with patellar resurfacing.

Conclusion(s):
Circumferential patellar denervation in total knee arthroplasty with patellar resurfacing did not reduce anterior knee pain or improve knee function compared with no denervation.

P1363

RENAL SAFETY OF ZOLEDRONIC ACID IN ELDERLY PATIENTS WITH OSTEOPOROSIS AND CHRONIC KIDNEY DISEASE

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Objective: Osteoporosis (OP) and chronic kidney disease (CKD) frequently coexist in the elderly, creating uncertainty regarding the safety of zoledronic acid (ZA). This study aimed to evaluate renal safety and the risk of hypocalcemia following ZA infusion in elderly patients with CKD stages 3b and 4.
Materials and methods:
Patients receiving ZA for OP were identified at a tertiary referral hospital through a retrospective review of electronic medical records from January 2022 to December 2024. Eligible patients were aged ≥ 60 years with CKD stages 3b and 4, defined as an eGFR (CKD-EPI) or CrCl (Cockcroft–Gault) < 45 mL/min. Renal function parameters and serum calcium levels were obtained before and after ZA infusion. Continuous variables were expressed as mean ± standard deviation (SD) and compared using the Wilcoxon signed-rank test. Statistical analyses were performed using R software, with a significance level of $p < 0.05$.
Results:
Of 1,080 ZA infusions screened, 145 met inclusion criteria, comprising 110 patients with CKD stage 3b and 35 with stage 4. The population had a mean age of 78.4 ± 9.0 years, was 94.5% female, and 85% white. Fragility fractures were present in 92 (63%) patients. Mean BMI was 23.3 ± 4.2 kg/m², and baseline 25-hydroxyvitamin D was 39.3 ± 13.7 ng/mL. Renal function and calcium levels remained clinically stable during a mean follow-up of 174.7 days between pre- and post-infusion assessments. Serum creatinine showed no significant variation (1.09 ± 0.3 vs. 1.09 ± 0.36 mg/dL; p = 0.35). Similarly, eGFR was preserved using both CKD-EPI (56.7 ± 15.2 vs. 58.3 ± 17.9 mL/min/1.73 m²; p = 0.15) and Cockcroft–Gault equations (35.9 ± 6.8 vs. 37.1 ± 9.5 mL/min; p = 0.62). Total serum calcium levels were also maintained (9.53 ± 0.51 vs. 9.34 ± 0.50 mg/dL; $p < 0.01$).
Conclusion:
Zoledronic acid infusion demonstrated a favorable safety profile in elderly patients with CKD stages 3b and 4. Renal function remained stable and no clinically significant hypocalcemia was observed, supporting the use of ZA as a therapeutic option in this high-risk population.
Keywords: Osteoporosis; Chronic Kidney Disease; Elderly; Zoledronate-aqqg.

P1364

ARTIFICIAL INTELLIGENCE VS HUMAN INTERPRETATION FOR OPPORTUNISTIC DETECTION OF VERTEBRAL FRACTURES IN ROUTINE CT IMAGING: RESULTS OF A 2-MONTHS PILOT STUDY

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Objective:
To evaluate the diagnostic performance of an artificial intelligence (AI) system for detecting vertebral fractures (VFs) opportunistically in routine chest and abdominal CT scans compared with human readers in a real-world hospital setting during a single-center pilot study.
Material and Methods:
All thoracic and abdominal CT scans performed over two months in patients aged ≥50 years at a tertiary hospital were prospectively analyzed using the HealthOST AI platform (Nanox AI Ltd.). Routine radiology reports and targeted endocrinologist reviews were compared to AI findings. A gold-standard adjudication panel confirmed VF presence or absence. Statistical comparisons of sensitivity, specificity, predictive values, and odds ratios (OR) were performed using χ^2 tests ($p<0.05$).
Results:
Among 427 scans, AI achieved a sensitivity of 86.3% in the discrimination of CT scans with or without VFs, outperforming radiologists (50.0%) and endocrinologists (68.8%) ($p\leq0.01$). In addition, AI demonstrated significantly higher odds of correctly flagging VFs leading to case finding: OR=14.23 (95% CI 4.7–43.1, p<0.000001) compared to radiologists, and OR=4.77 (95% CI 1.6–13.6, p=0.001) compared to endocrinologists. Extrapolated annually, the integration of this system in the hospital's radiology setting could identify approximately 150 otherwise undiagnosed patients needing osteoporosis therapy.
Conclusion:
AI-driven VF detection in routine CT scans offers significantly higher diagnostic accuracy than human interpretation. Its integration into clinical workflows can enhance early osteoporosis diagnosis and optimize treatment strategies without added imaging or cost.

P1365

EFFICIENT MANAGEMENT OF AN HISTIOCYTIC JAW LESION AND SUBSEQUENT BONE FORMATION FOLLOWING DENOSUMAB TREATMENT

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Objectives: Medication Related Osteonecrosis of the Jaw (MRONJ) is associated with antiresorptive treatments, including denosumab (Dmab). The reported incidence of MRONJ of patients with cancer treated with high dose Dmab is about 2% the first year, is much lower in patients with osteoporosis (5.2/10.000 yrs) and occurs mainly after an invasive oral procedure. We report here the effects of Dmab treatment on the jaw of a patient with Langerhans Cell Histiocytosis (LCH) following extensive oral surgery

Patient and Methods: A 41-year-old man presented with multiple painful, non-healing, teeth extractions of the right lower jaw associated with progressive osteolytic lesions of the maxilla and the mandible. Conservative treatment had no effect, and he also sustained a low impact fracture of the right clavicle with osteolytic lesions. A whole-body FDG PET/CT scan revealed increased metabolic activity in the mandible, the right clavicle, and pulmonary nodular lesions. Following the initial inconclusive mandibular and clavicular biopsies showing nonspecific inflammatory changes, a third biopsy of the mandible confirmed LCH and a consistent p.K57N (c.171G>C) mutation in exons 2 and 3 of the *MAP2K1* gene.

Results: He was treated with Dmab 120 mg/2 months for 6 months (4 doses), an efficacious off-label therapy of patients with LCH, and reported an early, dramatic decrease of the jaw pain associated with progressive decrease of serum CTX and P1NP values which stabilized at 6 months. A PET/CT scan 2 months after the last Dmab administration (8 mo follow-up) showed reduction of the extent of the mandibular lesions, decreased FDG avidity in the right clavicle, and stable low-grade metabolic activity in the pulmonary nodules. There was marked radiologic improvement of mandibular bone integrity, including formation of new bone matrix, and restoration of both lingual and buccal cortical plates at the site of posterior tooth loss.

Conclusion: The remarkable response of the operated jaw to Dmab is difficult to be explained and raises questions about the pathogenesis of MRONJ associated with Dmab use.

P1366

SITE CHARACTERISTICS AND PATIENT SELECTION CRITERIA FOR ROMOSOZUMAB IN ROUTINE CLINICAL PRACTICE: INSIGHTS FROM THE PRIME EUROPEAN MULTI-COUNTRY STUDY

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Objective: Romosozumab (Romo) is indicated for postmenopausal women with severe osteoporosis (OP) at high risk of fracture. We describe site characteristics, real-world prescribing and patient selection practices for Romo in the Prospective Romosozumab Investigation in Multiple European countries (PRIME).

Materials/Methods: PRIME is a non-interventional, primary data-collection study conducted in 8 European countries (final results expected Sept 2026), collecting patient-/site-/country-level data to describe patient characteristics, treatment patterns, persistence with and transition from Romo. To assess site characteristics, principal investigators completed a questionnaire.

Results: As of Nov 2025, all 99 currently enrolled centres, across 8 countries, completed the survey; 83% were outpatient clinics. Prescribing specialty varied: the most frequently reported specialties were rheumatology, endocrinology and multidisciplinary teams (26% of centres reported ≥2 specialties for OP care).

Self-injection at home was most common (83%), except Switzerland where in-clinic administration was preferred (5/6 centres). Across sites, patient follow-up typically occurred every 3–6 months (75%). 44% of centres were associated with a fracture liaison service (range: 10% [Greece] to 67% [Switzerland]).

Respondents cited that when a bone mineral density (BMD) T-score threshold was considered for starting Romo, it fell between ≤−2.5 and ≤−3.5; centres in Spain often used a lower threshold (≤−3.0). Most respondents rated recent (≤24 months; 75%), major osteoporotic (68%) and multiple fractures (78%) as being of high-to-very-high importance for consideration of Romo initiation.

Variability was observed in willingness to prescribe in the presence of comorbidities, reflecting differences in local healthcare systems. Interpretation and extrapolation is limited by responses representing only the opinion of the principal investigator at each centre and the possibility of recall bias.

Conclusion: Preliminary results from the PRIME study provide real-world insights into Romo use in routine OP care in Europe. Findings show cross-country variation in care, Romo administration and patient selection, underscoring the influence of healthcare systems and policies.

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AM: Employee of UCB.

ML: Employee of UCB.

PO: Employee of UCB.
PM: Reports fees for lectures/advisory boards and research grants from Amgen, ITF and Galenica and fees for lectures/advisory boards from UCB, Elpen, Solgar, Er-Kim.
MRL: Consultancy and lecture fees from Alexion, A.M. Pharma, AstraZeneca, Celltrion, Galapagos, Kyowa Kirin Pharma, Orifarm Healthcare, Pharmanovia, Samsung Bioepis, Sandoz, Takeda, Theramex, UCB and Will Pharma.
CB: Consultancy and lecture fees: Amgen, Ascendis Pharma, Recordati, Theramex, UCB.
ET: Employee of UCB.

P1367

CORTICAL AND TRABECULAR DXA-DERIVED 3D BONE PARAMETERS IN DIABETIC AND NON-DIABETIC WOMEN WITH FRACTURES: AN EXPLORATORY ANALYSIS

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Introduction
Individuals with diabetes mellitus experience increased fracture risk. DXA-based 3D modeling techniques such as 3D-Shaper allow separate estimation of trabecular volumetric BMD (vBMD) and cortical surface BMD (sBMD), potentially offering insight into compartment-specific skeletal deficits. Whether fracture-associated cortical and trabecular bone alterations differ between diabetic and non-diabetic individuals remains incompletely understood.
Methods
We performed a retrospective case–control analysis of women undergoing DXA with 3D-Shaper (3D-Shaper Medical, Barcelona, Spain). Corticosteroid users were excluded. Participants were stratified by diabetes status. Fracture status was defined as a history of fracture recorded in the clinical dataset. Standard hip aBMD T-scores, trabecular vBMD, and cortical sBMD were compared between fracture and non-fracture groups within diabetic and non-diabetic strata. Discriminative performance was assessed using univariate logistic regression and area under the receiver operating characteristic curve (AUC).
Results
Among diabetic women (fracture n=12; controls n=67), fracture cases demonstrated lower cortical sBMD and trabecular vBMD compared with controls. Cortical sBMD showed a numerically higher discriminative performance (AUC 0.67) than trabecular vBMD (AUC 0.62), though differences were modest and did not reach statistical significance. In non-diabetic women (fracture n=34; controls n=192), all measures were lower in fracture cases, with standard hip aBMD showing the highest discrimination (AUC 0.75), while trabecular and cortical parameters demonstrated similar performance (AUCs ~0.73).
Conclusion
In this exploratory analysis, both cortical and trabecular DXA-derived 3D parameters were associated with fracture status. In diabetic women, cortical measures showed a trend toward stronger association with fracture than trabecular measures, whereas in non-diabetic women, discriminative performance was comparable across compartments. Given the retrospective design and small number of diabetic fracture cases, these findings should be considered hypothesis-generating and warrant confirmation in larger, prospectively phenotyped cohorts.

P1368

PREDICTING OSTEOPOROSIS RISK IN CARDIOVASCULAR DISEASES USING THE FRAX SCORE.

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Introduction: Many journals and articles have mentioned the correlation between bone health and cardiovascular health. There are several overlapping risk factors in lifestyles and multiple comorbidities. We are using the FRAX score as we use it in patients presenting with falls risk and fractures to assess osteoporosis risk in patients with cardiovascular disease.

Aims and objectives: To assess osteoporosis risk in patients aged 75 years and above admitted to cardiology, using the FRAX score.

1. Osteoporosis risk using the FRAX score.

2. Correlation of FRAX score with coronary artery disease, heart failure, and similar conditions.

Methods This was a retrospective study involving 143 patients admitted to the cardiovascular care unit from April 2024 to March 2025. We used ICD codes to identify these cases: I11.0 Hypertensive heart disease with (congestive) heart failure; I25.5 Ischaemic cardiomyopathy; I42.0 Dilated cardiomyopathy; I42.9 Cardiomyopathy, unspecified; I50.0 Congestive heart failure; I50.1 Left ventricular failure; I50.9 Heart failure, unspecified; I24.9 Acute ischaemic heart disease, unspecified.

The data was collected using CERNER and LPRES records. Data collected for age, ethnicity, lifestyle (smoking, alcohol), body weight, BMI low/ high, family history of fracture, previous fracture(s), comorbidities; Type 1 or 2 diabetes mellitus, secondary causes for osteoporosis, rheumatological conditions, use of steroids, chemotherapy.

Once this data was collected, the online FRAX score calculator was used to determine the percentages for 10-year probability of fracture risk for major osteoporotic fracture < 20% or > 20%, and hip fracture risk of <3% or > 3% and NOGG advice on lifestyle vs. bone mineral density vs treatment for osteoporosis were captured.

Inclusion criteria Patients admitted to the CCU who were 75 years and above, male or female, with ICD codes as mentioned in the methods and excluded anyone below 75 years.

Results The majority of cases were male, admitted under the cardiac care unit of white British ethnicity. The lifestyle and co-morbidity history revealed 45.6% were smokers or ex-smokers, with alcohol consumption of around 14%, many had high BMI (41.2%), cases with a history of diabetes mellitus were 26.5%, only a fraction had previous fragility fractures (11.8%), very small number had rheumatological conditions.

On performing the FRAX score, the 10-year fracture probability of:

- Major Osteoporosis risk of <20% in 72% and > 20 % in 23.5%
- Hip fracture risk of <3 % in 21.7% and > 3% in 76.9%

FRAX score advice:

- 41.3% lifestyle advice
- 42% Measure BMD
- 13.3% to treat
- Not applicable to a small percentage

Discussion

- Is the FRAX score useful to predict fracture and osteoporosis risk in patients with cardiovascular conditions?
- Can this be used as a preventative measure to reduce fracture risk and improve bone health?

Plans: Train to use the FRAX score and use it regularly in our services, MfOP and cardiology.

Educating the team on the importance of preventing osteoporosis in cardiovascular diseases with shared risk factors.

Conclusion: FRAX score is a useful tool to identify osteoporosis risk in medical conditions with overlapping risk factors (lifestyles and multiple comorbidities). The advice for BMD scan on the FRAX score suggests that we need to consider bone health in this group of patients.

The FRAX score can be embedded as a part of holistic assessment by the primary, secondary, or tertiary care services, and if the BMD scans suggest a T-score in the osteoporosis range, to refer to the appropriate bone health clinic for further advice, treatment and management.

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6. FRAX score

Declaration: none from any author or co-author.

P1369

HANDGRIP STRENGTH AND BONE HEALTH IN CHILDHOOD: A 5-YEAR POPULATION-BASED PROSPECTIVE STUDY

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Objective
As longitudinal data on the handgrip–bone relationship in early childhood are limited, we aimed to determine whether handgrip strength predicts bone health from early childhood to preadolescence.
Materials and Methods
Data were obtained from 1,312 children in the Southampton Women's Survey (SWS), a UK population-based birth cohort. Handgrip strength was assessed using a Jamar dynamometer, and bone health was measured by total-body-less-head dual-energy X-ray absorptiometry (DXA) scans at ages 4, 6–7, and 8–9 years. Primary and secondary bone outcomes were area-adjusted bone mineral content (aBMC) and bone mineral apparent density (BMAD), respectively. Linear mixed-effects models with age interaction were fitted to multiply imputed and inverse probability-weighted data, adjusting for sex, socioeconomic status, height, and fat mass.
Results

At age 4, handgrip strength was not associated with bone outcomes. Across follow-up, greater handgrip strength predicted higher bone accrual (aBMC: 0.97 g/year per 1 kg increase, 95% CI: 0.71–1.22; BMAD: 0.00010 g/cm³/year per 1 kg, 95% CI: 0.00001–0.00019). Associations strengthened with age as seen for aBMC: 4 years (−1.02 g, 95% CI: −2.54–0.50), 6–7 years (0.91 g, 95% CI: −0.22–2.04), and 8–9 years (2.84 g, 95% CI: 1.97–3.72). A 1 SD higher grip strength at age 4 corresponded to approximately 2% greater aBMC accrual from ages 4 to 8. Findings were robust after adjustment for fat mass and consistent across sex and BMI categories.
Conclusion

This study provides the first longitudinal evidence linking handgrip strength with bone accrual in later childhood. Findings highlight muscular strength as a modifiable determinant of bone development in early childhood and underscore the potential for early-life interventions promoting muscle function to optimize peak bone mass and mitigate future osteoporosis risk.

P1370

MATERNAL DIABETES IN PREGNANCY AND FRACTURE RISK IN OFFSPRING: A VICTORIA STATE-WIDE DATA LINKAGE STUDY

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Objective
Maternal diabetes in pregnancy may influence fetal skeletal development; therefore, this study examined the association between maternal diabetes subtype and hazard of first long-bone fracture in offspring during the first nine years of life.
Materials and Methods
We conducted a population-based cohort study using linked administrative health data for singleton births in Victoria, Australia. Maternal gestational diabetes (GDM), type 1 diabetes (T1DM), or type 2 diabetes (T2DM) status was identified from the Victorian Perinatal Data Collection (2012–2015) using ICD-10-AM codes. Offspring time to first long-bone fracture and censoring was ascertained from emergency department records between 2013 and 2021 and modelled using Cox proportional hazards regression, with maternal diabetes subtype as the exposure. Models were adjusted for offspring sex, index of relative socioeconomic disadvantage, and maternal smoking during pregnancy.
Results
Among 279,067 mother–offspring pairs, 22,153 (8.0%) mothers had GDM, 998 (0.4%) had T1DM, and 885 (0.3%) had T2DM. A total of 15,275 (5.7%) offspring sustained at least one incident long-bone fracture during follow-up. Compared with offspring of mothers without diabetes, fracture hazard ratio was lower among offspring exposed to GDM (hazard ratio [HR] 0.90; 95% confidence interval [CI] 0.84–0.96), higher among those exposed to T1DM (HR 1.28; 95% CI 1.00–1.64), and not significantly different for T2DM (HR 0.92; 95% CI 0.68–1.25).
Conclusion
Offspring fracture hazard differed by maternal diabetes subtype, with higher hazard following T1DM and lower hazard following GDM, the latter likely reflecting behavioural rather than skeletal factors. Early monitoring and targeted injury-prevention strategies may benefit offspring exposed to maternal T1DM.

P1371

BİLATERAL ATYPİCAL FEMORAL FRACTURES FOLLOWİNG LONG-TERM DENOSUMAB THERAPY: A CASE REPORT AND LİTERATURE REVİEW

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Introduction
Denosumab is generally used for 5–10 years to treat postmenopausal osteoporosis. Atypical femoral fractures (AFFs) are rare complications classically associated with long-term bisphosphonate therapy. Emerging evidence suggests that denosumab, a potent RANKL inhibitor, may also be implicated, particularly with prolonged use.
Case Report
We report the case of a 73-year-old woman with postmenopausal osteoporosis who had been treated with denosumab for approximately 10 years. One day after her most recent injection, she sustained a low-energy fall resulting in a displaced fracture of the distal third of the right femoral shaft and a non-displaced fracture of the left femoral shaft. She had no prior exposure to bisphosphonates. Her medical history included type 2 diabetes mellitus, hypertension, and hyperlipidemia. Radiographic and clinical findings met all major and minor criteria for atypical femoral fractures as defined by the American Society for Bone and Mineral Research (ASBMR). No evidence of malignancy, metabolic bone disease, high-energy trauma, periprosthetic fracture, or other pathological conditions was identified, and all ASBMR exclusion criteria were ruled out. Despite long-term antiresorptive therapy, she had persistent osteoporosis and a recent severe vertebral compression fracture.
This case highlights the potential association between prolonged denosumab therapy and atypical femoral fractures, independent of bisphosphonate use. Long-term suppression of bone remodeling may impair microdamage repair, leading to compromised bone quality despite improvements in bone mineral density.
Conclusion
This case adds to the growing body of evidence that long-term denosumab therapy may be associated with atypical femoral fractures, even in bisphosphonate-naive patients. Clinicians should maintain a high index of suspicion for prodromal symptoms and consider individualized treatment duration and monitoring strategies in patients receiving prolonged denosumab therapy.
Keywords: Denosumab, atypical femoral fracture, osteoporosis, antiresorptive therapy

P1372

NON-ENDEMIC SKELETAL FLUOROSIS: ATYPICAL FEMORAL FRACTURE AS A MANIFESTATION OF EXCESSIVE TOOTHPASTE INGESTION

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Introduction: Skeletal fluorosis (SF) is a rare metabolic bone disorder caused by excessive fluoride accumulation, leading to osteosclerosis, altered bone architecture, and increased fracture risk. While endemic fluorosis is well described in regions with high natural fluoride exposure, non-endemic cases due to unusual sources are uncommon.
Case Report: We present a 54-year-old man who sustained an atypical fracture of the left femoral mid-diaphysis following a forward fall whilst reaching into a low kitchen cabinet. Radiographs demonstrated a grossly displaced fracture with diffusely sclerotic bone. A FDG-PET scan revealed diffuse osteosclerosis with no metabolically active lesions. Biochemical evaluation showed markedly elevated urinary fluoride 24 mg/L (reference range <1mg/L).
Bone mineral density was profoundly increased: lumbar spine BMD 3.324 g/cm² (T-score 16.9), right femoral neck BMD 1.718 g/cm² (T-score 5.0), and right total femur BMD 2.061 g/cm² (T-score 7.5). On further history, the patient reported ingestion of toothpaste after every episode of brushing (3 times a day) throughout life. The patient also reported chronically coating teeth in toothpaste multiple times a day as a chewing-gum substitute to freshen his mouth. He would consume approximately

1.5 tubes of toothpaste per week. This excessive fluoride exposure established the diagnosis of skeletal fluorosis. He was counselled to stop excessive consumption of toothpaste. On review in metabolic bone clinic 6 months after presentation, urinary fluoride was 10.81 mg/L

Discussion: This case highlights an unusual iatrogenic source of fluoride exposure leading to severe skeletal fluorosis and pathological fracture. The paradox of increased bone density and compromised bone quality is characteristic of fluorosis and highlights the importance of considering fluoride toxicity in the differential diagnosis of unexplained osteosclerosis.

Conclusion: SF though rare in non-endemic regions, can occur due to excessive ingestion of fluoride-containing products. Clinicians should maintain a high index of suspicion when encountering unexplained osteosclerosis and pathological fractures, as early recognition and elimination of the fluoride source are essential to prevent further morbidity.

P1373

ANTIGEN PRESENTATION OF CHONDROCYTES IN KNEE OSTEOARTHRITIS

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Osteoarthritis (OA) is characterized by cartilage degeneration. Within the cartilage, chondrocytes support joint structure, maintain joint homeostasis, and also have antigen presentation functions. As a non-immune cell, chondrocytes upregulate MHC class II in the OA setting. To date, an understanding of APC function in chondrocytes is lacking. Thus, this research aimed to study drivers that regulate APC function in chondrocytes. Primary chondrocytes were isolated from knee OA patients and evaluated for levels of cell surface molecule expression related to antigen presentation (CD40, CD80, CD86, HLA-ABC, HLA-DR) via flow cytometry. Our results show positive correlations between HLA-ABC and HLA-DR, CD86 and HLA-DR, and also CD40 and CD80. However, the expression of the cell surface molecules was not dependent upon body mass index (BMI), despite obesity being a risk factor of OA. Further research is needed to identify factors driving enhanced antigen presentation potential of chondrocytes.

P1375

ECOLOGICAL ANALYSIS OF LATITUDE AS A DETERMINANT OF OSTEOPOROSIS HEALTH-ADJUSTED LIFE EXPECTANCY

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Objective

To examine the ecological association between geographic latitude and osteoporosis-related Health-Adjusted Life Expectancy (HALE) in women across populations.

Material and Methods

Data on osteoporosis Health-Adjusted Life Expectancy (HALE), latitude, and covariates were obtained from the World Health Organization Global Health Observatory, the Global Health Data Exchange, and geographic coordinates from a validated GitHub repository. All analyses were conducted in RStudio (version 4.4.1). Descriptive statistics were computed for all variables, including normality assessment using Shapiro-Wilk tests. Regression analysis was employed to examine the association between latitude and osteoporosis HALE, adjusting for ecological covariates such as median age, and prevalence of underweight, alcohol consumption, etc.

Results

Descriptive analysis revealed considerable variability across all variables, with osteoporosis ranging from 16.97 to 898.31, median age spanning 15.20 to 56.90 years, and latitude extending from -41.00 to 72.00 degrees, indicating substantial geographic diversity in the sample. Spearman correlation analysis revealed a strong, statistically significant positive association between latitude and osteoporosis HALE (ρ = 0.526, $p < 0.01$). The rank-based regression analysis revealed significant ecological associations between latitude and osteoporosis HALE. Age demonstrated the strongest positive association with osteoporosis ranks (β = 10.999, $p < 0.001$), followed by latitude (β = 1.193, $p < 0.001$), indicating higher osteoporosis burden at more northern latitudes. DM showed a significant negative association (β = -7.682, $p < 0.001$). Health Expenditure approached significance with a negative trend (β = -0.827, p = 0.062), while Underweight, Cigarettes, and Alcohol consumption were not statistically significant. The model explained 72.25% of the variability in osteoporosis ranks (Robust R^2 = 0.7225).

Conclusion

This ecological analysis demonstrates that geographic latitude is significantly associated with osteoporosis HALE in women, with populations at higher latitudes experiencing greater osteoporosis-related health burden. Age was also a significant contributor, whereas higher health expenditure had a protective effect.

P1376

PREVALENCE AND DETERMINANTS OF OSTEOPOROSIS IN PATIENTS WITH RHEUMATOID ARTHRITIS USING EMERGING REMS TECHNOLOGY - EVIDENCE FROM A REAL-WORLD COHORT

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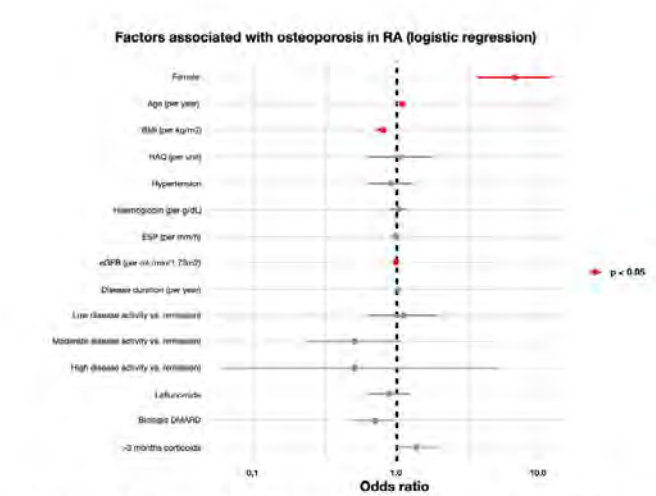
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Background/Objective: Rheumatoid arthritis (RA) is a chronic autoimmune disease characterised by persistent inflammation and progressive joint damage. Osteoporosis (OP) is one of its most consequential systemic complications. Individuals with RA have nearly twice the risk of OP compared with the general population due to the combined effects of inflammation, sarcopenia, reduced mobility and glucocorticoid exposure. Radiofrequency Echographic Multi-Spectrometry (REMS) has emerged as a valuable alternative, demonstrating diagnostic equivalence to DXA and greater accuracy. Some guidelines now endorse REMS when DXA is unavailable or unreliable. The aim of the study was to estimate the prevalence of OP and identify associated factors in a real-world RA cohort assessed with REMS.

Methods: A retrospective cross-sectional study included 1,290 adults with RA from a rheumatology centre. Only patients with a last year REMS of lumbar spine and/or femoral neck assessment were analysed. Sociodemographic data, comorbidities, disease activity, laboratory parameters and treatments were extracted from electronic records. OP was defined as a T-score ≤ −2.5. Bivariate analyses compared OP vs non-OP groups; multivariable logistic regression identified independent predictors.

Results: OP was present in 985 individuals (76%). Patients with OP were older (73 ± 8 vs 67 ± 6 years; p < 0.001), had lower BMI, lower haemoglobin and markedly reduced eGFR (63 vs 84 mL/min/1.73 m²; p < 0.001). Comorbid hypertension and cardiovascular disease were more frequent in the OP group. Disease activity did not differ between groups. Biologic DMARDs were more common in non-OP patients (30% vs 23%; p = 0.016). In adjusted models, female sex (OR 6.79; 95% CI 3.74–12.4), age (OR 1.10 per year; 95% CI 1.07–1.13), lower BMI (OR 0.80; 95% CI 0.76–0.84) and reduced eGFR (OR 0.99; 95% CI 0.98–1.00) were independently associated with OP. Biologic therapy showed a non-significant protective trend; glucocorticoid exposure was not independently associated.

Conclusions: OP was very common in this large Latin American RA cohort. Classic risk factors, older age, female sex and low BMI, were strongly associated with OP. Biologic therapy may offer protection, though further study is needed. REMS proved feasible and clinically informative in a population with limited DXA access.



OR: odds ratio; CI: confidence interval; BMI: body mass index; CVD: cardiovascular disease; Hb: haemoglobin; eGFR: estimated glomerular filtration rate; HAQ: Health Assessment Questionnaire; yrs: years.

Figure 1. Multivariable logistic regression of demographic, clinical, and therapeutic factors in rheumatoid arthritis patients on associated osteoporosis factors

P1377

PREVALENCE AND DETERMINANTS OF OSTEOPOROSIS IN PATIENTS WITH SYSTEMIC LUPUS ERYTHEMATOSUS USING EMERGING REMS TECHNOLOGY - EVIDENCE FROM A REAL-WORLD COHORT

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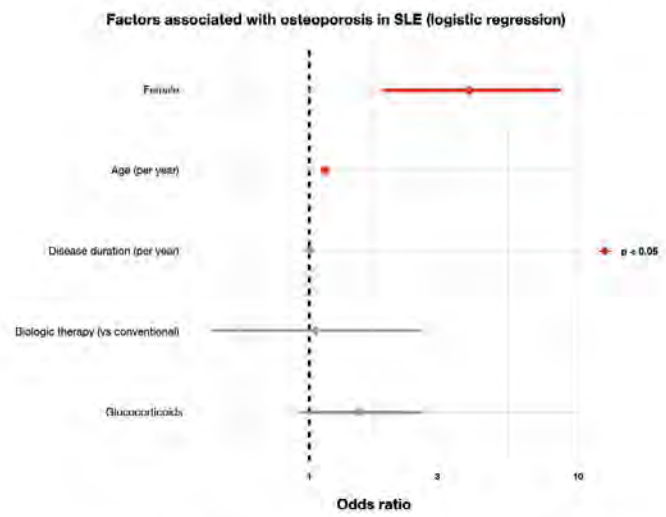
Background/Objective: Osteoporosis (OP) is a common comorbidity in systemic lupus erythematosus (SLE), driven by chronic inflammation, prolonged glucocorticoid exposure, hormonal influences, and reduced physical activity. In Latin America, evidence about OP is scarce and assessment often limited by restricted access to DXA the gold-standard examination. Radiofrequency Echographic Multi-Spectrometry (REMS), a portable and radiation-free ultrasound-based technology, offers an alternative, and its clinical relevance has been highlighted by ESCEO. The aim of the study was to estimate the prevalence of OP and identify associated factors in Colombian SLE patients assessed with REMS in routine practice.

Methods: A retrospective cross-sectional study of 385 adults with SLE from a rheumatology referral center. Lumbar spine and/or femoral neck Bone Mineral Density (BMD) was measured using REMS (ECHOLIGHT®). OP was defined using age-specific thresholds: T-score ≤ −2.5 in individuals ≥50 years, and Z-score ≤ −2.0 in those <50 years. Group comparisons used t-tests and Chi-square/Fisher tests; multivariable logistic regression identified independent predictors.

Results: OP prevalence was 55.6 %. Patients with OP were more often

female (92 % vs 81 %; p = 0.002), had slightly longer disease duration (17 ± 10 vs 15 ± 10 years; p = 0.019) and more frequent glucocorticoid use (71 % vs 60 %; p = 0.025). Age and SLEDAI activity scores were similar between groups. Lumbar spine T-scores were consistently lower than femoral neck values. In adjusted analyses, age (OR 1.15; 95 % CI 1.11–1.18) and female sex (OR 4.00; 95 % CI 1.91–8.85) remained independent predictors; glucocorticoids showed a non-significant trend (OR 1.54; p = 0.10) (Figure 1). The age-specific T/Z-score approach identified a clinically relevant subgroup of younger, steroid-exposed patients with low Z-scores.

Conclusions: OP was highly prevalent in this Colombian SLE cohort assessed with REMS. Age and female sex were the main determinants, while age-specific densitometric thresholds enabled the detection of younger, glucocorticoid-exposed patients who may be overlooked. REMS proved feasible and clinically valuable in a setting with limited DXA availability, supporting its role in improving OP detection and guiding targeted bone-health surveillance in SLE.



Multivariable logistic regression of demographic, clinical, and therapeutic factors in Lupus patients on associated Osteoporosis factors

P1378

TRAJECTORY ANALYSIS OF MEDICATION ADHERENCE IN A RURAL CHINESE COHORT WITH OSTEOPOROTIC FRACTURES

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Objective

To identify longitudinal medication adherence trajectories and associated factors among elderly patients with osteoporotic fractures in Huaihua, Hunan, China.

Material and Methods

A 12-month prospective observational study was conducted at two orthopedic centers in Huaihua. A total of 130 patients aged ≥65 years with fragility fractures were included. Medication adherence was assessed using the Morisky Medication Adherence Scale (MMAS-8) at baseline, 3, 6, and 12 months. Group-based trajectory modeling (GBTM) was used to classify adherence patterns. Data on socio-demographic, clinical, and psychosocial variables were collected via structured questionnaires and medical records. Multivariate logistic regression was performed to identify predictors of trajectory groups.

Results

Four distinct adherence trajectories were identified: "Stable High Adherence" (38.5%), "Progressive Decline" (26.9%), "Variable Adherence" (20.0%), and "Consistently Low Adherence" (14.6%). Lower health literacy (OR=3.12, p<0.01), polypharmacy (OR=2.34, p<0.05), lack of social support (OR=2.01, p<0.05), and limited access to healthcare services (OR=1.95, p<0.05) were significantly associated with belonging to the declining or low-adherence trajectories.

Conclusions

Medication adherence among elderly osteoporotic fracture patients in rural China follows distinct and often suboptimal trajectories, driven largely by patient-level and systemic barriers. These findings highlight the need for targeted adherence support strategies in similar populations, focusing on health education, medication management, and access to care. Future interventions should consider these predictors in design and implementation.

P1379

PREDICTORS FOR GOOD OUTCOME AFTER HIP REPLACEMENT FOR ELDERLY FEMORAL NECK FRACTURE

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Introduction

Elderly patients with hip fractures often face severe complications, reduced quality of life, and increased mortality. Hemiarthroplasty and total hip arthroplasty are the primary treatments for displaced intracapsular femoral neck fractures. However, patients with significant comorbidities may not qualify for total hip arthroplasty, making hemiarthroplasty a suitable alternative with comparable midterm outcomes. While previous studies have examined surgical and medical factors impacting outcomes, there is a gap in understanding how these parameters interact to predict recovery. This study aims to identify predictive factors for successful outcomes and develop a scoring system for elderly patients with femoral neck fractures.

Materials and Methods

Study Design and Subjects: This retrospective study, conducted from January 2015 to December 2021, included elderly patients with low-energy femoral neck fractures who underwent bipolar hemiarthroplasty (BHA) with at least two years of follow-up. Exclusion criteria included pathological fractures, primary tumors, high-energy trauma, and insufficient data, resulting in a final cohort of 427 patients.

Data Collection: Demographic information, comorbidities (e.g., diabetes, hypertension), surgical parameters, and functional outcomes were analyzed. The Charlson Comorbidity Index and American Society of Anesthesiologists classifications assessed preoperative physical conditions. Cognitive impairment was evaluated using the Mini-Mental State Examination (MMSE).

Surgical Procedure: Bipolar hemiarthroplasty was performed via the piriformis sparing approach, which preserves key muscles while exposing the joint. Standard postoperative pain management protocols were implemented for all patients.
Outcome Measurements: Patients were followed up at various intervals, with functional outcomes assessed using the Harris Hip Score (HHS). Scores were categorized into good (80-89) and non-good outcomes (<80), with any patient who died within two years classified as non-good.
Statistical Analysis: STATA version 14.0 was used for statistical analyses, employing descriptive statistics for demographic data and multivariate logistic regression to identify predictors of outcomes.
Development of the Scoring System: The Integrated Scoring System in Elderly Patients with Isolated Femoral Neck Fracture (ISSIFN) was developed from the patient data. Logistic regression identified predictors, and a scoring model was created based on regression coefficients. ROC curve analysis determined the optimal cut-off score for predicting good outcomes.

Results
The demographic and clinical characteristics of the study cohort are summarized in Table 1. The mean age of the participants was 80.6 ± 7.7 years (range, 60–96), with a predominance of females (76.4%). Over half of the patients (58.6%) were aged 80 years or older, and the mean body mass index was 22.0 ± 3.5 kg/m².
Comorbidities were prevalent, with 52.2% classified as ASA class III and a mean Charlson Comorbidity Index (CCI) of 4.37 ± 1.27. Cognitive impairment was observed in 12.4% of patients. The mean serum vitamin D level was 26.2 ± 12.9 ng/mL, while the mean hip bone mineral density (BMD) T-score was −2.39 ± 1.21.
Functional status prior to injury indicated that 66.5% of patients were independently ambulatory, whereas 32.1% required walking aids. Only 15.7% underwent surgery within three days of admission; however, 86.7% initiated rehabilitation within three days post-surgery.
In the regression analysis involving 427 elderly patients who underwent bipolar hemiarthroplasty (BHA), significant factors associated with favorable outcomes included: age <80 years, CCI ≤5, GFR ≥45 mL/min, hip BMD >-2.5, independent ambulation prior to fracture, normal cognitive function, vitamin D levels ≥20 ng/mL, and timely surgery and rehabilitation (≤3 days). The Integrated Scoring System in Elderly Patients with Isolated Femoral Neck Fracture (ISSIFN) score ranged from 0 to 21, with a cut-off score of at least 12 demonstrating optimal discriminatory power (AUC = 0.804), sensitivity of 70%, and specificity of 75%.

Discussion
restore hip function and enhance quality of life in elderly patients, early rehabilitation following bipolar hemiarthroplasty (BHA) for displaced femoral neck fractures is crucial. This study identifies significant non-surgical factors linked to functional outcomes, including patient comorbidities. Key indicators associated with favorable outcomes post-BHA include age <80 years, Charlson Comorbidity Index (CCI) ≤5, absence of cognitive impairment, estimated glomerular filtration rate (eGFR) ≥45 mL/min, serum vitamin D levels ≥20 ng/mL, hip bone mineral density (BMD) T-score >−2.5, independent ambulation prior to fracture, and timely intervention (surgery and rehabilitation within three days).
Previous research has similarly identified that vitamin D levels, renal function, pre-fracture ambulation, and age are critical predictors of recovery. Vitamin D deficiency, prevalent among elderly patients, contributes to sarcopenia and muscle weakness, adversely affecting rehabilitation. Impaired renal function is associated with poor bone quality and limited physiological reserves, complicating surgical recovery.

Surgical factors, including operative timing and rehabilitation protocols, also significantly influence recovery. Although the statistical significance of timing diminished in multivariate analyses, early surgery and rehabilitation remain essential. Delayed intervention has been linked to higher complication rates, while early ambulation mitigates the risks of immobilization.
This study is notable for integrating both surgical and comprehensive medical parameters, including bone health indicators, into the Integrated Scoring System in Elderly Patients with Isolated Femoral Neck Fracture (ISSIFN). The ISSIFN score, ranging from 0 to 21, identifies patients with a score of ≥12 as having a higher likelihood of achieving good outcomes, achieving an area under the ROC curve of 0.804.
While the study's strengths lie in its comprehensive approach, limitations include potential selection bias due to its retrospective design and the need for external validation across diverse populations. Despite these limitations, the ISSIFN score offers orthopedic surgeons a practical tool for evaluating and managing patients holistically, emphasizing the importance of addressing modifiable factors to enhance functional recovery in elderly patients with femoral neck fractures.

Conclusion
The Integrated Scoring System in Elderly Patients with Isolated Femoral Neck Fracture (ISSIFN) is a novel and effective tool that combines medical comorbidities—particularly vitamin D status and renal function—with surgical parameters to predict functional outcomes following bipolar hemiarthroplasty. This scoring system demonstrates high discriminatory power, enabling orthopedic surgeons to stratify patients early in the postoperative period. Beyond mere prognostication, the ISSIFN score promotes a proactive approach, allowing clinicians to address modifiable risk factors through targeted supplementation and intensive rehabilitation, thereby enhancing recovery in the geriatric population.

P1380

ISORHYNCHOPHYLLINE MITIGATES BONE LOSS IN OVX MICE BY MODULATING INFLAMMATORY RESPONSES, OXIDATIVE STRESS, GUT MICROBIOTA COMPOSITION AND SCFAS PRODUCTION

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Objective: This study examines the protective effects of IRN against bone loss in ovariectomized (OVX) mice, with a focus on its regulation of inflammatory responses, oxidative stress, gut microbiota composition, the production of short-chain fatty acids (SCFAs) and the intestinal barrier.
Methods: The potential core targets and mechanisms of action of IRN in the treatment of OP were investigated through network pharmacology and molecular docking, following by *in vivo* validation on OVX mice treated with 8-week IRN. The *in vivo* study included Micro-CT analysis, measurement of serum biomarkers for inflammation, oxidative stress and bone remodeling, gut microbiome profiling, SCFAs quantification, and immunohistochemical analysis of intestine.
Results: Network pharmacology analysis identified 50 intersecting targets between IRN and OP, with molecular docking demonstrating strong binding affinities of IRN to EGFR and GSK3B. GO and KEGG enrichment analyses revealed that IRN is involved in many key pathways related to cell survival, inflammation, and oxidative stress, with the PI3K-Akt signaling

pathway being notably prominent. *In vivo* assessment showed that IRN treatment reduced serum levels of the pro-inflammatory cytokines, such as tumor necrosis factor-alpha (TNF-α), interleukin-1 beta (IL-1β) and interleukin-6 (IL-6), while increasing serum levels of the anti-inflammatory cytokine interleukin-10 (IL-10) in OVX mice and reversed the excessive bone loss caused by estrogen deficiency. IRN also effectively managed the oxidative stress in OVX model, characterized by lowered serum levels of nitric oxide (NO), inducible nitric oxide synthase (iNOS) and reactive oxygen species (ROS). Combination of 16S rRNA sequencing and GC-MS analysis found that IRN modulated the gut microbiota composition, reducing the abundance of *Helicobacter* and increasing the level of butanoic acid, a type of SCFAs. Additionally, immunohistochemical analysis indicate that IRN repaired the compromised intestinal barrier in OVX mice by upregulating the expression of tight junction proteins, including Zonula Occludens-1(ZO-1), Claudin-1 and Occludin.
Conclusions: IRN effectively alleviates OVX-induced bone loss through its anti-inflammatory and antioxidant properties, modulation of gut microbiota composition, enhancement of short-chain fatty acid (SCFAs) production, and protection of the intestinal barrier.

P1381

TARAXASTEROL AMELIORATES OVX MICE BONE LOSS BY SUPPRESSING NLRP3 INFLAMMASOME AND MODULATING GUT MICROBIOTA

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Background: Postmenopausal osteoporosis (PMOP) is a prevalent skeletal disorder associated with menopause-related estrogen withdrawal. Taraxasterol (Tara), a pentacyclic-triterpene isolated from Taraxacum officinale, has been shown to have anti-inflammatory and anti-rheumatic effects. However, its efficacy against PMOP remains unclear. The purpose of this research is to investigate Tara's anti-osteoporotic effects.
Methods: In this study, the ovariectomized (OVX) mouse model is a well-established surrogate for PMOP, recapitulating the bone loss observed in humans following menopause. After 8 weeks of intervention, the mice were euthanized, and samples from their femur, serum, colon and feces were collected, then bone microstructure parameter, NLRP3 inflammasome, inflammatory cytokines, intestinal barrier and gut microbiota (GM) were assessed. Network pharmacology and molecular docking approach were employed to predict and validate its anti-osteoporosis-related molecular targets and pathways.
Results: The results revealed that Tara lowered proinflammatory cytokine levels (IL-6, TNF-α), suppressing NLRP3 inflammasome (caspase-1, IL-1β and IL-18) and affected adipokines content (decrease leptin and visfatin, increases adiponectin), which cloud enhance bone strength and prevent OVX-induced bone loss. Moreover, it restored the abundance of GM and increased the expression of Occludin and ZO-1 proteins in the colon. Network pharmacology identified a total of 75 core anti-osteoporosis targets. Of these, ALB, PPARG, IGF1, EGFR, ESR1, CASP3, HSP90AA1, SRC, GSK3B, MMP2 were successfully docked with the Tara and showed excellent binding ability.
Conclusions: The present study suggests that Tara alleviated inflammatory cytokines, NLRP3 inflammasome and intervened GM, representing that Tara is a novel, promising therapeutic candidate for PMOP.

P1383

PHENOTYPIC STRATIFICATION OF RESIDUAL PAIN AFTER OSTEOPOROTIC VERTEBRAL COMPRESSION FRACTURES USING SHEAR-WAVE ELASTOGRAPHY: A PROSPECTIVE COHORT STUDY

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Objective: To determine whether stiffness patterns measured by shear-wave elastography (SWE) can identify residual pain phenotypes after osteoporotic vertebral compression fractures (OVCF) and to examine their association with 6-month recovery.
Methods: This prospective cohort enrolled adults aged 55 years or older with acute OVCF within 4 weeks of onset. Baseline SWE assessed stiffness of the multifidus, erector spinae, and posterior vertebral soft tissues. Phenotypes were generated using unsupervised clustering based on stiffness level, asymmetry, and tissue uniformity. Outcomes included 6-month pain, Oswestry Disability Index (ODI), vertebral height change, EQ-5D-5L, and analgesic use. Analyses were adjusted for demographics, bone mineral density, fracture level, muscle quality, and treatment strategy.
Results: A total of 189 patients were enrolled and 172 completed follow-up. Three SWE phenotypes were identified: a high-stiffness pattern, a moderate-stiffness pattern with marked asymmetry, and a low-stiffness pattern with reduced muscle integrity. Residual pain at 6 months differed across phenotypes (26.2%, 44.7%, and 61.3%; $p < 0.01$). ODI improvement was greatest in the high-stiffness phenotype (−19.8 points) and lowest in the low-stiffness phenotype (−8.9 points). Neuropathic pain features were most prominent in the low-stiffness phenotype (mean PainDETECT 18.4), which also showed the greatest progression of anterior height loss (mean 6.1%). Stiffness asymmetry and reduced tissue uniformity independently predicted persistent pain (adjusted OR 1.31; 95% CI 1.12–1.54).
Conclusions: SWE-based phenotyping can stratify residual pain risk after OVCF. Early identification of unfavorable stiffness patterns may support targeted rehabilitation and improve long-term outcomes.

P1384

CHONDROITIN SULFATE IN KNEE OSTEOARTHRITIS: REAL-WORLD EVIDENCE FROM POST-MARKETING CLINICAL FOLLOW-UP

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Objectives: European guidelines now recommend chondroitin sulfate (CS) as first-line osteoarthritis (OA) treatment, but real-world evidence remains limited. TRUST was a study conducted in patients with knee OA treated with pharmaceutical-grade CS. It aimed to describe: 1) their baseline clinical profile and OA symptom severity, as assessed by the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC); 2) changes in OA symptom severity and health-related quality of life over 6 months (6M), as respectively assessed by the WOMAC and Short Form 12-item (SF12) questionnaire; 3) changes in concomitant use of non-steroidal anti-inflammatory drugs (NSAIDs) and analgesics during the 6M follow-up compared to the 6M prior to study inclusion.
Material and Methods: This prospective, multicentre, observational study included patients aged 50–85 years with a confirmed diagnosis of knee OA and a new CS prescription, treated at 11 Polish centers and followed for 6M (JUL2023–OCT2024). Collected data included demographics, clinical characteristics, prior OA treatments, CS treatment details, patient-reported outcomes at baseline, 3M and 6M (WOMAC, SF12 and treatment satisfaction questionnaire), and adverse events.
Results: Among 136 eligible patients (68% women; mean age 65 years; with severe physical impairment), 124 (91%) remained on CS by 6M. CS treatment was associated with a reduction in OA symptoms as measured by the WOMAC (mean decrease 54 ± 34%), improved quality of life according to SF-12 (mean increase 24 ± 27% in physical component and 20 ± 34% in mental component) and decreased use of NSAIDs and analgesics (36% of patients stopped these medications and 15% reduced their dosage). Few adverse events (10), all non-serious, occurred in 9 patients (7%), and 97% of patients gave CS a positive assessment at 6M.
Conclusion: This real-world study supports the clinical effectiveness, favourable benefit-risk profile and high treatment satisfaction associated with pharmaceutical-grade CS in knee OA management.
Acknowledgements: Funding by Pierre Fabre Médicament (France).
Disclosures: PW, EJK and MRB received fees from Pierre Fabre Médicament as Scientific Committee members. VE and RN are employed by Pierre Fabre Médicament and CH is a former employee. AISS, MA and SD are employed by ClinSearch.

P1385

DEVELOPMENT OF AN OVERLOAD RESISTANCE TRAINING CURRICULUM USING PORTABLE EQUIPMENT TO IMPROVE OSTEOPOROSIS AND SARCOPENIA IN RURAL TAIWAN

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Objective
The study aims to address the lack of specialized equipment in rural Taiwan and provide effective strength training for individuals at high risk of osteoporosis and sarcopenia.
Materials and Methods

1. Participants: 345 participants from the 2025 Exercise and Nutrition Curriculum for Osteoporosis and Sarcopenia High-Risk Groups in Chiayi, Taiwan.

2. Curriculum Design: Based on the ACSM (GETP12) FITT-VP principle, the curriculum focuses on strength enhancement, three times a week for two hours each time, for a total of 12 weeks.

3. Course Content: Resistance training courses include " Front-Loaded Carries", "long bar midsection pull-up" and "1/4 squat quick pull-up", while other courses include Cross-walking and Self-practice courses.

4. Intelligent Resistance Training Machine: A portable, compact device utilizing a motor-driven cable and pulley system to generate resistance. It supports multi-angle training with a maximum pull force of 120 kg, making it suitable for training in rural areas.

5. Assessment: Pre- and Post-assessment of the 12-week exercise curriculum, including body composition analysis and upper and lower limb muscle strength tests.

Results
Muscle Mass Index (SMI) increased in 162 participants (47%); Total Muscle Mass (SMM) increased in 227 participants (65.8%), total increase of 73.2 kg. Maximum grip strength increased in 272 participants (78.8%), average increase of 2.25 kg; Peak Force(PF) increased in 320 participants (92.8%), average increase of 133.45 N ($kg \cdot m/s^2$); and Rate of Force Development (RFD) increased in 190 participants (55.1%), average increase of 226.99 N/s. The t-test showed that SMI, SMM, grip strength, PF, and RFD were all reached statistical significance ($p^* < .05$).
Conclusion
After 12-week progressive overload resistance training curriculum using intelligent resistance training machine, 345 participants achieved effective improvements in both muscle quality and quantity, confirming that developing overload resistance training curriculum using portable resistance training equipment can improve the symptoms of osteoporosis and sarcopenia patients in rural Taiwan.

P1386

IMPROVING CORE STABILITY THROUGH BADUANJIN EXERCISE TO OPTIMIZE MUSCLE TRAINING QUALITY FOR SARCOPENIA PATIENTS IN TAIWAN FEMALE

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Objective

This study aims to investigate whether Baduanjin, a traditional Oriental exercise combining precise stretching with rhythmic breathing, can enhance body stability and core strength in individuals at sarcopenia patients. Furthermore, the study evaluates whether these improvements increase the efficiency of overload resistance training in enhancing muscle quality.

Materials and Methods

1. **Participants:**A total of 195 Taiwan female patients with sarcopenia were recruited and assigned to either **Experimental group** (overload resistance training , Baduanjin and self-practice, n = 97) and **Control group** (overload resistance training, cross walking and self-practice, n = 98).

2. **Course Design**:The intervention lasted 12 weeks, with training conducted three times per week for two hours per session, following the ACSM FITT-VP exercise prescription guidelines.

3. **Experimental Design**: Pre- and post-intervention assessments included muscle mass (InBody 270), upper limb strength (handgrip strength), flexibility (sit-and-reach test), cardiorespiratory endurance (3-minute step test), balance ability (eyes-closed double-leg stance, COP path length), and lower limb strength (isometric mid-thigh pull).

4. **Statistical Analysis**: Multivariate and univariate analyses of covariance (MANCOVA and ANCOVA) were performed with baseline values as covariates.

Results

After adjusting for baseline measurements, a significant overall group effect was observed ($p < .001$). The experimental group demonstrated significantly greater improvements in muscle mass, upper and lower limb strength, flexibility, and postural stability compared with the control group ($p < .05$). Notably, the center of pressure(COP) path length was significantly reduced in the experimental group, indicating enhanced balance and core stability. The control group showed slightly superior performance in step counts, reflecting greater cardiorespiratory adaptation.

Conclusion

Combining Baduanjin with overload resistance training effectively enhances core stability, neuromuscular control, and muscle training quality in individuals with sarcopenia. This integrative exercise approach appears to be safe, practical, and beneficial, supporting its application as an adjunct training strategy in clinical and community-based sarcopenia interventions.

P1387

SEX DIFFERENCES IN CANNABINOID-MEDIATED ANALGESIA IN AN OSTEOARTHRITIS MOUSE MODEL: ROLE OF CAMKIIA NEURONS IN THE MEDIAL PREFRONTAL CORTEX

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Objective: This study aimed to identify CaMKIIα neurons in the upstream mPFC that control vlPAG activity and to determine if CB1R signaling in this circuit mediates sex-specific antinociception in an OA mouse model.
Material and Methods: We utilized the monosodium iodoacetate (MIA) model to induce knee osteoarthritis in male and female C57BL/6J wild-type and CB1R-floxed mice. To map the mPFC-vlPAG circuitry, we employed retrograde viral tracing combined with RNAscope in situ hybridization and immunohistochemistry. To investigate the functional role of CB1R, we used a Cre-loxP system to selectively knockout CB1R in mPFC CaMKIIα neurons. Furthermore, optogenetics and whole-cell patch-clamp recordings were performed to evaluate changes in synaptic transmission (oEPSCs and sIPSCs) within the vlPAG in response to specific activation of mPFC terminals.
Results: Viral tracing revealed that the mPFC-vlPAG projection is predominantly composed of CaMKIIα excitatory neurons. Under naive conditions, these neurons exhibited significantly higher CB1R expression in females compared to males. Following OA induction, CB1R mRNA levels were downregulated in both sexes, but the reduction was significantly more pronounced in female mice. Behavioral testing showed that specific ablation of CB1R in this pathway exacerbated OA-induced mechanical allodynia, particularly in females. Conversely, specific optogenetic activation of CB1R on mPFC terminals produced robust analgesia that was more effective in female mice. Electrophysiological analysis demonstrated that CB1R activation inhibits glutamatergic drive onto vlPAG GABAergic neurons, thereby disinhibiting the descending analgesic output—a mechanism that is compromised in female OA mice due to receptor downregulation.
Conclusion: These results clarify the function of CB1R in the mPFC-CaMKIIα-vlPAG circuit. We demonstrate that the sex-specific distribution and pathological downregulation of CB1R in this cortical-subcortical pathway underlie the differential pain sensitivity and analgesic responses observed in OA. These findings shed light on sex-specific cannabinoid analgesia and provide a theoretical basis for developing more potent, sex-tailored therapeutics for osteoarthritis pain management.

P1388

HIGH-VELOCITY STRENGTH TRAINING FOR ENHANCING BONE MINERAL DENSITY IN WOMEN OVER 45: SAFETY AND ACCEPTABILITY OF THE OSTEOVELOCITY TRIAL

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Objective: To determine the safety and acceptability of high-velocity strength training designed to enhance bone mineral density (BMD).
Materials and Methods: The OsteoVelocity trial (ACTRN12624001276549) is a pilot RCT to enhance strength training (ST) for increasing BMD. Healthy untrained women over 45 with osteopenia or normal BMD were included. 51 women were randomly assigned to one of two ST intervention groups or control. Both intervention groups engaged in ST, incorporating an explosive concentric phase, twice weekly over a 6-month period. The high strain rate group (HST) performed the eccentric phase at a moderate pace (2 s), while the low strain rate group (LST) implemented a prolonged eccentric phase (4 s). Adverse events were recorded. After 6 months, surveys and group interviews were administered. Survey questions utilized a 5-point Likert scale (1 = "strongly agree"; 5 = "strongly disagree").
Results: There were 3 minor adverse events in the LST and 1 in the HST group. 50 % were deemed "unlikely related." Participants reported no pain beyond muscle soreness [1.5 (0.79)]. Soreness did not impede their activities of daily living (ADLs) [1.28 (0.46)]. All stated that they would participate in the study again [1.07 (0.26)]. They expressed enjoyment of the training program [1.23 (0.51)] and looked forward to the training sessions [1.5 (0.75)]. They enjoyed training with free weights [1.35 (0.73)], pin-loaded machines [1.32 (0.67)], and the cable pulley [1.5 (0.79)]. Qualitative data indicated a particular preference for compound exercises. Additionally, most favoured performing exercises with eight repetitions or fewer. Preferences regarding exercise pace varied. Most expressed an intention to continue ST in future [1.39 (0.57)]. They noticed favourable changes in their body [1.54 (0.79)] and feel fitter for ADL's [1.36 (0.62)]. All participants reported experiencing benefits from the program, with increases in strength and confidence being frequently highlighted. Furthermore, many participants noted improvements in well-being, such as reduced pain during ADLs and alleviation of menopausal symptoms.
Conclusion: High-velocity strength training is safe and accepted for non-osteoporotic women over 45.

P1389

OSTEOMETABOLIC BASELINE CHARACTERISTICS OF YOUNG ADULTS AT THE BEGINNING OF GENDER AFFIRMING HORMONAL TREATMENT

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INTRODUCTION

Nowadays, the number of transgender people undergoing gender-affirming hormone therapy (GAHT) is increasing, and they are getting younger and younger. Since GAHT has a significant impact on bone, osteometabolic assessment is essential both at the start of treatment and during follow-up.

OBJECTIVE

Describe the osteometabolic profile of transgender patients at the start of GAHT.

METHODS

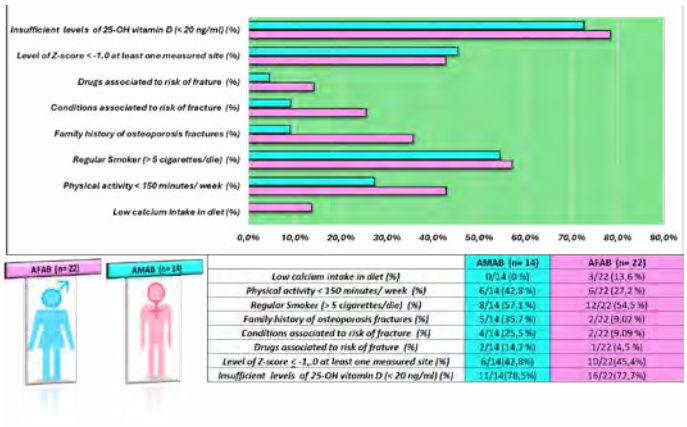
36 transgender individuals (Mean Age 22.2 ± 3.73 years) were enrolled at the start of the GAHT. Of these, 14 were AMAB (Assigned Male At Birth, Mean Age 22.3 ± 3.78 years) and 22 were AFAB (Assigned Female At Birth, Mean Age 22.2 ± 3.79 years). Demographic characteristics, osteometabolic risk factors, bone mineral density obtained by DXA (Dual X-ray Absorptiometry), and laboratory data are summarised in Table 1.

	AMAB (n= 14)	AFAB (n= 22)
Demographic characteristics	Mean + SD	
Age at first evaluation (years)	22,32 + 3,78	22,22 + 3,79
BMI (kg/m2)	26,58 + 5,65	22,74 + 3,79
Waist circumference (cm)	89,5 + 14,5	73,7 + 10
Hip circumference (cm)	99,8 + 11,45	95,6 + 12,6
DXA results	Mean + SD	
Lumbar BMD (g/cm2)	1,13 + 0,12	1,14 + 0,13
Lumbar Z-score	-0,74 ± 1,19	-0,21 ± 1,10
Total femur BMD (g/cm2)	1,06 + 0,14	0,99 + 0,10
Total Femur Z-score	-0,23 ± 1,17	-0,09 ± 0,89
Femoral Neck BMD (g/cm2)	1,02 + 0,14	0,93 + 0,12
Femoral Neck Z-score	-0,41 ± 0,93	-0,43 ± 0,85
Laboratory results	Mean + SD	
Creatinine (mg/dl)	0,85 + 0,10	0,74 + 0,11
eGFR (ml/min)	123,9 + 9,46	117 + 11,1
Total calcium (mg/dl)	9,71 + 0,06	9,38 + 0,33

Phosphate (mg/dl)	3,89 + 0,83	3,75 + 0,56
Alcaline Phosphatase (U/L)	18,2 + 7,43	7,2 + 24,7
25OH-vit D (ng/ml)	14,7 + 5,38	18,31 + 7,55
TSH (mU/L)	2,70 + 1,95	2,09 + 0,98
LH (mIU/ml)	5,79 + 2,47	11,71 + 13,38
FSH (mIU/ml)	4,02 + 3,23	6,38 + 3,31
Estradiol (pg/ml)	32,6 + 12,64	81,74 + 51,3
Total Testosterone (ng/ml)	5,18 + 1,90	0,33 + 0,16
Prolactin(ng/ml)	16,7 + 10,17	22,08 + 14,90

RESULTS

A level of physical activity below 150 minutes per week (AMAB 42.8%, AFAB 27.2%), smoking more than 5 cigarettes per day (AMAB 57.1%, AFAB 54.5%), a Z-score level < -1.0 at least one measured site (AMAB 42.8%, AFAB 45.2%) and levels of 25-OH vitamin D < 20 ng/ml (AMAB 78.5%, AFAB 72.7%) emerged as the main risk factors for fractures at the initial assessment in our population study (figure 1).



CONCLUSIONS

Osteometabolic assessment at the start of GAHT is extremely important due to its impact on fracture risk. Smoking, lack of physical activity and hypovitaminosis D are prevalent risk factors in this population, and correcting them can help to improve the long-term bone health of transgender patients.

P1390

DIGITAL VERSUS PAPER-BASED RESISTANCE EXERCISE FOR INDIVIDUALS WITH KNEE OSTEOARTHRITIS: A RANDOMIZED CONTROLLED STUDY

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Background and Objective:
Digital health tools are increasingly used to support rehabilitation programs; however, evidence comparing app-guided exercise to conventional formats remains limited in knee osteoarthritis (KOA). This study aimed to compare the effects of a smartphone-delivered resistance training program with a paper-based exercise protocol on pain, lower-limb strength, functional performance, and exercise adherence in individuals with KOA.

Methods:
A single-blind randomized controlled trial was conducted in which participants with KOA completed a 6-week resistance training program delivered either through a mobile application or printed exercise materials. Outcome measures were collected at baseline and after the intervention and included pain intensity (Numeric Pain Rating Scale), knee-related symptoms and function (WOMAC), functional mobility (Timed Up and Go), lower-extremity performance (Five-Times Sit-to-Stand Test), muscle strength, and self-reported adherence. Mixed-model ANOVA was used to examine within- and between-group effects.

Results:
Forty participants were randomly allocated to the app-guided group (n = 20) or the paper-based group (n = 20). Significant improvements over time were observed in both groups across pain, muscle strength, functional performance, and adherence outcomes ($p < 0.05$). No statistically significant differences were identified between groups for any outcome measure ($p > 0.05$).

Conclusion:
An app-guided resistance training program produces comparable clinical and functional benefits to traditional paper-based exercise instruction in individuals with knee osteoarthritis. These findings support the use of mobile applications as an effective and practical alternative for delivering resistance exercise interventions in this population.

P1391

THE THAI ICOAP-HIP: CROSS-CULTURAL ADAPTATION AND VALIDATION FOR ASSESSING INTERMITTENT AND CONSTANT PAIN IN HIP OSTEOARTHRITIS

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Objective: The Intermittent and Constant Osteoarthritis Pain (ICOAP) questionnaire, developed by the OARSI/OMERACT initiative, is a tool for assessing pain in hip and knee osteoarthritis patients. This study aimed to develop a Thai version of the ICOAP for hip through standardized translation and cross-cultural adaptation and to evaluate its reliability and validity.
Material and Methods: In this prospective descriptive study, patients aged ≥18 years with hip osteoarthritis were enrolled. Thai Intermittent and Constant Osteoarthritis Pain for hip (ICOAP-Hip) was developed using a multi-language translation and adaptation process. Forty-eight patients (24 males) completed the Thai ICOAP-Hip, pain subscale of the Thai Hip Osteoarthritis Outcome Score (HOOS), a Visual Analog Scale (VAS) for pain, and Thai Short Form-36 Health Survey version 2 (SF-36v2) during outpatient visits. Test-retest reliability was assessed by readministering ICOAP-Hip via telephone 48 hours later. Reliability was evaluated using intraclass correlation coefficient (ICC) and Cronbach's alpha, while construct validity was examined via Pearson's correlation with comparator instruments.
Results: Thai ICOAP-Hip total score showed excellent test-retest

reliability (ICC = 0.988) and high internal consistency (Cronbach's α = 0.941). Construct validity was supported by strong negative correlations with the HOOS pain subscale (r = -0.737, p < 0.001) and SF-36v2 bodily pain subscale (r = -0.737, p < 0.001), as well as a strong positive correlation with VAS pain (r = 0.796, p < 0.001).
Conclusion: The Thai ICOAP-Hip is a reliable and valid instrument for evaluating pain in Thai patients with hip osteoarthritis.

P1393

SPORT-SPECIFIC VARIATION OF TIBIAL AND FIBULAR SAFETY FACTOR PROXIES IN YOUNG MALE ATHLETES

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Objectives
To characterise sportspecific differences in tibial and fibular safety factor (SF) proxies and to determine whether these adaptations are sitespecific along the shaft and differ between axial (jump) and lateral (eversion) loading.

Material and Methods
Crosssectional study in men aged 25–35 years: semiprofessional basketball, rugby, football, tennis, gymtrained athletes and sedentary controls (≈10–15/group). Peripheral QCT of tibia and fibula was obtained at 14 sites between 10–80% of tibial length. At each site we computed polar bone strength index (pBSI). Two SF proxies were defined: pBSI_Fvec = pBSI/Fjump (vertical countermovementjump force) and pBSI_Frot = pBSI/Fever (maximal rotationaleversion force measured with a loadcell device). Linear mixedeffects models (random intercept for subject) included sport, site, sport×site, body mass and tibial length.

Results
In tibia, pBSI_Fvec showed a strong site effect (p<0.0001) but no sport or sport×site effect, indicating similar longitudinal SF patterns across groups. Tibial pBSI_Frot showed a marked site effect (p<0.0001) and a significant sport×site interaction (p<0.0001), without a global sport effect. Posthoc comparisons revealed higher distal (≈65–80%) tibial pBSI_Frot in basketball and rugby versus sedentary, with football intermediate and gym/tennis similar to controls. In fibula, pBSI_Fvec depended only on site (p<0.0001). Fibular pBSI_Frot showed significant site (p<0.0001) and sport×site effects (p<0.001); only rugby presented higher midshaft (≈35–55%) values than sedentary. Covariates were not independent predictors.

Conclusions
SF proxies vary strongly along tibia and fibula. Jumpbased SF does not discriminate sports at any level, whereas eversionbased SF reveals localised advantages in regions relevant to lateral ankle loading in basketball and especially rugby. These findings support a bone and sitespecific mechanostat rather than a uniform SF along the leg.

P1394

PHARMACOKINETICS, PHARMACODYNAMICS, SAFETY AND IMMUNOGENICITY OF BP16 (PROPOSED DENOSUMAB BIOSIMILAR) COMPARED TO EU- PROLIA® AND US- PROLIA®

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Objective(s)
To evaluate the pharmacokinetic (PK) similarity along with pharmacodynamic (PD), safety, and immunogenicity of BP16 with the US-Prolia® and EU-Prolia® following a single SC administration in healthy male subjects.
Material and Methods
In this phase 1, double-blind, parallel group study, 204 healthy male subjects were randomized 1:1:1 and treated to receive a single 60 mg/mL SC administration of BP16, EU-Prolia® or US-Prolia®, and evaluated for 253 days. The primary objective was to demonstrate PK similarity by evaluation of AUC0-inf, AUC0-t, and Cmax. between BP16 and the reference products, using the standard 80–125% bioequivalence criteria.
Results
Demographics and baseline demographics for the 204 subjects were comparable across all treatment groups. Of the 204 subjects who received treatment, 185 subjects completed the study: 60 subjects (88.2%) from BP16 arm, 62 subjects (88.6%) from EU-Prolia® arm, and 63 subjects (91.3%) from US-Prolia® arm.
PK profile of denosumab serum concentrations in terms of primary PK parameters (AUC0-inf, AUC0-t, and Cmax) were similar between the three products. The 90% CIs for the ratios of PK parameters were within 80% to 125% for all three pairwise comparisons. PD profiles of sCTX using percent change from baseline evaluated in terms of Emax and AUEC0-t was found to be comparable between the three treatment arms.
Treatment-emergent adverse events (TEAEs) were reported by 86.8%, 88.4% and 89.6% subjects in the BP16, EU- Prolia®, and US- Prolia® groups, respectively. The most common TEAEs were vitamin D decreased, upper respiratory tract infection, COVID-19, headache, and arthralgia. In all the treatment groups, immunogenicity profile was comparable with majority of subjects having positive ADA responses. Majority of ADA response were transient in nature with negative neutralizing antibodies. The ADA positive rate was comparable among the treatment arms with no impact on the safety, PK, or PD profile.
Conclusion(s)
This study demonstrated 3-way PK similarity between BP16, EU-Prolia® and US-Prolia®. All three treatments had a similar PD, safety, and immunogenicity profile and were well tolerated.
CT Number: ACTRN12623000520639

P1395

REAL WORLD COMPARISON BETWEEN THE HEALTHVCF AND HEALTHOST AI MODELS FOR DETECTION OF VERTEBRAL FRACTURES FROM EXISTING CT SCANS

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Objectives

A number of different AI models have been developed to identify vertebral fractures (VFs) from existing CT scans to increase the case identification of adults at high fracture risk for fracture liaison services (FLS). We aimed to compare the test performance of AI detected vertebral fractures (moderate/ severe deformity or clear endplate fractures) between the commercially available Nanox-AI HealthVCF (VCF) and HealthOST (OST) models.

Material and Methods

A consecutive series of CT scans from 1st to 3rd October 2025 were analyzed using the VCF and OST models using the balanced sensitivity equivalent settings. While VCF analyzes axial images to generate a sagittal image output, HealthOST is a measurement tool of vertebral height loss on primary sagittal images. An FLS nurse with experience in identifying vertebral fractures read the AI outputs from both models blinded to order. We used descriptive statistics to test agreement and describe differences between the two AI models.

Results

431 consecutive CT scans were analysed by both VCF and OST, 24 (5.6%) only by VCF and 43 (10.0%) only by OST. In the 364 scans analysed by both models, the clinician VF prevalence was 9.6% with VCF and higher at 12.7% with OST (p<0.001) with 94.5% agreement (kappa 0.74, p<0.001; Gwet's AC 0.93). The improvement in performance characteristics from VCF to OST are shown in Table 1. 10.1% of OST AI scans were also identified as low BMD, with higher rates of low BMD in scans that were clinically confirmed VFs (23.9% vs 8.2%, p=0.001).

Conclusion

The HealthOST system improved the clinician detection of VF as well as test performance with fewer scans flagged requiring clinical confirmation and fewer VF missed. The addition of low BMD detection identified almost a quarter of VF patients who could be prioritised for FLS assessment.

Table: Comparison between HealthVCF and HealthOST AI vs clinician reading for Vertebral Fracture (VF) detection and estimated impact per 1000 CT scans

	AI VF flag rate	Sensitivity	Specificity	% clinician agreement	NPV	PPV	Estimated impact per 1000 scans using 12.7% VF prevalence			
							AI-flagged scans (n)	AI-flagged scans with VF (n)	AI-flagged Scans without VF (n)	VF missed (n)
HealthVCF	32.7%	88.6%	73.3%	74.7%	98.4%	26.1%	327	112	215	14.5
HealthOST	28.0%	95.7%	81.7%	83.5%	99.2%	43.1%	280	121	159	5.4

Declarations;

RE has received sponsorship for external talks from UCB.

MKJ has received has received paid consultancy or sponsorship for external talks from Amgen, UCB, Sanofi, Kyowa Kirin, Nanox-AI, Naitive Technologies, Thornton Ross, Theramex

P1396

BENCH PRESS PERFORMANCE IS ANOTHER INDICATOR OF BONE MINERAL DENSITY IN MIDDLE-AGED MEN

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Objective: The main aim of the current study was to explore the relationships between bench press performance and bone health variables in a group of middle-aged active men. Because the bench press primarily reflects absolute strength rather than relative strength, we hypothesized that bench press performance would show a stronger correlation with whole-body bone mineral content (BMC) and bone mineral density (BMD) compared to the squat or deadlift.
Methods: A total of 50 physically active men in middle adulthood voluntarily took part in this study. The participants had a mean age of 45 ± 8.6 years and were randomly selected from the northern region of Lebanon. All individuals were in good health, with no history of significant orthopedic conditions or other medical issues known to impact bone metabolism. Bone mineral density (BMD) measurements were obtained using dual-energy X-ray absorptiometry (DXA; GE Lunar, Madison, WI, USA).
Results: 1-RM bench press was positively correlated with WB BMC (r = 0.66; p < 0.001), WB BMD (r = 0.59; p < 0.001), L1-L4 BMD (r = 0.38; p < 0.01), TH BMD (r = 0.40; p < 0.01), FN BMD (r = 0.39; p < 0.01), CSA (r = 0.57; p < 0.001), CSMI (r = 0.50; p < 0.001) and Z (r = 0.34; p < 0.05). These positive correlations remained significant after controlling for age. 1-RM squat was positively correlated with WB BMC (r = 0.56; p < 0.001), WB BMD (r = 0.40; p < 0.01), L1-L4 BMD (r = 0.29; p < 0.05), CSA (r = 0.48; p < 0.001), CSMI (r = 0.58; p < 0.001) and Z (r = 0.45; p < 0.01). 1-RM deadlift was positively correlated with WB BMC (r = 0.43; p < 0.01), WB BMD (r = 0.36; p < 0.01), CSA (r = 0.38; p < 0.01), CSMI (r = 0.40; p < 0.01) and Z (r = 0.37; p < 0.01).
Conclusion: The current study suggests that bench press performance is a positive predictor of whole-body BMC and BMD in middle-aged men. It also showed moderate associations with regional BMD and bone strength indicators.

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BONE HEALTH PARAMETERS IN MIDDLE-AGED FORMER VOLLEYBALL PLAYERS COMPARED WITH MIDDLE-AGED ACTIVE MEN

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Objective: The purpose of this study was to compare bone health parameters (bone mineral content (BMC), bone mineral density (BMD), geometric indices of femoral neck (FN) strength (cross-sectional area [CSA], cross-sectional moment of inertia [CSMI], section modulus [Z], and strength index [SI]), and composite indices of FN strength (compression strength index [CSI], bending strength index [BSI], and impact strength index [ISI])) between middle-aged active men (n = 24) and middle-aged former volleyball players (n = 26).
Methods: Fifty middle-aged men aged 35–60 years participated in the study. Dual-energy X-ray absorptiometry (DXA) was used to assess body composition, BMD, and geometric indices of FN strength. Composite indices of FN strength (CSI, BSI, and ISI) were calculated using established formulas. Physical performance was evaluated through tests assessing vertical jump (VJ), horizontal jump (HJ), triple jump (TJ), lower-limb maximal power (MP, watts), maximal squat strength, maximal bench press strength, maximal leg extension strength, maximal barbell curl strength, maximal triceps extension strength, sprint performance over 10 m, and maximal oxygen consumption (VO max, L/min).
Results: After adjusting for body weight using one-way analysis of covariance (ANCOVA), no significant differences were observed between the two groups in bone health parameters, including BMC, BMD, and hip geometry indices.
Conclusion: The findings of the present study suggest that former volleyball participation is not associated with superior bone health parameters in middle-aged men compared with age-matched active men.

P1398

IMPACT OF VITAMIN D LEVELS ON FUNCTIONAL PERFORMANCE AND JOINT SYMPTOMATOLOGY: IMPLICATIONS FOR OSTEOMETABOLIC HEALTH

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Objective: Osteometabolic homeostasis is highly dependent on adequate vitamin D levels. In knee osteoarthritis (KOA), the complex interaction with bone metabolism often results in increased pain and functional impairment. Given that vitamin D is a key determinant of musculoskeletal health, this study aims to evaluate the association between serum vitamin D levels and clinical symptoms, as measured by the WOMAC score and its subscales, in individuals with KOA.
Material and Methods: Seventy-two individuals of both sexes with a clinical and radiographic diagnosis of KOA (according to the ACR criteria) were evaluated. A multiple linear regression analysis was performed, adjusted for sex and age. The Bootstrap resampling technique (1000 replications) was applied to ensure the robustness of the total WOMAC score estimates. Statistical analyses were performed in RStudio, with significance set at $p < 0.05$.
Results: The sample consisted of 72 individuals with a mean age of 58.3 years (SD = 9.37), predominantly female (63.9%). The regression model for Total WOMAC was statistically significant (P = 0.0042). Vitamin D demonstrated a protective effect with beta = -5.259. Although the nominal p-value was marginal (P = 0.0512), Bootstrap analysis confirmed the association (95% CI: -11.15 to -0.544). In domain-specific analysis, vitamin D was an independent and significant factor for physical function (beta = -4.195; P = 0.0351), showing no direct association with pain (P = 0.3307) or stiffness (P = 0.6625). Sex significantly influenced pain (P = 0.0148) and function (P = 0.0006), while age was not a significant predictor.
Conclusion: Vitamin D levels are essential determinants of functional performance in KOA. The clinical benefit focuses on physical activity and mobility, independent of age or direct pain relief. These findings suggest that vitamin D sufficiency helps preserve mechanical competence, serving as a key strategy for maintaining functional independence.

P1399

INTEGRATIVE TRANSCRIPTOMICS AND MACHINE LEARNING IDENTIFY OSTEOBLAST IMMUNOLOGY DYSREGULATION IN STAT3-LOF HYPER-IGE SYNDROME

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Aim:
To identify molecular mechanisms underlying bone–immune dysregulation in STAT3-LOF HIES using an AI-driven transcriptomic approach.
Methods:
Four STAT3-LOF HIES patients (mutations spanning DNA-binding, coiled-coil, and linker domains; NIH score ≥20; Th17 ≤0.5%; pSTAT3 <30%) and four healthy controls were studied. PBMC-derived mesenchymal stromal cells were differentiated into osteoblasts and assessed for alkaline phosphatase (ALP) activity and mineralization. Bulk RNA-sequencing was performed followed by differential expression analysis. To move beyond static DEG analysis, we implemented a multi-layer AI pipeline comprising:(i) trajectory-based pseudotime inference to reconstruct osteoblast maturation dynamics, (ii) WGCNA with cross-power robustness assessment to identify stable co-expression modules, (iii) machine-learning feature prioritization using Elastic Net, Random Forest, and ReliefF with bootstrap stability and consensus ranking, (iv) STAT3 transcription factor activity inference using DoRothEA-VIPER, (v) pathway activity inference using PROGENy, and (vi) image-anchored pseudo-spatial analysis integrating immunofluorescence-derived ALP and OCN signals with transcriptomic maturation scores. Key genes were validated by qRT-PCR, and discriminative performance was assessed using ROC analysis.
Results: Patient-derived osteoblasts exhibited impaired mineralization and reduced ALP activity compared with controls. RNA-seq identified **529 downregulated and 769 upregulated genes** (≥1.5-fold). AI-guided

enrichment analyses highlighted pathways central to **extracellular matrix organization, skeletal system development, osteoblast differentiation, immune cell signaling, and cytokine-mediated regulation of bone remodeling**. WGCNA revealed distinct modules enriched in skeletal and immune programs: the **turquoise module** (836 DEGs) was dominated by skeletal morphogenesis genes (HOX cluster, **TBX15, ALPL, ID4, EFEMP1**); the **yellow module** (197 DEGs) contained immune regulators (**CYBB, ITGAX, TLR4, MMP9, SPP1, SPI1, TREM2**); and the **blue/red modules** were enriched for ECM remodeling and signaling mediators (**POSTN, BMP4, FOS, NFATC2, WNT9A**). Integrated ML feature selection and DEG overlap prioritized a compact **bone–immune signature** consisting of **BGN, EFEMP1, HOXA11, SULF1, IGFBP3, ID4, ADRB2** (skeletal) and **TLR4, MMP9, SPP1, TREM2, SPI1** (immune). ROC analyses confirmed excellent discriminative performance for this signature (Random Forest AUC ≈ 1.0), and qRT-PCR validation confirmed altered expression (**p = 0.0286**). Together, these findings support the potential of these hub genes as **robust biomarkers linking immune dysfunction to skeletal pathology in STAT3-LOF HIES**.

Conclusions: Our integrative transcriptomic and AI-based analysis reveals profound dysregulation of bone–immune regulatory networks especially in osteoblast formation in STAT3-LOF HIES. These findings provide new insights into the molecular basis of skeletal abnormalities in primary immunodeficiency and highlight potential biomarkers linking immune dysfunction to bone pathology.

P1400

COMPARATIVE EFFECTS OF ANTIDIABETIC DRUGS ON LEAN BODY MASS AND FAT MASS: A SYSTEMATIC REVIEW AND NETWORK META-ANALYSIS

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Objective : his systematic review and network meta-analysis aimed to quantify and compare the effects of major antidiabetic agents on key body composition parameters.

Methods: We systematically searched PubMed, Web of Science, and Scopus databases from inception to March 2025 for randomized controlled trials assessing the effects of major antidiabetic drugs on body composition outcomes in adults. Network meta-analyses were performed within a frequentist random-effects framework to estimate mean differences (MDs) and 95% confidence intervals (CIs) for changes fat mass (FM) and lean body mass (LBM).

Results: A total of 41 randomized trials (n = 2,906) were included. For LBM, tirzepatide (MD = -4.40 kg; 95% CI -7.58 to -1.22; low certainty) and liraglutide (MD = -1.54 kg; 95% CI -2.55 to -0.52; moderate certainty) significantly reduced LBM versus placebo. SGLT2 inhibitors caused minor reductions, while metformin, insulin regimens, and DPP-4 inhibitors showed neutral effects. Compared with placebo, tirzepatide showed the greatest reduction in FM (MD = -10.70 kg; 95% CI -13.42 to -7.99; moderate certainty), followed by liraglutide combined with exercise and beinaglutide. Semaglutide and liraglutide produced moderate FM decreases. In contrast, glargine (MD = +2.60 kg; 95% CI 1.24 to 3.97; low certainty) and alogliptin (MD = +1.89 kg; 95% CI 0.26 to 3.52; very low certainty) increased FM compared with metformin.

Conclusion: GLP-1 receptor agonists and dual GIP/GLP-1 agonists, particularly tirzepatide, liraglutide, semaglutide, and beinaglutide, significantly reduce both LBM and FM. Liraglutide combined with exercise showed the most pronounced FM reduction, except for tirzepatide, which had the greatest overall reduction in FM but also caused a significant decrease in LBM. Among SGLT2 inhibitors, canagliflozin and empagliflozin led to modest reductions in LBM, while alogliptin as a DPP-4 inhibitor slightly increased FM without affecting LBM. In contrast, metformin, insulin, and sulfonylureas had no meaningful impact on either FM or LBM. These findings underscore the varied effects of antidiabetic drugs on body composition and highlight the need for further research into the role of dosage and treatment duration.

P1401

COMPARATIVE INCIDENCE OF SUBSEQUENT FRACTURES FOLLOWING ANTIRESORPTIVE VERSUS OSTEOANABOLIC THERAPY IN A FRACTURE LIAISON SERVICE IN SPAIN

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OBJECTIVE

The objective of this study was to analyze and compare the incidence of subsequent fractures in patients treated with antiresorptive drugs (ARs) versus those treated with osteoanabolic drugs (OAs) among patients enrolled in an FLS, where standardized follow-up is implemented to monitor treatment adherence.

MATERIAL AND METHODS

- Retrospective observational cohort study
- Patients aged ≥50 years with fragility fractures enrolled in a FLS between 2017 and 2025
- Comparative descriptive statistical analysis of subsequent fracture incidence between treatment groups (AR versus OA) over a follow-up period of up to 8 years, stratified by treatment type and adherence

RESULTS

A total of 2,322 patients included in the FLS initiated treatment (either AR or OA), with a mean follow-up of 2.2 years (range: 0.5–8.7 years). In the overall cohort, 386 subsequent fractures occurred, corresponding to an incidence rate of 6.67 fractures per 100 person-years (95% CI: 6.0–7.3). In the AR group, 303 fractures occurred (6.4 per 100 person-years) compared with 83 fractures in the OA group (13.3 per 100 person-years). Patients treated with ARs demonstrated a significantly lower re-fracture rate (incidence rate ratio [IRR] 0.48, 95% CI: 0.38–0.61; p<0.001)

The most frequent site of re-fracture in the overall cohort was the hip (24.6%), followed by the forearm (17.6%). After an index hip fracture, the most common subsequent fracture was the hip (37.4%). Similarly, following an index vertebral fracture, the most frequent subsequent fracture was vertebral (26.4%)

Following the index fracture, 86.1% of patients initiated ARs while 13.9% received OAs. The rate of good adherence to treatment (>80% of prescribed doses) at 2 years was similar in both groups (80.5% in the OA group and 79.5% in the AR group). Similarly, good adherence was observed among re-fractured patients (84.3% in the AR group and 79.5% in the OA group)

CONCLUSION
A rate of re-fracture of 6.67 fractures per 100 person-years was recorded in our FLS. The proportion of high/very high-risk patients receiving OA therapy was low. The higher re-fracture rate observed in the OA group likely reflects the very high baseline fracture risk in this population. The hip was the most common site of re-fracture, emphasizing the importance of effective secondary fracture prevention strategies.

P1402

MORTALITY AFTER PROXIMAL HUMERUS FRAGILITY FRACTURES IN A FRACTURE LIAISON SERVICE COHORT: BEYOND TREATMENT STRATEGY

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Objectives
To analyze mortality after proximal humerus fragility fractures in a Fracture Liaison Service (FLS) cohort and to evaluate the impact of treatment strategy, comorbidity burden, and anti-osteoporotic treatment on survival.
Material and Methods
A retrospective observational study was conducted including patients aged ≥50 years with proximal humerus fragility fractures enrolled in a Fracture Liaison Service between 2017 and 2025. Patients were classified according to treatment strategy (conservative or surgical). Demographic data, baseline functional status, comorbidity burden assessed using the age-adjusted Charlson Comorbidity Index (ACCI), anti-osteoporotic treatment, and follow-up were recorded. The primary outcome was all-cause mortality during follow-up. Multivariate logistic regression analysis was performed.
Results
A total of 121 patients were included, with a mean age of 77.1 ± 10.3 years and a mean follow-up of 22.8 ± 14.7 months. Patients treated conservatively were significantly older than those treated surgically (80.7 ± 9.4 vs 72.0 ± 9.7 years) and had a higher comorbidity burden. Mortality was 33.3% in the conservative group and 20.4% in the surgical group (p = 0.18). In multivariate analysis, treatment strategy and type of anti-osteoporotic treatment (bisphosphonate, denosumab, or teriparatide) were not independently associated with mortality. Higher ACCI scores, male sex, and loss of pre-fracture autonomy were independent predictors of mortality.
Conclusions
In a Fracture Liaison Service cohort, mortality after proximal humerus fragility fractures is primarily driven by patient-related factors rather than treatment strategy or anti-osteoporotic therapy. The higher mortality observed in conservatively treated patients appears to reflect older age, greater comorbidity burden, and poorer baseline clinical status. These findings highlight the importance of comprehensive patient assessment and multidisciplinary management within FLS programs.

P1403

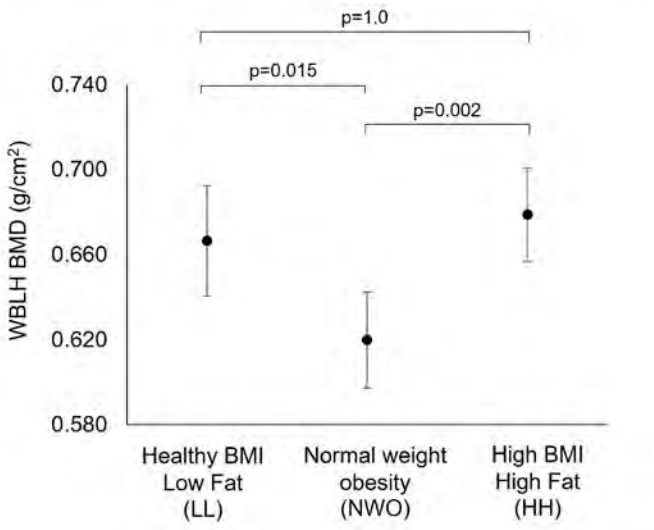
NORMAL WEIGHT OBESITY: A THREAT TO BONE HEALTH IN CHILDHOOD?

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Objectives
Normal weight obesity (NWO) describes a healthy body mass index (BMI) but high body fat percentage (%BF). It is associated with increased cardiovascular risk. The effect on bone health is poorly described, particularly in childhood when high BMI is associated with higher bone mineral density (BMD) compared to peers with healthy BMI. We compared BMD in children with NWO to those with a healthy BMI and %BF (LL) and a high BMI and %BF (HH).
Materials and Methods
In the Southampton Women's Survey cohort study, children aged 8-9y had anthropometry measurements and whole body (WB) and lumbar spine (LS) DXA (Hologic Discovery). BMI z-score (BMIz) for age and sex was calculated using British reference data; overweight/obese was defined as ≥1. DXA WB %BF adjusted for age and sex was standardised within the cohort and ≥1 was classed as high.
For each sex, propensity score matching was used to match 1:1 NWO (BMIz<1 & %BFz≥1) to LL (BMIz<1 & %BFz<1) by BMIz and age, and to HH (BMIz≥1 & %BFz≥1) by %BFz and age.
Whole body less head (WBLH) and LS bone mineral content (BMC), BMD and bone mineral apparent density (BMAD) were compared across groups (ANOVA). Results are shown as mean (SD).
Results
Of 807 participants, 24 (3%) had NWO (9 male, mean BMIz 0.55 (0.36), %BF 34.2 (2.6)). The 24 matched LL had similar BMIz (0.63 (0.29) p=1.0) but lower %BF (25.2 (3.2) p<0.001); HH had higher BMIz (1.65 (0.51), p<0.001) but similar %BF (34.5 (2.7) p=1.0).
WBLH BMC was similar for each group (p=0.92). WBLH BMD was lowest in NWO and similar in LL and HH (Fig 1). WBLH BMAD was also lower in NWO (0.018 g/cm^3 (0.002), LL 0.020 (SD 0.002), HH 0.020 (SD 0.002), p<0.001 across groups). LS BMD and BMAD showed similar trends (p>0.05).

Fig 1: Whole body less head (WBLH) bone mineral density (BMD) in children grouped by BMI and body fat percentage
Shown as mean (95% CI)



Conclusions
Children with NWO have a lower BMD, suggesting that excess adiposity without loading weight may impair bone mineral accrual. Consideration of how to identify children with NWO and promote bone health is needed.

P1404

EXPANDING ACCESS TO EVIDENCE-BASED BONE HEALTH TRAINING: COLLABORATIVE GROWTH OF THE BONE FIT™ PROGRAM

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Objectives:

To successfully adapt Bone Fit™ program, developed by the Ontario Osteoporosis Strategy (OOS), to the requirements of the U.S. audience and train healthcare professionals in the clinical and fitness fields on how to administer safe, effective and evidence-based exercises to patients with osteoporosis.

Material & Methods:

The Bone Fit™ program provides safe, effective, evidence-based training for rehabilitation and exercise professionals to better support patients with osteoporosis or those who have recently fractured. It was developed in conjunction with an advisory committee of expert clinicians and academics in the field of osteoporosis and exercise and launched in 2010. The curriculum was adapted to a hybrid delivery post COVID-19 and was updated based on the Canadian Osteoporosis Guideline published in 2023.

In 2019, OOS and the Bone Health and Osteoporosis Foundation (BHOF) collaborated to bring Bone Fit™ to the United States to address the growing population of osteoporosis patients who would benefit from exercise intervention. OOS shared Bone Fit™ program's content, background materials and research with the BHOF to use and adapt to their own clinical guidance and develop a similar program. OOS and BHOF have established an Advisory Council consisting of researchers, experts and Bone Fit™ trainers that meet bi-annually to review and update the training curriculum to ensure Bone Fit™ workshops provide continued value to rehabilitation and exercise practitioners.

Results:

Program launch	Organization	Workshops	Trainees	Method of Learning
2010	OOS	128	3004	Virtual & In-Person
2019	BHOF	15	424	Virtual & In-Person

The program has been very well received, prompting both organizations to expand in response to strong demand, with BHOF maintaining a waitlist of over 100 professionals and increasing to four annual workshops, while OOS has already opened three workshops for 2026 and plans to schedule them monthly. The OOS has also received interest from healthcare professionals in the United Kingdom, Australia, Hungary and New Zealand.

Conclusions:

The Bone Fit™ program was established to serve Canadian rehabilitation and exercise professionals. The OOS has successfully collaborated with the U.S. and adapted the educational content for its use. This collaboration can serve as a model for adapting Bone Fit™ for other countries.

P1405

DENOSUMAB-INDUCED HYPOCALCAEMIA IN PATIENTS WITH LOW EGFR: A CASE SERIES

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Objective: There are limited therapeutic options for treating patients with severe osteoporosis and chronic kidney disease, especially those with an estimated glomerular filtration rate (eGFR) of <30ml/min/1.73^2. These patients often have a very high risk of morbidity and mortality associated with a major osteoporotic fracture. Denosumab is effective at reducing the risk of osteoporotic fractures, however is associated with a risk of hypocalcaemia [1]. We audited the risk of developing significant hypocalcaemia in patients with low eGFR taking denosumab for osteoporosis.
Material and Methods: We present a small retrospective case series on patients with eGFR <30ml/min/1.73^2 who received denosumab 60mg by subcutaneous (SC) injection. Prior to administration, initial bloods including bone profile, urea and electrolytes and vitamin D were normal or corrected (vitamin D>50nmol/L). Blood monitoring of serum corrected calcium (cCa2+) was completed every 2 weeks for 6 weeks post Denosumab injection (2,4 and 6 weeks). All patients received high dose Vitamin D3 as colecalciferol 20,000iu for 6 weeks (week 2,4 and 6).

Results: We terminated the audit after treating seven female patients (age 74-95 years). There were six Caucasian and one South Asian patient. Six patients had a history of multiple fractures and one patient had been taking letrozole. The median baseline eGFR was 24 (4-31) ml/min/1.73^2 and mean baseline serum cCa2+ (at time of 1st injection) was 2.44 mmol/l (2.22-2.65). At 2 weeks, the mean serum cCa2+ was 2.14 mmol/l (1.54-2.51), at week 4, 2.24 mmol/l (1.90.2.51) and at week 6, 2.25 mmol/l (1.94-1.41). Two out of seven patients developed severe hypocalcaemia in week 2 (1.54 mmol/l and 1.62 mmol/l) with emergency hospitalisation to correct this. These patients had eGFR 4 ml/min/1.73^2 and eGFR 19ml/min/1.73^2 respectively. Both were asymptomatic and corrected with IV therapy. Two patients developed mild-moderate hypocalcaemia (1.90-2.10 mmol/l), in week 4 and week 6. There was no discernible trend between decreasing eGFR and decreasing serum cCa2+ levels across all weeks.

Conclusion: Treating elderly females with a low eGFR for osteoporosis with denosumab carries a significant risk of severe hypocalcaemia, which in turn can be life-threatening. The hypocalcaemia may be asymptomatic and based on this audit the risk is highest in patients with an eGFR <20ml/min/1.73^2.

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P1406

ULTRA-PROCESSED FOOD CONSUMPTION AND ITS RELATIONSHIP WITH BONE MINERAL DENSITY AND MUSCLE HEALTH: EVIDENCE FROM THE IRANIAN MULTICENTER OSTEOPOROSIS STUDY (IMOS)

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Objective:
This study examined the association between ultra-processed food intake and bone mineral density among Iranian adults participating in the Iranian Multicenter Osteoporosis Study (IMOS).
Materials and Methods:
This cross-sectional study included 1,365 adults aged 50 years and older from the Iranian Multicenter Osteoporosis Study (IMOS), a nationwide population-based study conducted in Iran. Dietary intake was assessed using a validated food frequency questionnaire, and participants were categorized into tertiles of ultra-processed food intake. Bone mineral density at the total hip, lumbar spine, and femoral neck was measured using dual-energy X-ray absorptiometry (DXA). Baseline characteristics across UPF tertiles were compared using analysis of variance and chi-square tests. Logistic regression models were used to examine associations between UPF intake and BMD. Model 1 was adjusted for age and sex, while Model 2 further adjusted for education level, smoking status, diabetes, body mass index, physical activity, and total energy intake.
Results:
The mean age of participants was 59.6 ± 7.2 years, and 55.4% were women. In age and sex-adjusted analyses, participants in the highest tertile of UPF intake had higher odds of lower femoral neck BMD (OR = 1.42; 95% CI: 1.05–1.93) compared with those in the lowest tertile. A similar but non-significant trend was observed for total hip BMD, while no significant association was found for lumbar spine BMD. After further adjustment for lifestyle and clinical factors, the observed associations were attenuated and did not remain statistically significant.
Conclusions:
Higher consumption of ultra-processed foods was associated with lower femoral neck BMD in minimally adjusted models, but no independent associations were observed after comprehensive adjustment. These findings suggest that the relationship between UPF intake and bone health may be influenced by confounding lifestyle and clinical factors. Prospective studies are needed to clarify the potential role of ultra-processed food consumption in osteoporosis risk.

P1407

DIETARY PHYTOCHEMICAL INTAKE AND ITS RELATIONSHIP WITH BONE MINERAL DENSITY AND MUSCLE HEALTH: EVIDENCE FROM THE IRANIAN MULTICENTER OSTEOPOROSIS STUDY (IMOS)

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Objective:
Phytochemical-rich foods may support musculoskeletal health, especially in postmenopausal women. The phytochemical index (PI) reflects dietary phytochemical intake, but evidence linking PI to site-specific bone mineral density (BMD) and muscle outcomes is limited. This study examined associations between PI and musculoskeletal problems in general population.
Materials and Methods:
This cross-sectional analysis included 1,365 adults aged ≥50 years from Round 4 of the Iranian Multicenter Osteoporosis Study (IMOS), recruited via multi-stage random sampling. Participants with implausible energy intake (<800 or >4,200 kcal/day), secondary osteoporosis, or missing data were excluded. Dietary intake was assessed using a validated food frequency questionnaire, and PI calculated as the percentage of energy from phytochemical-rich foods. Hip, spine, and femoral neck BMDs were measured by dual-energy X-ray absorptiometry. Baseline characteristics across PI tertiles were compared using ANOVA and chi-square tests. Associations with BMD were assessed by Pearson correlations, and logistic regression estimated odds ratios (ORs) for abnormal BMD, sarcopenia, and osteosarcopenia, adjusting for demographic, lifestyle, and clinical factors ($P < 0.05$).
Results:
Participants (mean age 59.6 ± 7.2 years; 55.4% women) showed differences across PI tertiles in education, BMI, smoking, vitamin D deficiency (all $P \leq 0.01$), and marital status ($P = 0.012$). Spine BMD ($P = 0.011$) and T-scores ($P = 0.009$) increased across PI tertiles, while hip and femoral neck BMD did not. PI showed weak positive correlations with hip ($r = 0.082$), spine ($r = 0.101$), and femoral neck ($r = 0.108$) BMD (all $P \leq 0.003$). Higher PI tertiles were linked to lower odds of abnormal spine BMD in crude and partially adjusted models (Model 1, third vs. first tertile: OR 0.65; $P = 0.003$; P-trend = 0.035), but not after full adjustment. No significant associations were observed for other outcomes.
Conclusions:
Higher PI was associated with better spine BMD in unadjusted analyses, but not independently after adjustment. Our findings suggest potential benefits of phytochemical-rich diets on spine health, although residual confounding and dietary complexity may influence these findings, highlighting the need for intervention studies to clarify the role of dietary phytochemicals in bone and muscle health.

P1408

TARGETING IMMUNOPOROTIC PTREGS AS A NOVEL STRATEGY IN MITIGATING INFLAMMATORY BONE LOSS IN POST-MENOPAUSAL OSTEOPOROSIS

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Introduction: Osteoporosis, particularly post-menopausal osteoporosis (PMO), is increasingly recognised as an immune-mediated skeletal disorder ***(Immunoporosis)***. The gut represents the largest immune compartment, and emerging evidence indicates that gut-resident regulatory T cells (GTregs) critically regulate bone remodeling and inflammation-driven bone loss. However, the functional dichotomy between thymus-derived Tregs (tTregs) and peripherally induced Tregs (pTregs), including RORγT$^-$ and RORγT$^+$ subsets, in PMO-associated bone deterioration remains unresolved.
Materials & Methods: Female C57BL/6 mice were divided into Sham and ovariectomized (ovx) groups. After 45 days, mice were euthanised, intestine and bone marrow were harvested for various analyses using SEM, µCT, FACS, and ELISA. HPLC was performed on collected faecal samples to determine the effect of ovx on SCFA production. Additionally, *in vitro* assays were conducted to investigate the potential of SCFAs in promoting the differentiation of Treg cells and influencing osteoclastogenic/osteoblastogenic pathways. Furthermore, ovx mice were supplemented with probiotic strains (*Lactobacillus rhamnosus, Bifidobacterium longum,* and *Lactobacillus acidophilus*) and butyrate to evaluate restoration of GTreg homeostasis.
Results: We observed that GTregs are depleted in PMO and are functionally critical in maintaining bone homeostasis. GTregs significantly promoted osteoblast differentiation while suppressing osteoclastogenesis in a ratio-dependent manner. SCFAs deficiency under PMO conditions disrupts the balance of tTregs and pTregs. Interestingly, within pTregs, the population of RORγT$^-$ pTregs and RORγT$^+$ pTregs is further altered, along with simultaneous expansion of Th17 cells-likely through the conversion of RORγT$^-$ pTregs into Th17 cells. Notably, probiotic supplementation restores the homeostasis of RORγT$^-$ pTregs and Th17 cells in a butyrate-mediated manner. Moreover, it was observed that butyrate-primed RORγT$^-$ pTregs have reduced osteoclastogenic potential. Collectively, our findings for the first time reveal the pivotal role of gut resident RORγT$^-$ pTregs-Th17 cell axis in the pathophysiology of PMO. Notably, GTreg dysregulation was also evident in osteopenic and osteoporotic patients, underscoring their clinical relevance as regulators of bone integrity.
Conclusion: These findings establish GTregs, especially RORγT$^-$ pTregs, as central modulators of bone-immune homeostasis in PMO. The SCFA-dependent restoration of GTreg composition by targeted probiotics

highlights a promising immunomoporotic approach to mitigate inflammatory bone loss and offers translational potential for future therapeutics.

P1409

LATE-DIAGNOSED JUVENILE IDIOPATHIC ARTHRITIS OF THE HIP PRESENTING AS COXA MAGNA AND LIMB-LENGTH DISCREPANCY

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Objective

To present a rare case of late-diagnosed juvenile idiopathic arthritis (JIA) of the hip leading to severe structural deformity, limb-length discrepancy and the need for surgical treatment.

Methods (Case presentation)

A 16-year-old male presented with a two-year history of progressive right hip pain, limp, and limitation of motion, without previous trauma. Initial evaluation elsewhere raised suspicion of osteoid osteoma. Pelvic MRI demonstrated marked synovial hypertrophy, joint effusion, cartilage loss, and secondary degenerative changes of the right hip.

Open biopsy revealed chronic synovitis. Laboratory testing showed elevated C-reactive protein (21.2 mg/L) with negative rheumatoid factor and antinuclear antibodies. Based on clinical, radiological and histological findings, a diagnosis of juvenile idiopathic arthritis with isolated hip involvement was made.

Because symptoms started during skeletal growth, progressive deformity developed, including coxa magna, femoral neck widening, limb-length discrepancy of approximately 2 cm, and significant atrophy of the pelvitrochanteric and thigh muscles.

Results

The patient was treated with systemic corticosteroids and sulfasalazine, resulting in partial inflammatory control (CRP decreased to 8.45 mg/L), but persistent pain, stiffness, and progressive deformity remained. Due to ongoing symptoms and structural deterioration, surgical treatment was indicated. The patient underwent open hip synovectomy combined with soft-tissue release.

Despite medical therapy, the disease progressed, confirming that delayed diagnosis of JIA affecting the hip can lead to irreversible joint destruction and major functional impairment.









Conclusion
Hip involvement in juvenile idiopathic arthritis is a major predictor of poor functional outcome. Late diagnosis during growth may result in coxa magna, limb-length discrepancy, muscle atrophy, and early joint destruction. Early recognition and aggressive medical treatment are essential to prevent irreversible damage. Synovectomy and soft-tissue release may be beneficial in early stages, whereas advanced disease often requires reconstructive surgery or total hip arthroplasty.

P1410

THE USE OF P1NP IN A NON-TERTIARY CENTRE

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Objectives
Procollagen type 1 N-terminal propeptide (P1NP) is increasingly used in osteoporosis management, with suppression indicating effective antiresorptive therapy and elevation representing successful anabolic therapy or inadequate antiresorptive effect. No formal guidelines exist for its use in clinical practice. Our objective was to evaluate P1NP utilisation and its impact on management in a non-tertiary rheumatology centre.

Methods
P1NP requests between March 2025 - August 2025 were extracted and case notes reviewed. Historic P1NP results were included when found. Data collected included indication, frequency of repeat testing and resulting change in management. If reasoning was not explicitly stated but could be inferred from treatment, this was recorded. Dual-energy X-ray absorptiometry (DEXA) results were reviewed when available.

Results
138 patients had P1NP measured in the study period. 9 cases were excluded due to absent documentation.
Indications are summarised in table 1:

Reasoning	Numbers
Drug Holiday	72
Baseline (no specific reasoning, done at initial assessment)	17
Justify switch to parenteral or anabolic	9
Baseline (specific reasoning, e.g. fractures with normal BMD)	8
Assess drug response (no specific indication)	6
Denosumab cessation	5
Metabolic bone MDT advice	5
Pre-anabolic	4
Treatment restart after complication (ONJ/ AFF)	3

Other findings of note included repeat tests during drug holidays. In some cases 35 µg/L was noted to rise as early as six months after treatment cessation. In most cases, P1NP trends were concordant with DEXA findings. Where results were discordant, clinicians favoured DEXA results.
Baseline P1NP testing changed management only when performed for a specific indication, indiscriminate baseline testing did not alter treatment decisions.
P1NP measurement to assess therapy response did not result in treatment changes.

Conclusions
These results support targeted use of P1NP to guide drug holidays, parenteral/anabolic escalation, denosumab cessation and selected baseline assessments. Routine baseline testing did not provide clinical benefit, but conclusions are possibly limited by the short study duration. Similarly, using P1NP to assess treatment response in the absence of clinical change or planned treatment change did not influence management.

P1411

MALE PATIENT WITH PSORIATIC ARTHROPATHY AND OSTEOPOROSIS

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Osteoporosis is a systemic skeletal disorder characterized by reduced bone mineral density and an increased risk of fractures, resulting from an imbalance between bone formation and bone resorption. In inflammatory rheumatic diseases, chronic inflammation and glucocorticoid therapy promote bone loss, contributing to the development of secondary osteoporosis and to the worsening of functional disability.
A 67-year-old male patient, with a medical history significant for renal tuberculosis (1998), psoriatic polyarthritis (2024), hyperuricemia (2024), chronic kidney disease (2024), and mixed peripheral neuropathy (2024), presented with mechanical pain in the left ankle, cramp-like pain in the left calf and low back pain.
Clinical musculoskeletal examination revealed lumbar spine involvement with bilateral paravertebral muscle contracture, decreased lumbar mobility (finger-to-shin distance of ½ calf), and painful limitation of extension and lateral flexion.
Fall risk assessment using the Johns Hopkins Health System Corporation Fall Risk Assessment Tool yielded a score of 17 points, indicating a high risk of falls.
Dual-energy X-ray absorptiometry (DXA) performed during hospitalization revealed the following values: right femoral neck – T-score −1.4 (−22%), Z-score −0.9 (−15%); lumbar spine – T-score −2.8 (−35%), Z-score −2.1 (−27%). These findings are consistent with a diagnosis of osteoporosis.
Anti-osteoporotic pharmacological treatment and a daily individualized physical therapy program were recommended.
Secondary osteoporosis associated with inflammatory rheumatic diseases represents a clinically significant issue in rehabilitation medicine, requiring an integrated approach focused on optimal control of inflammation, as well as prevention and treatment of bone loss, in order to reduce fracture risk and improve long-term functional outcomes.

P1412

SEVERE NUTRITIONAL POLYNEUROPATHY WITH FLACCID TETRAPARESIS FOLLOWING BARIATRIC SURGERY: A CASE REPORT

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Background:
Bariatric surgery is an effective treatment for morbid obesity, but it may be complicated by nutritional, metabolic, and neurological disorders. [1,2] Neurological complications occur in up to 16% of patients, most commonly as peripheral neuropathies related to malabsorption, persistent vomiting, and rapid weight loss. [3,4] Severe flaccid tetraparesis remains a rare but disabling manifestation.[4]

Case Presentation:
We report the case of a 42-year-old woman with class III obesity (BMI 41 kg/m²) who underwent laparoscopic sleeve gastrectomy in January 2023, followed by two reinterventions, including gastro-jejunal anastomosis, due to persistent vomiting and feeding intolerance. During the third intervention, she developed acute flaccid tetraparesis with progressive sensorimotor deficits, predominantly affecting the left hemibody. By December 2023, she presented with cachexia, recurrent hematemesis, and severe malnutrition (BMI 16.1 kg/m²), secondary to a giant ischemic gastric ulcer with mediogastric stenosis. Neurological examination revealed areflexic flaccid tetraparesis, marked sensory loss, gait impairment, and mild cognitive decline. Laboratory investigations showed normocytic anemia, hypoproteinemia, hypoalbuminemia, vitamin D deficiency, and persistent hypocalcemia, with normal vitamin B12 levels.

Management:
A multidisciplinary rehabilitation program was initiated, combining nutritional and metabolic stabilization, pharmacological therapy, intensive physical and occupational rehabilitation, orthotic support, and psychological counselling. Differential diagnoses, including Guillain–Barré syndrome, multiple sclerosis, diabetic and toxic neuropathies, were excluded, supporting the diagnosis of nutritional axonal sensorimotor polyneuropathy secondary to bariatric surgery complications.

Outcomes:
During hospitalization, gradual motor and functional improvement was observed, with partial recovery of ambulation and activities of daily living, though residual left lower limb deficits persisted.

Conclusions:
This case highlights a rare but severe neurological complication of bariatric surgery and underscores the importance of early recognition, nutritional surveillance, and interdisciplinary rehabilitation to optimize functional outcomes and prevent irreversible disability.
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P1413

ROSAH SYNDROME DUE TO A RARE P.TYR254CYS VARIANT IN THE ALPK1 GENE: ATYPICAL PRESENTATION WITH EROSIVE ARTHRITIS AND UVEITIS IN THE ABSENCE OF SPLENOMEGALY

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Objective: ROSAH syndrome (Retinal dystrophy, Optic nerve edema, Splenomegaly, Anhidrosis, Headache) is an autosomal dominant autoinflammatory disorder caused by heterozygous pathogenic variants in the *ALPK1* gene. Typical manifestations include ocular involvement (retinal dystrophy, optic disc edema), splenomegaly, anhidrosis, and headache. However, the phenotypic spectrum may be broader, encompassing arthritis, fever, and elevated acute-phase reactants. The p.Thr237Met variant is the most frequently reported. We present a case with the rare p.Tyr254Cys variant and an atypical phenotype.
Material and Methods: A male patient was observed from birth due to congenital ichthyosis and cheek erythema. At 4 months of age, painless swelling of the wrist and knee joints was noted. By 1 year of age, flexion contractures of the fingers, multiple caries, recurrent fever episodes, and anhidrosis had developed. At 3 years, he was hospitalized at a pediatric rheumatology department for evaluation. The workup included: clinical examination, radiography and MRI of the joints, laboratory tests (rheumatoid factor, anti-CCP, ANA, HLA-B27, CRP), and ophthalmological examination. Whole-exome sequencing was performed, with Sanger sequencing confirmation.
Results: Examination at age 3 revealed severe deformities and limited range of motion in the wrist joints (swan-neck deformity). Chronic erosive arthritis of the hand and foot joints was verified instrumentally. Rheumatic serology was negative, and CRP was normal. Ophthalmological examination diagnosed acute bilateral anterior uveitis. Splenomegaly and cytopenia were absent. Based on the atypical course (early onset, erosive arthritis without pain or systemic inflammation, ichthyosis, anhidrosis), a monogenic disorder was suspected. Genetic analysis identified a heterozygous c.761A>G (p.Tyr254Cys) mutation in the *ALPK1* gene. The mutation was not found in the parents (de novo). The diagnosis of ROSAH syndrome was established despite the absence of key features (splenomegaly, cytopenia). Due to active polyarthritis, therapy with the JAK inhibitor tofacitinib (0.2 mg/kg/day) was initiated. Uveitis was controlled with topical corticosteroids, which were subsequently discontinued. After 6 months of tofacitinib therapy, positive dynamics were observed: no uveitis flares, reduced arthritis activity, and slowed progression of joint deformities.
Conclusions: This case expands the phenotypic spectrum of ROSAH syndrome, demonstrating a presentation with isolated arthritis mimicking JIA and uveitis, lacking classical signs (splenomegaly, cytopenia). The presence of congenital ichthyosis and anhidrosis should raise suspicion for autoinflammatory syndromes. The use of tofacitinib showed preliminary efficacy in controlling articular and ocular manifestations, warranting further investigation in larger studies. ROSAH syndrome should be included in the differential diagnosis of atypical juvenile arthritis, especially when combined with skin and eye involvement.

P1414

FEATURES OF THE HYPOTHALAMIC-PITUITARY-GONADAL AXIS IN WOMEN OF REPRODUCTIVE AGE WITH SYSTEMIC LUPUS ERYTHEMATOSUS AT EARLY AND ADVANCED DISEASE STAGES

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Objective: Systemic lupus erythematosus (SLE) exhibits a marked sexual dimorphism, with a predominance of incidence among women of reproductive age, indicating a significant role of sex hormones in its pathogenesis. According to current data, estrogens and prolactin can modulate the immune response, potentiating humoral reactions and the survival of autoreactive lymphocytes, while androgens often possess immunosuppressive properties. Investigating the state of the hypothalamic-pituitary-gonadal (HPG) axis at different stages of SLE remains relevant for understanding the mechanisms of disease onset and progression, as well as for developing personalized therapeutic strategies.
Material and Methods: The study included 64 women of reproductive age diagnosed with SLE according to the SLICC 2012 classification criteria. Patients were divided into two groups: Group 1 (n=32) – with early-stage SLE (disease duration ≤ 6 months, no prior glucocorticoid or cytostatic therapy); Group 2 (n=32) – with advanced-stage SLE (disease duration ≥ 2 years, receiving standard immunosuppressive therapy). The control group consisted of 24 healthy women of comparable age. Disease activity was assessed using the SLEDAI-2K index. On days 5–8 of the menstrual cycle, serum levels of luteinizing hormone (LH), follicle-stimulating hormone (FSH), prolactin, estradiol, and total testosterone were determined by enzyme-linked immunosorbent assay. Statistical analysis was performed using Student's t-test and Pearson's correlation analysis (data presented as M ± SD, $p < 0.05$ considered significant).
Results:

Hormonal Status: Patients in Group 1 showed a significant increase in estradiol (119.95 ± 48.80 pg/ml vs. 55.43 ± 13.16 pg/ml in controls, $p<0.001$) and prolactin levels (32.28 ± 21.7 ng/ml vs. 16.20 ± 8.58 ng/ml, $p<0.05$). Testosterone concentration was decreased (0.38 ± 0.09 ng/ml vs. 0.58 ± 0.12 ng/ml, $p<0.05$). In Group 2, levels of estradiol (70.19 ± 31.61 pg/ml) and prolactin (22.20 ± 8.24 ng/ml) remained above control values but were lower than in Group 1. Hypoandrogenemia persisted (0.42 ± 0.11 ng/ml, $p<0.05$). LH and FSH levels did not differ significantly from controls.

Clinical Correlations: A direct correlation was found between disease activity (SLEDAI-2K) and levels of prolactin ($r=0.52$, $p<0.05$) and estradiol ($r=0.47$, $p<0.05$) in Group 1.
Conclusions: Women with SLE at the early disease stage exhibit a pronounced HPG axis imbalance characterized by hyperestrogenemia, hyperprolactinemia, and relative hypoandrogenemia. These changes are most significant at disease onset and are associated with its activity. The

obtained results support the hypothesis of neuroendocrine mechanisms' involvement in SLE immunopathogenesis and justify the feasibility of assessing the hormonal profile as a potential marker of disease activity and prognosis.

P1415

COMPARATIVE ANALYSIS OF CLINICAL AND LABORATORY PROFILES IN WOMEN WITH EARLY AND ESTABLISHED SYSTEMIC LUPUS ERYTHEMATOSUS

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Objective: To conduct a comparative analysis of the spectrum and severity of clinical symptoms and laboratory markers in women with early and established stages of SLE.
Material and Methods: A single-center cross-sectional study included 64 women of reproductive age with SLE (mean age 27.1 ± 8.6 years). The diagnosis was verified according to the 1997 ACR criteria. Patients were divided into 2 groups: Group 1 (n=32) – early stage (disease duration < 6 months, no prior immunosuppressive/glucocorticoid therapy); Group 2 (n=32) – established stage (disease duration ≥ 2 years, receiving standard therapy). Disease activity was assessed using the SLEDAI-2K index. A comprehensive laboratory workup was performed: complete blood count, ESR, CRP, creatinine, total protein, and enzyme-linked immunosorbent assay for antinuclear antibodies (ANA), anti-double-stranded DNA (anti-dsDNA), and anti-Sm antibodies. Statistical analysis employed the Mann-Whitney U test and the χ^2 test.
Results: Patients with early-stage SLE had significantly higher disease activity by SLEDAI-2K (14.5 ± 4.2 vs. 6.8 ± 3.1 in Group 2; p<0.001). This group also showed a significantly higher frequency of fever (69% vs. 28%; p<0.01), lymphadenopathy (53% vs. 16%; p<0.01), and markedly elevated ESR (39.2 ± 11.5 mm/h vs. 24.1 ± 10.8 mm/h; p<0.05). The frequency of arthralgia (75% vs. 58%) and skin manifestations (76% vs. 53%) was higher in Group 1, but the differences did not reach statistical significance (p>0.05). Mild anemia was noted in both groups without a significant difference (hemoglobin 109.4 ± 12.7 g/L vs. 114.2 ± 11.9 g/L; p>0.05). The immunological profile was characterized by a high frequency of ANA (>90% in both groups), anti-dsDNA (74% vs. 71%), and anti-Sm antibodies (42% vs. 38%) with no intergroup differences (p>0.05), indicating their stable diagnostic value regardless of disease stage or therapy.
Conclusions: 1. The early stage of SLE in women is characterized by higher immunoinflammatory activity, manifested by a significantly higher frequency of constitutional symptoms (fever, lymphadenopathy) and an acute-phase laboratory response (ESR). 2. The frequency of specific immunological markers (ANA, anti-dsDNA, anti-Sm) is independent of disease stage, confirming their fundamental role in diagnosis. 3. The obtained data emphasize that the diagnostic algorithm for suspected SLE should be uniform and include comprehensive immunological screening even at early stages, while the reduction of general symptoms under therapy with persistent serological abnormalities requires constant monitoring.

P1416

PATIENT INVOLVEMENT IN DISEASE MANAGEMENT AS A FACTOR IN TREATMENT EFFICACY FOR KNEE OSTEOARTHRITIS

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Objectives: Osteoarthritis (OA) is a prevalent chronic degenerative joint disease leading to pain, functional impairment, and reduced quality of life. Current guidelines emphasize the importance of a comprehensive approach, where the patient's active role (disease self-management) is considered a key component alongside pharmacotherapy. The study aimed to evaluate the impact of a structured patient involvement program in OA management on pain dynamics.
Material and Methods: The study included 44 patients (24 women, 20 men) with radiographically confirmed knee OA (Kellgren-Lawrence grade II) and obesity (BMI 32±3). All patients received standard therapy with diacerein for 30 days. Patients were divided into two groups. The intervention group (n=22) participated in a structured disease management program alongside medication. This program included an educational module on OA pathogenesis and treatment mechanisms, training in medication self-monitoring, dietary counseling for weight control, and a course of supervised physical exercises in the rehabilitation department. The control group (n=22) received only pharmacological treatment. Pain intensity was assessed using a Visual Analogue Scale (VAS, 0-3 points) at baseline and after 30 days. Statistical analysis was performed using Student's t-test in Statistica 11.0; differences were considered significant at p<0.05.
Results: Before treatment, the mean pain VAS scores showed no significant difference between groups (2.89±0.12). After 30 days, a significant reduction in pain intensity to 1.36±0.04 was recorded in the intervention group (p<0.05). A positive trend was also observed in the control group (2.18±0.09), but it did not reach statistical significance (p>0.05). The intergroup difference after treatment was significant (p<0.05).
Conclusions: The obtained data demonstrate that integrating a structured patient involvement program for osteoarthritis management - based on education, lifestyle modification, and physical rehabilitation - combined with standard pharmacotherapy (diacerein) leads to a statistically significant and clinically more pronounced reduction in pain compared to isolated drug therapy. This supports the feasibility of implementing disease self-management strategies into the clinical practice of managing OA patients.

P1417

THE INFLUENCE OF AGE AT DISEASE ONSET ON THE EFFICACY OF ANTI-B-CELL THERAPY IN SYSTEMIC SCLEROSIS: A PROSPECTIVE COHORT STUDY

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Objectives: Late-onset systemic sclerosis (SSc) is often associated with a more severe disease course and poorer prognosis. The impact of age at onset on therapeutic response, particularly to B-cell depletion therapy with rituximab (RTX), remains underexplored. We aimed to assess the dynamics of skin fibrosis, measured by the modified Rodnan Skin Score (mRSS), in response to RTX in SSc patients stratified by age at disease onset.

Material and Methods: In this prospective cohort study, 151 patients with a confirmed SSc diagnosis (according to ACR/EULAR 2013 criteria) were included. Patients were stratified into three groups based on age at onset: Group 1 - <30 years (n=40, 26%), Group 2 - 31-59 years (n=90, 60%), and Group 3 - ≥60 years (n=21, 14%). The mean follow-up period was 13±2.3 months. All patients received RTX (cumulative dose 1.5±0.6 g) along with stable low-dose glucocorticoids (prednisone 11.6±4.8 mg/day); 48% received concomitant immunosuppressants without dose changes during the observation period. Disease activity was assessed using the European Scleroderma Study Group Activity Index (EScSG-AI). Skin involvement was evaluated by mRSS at baseline and follow-up. Statistical analysis employed the Wilcoxon signed-rank test for intra-group dynamics and ANOVA/Kruskal-Wallis test for inter-group comparisons.

Results: The mean patient age was 48±13 years, 83% were female. Diffuse cutaneous SSc was present in 52%. Baseline mRSS and disease activity were significantly higher in Group 3 (p<0.001). A significant reduction in mRSS was observed in all groups: Group 1 – from 10.2±8.0 to 7.7±6.5 (p=0.01); Group 2 – from 9.0±7.2 to 6.2±4.7 (p=0.0001); Group 3 – from 20.5±14.1 to 10.8±9.4 (p=0.001). The absolute reduction in mRSS was greatest in Group 3 (-9.7±5.8 points vs. -2.8±3.2 in G1 and -2.8±4.1 in G2, p<0.01), while the relative reduction was comparable (≈47% in all groups, p=0.85). The EScSG-AI also decreased significantly in all groups (p<0.01 for each), with the most pronounced drop in Group 3 (from 4.2±2.1 to 1.3±1.0).

Conclusions: Anti-B-cell therapy with rituximab led to a significant improvement in skin fibrosis and overall disease activity in systemic sclerosis patients regardless of age at onset. Notably, patients with late-onset disease (≥60 years), despite having more severe skin involvement initially, demonstrated a comparable or even greater absolute response to therapy. Therefore, older age at SSc onset should not be considered a limiting factor for prescribing rituximab.

P1418

EFFICACY OF RITUXIMAB IN SYSTEMIC SCLEROSIS PATIENTS: A COMPARATIVE ANALYSIS BASED ON THE PRESENCE OF ASSOCIATED MYOPATHY

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Objectives: Systemic sclerosis (SSc) is a multysystem disorder where skeletal muscle involvement (scleroderma myopathy) is a poor prognostic marker, associated with more severe disease and significant visceral organ involvement, particularly interstitial lung disease (ILD) and cardiomyopathy. Rituximab (RTX) has shown efficacy in SSc-associated ILD and skin disease, yet data on its effect on the myopathic component are limited.

Material and Methods: A prospective single-center observational study included 151 patients with confirmed SSc (mean age 48±13 years, 83% female). Myopathy was diagnosed based on the presence of proximal muscle weakness (≥3 on the MRC scale) combined with pathological needle electromyography findings and/or elevated creatine phosphokinase (CPK) levels. Patients were divided into two groups: Group 1 (n=22) with myopathy and Group 2 (n=129) without myopathy. All patients received RTX therapy (mean cumulative dose 1.5±0.6 g) in addition to standard care. Assessments were performed at baseline and after 13±2.3 months and included the modified Rodnan skin score (mRSS), pulmonary function tests (FVC and DLCO, % predicted), CRP, CPK levels, and the European Scleroderma Study Group (EScSG) activity index. Statistical analysis employed the Mann-Whitney U test, Wilcoxon signed-rank test, and Spearman's correlation.

Results: Myopathy was detected in 15% of patients. Group 1 patients had a significantly shorter disease duration (3.8 [1.5; 6.0] vs. 6.0 [2.0; 10.0] years, p=0.003), higher mRSS (12.0 [6.0; 18.0] vs. 8.0 [4.0; 14.0], p=0.004), higher EScSG activity index (3.9±1.7 vs. 3.1±1.8, p=0.03), and elevated CRP (9.3 [3.8; 20.6] vs. 5.2 [1.7; 11.5] mg/L, p=0.04) and CPK levels (458 [240; 639] vs. 243 [225; 261] U/L, p<0.001). Baseline FVC did not differ, but DLCO was higher in Group 1 (55.7±16.4% vs. 46.1±20.1%, p=0.0001). Following RTX therapy, Group 1 demonstrated significantly greater improvement: increase in FVC (+4.3% [0.1; 12.2] vs. +2.4% [-1.8; 9.4], p=0.04), decrease in CRP (-3.8 [0.1; 8.9] vs. -0.9 [-1.0; 4.2] mg/L, p=0.01) and activity index (-2.2±1.6 vs. -1.6±1.5 points, p=0.02), as well as a more pronounced reduction in prednisone dose. A strong negative correlation was found between baseline muscle weakness and change in DLCO (r=-0.656; p=0.002).

Discussion: Our data confirm that myopathy in SSc is a marker of more active and aggressive disease. The more pronounced response to RTX in patients with myopathy, particularly regarding lung function and inflammatory markers, may be related to its effect on a common immunopathological mechanism underlying both myopathy and ILD progression. The identified correlation suggests that assessment of the muscular component may be relevant for predicting pulmonary response to therapy. A limitation of the study is the relatively short follow-up period.

Conclusions: SSc-associated myopathy (15% in our cohort) is

characterized by higher overall inflammatory and skin activity. Patients with myopathy demonstrate a significantly better response to rituximab therapy across multiple parameters (FVC, inflammatory markers, disease activity) compared to patients without myopathy. The presence of myopathy may serve as a predictor of a more pronounced positive effect of rituximab on lung function, warranting further investigation in randomized controlled trials.

P1419

CLINICAL AND GENETIC PREDICTORS OF TREATMENT FAILURE IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Objective: Despite advances in therapy with biologic (bDMARDs) and targeted synthetic disease-modifying antirheumatic drugs (tsDMARDs), a significant proportion of patients with rheumatoid arthritis (RA) do not achieve low disease activity or remission. Primary and secondary treatment failures necessitate switching between these agents. However, reliable predictors of response to a subsequent line of targeted therapy remain largely unidentified, leading to a "trial-and-error" approach.
Material and Methods: The study included 174 patients (86.6% female, mean age 46.9±13.9 years) with established RA and moderate/high disease activity (DAS28-CRP 5.4±0.9) despite current bDMARD/tsDMARD therapy. All patients were switched to a drug with a different mechanism of action: TNF inhibitors (17.8%), IL-6 inhibitors (25%), rituximab (45.6%), abatacept (1.1%), JAK inhibitors (10.6%). Clinical response was assessed after 6 months using DAS28-CRP. Responders (n=75) were defined as achieving remission or low disease activity (DAS28-CRP ≤3.2), while non-responders (n=71) did not. Thirty-four patients discontinued the study. For the 146 patients who completed the 6-month follow-up, genotyping of 10 single nucleotide polymorphisms (SNPs) was performed using real-time PCR: IL6 (rs1800795), IL6R (rs2228145), TNFAIP3 (rs10499194, rs6920220), TNFα (rs1800629), CTLA4 (rs231775), TNFSF13B (BAFF) (rs9514828), KCNS1 (rs734784), IL10 (rs1800872), STAT4 (rs7574865). SNP selection was based on prior evidence of association with RA pathogenesis or treatment response. Hardy-Weinberg equilibrium was assessed. Baseline clinical, immunological, and genetic parameters were compared between groups using comparative, correlational, and binary logistic regression analysis (intention-to-treat principle applied).
Results: Multivariate logistic regression identified independent predictors of treatment failure after switching.
Factors increasing the risk of failure:
* Overweight/obesity (BMI ≥25 kg/m²): OR=2.4, 95% CI 1.0–5.7, p=0.048.
* Higher baseline pain VAS (per 1 mm increase): OR=1.04, 95% CI 1.00–1.08, p=0.042.
* Higher tender joint count (per joint): OR=1.12, 95% CI 1.04–1.21, p=0.004.
* Higher PainDetect questionnaire score (neuropathic pain component): OR=1.07, 95% CI 1.01–1.13, p=0.032.
* Concomitant glucocorticoid use at baseline: OR=2.75, 95% CI 1.20–6.30, p=0.017.
* IL10 rs1800872 AA genotype: OR=12.81, 95% CI 1.25–131.73, p=0.031.
Factors associated with a lower risk of failure (protective):
* Seropositivity for rheumatoid factor: OR=0.33, 95% CI 0.11–0.96, p=0.043.
* Presence of rheumatoid nodules: OR=0.34, 95% CI 0.12–0.94, p=0.038.
* TNFSF13B (BAFF) rs9514828 T allele: OR=0.27, 95% CI 0.11–0.67, p=0.005.
* KCNS1 rs734784 G allele: OR=0.41, 95% CI 0.17–0.97, p=0.044.
Conclusions: This study reveals that the likelihood of a second-line bDMARD/tsDMARD failure is influenced by a combination of heterogeneous factors. Alongside known clinical factors (BMI, GC use, pain severity), the presence of a neuropathic pain component and specific genetic polymorphisms (IL10, BAFF, KCNS1) are significant independent predictors. The strong protective association of seropositivity and rheumatoid nodules warrants further investigation. These findings highlight the potential for developing a predictive model to guide personalized treatment selection after an initial targeted therapy failure in RA.

P1420

THE EFFECT OF TOCILIZUMAB ON CARDIOVASCULAR PARAMETERS IN SYSTEMIC SCLEROSIS PATIENTS WITH DIFFERENT DISEASE COURSE VARIANTS

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Objectives: To study the impact of the inhibition of the IL-6 signaling pathway with the monoclonal antibody tocilizumab on the cardiovascular profile in SSc patients, with the effect potentially varying depending on disease activity (course variant).
Material and Methods: A prospective observational study included 79 SSc patients (mean age 38.5±7.8 years, 92.4% female, disease duration 6.2±3.8 years). All patients, alongside standard therapy, received tocilizumab (8 mg/kg IV every 4 weeks) based on indications (active disease refractory to standard treatment). A comprehensive assessment was performed at baseline and after 6 months: disease activity index (EDAI), levels of C-reactive protein (CRP) and IL-6, echocardiography (EchoCG) with assessment of systolic (left ventricular ejection fraction – LVEF) and diastolic (E/A, e') function, end-systolic and end-diastolic volumes (ESV, EDV), left ventricular mass (LVM), as well as 24-hour ECG and BP monitoring. Statistical analysis used the paired Student's t-test and χ^2 test; data are presented as M±SD; differences were considered significant at $p<0.05$.
Results: After 6 months of therapy, a significant reduction in SSc activity (EDAI) and inflammatory markers was observed: CRP in 60 patients (75.9%, $p<0.01$), IL-6 in 57 (72.2%, $p<0.01$). BP stabilization was achieved in 55 patients (69.6%). EchoCG in the total group showed: a significant 8.3% decrease in LV ESV (from 72.4±5.1 ml to 66.4±4.7 ml; $p<0.05$) and a 6.5% decrease in LV EDV (from 138.7±7.2 ml to 129.7±6.8 ml; $p<0.05$). The increase in LVM in the tocilizumab group was only 3.2% (from 143.5±10.4 g to 148.0±9.7 g), which was significantly less than in a historical control group (standard therapy, +9.7%; $p<0.05$). LVEF significantly increased by 6.0% (from 51.5±4.2% to 54.6±3.8%; $p<0.01$). Positive dynamics on Holter monitoring (reduction in ventricular extrasystoles and episodes

of silent ischemia) were registered in 46 patients (58.2%). The most pronounced comprehensive clinical and instrumental response was noted in the subacute course group: improvement was recorded in 24 of 28 patients (85.7%).
Conclusions: The addition of tocilizumab to standard SSc therapy is associated with reduced inflammatory activity, positive cardiac remodeling (decreased LV volumes, slowed progression of myocardial hypertrophy), and improved systolic function. Positive dynamics regarding BP stabilization and reduced arrhythmia frequency were observed. The greatest therapeutic efficacy was demonstrated in patients with the subacute variant of SSc, likely due to a more pronounced inflammatory component in the pathogenesis at this stage.

P1421

PREVALENCE OF FIBROMYALGIA IN PATIENTS WITH PSORIATIC ARTHRITIS AND ITS IMPACT ON DISEASE ACTIVITY AND PATIENT-REPORTED OUTCOMES

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Objectives: The prevalence of fibromyalgia (FM) in psoriatic arthritis (PsA) cohorts, according to contemporary research, ranges from 17.2% to 53.3%, significantly exceeding population levels. The presence of FM in PsA patients is associated with a more severe subjective disease burden, which can complicate the assessment of objective inflammatory activity. Established risk factors for developing or exacerbating FM symptoms in these patients include female sex, older age, high PsA activity, presence of enthesitis, as well as comorbid anxiety disorders and impaired quality of life (QoL). Importantly, a substantial proportion of patients with PsA and FM (reported up to 28.5%) show a lower response to standard therapy, necessitating special consideration in treatment strategy.
Material and Methods: A single-center cross-sectional study included 114 consecutive patients with a verified PsA diagnosis according to the CASPAR criteria (2006). The cohort comprised 58 male (50.9%) and 56 female (49.1%). PsA activity was evaluated using DAPSA, ASDAS-CRP, and BASDAI indices, while functional capacity was assessed using the BASFI index. Patient-reported outcomes (PROs) were collected using the Visual Analogue Scale (VAS) for pain, VAS for disease activity, PsAID-12, FACIT-F (fatigue), and HADS (anxiety and depression) questionnaires. FM was screened using the validated Fibromyalgia Rapid Screening Tool (FiRST). Patients providing 5 or 6 positive answers on FiRST were allocated to the PsA+FM group (n=19, 16.7%), others to the PsA without FM group (n=95, 83.3%). The groups were comparable in age (median 46 [38;55] years) and PsA duration (median 36 [12;96] months). Statistical analysis utilized the χ^2 test for qualitative variables and the Mann-Whitney U test for quantitative variables, presented as median with interquartile range [Q25; Q75] or mean ± standard deviation (M±SD). The significance level was set at $p < 0.05$.
Results: FM was diagnosed significantly more often in women (13.2% of the cohort) than in men (3.3%, p=0.002). The PsA+FM group had a statistically significantly higher number of tender joints compared to the PsA without FM group (p=0.01). However, the number of swollen joints (p=0.05) and enthesitis sites (p=0.26) did not differ significantly. PROs were significantly worse in the PsA+FM group: pain VAS (68.8±12.1 mm vs. 54.2±20.9 mm, p=0.007), disease activity by BASDAI (6.68±1.39 vs. 5.50±2.0, p=0.02), functional impairment by BASFI (6.02±1.96 vs. 3.71±2.62, p=0.0006), fatigue level by FACIT-F (23.5±7.71 vs. 30.2±9.78, p=0.02), and disease impact on QoL by PsAID-12 (6.38±1.5 vs. 4.18±2.33, p=0.007). Anxiety levels (HADS) were higher in the PsA+FM group (10.6±2.91 vs. 6.22±3.51, p=0.00001), while depression scores, although higher in the FM group, also showed a statistically significant difference (p=0.005).
Conclusions: The study confirms that patients with PsA and comorbid FM, despite comparable objective inflammatory activity (number of swollen joints, enthesitis), experience a significantly more severe subjective disease burden. This manifests as greater pain intensity, higher patient-reported disease activity (BASDAI), pronounced functional impairment (BASFI), increased fatigue, reduced QoL (PsAID-12), and higher anxiety levels. Identifying FM in PsA patients is clinically crucial, as it necessitates a comprehensive treatment approach addressing both inflammatory and central (nociplastic) pain components.

P1422

EVALUATION OF THE EFFICACY OF LOCAL INJECTION THERAPY FOR THE CONTRALATERAL KNEE JOINT AFTER UNILATERAL TOTAL KNEE ARTHROPLASTY

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Objectives: Patients after unilateral total knee arthroplasty (TKA) experience increased biomechanical load on the contralateral knee, which can exacerbate pre-existing osteoarthritis (OA) symptoms. Effective management of pain and function in the non-operated knee is crucial for patient rehabilitation and quality of life.
Material and Methods: A prospective, single-center, randomized controlled study included 88 patients with bilateral post-traumatic knee OA (Kellgren-Lawrence grade III) after unilateral TKA. Patients were comparable in age, sex, and comorbidities. They were randomized into three groups (n=30 each): Group 1 received a single 3 ml injection of HA+CS into the contralateral knee; Group 2 received a single 6 ml injection of HA+CS; Control Group received no injection therapy. Pain intensity was assessed using a Visual Analog Scale (VAS) at rest and during movement at 3 and 6 months post-TKA. The monthly consumption of lornoxicam tablets (NSAID) was recorded.
Results: At the 3-month follow-up, VAS pain scores in the non-operated knee were significantly lower in Groups 1 and 2 compared to the Control Group ($p<0.05$). At 6 months, a more substantial and statistically significant reduction in pain was observed only in Group 2 compared to both its 3-month score and the other groups ($p\leq0.01$). NSAID consumption significantly decreased from 8.93±3.27 to 6.13±3.19 tablets/month between 3 and 6 months in Group 2 ($p\leq0.01$). In Group 1, consumption remained higher (11.1±3.44 to 9.9±3.44 tablets/month, $p>0.05$). The Control Group maintained the highest consumption level (>14 tablets/month) throughout the period, correlating with significantly

higher pain scores (p≤0.01 vs. intervention groups).
Conclusion: A single 6 ml intra-articular injection of a combined hyaluronic acid and chondroitin sulfate preparation into the contralateral knee joint after unilateral TKA provides effective pain relief and significantly reduces the need for NSAIDs over a 6-month period, demonstrating its utility as an adjunct therapy in postoperative rehabilitation.

P1423

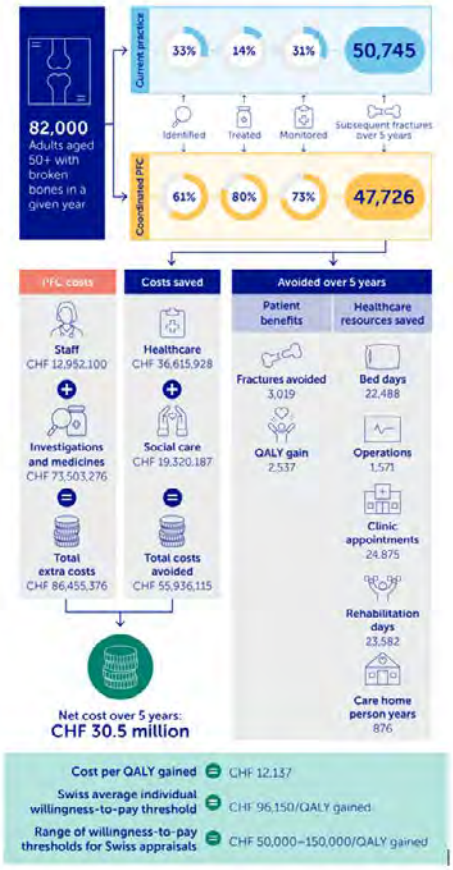
EVALUATING THE CLINICAL AND ECONOMIC IMPACT OF COORDINATED POST-FRACTURE CARE IN OSTEOPOROSIS MANAGEMENT IN SWITZERLAND

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Objective(s): Despite osteoporotic fractures accounting for 4.5% of Swiss healthcare spending, an estimated 684,000 women in Switzerland remain untreated, highlighting a substantial care gap.[1] Coordinated post-fracture care (PFC) is designed to identify, treat and monitor patients with fragility fractures, to reduce the risk of re-fracture. We sought to assess the cost-effectiveness of implementing PFC in Switzerland.
Materials and Methods: An established state-based microsimulation model was used to estimate the impact of PFC compared with current practice over 5 years, for people aged 50 years or older with a fragility fracture.[2] Model input parameters, including estimated PFC efficiency and fracture costs, were sourced from published literature, Swiss insurer data, the Swiss Osteoporosis Registry, extrapolated Dutch data, and Swiss expert elicitation. Outcomes estimated included number of re-fractures, hospital admissions, operations, bed days, clinical appointments, rehabilitation needs, care home admissions, costs averted and associated costs of PFC. Indirect costs were not included. The model predicted fractures avoided, quality-adjusted life years (QALYs) gained, and net economic outcomes over 5 years.
Results: Compared with current practice, PFC was associated with avoidance of 3,019 fractures, 1,571 operations and 22,488 bed days over 5 years (**Figure**). Costs saved over 5 years totalled CHF 55,936,115, including CHF 36,615,928 in healthcare and CHF 19,320,187 in social care. A net cost of CHF 30.5 million was estimated for PFC implementation, resulting in 2,537 QALYs gained and an incremental cost-effectiveness ratio of CHF 12,137/QALY. Thus, PFC was likely costeffective at an average Swiss willingness-to-pay threshold of ~CHF 96,150/QALY.[3]
Conclusions: PFC was likely cost-effective compared with current practice over 5 years in Switzerland using a microsimulation model. The results demonstrate the value of PFC in closing the osteoporosis care gap for patients at very high risk of fracture, supporting policy and clinical decisions.

Figure. Expected overall impact of PFC implementation in Switzerland over 5 years



CHF: Swiss Franc; PFC: coordinated post-fracture care; QALY: quality-adjusted life year.

References:1. Kanis JA. Arch Osteoporos 2021;16:82. **2.** Pinedo-Villanueva R. J Bone Min Res 2023;38:499–511. **3.** Fischer B. Soc Sci & Med 2023;326:115909.
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JEG: None to declare.
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RPV: Received funding from UCB to conduct research in osteoporosis.

P1424

ADULTS WITH XLH WHO LOOK AFTER RELATIVES WITH XLH: QUALITY OF LIFE PROFILES FROM THE RUDY STUDY

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Objective

To identify distinct groups of adults living with XLH, who act as carers of relatives with XLH, based on their quality of life.

Methods

Adults with XLH reporting to act as carers of relatives with XLH who completed the CarGOQol carer quality of life questionnaire as participants in the Rare and Diagnosed Study (RUDY) were included. Self-reported patient-level data were extracted in October of 2025. The CarGOQol consists of 29 questions covering 10 domains: Psychological well-being, Burden, Relationship with health care, Administration and finances, Coping, Physical well-being, Self-Esteem, Leisure, Social support, and Private Life. Latent profile analysis was conducted to identify unobserved groups of carers based on the 10 unweighted CarGOQol domain scores. Different numbers of profiles were tested and the solution with the lowest BIC/AIC was selected. Model fit was assessed by interpretability and mean posterior probabilities with >0.79 indicating good separation.

Results

Currently, 13 participants from various regions in the UK met the inclusion criteria, mean age 42.5 years and 85% female. They looked after one to three people with XLH (mean 1.5), either children only (46.2%), adult only (46.2%), or a mix (1/13).

One to four possible profiles were tested and a three-profile solution was selected based on BIC/AIC and interpretability (Figure 1). Class sizes (11, 1, 1) were unsatisfactory though likely due to reduced sample size. Profiles: (1) Average QoL domains; (2) Very good QoL, poor relationship with the health care system; (3) Mixed levels of QoL across domains, good relationship with the health care system, self-esteem and social support but poor psychological and physical wellbeing, coping and private life. Mean posterior probabilities indicate good class separation for profile 1 (0.85) but poor for profiles 2 and 3 (0.08 each).

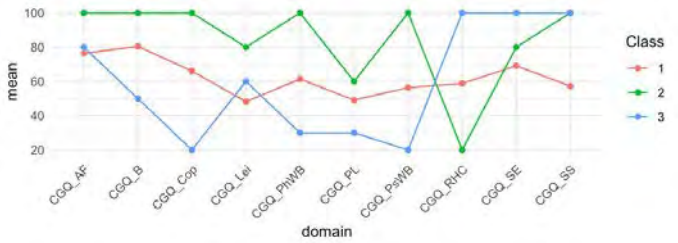
Conclusions

There are distinct hidden groups within people with XLH who care after relatives with XLH. Future analysis with larger sample size is needed. Understanding carer profile characteristics can help support care givers and the relatives they care for.

Acknowledgment

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Figure 1: XLH carer profiles



P1425

DYSLIPIDEMIA IN SYNOVIAL FLUID STRONGLY ASSOCIATED WITH SYNOVITIS AND CARTILAGE DEGRADATION IN OSTEOARTHRITIS

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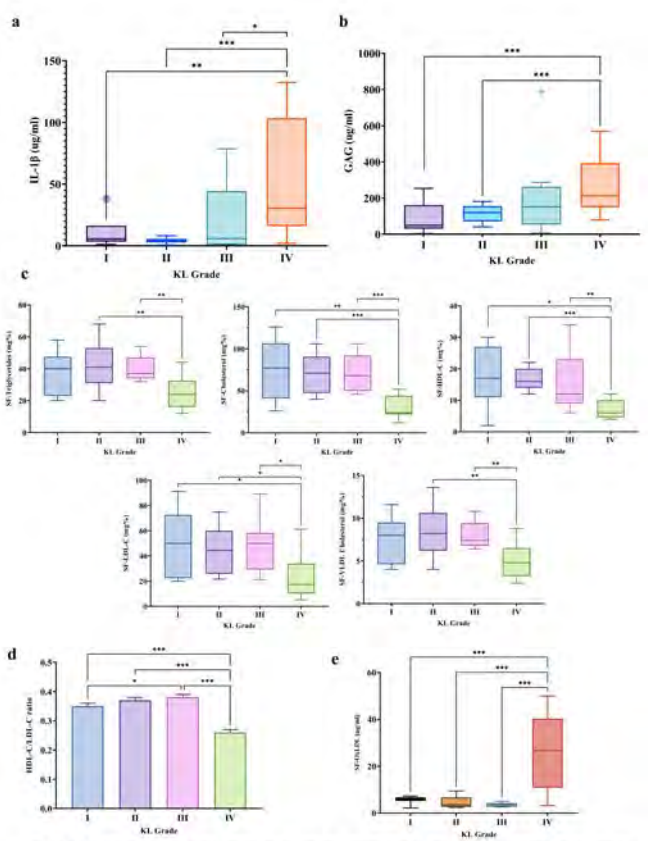


Figure 1a, 1b: IL-1β and GAG levels in SF (µg/ml) respectively, **1c**: Lipid parameters in SF (mg%). Grade-wise statistical significance was performed using One-way ANOVA followed by Kruskal-Wallis and Mann–Whitney U test. **1d**: HDL-C/LDL-C ratio in SF. **1e:** OxLDL level in SF (ng/ml) and statistical significance was performed using One-way ANOVA followed by Bonferroni test, p<0.05 was considered significant.

Table 1. Grade-wise proteome analysis of OA-SF. Fold Change is calculated as per the Grade-I proteome

Protein names	Gene	logFC(G2-G1)	logFC(G3-G1)	logFC(G4-G1)
Apolipoprotein A-I	APOA1	0.235998905	-0.038540154	-0.17359113
Apolipoprotein A-II	APOA2	-0.048126232	-0.579794976	-0.743498618
Apolipoprotein A-IV	APOA4	0.831296461	-0.286641043	0.083927264
Apolipoprotein B receptor	APOBR	0	37.29584004	0
Apolipoprotein B-100	APOB	0.104612865	-0.275793415	-0.666323212
Apolipoprotein C-I (Fragment)	APOC1	-0.034858854	-0.434730881	-1.040275219
Apolipoprotein C-II	APOC2	-0.139930592	-1.311187789	-0.836950653
Apolipoprotein C-III	APOC3	0.256149917	-0.121334937	0.731170317
Apolipoprotein C-IV	APOC4	-0.024724687	-0.583779248	-0.685952409
Apolipoprotein D	APOD	0.443864143	-0.686166036	-1.116237443
Apolipoprotein E	APOE	0.266488924	-0.461534573	-1.314596576
Apolipoprotein F	APOF	-0.002791864	-1.027326	-1.755457214
Apolipoprotein L1	APOL1	0.117447375	0.054528416	-0.255513996
Apolipoprotein(a)	LPA	42.64854122	40.51738935	41.92211162
Cholesteryl ester transfer protein	CETP	1.106360811	-2.125489192	0.442033727
Fatty acid-binding protein 5	FABP5	3.521737311	-34.70651002	0.769872091
Isoform 2 of Apolipoprotein M	APOM	-0.747286764	-0.397471003	-1.209100871
Lipopolysaccharide-binding protein	LBP1	-0.215286466	0.083045133	-0.210217232
Neutrophil gelatinase-associated lipocalin	NGAL	0	41.65534699	40.07221613
Phosphatidylcholine-sterol acyltransferase	LCAT	0.17285029	-1.414521118	-0.66149181
Phosphatidylinositol-glycan-specific phospholipase D	GPLD1	-0.101491139	-1.103149299	-1.246674821
Phospholipase A2	PLA2G2A	2.003637323	2.129905432	0.998775134
Phospholipase B-like 1	PLBD1	0	33.993446	36.15762321
Phospholipid transfer protein	PLTP	0.529233967	-0.071410797	0.148116526
Polyunsaturated fatty acid 5-lipoxygenase	ALOX5	0	38.4070487	34.90340397
Prolow-density lipoprotein receptor-related protein 1	LRP1	-0.466796548	-1.926998744	-0.876862898
Prosaposin	PSAP	0.086014107	0.829081891	-0.666259364

Objectives: Dyslipidemia is characterized by an abnormal lipid profile, including hypercholesterolemia and hypertriglyceridemia. Oxidized LDL (Ox-LDL), play a key role in joint inflammation and cartilage degeneration. Although serum lipids are routinely investigated, similar studies on synovial fluid (SF) are limited. As a dynamic interface among various tissues within the knee joint, the lipid profiling of SF is a promising approach to track dynamic changes in lipid signatures, including OxLDL, during OA progression.

Material and Methods: Lipid analysis of 34 SF samples from patients with OA across the Kellgren–Lawrence (KL) grades was performed using an automated enzymatic analysis. Ox-LDL levels in SF were measured using a commercial ELISA kit. Synovitis and cartilage damage were assessed by estimation of Interleukin-1β (IL-1β) and glycosaminoglycan (GAG) levels respectively in SF samples. This data was compared with the proteomic data available from our previous study.

Results: IL-1β levels increased with OA severity, except for a non-specific significant decline in KL grade-II SF samples, whereas GAG levels showed a constant grade-wise increase. Significantly higher levels of triglycerides, total cholesterol, LDL, and VLDL were noted in all SF samples but declined gradually with advanced OA grades. The HDL/LDL ratio showed significant decline with increasing KL grade, particularly in advanced OA. Ox-LDL levels increased progressively with OA severity and were significantly elevated in grade-IV **(Figure 1a, b, c, d, e)**. Proteome analysis revealed upregulation of LPA and down-regulation in apolipoproteins (APOB-100, APOA1, APOA2, APOA4, APOC4, and APOE) in advanced OA grades **(Table 1)**.

Conclusions: This is the first report on grade-wise lipid profile analysis in OA-SF. Elevated triglycerides, total cholesterol, LDL, and VLDL levels in SF confirm lipid infiltration and oxidative stress, with notable elevation of Ox-LDL in advanced OA. SF triglycerides and total cholesterol levels parallelly increased with IL-1β levels across the grade, supporting an association between lipid dysregulation and chronic synovial inflammation. IL-1β levels are positively correlated with glycosaminoglycan (GAG) release and KL grade, linking lipid dysregulation with cartilage degradation. A declined HDL/LDL ratio indicates a shift toward pro-inflammatory lipid milieu within the SF reflects impaired lipid homeostasis, favoring LDL dominance and oxidative modification. Further, this data aligns with downregulation of APO-lipoproteins, that are major carriers of triglycerides, total cholesterol and their derivatives. Altogether, these findings highlights changes in lipid imbalance and Ox-LDL as key contributors to OA associated inflammation and cartilage damage.

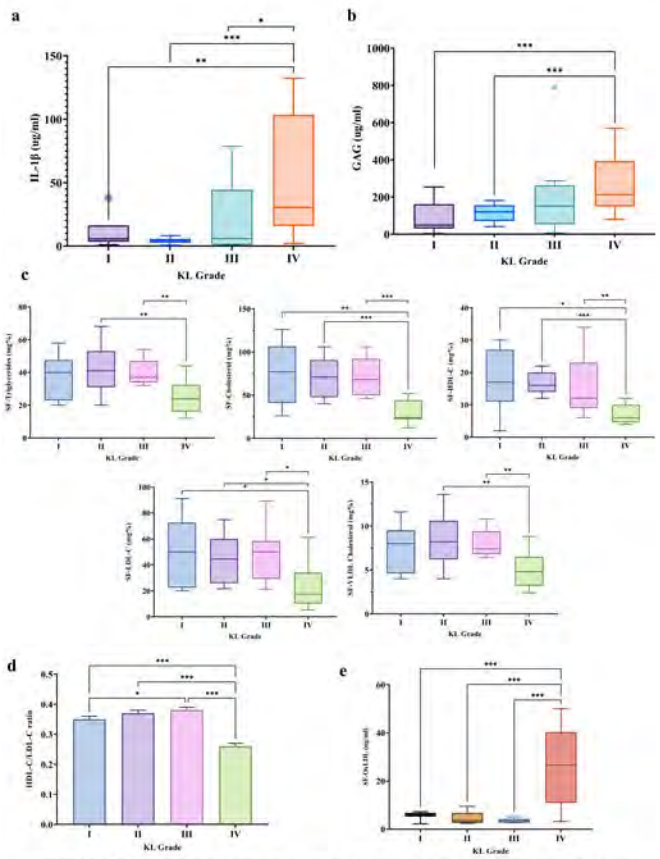


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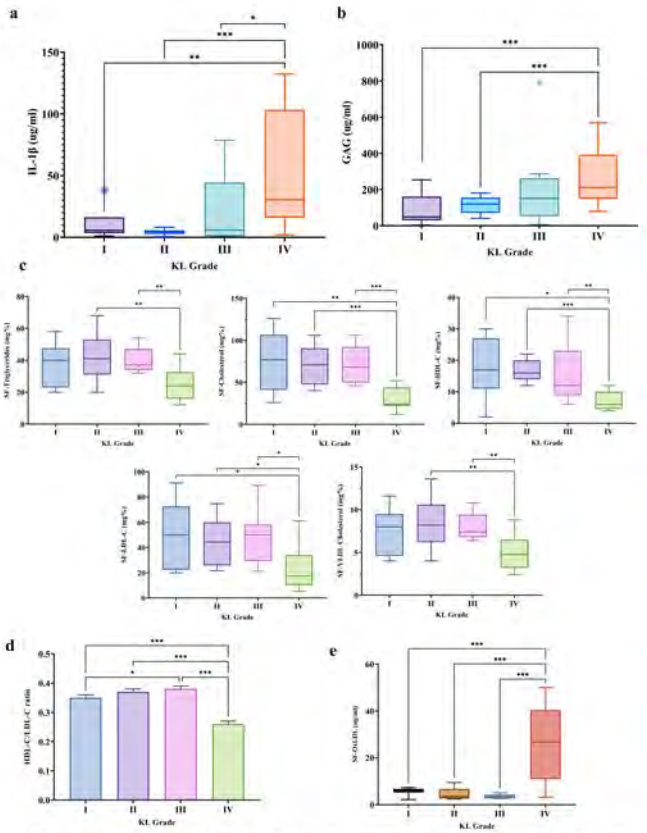


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P1426

SYNOVIAL FLUID-CELL TRANSCRIPTOME ACROSS THE KL-GRADES IN KNEE OSTEOARTHRITIS REVEALED ALTERED LIPID METABOLIC NETWORK AND ACTIVATION SIGNATURE OF IMMUNE CELLS

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Objective

We have shown that synovial fluid (SF) serves as a niche for differentiation of immune cells like monocytes and haematopoietic stem cells into effector cells. SF is known to contain several types of cells including macrophages, neutrophils and mast cells (MCs) which drive inflammation and disease progression. We have performed transcriptomic analysis of osteoarthritis (OA) SF-cells across the grades and correlate transcript abundance with OA severity. This would provide us with a comprehensive understanding of molecular mechanism and diversity of immune cells in OA.

Materials and Methods

The SF samples were collected from clinically and radiographically confirmed OA (age group – 40 to 75 years, ethnicity – Indian Asian, exclusion – rheumatic, gouty and infective arthritis), with severity graded by the Kellgren–Lawrence (KL) scale. A subset of SF samples (n = 20; 5 × 4 grades) was used for grade-wise transcriptomic analysis. Total RNA was extracted and purified by phenol–chloroform extraction followed by TapeStation. rRNA depleted samples were used for strand-specific library preparation using the KAPA RNA HyperPrep Kit. Final libraries were purified, quantified, pooled, and sequenced on a NovaSeq X Plus (150 bp paired end; ~40 million reads/sample). FASTQ files were processed and aligned using Strand NGS v4.1. Differential gene expression was analysed using Strand NGS, with KL grade-I as the control.

Results

Transcriptomic profiling of SF across KL grades revealed extensive molecular alterations involving lipid metabolism, apolipoprotein signaling, and MCs associated pathways. Multiple apolipoproteins (ApoA-I, ApoC-III, ApoA-IV, ApoM, PLTP, FABP5, etc.) were differentially expressed, highlighting dysfunctional lipoprotein remodelling involving significant alterations in lipid and fatty acid transport, handling indicating a progressive shift toward a dyslipidemic and inflammatory microenvironment. Importantly, MCs associated genes including FCER1A (high-affinity IgE receptor α-chain) and c-KIT (MCs survival and maturation receptor) were consistently upregulated. This suggest a close link between MCs activation within SF-dyslipidaemia in shaping the inflammatory landscape reflecting a metabolically stressed and immunologically active synovial milieu in OA progression.

Conclusion

This study demonstrates that OA severity is marked by progressive alterations in SF lipid pathways, apolipoprotein networks, and MCs related transcriptional signatures. Our grade-wise SF analysis reveals that OA progression is accompanied by dysregulation of apolipoproteins, lipid handling pathways, and MCs associated genes. Upregulation of FCER1A and c-KIT, together with a dyslipidemic SF profile, suggests that MCs activation and abnormal lipid remodeling are integral to the inflammatory progression of OA.

P1427

REAL-WORLD TREATMENT DURATION WITH ROMOSOZUMAB IN CONTEXT OF OTHER OSTEOANABOLIC/ANTIRESORPTIVE TREATMENTS - DATA FROM GERMAN CLAIMS DATABASE

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Objective

We analyzed treatment duration by estimating the time to discontinuation of romosozumab (ROMO), abaloparatide (ABALO), teriparatide (TERI) and alendronate (ALN), including subgroup analyses with ROMO treated patients by prior osteoporosis treatment and co-medications.

Materials and Methods

This retrospective study used a German claims database of 64 million insured individuals. It included women newly initiated on ROMO, ABALO, TERI or ALN (Jan 2022–Oct 2025) with ≥12 months pre-index data; combination therapy was excluded. Time until 25%, 50%, and 75% of patients discontinued treatment was estimated via Kaplan–Meier method. Discontinuation was defined as no refill within package duration plus 60 days grace period; ongoing treatments were censored at database end.

Results

A total of 10,651 female patients treated with ROMO (mean age 73.7 ± SD 9.4 years), 895 with ABALO (74.0±9.2 years), 9,171 with TERI (72.5±12.6 years) and 250,510 with ALN (75.1±9.4 years) were included.

Median time to discontinuation for each drug – when 50% of the cohort have stopped the medication (25%; 75%) – were: ROMO 12.1 (6.8; 12.8), ABALO 11.0 (3.1; 17.9), TPTD 12.4 (3.5; 23.6) and ALN 4.8 (2.8; 15.2) months (see figure), respectively.

Among ROMO treated patients there was no difference in the discontinuation rate with respect to 50% and 75% threshold between patients pretreated with bisphosphonates (BP) and those without osteoporosis pre-treatment (see table). However, 25% of BP pre-treated patients discontinued ROMO after 10.1 months compared to 5.5 months among patients without pre-treatment (see table).

In subgroup analyses based on the number of concomitant medications, 25% of patients with 0-1 co-medication discontinued ROMO after 2.0 months. For patients with 2-3, 4-5, or 6+ co-medications, the corresponding durations were 4.7, 8.4, and 11.0 months, respectively. However, there was no difference regarding the type of co-medication (Tab. 1).

Conclusion

This real-world evidence shows that most patients completed the full recommended treatment duration (12 months) for ROMO, while the real-world treatment duration with ALN, ABALO and TERI are all shorter than recommended, which is consistent with known adherence issues in osteoporosis.

Figure: Persistence in patients treated with ROMO, ABALO, TERI or ALN

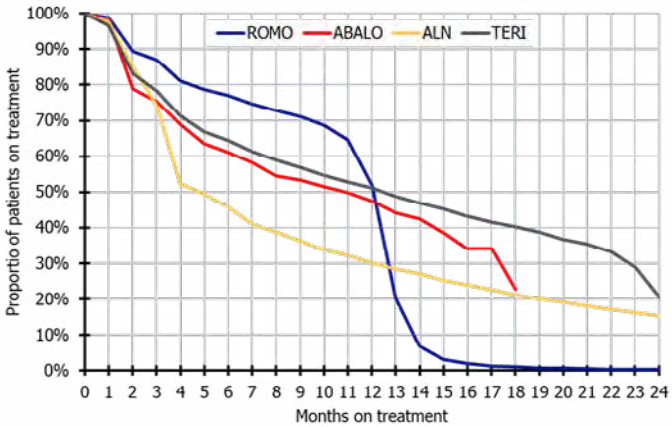


Table: Time in months until 25%, 50% and 75% of romosozumab treated patients discontinued treatment stratified by subgroups

Subgroups		25%	50%	75%
Osteoporosis pre-treatment	Bisphosphonates (n=2,456)	10.1	12.3	12.9
	Denosumab (n=844)	8.0	12.1	13.0
	Estrogens/SERMs (n=239)	9.4	12.2	12.8
	PTH (n=163)	6.7	11.8	12.7
	No pre-treatment (n=5,165)	5.5	11.9	12.8
Number of co-medications	0-1 (n=1,894)	2.0	6.0	12.3
	2-3 (n=1,802)	4.7	11.9	12.7
	4-5 (n=1,623)	8.4	12.1	12.8
	6+ (n=3,548)	11.0	12.3	13.0
Type of co-medication (ATC code)	PPIs (A02B*) (n=2,319)	10.9	12.3	13.1
	Statins (C10A*) (n=1,618)	10.8	12.3	12.9
	Thyroid medications (H03A*) (n=1,780)	11.0	12.3	12.9
	NSAIDs (M01A*) (n=1,655)	11.1	12.3	13.0
	Other analgesics (N02B*) (n=3,076)	10.2	12.3	13.0
	CV medications (C07A*/ C08A* / C09C*) (n=4,614)	10.2	12.3	12.9
	Vitamin D and / or Calcium (A11C*/A12A*) (n=4,370)	10.7	12.3	12.9

Disclosures

GS & CS were / are employees of Insight Health GmbH which received funding from UCB / Amgen to conduct this study. HDP & LM are employees / LM is shareholder of UCB. RS & LS received consulting / speaker fees from UCB.

P1428

REAL-WORLD EFFECTIVENESS OF ANTIRESORPTIVE THERAPY ON BONE DENSITY IN THAI BREAST CANCER PATIENTS RECEIVING LETROZOLE

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Objective(s): To evaluate the real-world effectiveness of bisphosphonates and denosumab in preventing bone loss among Thai postmenopausal women receiving letrozole and to compare site-specific skeletal responses.

Material and Methods: This retrospective study evaluated 369 Thai postmenopausal women receiving adjuvant letrozole (2016-2020). Bone mineral density (BMD) at the lumbar spine, total hip, and distal radius was assessed using DXA. Patients were grouped into no antiresorptive, bisphosphonate, or denosumab. Percentage annualized BMD change was compared using ANCOVA adjusted for age, BMI, baseline BMD, fracture history, and years since menopause. Longitudinal analysis included 178 patients with follow-up data (N varied slightly by site).

Results: Among 178 patients (mean follow-up 16.3 months), antiresorptive therapy significantly preserved total hip BMD compared with no treatment (adjusted mean change: -1.90%/year vs. +0.02%/year with bisphosphonates and +1.14%/year with denosumab; $p < 0.001$). At the lumbar spine, adjusted differences were not statistically significant (no treatment: -1.59%, bisphosphonates: -0.37%, denosumab: -0.17%; $p = 0.284$). However, bone loss persisted at the distal radius across all

groups (no treatment: -2.25%, bisphosphonates: -0.86%, denosumab: -2.93%; p = 0.308).
Conclusion(s): In real-world practice, antiresorptive therapy effectively preserves hip BMD in Thai women receiving letrozole. The persistent bone loss at the distal radius suggests a therapeutic gap for cortical bone, highlighting the need for site-specific monitoring.

P1429

HIGH ANTICIPATORY ANXIETY VERSUS LOW CLINICAL NECESSITY FOR DRUG HOLIDAYS: REAL-WORLD INSIGHTS FROM A DIGITAL DENTAL DECISION AID IN OSTEOPOROTIC PATIENTS

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OBJECTIVE(S) To compare patient-perceived anticipatory anxiety regarding medication-related osteonecrosis of the jaw (MRONJ) against the actual clinical necessity for drug holidays determined by a digital decision aid.
MATERIAL AND METHODS We analyzed two datasets from a tertiary osteoporosis center (Jan–Aug 2025). First, a prospective cohort of 51 osteoporotic patients (mean age 70.3 years) on antiresorptive therapy assessed dental anxiety using the Visual Analog Scale (VAS) before and after using "Dental Confidence," a web-based decision aid (AAOMS 2022 guidelines). Second, we performed an aggregate analysis of 109 system usage logs to characterize the real-world risk profile. Subjective fear was contrasted with objective clinical recommendations.
RESULTS Patients exhibited high baseline anticipatory anxiety (mean Pre-VAS = 51.38 ± 32.91). However, risk stratification revealed that clinical necessity for discontinuation was rare. Among 109 assessments, 98.2% did not require a drug holiday. Specifically, 69.7% were low risk (proceed immediately), while 19.3%—predominantly Denosumab users—were guided to schedule procedures during the optimal window (3-4 months post-injection). Only 1.8% (n=2) met criteria for a drug holiday (>4 years oral bisphosphonates or concomitant risk factors). Following this risk contextualization, patient anxiety significantly decreased (Post-VAS = 41.49 ± 32.30, p=0.0002).
CONCLUSION(S) A disconnect exists between high anxiety and low necessity for drug holidays (<2%). Digital aids bridge this gap by distinguishing "high risk" requiring discontinuation and "manageable risk" requiring only schedule optimization. This guidance reassures patients, reducing anxiety and supporting adherence without compromising safety.

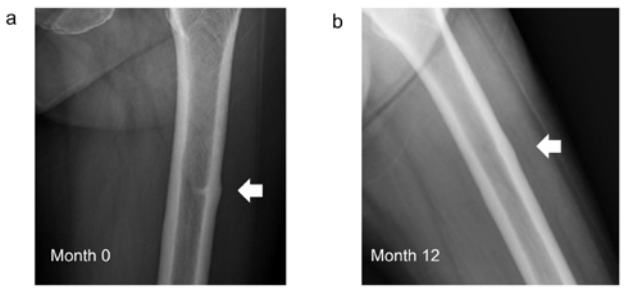
P1430

SUCCESSFUL HEALING OF AN INCOMPLETE ATYPICAL FEMORAL FRACTURE AFTER BISPHOSPHONATE DISCONTINUATION AND ROMOSOZUMAB THERAPY: A CASE REPORT AND LITERATURE REVIEW

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Objective(s): To report a case of successful non-operative management of an incomplete atypical femoral fracture (AFF) using romosozumab following denosumab discontinuation and to review the potential role of anabolic therapy in this clinical scenario.
Material and Methods: A 70-year-old woman with rheumatoid arthritis on long-term immunosuppressants presented with an asymptomatic incomplete AFF after ten years of sequential antiresorptive therapy (bisphosphonate followed by denosumab). DXA showed osteoporosis with high fracture risk and significant bone mineral density (BMD) decline (-10% at the total hip) despite denosumab treatment. Denosumab was discontinued, and romosozumab (210 mg monthly) was initiated along with protective weight-bearing and close radiographic monitoring.
Results Radiographs: at six months demonstrated progressive cortical healing. After 12 months of romosozumab therapy, complete radiographic union and callus remodeling were achieved. Follow-up DXA demonstrated substantial BMD improvement: +15.5% at the lumbar spine, +6.2% at the femoral neck, and +3.6% at the total hip. The patient remained asymptomatic, ambulated normally, and successfully transitioned to oral alendronate for maintenance.
Conclusion(s): Incomplete AFF can heal with non-operative management after antiresorptive discontinuation. In this case, romosozumab therapy supported complete radiographic union and substantial BMD gain, suggesting its potential value for patients at high fracture risk transitioning from denosumab.
Disclosures: None



(a) Initial presentation showing a transverse radiolucent line (arrow). (b) Complete cortical union and remodeling after 12 months of romosozumab.

P1431

BONE HEALTH OPTIMIZATION IN REVERSE SHOULDER ARTHROPLASTY: FROM OPPORTUNISTIC SCREENING TO SURGICAL MITIGATION

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Objective(s): Reverse shoulder arthroplasty (RSA) in patients with severe osteoporosis carries significant risks of fixation failure, periprosthetic fracture, and acromial stress fracture. While mechanical solutions exist, a comprehensive strategy integrating surgical precision with systemic Bone Health Optimization (BHO) is often lacking. We propose a quantitative, algorithmic approach to bridge this gap.
Material and Methods: Based on a comprehensive review of current evidence, we describe the "Red Zone" management algorithm utilizing preoperative quantitative computed tomography (CT) analysis. Local bone density is measured in Hounsfield Units (HU) to identify critical deficits in three structural pillars: the proximal humerus (<50 HU), glenoid vault (<200 HU), and acromion (<100 HU). This objective classification dictates zone-specific reconstruction strategies.
Results: The algorithm mandates a shift from standard techniques to targeted solutions for the "Red Zone" patient. For the "stovepipe" humerus, cemented fixation with undersized broaching relative to the canal is utilized to mitigate fracture risk. Glenoid management prioritizes augmented baseplates or specific screw trajectories to engage higher-density columns. For the fragile acromion, implant geometry is optimized alongside "deltoid-protective" tensioning. Crucially, these mechanical constructs are coupled with aggressive pharmacological optimization, prioritizing anabolic therapy (e.g., teriparatide, romosozumab) via pre-operative optimization for elective cases and immediate initiation for fractures, to accelerate osseointegration and fracture healing, alongside a load-managing rehabilitation protocol.
Conclusion(s): The "Red Zone" algorithm serves as a practical execution tool within the broader context of BHO. By combining objective density metrics with synergistic surgical and biological interventions, surgeons can transform a catastrophic risk into a durable reconstruction for the fragility patient.

P1432

TRAUMATIC TIBIAL PLATEAU FRACTURE IN A PATIENT WITH OSTEOPOIKILOSIS: UNVEILING THE BONE QUANTITY-QUALITY PARADOX AND METABOLIC ACTIVITY - A CASE REPORT

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Objective(s): Osteopoikilosis (OPK) is a rare sclerosing bone dysplasia that radiographically mimics osteoblastic metastases. While often considered incidental, the biological quality of the bone remains poorly understood. We report a rare case of a tibial plateau fracture in OPK to characterize the "quantity-quality paradox" between Bone Mineral Density (BMD) and Trabecular Bone Score (TBS), and to investigate the metabolic activity of the lesions.
Material and Methods: A 66-year-old female sustained a Schatzker type II tibial plateau fracture following a simple mechanical fall. Radiographs revealed multiple symmetric sclerotic spots. To differentiate from malignancy, a comprehensive evaluation including tumor markers (CEA, CA 15-3, CA 125, CA 19-9) and whole-body computed tomography was performed. Biologic bone assessment included serum bone turnover markers (CTX, P1NP), DXA-derived BMD and TBS, and metabolic imaging via 18F-Sodium Fluoride (18F-NaF) PET/CT. The fracture was managed with standard Open Reduction and Internal Fixation (ORIF).
Results: Malignancy was ruled out. Bone turnover markers were within normal limits, yet 18F-NaF PET/CT demonstrated intense focal tracer uptake within the sclerotic lesions, indicating active bone remodeling rather than inert islands. DXA revealed a "bone paradox": lumbar spine BMD and hip BMD were normal (T-score -0.2 and 0.5), whereas TBS indicated degraded microarchitecture (score 1.173). Despite the compromised trabecular texture and altered metabolic signal, the fracture achieved solid union at 2 months with full weight-bearing recovery.
Conclusion(s): In OPK, normal BMD is misleading due to sclerotic artifacts. This case highlights the biological complexity of OPK: lesions are metabolically active on 18F-NaF PET/CT and exist alongside degraded microarchitecture (low TBS). TBS may serve as a valuable adjunctive tool to provide better insight into bone quality. Despite these biologic abnormalities, the bone retains its healing potential, confirming that standard fixation remains the treatment of choice.

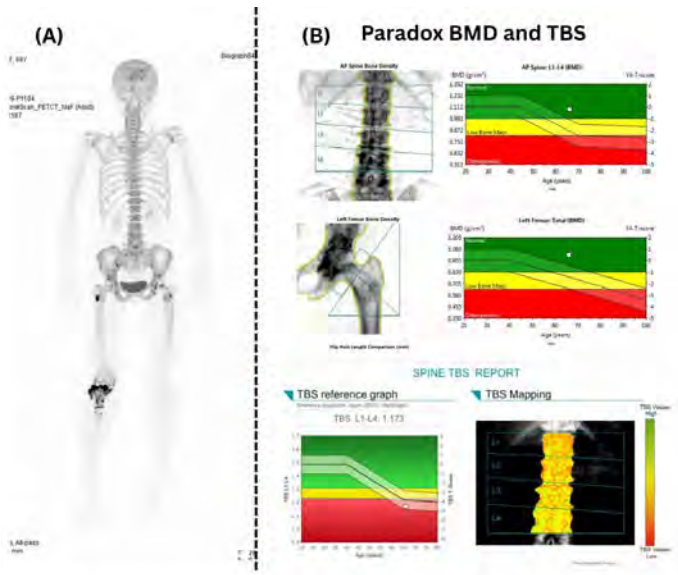


Figure 1: (A) 18F-NaF PET/CT showing active metabolic uptake in sclerotic lesions. (B) DXA Paradox: normal BMD T-score (-0.2 and 0.5) due to sclerosis (top), contrasted with Degraded Microarchitecture (TBS 1.173) (bottom).

P1433

UNMASKING HIDDEN OSTEOPOROSIS RISKS AND REACTIVE HEALTH BEHAVIORS USING A GAMIFIED WEB-BASED SCREENING TOOL: A CROSS-SECTIONAL STUDY IN THAILAND

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Objective(s): To evaluate a web-based gamified tool in characterizing osteoporosis risk profiles and identifying "hidden risk" populations among Thai adults.
Material and Methods: A descriptive and analytic cross-sectional study evaluated the "Bone Score Challenge," a responsive web application designed for smartphone and desktop accessibility. The tool utilized a weighted scoring algorithm, with a baseline of 100 points, derived from Thai Osteoporosis Foundation (TOPF) guidelines and international standards. To enhance user engagement, the application integrated gamification mechanics, including instant visual feedback via a color-coded traffic light system (Green for Excellent, Orange for Improvement Needed, Red for High Risk) and a social percentile ranking system that compares users against the aggregate database. Logistic regression and chi-square tests analyzed associations between lifestyle factors and fracture history, with the multivariate model adjusted for age.
Results: The algorithm demonstrated internal validity with significantly lower mean scores in the fracture group compared to the non-fracture group ($p < 0.001$). Multivariate analysis (Table 1) identified history of falls as the strongest independent predictor of fracture history (aOR 6.13, 95% CI: 2.92–12.85, $p < 0.001$). A synergistic protective effect was observed: combined adequate calcium and vitamin D exposure was associated with 60% lower odds of fracture history (aOR 0.40, $p = 0.013$). The tool identified a "hidden risk" cohort among participants aged <60 years (41.5%) who exhibited high-risk lifestyle scores despite being asymptomatic. Additionally, an inverse association between exercise and fracture history suggested a pattern of reactive behavioral modification post-diagnosis.
Conclusion(s): The "Bone Score Challenge" effectively unmasks hidden risks and identifies reactive health behaviors. This digital platform serves as a scalable pre-screening mechanism to bridge the gap between community awareness and clinical diagnosis.

Table 1: Clinical characteristics and risk factors associated with fracture history (N=261)

Variable	Fracture (n=43)	No Fracture (n=218)	aOR (95% CI)*	P-value
Age (years), Mean ± SD	57.2 ± 13.9	50.8 ± 13.2	1.06 (1.03–1.09)	<0.001
History of Falls, n (%)	19 (44.2)	31 (14.2)	6.13 (2.92–12.85)	<0.001
Parental Fracture, n (%)	13 (30.2)	30 (13.8)	-	0.011
Very Active Exercise†, n (%)	15 (34.9)	40 (18.3)	-	0.024
Nutrient Synergy‡, n (%)	14 (32.6)	104 (47.7)	0.40 (0.19–0.82)	0.013

*Adjusted for age. †Exercise frequency ≥3 times/week. ‡Concurrent adequate calcium and vitamin D.
Statistically significant (P < 0.05).

P1434

OPPORTUNISTIC SCREENING FOR OSTEOPOROTIC VERTEBRAL COMPRESSION FRACTURES USING STANDARD AP DENSITOMETRY REPORT IMAGES: A DEEP LEARNING-BASED COMPARATIVE STUDY AGAINST ORTHOPEDIC SPECIALISTS

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Objective(s): Osteoporotic vertebral compression fractures (OVCFs) are frequently underdiagnosed. While lateral imaging is standard, Bone Mineral Density (BMD) reports routinely utilize Anteroposterior (AP) spine images, which are overlooked for screening. This study investigated the clinical utility of a deep learning model to opportunistically screen for OVCFs using these standard AP report images, comparing performance against orthopedic surgeons and residents.
Material and Methods: A YOLO-based model was developed using 513 AP spine images extracted from BMD reports, utilizing data augmentation. Following internal validation (mAP@0.5 = 91.0%), the model was evaluated on an external set of 60 patients (30 fractures, 30 controls). Diagnostic performance was compared with (1) three board-certified orthopedic surgeons and (2) three orthopedic residents. We analyzed performance against both the pooled average of individual readers and their majority vote consensus.
Results: Patient-level AI sensitivity was 93.3% (95% CI: 74.4-96.5), significantly superior to the pooled average of surgeons (68.9%, $p<0.001$) and residents (81.1%, $p=0.003$). Against expert consensus, AI sensitivity remained significantly higher than surgeons (93.3% vs 70.0%, $p=0.016$) and comparable to resident consensus (86.7%, $p=0.50$). While surgeons showed superior specificity (100%), AI maintained robust specificity (83.3%). At the vertebral level, AI significantly outperformed surgeon consensus in sensitivity (78.0% vs 51.2%, $p=0.003$), highlighting superior detection of subtle fractures in AP images.
Conclusion(s): Deep learning transforms standard AP BMD report images into an opportunistic screening tool. The AI demonstrated significantly higher sensitivity than both average and consensus orthopedic surgeons, serving as an automated second reader to enhance detection in routine reports without additional cost or radiation.

P1435

CLOSING THE EXPERTISE GAP IN OSTEOPOROSIS MANAGEMENT: AN EQUALIZING EFFECT OF A GUIDELINE-BASED CLINICAL DECISION SUPPORT SYSTEM AMONG JUNIOR AND SENIOR PHYSICIANS

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Objective(s): To evaluate the impact of a clinical decision support system (CDSS) on the accuracy of osteoporosis risk assessment and treatment selection, and to examine its role in standardizing care across different levels of clinical experience.
Material and Methods: A within-subject randomized experimental study was conducted with 65 physicians (56 orthopedists, 5 general practitioners, 4 internal medicine). Participants were divided into Junior (GP/R1, n=22) and Senior (R2-Staff, n=43) groups. Each evaluated 20 randomized clinical vignettes derived from real-world data, comparing manual assessment against CDSS-supported assessment. The CDSS utilized a deterministic logic engine based on the 2021 Thai Osteoporosis Foundation (TOPF) guidelines. Accuracy and error patterns (under/over-treatment) were analyzed against an expert-validated gold standard.
Results: CDSS support significantly improved risk classification accuracy from 70.3% to 84.8% (absolute gain +14.5%, p<0.001) and treatment selection concordance from 78.5% to 85.4% (gain +6.9%, p=0.003). A marked "equalizing effect" was observed: Junior physicians achieved a 22.3% accuracy gain (62.7% to 85.0%), effectively eliminating the performance gap with Senior physicians (84.7% with support). Furthermore, CDSS use reduced under-treatment in high-risk cases from 17.3% to 12.8% and nearly halved over-treatment (8.9% to 4.5%). System usability was rated as "good" (SUS: 69.1 ± 17.0).
Conclusion(s): The guideline-based CDSS facilitates high-fidelity adherence to osteoporosis management protocols. By mitigating clinical errors and equalizing performance between junior and senior clinicians, the system serves as a powerful tool for standardizing patient safety and optimizing musculoskeletal care delivery.

P1436

COMPARISON OF ULTRASONOGRAPHICALLY MEASURED NAIL PLATE THICKNESS IN PATIENTS WITH OSTEOPOROTIC FRACTURES, OSTEOPENIC FRACTURES, AND HEALTHY CONTROLS

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Objective:
This study aimed to compare ultrasonographically measured nail plate thickness in patients with osteoporotic fractures, patients with osteopenic fractures, and healthy controls, and to evaluate its potential association with bone quality.
Methods:
A total of 69 participants were included and categorized into three groups: patients with osteopenic fractures (n=25), patients with osteoporotic fractures (n=24), and healthy controls without fractures (n=20). Nail plate thickness was measured using ultrasonography from the first to fifth digits. Group comparisons were performed to assess differences in ultrasonographic nail plate thickness among the three groups.
Results:
Patients with osteoporotic fractures demonstrated significantly lower nail plate thickness in the second through fifth digits compared with healthy controls (p<0.01 for all), while no significant difference was observed for the first digit (p=0.64). Patients with osteopenic fractures also exhibited reduced nail plate thickness compared with controls, particularly in digits 2–5 (p<0.01). Post-hoc analysis revealed that differences were mainly driven by comparisons between fracture groups and controls, whereas nail plate thickness was largely comparable between osteoporotic and osteopenic fracture groups, except for the fifth digit (p=0.04). Patients with osteoporotic fractures had lower BMD values and higher FRAX-derived major osteoporotic and hip fracture risks compared with osteopenic fracture patients.
Conclusion:
Ultrasonographically measured nail plate thickness, particularly in the second to fifth digits, was reduced in patients with osteoporotic and osteopenic fractures compared with healthy controls. These findings suggest that nail plate thickness assessment by ultrasonography may reflect underlying bone quality and fracture risk, supporting its potential role as a simple, non-invasive imaging biomarker.

P1437

LONG-TERM QUALITY OF LIFE TRAJECTORIES IN FIBROUS DYSPLASIA AND MCCUNE-ALBRIGHT SYNDROME

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Objectives: Fibrous dysplasia and McCune-Albright syndrome (FD/MAS) are associated with substantial morbidity, yet long-term patient-reported outcomes remain poorly characterised. We describe longitudinal health-related quality of life (HRQoL) trajectories in FD/MAS and identify clinically meaningful subgroups at differential risk of deterioration using generic HRQoL (EQ-5D) data.
Material and Methods: We analysed longitudinal EQ-5D-5L data from 74 adults with participant-reported FD/MAS contributing 509 HRQoL observations (median follow-up 6.5 years) from the UK-based RUDY research database (www.rudystudy.org). Linear mixed-effects models estimated annual changes across EQ-5D domains and VAS, adjusting for age, sex, and year of entry. EQ-5D index scores were derived using validated algorithms. Patients with ≥2 measurements underwent unsupervised clustering of baseline-to-follow-up EQ-5D index change. K-means clustering (k=2) was compared with Gaussian mixture modelling (GMM). Baseline associations with cluster membership were tested using Fisher's exact tests.
Results: Population-level analyses showed overall significant annual worsening in mobility, self-care, and anxiety/depression, with declining EQ-5D VAS scores, while pain/discomfort and usual activities remained stable. Clustering identified two distinct trajectories. A high-risk

"decliner" group (≈30%) had poor baseline HRQoL (mean EQ-5D index 0.33) with marked deterioration over time (mean change -0.23), while a second majority group remained stable or slightly improved (Figure 1). Baseline EQ-5D index <0.5 was strongly associated with high-risk cluster membership (p=0.0005), whereas age and sex showed no association.
Conclusions: FD/MAS patients demonstrate heterogeneous long-term HRQoL trajectories. A substantial subgroup experiences a severe, progressive decline that may be identified at first assessment using baseline EQ-5D index scores. Early recognition may support targeted monitoring, multidisciplinary intervention, and future trials in this rare disease population.
Declarations: RV, FC, MAL, RPV nothing to declare. MKJ received paid consultancy or sponsorship for external talks from Amgen, UCB, Sanofi, Kyowa Kirin, Nanox-AI, Native Technologies, Thornton Ross and Theramex

P1439

CLINICAL OUTCOMES OF A COMBINED THERAPEUTIC APPROACH IN PATIENTS WITH SYSTEMIC OSTEOPOROSIS AND FIXED LUMBAR VERTEBRAL COMPRESSION FRACTURES

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Objective**:** Vertebral compression fractures are often the initial sign of systemic osteoporosis. Early detection and targeted treatment are crucial to prevent additional skeletal damage.
Methods: Ten patients with systemic osteoporosis and confirmed lumbar compression fractures were examined (mean age 63 ± 2 years; 8 women, two men). All fractures occurred before patients were aware of their osteoporosis. Laboratory tests included 25(OH)D, CRP, calcium, ionized calcium, and phosphorus. DXA scans were performed at the hip and lumbar spine. Initial results showed vitamin D levels at 18.7 ± 1.3 ng/mL (normal 30), CRP at 7.25 ± 1.1 mg/L (normal <5), phosphorus at 0.65 ± 0.07 mmol/L (normal 0.81), and ionized calcium at 0.81 ± 1.1 mmol/L (normal 1.1). Femoral neck T-score was −2.2 ± 0.1, Z-score −2.3 ± 0.1; lumbar spine T-score +2.5 ± 0.1 and Z-score +2.8 ± 0.1, reflecting degenerative artifacts. All patients received vitamin D 5600 IU, ibandronic acid 150 mg monthly, and Osteogenon two tablets twice daily for 60 days.
Results. After six months, improvements were observed in clinical, laboratory, and densitometric assessments. Vitamin D levels normalized in 9 patients (33.2 ± 2.3 ng/mL). DXA showed positive changes: hip T-score increased to −1.9 ± 0.1 and Z-score to −1.8 ± 0.1; lumbar spine T-score rose to −1.7 ± 0.1 and Z-score to −1.6 ± 0.1.
Conclusion: The combined therapeutic approach of vitamin D repletion, anabolic vitamin D repletion, anti-resorptive therapy with ibandronic acid, and adjunctive Osteogenon recting metabolic abnormalities and enhancing bone mineral density. These findings support the importance of comprehensive, multimodal management in patients with systemic osteoporosis and vertebral compression fractures.

P1440

METHOTREXATE INTOLERANCE: AN UNFORTUNATE REALITY!

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Introduction: Methotrexate (MTX) is gold standard disease-modifying antirheumatic drug (DMARD) treatment in rheumatoid arthritis (RA). While effective, it is often poorly tolerated by patients. Consequently, this lack of adherence can be an obstacle to achieving remission. The objective of this study was to evaluate MTX tolerance through the frequency of adverse effects and across MISS score evaluation, and to determine the factors associated with the disease itself and/or the drug that predict poor tolerance.
Patients and Methods: This was a cross-sectional study including RA patients meeting the 2010 ACR/EULAR criteria while taking MTX. Intolerance to this treatment was assessed using the "MISS" (Methotrexate Intolerance Severity Score), and logistic regression was used to determine predictive factors. SPSS 26 was used for statistical analysis.
Results: 57 patients were collected: 53 women and 4 men with a mean age of 51.53 ± 10.58 [29–72 years]. The mean disease duration was 12.11 years ± 6.12 [3–30 years], with 73.7% of patients being immunopositive. The DAS28-ESR showed remission in 10.5%, low disease activity in 70.2%, moderate disease activity in 17.5%, and high disease activity in 1.8%. HAQ score was <0.5 in 54.4%, between 0.5 and 1 in 28.1%, and between 1 and 3 in 17.5%. All patients were receiving methotrexate (MTX): the mean dose was 19.3 mg/week for 7.47 ± 3.16 [2–15 years], administered orally in 40.4% and by injection in 59.6%, combined with folic acid in isodose form in 94.7%. The mean time to switch to injectable was 2.57± 3.02. Patients were simultaneously receiving corticosteroids in 49.1%, NSAIDs in 24.6% and biologics in 36.8%. The MISS score was 6.53 ± 4.83 [0–20], indicating good tolerance (score=0) in 17.5%, mild intolerance (score 1–5) in 26.7%, moderate intolerance (score 6–10) in 36.8%, and severe intolerance (score 11–36) in 19.3% of patients. Severe intolerance was characterized by abdominal pain in 21.1%, nausea in 56.1%, fatigue in 52.6%, crying spells in 15.8%, and irritability and/or aversion to the drug in 54.4%. Liver function tests were abnormal in 7% and hematological function tests in 24.6%. A statistically significant relationship was found between a MISS score ≥ 6 and sex (p = 0.05), age (p = 0.02), HAQ score (p = 0.011), route of administration (p = 0.003) favoring the oral intake (34% vs. 66%), duration of use (p = 0.025), and use of biologics (p = 0.017). In contrast, disease duration, DAS28 score, MTX and/or folic acid dose, and use of corticosteroids and/or NSAIDs did not appear to be predictive factors for intolerance.
Conclusion: MTX intolerance is a fact, with the psycho-behavioral component playing the dominant role. MISS should be used more frequently in consultations to predict individuals likely to experience intolerance and thus identify candidates eligible for therapeutic education sessions. The association with bDMARD use likely suggested an easy recourse to biologics due to poor adherence to maintenance therapy.

P1441

IS LOW APPENDICULAR LEAN MASS A FRAX-INDEPENDENT PREDICTOR FOR FRACTURE AFTER ACCOUNTING FOR PRIOR FALLS AND COMPETING MORTALITY?

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Objective: To determine whether low appendicular lean mass (ALM) consistent with sarcopenia (EWGSOP2) predicts major osteoporotic fracture (MOF), hip fracture, and any clinical fracture independently from FRAX-derived fracture probability.
Methods: We conducted a population-based retrospective cohort study of adults aged ≥50 years undergoing dual-energy X-ray absorptiometry (DXA) in Manitoba, Canada (1999–2017). ALM was estimated from spine and hip DXA using a validated algorithm, and categorized as low or normal according to EWGSOP2 criteria. We estimated hazard ratios (HR) for low (versus normal) ALM from Cox models, sequentially adjusting for FRAX probability with bone mineral density (BMD) and self-reported prior-year falls. Competing mortality was considered using Fine-Gray subdistribution hazard regression (SHR). FRAX calibration was assessed by comparing predicted and observed 10-year fracture probabilities across risk quintiles, accounting for competing mortality.
Results The cohort included 69,554 individuals (mean age 65.6 years; 89.9% women), of whom 10.9% had low ALM. After adjustment for FRAX probability, low ALM was associated with higher risk for MOF (HR 1.31), hip fracture (HR 1.27), any clinical fracture (HR 1.29) and even more strongly with death (HR 1.66), without significant sex differences (all p-interaction >0.1). The effect of low ALM was similar when further adjusted for fall history (HR MOF 1.39, hip 1.32, any fracture 1.36, death 1.97, respectively) but was attenuated after accounting for competing mortality (Fine-Gray SHR MOF 1.18, hip 1.11, any fracture 1.16, respectively). FRAX demonstrated good calibration in individuals with and without low ALM for MOF (both slopes 0.95) and hip fracture (slopes 1.00 and 1.14, respectively), although predicted and observed fracture probabilities were higher in those with low ALM within all risk quintiles.
Conclusion: Low ALM consistent with sarcopenia is a FRAX-independent risk factor for fracture independent of self-reported falls, but observed associations are attenuated after accounting for competing mortality. FRAX showed good calibration across risk strata in those with and without low ALM.

P1442

SPINE AGE DERIVED FROM DXA VFA IMAGES PREDICTS FALL-ASSOCIATED HOSPITALIZATION: THE MANITOBA BONE MINERAL DENSITY REGISTRY

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Objective: Biological age, which reflects heterogeneity in the aging process, may offer greater predictive value for health outcomes than chronological age. We investigated whether accelerated spine aging, estimated from dual-energy x-ray absorptiometry (DXA) vertebral fracture assessment (VFA) using deep learning, predicts fall-related hospitalization independently of chronological age and other covariates.
Methods: Among 27,601 adults aged ≥50 years who underwent DXA VFA in Manitoba, Canada (2010–2023), a pre-trained model was fine-tuned using 20% randomly sampled scans. Predicted spine age difference (PAD) was defined as predicted spine age minus chronological age. Among the remaining 80%, 8,810 individuals completed DXA VFA before 2018 and had linkage with population-based administrative data including hospital records for ascertaining any fall-associated hospitalization during follow-up through 2018.
Results: During a mean follow-up of 3.9 years, 758 fall-associated hospitalizations were identified. Spine age positively correlated with chronological age (r=0.89), with a mean difference of 0.0 years (SD=3.4). Spine age was more strongly associated with fall-associated hospitalizations than chronological age (area under the curve 0.693 versus 0.657, respectively; difference = 0.026, p<0.001). Individuals with PAD greater than 1 SD (accelerated spine age) had a 2-fold higher risk of outcome compared to those with PAD < 1 SD, after adjustment for chronological age and sex (adjusted hazard ratio [aHR] 2.04, p<0.001). Each SD increase in PAD was associated with increased risk of fall-associated hospitalization (HR 1.28, 95% CI 1.19 to 1.37, p<0.001), which was independent of age, sex, body mass index, radiographically confirmed vertebral fracture, nonvertebral fracture history, spine degenerative/structural artifact, and femoral neck BMD (aHR 1.17, 95% CI 1.09 to 1.27, p<0.001). The association remained robust after excluding individuals with fall-associated hospitalization in the last 3 years or self-reported fall within the last year (aHR 1.24, p=0.005) and when death was considered as a competing risk (Fine-Gray HR 1.14, p=0.001).
Conclusion: Accelerated spine aging detected from DXA VFA predicts fall-associated hospitalization independently of chronological age, multiple covariates and previous falls, supporting its potential to both enhance fracture risk assessment and identify additional aging-related health outcomes.

P1443

DEEP LEARNING-BASED FRACTURE RISK PREDICTION USING ONLY DXA HIP IMAGES: COMPARISON WITH FRAX

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Objectives: Can deep learning (DL) models trained exclusively on Dual-Energy X-ray Absorptiometry (DXA) hip images achieve fracture risk prediction comparable to FRAX™ with Bone Mineral Density (BMD)?
Methods: We conducted a population-based retrospective cohort study of adults aged 40-90 years undergoing baseline hip DXA on GE Healthcare systems in Manitoba, Canada (1999-2018). Data were split into training (70%), validation (10%), and test (20%) cohorts with similar event rates (hip 2.8%, major osteoporotic fracture [MOF] 9.3%, any fracture 12.5%). Seven DL models (convolutional neural networks and transformers) were trained on hip DXA images, using a Cox proportional hazards loss and patient-level ensembling across 5 random seeds. Sampling and model selections were performed on the validation set using a hierarchical framework based on integrated Brier score adjusted for inverse probability of censoring weighting (IBS-IPCW), 10-year calibration error, and 10-year discrimination. Test set performance was compared with FRAX™+BMD using paired bootstrap analyses.
Results: The cohort included 79,748 adults (mean age 64.7 years; 90.2% women; mean follow-up 8.65 years). For hip fracture prediction, the DL model achieved a 10-year time-dependent area under the curve (tAUC) of 0.809 (95% CI 0.786:0.831), comparable to FRAX™+BMD (0.806, 95% CI 0.784:0.826; ΔtAUC 0.003, 95% CI −0.013:0.020). For MOF, the DL model outperformed FRAX™+BMD at 10 years (0.717 [0.702:0.732] vs 0.698 [0.683:0.713]; ΔtAUC 0.019, 95% CI 0.006:0.032) and at 5 years (ΔtAUC 0.038). For any fracture, the DL model exceeded FRAX™+BMD at 10 years (0.706 [0.691–0.719] vs 0.684 [0.669–0.699]; ΔtAUC 0.022, 95% CI 0.010–0.034) and at 5 years (ΔtAUC 0.034). At 2 years, differences were not statistically significant. Calibration plots showed agreement between predicted and observed risk at 2, 5, and 10 years, with acceptable 10-year calibration (mean absolute error ≈ 0.011 hip, 0.038 MOF, 0.045 any fracture). Kaplan-Meier curves demonstrated clear risk-stratified separation.
Conclusions: DL models trained solely on baseline hip DXA images matched FRAX™+BMD for hip fracture prediction and significantly outperformed FRAX™+BMD for predicting MOF and any fracture. These findings highlight the prognostic value of DXA images beyond BMD and support image-based DL approaches for fracture risk prediction. Independent external validation is ongoing.

P1444

TEMPORAL PATTERNS IN LABORATORY-MEASURED TESTOSTERONE LEVELS IN ADULT MEN: IMPLICATIONS FOR MALE SKELETAL HEALTH

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Aim:
This study examines temporal trends in laboratory-measured testosterone test results in adult men and explores their relevance to bone health and fracture risk.
Methods:
A retrospective, repeated cross-sectional analysis was conducted using a large clinical laboratory database comprising 104,559 serum testosterone test results from adult men aged ≥18 years, collected between 2008 and 2025. Annual distributions were evaluated using descriptive statistics. Lower-quantile exposure (10th and 25th percentiles), the prevalence of testosterone levels <300 ng/dL, and age-by-year heatmap analyses were used to identify bone-relevant hormonal vulnerability across the adult life course.
Results:
Mean serum testosterone levels demonstrated marked inter-year variability rather than a monotonic decline, with calendar year explaining minimal overall variance. However, lower-quantile testosterone values remained persistently low across the study period, indicating sustained exposure to bone-adverse hormonal ranges in a substantial subgroup of men. Approximately 35–40% of adult men consistently exhibited testosterone levels <300 ng/dL across multiple years. Age-by-year heatmap analysis revealed considerable overlap in testosterone distributions between younger and older men, suggesting that hormonal vulnerability relevant to bone health is not confined to advanced age.
Conclusion:
Despite apparent stability in population mean testosterone levels, a large proportion of adult men experience chronic exposure to testosterone concentrations associated with impaired bone health and increased fracture risk. These findings highlight laboratory testosterone testing as an underutilized marker for identifying male skeletal risk and support a life-course approach to fracture prevention in men.

P1445

OCCULT MONOCLONAL GAMMOPATHY IN MEN: IMPLICATIONS FOR SECONDARY OSTEOPOROSIS FROM A 15-YEAR REAL-WORLD LABORATORY COHORT

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Background: Male osteoporosis is frequently underdiagnosed and often attributed to primary or age-related bone loss. Plasma cell dyscrasias, including monoclonal gammopathy of undetermined significance and early multiple myeloma, are increasingly recognized contributors to skeletal fragility in men. However, subtle laboratory abnormalities on protein electrophoresis may delay recognition.
Objective: To evaluate the burden and diagnostic patterns of monoclonal gammopathy in men undergoing serum and urine protein electrophoresis and to explore their relevance to male bone health.
Methods: We conducted a retrospective laboratory-based analysis of serum and urine protein electrophoresis data collected between 2008 and 2023, comprising 29,448 unique diagnostic episodes. Monoclonal gammopathy was identified based on electrophoretic patterns and confirmed by immunofixation. Age- and sex-stratified analyses were performed, and multivariable logistic regression was used to identify predictors of monoclonal detection, with emphasis on subtle findings.
Results: Monoclonal gammopathy was identified in 32.7% of diagnostic episodes. Men had a significantly higher likelihood of monoclonal protein detection compared with women. Among 1,445 episodes reporting a faint band on electrophoresis, 712 (49.3%) were confirmed as true monoclonal gammopathy on immunofixation. Light-chain–only disease constituted a disproportionate share of these subtle findings.
Conclusion: Nearly half of faint monoclonal bands represent true clonal disease, with clear male predominance. These findings have important implications for male bone health, suggesting that occult monoclonal gammopathy may represent an underrecognized cause of secondary osteoporosis. Screening strategies for men with unexplained low bone mass or fragility fractures should include protein electrophoresis, supported by reflex immunofixation and urine studies when abnormalities are detected.

P1446

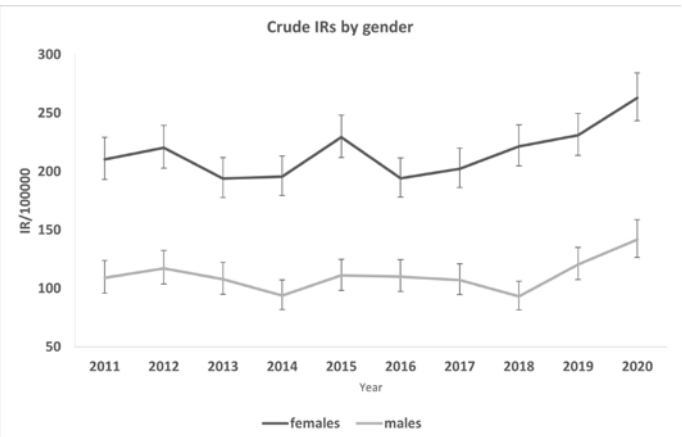
SECULAR TRENDS IN HIP FRACTURE INCIDENCE RATES IN LEBANON, 2011-2020

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Objectives: To estimate national hip fracture incidence rates (IRs) in Lebanon from 2011–2020 using Ministry of Public Health data and to standardize rates to United Nations (UN) world population estimates.
Methods: We analyzed data from the Ministry of Public Health hip fracture registry, using combined ICD diagnosis codes and CPT procedure codes for case identification and confirmation. We calculated age- and sex-specific hip fracture IRs among adults aged ≥50 years. We assessed secular trends using Kendall's tau-b (τb) test correlation between year and annual IRs, and estimated the annual percent change (APC) using log-linear regression. Age-standardized rates were calculated using direct standardization to the UN 2020 world estimates.
Results: Between 2011 and 2020, we identified 8,189 hip fractures among Lebanese adults aged ≥50 years, with women accounting for approximately two-thirds of cases. Annual crude hip IRs per 100,000 ranged from 194 (95% CI [178-212]) to 263 [244-284] in women and from 93 [82-106] to 142 [127-159] in men. Incidence increased steeply with advancing age in both sexes and was highest in individuals aged ≥80 years, with higher rates in women. UN age-standardized rates ranged from 197 [179-214] to 267 [246-288] per 100,000 in women and 62 [54-70] to 94 [83-105] per 100,000 in men. The women-to-men incidence rate ratio averaged 1.4 (range 1.2-1.5) for crude rates and 2.9 (range 2.3–3.4) for age-standardized rates. Kendall's tau analysis showed no statistically significant monotonic secular trend in hip fracture incidence over time in either sex, with a weak positive association in women ($\tau = 0.47$, $p = 0.06$) and men ($\tau = 0.11$, $p = 0.66$). However, a significant short-term increase in incidence was observed among women during 2017–2020 while no significant trends were detected among men.
Conclusion: Hip fracture incidence in Lebanon remains relatively stable, consistently greater in women than men, with a steep age-related increase in both sexes. Compared with international data, Lebanese rates were in the upper-middle global range for women and the lower-middle range for men, with sex differences consistent with global patterns. These updated, national estimates provide essential evidence to support calibration of the FRAX Lebanon calculator and guide national osteoporosis guidelines.

Figure: Crude IRs by gender and year 2011-2020



P1447

FRACTURE LIAISON SERVICE AND BONE HEALTH; A SCIENTOMETRIC STUDY

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Objective: Fractures have become huge public health burden and mortality rate. Fracture Liaison Service (FLS) is established to prevent future fractures and mortality rate following the fracture. We conducted a scientometric analysis of scholarly publications over the past 15 years in field of FLS and its impact on bone health.
Material and Methods: We carried out a bibliometric study through a comprehensive search of Scopus database up to 20 Dec. 2025. We identified publication trend, the most productive countries and University, main journals, and the most prominent subject areas in the field. Bibliometric analysis was conducted by "analyze results" tool available in Scopus.
Results: After assessing 165 records, 93 relevant studies were included in the analysis. The highest number of publications was in 2025 (n=15, 16.13%). Main type of the papers was original articles (n=78, 83.9%). Netherlands (n=16, 17.20%), UK (n=15, 16.13%), and the US (n=14, 15.05%) were ranked as top three productive countries. The main subject area of the published papers was "medicine" (n=90, 96.77%), followed by " Biochemistry, Genetics and Molecular Biology" area (n=12, 12.90%). Among total citation number (1,903), the highest cited paper (222, 11.66%) was a research article entitled “Fracture liaison services for the evaluation and management of patients with osteoporotic fracture: A cost-effectiveness evaluation based on data collected over 8 years of service provision", published in “Osteoporosis International", 2011, with an impact factor: 3.1. Top ranked University in producing the related documents was different institutes from “Maastricht University”, Netherlands.
Conclusions: There is a large research output in field of FLS and bone health with a leading position for Netherlands as top productive country. Medicine-related journals were the main source which published the scientific papers in the studied field.
Keywords: Fracture Liaison Service, Fracture, FLS, Bone, Scientometric.

P1448

A DOSE–RESPONSE RELATIONSHIP BETWEEN BODY MASS INDEX AND FALL RISK: EVIDENCE FROM A NATIONALLY REPRESENTATIVE IRANIAN COHORT STUDY

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Background: Falls are a major contributor to injury and disability and may be influenced by body composition and excess body weight. While obesity has been linked to impaired balance and mobility, evidence on the dose–response relationship between body mass index (BMI) and fall risk in nationally representative populations is limited.
Methods: This prospective cohort study utilized nationally representative data from the STEPS 2021 survey in Iran with a four-year follow-up. A total of 8,625 adults were included in the analysis. BMI was measured at baseline and calculated as weight in kilograms divided by height in meters squared (kg/m²). Participants were categorized as underweight (<18.5), normal weight (≥18.5 to <25), overweight (≥25 to <30), or obese (≥30), based on World Health Organization criteria. Incident falls were assessed using a self-reported history of falls within the previous year at follow-up. Weighted analyses were conducted to ensure national representativeness. The association between BMI categories and fall occurrence was evaluated using the chi-square test, and 95% confidence intervals (CIs) were reported. All analyses were performed using Stata software.
Results: Overall, 55.13% of participants were female. The prevalence of falls increased progressively across BMI categories, from 1.42% (95% CI: 0.57–3.52) among underweight individuals to 3.84% (95% CI: 3.12–4.72) in normal-weight, 4.47% (95% CI: 3.73–5.34) in overweight, and 5.10% (95% CI: 4.17–6.22) in obese participants. A statistically significant association was observed between BMI category and fall occurrence (P = 0.022), indicating a dose–response pattern.
Conclusion: Higher BMI was associated with an increased risk of falls in a graded manner at the population level. These findings highlight excess body weight as a potential modifiable risk factor for falls and support the inclusion of weight management strategies in fall prevention programs.
Keywords: BMI, Obesity, Osteoporosis, Fall Risk, Iran

P1449

KIDNEY FUNCTION DECLINE AND INCIDENT FALLS: A LINEAR DOSE-RESPONSE ANALYSIS IN A NATIONAL POPULATION

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Background: Falls are a significant public health problem and are influenced by chronic conditions that impair physical function. Chronic kidney disease (CKD) may increase fall risk through progressive decline in kidney function; however, evidence on the linear relationship between estimated glomerular filtration rate (eGFR) and falls in nationally representative populations is limited.
Methods: This prospective cohort study used nationally representative data from the STEPS 2021 survey in Iran with a four-year follow-up. A total of 6,219 adults were included. CKD was defined as an eGFR < 60 mL/min/1.73 m² using the 2021 CKD-EPI creatinine equation and/or a urinary albumin-to-creatinine ratio (UACR) ≥ 30 mg/g. Incident falls were assessed using a self-reported history of falls within the previous year at follow-up. Weighted analyses were conducted to ensure national representativeness. The association between CKD status and falls was assessed using the chi-square test, while the linear relationship between eGFR and falls was examined using Pearson correlation. All analyses were performed using Stata, and 95% confidence intervals (CIs) were reported.
Results: Overall, 55.26% of participants were female. A weak but statistically significant inverse linear correlation was observed between eGFR and incident falls (r = −0.0699, P < 0.001), indicating a lower fall risk with higher kidney function. Among participants with CKD at baseline (n = 728), 6.46% (95% CI: 4.51–9.17) reported falls, compared with 4.52% (95% CI: 3.92–5.21) among those without CKD (P = 0.069).
Conclusion: Higher kidney function was linearly associated with a lower risk of falls at the population level, despite the modest strength of the association. These findings suggest that even mild reductions in eGFR may contribute to fall risk and should be considered in population-based fall prevention strategies.
Keywords: Kidney Failure, Osteoporosis, Fall Risk, Iran

P1450

THE IMPACT OF CARDIOMETABOLIC MULTIMORBIDITY ON FALL RISK: A PROSPECTIVE NATIONAL INVESTIGATION

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Introduction: Cardiometabolic multimorbidity—the co-occurrence of two or more conditions such as cardiovascular disease, diabetes, chronic kidney disease, hypertension, or cancer—is a growing public health challenge in Iran. Despite its clinical significance, the association with functional outcomes, such as fall risk, remains underexplored in nationally representative cohorts. This study investigates the prospective relationship between cardiometabolic multimorbidity and falls using the national IRAN-STEPS Follow-Up Cohort (ISFUC). Method: This is a prospective longitudinal analysis embedded within the ISFUC. The baseline population consists of adults aged 18 years or older who participated in the 2021 national STEPS survey, which collected comprehensive data on demographics, behavioral risk factors, medical history, anthropometrics, and laboratory biomarkers (e.g., fasting glucose, HbA1c, creatinine, blood pressure). From this cohort, we included 5,937 participants with complete data on the conditions of interest and follow-up. Cardiometabolic multimorbidity was defined as the presence of two or more of the following physician-diagnosed conditions: CVD, diabetes, CKD, HTN, or any cancer. Fall incidence in the three past years was assessed via follow-up interviews. The association was evaluated using chi-square tests. Analyses were performed in STATA 18, with a p-value <0.05 considered statistically significant. Results: From a total of 5,937 participants, 56.84% (95% CI: 54.32, 57.36) were female, and 44.16% (95% CI: 42.64, 45.68) were male. Among the participants, 3,461 (58.3%) had no cardiometabolic conditions, 1,508 (25.4%) had one condition, and 968 (16.3%) had multimorbidity (≥2 conditions). The incidence of falls increased progressively with the number of cardiometabolic conditions: 3.39% (95% CI: 2.76, 4.16) among those with no conditions, 5.98% (95% CI: 4.69, 7.60) among those with one condition, and 8.72% (95% CI: 6.80, 11.12) among those with multimorbidity (≥2 conditions). The association between multimorbidity and fall occurrence was statistically significant (p-value <0.001). Conclusion: Cardiometabolic multimorbidity is significantly associated with an increased risk of falls in the Iranian adult population. These findings underscore the importance of integrating fall risk assessment and prevention strategies into the clinical management of individuals with multiple chronic cardiometabolic conditions.
Keywords: Multimorbidity, Diabetes, Osteoporosis, Fall Risk, Iran

P1451

CURRENT SMOKING AND EXPOSURE TO SECONDHAND SMOKE IN RELATION TO INCIDENT FALLS: EVIDENCE FROM A NATIONALLY REPRESENTATIVE PROSPECTIVE STUDY IN IRAN

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Background: Falls represent an important public health issue and are influenced by behavioral and environmental risk factors. Tobacco use and exposure to secondhand smoke may affect neuromuscular function and balance; however, population-based evidence on their association with falls remains limited, particularly in nationally representative settings. **Methods**: This prospective cohort study used nationally representative data from the STEPS 2021 survey in Iran with a four-year follow-up. A total of 8,648 adults were included. Current smoking status was assessed by self-report at baseline. Exposure to secondhand smoke was defined as reported exposure within the past 30 days at home and/or workplace, with exposure in at least one setting considered positive. Incident falls were assessed using a self-reported history of falls within the previous year at follow-up. Weighted analyses were performed to ensure national representativeness. Associations between smoking status, secondhand smoke exposure, and falls were evaluated using the chi-square test. All analyses were conducted using Stata, and 95% confidence intervals (CIs) were reported. **Results**: Among participants, 55.12% were female. The prevalence of falls was 3.59% (95% CI: 2.59–4.96) among current smokers and 4.42% (95% CI: 3.92–4.98) among non-smokers, with no statistically significant association observed (P = 0.238). Similarly, participants exposed to secondhand smoke had a fall prevalence of 5.90% (95% CI: 4.26–8.11), compared with 4.73% (95% CI: 4.14–5.41) among those without exposure (P = 0.217). No significant differences in fall occurrence were detected across exposure groups. **Conclusion**: In this nationally representative cohort, neither current smoking nor exposure to secondhand smoke was significantly associated with incident falls. These findings suggest that tobacco-related exposures may not play a major role in fall risk at the population level, although further studies using objective exposure measures and longer follow-up periods are warranted. **Keywords**: Smoking, Passive Smoke, Cigarette, Hookah, Osteoporosis, Iran.

P1452

TEMPORAL PATTERNS IN OBESITY-ATTRIBUTABLE MUSCULOSKELETAL DISABILITY AND MORTALITY ACROSS THE NORTH AFRICA AND MIDDLE EAST REGION, 1990–2023

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Objective: To analyze trends in obesity-attributable disability and mortality for osteoarthritis and low back pain in the North Africa and Middle East region from 1990 to 2023.

Material and Methods: Age-standardized disability-adjusted life year (DALY) and mortality data for osteoarthritis and low back pain attributable to high body mass index (BMI) were obtained from the Global Burden of Disease 2023 study for the region, stratified by year and sex.

Results: The obesity-related musculoskeletal disease burden increased substantially over the study period. The age-standardized DALY rate for osteoarthritis rose from 42.93 to 62.20 per 100,000, with women experiencing higher rates (50.85 to 70.87) than men (35.26 to 53.74). Similarly, low back pain showed a sharp linear increase in DALY rate from 114.37 to 185.55, again disproportionately affecting women (rising from 155.01 to 241.04) compared to men (75.52 to 134.11).

Conclusions: The substantial rise in obesity-related musculoskeletal burden — particularly among women — signals a growing public health challenge for the region. These findings underscore the urgent need for strengthened obesity prevention and management strategies aimed at reducing osteoarthritis and back pain disabilities. Health authorities should prioritize resources and targeted interventions (especially for women) to curb this trend and mitigate future disability and healthcare costs.

P1453

ASYMPTOMATIC MULTIFOCAL OSSEOUS SARCOIDOSIS: THE DIAGNOSTIC VALUE OF PET AND MRI

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Introduction: Osseous sarcoidosis is a rare manifestation of sarcoidosis, and most patients are asymptomatic. Its reported prevalence ranges from 0.5-30% according to the sensitivity of the imaging modalities used.[1, 2]
Case report: A 47-year-old male with known pulmonary and lymph node sarcoidosis, without musculoskeletal symptoms, was referred to the Rheumatology department due to imaging abnormalities. PET revealed multiple areas of increased uptake, including bone involvement, despite normal findings on plain radiographs and CT. T1-weighted modified Dixon MRI (Fig. 1A–D) showed sacral, iliac, and peritrochanteric lesions with enhancement on fat-suppressed sequences. Calcium-phosphate metabolism was unremarkable. An extensive evaluation to exclude malignancy, including bone biopsy, showed no evidence of neoplasia; however, biopsy of the lesions was not feasible due to technical inaccessibility. In the context of established systemic sarcoidosis, the imaging findings supported the diagnosis of osseous sarcoidosis. The patient will started treatment with prednisolone.
Discussion: Osseous sarcoidosis may affect any bone, most commonly the metacarpals and phalanges of the hands and feet, typically with bilateral distribution. Lesions affecting the spine and pelvis are particularly challenging, as they may mimic metastatic disease and require careful differential diagnosis. Imaging plays a central role in the detection of osseous sarcoidosis. More sensitive imaging techniques, such as MRI and 18F-FDG PET, have been shown to detect bone involvement not identified by conventional radiography or CT. Accurate diagnosis relies on correlation between imaging findings and clinical and laboratory data. Bone biopsy may be required in atypical cases or in the absence of typical extraosseous manifestations.[1,2] Bone involvement in sarcoidosis is most commonly observed in advanced, chronic multiorgan disease. Although osseous lesions are frequently asymptomatic, many patients with bone sarcoidosis receive systemic therapy due to concomitant active involvement of other organs, particularly pulmonary disease. [1] This case highlights the importance of considering osseous sarcoidosis in the differential diagnosis of multifocal bone lesions, particularly in patients with known systemic sarcoidosis.

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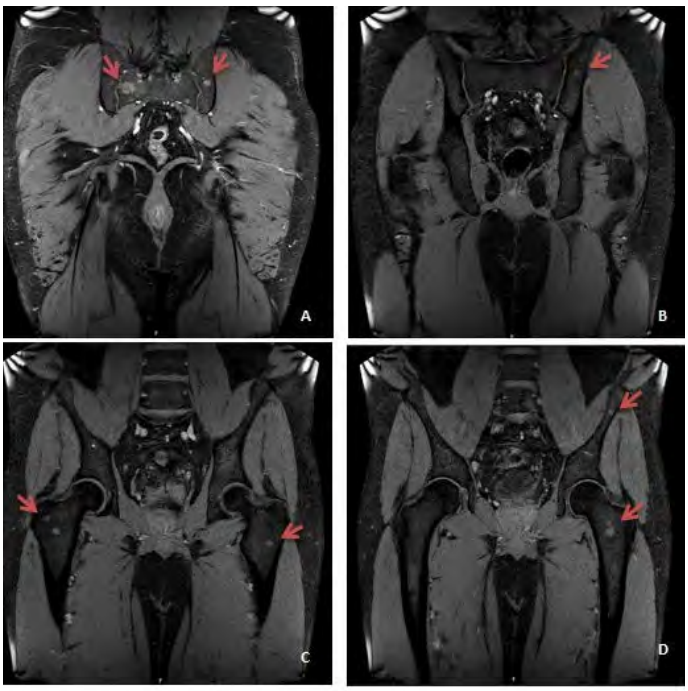


Fig. 1 (A-D) – Coronal T1-weighted modified Dixon MRI demonstrating sacral, iliac, and peritrochanteric lesions.

P1454

METHOTREXATE AND BONE HEALTH: WHEN COMMON THERAPY TURNS INTO A RISK

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Introduction: Methotrexate (MTX) at doses ≤ 25 mg/week is commonly used as first-line disease-modifying antirheumatic drug in rheumatic diseases such as peripheral psoriatic arthritis.[1,2] MTX osteopathy is a rare adverse effect characterized by the triad of bone pain, osteopenia/osteoporosis, and stress fractures.[3]
Clinical case: A 51-year-old woman presented to the rheumatology department with mechanical bilateral knee pain without trauma. She had been diagnosed with psoriatic arthritis in 2019 and treated with MTX 20 mg/week for four years, with good disease control. Physical examination showed significant tenderness over both tibial plateaus, without visible abnormalities. Radiographs showed bilateral tibial plateau fractures, and magnetic resonance imaging (MRI) confirmed stress fractures in the tibial metaphysis (Figs. 1 and 2). Calcium-phosphate metabolism was normal. Dual-energy X-ray absorptiometry (DXA) demonstrated osteopenia (femoral neck T-score of -2.3, lumbar spine T-score of -1.8). Based on these findings, a diagnosis of MTX osteopathy was established. MTX was discontinued, and treatment with denosumab was initiated. The patient showed marked improvement, with no psoriatic arthritis relapse. Follow-up computed tomography after one year demonstrated near-complete bone healing.
Discussion: Stress fractures due to MTX osteopathy most commonly involve the tibia, followed by the calcaneus.[4] Patients usually present with multiple, bilateral, and sometimes recurrent stress fractures.[5] While DXA frequently shows osteopenia or osteoporosis, typical osteoporotic fractures are rare.[4] MRI is the preferred diagnostic tool due to its high

sensitivity for early and subtle bone changes.[3,5] Characteristic band- or meander-shaped stress fractures along the growth plate (epimetaphyseal osteolysis and band-like sclerosis) are considered pathognomonic.[5] Prognosis is generally favorable after MTX withdrawal. In some cases, anti-osteoporotic drugs, including antiresorptive and osteoanabolic agents, may be used to promote bone healing and improve bone density.[4] This case illustrates MTX osteopathy with bilateral tibial stress fractures, osteopenia, and improvement after MTX discontinuation and anti-osteoporotic treatment.

Conclusion: MTX osteopathy should be considered in patients with unexplained lower limb pain, particularly with no trauma and atypical sites of osteoporotic fractures. Early recognition is essential to prevent complications and guide therapy.

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Fig. 1 (A and B) – Sagittal (A) and coronal (B) PD fat-suppressed FSE MRI of the right knee showing a horizontal fracture of the tibial metaphysis with marked surrounding bone marrow edema.



Fig. 2 (A and B) – Sagittal (A) and coronal (B) PD fat-suppressed FSE MRI of the left knee showing a horizontal fracture of the tibial metaphysis with marked surrounding bone marrow edema.

P1455

UNEXPECTED DIAGNOSIS OF METASTATIC MELANOMA IN A RHEUMATOID ARTHRITIS PATIENT PRESENTING WITH HIP PAIN

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Objective: To present a case in which hip pain in a patient with rheumatoid arthritis led to the diagnosis of metastatic melanoma.

Methods: Clinical, imaging and histopathology data were retrospectively reviewed.

Results: A 76-year-old male with a previous diagnosis of rheumatoid arthritis was referred to our rheumatology department for evaluation He was treated with methotrexate 10 mg/week, with inflammatory disease control. At first evaluation, he reported persistent bilateral nocturnal hip pain for the past three months, with only partial response to analgesic therapy. Physical examination showed good general condition, absence of arthritis or deformities, and painless limitation of left hip rotation. Laboratory evaluation was unremarkable. Baseline radiographs revealed a discontinuity of the right ischiopubic ramus, not present on previous imaging (Figure 1). Subsequent bone scintigraphy and pelvic magnetic resonance imaging (MRI) identified a large pelvic mass with bone involvement and additional hypermetabolic skeletal lesions (Figure 2 and 3). Positron emission tomography (PET) demonstrated intense metabolic activity in the pelvic lesion and distant skeletal sites (Figure 4). Biopsy of the pelvic mass revealed histological and molecular features consistent with melanoma, and a BRAF V600E mutation was identified. A diagnosis of metastatic melanoma was established and palliative therapy with encorafenib and binimetinib initiated, resulting in mild metabolic response on recent follow-up PET. The patient remains in good general condition.

Conclusion: This case demonstrates that serious underlying conditions can present with minimal warning or nonspecific musculoskeletal symptoms. In patients with pre-existing rheumatic disease, pain is often attributed to the chronic condition, so maintaining a low threshold for further investigation is essential for timely diagnosis and may be, in some cases, lifesaving.



Figure 1. Pelvic radiograph: discontinuity of the right ischiopubic ramus.

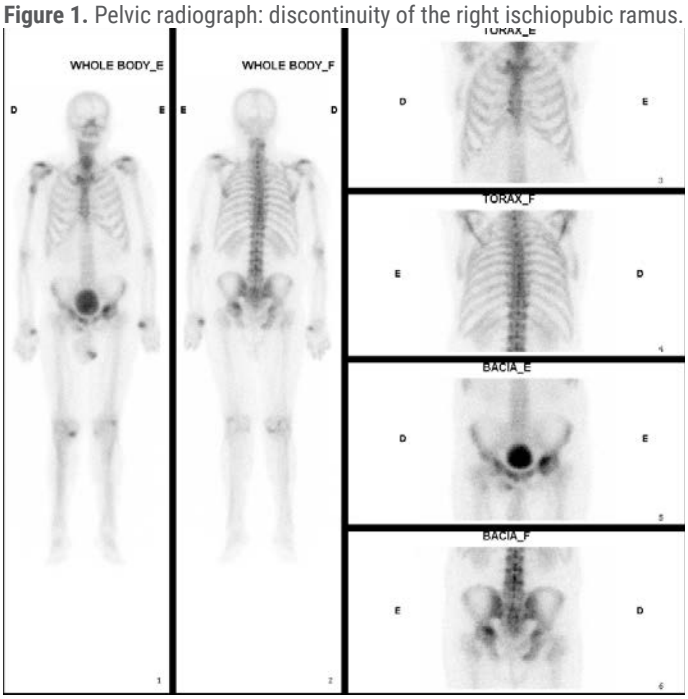


Figure 2. Bone scintigraphy: increased uptake in the ischial and pubic bones, acetabulum, and left humerus.

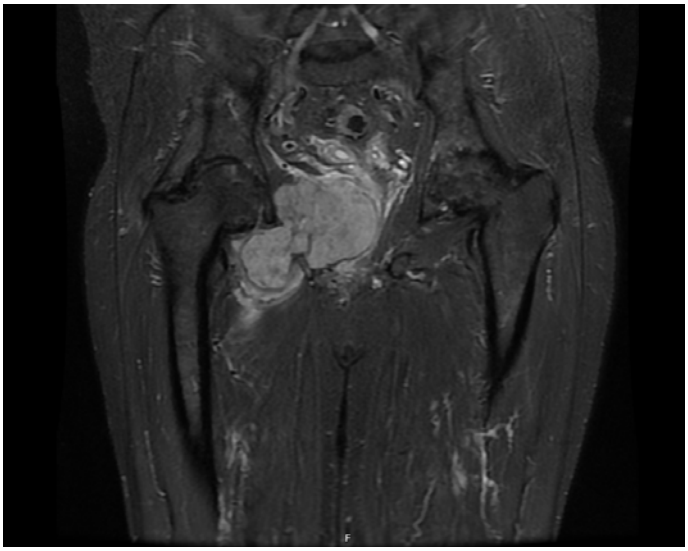


Figure 3. Pelvic MRI: lobulated mass extending into the pelvic cavity and thigh with bone marrow and soft tissue oedema.

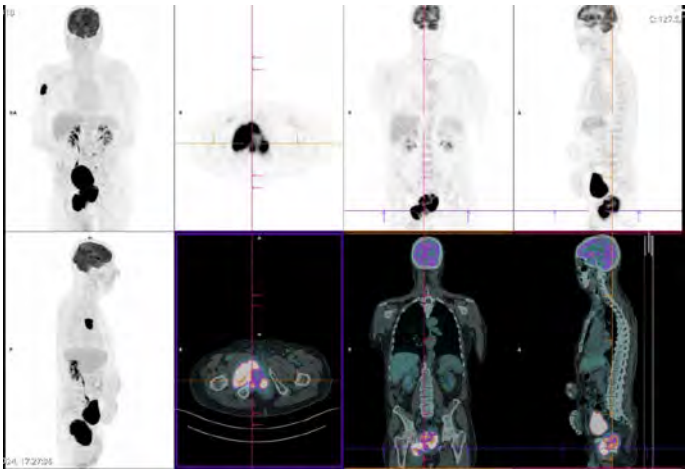


Figure 4. PET scan: intense metabolic activity in the pelvic mass, proximal right humerus and right femoral condyle.

P1456

CHRONIC RECURRENT MULTIFOCAL OSTEOMYELITIS: REPORT OF TWO SISTERS

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Objective:
To describe the clinical and imaging features of Chronic Recurrent Multifocal Osteomyelitis (CRMO) in two sisters and discuss potential genetic predisposition in this rare autoinflammatory bone disease.
Methods:
We report two paediatric CRMO cases in siblings followed at a tertiary rheumatology center.
Results:
Case 1: An 11-year-old girl presented with bilateral hip pain of insidious onset and elevated inflammatory markers. Magnetic resonance imaging (MRI) revealed multifocal bone marrow oedema in sacroiliac joints and acetabula with joint effusion (figure 1). CRMO was diagnosed after exclusion of other aetiologies. Nonsteroidal anti-inflammatory drug (NSAID) therapy led to clinical, laboratory, and imaging improvement. Methotrexate was added due to difficulty tapering NSAIDs and later discontinued after stable disease. At 15 years, she remains clinically stable, with follow-up MRI showing decreased oedema.

Case 2: An 8-year-old sister developed acute inflammatory pain in the dorsal right foot, pubic symphysis, and left ankle, partially responsive to NSAIDs. Examination showed localized swelling and tenderness; labs revealed raised inflammatory markers. Whole-body MRI (WB-MRI) demonstrated bone marrow oedema in pubic rami, first right metatarsal, and distal left tibia, with surrounding soft tissue oedema (Figure 2). A concomitant diagnosis of psoriasis was established by Dermatology. Methotrexate resulted in clinical and imaging improvement. At 11 years, she remains stable, with follow-up WB-MRI showing lesion regression and no new foci.

Both sisters were referred for genetic evaluation, which is pending.
Conclusion:
The occurrence of CRMO in two sisters with similar clinical and imaging patterns supports a genetic predisposition. Although most cases are not monogenic, familial aggregation suggests an underlying genetic susceptibility, including non-syndromic forms. Genetic evaluation may contribute to improved understanding of disease mechanisms and support earlier diagnosis and targeted therapeutic strategies.



Fig.1 Multifocal bone marrow oedema in sacroiliac joints and acetabula.

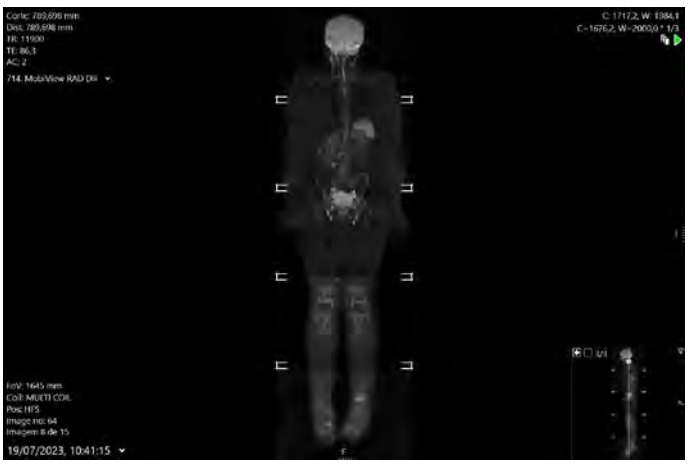


Fig.2 Bone marrow oedema in pubic symphysis, adductor insertions, pubic rami, first right metatarsal, and distal third of the left tibia, associated with soft tissue oedema.

P1457

OSTEOPOROSIS AND FRAGILITY FRACTURES IN SYSTEMIC SCLEROSIS: INSIGHTS FROM A SINGLE-CENTER COHORT

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Objectives: Given the increased susceptibility of systemic sclerosis (SSc) patients to osteoporosis (OP), this study aimed to investigate the clinical determinants and risk factors involved.
Material and methods: This retrospective monocentric study included 144 patients (133 women)- mean age 67.7±12.9years, from the Reuma.pt database. Associations between clinical variables (SSc subtype, overlap syndromes, organ involvement, autoantibodies, treatments) and OP and fractures (overall, fragility, atypical, other sites) were analyzed using SPSS v30 ($p < 0.05$).
Results: OP prevalence was 40.7% (mean age at diagnosis 64.8±8.8years). Among patients with OP, fracture distribution was 32.2% vertebral, 6.8% hip, 3.4% wrist, 1.7% atypical, and 11.9% at other locations.

Anti-topoisomerase I (ATA) was the most robust and consistent independent predictor of bone-related outcomes, significantly increasing the risk of osteoporosis (RR=2.83;95%CI 2.09-3.84,p<0.001), overall fracture (RR=4.76;95%CI: 2.77-8.19,p<0.001) and vertebral fractures (RR=7.08; 95%CI:3.23-15.50,p<0.001).
Furthermore, the use of antidiabetic agents was independently associated with vertebral involvement (RR=7.44; 95%CI: 1.69-32.70,p=0.003), whereas antihypertensive therapy was independentlyassociated with osteoporosis (RR=2.343; 95%CI: 1.11-4.96, p=0.024). Pentoxifylline was associated with increased risk in bivariate analysis, but not after adjustment for serological markers.
Corticosteroid use was not associated with OP or fractures. Most patients received low doses, with 95.8% exposed to ≤ 5 mg/day.
Multivariate analysis confirmed ATA as the strongest independent predictor after adjustment for pharmacological factors (β = −0.39; p < 0.001)
OP was associated with adverse outcomes and reduced survival (RR=1.60; 95%CI:1.09–2.34, p=0.024)
Conclusion: Patients with SSc have a substantially higher OP risk than the general population (40.7% vs. 5.6%). ATA positivity and selected cardiovascular risk factors may support tailored risk stratification.

P1458

WILLINGNESS TO TAKE ANTI-OSTEOPOROSIS MEDICATIONS (AOM) IS VERY HIGH AFTER DOING DEXA SCAN AMONGST THE OLDER ADULTS (OA)

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OBJECTIVES : To explain that older adults suffering from osteoporosis , after diagnosis by doing DEXA or after calculating FRAX Plus scores (SOS) , are highly interested in taking AOM . Materials and Methods : The PI at Kedarmal Bajaj Falls Institute of India (KBFII) , have analysed retrospectively the willingness to take Anti -Osteoporosis Medication (AOM), specifically after doing DEXA Scan . The beneficiaries were chosen from 1 Jan 2025 to 31 Dec 2025 from the KBFII registered members . Total 51 people had done the DEXA Scan .
After studying their T-Scores & taking FRAX Plus Scores (SOS) into consideration each one was advised the AOM or no medications etc , as follows :

1. Zoledronic Acid = 12
2. Denosumab (DMAB) = 16
3. Teriparatide (TPTD) = 2
4. TPTD and DMAB (Both) = 1 (Here the T Score was -10.5 at Left Wrist)
5. Oral AOM = 2
6. Refused to take any medication = 9
7. Within normal limits = 8 (No Medications)
8. Lost to follow up = 1

Total = 51 .
RESULTS : Out of total 51 members studied , 33 started taking the advised AOM , which is approximately 65% . In this study 8 members had reports within normal limits and 9 refused to take any treatment . Here the willingness to start AOM , after doing DEXA Scan , was significantly high .

CONCLUSIONS : After doing DEXA Scan and calculating FRAX Plus scores (SOS) , if appropriate advice is given, older adults listen and initiat the AOM .

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P1459

EFFECTIVENESS OF COMBINED PHYSICAL THERAPY IN IMPROVING FUNCTIONAL STATUS IN PATIENTS WITH KNEE OSTEOARTHRITIS IN A HEALTH CENTER "PROKUPLJE"

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Background: Osteoarthritis of the knee is a leading cause of disability among older adults. Rehabilitation programs in regional centers play a crucial role in improving mobility and reducing pain.

Objectives: To evaluate the effectiveness of a combined rehabilitation protocol (kinesiotherapy + electrotherapy + patient education) in patients with knee osteoarthritis treated at ZC Prokuplje.

Methods: A prospective study included 52 patients (mean age 67 ± 8 years; 38 women, 14 men). All underwent a 4-week program consisting of daily kinesiotherapy sessions, low-frequency electrotherapy, and structured education on joint protection. Outcomes were measured using WOMAC, Timed Up and Go (TUG), and Visual Analogue Scale (VAS) at baseline and post-intervention.

Results: Significant improvements were observed in pain reduction (VAS decreased by 35%, p < 0.01), functional mobility (TUG improved by 2.4 seconds, p < 0.05), and overall WOMAC score (improvement of 28%). Patient-reported adherence to home exercises was 82%.

Conclusion: A structured rehabilitation program in a regional setting significantly improves pain and mobility in knee osteoarthritis patients, highlighting the importance of accessible multidisciplinary care outside tertiary centers.

P1460

QUANTITATIVE PROFILE OF NEUTROPHIL EXTRACELLULAR TRAP FORMATION: ASSOCIATION WITH CLINICAL ACTIVITY IN RHEUMATOID ARTHRITIS

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Introduction: Emerging evidence points to neutrophil dysregulation in the immunopathogenesis of rheumatoid arthritis (RA), where neutrophil extracellular traps (NETs) serve as a critical link between innate immunity and autoimmune tissue damage. NETs provide a scaffold for citrullinated autoantigens and sustain inflammation.
Objective: To perform a quantitative analysis of NET generation by assessing both the basal (spontaneous) and inducible (PMA-stimulated) capacity of neutrophils across the clinical activity continuum of RA, from remission to high disease activity.
Materials and Methods: A cohort of 49 RA patients (mean age 44.5 years, disease duration ≤2 years) and 35 demographically matched healthy donors (control group) were enrolled. Clinical phenotyping was performed using the DAS28 index. Peripheral blood neutrophils were isolated by density gradient centrifugation [1, 2]. A standardized fluorescence microscopy assay with dual staining was employed using SYBR Green (nucleic acid) and antibodies against myeloperoxidase (MPO) conjugated with R-phycoerythrin for specific NET identification. NETs were defined as extracellular MPO-positive DNA structures exceeding cell size [3, 4]. The primary assessed parameters were the proportion of neutrophils demonstrating spontaneous NETosis and the proportion of cells responding with NET formation to *in vitro* stimulation with 100 nM PMA.
Results: RA patients exhibited a pronounced, statistically significant ($p<0.0001$) increase in NET formation compared to the control group, indicating a state of neutrophil hyperactivation. NET levels correlated with clinical status. Compared to controls [Spontaneous: 3.9% (95% CI 2.7–5.1); Induced: 12.4% (9.2–15.6)], patients with inactive disease (DAS28<2.6) showed an intermediate increase [6.2% (5.9–6.5) and 27.3% (24.4–30.2), corresponding to a 1.6- and 2.2-fold rise, respectively]. The most pronounced dysregulation was observed in active RA (DAS28>3.2), where spontaneous NET formation increased to 16.9% (16.7–17.1; a 4.3-fold increase) and induced formation to 38.4% (38.1–38.7; a 3.1-fold increase).
Conclusion: This study identifies a profile of NET formation in RA that is linked to clinical activity. The results demonstrate not only elevated basal neutrophil activity but also a significant reserve potential for NET generation. Critically, the persistence of neutrophil hyperactivation even during remission indicates an ongoing subclinical immunopathological process. These findings justify the integration of quantitative NET parameters into the biomarker panel for RA as a novel cell-oriented indicator. Its use may enable a deeper assessment of immunological activity, refine therapeutic targets, and monitor treatment efficacy, complementing traditional clinical scales.

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P1461

MONOCYTE EXTRACELLULAR TRAPS IN RHEUMATOID ARTHRITIS: FROM REMISSION TO CLINICAL EXACERBATION

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Introduction. Chronic inflammation in rheumatoid arthritis (RA) is characterized by a dissociation between clinical remission and the persistent risk of structural progression. The role of monocytes, capable of forming extracellular traps (METs), in maintaining the subclinical immune response is insufficiently studied. We hypothesized that quantitative parameters of MET formation could serve as an indicator of immunological activity, retaining informativeness even upon achieving clinical well-being.
Objective. To conduct a quantitative assessment of spontaneous and induced formation of monocyte extracellular traps (METs) in RA patients to determine their association with clinical disease activity.
Methods. A prospective study included 49 patients with early RA (disease duration ≤2 years, DAS28<2.6 at baseline) and 35 healthy donors as a control group. Monocytes were isolated by centrifugation in an iohexol gradient [1, 2, 3]. The ability to form extracellular traps was assessed using fluorescence microscopy by measuring the proportion of cells forming METs spontaneously and in response to stimulation with PMA (100 nM) [4, 5, 6].
Results. At baseline, all RA patients (n=49) showed a significant ($p<0.0001$) increase in MET formation compared to controls: a 1.6-fold increase in spontaneous formation (8.9% [8.5–9.3] vs. 5.6% [4.4–6.8]) and a 1.5-fold increase in induced formation (26.6% [24.9–28.3] vs. 18.3% [15.6–21.0]). In patients who experienced an exacerbation during follow-up (DAS28>3.2), the values reached a maximum: 18.4% [18.1–18.7] for spontaneous formation (3.3-fold higher than control) and 38.6% [38.4–38.8] for induced formation (2.1-fold higher). In patients who achieved stable clinical remission by the 12th month (DAS28<2.6, n=21) and normalization of CRP (median 3.2 mg/L), MET levels remained stably elevated, practically unchanged from baseline values (spontaneous: 8.4–8.7%, induced: 26.8–27.3%).
Conclusions. Thus, METs represent a novel potential quantitative biomarker reflecting RA activity. The persistence of METs during clinical remission despite normal systemic inflammatory markers indicates sustained subclinical activation of the monocyte compartment and incomplete immunological recovery. Monitoring METs could become an important addition to standard clinical and laboratory criteria, enabling the identification of patients in "immunological" remission versus those with ongoing hidden immune activation and, presumably, a higher risk of progression. This opens prospects for a personalized approach to

assessing therapy efficacy and long-term prognosis in RA.

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P1462

LEVERAGING ARTIFICIAL INTELLIGENCE AND DIGITAL TOOLS FOR PERSONALIZED PROGNOSIS AND MANAGEMENT IN OSTEOARTHRITIS AND RHEUMATOID ARTHRITIS

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Introduction: The transition to precision medicine in rheumatology is underpinned by digital technologies: artificial intelligence (AI), machine learning (ML), and telemedicine. These innovations are fundamentally reshaping diagnostic and therapeutic strategies through their capacity to process multidimensional data, thereby facilitating truly individualized patient management.
Objective: to systematize current evidence on how digital technologies can enhance early diagnosis, predict treatment outcomes, and facilitate dynamic monitoring in osteoarthritis (OA) and rheumatoid arthritis (RA).
Materials and Methods: A comprehensive literature review was conducted using major scientific databases (PubMed, Scopus, Web of Science) for studies published between 2018 and 2025. The search focused on keywords including "artificial intelligence," "machine learning," "digital biomarkers," "wearable devices," "telemedicine," "rheumatoid arthritis," and "osteoarthritis." The review analyzed data from retrospective and prospective cohort studies, clinical trials, and proof-of-concept studies.
Results: The analysis revealed several key findings:

1. Artificial intelligence-based automated analysis of medical imaging is used for early diagnosis and progression assessment. It automatically detects and classifies radiographic features of osteoarthritis (using the Kellgren-Lawrence scale), as well as quantitatively measures synovitis activity and the degree of bone erosions in rheumatoid arthritis on MRI and ultrasound scans. Modern algorithms are capable of solving key diagnostic tasks with accuracy comparable to that of an expert rheumatologist, and in some parameters, even surpassing it.

2. Predictive modeling and algorithm development utilizing big data (from registries and genomic databases) for forecasting individual therapeutic response and complication risk in rheumatoid arthritis (RA), aimed at optimizing the choice of first-line treatment.

3. Remote monitoring technologies, including electronic patient-reported outcomes (ePRO) and wearable devices, provide continuous collection of objective data on disease activity (joint mobility, step count, morning stiffness) in real time. This enables the physician to dynamically assess the patient's condition and manage care beyond the clinical setting.

At the same time, implementation is hindered by a complex of challenges: methodological (validation on quality data), legal (data protection), and organizational (integration into practice).
Conclusion: Personalized treatment of OA and RA is becoming possible thanks to digital technologies: AI for accurate diagnosis and wearables for monitoring. The key remaining tasks are the validation, regulation, and clinical implementation of these tools.

P1463

AN EXAMINATION OF PATIENT KNOWLEDGE AND EDUCATION IN PATIENTS WITH OSTEOPOROSIS, OSTEOPENIA, AND NORMAL BONE DENSITY

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Introduction: Osteoporosis represents a preventable and often treatable condition that is responsible for 1.5 million fractures annually in the United States. Proper patient knowledge represents a crucial aspect of disease management and has potential implications in treatment adherence and lifestyle modification. By examining how much patients know about their own diagnosis, their disease knowledge, and what resources they would like to use, we aim to lay the groundwork for developing efficient patient education resources.
Methods: We surveyed 52 individuals and collected data on demographics, bone density test results, disease knowledge, and educational sources both used and preferred. This was done to learn how much patients know about their condition on a fundamental level.
Results: 50% of participants diagnosed with osteoporosis correctly self-reported their condition, as did 21.1% diagnosed with osteopenia. Between the normal, osteopenia, and osteoporosis groups there were no significant differences between participants' scores on the patient knowledge questionnaire. The resources most used by patients were handouts/brochures and internet/personal research, and patients reported a preference for learning directly from their doctor/nurse.
Conclusion: Most fractures occur in patients with osteopenia because they have not yet been treated or diagnosed. Our study confirms the lack of disease awareness in patients with osteopenia. The observed discrepancy poses a serious health threat since such patients are at risk for disease progression. We confirmed the invaluable role of medical personnel in teaching patients about bone density loss. It is through efficient learning that patients can be empowered to take charge of their health.

P1464

TUBERCULOSIS INFECTION IN CHRONIC INFLAMMATORY RHEUMATIC DISEASES: FREQUENCY AND REACTIVATION UNDER BIOLOGICS

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Introduction :
Biotherapy has revolutionized the management of chronic inflammatory rheumatic diseases (CIRD) by reducing inflammation and structural damage [1]. However, these therapies increase the risk of serious infections, particularly tuberculosis, due to the reactivation of latent infections.

Objective:
The aim of our study was to determine the frequency of tuberculosis in patients with CIRD and to assess the rate of tuberculosis reactivation on biologic therapy.

Methods:
We conducted an 11-year retrospective study of patients with CIRD recruited from the rheumatology department of Mongi Slim Hospital. Sociodemographic and disease activity data were collected. We also collected data related to tuberculosis infection (latent or active) and its management. Additional details such as imaging findings (e.g., CT scans) and microbiological data (e.g., BK testing, interferon-gamma release assay (IGRA)) were also documented.

Results:
The study included 50 patients with CIRD : rheumatoid arthritis (RA) (40%), and spondyloarthritis (60%), with a male-to-female ratio of 1.08. The mean age at diagnosis was 38 years [11-63], with a mean disease duration of 10.7 years [3-24]. The patients' current mean age was 48.8 years [19-77]. The main comorbidities were high blood pressure (14%), diabetes (4%), dyslipidaemia (2%), progressive neoplasia (4%) and inflammatory bowel disease (10%). In terms of therapy, 60% of patients had received treatment with CsDMARDs distributed as follows: Methotrexate (MTX) (12%), MTX and Sulfasalazine (SLZ) (22%), SLZ (8%) and a combination of MTX and leflunomide (10%). The majority of patients (80%) had more than 2 Csdmards. Twenty-four per cent of the patients were on corticosteroids, with a mean dose of 7.95 mg/d [5-15] of prednisone equivalent. The average duration of corticosteroids was 44.6 months [7-84]. The distribution of the different biologics was as follows : Anti-TNFα (62%) : Adalimumab (35.4%), Etanercept (29%), Certolizumab (29%), Golimumab (6.4%), Anti-IL6 (24%), Rituximab (10%), and Jak inihibitors (4%). Prior to initiating biologics, 22% of patients had a positive IGRA. Among these, 27% were diagnosed with tuberculosis, all of which were pulmonary, as confirmed by the presence of BK in sputum samples and thoracic CT scans, and 54.5% had latent tuberculosis treated by chemoprophylaxis. During follow-up, no tuberculosis reactivation was observed. However, 2% of the patients developed peritoneal tuberculosis, which was successfully treated with a 9-month anti-tuberculosis treatment.

Conclusion:
Our study showed a high frequency of latent or active tuberculosis in patients with CIRD, with no reactivation on biologics. However, 2% of them developed tuberculosis while on biotherapy.
This underlines the importance of ongoing monitoring, even after a negative pre-therapy work-up.

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P1465

ASSOCIATION BETWEEN SYSTEMIC IMMUNE-INFLAMMATION INDEX AND BONE MINERAL DENSITY IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Introduction Rheumatoid arthritis (RA) is associated with an increased risk of osteoporosis (OP) due to chronic systemic inflammation, disease activity, and prolonged exposure to glucocorticoids (GCs). Identifying simple inflammatory markers reflecting bone involvement may help improve early risk stratification. The systemic immune-inflammation index (SII), derived from routine blood counts, reflects systemic inflammatory burden, but its association with bone mineral density (BMD) in RA remains insufficiently explored.
Objective The objective of this study was to evaluate the association between the systemic immune-inflammation index and bone mineral density in patients with rheumatoid arthritis.
Methods We conducted a cross-sectional study including patients with RA. BMD was assessed by dual-energy X-ray absorptiometry (DXA) at the femoral neck and lumbar spine, and results were expressed as T-scores. OP was defined according to World Health Organization (WHO) criteria (T-score ≤ −2.5).
SII was calculated as (neutrophil count × platelet count) / lymphocyte count. Demographic, clinical, biological, and therapeutic data were collected. Associations between SII and BMD parameters were evaluated using Spearman's rank correlation, and SII values were compared across bone status categories using the Kruskal–Wallis test.
Results The study included 48 patients, with a mean age of 59.5 ± 11.0 years and a marked female predominance (85.4%). The mean disease duration was 10.4 ± 8.5 years. The majority of patients were seropositive (85.4%), with anti-citrullinated protein antibodies (ACPA) and rheumatoid factor (RF) positivity observed in 77.1% and 72.9% of cases, respectively. Structural joint deformities were present in 48.9% of patients. RA was classified as active in 72.9% of patients, , with a mean DAS28-erythrocyte sedimentation rate (DAS28-ESR) of 4.07 ± 1.41, and 72.9% of patients had active disease. Inflammatory markers were elevated, with mean C-reactive protein (CRP) and erythrocyte sedimentation rate (ESR) values of 18.6 ± 22.5 mg/L and 49.9 ± 33.1 mm, respectively.
Regarding treatment, 72.9% of patients were receiving methotrexate (MTX), and 25% were treated with biologic disease-modifying antirheumatic drugs (bDMARDs). GC therapy was used in 75% of patients, most frequently at a daily dose of 5 mg, and 35.7% had received GC bolus therapy. BMD assessment revealed a high prevalence of bone involvement. Mean femoral and vertebral T-scores were −2.13 ± 1.30 and −1.90 ± 1.36, respectively. OP was identified in 57.4% of patients, while 21.3% had osteopenia and 21.3% had normal BMD. The mean SII value was 703,3 ± 474,8. SII was significantly and inversely correlated with femoral T-score (Spearman's ρ = −0.436, p = 0.002) and vertebral T-score (ρ = −0.334, p = 0.022).
Patients with OP tended to have higher SII values compared to those with osteopenia, although the difference did not reach statistical significance (p = 0.077).

Conclusion
In patients with RA, higher SII values are associated with lower BMD at both femoral and vertebral sites. As a simple and low-cost biomarker, SII may help identify RA patients at increased risk of OP, particularly in settings where access to advanced investigations is limited. Prospective studies are needed to confirm its role in clinical practice.

P1466

IS THE NUTRITION–INFLAMMATION INDEX A PREDICTOR OF BONE HEALTH IN RHEUMATOID ARTHRITIS?

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Introduction
Rheumatoid arthritis (RA) is a chronic inflammatory disease associated with systemic complications, including anemia and bone loss. Conventional inflammatory markers may not fully reflect the combined impact of inflammation and nutritional status. The C-reactive protein to albumin ratio (CAR) has emerged as a practical composite marker of systemic inflammation. Its relationship with disease activity and bone health in patients with RA remains insufficiently characterized.
Objective
To evaluate the association between CAR, disease activity, and bone health in patients with rheumatoid arthritis.
Methods
We conducted a cross-sectional study including patients with established RA. Clinical, biological, and densitometric data were collected. Disease activity was assessed using DAS28-ESR. Bone mineral density (BMD) was measured at the femoral and vertebral sites by DXA and categorized as normal, osteopenia, or osteoporosis. Fragility fractures were recorded. The CAR index was calculated as CRP (mg/L) divided by serum albumin (g/L). Correlations were assessed using Spearman's rank correlation coefficient. Comparisons between groups were performed using Mann–Whitney or Fisher's exact test, as appropriate.
Results
The study population consisted of 48 patients, predominantly postmenopausal women (85.4%), with a mean age of 59.5 ± 11.0 years and a mean disease duration of 124.8 ± 101.5 months. Eighty-five percent of patients were seropositive for rheumatoid factor and/or ACPA. Mean DAS28-ESR was 4.07 ± 1.41, indicating moderate to high disease activity. Osteoporosis was present in 56.3% of patients, osteopenia in 21.3%, and normal BMD in 21.3%. Fragility fractures were observed in 26.8% of patients.The mean CAR was 0.72 ± 0.90. CAR showed a significant positive correlation with disease activity (DAS28-ESR: r = 0.524, p = 0.001). However, The CAR index was not significantly correlated with femoral BMD (r = −0.158, p = 0.366) or vertebral BMD (r = −0.207, p = 0.232). Similarly, there were no differences between CAR in patients with and without fractures (Mann–Whitney test, p = 0.617).
Conclusion
The CAR index was strongly associated with disease activity but not with BMD or fragility fractures. These findings suggest that CAR primarily reflects systemic inflammatory burden rather than bone involvement.

P1467

ANEMIA IN RA : A CAUSE OR CONSEQUENCE OF INFLAMMATION ?

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Introduction
Anemia is a frequent extra-articular manifestation of rheumatoid arthritis (RA) and is mainly driven by chronic inflammation. However, the relationship between hemoglobin (Hb) levels, inflammatory markers, and disease activity remains incompletely characterized in routine clinical practice.
Objectives
To evaluate the association between Hb levels, inflammatory markers, disease activity, and serum albumin in patients with RA, and to identify independent predictors of anemia.
Methods
We conducted a cross-sectional observational study including patients with established RA. Clinical, immunological, and biological data were collected. Disease activity was assessed using the 28-joint Disease Activity Score with erythrocyte sedimentation rate (DAS28-ESR). Nutritional status was assessed using serum albumin and Hb levels. Correlations were assessed using Spearman's rank test. Linear regression analyses were performed to identify predictors of Hb levels.
Results
Forty-eight patients were included. They were predominantly female (85.4%), with a mean age of 59.5 ± 11 years. The mean disease duration was 124.8 ± 101.5 months. Most patients were seropositive for rheumatoid factor (RF) and/or anti-citrullinated protein antibodies (ACPA) (85.4%). The mean DAS28-ESR was 4.07 ± 1.41, reflecting moderate to high disease activity in the majority of patients. The mean Hb level was 12.1 ± 1.8 g/dL.
Hb levels were negatively correlated with C-reactive protein (CRP) (ρ = −0.495, p < 0.001), ESR (ρ = −0.435, p = 0.002), and DAS28-ESR (ρ = −0.352, p = 0.014), and positively correlated with serum albumin (ρ = 0.482, p = 0.003).
In univariate linear regression analysis, ESR was a significant predictor of Hb levels (β = −0.398, p = 0.005), explaining 15.9% of Hb variability. In multivariate analysis, only serum albumin remained independently associated with Hb levels (β = 0.371, p = 0.028), while inflammatory markers and disease activity were no longer significant.
Conclusion
Hb levels in RA are closely associated with inflammatory burden and disease activity, supporting the concept of inflammation-related anemia. Serum albumin was an independent predictor of Hb levels, highlighting the combined role of chronic inflammation and nutritional status in the pathophysiology of anemia in RA. These findings emphasize the importance of comprehensive inflammatory control and nutritional assessment in the management of anemia in RA.

P1468

PREVALENCE AND DETERMINANTS OF FRAGILITY FRACTURES IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Introduction:
Rheumatoid arthritis (RA) is associated with an increased risk of osteoporosis and fragility fractures due to chronic inflammation, autoimmune mechanisms, and exposure to glucocorticoids. Data on fracture prevalence and associated factors in RA in Tunisia remain limited.
Objective:
To assess the prevalence of fragility fractures in Tunisian patients with RA and to analyze their association with bone mineral density (BMD), immunological status, treatments, and clinical characteristics.
Methods:
We conducted a cross-sectional study including patients with established RA. Demographic data (age, sex, menopausal status), disease characteristics (serological status, disease duration), treatments , and BMD assessed by dual-energy X-ray absorptiometry were collected. Osteoporosis was defined according to WHO criteria. Fragility fractures were identified clinically and radiologically. Categorical variables were compared using chi-square or Fisher's exact test, and quantitative variables using non-parametric tests. A p-value <0.05 was considered statistically significant.
Results:
The study population included 48 patients, of whom 85.4% were postmenopausal women, with a mean age of 59.5 ± 11.0 years. Eighty-five percent of the patients were seropositive for rheumatoid factor and/or ACPA. Osteoporosis was present in 56.3% of patients, osteopenia in 21.3%, and normal BMD in 21.3%. Regarding bone-protective treatments, bisphosphonates were prescribed in 28.2% of patients.
Fragility fractures were observed in 26.8% of patients with available data. Among fractured patients, 90.9% had osteoporosis and 9.1% had osteopenia, with no fractures occurring in patients with normal BMD. Vertebral fractures were the most frequent (14.6%), followed by wrist fractures (7.3%) and hip fractures (4.9%). Fractures were significantly more frequent in patients with osteoporosis compared to those without osteoporosis (90.9% vs 9.1%, Fisher's exact test p = 0.042).
In the osteopenic patient, the femoral neck T-score was −2.0 SD with a corresponding BMD of 0.773 g/cm², and the lumbar spine T-score was −2.1 SD with a BMD of 0.901 g/cm². Among patients with both osteoporosis and fragility fractures, the mean femoral neck T-score was −3.19 ± 0.60 SD, corresponding to a mean femoral BMD of 0.67 ± 0.13 g/cm². The mean lumbar spine T-score was −2.76 ± 1.22 SD, with a corresponding mean BMD of 0.75 ± 0.12 g/cm².
No significant association was found between fragility fractures and current glucocorticoid use, although most fractured patients were receiving corticosteroids.
Conclusion:
Fragility fractures are frequent in patients with rheumatoid arthritis and are strongly associated with BMD levels.

P1469

MANAGING THE GAP OF OSTEOPOROSIS IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Background
Patients with rheumatoid arthritis (RA) are at increased risk of osteoporosis (OP) and fragility fractures due to chronic inflammation, glucocorticoid exposure, and hormonal factors. International guidelines recommend systematic screening and appropriate anti-osteoporotic treatment in high-risk patients. However, real-life adherence to these recommendations remains uncertain.
Objective
To evaluate the management OP in patients with RA and to identify potential gaps between bone health status and therapeutic interventions.
Methods
We conducted a cross-sectional study including patients with RA. Demographic data (age, sex, menopausal status), disease characteristics, bone mineral density (BMD) assessed by dual-energy X-ray absorptiometry (DEXA), and history of fragility fractures were collected. OP and osteopenia were defined according to WHO criteria. Data on OP management, including bisphosphonate therapy and calcium–vitamin D supplementation were recorded.
Results
The study population included 48 patients, predominantly postmenopausal women (85.4%), with a mean age of 59.5 ± 11.0 years. OP was diagnosed in 56.3% of patients, while 21.3% had osteopenia and 21.3% had normal BMD. Fragility fractures (FF) were identified in 26.8% of patients with available data, mainly vertebral fractures. Calcium and vitamin D supplementation was prescribed at a mean daily dose of 1000 mg and 800 IU, respectively, but use was inconsistent, even among patients with low BMD.Despite the high prevalence of OP and fractures, only 28.2% of patients were receiving bisphosphonate therapy.
Notably, 45.5% of patients with documented FF were not receiving any specific anti-osteoporotic treatment at the time of evaluation.
Conclusion
Our study highlighted the gap in the management of OP among patients with RA . Despite a high prevalence of OP and FF , anti-osteoporotic therapies remain underutilized. These findings emphasize the need for improved implementation of OP screening and treatment strategies in RA, to reduce fracture risk and long-term morbidity.

P1470

PREDICTORS OF OSTEOPOROSIS IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Introduction
Osteoporosis (OP) is a common complication of rheumatoid arthritis (RA), resulting from the combined effects of chronic inflammation, disease activity, hormonal status, and long-term treatments, particularly corticosteroids. Identifying factors associated with OP in RA remains essential for early prevention and optimized management.
Objectives:
To identify clinical, biological, and therapeutic factors associated with OP in patients with RA.
Methods
We conducted a cross-sectional study including 48 patients with RA . Demographic characteristics, disease-related variables, biological parameters, and therapeutic data were collected. Disease activity was assessed using DAS28-VS. Bone mineral density (BMD) was measured at femoral and vertebral sites by dual-energy X-ray absorptiometry, and OM was defined according to WHO criteria. Associations between OM and clinical, biological, and therapeutic variables were evaluated using non-parametric tests. A multivariable logistic regression model was performed to identify independent predictors of OP.
Results
The study population was predominantly female (85.4%), with a mean age of 59.5 ± 11.0 years. Most women were postmenopausal (85.4%). Disease activity was moderate, with a mean DAS28-VS of 4.07 ± 1.41. Corticosteroids were used in 75% of patients, with a mean daily dose of 5 mg, and 35.7% had received corticosteroid boluses. Biologic therapy was prescribed in 25% of patients. Calcium and vitamin D supplementation were administered in 69% and 74% of cases, respectively, while 28.2% received anti-osteoporotic treatment. OP was diagnosed in 56.3% of patients, osteopenia in 20.8%, and normal BMD in 20.8%. The mean femoral and vertebral T-scores were −2.13 ± 1.30 and −1.90 ± 1.36, respectively. In multivariable logistic regression analysis including age, menopausal status, and corticosteroid use, no factor was independently associated with OP. Corticosteroid use showed a trend toward increased risk (OR 3.4, p = 0.14).
Conclusion
In our study OP was highly prevalent despite relatively young age and moderate disease activity. No clinical or therapeutic factor was independently associated with OP in multivariable analysis, although corticosteroid exposure tended to increase the risk.

P1471

PAIN SEVERITY AND INFLAMMATORY MARKERS IN RHEUMATOID ARTHRITIS

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Background
Pain is a major contributor to disability in rheumatoid arthritis (RA) and reflects both inflammatory activity and clinical disease burden. The relationship between pain intensity, inflammatory markers, and disease activity remains complex.
Objectives
To assess the association between pain severity, inflammatory markers, and disease activity in patients with RA.
Methods
We conducted a cross-sectional study including patients with established RA. Pain severity was evaluated using a visual analog scale (VAS). Disease activity was assessed using DAS28-ESR, while inflammatory markers included C-reactive protein (CRP) and erythrocyte sedimentation rate (ESR). Correlations were analyzed using Spearman's rank test, and pain severity was compared between active and inactive disease using the Mann–Whitney U test.
Results
The study population included 48 patients, predominantly female (85.4%), with a mean age of 59.5 ± 11.0 years and a mean disease duration of 124.8 ± 101.5 months. Most patients were seropositive for rheumatoid factor and/or anti-citrullinated protein antibodies (85.4%). The mean DAS28-ESR was 4.07 ± 1.41, indicating moderate to high disease activity. Mean VAS pain score was 4.7 ± 2.3. The mean number of tender joints (NAD) was 5.9 ± 5.1, while the mean number of swollen joints (NAT) was 2.2 ± 3.1. The mean patient global assessment (EGP) was 4.7 ± 2.4. Pain severity was strongly correlated with disease activity assessed by DAS28-ESR ($\rho = 0.539$, $p < 0.001$). In contrast, no significant correlation was observed between pain severity and CRP ($\rho = 0.122$, $p = 0.408$) or ESR ($\rho = 0.108$, $p = 0.465$). Patients with active disease reported significantly higher pain scores compared to those with inactive disease ($p = 0.001$).
Conclusion
Pain severity in RA is strongly associated with clinical disease activity but not with isolated biological inflammatory markers. These findings highlight the importance of comprehensive clinical assessment, beyond laboratory parameters, to adequately evaluate pain and disease burden in RA.

P1472

IMPACT OF SEROLOGICAL STATUS ON DISEASE ACTIVITY IN RHEUMATOID ARTHRITIS

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Introduction
Rheumatoid arthritis (RA) is a chronic inflammatory disease with heterogeneous clinical severity and outcomes. Serological markers such as rheumatoid factor (RF) and anti-citrullinated protein antibodies (ACPA) are key elements in disease classification and prognosis. However, the association between serological status and the clinical phenotype of RA, including disease activity, functional impairment, and structural damage, remains incompletely defined.
Objective
To evaluate the impact of serological status on the clinical phenotype of rheumatoid arthritis.
Patients and Methods
We conducted a cross-sectional study including 48 patients with rheumatoid arthritis. Serological status was assessed using RF and ACPA, and patients were classified as seropositive or seronegative. Disease activity, functional impairment, and structural severity were evaluated using the Disease Activity Score in 28 joints (DAS28-ESR), the Health Assessment Questionnaire (HAQ), and the presence of joint

deformities, respectively.
Comparisons between ACPA status and RA clinical phenotype were performed using non-parametric tests (Mann–Whitney U test) for quantitative variables and Chi-square or Fisher's exact test for qualitative variables. Statistical significance was set at $p < 0.05$.

Results

The study population was predominantly female (85.4%) with a mean age of 59.5 ± 11.0 years. The mean disease duration was 124.8 ± 101.5 months. Seropositivity was observed in 85.4% of patients; ACPA positivity was present in 77.1%, and RF positivity in 72.9%. Regarding treatment, 75.0% of patients were receiving corticosteroid therapy, with a mean daily dose of approximately 5 mg of prednisone equivalent. Methotrexate was used in 72.9% of patients, leflunomide in 16.7%, sulfasalazine in 29.2%, and hydroxychloroquine in 8.3%. Biologic therapy was prescribed in 25.0% of cases, mainly anti-TNF agents. RA was classified as active in 72.9% of patients with a mean DAS28-VS of 4.07 ± 1.41, and a mean HAQ score of 0.96 ± 0.68. Joint deformities were observed in 48.9% of patients.
Disease activity assessed by DAS28 did not differ significantly between seropositive and seronegative patients ($p = 0.942$). Similarly, no significant difference was observed in HAQ scores between the two groups ($p = 0.941$). Joint deformities were more frequent in seropositive patients (52.6%) compared to seronegative patients (28.6%), although this difference did not reach statistical significance ($p = 0.242$).

Conclusion

Seropositive status was associated with a tendency toward higher disease activity and greater structural damage, although no statistically significant differences were observed. Larger studies are needed to better delineate its prognostic value.

P1473

BODY COMPOSITION AND BONE IMPAIRMENT IN AXIAL SPONDYLOARTHRITIS: A CROSS-SECTIONAL STUDY

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Introduction

Axial spondyloarthritis (axSpA) is a chronic inflammatory disease frequently complicated by alterations in bone health, including osteopenia and osteoporosis (OP), which contribute to increased morbidity and fracture risk. While systemic inflammation is known to affect both muscle and bone, the relationship between body composition and bone impairment in axSpA remains insufficiently explored.

Objective

The objective of this study was to assess the association between body composition parameters (lean and fat mass indices) and bone impairment

Patients and Methods

A cross-sectional study was conducted including patients with axSpA. Demographic, clinical and biological data were collected, including age, sex, disease duration, body mass index (BMI), disease activity scores (Ankylosing Spondylitis Disease Activity Score based on C-reactive protein and erythrocyte sedimentation rate : ASDAS-CRP and ASDAS-ESR), Bath Ankylosing Spondylitis Disease Activity Index (BASDAI) and functional status assessed using the Bath Ankylosing Spondylitis Functional Index (BASFI). Body composition parameters were assessed using lean mass index (LMI) and fat mass index (FMI). Bone impairment was defined as the presence of either osteopenia or OP .

Results

The study population of 129 patients had a mean age of 40.7 ± 12.9 years and included 61% women. The mean BMI was 26.9 ± 5.0 kg/m². The mean FMI was 0.068 ± 0.041, and the mean LMI was 26.9 ± 4.9 kg/m².
OP was observed in 17 patients (13.2%) and osteopenia in 8 patients (6.2%), resulting in an overall prevalence of bone impairment of 19.4%. Patients with bone impairment tended to have a lower LMI compared to those without bone impairment (25.9 ± 5.5 vs 27.2 ± 4.8 kg/m²), although this difference did not reach statistical significance. FMI did not differ significantly between groups (0.078 ± 0.050 vs 0.065 ± 0.038). No significant differences were observed between patients with and without bone impairment regarding disease activity or functional scores, including ASDAS-CRP, ASDAS-ESR, BASDAI and BASFI. In multivariable logistic regression analysis adjusting for age, sex, BMI, disease duration and disease activity, neither LMI nor FMI was independently associated with bone impairment.

Conclusion

Our study showed that bone impairment affects nearly one-fifth of patients with axSpA and does not appear to be adequately explained by standard body composition parameters. These findings suggest that the muscle–bone interaction in axSpA is complex and multifactorial, highlighting the need for a more comprehensive approach to bone health assessment beyond conventional clinical and biological markers.

P1474

INFLUENCE OF BODY MASS COMPOSITION ON DISEASE ACTIVITY IN AXIAL SPONDYLOARTHRITIS

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Introduction

Alterations in body composition, including increased fat mass and reduced muscle mass, have been described in chronic inflammatory diseases and may contribute to functional impairment and symptom burden. In axial spondyloarthritis (axSpA), the relative contributions of fat and lean compartments to disease activity remain insufficiently explored.

Objective

The objective of this study was to assess the associations between body composition parameters and disease activity and functional outcomes in patients with axSpA .

Patients and Methods

We conducted a cross-sectional study including patients diagnosed with axSpA. Demographic and clinical data were collected, including age, sex, anthropometric measurements, and disease characteristics. Body composition was assessed using bioimpedance-derived parameters, including fat mass percentage (FM%), fat mass index (FMI), and lean mass index (LMI). Disease activity was evaluated using the Ankylosing Spondylitis Disease Activity Score based on erythrocyte sedimentation rate (ASDAS-ESR) and C-reactive protein (ASDAS-CRP), as well as the Bath Ankylosing Spondylitis Disease Activity Index (BASDAI). Functional status was assessed using the Bath Ankylosing Spondylitis Functional Index (BASFI).

Results

A total of 129 patients were included. The mean age was 40.7 ± 12.9 years, and 61.2% were women. The mean body mass index (BMI) was

26.9 ± 5.0 kg/m², and 29.9% of patients were classified as obese. Mean disease activity and functional scores were 2.29 ± 0.93 for ASDAS-ESR, 1.94 ± 0.97 for ASDAS-CRP, 2.43 ± 1.65 for BASDAI, and 2.08 ± 2.32 for BASFI. The mean FM% was 18.5 ± 10.1%, the mean FMI was 0.068 ± 0.041, and the mean LMI was 26.9 ± 4.9 kg/m².

LMI was inversely correlated with BASDAI (ρ = −0.24, p = 0.045), while no significant correlations were observed between FMI and disease activity or functional indices. Neither FMI nor LMI correlated with ASDAS-ESR, ASDAS-CRP, or BASFI.

In multivariable linear regression analyses adjusted for age and sex, LMI showed a non-significant trend toward an inverse association with BASDAI (β = −0.16, p = 0.08), whereas FMI was not independently associated with any disease activity or functional outcome. BASDAI did not differ significantly between obese and non-obese patients (2.13 ± 1.83 vs 2.50 ± 1.58, p = 0.41).

Conclusion

Lean mass was more strongly associated to disease activity than fat mass in axSpA. These findings suggest that muscle depletion may contribute to symptom burden independently of overall adiposity, highlighting sarcopenia as a potential therapeutic and rehabilitation target in this population.

P1475

CLINICAL PHENOTYPES AND BONE HEALTH IN AXIAL SPONDYLOARTHRITIS: INSIGHTS FROM BODY COMPOSITION ANALYSIS

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Introduction

Bone loss is a frequent and under-recognized complication of axial spondyloarthritis (axSpA), resulting from a complex interplay between systemic inflammation, mechanical factors, and body composition. While the muscle–bone axis has emerged as a key determinant of skeletal health, the influence of clinical phenotypes and body composition on bone impairment in axSpA remains insufficiently characterized.

Objective:

The objective of this study was to assess the association between clinical phenotypes and bone impairment in patients with axial spondyloarthritis.

Patients and Methods

We conducted a cross-sectional study including patients fulfilling the Assessment of SpondyloArthritis International Society (ASAS) criteria for axSpA. Clinical phenotypes were classified according to ASAS definitions. Disease activity was assessed using the Ankylosing Spondylitis Disease Activity Score (ASDAS), the Bath Ankylosing Spondylitis Disease Activity Index (BASDAI), and functional status using the Bath Ankylosing Spondylitis Functional Index (BASFI). Bone impairment was defined as the presence of osteoporosis (OP) or osteopenia based on dual-energy X-ray absorptiometry (DXA). Body composition parameters included fat mass index (FMI) and lean mass index (LMI). Associations between clinical phenotypes, body composition, and bone impairment were analyzed using multivariable models adjusted for age, sex, body mass index (BMI), and disease duration.

Results

The study included 129 patients with a mean age of 49.2 ± 13.3 years, and a female predominance (61.2%). The mean disease duration was 4.25 ± 2.14 years. The distribution of clinical phenotypes was as follows: pure axial SpA (25.4%), peripheral articular SpA (12.7%), peripheral enthesitic SpA (6.3%), peripheral articular and enthesitic SpA (14.3%), axial with peripheral articular involvement (19.8%), axial with peripheral enthesitic involvement (6.3%), and axial with combined peripheral involvement (15.1%). Regarding treatments, 60.5% of patients received conventional synthetic DMARDs (csDMARDs), 55.8% had been treated with biologic DMARDs (bDMARDs), and 27.1% had a history of methotrexate (MTX) use, while no patient received targeted synthetic DMARDs (tsDMARDs). Among the 129 patients, OP was present in 13.2% and osteopenia in 6.2%, resulting in an overall bone impairment prevalence of 19.4%. Bone impairment significantly differed across clinical phenotypes, with the highest prevalence observed in patients with peripheral involvement (44% in axial–peripheral articular phenotype), compared with pure axial disease (12.5%).

FMI significantly varied across phenotypes, with higher FMI values observed in patients with combined axial and peripheral involvement, particularly those with both articular and enthesitic features, whereas patients with pure axial disease showed the lowest FMI values. In contrast, LMI did not significantly differ between phenotypes (p = 0.45). Similarly, no significant differences in disease activity or functional scores (ASDAS, BASDAI, BASFI) were observed between patients with and without bone impairment. In multivariable logistic regression, clinical phenotype showed a borderline association with bone impairment (OR 1.36, p = 0.093), while age, sex, BMI, disease activity indices, and disease duration were not independently associated.

Conclusion

Bone impairment in axSpA is significantly influenced by clinical phenotype, with peripheral forms showing the highest risk. Fat mass, rather than lean mass, appears to be associated with unfavorable bone profiles, highlighting the importance of body composition in skeletal vulnerability. These results emphasize the need for phenotype-driven strategies for bone health screening and

P1476

CLINICAL CHARACTERISTICS OF PATIENTS WITH TYPE 2 OSTEOPOROSIS RECEIVING PROTON PUMP INHIBITORS: AN OBSERVATIONAL STUDY

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Background:

Type 2 osteoporosis is a major public health concern, associated with increased fracture risk and morbidity. Several studies have suggested a potential association between long-term use of proton pump inhibitors (PPIs) and impaired bone metabolism; however, available evidence remains inconsistent.

Objective:

To evaluate clinical characteristics and potential differences between patients with type 2 osteoporosis using proton pump inhibitors and those not receiving PPIs.

Materials and Methods:

This observational study included 32 female patients diagnosed with type 2 osteoporosis. Among them, 14 patients were receiving concomitant treatment with proton pump inhibitors, while 18 patients were not using PPIs. Relevant clinical and paraclinical data related to bone health were analyzed and compared between the two subgroups.

Results:
Patients receiving proton pump inhibitors accounted for 43.75% of the study population. Differences were observed between the two groups in the evaluated parameters; however, the small sample size limited the statistical power of the analysis. No definitive causal relationship between PPI use and osteoporosis severity could be established.

P1477
THE IMPORTANCE OF EARLY DIAGNOSIS AND PREVENTION OF MORTON'S NEUROMA

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Background:
Morton's neuroma is a common cause of metatarsalgia, characterized by fibrotic thickening of the interdigital nerve, most frequently located in the third intermetatarsal space. Diagnosis is often delayed, as early symptoms are nonspecific and frequently attributed to other forefoot disorders.
Objective:
To highlight the importance of early diagnosis and preventive measures in limiting the clinical progression of Morton's neuroma and reducing the need for invasive treatments.
Materials and Methods:
This paper is based on the analysis of clinical data and a review of the relevant literature regarding the biomechanical mechanisms involved in the development of Morton's neuroma, associated musculoskeletal risk factors, and strategies for prevention and early diagnosis.
Results:
The reviewed data suggest that early recognition of suggestive symptoms (intermetatarsal pain, burning sensation, or paresthesia) and correction of predisposing biomechanical factors (metatarsalgia, forefoot deformities, inappropriate footwear) may limit the progression of nerve damage. Preventive measures, including patient education, use of plantar orthoses, and footwear modification, are associated with symptom relief and a reduced risk of recurrence.
Conclusions:
Early diagnosis and prevention are essential components in the management of Morton's neuroma. A preventive and multidisciplinary approach may limit disease progression, reduce the need for invasive interventions, and improve patients' quality of life.

P1478
ANALYSIS OF COMORBIDITY SCORES IN PATIENTS WITH DXA-CONFIRMED OSTEOPOROSIS

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Background:
Osteoporosis is a chronic condition frequently associated with multiple comorbidities, which may influence disease progression, fracture risk, and therapeutic strategies. Standardized assessment of comorbidities allows an objective evaluation of the clinical complexity of patients with osteoporosis.
Objective:
To analyze comorbidity scores assessed using the Charlson Comorbidity Index in patients with DXA-confirmed osteoporosis.
Materials and Methods:
This observational study included 25 female patients diagnosed with osteoporosis according to DXA criteria. Comorbidities were assessed using the **Charlson Comorbidity Index (CCI)**. Data were analyzed descriptively, focusing on the distribution of CCI scores and their relationships within the study cohort.
Results:
Charlson Comorbidity Index scores demonstrated considerable variability in comorbidity burden among the included patients. The observed interindividual differences reflect the clinical heterogeneity of the study population. The small sample size limits the statistical power of the analysis and the interpretation of the observed relationships.
Conclusions:
Assessment of comorbidities using the Charlson Comorbidity Index provides relevant information regarding the clinical profile of patients with DXA-confirmed osteoporosis. Integrating CCI into routine evaluation may contribute to individualized osteoporosis management. Larger, prospective studies are needed to validate these findings.

P1479
EMOTIONAL DETERMINANTS OF MUSCULOSKELETAL PAIN IN CHRONIC ARTHRITIS

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Background: Chronic inflammatory joint diseases such as rheumatoid arthritis (RA), ankylosing spondylitis (AS), and psoriatic arthritis (PsA) are among the most prevalent rheumatic conditions and are frequently associated with persistent musculoskeletal pain. Pain pathogenesis is multifactorial, involving inflammatory, neurobiological, and psychosocial mechanisms. While inflammatory activity plays a central role, psychoemotional factors may significantly influence patients' perceptions and reporting of pain.
Objectives: To evaluate the intensity of musculoskeletal pain (arthralgia and myalgia) and its association with anxiety and depressive symptoms in a Bulgarian cohort of patients with chronic inflammatory joint diseases.
Methods: This single-center observational study included patients with RA, AS, and PsA followed at the Rheumatology Clinic of St. Marina University Hospital, Varna. All patients fulfilled established classification criteria for the respective disease and were receiving biological therapy. Pain intensity (joint and muscle) was assessed using visual analogue scales (VAS). Anxiety and depressive symptoms were evaluated using the Zung Self-Rating Anxiety Scale (SAS) and Self-Rating Depression Scale (SDS). Laboratory markers of inflammation were recorded. Statistical analyses included descriptive statistics, one-sample t-tests, correlation, and linear regression analyses, with a significance level set at $p<0.01$.
Results: A total of 130 patients were included (mean age 56.37± years, range 21–76); 41.5% were women and 58.5% men. No significant sex differences were observed in joint or muscle pain intensity ($p=0.177$ and $p=0.717$, respectively). Women demonstrated significantly higher anxiety

and depression scores compared to men (p<0.001 for SDS; p=0.001 for SAS). Depressive symptoms showed a strong positive correlation with both muscle and joint pain (SDS–VASm r=0.666, p<0.001; SDS–VASj r=0.644, p<0.001). Anxiety symptoms correlated significantly with joint pain and muscle pain (SAS–VASj r=0.680, p<0.001; SAS–VASm r=0.698, p<0.001). Inflammatory markers explained approximately 8% of the variance in pain intensity (R^2=7.8% for joint pain; R^2=8.1% for muscle pain).

Conclusion: Musculoskeletal pain in chronic inflammatory joint diseases is influenced not only by inflammatory activity but also by psychoemotional factors. Anxiety and depressive symptoms are significantly associated with higher pain intensity, underscoring the importance of integrated biopsychosocial assessment and management in patients with inflammatory rheumatic diseases.

P1480

MEDICAL EDUCATION IN HYPOPHOSPHATASIA SIGNIFICANTLY IMPROVES COMPETENCE IN DIFFERENTIAL DIAGNOSIS

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Objectives

Hypophosphatasia (HPP) is often missed or misdiagnosed by pediatric endocrinologists as a) it is rare; b) its clinical presentation overlaps with more common metabolic bone diseases. The critical diagnostic marker of low serum alkaline phosphatase is often overlooked. We sought to improve physician competence in recognizing possible HPP by providing expert-led accredited education.

Material and Methods

Physicians were targeted based on their specialty, learning habits, and interest, to participate in a 40-minute, video-based, online CME activity delivered by experts, with synchronized slides (available at https://www.medscape.org/viewarticle/1001401). The effects of the education were assessed using a 3-question, repeated pairs, pre-assessment/post-assessment study design. One question assessed confidence. Differences from pre- to post-assessment were evaluated using the McNemar's test. P ≤ 05 is the significance level.

Results

Overall significant improvements were seen after participation for both endocrinologists (correct response rate of 49% at pre-assessment vs 68% at post-assessment; P<.001, Cohen's d= 0.96, N=57), and pediatricians (correct response rate of 48% at pre-assessment vs 65% at post-assessment; P<.001, Cohen's d= 0.74, N=82). Specifically, significant improvements were observed in clinicians' ability to identify differential labs & symptoms between HPP and rickets, and in their understanding of how to correctly quantify ALP levels.

After participating in the activity, 60% of endocrinologists and 51% of pediatricians had measurable improved confidence related to differentially diagnosing hypophosphatasia from other rare metabolic diseases. In addition, 62% of endocrinologists and 54% of pediatricians said they intend to "always request ALP levels in heparin test tubes when HPP is part of my differential diagnosis."

Conclusions

This study demonstrates the success of online, expert-led, video-based education in improving competence and confidence in differentially diagnosing HPP when the right target audiences are identified, reached, and engaged at addressable learning moments.

P1481

FLUOROSCOPY-GUIDED LUMBAR FACET JOINT INFILTRATION WITH HYDROLYZED COLLAGEN PEPTIDES IN CHRONIC FACET SYNDROME: A PROSPECTIVE COMPARATIVE COHORT

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Objective(s): To explore short-term pain and disability outcomes of fluoroscopy-guided lumbar facet joint infiltration with low molecular weight collagen peptides (LWPs) compared with standard approaches in chronic low back pain due to facet syndrome.

Material and Methods: Single-centre prospective cohort at the Orthopaedics and Traumatology Department, "SS. Annunziata" Hospital (Taranto, Italy). Forty patients (mean age 68.6 years; range 64–73) were treated in four groups (n=10 each): corticosteroid injection, corticosteroid+LWPs, LWPs alone, or corticosteroid+radiofrequency (RF) procedure. Outcomes were numeric rating scale (NRS) pain and Oswestry Disability Index (ODI) at baseline, 1 month and 3 months.

Results: Mean NRS pain scores at baseline, 1 month and 3 months were: corticosteroid 7.9, 5.0, 3.0; corticosteroid+LWPs 8.0, 4.0, 2.0; LWPs 8.0, 5.0, 3.0; corticosteroid+radiofrequency (RF) 8.0, 3.0, 1.0. Mean ODI (mean ± SE, %) improved: corticosteroid 26.5±5.44, 20.5±3.50, 15.2±4.80; corticosteroid+LWPs 25.7±6.31, 16.0±4.85, 16.3±5.25; LWPs 23.5±6.31, 18.0±6.55, 14.7±3.77; corticosteroid+RF 27.6±7.03, 17.7±5.52, 14.6±3.37. No adverse events were reported. The cohort was clinically homogeneous in terms of diagnosis and age range; however, variability measures for NRS could not be derived from the available dataset.

Conclusion(s): All treatment strategies were associated with reduced pain and disability at 3 months, with the greatest mean pain improvement observed in the corticosteroid+RF group. The addition of LWPs to corticosteroid appeared to be associated with lower NRS scores compared with corticosteroid alone, while disability improvements were similar across groups. Although preliminary and limited by sample size and incomplete NRS variance reporting, these findings suggest that fluoroscopy-guided LWPs infiltration may represent a feasible adjunct or alternative option to conventional corticosteroid injections and RF procedures in chronic facet syndrome.

P1482

RARE CAUSE OF PRIMARY OSTEOPOROSIS DUE TO MUTATION IN LRP5 GENE AND RESPONSE TO BISPHOSPHONATE THERAPY

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Introduction: Low-density lipoprotein receptor-related protein 5 is a protein encoded by the *LRP5* gene.LRP5 has an essential role in the Wnt signaling pathway, since it acts as a co-receptor that binds Wnt proteins with Frizzled-receptors. Gain-of-function mutations in the *LRP5* gene can cause high-bone-mass phenotypes in humans, whereas homozygous loss-of-function mutations cause osteoporosis-pseudoglioma syndrome (OPPG) which is characterized by early-onset osteoporosis and complications in eye development (1,2). Mutations in this gene also cause exudative viteroretinopathy (EVR). Osteoporosis-pseudoglioma syndrome (OPPG) is a rare autosomal recessive syndrome of juvenile-onset osteoporosis and ocular abnormalities described first by Saraux in 1967. To date, approximately 50 cases have been reported, most with onset of fractures after age 2 years and congenital blindness, the latter due to persistence of the fetal ocular fibrovascular system and failure of retinal development (3). Familial exudative vitreoretinopathy (FEVR) is a rare childhood hereditary eye disorder that affects both the retina and the vitreous body. It is clinically similar to advanced retinopathy of prematurity, but the affected individuals do not have a history of premature birth and oxygen therapy (4).
Objective: We report 2 cases of pediatric primary osteoporosis due to LRP5 mutation. Both of them were managed with bisphosphonate therapy
Case discussion: Case 1: A 13-year-old boy, first born of consanguineous parentage, presented with spontaneous low back ache. Evaluation of his back ache revealed multilevel vertebral compression fractures. The causes of secondary osteoporosis were ruled out after which whole exome sequencing (WES) was done. WES reveled a missense variant p. Arg1036Trp in the homozygous state in *LRP5* gene. His ocular examination was within normal limits. Following the diagnosis of osteoporosis, he was initiated on bisphosphonate therapy (Zoledronic acid). He received 2 doses of Zoledronic acid and has not had any further osteoporotic fractures. He will be maintained on Zoledronic acid for 2 years.
Case 2: A 14-year -old girl, second born of consanguineous parentage, had spontaneous blurring of vision at 9 years of age. Simultaneously she had spontaneous low back ache. She was investigated for the visual blurring and diagnosed to have right posterior subcapsular cataract and straightening of bilateral retinal vessels all quadrants with areas of capillary dropout noted in temporal peripheries. Evaluation of the back ache revealed multilevel vertebral compression fractures. The causes of secondary osteoporosis were ruled out after which whole exome sequencing was done and she was found to have homozygous missense variant of uncertain significance in the *LRP5* gene. The amino acid change detected was p.(Arg399Ser). Her phenotype and genotype were suggestive of exudative vitreoretinopathy. Along with the ocular findings, she had osteoporosis. In view of the osteoporosis, she has been on bisphosphonate therapy from the age of 11 years. During the course of bisphosphonate therapy, she has not developed further osteoporosis fractures.
Conclusion: We report 2 cases of primary osteoporosis which outlines a rare cause of pediatric primary osteoporosis due to mutation in *LRP5* gene. LRP5 protein affects bone accrual and eye development. Mutation of the *LRP5* gene is associated with osteoporosis and ocular abnormalities. Both the cases had good response to bisphosphonate therapy.
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P1483

SINGLE CENTER EXPERIENCE OF PEDIATRIC OSTEOPOROSIS

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Introduction : The practice of our institution is to diagnose and treat cases of pediatric osteoporosis is based on the following 3 phases:

• (1) **Bone health monitoring**, which is used to identify early signs of compromised bone health

• (2) **Osteoporosis stabilization**, which is aimed to mitigate back pain and interrupt the fracture–re fracture cycle through bone-targeted therapy

• (3) **Bone health maintenance**, which has the goal to preserve the clinical gains realized during the stabilization phase through ongoing bone-targeted therapy

• (4) **Osteoporosis therapy discontinuation**, which places those who are eligible for discontinuation of osteoporosis treatment back on a health monitoring program.

Objective : The aim of this study is to describe the cases of pediatric osteoporosis being managed (from 2024) in the bone clinic under the Division of Endocrinology and Diabetes at our institution.
Methodology: The cases of suspected pediatric osteoporosis are referred to the bone clinic for establishment of care and further follow-up. The bone clinic has been functional once a month from 2025. As per ***The International Society of Clinical Densitometry (ISCD) 2019 official position statement for pediatrics***, the diagnostic criteria for osteoporosis is as follows :

• The finding of >/= 1 vertebral compression fractures (VF) is indicative of osteoporosis , in the absence of local disease or high energy trauma.

• In the absence of VF , diagnosis of osteoporosis is indicated by presence of both

• **Clinically significant fracture history**

• **BMD score </= -2.0**

• **BMD Z-score >-2.0 does not preclude the possibility of skeletal fragility and increased fracture risk**

• Clinically significant fractures (one or more):

• 2 or more long bone fractures by the age of 10 years or

• 3 or more long bone fractures at any age till 19 years of age

• 2 or more long bone fractures of the upper limbs

Results :

A total of 26 patients have established care in the bone clinic for management of osteoporosis. 7 of them had primary osteoporosis, the etiology being osteogenesis imperfecta, Bruck syndrome, Winchester syndrome,osteoporosis pseudoglioma syndrome. All of them are on bisphosphonate therapy (intravenous Zoledronic acid) and have showed improvement in BMD Z-score and vertebral morphology with therapy. The remaining 19 had osteoporosis secondary to Duchenne muscular dystrophy, spinal muscular atrophy, hereditary spastic paraplegia, steroid dependent nephrotic c syndrome , juvenile dermatomyositis, Marfan syndrome, Sjogren's syndrome. The modified criteria for osteoporosis in DMD (Duchenne muscular dystrophy) (***as per Diagnosis and management of Duchenne muscular dystrophy, part 2: respiratory, cardiac, bone health, and orthopedic management 2018***):Osteoporosis is diagnosed once a child with DMD demonstrates at least 1 clinically significant fracture (i.e., a long-bone fracture or vertebral fracture) , multiple fractures are not required.

Conclusion: We are adhering to the diagnostic criteria of osteoporosis before considering bisphosphonate therapy.In terms of secondary osteoporosis the currents standard of care is in line with secondary prevention i.e to identify and treat early instead of late signs of bone fragility, including timely identification of VF through periodic spine imaging.The protocol for initiation of bisphosphonate therapy is in accordance with the Hospital clinical guidelines. The bisphosphonate of choice are Pamidronate (less than 2 years of age) and Zoledronic acid (2 years and above)

P1484

CHANGES IN BONE STRENGTH WITH ROMOSOZUMAB AFTER LONG-TERM DENOSUMAB USE IN WOMEN WITH POSTMENOPAUSAL OSTEOPOROSIS: A REAL-WORLD STUDY

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Objectives: Treatment with a potent anti-resorptive agent like denosumab (DMAb) can provide large gains in bone mineral density (BMD) over time in women with postmenopausal osteoporosis (PMO). However, in patients who remain at very high risk of fracture, switching to a bone-forming agent may help in achieving greater and more rapid gains in BMD and bone strength to reduce fracture risk. This study evaluated the real-world effectiveness of romosozumab (Romo) after DMAb treatment (DMAb-Romo) on bone strength in Japanese women with PMO using biomechanical computed tomography (BCT; VirtuOst®, FDA-cleared).

Materials and methods: Women with PMO aged ≥55 years either received Romo as initial therapy (Romo-first, n=57) or switched to Romo after prior DMAb (DMAb-Romo, n=9). Women in the Romo-first group had not received osteoporosis medication within the 36 months before Romo initiation, whereas women in the DMAb–Romo group had received DMAb for an average of 43 months prior to switching. Vertebral and proximal femoral bone strength and volumetric BMD (vBMD) were assessed at baseline and after 12 months of treatment. The primary endpoint was percentage change in vertebral strength at 12 months. Secondary endpoints included percentage changes in vertebral vBMD and proximal femoral strength and vBMD.

Results: At baseline, vertebral strength was lower in the Romo-first group than in the DMAb-Romo group, whereas differences in vertebral vBMD and proximal femoral strength and vBMD were minimal between groups (Fig A). After 12 months of treatment, percent increase in vertebral strength from baseline was 39.5% in Romo-first and 11.4% with DMAb-Romo group, with the group difference of 24.3% (Fig B). Similar changes were observed for vertebral vBMD (Fig B). Percent increase in proximal femoral strength was 7.4% in Romo-first group, and 1.7% decrease in DMAb-Romo group. Similar trends were observed for proximal femoral vBMD (Fig B).

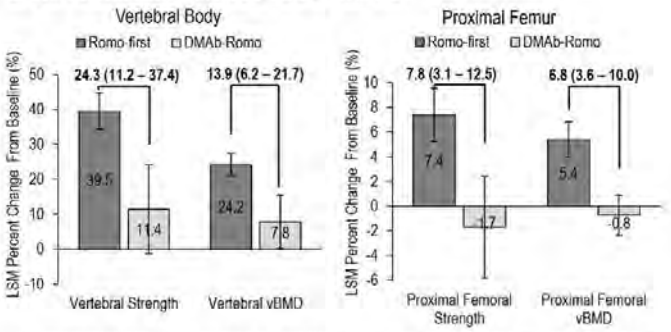
Conclusion: In this real-world BCT study, Romo further increased vertebral strength and vBMD in women with prior DMAb treatment, and changes in proximal femoral strength and vBMD were minimal. Romo-first provides greater gains in vertebral strength and vBMD, while switching to Romo after DMAb may still offer additional benefits when further improvement is needed at the vertebrae.

Figure: Baseline characteristics and endpoints in Romo-first and DMAb-Romo cohorts

A. Baseline Characteristics

	Romo-first (N = 57)	DMAb-Romo (N = 9)
Age, mean (SD) years	73.8 (7.9)	78.6 (6.5)
Fracture history, n (%)	45 (79)	8 (89)
Vertebral strength, Newton	3680 (840)	4360 (1410)
Vertebral vBMD, mg/cm^3	132 (20)	145 (36)
Proximal Femoral strength, Newton	2440 (600)	2620 (620)
Proximal Femoral vBMD, mg/cm^3	201 (43)	207 (48)

B. LSM Percent Change From Baseline at Month 12



LSM percent change (mean, 95% CI) was determined using generalized linear models adjusted for the patients age at the index date, baseline value of the parameter, and fracture history. Numbers above the bar graphs represent the group difference of LSM percent change from baseline with lower and upper bound 95% CI in the parenthesis. CI, confidence interval; LSM, least square mean; Romo romosozumab; DMAb, denosumab; vBMD, volumetric bone mineral density.

P1485

THE EFFECT OF PREGNANCY VITAMIN D SUPPLEMENTATION ON OFFSPRING BONE MINERAL DENSITY IS NOT AFFECTED BY MATERNAL AND CHILD GENETIC VARIATION IN THE VITAMIN D METABOLISM PATHWAY

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Objectives Post-hoc analysis of the MAVIDOS trial showed that pregnancy vitamin D supplementation is associated with higher offspring bone mineral density (BMD) at age 6-7 years. In this analysis, we assessed whether genetic variation (single nucleotide polymorphisms (SNP)) related to vitamin D metabolism modifies this effect.

Material and Methods MAVIDOS was a randomised placebo-controlled trial of 1000 IU/day cholecalciferol (vitD) from 11-14 weeks gestation until delivery. Offspring follow-up at age 6-7 years included whole-body-less-head (WBLH) dual-energy X-ray absorptiometry (DXA; Hologic Discovery) to assess BMD and, in a subset, tibia high resolution peripheral quantitative computed tomography (HR-pQCT, Scanco XTremeCTII) to assess bone microarchitecture.

Maternal and child genotype at four SNPs [rs12785878 (*DHCR7*), rs10741657 (*CYP2R1*), rs6013897 (*CYP24A1*), rs2282679 (GC)] was determined from blood samples. Statistical interactions between genotype and randomisation group (placebo or vitD) were assessed for standardised BMD and HRpQCT outcomes (bone cross-sectional area, cortical thickness, cortical porosity, trabecular number, trabecular thickness, cortical volumetric BMD, trabecular volumetric BMD) using additive linear regression models with adjustment for the child's age and sex.

Results WBLH DXA and SNP data were available for 466 children (228 placebo; 238 vitD), and HRpQCT for 170 children. WBLH BMD was greater in the vitD group (β=0.15 SD, 95%CI -0.02, 0.32), but tibia microarchitecture was similar in both groups. There was no evidence of a significant interaction between maternal or child genotype in the SNPs and intervention for any bone outcome.

Conclusions The beneficial effect of maternal vitamin D supplementation in pregnancy on offspring BMD at 6-7 years was not modified by maternal or child SNPs. These findings point away from the use of personalised genotype directed vitamin D supplementation in pregnancy to optimise offspring bone health.

P1486

THE INFLUENCE OF THE MUSCULAR SYSTEM ON BONE MINERAL DENSITY IN WOMEN OF THE OLDER AGE GROUP WITH OSTEOARTHRITIS OF THE KNEE JOINT

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Objective. Sarcopenia is a complex multifactorial condition, the clinical picture of which is determined not only by muscle mass, but also by muscle strength and functional abilities.

Purpose of the study: to evaluate bone mineral density in women of the older age group with osteoarthritis of the knee joint depending on the condition of the muscular system.

Materials and methods. The study included 64 patients with diagnosed osteoarthritis of the knee joint. The median age of patients was 68.7 years (interquartile range: 66.1–71.3 years). The diagnosis of osteoarthritis of the knee was made according to the diagnostic criteria of the American College of Rheumatology (ACR, 1991).

To conduct a comparative analysis, all patients with knee osteoarthritis were stratified into three groups depending on the state of the muscular system, according to the recommendations of the European Working Group on Sarcopenia in Older People (EWGSOP, 2010). Group 1: 19 patients without signs of sarcopenia; Group 2: 21 patients with presarcopenia; Group 3: 26 patients with sarcopenia.

Assessment of the state of the muscular system was carried out using the following methods: muscle mass; multislice computed tomography.

Bone mineral density was assessed by dual-energy X-ray absorptiometry in the following areas: femoral neck and proximal femur (total), as well as the lumbar spine.

Results. Osteopenic syndrome was diagnosed in 46 (71.9%) patients: osteopenia was detected in 38 (59.4%) patients, osteoporosis - in 8 (12.5%). Normal bone mineral density values were recorded in 18 (28.1%) patients.

The frequency of detection of osteopenic syndrome in patients with sarcopenia was statistically significantly higher compared to patients without sarcopenia (p=0.031) and with presarcopenia (p=0.042).

Indicators of bone mineral density in the neck and proximal femur (total) in patients with sarcopenia were statistically significantly lower than in patients without sarcopenia and with presarcopenia (p = 0.021).

A direct correlation has been established between the total area of skeletal muscles at level LIII and densitometric parameters of the femoral neck.

Conclusions. Sarcopenia is associated with a decrease in bone mineral density in the neck and proximal femur in elderly and senile women with osteoarthritis of the knee.

P1487

STUDY OF BIOCHEMICAL MARKERS OF BONE TISSUE IN THE EARLY STAGES OF OSTEOARTHRITIS

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Objective. The relationship between changes in bone tissue and the dynamics of bone remodeling markers in the early stages of knee osteoarthritis was studied. Understanding these processes is key to developing strategies for early diagnosis and pathogenetic therapy.

Materials and methods. The study included 78 patients with a verified diagnosis of osteoarthritis of the knee joint of radiographic stages I and II. The average age of the sample was 54.68±13.97 years, the ratio of men to women was 1:4.7. The average duration of the disease in history was 5.37±3.92 years.

All participants underwent a comprehensive clinical, laboratory and instrumental examination. Determination of the levels of osteocalcin and C-terminal telopeptides of type I collagen (b-CrossLaps, β-CTX) was carried out by immunochemiluminescence using an automatic analyzer.

Exclusion criteria from the study included: secondary forms of osteoarthritis, diabetes mellitus, cancer, pathology of the parathyroid glands, osteoporosis, as well as a history of taking symptom-modifying drugs, systemic glucocorticoid therapy and drugs that affect bone mineral density.

Results and discussion. The average values of biochemical markers of bone remodeling were: osteocalcin – 25.90±10.47 ng/ml; b-CrossLaps – 0.33±0.18 ng/ml. It is important to note that the obtained indicators did not go beyond the reference values for a healthy population. However, a number of statistically significant correlations were identified. The b-CrossLaps level showed a positive correlation with the radiographic stage of knee osteoarthritis ($r=0.74$, $p<0.045$). There was a strong positive correlation between b-CrossLaps levels and the presence of osteophytes ($r=0.78$, $p<0.045$). Osteocalcin content correlated with the severity of subchondral sclerosis in the femur ($r=0.68$, $p<0.045$) and tibia ($r=0.82$, $p<0.05$).

A direct correlation was revealed between the level of osteocalcin and b-CrossLaps ($r=0.68$, $p<0.05$), which indicates a parallel change in the processes of bone formation and bone resorption.

Conclusions. In the early stages of osteoarthritis, there is a relationship between an increase in bone resorption markers and the formation of osteophytes, as well as bone formation markers and the development of subchondral sclerosis.

P1488

ASSESSMENT OF CARDIOMETABOLIC RISK IN WOMEN WITH NEWLY DIAGNOSED POSTMENOPAUSAL OSTEOPOROSIS

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Objective. Postmenopausal osteoporosis is a severe progressive disease with high social significance. The development of postmenopausal osteoporosis in patients with cardiovascular pathology and type 2 diabetes mellitus has not been sufficiently studied.

Purpose of the study. To assess the severity of cardiometabolic risk in women with newly diagnosed postmenopausal osteoporosis.

Materials and methods. The study included 59 women with newly diagnosed postmenopausal osteoporosis (average age 64.27±4.29 years). All patients underwent a comprehensive examination: To assess cardiometabolic risk, the CMDS (Cardiometabolic Disease Staging) scale was used.

Results. The average age of patients at the time of diagnosis of postmenopausal osteoporosis was 63.43±4.55 years. The average age of onset of natural menopause was 47.58±6.14 years (n=34), surgical menopause – 45.3±1.41 years (n=25). Menopausal hormone therapy was not administered in any case. Excess body weight was detected in 32.2% of those examined: overnutrition - 9 cases, obesity of 1st degree - 7 cases, obesity of 2nd and 3rd degrees - one case each. The average values of systolic and diastolic blood pressure were 145/87±6.71 mm Hg. Art. 52.1% of patients had a history of prolonged arterial hypertension. There was no history of cardiovascular events in all subjects. The glomerular filtration rate calculated using the CKD-EPI formula was 82±9.5 ml/min/1.73 m². The average fasting glucose level was 5.31±0.54 mmol/l; in three cases, impaired fasting glucose was detected. The average level of glycated hemoglobin (HbA1c) is 5.51±0.24%. The average values of total cholesterol were 6.11±1.19 mmol/l, triglycerides - 1.01±0.38 mmol/l, low-density lipoproteins - 3.9±1.3 mmol/l, high-density lipoproteins - 1.74±1.26 mmol/l. Dyslipidemia requiring drug correction was detected in 27% of cases. Distribution of cardiometabolic risk stages according to the CMDS (Cardiometabolic Disease Staging) scale: stage 1 – 25.6%, stage 2 – 20.5%, stage 3 – 12.8%, stage 4 – 2.6%. 38.5% of those examined were considered metabolically healthy.

Conclusions. 1. Women with newly diagnosed postmenopausal osteoporosis have a cardiometabolic risk corresponding to stages 1-4 on the CMDS scale.

2. Patients are shown dynamic monitoring by specialized specialists and treatment.

P1489

ASSESSMENT OF 25(OH)D LEVELS IN PATIENTS WITH OSTEOPOROSIS AND OSTEOARTHRITIS

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Objective. In clinical practice, it is important to assess the level of 25(OH)D in patients with osteoporosis and osteoarthritis in order to timely correct the disorders.

Materials and methods. The study involved 54 people aged from 47 to 75 years. Of these, 30 patients suffered from osteoporosis (27 women, 3 men), and 24 from osteoarthritis (17 women, 7 men). Total calcium and 25(OH)D levels were determined in all participants. Interpretation of 25(OH)D results was carried out as follows: severe deficiency <10 ng/ml; deficiency <20 ng/ml; deficiency 20-30 ng/ml; adequate level 30-100 ng/ml (target values for correction of vitamin D deficiency 30–60 ng/ml). The reference values for total calcium in the blood for the age group 12-60 years were 2.10-2.55 mmol/l, for the age group 60-90 years 2.2-2.55 mmol/l.

Results. In patients with osteoporosis: severe 25(OH)D deficiency (<10 ng/ml) was detected in one case (3.3%) in a smoking woman with type 2 diabetes mellitus requiring insulin therapy and a combination of AP with osteomalacia. Deficiency (<20 ng/ml) was found in 7 patients (23.3%), including 2 men and 5 women. It was noted that vitamin D deficiency was identified in men who abuse alcohol. Insufficiency (20-30 ng/ml) was detected in 20 patients (67%), of whom 2 were men and 18 women. Adequate levels (30-100 ng/ml) were recorded in 2 patients (6.31%).

The level of total calcium in the blood serum was reduced only in 4 (37.5%) patients with 25(OH)D deficiency and in 13 (52%) patients with its deficiency. In the remaining patients, calcium levels were normal.

In patients with osteoarthritis: adequate levels of 25(OH)D (30-100 ng/ml) were detected in 5 patients (20.83%), including 3 men and 2 women; deficiency (<20 ng/ml) was found in 6 patients (25%); deficiency (20-30 ng/ml) was detected in 13 patients (54.16%), of whom 5 were men and 9 women.

In the group of patients with osteoarthritis, total calcium levels were reduced in all patients with vitamin D deficiency and in 3 patients with normal 25(OH)D levels.

Conclusions. Vitamin D metabolism is impaired in patients with osteoarthritis and osteoporosis. In both groups, vitamin D insufficiency prevailed over its deficiency. No direct correlation was found between a decrease in total serum calcium levels and 25(OH)D deficiency.

P1490

SECONDARY OSTEOPOROSIS IN NEUROLOGICAL DISORDERS: A FUNCTIONAL AND OSTEODENSITOMETRIC ANALYSIS

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Introduction

Secondary osteoporosis frequently complicates neurological disorders due to immobilization and motor deficits, leading to decreased bone mineral density and increased fracture risk, even in young patients experiencing prolonged motor impairment and reduced mechanical loading.

Objectives

This study aimed to examine clinical, functional, and bone health characteristics in young neurological patients with secondary osteoporosis and their association with motor deficits and fall risk.

Materials and Methods

From an initial cohort of 54 patients with neurological disorders and osteoporosis, 19 with secondary osteoporosis due to immobilization were selected. The group included patients with stroke, multiple sclerosis, spinal cord injury, traumatic brain injury, ALS, Charcot–Marie–Tooth neuropathy, muscular dystrophy, Guillain–Barré syndrome, Stiff Person syndrome, bulbar cavernoma, and paraparesis. Patients were hospitalized at the Clinical Rehabilitation Hospital Băile Felix between May 2025 and January 2026. Bone mineral density was assessed by DXA (Medix 90), functional status by FIM, Barthel Index, and FAC, and fall risk by the Johns Hopkins tool. All patients received personalized rehabilitation based on their neurological condition and comorbidities.

Results

The study included 19 patients (36.8% men, 63.2% women) with a mean age of 43.8 ± 2.1 years, all presenting chronic neurological conditions with significant functional impairment. Patients exhibited high fall risk (mean score 18.8 ± 3.6) and moderate functional dependence, with reduced independence in daily activities (mean FIM 77.7 ± 15.3; Barthel Index 55.3 ± 20.1). Gait was limited (FAC 2.0 ± 1.6), requiring physical assistance. Bone mineral density assessment revealed reduced values, with mean hip Z and T scores of −2.06 ± 0.68 and −2.4 ± 0.63, and lumbar spine Z and T scores of −2.4 ± 0.69 and −2.64 ± 0.87, consistent with secondary osteoporosis in this young patient population.

Discussion

Relatively young neurological patients exhibit secondary osteoporosis characterized by reduced bone mineral density, functional impairment, limited mobility, and increased fall risk.

Conclusions

Neurological patients with secondary osteoporosis require a multidisciplinary approach integrating rehabilitation, fall prevention strategies and appropriate antiosteoporotic treatment.

P1491

EFFECTS OF SELECTIVE CANNABINOID RECEPTOR TYPE 2 (CBR2) ANTAGONIST ON OSTEOGENIC DIFFERENTIATION AND BONE-RELATED GENE REGULATION IN HUMAN ADIPOSEDERIVED STEM CELLS: A PRELIMINARY STUDY

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Objectives: The endocannabinoid system (ECS) has emerged as an important regulator of bone remodeling, with activation of the cannabinoid receptor type 2 (CBR2) reported to promote osteoblast maturation and reduce bone loss. However, the effects of CBR2 inhibition on osteogenic differentiation remain poorly defined. This study aimed to investigate the *in vitro* effects of the selective CBR2 antagonist SR144528 on the osteogenic differentiation of human adipose-derived mesenchymal stem cells (hADMSCs) and on the expression of osteogenic markers and bone-metabolism-related microRNAs.
Methods: hAMSCs were isolated from subcutaneous adipose tissue of healthy donors and induced toward osteogenic differentiation in the presence of SR144528 (i.e., 300nM, 1μM, and 3μM) for up to 35 days. Alkaline phosphatase (ALP) activity and calcium-phosphate deposition were quantified by fluorometric assay and laser-scanning confocal microscopy, respectively. Furthermore, qPCR was performed to evaluate the expression of early and late osteogenic marker genes, as well as selected microRNAs closely related to bone metabolism.
Results: Treatment with SR144528 at 3 μM and 1 μM significantly reduced ALP activity and HA deposition at day 28 compared to control. At day 7, 3μM and 1μM SR144528 downregulated early osteogenic markers (*ALP*, *RUNX2*, *COL1A1*) and reduced *OPG* expression at day 21, while *OCN* levels remained unchanged. Moreover, qPCR analysis revealed a significant upregulation of miR-23a and miR-21, whose overexpression has been associated with the inhibition of osteogenic differentiation. In parallel, a marked downregulation of miR-29b was detected, whose increased expression correlates with enhanced ALP activity and extracellular matrix mineralization.
Conclusions: Collectively, these findings indicate that CBR2 activity contributes to osteogenic mineralization and bone matrix formation. Pharmacological CBR2 activation could therefore represent a promising therapeutic strategy for osteoporosis and other lowbonemass conditions, whereas CB2R inhibition could be relevant in pathological conditions characterized by excessive mineral deposition, such as tumoral calcinosis.
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P1492

STUDY OF THE IN VITRO EFFECT OF PHOSPHATE ON OSTEOGENIC DIFFERENTIATION AND MINERALIZATION IN HUMAN ADIPOSE-DERIVED MESENCHYMAL STEM CELLS

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Objectives: Inorganic phosphate (Pi) is essential in mammals, supporting key metabolic activities such as intracellular signaling and ATP-dependent energy production. Pi also contributes structurally by enabling hydroxyapatite formation in bone tissue, while reduced Pi levels are linked to impaired bone metabolism and mineralization defects. This study aimed to investigate for the first time how phosphate exposure influences calcification and osteogenic differentiation in human adipose-derived mesenchymal stem cells (hADMSCs).
Methods: hADMSCs were isolated from subcutaneous adipose tissue of healthy donors and cultured in 24-well plates. Cells were exposed to 2, 3, or 4mM Pi for up to 35 days, either in standard growth medium or in osteogenic differentiation medium. Alkaline phosphatase (ALP) activity and hydroxyapatite (HA) deposits were quantified by fluorometric assay during osteogenic differentiation (from day 0 to day 35). In addition, qPCR using TaqMan technology was performed to evaluate the expression of early- and late-stage osteogenic marker genes, including *ALP*, *COL1A1*, *OPG*, and *OCN*.
Results: Our data showed a significant increase in ALP activity in hADMSCs induced toward the osteogenic phenotype and treated with 4mM Pi at day 28 compared with control cells. Regarding mineralization, 4mM Pi significantly enhanced HA deposition both in standard growth medium and in osteogenic differentiation medium. Gene expression analysis revealed a significant upregulation of early (*ALP* and *COL1A1*) and late (*OCN* and *OPG*) osteogenic markers in cells induced to differentiate toward the osteogenic phenotype in the presence of 4mM Pi.
Conclusions: Overall, exposure to high Pi concentration (4mM) significantly enhanced osteogenic differentiation by increasing ALP activity, promoting HA deposition, and upregulating both early and late osteogenic markers in hADMSCs, thereby supporting the pro-osteogenic activity of phosphate *in vitro*. Based on these findings, investigating the role of Pi in osteoblastic cell differentiation may contribute to a better understanding of metabolic bone disease.
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P1493

A STRANGE CASE OF HYPERPARATHYROIDISM

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Coeliac disease (CD) affects 1-2% of the population, diagnosed in early childhood but also in the second or third decade of life.
It has chameleonic clinical presentation, ranging from severe malabsorption to minimally symptomatic to osteomalacia and high fracture risk. Hypocalcaemia is a common finding in CD, however hypercalcemia has been also reported either due to primary hyperparathyroidism (PHPT) or tertiary hyperparathyroidism (THPT). Bone turnover is enhanced in several metabolic bone diseases, but there is no statement regarding cut-off values, nor national standardization of bone turnover markers (BTM) especially in premenopausal patients with CD.
We present the case of a 33-year-old patient with CD, high BTM probably due to mixed hyperparathyroidism (bone THPT).

P1494

DETERMINANTS OF SUBOPTIMAL BONE MINERAL DENSITY RESPONSE TO ROMOSOZUMAB: A PROSPECTIVE MULTICENTER SWISS COHORT STUDY

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Objective: Thanks to its dual anabolic and antiresorptive effects, romosozumab (Romo) substantially increases bone mineral density (BMD). In the FRAME trial, 1-year Romo BMD gains <3% were observed in only 4% of subjects at spine and 22% at hip. However, prior anti-resorptive (AR) therapy attenuates Romo effects on BMD. We assessed the proportion and determinants of suboptimal BMD response to Romo in real-world practice.
Materials and Methods: This prospective multicenter study included osteoporosis patients (70% with recent and/or multiple fractures) treated with Romo (210mg s.c. monthly for 12 months) across five centers in Switzerland between 2021 and 2025. Non-responders (NR) were defined as patients with <3% BMD gain at spine and/or hip after one year. Determinants of NR were analyzed using multivariable logistic regression models including baseline clinical characteristics, prior treatment exposure, and bone turnover markers (CTx, P1NP).
Results: A total of 496 patients (89.7% women; mean age 70.4 ± 10.3 years) were included, of whom 51% were treatment-naïve and 49% previously exposed to AR (mainly bisphosphonates). At 12 months, 10.7% were NR at spine and 47.9% at hip. Among spine responders, 41.7% were NR at hip, whereas 90.2% of hip NR responded at spine. In treatment-naïve patients, 7.1% were NR at spine and 39.0% at hip, whereas among pre-treated patients the proportion of NR reached 14.6% at spine and 57.7% at hip ($p < 0.001$ vs. naïve). In multivariable logistic regression models, prior AR treatment (OR 1.98, 95%CI 1.07–3.65), age (OR 1.03, 95%CI 1.00–1.05) and higher baseline hip BMD (OR 1.75, 95%CI 1.35–2.34), but not BMI nor baseline CTx / P1NP, were the strongest determinants of NR at one year. Moreover, lower P1NP levels at 3 months were associated with BMD non-response at spine but not at the hip.
Conclusion: In real-world practice, the vast majority of Romo-treated subjects gains >3% BMD at spine, yet suboptimal hip BMD response is commonly observed, even among treatment-naïve patients. Although prior AR use, age, and baseline hip BMD contributed, a substantial proportion of variability remained unexplained, underscoring the incomplete understanding of hip-specific anabolic response and the need for optimized treatment sequencing.
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P1495

ENHANCING EARLY DETECTION OF LOW BONE MASS VIA NON-INVASIVE MACHINE LEARNING: THE BUSHEHR ELDERLY HEALTH PROGRAM

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Objective: To develop and validate supervised machine learning models for the screening of low bone mass using demographic and clinical data from the Bushehr elderly health (BEH) program.

Material and Methods: We partitioned BEH baseline data into training (80%) and independent test (20%) sets. Low bone mass was defined by DXA T-score ≤ −1.0 (lumbar spine, femoral neck, or total hip). We trained 15 machine learning algorithms including linear classifiers, neural networks, and ensembles. Top predictors were selected via recursive feature elimination with logistic regression and XGBoost. Random undersampling within stratified 5-fold nested cross-validation addressed class imbalance. Decision thresholds prioritized sensitivity. Performance metrics included AUC, sensitivity, specificity, and F1-score.

Results: 4,110 participants (median age 66, 54.2% female, 84% low bone mass prevalence) were analyzed. In the test set, balanced stacking ensemble and logistic regression yielded identical AUC (0.79), sensitivity (87.3%), specificity (47.3%), and F1-score (0.89). Standard stacking ensemble demonstrated a comparable AUC of 0.79 and F1-score of 0.89, with slightly higher sensitivity (87.7%) and lower specificity (45.0%). Conversely, the multi-layer perceptron classifier exhibited an AUC of 0.79, a sensitivity of 84.0%, a specificity of 56.6%, and an F1-score of 0.87 (Table & Figure).

Conclusion: Stacking ensemble models demonstrate utility as non-invasive screening tools, effectively triaging high-risk individuals for confirmatory DXA. This approach optimizes resource allocation for early fracture prevention. We developed an online risk calculator based on these models.

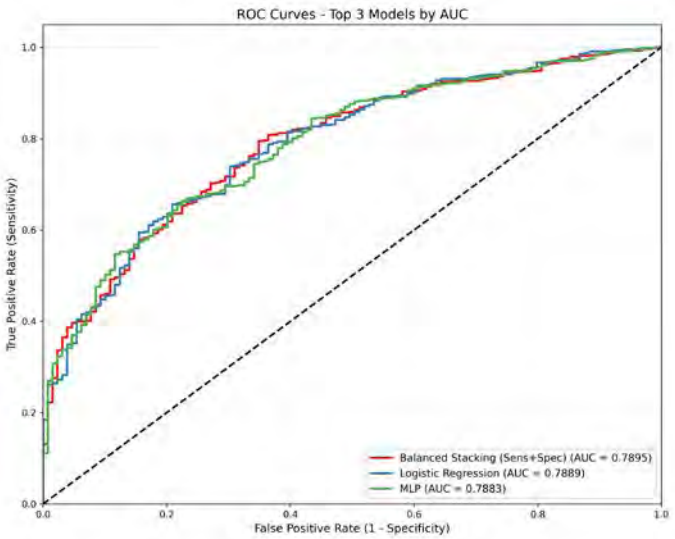
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Table: Performance of the top five models for low bone mass screening using 11 features.

Model	F1-Score	Sensitivity	Specificity	ROC-AUC
Stacking Ensemble	0.886	0.877	0.450	0.788
Balanced Stacking	0.886	0.873	0.473	0.789
Logistic Regression	0.886	0.873	0.473	0.789
Gradient Boosting	0.876	0.859	0.457	0.771
Voting Ensemble	0.875	0.856	0.457	0.782

Selected features: diabetes, hormone replacement therapy, smoking status, fracture cause, difficulty climbing stairs, age, forearm circumference, height, parity, waist circumference, and body weight.				

Figure: ROC curves of top low bone mass models.



P1496

APPLICATION OF MACHINE LEARNING MODELS FOR OSTEOPOROSIS SCREENING: BUSHEHR ELDERLY HEALTH (BEH) PROGRAM

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Objective: To design and evaluate machine learning approaches for osteoporosis screening.

Material and Methods: Using baseline data from the Bushehr Elderly Health (BEH) program, we developed screening tools defining osteoporosis as bone mineral density T-score ≤ -2.5 (lumbar spine, femoral neck, or total hip) by dual-energy X-ray absorptiometry. Data were partitioned into training (80%) and independent test (20%) sets. Fifteen algorithms were trained using hybrid feature selection (recursive elimination with logistic regression and XGBoost). We addressed class imbalance via SMOTEENN resampling within stratified cross-validation. Decision thresholds were constrained to maximize F2-score. Model performance was evaluated on the test set using AUC, sensitivity, specificity, and F2-score.

Results: Among 4,110 participants (median age: 66 years; 54.2% female; 37.8% osteoporosis prevalence), key predictors included weight, height, age, parity, and fracture cause. The voting ensemble achieved the highest screening performance (AUC 0.82, sensitivity 95.2%, specificity 39.3%, F2-score 0.80). Gradient boosting demonstrated balanced discrimination (AUC 0.82, sensitivity 90.7%, specificity 52.1%, F2-score 0.80), while LightGBM offered higher specificity (AUC 0.82, sensitivity 82.6%, specificity 60.7%, F2-score 0.75) (Table & Figure).

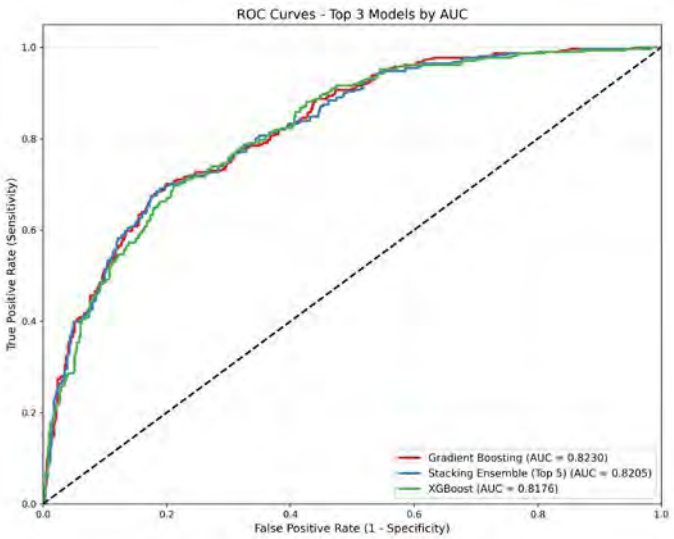
Conclusion: Machine learning enables effective osteoporosis screening; the voting ensemble excels at exclusion, while Gradient boosting optimizes discriminative balance. This allows tool selection based on surveillance goals and resource constraints. An online risk calculator was developed.

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Table: Performance of the top five models for osteoporosis screening using 10 features.

Model	F2-Score	Sensitivity	Specificity	ROC-AUC
Voting Ensemble	0.800	0.952	0.393	0.817
Extra Trees	0.799	0.949	0.398	0.808
Gradient Boosting	0.796	0.907	0.521	0.823
AdaBoost	0.795	0.929	0.443	0.808
Random Forest	0.794	0.913	0.492	0.817
Feature importance: weight, height, age, parity, fracture cause, diabetes, difficulty walking, hormone replacement therapy, smoking status, difficulty climbing stairs.				

Figure: ROC curves of top osteoporosis screening models.



P1497

THE ASSOCIATION OF 25(OH)D3 CONCENTRATION WITH BONE MINERAL DENSITY, BONE TURNOVER MARKERS AND BIOCHEMICAL PARAMETERS IN PSORIATIC ARTHRITIS

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Objective: Psoriatic arthritis (PsA) is an inflammatory rheumatic disease characterized by inflammation of joints and entheses, and may be associated with osteoporosis. Although the role of vitamin D in bone health is well documented, its effects in PsA remain unclear. The aim of this study was to elucidate the association of vitamin D concentration with bone mineral density (BMD), trabecular bone score (TBS), and bone turnover markers (BTM) in PsA patients.

Materials and Methods: This was a cross-sectional study with 68 patients diagnosed with PsA. Participants were divided into two groups based on their 25(OH)D3 concentrations (<75 nmol/L and >75 nmol/L). BMD and TBS were measured using dual-energy X-ray absorptiometry (DXA), while serum samples were analyzed for calcium, phosphorus, osteocalcin, CTX-I, and parathyroid hormone (PTH) concentrations. (Table 1)

Results: Patients with 25(OH)D3 levels >75 nmol/L had a significantly lower BMD at the lumbar spine compared to those with levels <75 nmol/L (P = 0.020), which was not shown for hip or femoral neck. Additionally, significant differences were observed in BTM, with higher concentrations of osteocalcin and CTX-I in patients with 25(OH)D3 levels exceeding 75 nmol/L. There were no significant differences regarding TBS, as well as alkaline phosphatase or other biochemical parameters.

Conclusion: Our study suggests that higher vitamin D levels in PsA patients may be associated with lower lumbar spine BMD and altered bone turnover markers. These findings highlight the complexity of bone metabolism in PsA and suggest that vitamin D supplementation may have a nuanced impact on bone health. Further studies are needed to confirm these results and explore their clinical implications.

Table 1. Bone and biochemical parameters according to the concentration of 25(OH)D3.

Parameter	25(OH)D3 <75 nmol/L	25(OH)D3 >75nmol/L	P
Hip BMD	0.50 (-0.53-0.90)	-0.40 (-0.83-0.90)	0.110
Femur BMD	-0.75 (-1.30-0.30)	-0.80 (-1.75-0.03)	0.418
Spine BMD	0.25 (-1.50-1.30)	-1.20 (-2.20-0.15)	0.020*
TBS	1.41 (1.34-1.48)	1.39 (1.22-1.43)	0.095
ALP (U/L)	73 (57-92)	76 (57-95)	0.806
Ca (mmol/L)	2.38 (2.30-2.45)	2.35 (2.30-2.41)	0.712
iCa (mmol/L)	1.24 (1.22-1.28)	1.25 (1.23-1.28)	0.642
Phos (mmol/L)	1.04 (0.86-1.56)	1.19 (1.07-1.28)	<0.001*
PTH (pmol/L)	4.35 (3.49-5.06)	3.85 (3.28-4.96)	0.231
Osteocalcin (µg/L)	18 (14-23)	23 (18-30)	<0.001*
CTX-I (µg/L)	0.329 (0.240-0.465)	0.459 (0.345-0.576)	<0.001*

BMD - bone mineral density, TBS- trabecular bone score, ALP- alkaline phosphatase, Ca- total calcium, iCa- ionized calcium, Phos- inorganic phosphates, PTH- parathyroid hormone, CTX-I- C-terminal telopeptides of type I collagen, 25(OH)D3- 25-hydroxy vitamin D3. Data are presented as median and interquartile range.

P1498

DOES THE FRACTURE LIAISON SERVICE MODEL REDUCE MORTALITY AFTER A FRAGILITY FRACTURE? A SYSTEMATIC REVIEW AND META-ANALYSIS OF THE LITERATURE

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Background: The first Fracture Liaison Service (FLS) model was born in 2003. Since then it has spread all over the world, improving fragility fractures (FF) management, pharmacological treatment and reducing re-fracture rates. However, FFs carry an increased risk of death within 2 years of the fracture. Although the effectiveness of FLS in reducing re-fractures rates has been proved, its effect on FF-related mortality could not be more blurry. The purpose of this systematic review is to answer its impact on mortality using meta-analysis.

Methods: A literature search was performed within several databases to identify original articles published until 15 September 2025, reporting the effect of FLS on mortality versus a control group. A meta-analysis using random-effects models was conducted summarising the data as risk ratio (RR) and correspondent 95% confidence intervals (CIs). The quality of studies was appraised after combining and modifying criteria of existing quality assessment tools.

Results: Among the 331 works initially examined, we included 21 observational studies (mainly pre/post studies) for a total of 146,453 patients (73,331 in FLS vs. 73,122 controls). During a mean follow-up period of 2.4 years, 12,329 in the FLS group vs. 18,602 in the control group died (16.8% FLS vs. 25.4% in control group). The meta-analysis of the raw data showed a significant reduction of 17% of FLS compared to the control group (RR=0.83; 95%CI: 0.75-0.92; figure 1), even if this outcome was characterized by a high heterogeneity (I^2=87.4%). Conversely, in 13 studies giving data for the adjusted analyses, after correcting for a mean of 5 potential confounders, the adjusted RR was 0.80 (95%CI: 0.70-0.91; I^2=91.8%; figure 2).

Stratifying the data for the type of fracture, FLS was more effective in preventing mortality for any fracture (RR= 0.78; 95%CI: 0.69-0.89; I^2=91%) compared to hip fracture (RR= 0.92; 95%CI: 0.85-1.00; I^2=0%) (p for interaction<0.0001).

Conclusions: FLS care is associated with a significantly lower probability of mortality, even after adjusting for potential confounders and, particularly, when considering hip fracture as type of fracture.

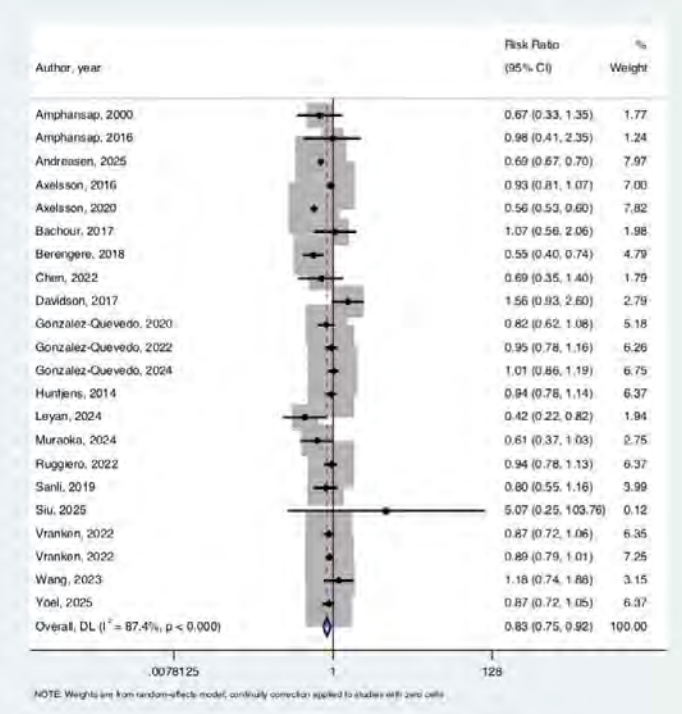


Figure 1. Meta-analysis of the raw data.

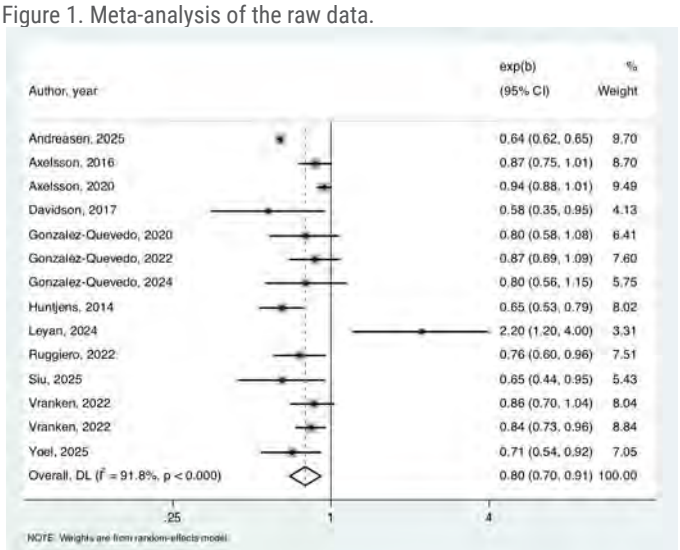


Figure 2: meta-analysis of the adjusted data.

P1499

CLINICAL PREDICTORS OF REHABILITATION OUTCOMES AFTER FRAGILITY HIP FRACTURE IN PATIENTS AGED ≤75 YEARS: A RETROSPECTIVE COHORT STUDY

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Objective

To investigate clinical, functional and metabolic determinants of rehabilitation outcomes in patients aged ≤75 years with fragility hip fractures, a population underrepresented in current literature and potentially highly responsive to targeted interventions.

Material and Methods

This retrospective observational study included 84 consecutive patients aged ≤75 years admitted to a specialist rehabilitation unit after surgically treated fragility hip fracture (January 2023–August 2025). Demographic characteristics, comorbidities, bone mineral density (DXA), laboratory parameters (including 25-hydroxyvitamin D), surgical timing, and rehabilitation data were collected. Functional outcome was assessed using the Barthel Index (BI) at admission and discharge. Multivariable linear regression analyses were performed to identify independent predictors of functional outcome and rehabilitation length of stay.

Results

The cohort had a mean age of 69.2 ± 5.7 years and was predominantly female (75%). Functional autonomy improved markedly during rehabilitation, with BI increasing from 50.9 ± 18.2 at admission to 90.4 ± 15.7 at discharge ($p < 0.001$). In multivariable models, BI at admission emerged as the strongest independent predictor of BI at discharge ($\beta = 0.38$; $p < 0.001$) and shorter rehabilitation stay ($\beta = -0.16$; $p < 0.001$, figure 1). Vitamin D deficiency (<20 ng/mL), observed in 40% of patients, was independently associated with longer rehabilitation stay ($\beta = -0.12$; $p = 0.028$, figure 2). Neither osteoporosis diagnosis, sex, type of surgical procedure nor DXA T-scores significantly influenced functional outcome.

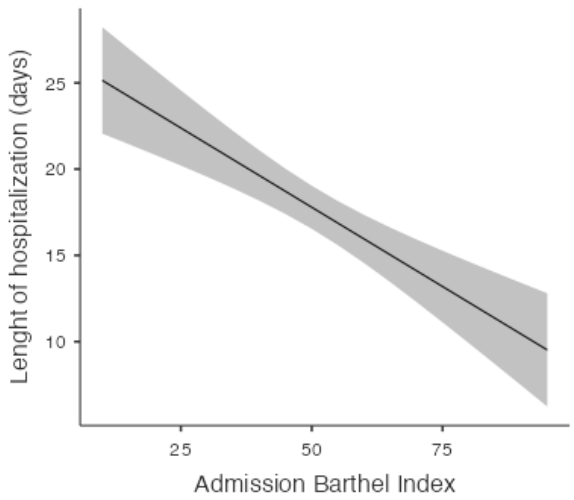


Figure 1: linear regression plot with 95% confidence interval demonstrating a negative relationship between Barthel Index at admission and lenght of hospital stay.

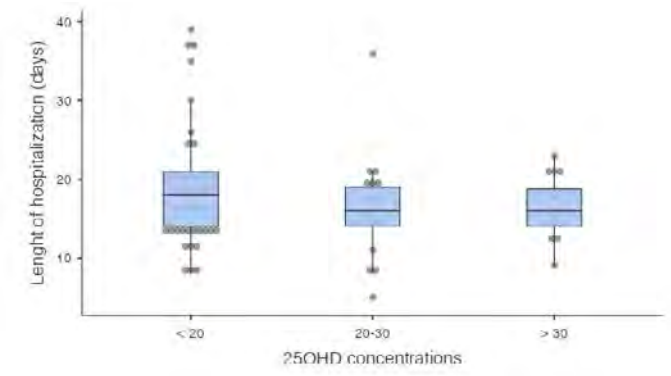


Figure 2: box-and-whisker plot demonstrating the relationship between vitamin D concentration and lenght of hospitalization.

Conclusion

In younger-old patients with fragility hip fracture, baseline functional status is the strongest predictor of rehabilitation success, surpassing traditional structural bone parameters and comorbidities. Vitamin D deficiency represents a modifiable factor associated with delayed recovery. These findings support a shift toward early functional stratification and metabolic optimization to improve rehabilitation efficiency and outcomes in this clinically and socially active population.

P1500

MUTATIONS IN THE GENE FOR LRP5 AS CAUSE FOR MALE JUVENILE OSTEOPOROSIS

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Osteoporosis in juvenile age may result from genetic causes. The availability of genetic panel analyses allows the use of genetic diagnostic investigations also in routine medical care, because samples can be send to specialized laboratories accredited for health care. Diagnostic procedures often reveal genetic variants, which have low pathogenetic significance. However, the combination of two mutations (compound mutation) might nevertheless result in severe osteoporosis, as is demonstrated in the following case report:

The patient (46 years) presented with a history of multiple fractures: ribs, clavicula, vertebral fractures. The areal bone mineral density (BMD, DXA) measurement showed a T-Score of -3.2 at the proximal femur. Except for an eating disorder in the past there were no risk factors. The actual body mass index was 21 kg/m2. The physical examination showed no blue sclerae and no increased mobility of the joints. Endocrine disorders, osteomalacia, hypophosphatasia, or hematologic disease were excluded by laboratory diagnostics.

Treatment was initiated with 5 mg of intravenous zoledronate. After 6 months, the patient presented again with a fracture of the right humerus and multiple rib fractures on the right side without adequate trauma. Genetic panel screening was then performed (Laboratory Heidrich and colleagues, Hamburg, Germany). Within the LRP5-Gen (LDL receptor related protein 5) two heterozygous variants were found: c.1999G>A p.(Val667Met) and c.3989C>T p.(Ala1330Val).

Both variants are described as low grade pathogenic, but show a high prevalence in patients with juvenile osteoporosis (Collet et al. *JBMR1 Plus, Vol. 2, No. 1, pp 12–21*).

Treatment was switched to teriparatide. Thereafter, the patient suffered one fracture of the clavicula after trauma, but there were no further vertebral fractures and no fractures of the extremities. Moreover, the pain symptoms improved significantly.

Conclusion: functional variants of the LRP5-gene can cause severe osteoporosis provided they present as a compound mutation. Teriparatide appears as an successful treatment.

P1501

ROMOSOZUMAB VERSUS TERIPARATIDE AND RISK OFALL-CAUSE MORTALITY IN PATIENTS WITH OSTEOPOROSIS: A REAL-WORLD PROPENSITY SCORE-MATCHED COHORT STUDY

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Background

Osteoporosis is a prevalent condition among older adults and significantly increases the risk of fragility fractures,particularly affecting the hip and vertebrae. Pharmacologictherapy remains central to osteoporosis management, with anabolic agents such as Romosozumab and Teriparatide demonstrating efficacy in increasing bone mineral density andreducing fracture risk. However, direct comparative evidenceregarding their impact on mortality is limited. This studyaimed to evaluate the differences in all-cause mortality between Romosozumab and Teriparatide in patients with osteoporosis, utilizing a large real-world dataset.

Methods

We conducted a retrospective cohort study using electronic medical records from the TriNetX US Collaborative Network, comprising data from over 120 healthcare organizations. Patients aged ≥20 years diagnosed with osteoporosis betweenJanuary 1, 2016, and December 31, 2023, initiating either Romosozumab or Teriparatide were included. Individuals with malignancies, bone neoplasms, multiple myeloma, parathyroid disorders, or cerebrovascular accidents were excluded. Propensity score matching (1:1) balanced demographic, clinical, and laboratory characteristics between cohorts. The primary outcome was all-cause mortality, with subgroup analyses performed based on age, sex, comorbidities, and treatment settings.

Findings

Each treatment group included 2470 matched patients. Overthe follow-up period, Romosozumab was associated with significantly lower all-cause mortality compared to Teriparatide (hazard ratio [HR] 0.68, 95% CI: 0.49–0.94). This survival advantage was particularly evident in patients aged ≥60 years (HR 0.65, 95% CI: 0.47–0.88). Subgroup analyses consistently favored Romosozumab across multiple comorbid conditions, including diabetes mellitus and chronic kidney disease, although these subgroup results did not reach statistical significance. Importantly, no increased mortality risk was observed in patients with hypertension or coronaryheart disease, indicating a favorable cardiovascular safety profile in these populations.

Interpretation

In this extensive real-world analysis, Romosozumab was associated with a significantly lower risk of all-causemortality compared to Teriparatide among patients withosteoporosis. These findings support the preferential consideration of Romosozumab, particularly for older adults and patients at elevated fracture risk, while highlighting the necessity of careful cardiovascular risk assessment.

P1502

LONG-TERM EFFICACY AND SAFETY OF DENOSUMAB IN PATIENTS WITH ANKYLOSING SPONDYLITIS AND LUMBAR OSTEOPOROSIS

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Objective

Ankylosing spondylitis (AS) is a chronic inflammatory disease characterized by inflammation of the axial skeleton, which can lead to structural damage and ankylosis. Chronic spinal inflammation has been associated with reduced vertebral bone mineral density (BMD). We previously reported the 1-year efficacy of denosumab in patients with AS and osteoporosis. This study aimed to evaluate the long-term efficacy and safety of denosumab with follow-up of up to 7 years in this population.

Methods

Between 2018 and 2020, patients with AS were assessed for osteoporosis using dual-energy X-ray absorptiometry (BMD) or quantitative computed tomography (qCT). Patients diagnosed with osteoporosis were treated with denosumab and followed longitudinally.

Results

Of the 26 patients initially followed for 1 year, 24 patients were followed for at least 2 years; two patients discontinued treatment after 1 year due to improvement in osteoporosis. Among the 24 patients, 9 were male and 15 were female. The mean age was 54.0 ± 6.7 years, and the mean disease duration was 16.7 ± 10.6 years. Seventeen patients were evaluated using BMD and seven using qCT. The mean follow-up duration was 4.7 ± 1.5 years. At the final follow-up, increased bone density was observed in 19 patients (79.1%). The mean change in BMD T-score was +0.4 ± 0.5, and the mean change in qCT was +6.1 ± 13.2. No serious adverse events related to denosumab were observed during the follow-up period.

Conclusion

Long-term treatment with denosumab in patients with ankylosing spondylitis and osteoporosis was effective and well tolerated, with sustained improvements in bone density and no significant safety concerns.

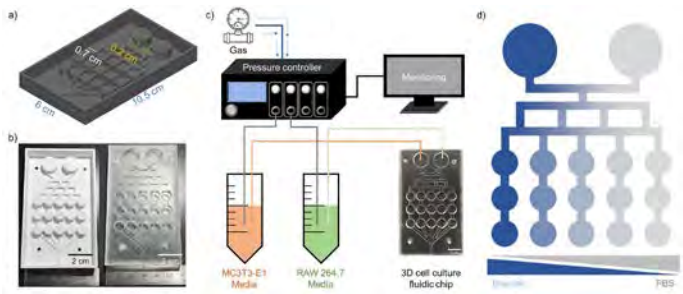
P1503

CONTRIBUTION OF OSTEOBLAST AND OSTEOCLAST SUPERNATANTS TO BONE FORMATION: DETERMINATION USING A NOVEL MICROFLUIDIC CHIP

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We fabricated a microfluidic chip (osteoblast [OB]-osteoclast [OC] chip) that could regulate the mixture amounts of OB and OC supernatants to investigate the effect of different supernatant distributions on osteogenesis or osteoclastogenesis. Computer-aided design was used to produce an OB-OC chip from polydimethylsiloxane. A pressure controller was assembled and different blends of OB and OC supernatants were correctly determined. OB and OC supernatants were placed on the upper panels of the OB-OC chip after differentiation for an in vitro evaluation. We then tested the changes in osteogenesis using MC3T3-E1 cells in the middle chambers. We observed that a 75:25 distribution of OB and OC supernatants was the most potent in osteogenesis. We then primed the osteogenic differentiation of MC3T3-E1 cells using an OB-OC mixed supernatant or an OB supernatant alone (supernatant ratios of 75:25 or 100:0, respectively). These cells were placed on the calvarial defect sites of rats. Microcomputed tomography and histological analyses determined a significantly higher bone formation in the group exposed to the OB-OC supernatant at a ratio of 75:25. In this study, we demonstrate the applicability of an OB-OC chip to evaluate the effect of different supernatant distributions of OB and OC. We observed that the highest bone-forming potential was in MC3T3-E1 cells treated with conditioned media, specifically the OB-OC supernatant at a ratio of 75:25.



P1504

DIFFERENTIAL DISTRIBUTION OF BONE MINERAL DENSITY AND CORTICAL THICKNESS BETWEEN FEMORAL NECK AND INTERTROCHANTERIC FRACTURES: A 3D-DXA-BASED CROSS-SECTIONAL STUDY

S. Huang[1], M. Irene Bracco[2], Z. Yanling[3], J. Fang[1], J. Fei[1], J. Zhang[1]

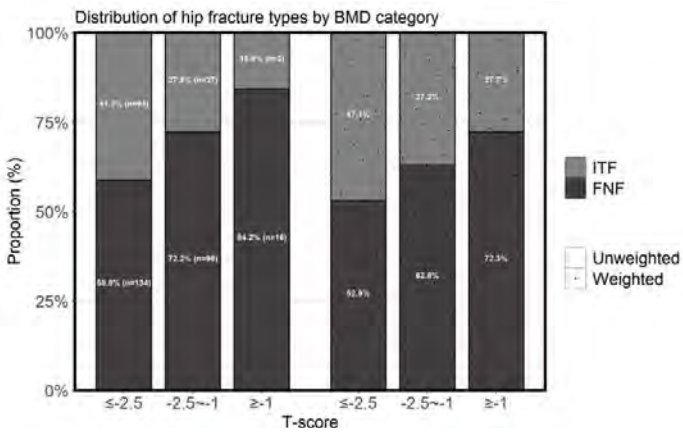
[1]Ningbo No. 2 Hospital, Ningbo, China; [2]3D-Shaper Medical, Barcelona, Spain; [3]Beijing United Family Hospital, Beijing, China

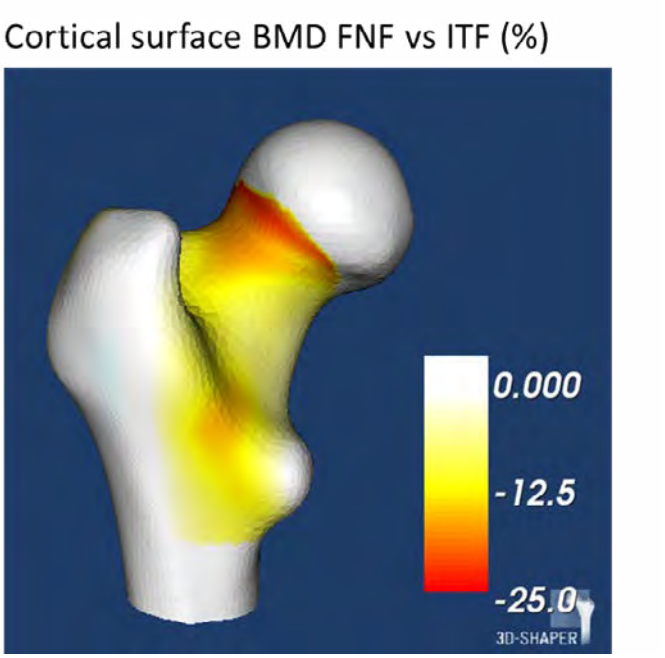
Objectives: To investigate the fracture type distribution across T-score ranges in elderly hip fracture patients and to identify spatial differences in bone mineral density(BMD) and cortical thickness between femoral neck fractures (FNF) and intertrochanteric fractures (ITF).

Material and Methods: In this retrospective, cross-sectional analysis, elderly patients (≥65 years, N=1993) with first-time, non-violent unilateral hip fractures (2019-2024) were reviewed; those receiving contralateral DXA within one month from the injury were included (N=380). Selection bias related to age, sex, and fracture type was addressed using inverse probability weighting. Fracture type proportions across T-score ranges were calculated, with the T-score taken as the minimum T-score between the femoral neck and total hip. Region-specific BMD and cortical parameters were analyzed using a DXA-based 3D modeling software (3D-SHAPER), with comparisons between FNF and ITF groups adjusted for age, sex, and height.

Results: Among hip fracture patients, 40% (42% after weighting) were non-osteoporotic, of whom 74% (64% after weighting) had FNF—a proportion increasing with T-score. Total hip BMD was higher in FNF versus ITF patients (P=0.005), while femoral neck BMD was similar (P=0.588). Lateral cortical deficits were fracture-site specific: at the femoral neck in FNF patients (P<0.001 for thickness, P=0.016 for surface BMD) and at the intertrochanteric region in ITF patients (P<0.001 for both parameters). Medial cortical parameters, except intertrochanteric surface BMD, did not differ. Differences in lateral cortical thickness at both sites persisted when comparing FNF and ITF patients within the same T-score ranges.

Conclusions: T-score-based assessment fails to accurately capture the fracture risk associated with FNF. Specific lateral cortical deficits are associated with different hip fracture types, highlighting the need to further investigate the role of lateral cortical parameters in fracture risk stratification.





P1505

TWELVE-MONTH REAL-WORLD SAFETY OUTCOMES FOR BIOSIMILAR DENOSUMAB IN CLINICAL PRACTICE IN CANADA

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Objective

Biosimilar denosumab (Jubbonti® for treatment of osteoporosis and increasing bone mass, and Wyost® for bone giant cell tumors and prevention of bone fractures in metastatic cancers; Sandoz) was approved by Health Canada in 2024. As of August 2025, its estimated cumulative exposure in Canada was 118,544 (osteoporosis) and 17,540 (oncology) patient treatment years. Here, we describe the first Canadian post-marketing safety experience for this biosimilar denosumab.

Material and Methods

Post-marketing safety reports received by Sandoz during the first 12 months following product launch in Canada and coded under 'denosumab' were assessed using MedDRA v28.0, classified by causal association to biosimilar denosumab by event-level assessment, and categorized by seriousness.

Results

A total of 97 reports were received (38 oncology dose; 9 osteoporosis dose; 5 'other'; 45 'unknown') describing 213 events, with 80 events determined as 'suspected', 15 'not suspected', and 118 'not assessable' for causal association with denosumab; 72/213 events were characterized as 'serious'. The most reported event was arthralgia (12/213).

Severe hypocalcemia was reported in two cases, with one requiring hospitalization. No serious infections were reported. No skin infections or hypersensitivity/anaphylaxis were identified. Two cases describing malignancies were retrieved (no new malignancies) and assessed as 'not related' to denosumab treatment.

Treatment interruption was reported in five cases, and treatment discontinuation occurred in six cases, with no specific event predisposition. No occurrences of osteonecrosis of the jaw and atypical femoral fractures were reported. Twelve deaths were reported, all 'not assessable' for causality, with 11/12 in patients treated for oncologic indications (one 'unknown').

Conclusions

Initial 12-month Canadian post-marketing safety reporting for this biosimilar denosumab observed predominantly non-serious adverse drug reactions, consistent with the established safety profile of denosumab, identifying no new or unexpected safety signals and risks.

Disclosures

All authors are Sandoz employees.

P1506

CASE OF SCLERODERMA CALCINOSIS AND VITAMIN D POISONING

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This is a 66-year-old female patient with a 16-year history of scleroderma and Raynaud's phenomenon. She was prescribed 5,000 units of vitamin D daily. Due to an error in interpretation, the patient took 50,000 units of vitamin D daily for 5 years. Multiple calcium deposits were found in her right elbow, causing skin breakdown and infection. As well extraosseous calcifications in the right axillary región, abdomen and lower limbs

Preoperative tests from October 14, 2025, showed the following: blood chemistry: glucose 74 mg/dL, BUN 20.23, creatinine 0.80 mg/dL, calcium 9.8, albumin 4.04, phosphorus 3.4; normal thyroid function tests; PTH 26.4; vitamin D 25-hydroxylase > 210 ng/mL; DEXA T score: lumbar spine -3.1, femoral neck -2, total hip -1.9

She underwent surgery to remove calcifications from his elbow and resolve the infection.

Vitamin D was discontinued, 5 mg of zoledronic acid was applied.

There are some x-ray images

pictures pre and post-operative

P1507

RISK OF IMMINENT OSTEOPOROTIC FRACTURES AND MORTALITY FOLLOWING SURGICAL TREATMENT OF PROXIMAL FEMUR FRACTURES IN ELDERLY INDIAN WOMEN: A PROSPECTIVE COHORT STUDY

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Objectives: The concept of "imminent fractures," defined as fractures occurring within 2 years of an initial osteoporotic fracture, aims to improve bone quality and reduce mortality and morbidity associated with major osteoporotic fractures. This study's objective was to assess the risk of subsequent (imminent) fractures and mortality following operative treatment of fragility fractures of proximal femur in elderly Indian women. **Materials and methods:** In this 2-year prospective cohort study, 176 female patients over 60 years with low-energy proximal femur fractures treated surgically were included. Patients were followed up at 3,6, 12, and 24 months and assessed. The primary outcomes were mortality and occurrence of imminent fractures (new major osteoporotic fractures at the hip, vertebrae, distal radius, or proximal humerus within 24 months of the initial fracture). Secondary outcomes included time to refracture, site of refracture, comorbidities, osteoporosis treatment, and mobility. Clinical and patient characteristics at baseline and cumulative fracture incidences at 12 and 24 months were analyzed. Risk factors for subsequent fractures were identified using multivariate regression analysis, considering fracture as the outcome and death as a competing event. **Results:** Among the 176 elderly women followed over two years, the incidence of refracture was 8.4% at one year and 14.5% at two years. During follow-up, 32 patients (18.2%) died, including 14 with refracture and 18 without. Mortality was significantly higher in patients with refracture (53.8%) compared to those without (12.0%) ($p < 0.001$). Patients with refracture were significantly older . Cox proportional hazards regression analysis showed that refracture independently increased mortality risk (HR 3.02, 95% CI 1.55–5.88, $p = 0.001$). Kaplan–Meier analysis revealed a gradual decline in overall survival, with estimated survival probabilities of 86% at 12 months, and 81.8% at 24 months, corresponding to an overall 2-year mortality rate of 18.2%.**Conclusions:**This study underscores the significance of "imminent" fractures, declining bone quality, and increased mortality following primary hip fractures in elderly Indian women. The perioperative period is a critical window to aggressively address osteoporosis and general health , ideally through establishing fracture liaison services. Preventing imminent fractures may indirectly reduce mortality and enhance quality of life in this population.

P1508

A NOVEL TECHNIQUE FOR BUNIONETTE DEFORMITY - FIRST PRESENTATION

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Background

The bunionette, also known as a tailor's bunion, can be a painful deformity causing excessive pressures to the lateral and plantar fifth metatarsal head. Clinically it is a lateral deviation of the fifth metatarsal head and adduction of the fifth digit at the metatarsophalangeal joint. Its etiology is multifactorial, being associated with both anatomical and structural factors.

The purpose of this study is to present a novel, first attempted at our institution, minimal invasion technique to correct this deformity with the use of a non-absorbable suture with a fixation button (tight rope by Arthrex).

Case Presentation

A female 27 years old came to our outpatient clinic presenting a painful prominence on the lateral aspect of the 5th metatarsal head and a callus formation of her right foot. The radiographic imaging depicted increased 4-5 IMA and increased width of MT head, characteristic findings of tailor's bunion. An operation was decided and the patient admitted to our clinic a few weeks later.

Under general anesthesia a incision was performed at the lateral side of the head of the 5th metatarsal and we resected the lateral exostosis of the fifth metatarsal head. A second approximately 2 cm longitudinal incision was made between the 3rd and 4th metatarsals proximal their heads at the level of the proximal extent of the lateral resection. The medial aspect of the 4th metatarsal shaft was exposed and a tunnel was performed with a 1,3 or 1,1 K-wire through the 4th metatarsal and then through the 5th metatarsal, exiting through the lateral diaphysis just proximal to the 5th metatarsal head. The suture button construct was then inserted. It was very important for the fore foot to be supple enough so as the correction of the IMA was possible without major forces being exerted on the metatarsal. The incisions are closed, and soft sterile dressings are applied to the foot and ankle.

The patient discharged from hospital the next day and the patient is allowed to weightbear as tolerated without the use of a special shoe or boot.

Clinical Outcomes
After six months the correction of the IMA is stable and no pain or lateral hyperkeratosis on the skin has been reported from the patient. So and the cosmetic and the functional deformity is considered treated.

Discussion
To our knowledge this is the first case of bunionnete treated this way. This novel technique described provides a stable method for correcting bunionettes with minimal violation to the soft tissue. This allows for a reduction through the center of angular rotation as well as fixation with the tight rope to allow for maintained reduction. This minimal invasion technique not only benefits in maintaining reduction and healing but allows for early weightbearing from the time of surgery. The use of a soft tissue procedure combined with tight rope IMA correction is a safe and effective treatment of bunionette. Our results show that this technique can achieve correction of the IMA without the need for osteotomy.

P1509

CLINICAL EFFICACY OF GUIDED TISSUE REGENERATION IN MANAGING OF CHRONIC PERIODONTITIS

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Objective: Achieving bone regeneration in patients diagnosed with periodontitis remains a significant priority in contemporary dental practice. This study aims to evaluate the effectiveness of the Guided Tissue Regeneration (GTR) technique, utilizing the "Bio-Gide" barrier membrane, for the remediation of periodontal bone defects.
Material and Methods: The study cohort comprised nine individuals with moderate chronic periodontitis. Following a comprehensive diagnostic phase—which included periodontal pocket depth probing and assessment of alveolar bone status via orthopantomography (OPG), along with an initial phase of non-surgical therapy—surgical treatment was performed. Five subjects underwent GTR procedures with the placement of a "Bio-Gide" collagen membrane, while the remaining four received a conventional flap operation supplemented with an osteoplastic graft material.
Results: The investigation findings demonstrated that the GTR protocol yielded a mean bone fill reaching approximately 80% of the original defect volume. In contrast, bone reconstruction following the flap surgery with bone grafting did not exceed 55%.
Conclusions: Therefore, the application of the Guided Tissue Regeneration method facilitates considerable alveolar bone reconstruction, substantially enhancing the overall quality and outcomes of the therapeutic intervention.

P1510

JUVENILE OSTEOPOROSIS CAUSED BY LRP 5 GENE MUTATION

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Low-density lipoprotein receptor-related protein 5 (LRP5; OMIM: 603506) is encoded by the ***LRP5*** gene (11q13.2). This gene encodes a transmembrane low-density lipoprotein receptor that binds and internalizes ligands in the process of receptor-mediated endocytosis. LRP5 acts as a co-receptor with Frizzled protein family members for transducing signals by Wnt proteins. LRP5 gene mutations can lead to changes in bone mineral density (BMD): Inactivating mutations lead to osteoporosis (with pseudoglioma). Activating LRP 5 mutations result in excessively high BMD, even to osteopetrosis. We report a patient carrying LRP 5 mutation with osteoporosis.15-year old boy with uneventful personal and family history suffered two low-energy trauma fractures (L2-L3 vertebral compression fractures and a distal radius fracture) within six months.His anthropometric parameters were normal. Blood count and biochemical parameters (incl. S-creatinine, AST, ALT, Ca, P, Mg, ALP, PTH) were also within reference range, with the sole exception of lower 25OH-D vitamin. Bone densitometry performed by dual-X-ray absorptiometry (DXA) revealed low BMD : L1-L4 -3.3 SD Z-score. Therefore, oral ibandronate 150 mg once -a-month was started at the age of 16 years, together with calcium (1000 mg daily) and cholecalciferol (1000 IU/day). After two years of therapy, a significant increase in L1-L4 BMD (+70%) up to -1.9 SD Z-score was apparent. After these two years we proceeded to drug holiday and terminated the ibandronate treatment. Periodic controls (blood count, S-Ca,P, PTH, ALP, ALT, AST) were performed throughout the treatment and the results were always within relevant reference ranges. The genetic examination revealed interesting results: Firstly, LRP5 heterozygous sequential variant c.4087G>A,p.(Asp1363Asn). This causes exsudative vitreoretinopathy, osteoporosis and liver polycystosis type 4. The result of the genetic analysis is related to patient´s bone fragility. Fortunately, no liver cysts were detected by abdominal ultrasonography. The magnetic resonance imaging of the brain is normal, same as the ophthalmology examination. The patient is also a healthy carrier of heterozygous sequential variant c.1213+6T>C,p in arylsulphatase B (ARSB) gene, causative for mucopolysacharidosis type VI (Maroteaux-Lamy syndrome) and a heterozygous sequential variant c.100del,p.(His34ThrfsTer14) in the dedicator of cytokinesis 6 (DOCK6) gene , causative for autosomal recessive Adams-Oliver syndrome type 2 (skin and central nervous system defects, limb

malformations). The patient is currently 22 years old. He is in good state of health. At the age of 19 years he suffered a high-energy fracture of the left olecranone, otherwise he is free of fractures since the ibandronate treatment. He survived several injuries, always without fracture. The BMD measurement by DXA is repeated every two years, and remains stable (cca -2 SD). His basic biochemistry and bone turnover markers are within normal reference ranges. In conclusion, orally adminstered ibandronate improved BMD and quality of life in a patient with juvenile osteoporosis. Genetic assessment revealed LRP 5 mutation in a young man with bone fragility.

P1511

EFFECTS OF A 12-WEEK MULTIMODAL EXERCISE INTERVENTION ON BONE HEALTH IN POSTMENOPAUSAL WOMEN – PILOT STUDY

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Objective The aim of this pilot study was to investigate the effects of a 12-week multimodal exercise intervention on bone mineral density and physical function in postmenopausal women with osteopenia, and to evaluate its potential role in attenuating menopause-related functional decline.

Material and Methods Fifteen postmenopausal women aged 55–75 years with osteopenia or osteoporosis participated in a single-group pre–post study. Participants completed a 12-week multimodal exercise intervention focusing on lower-limb function, incorporating weight-bearing activities, resistance training, and traditional Chinese exercise (Baduanjin). Whole-body bone mineral density and functional outcomes were assessed before and after the intervention using dual-energy X-ray absorptiometry (DEXA). Statistical analyses were performed using SPSS software. Normality was assessed using the Shapiro–Wilk test, and paired t-tests or Wilcoxon signed-rank tests were applied as appropriate, with significance set at $P < 0.05$

Results Following the intervention, Tscores changed from −1.80 (IQR: −2.40 to −0.30) to −1.10 (IQR: −2.20 to −0.70), with no statistically significant difference ($P = 0.440$). Wholebody bone mineral content (BMC) changed from 1870.35 g (IQR: 1823.26–2084.42) to 1875.92 g (IQR: 1776.28–2051.70), showing no significant difference ($P = 0.307$). The agematched percentage (AM%) decreased from 97.40 ± 7.52 to 96.80 ± 6.92 after the intervention, with no statistically significant difference ($P = 0.436$). Bone mineral density (BMD) values changed from 0.987 ± 0.081 g/cm² to 0.981 ± 0.076 g/cm², and the difference was not statistically significant ($P = 0.383$).

Conclusion: This study found that a 12-week multimodal exercise intervention incorporating weight-bearing activities, resistance training, and Baduanjin did not result in statistically significant changes in whole-body bone mineral density, bone mineral content, or T-scores in postmenopausal women with osteopenia or osteoporosis. On the other hand, all bone-related outcomes were maintained over the intervention period, with no statistically significant declines. These findings suggest that this exercise program may help attenuate postmenopausal bone loss and contribute to the preservation of bone health.

P1512

CLINICAL EFFICACY AND SAFETY OF INTRA-ARTICULAR ALLOGENIC MESENCHYMAL STEM CELL THERAPY IN KELLGREN-LAWRENCE GRADE 2 & 3 KNEE OSTEOARTHRITIS

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Objective: Incidence of osteoarthritis (OA) is rising with increased life expectancy of the population. OA is a degenerative joint disease primarily affecting the older population. Unfortunately, till to date, no medical treatment can reverse/ stop the articular cartilage degeneration eventually necessitating surgical procedure like Total Knee Arthroplasty. Allogenic mesenchymal stem cells (AMSC) have been shown to be a promising candidate to treat grade 2 and 3 Kellgren Lawrence (KL) OA due to their anti-inflammatory, immunomodulatory and chondrocyte differentiating properties potentially leading to cartilage regeneration. Aim of the study is to evaluate the safety and efficacy of the AMSC in treating grade 2 &3 KL OA.

Methods: A retrospective analysis of a prospectively collected data of 8 knees treated with intra articular AMSC plus hyaluronic acid injection from June 2023 to August 2024. Inclusion criteria were patients having grade 2&3 KL OA refractory to medical treatment. Patient having inflammatory arthritis, grade 3 meniscal tears and varus/ valgus deformity of > 5 degrees were excluded. Patients were evaluated by an independent observer with Visual analogue score (VAS) and Oxford Knee Score (OKS) at baseline and at 3,6 & 12-months post injection. Statistical analysis was carried out with student's t - test. P value < 0.05 was considered statistically significant.

Results:

The study group had 6 patients (M: F, 3:3). In 2 patients both knee joints were injected (Total 8 knees). The mean age of the study group was 54.38 ± 18.39 years (Range 35-80). The pre procedure VAS score was 6.5±0.92 which improved to 3.25±0.71 at 12 months follow up (p value<0.0001) The pre procedure OKS was 25.13±2.80, which improved to 37.25±3.65 at 12 months follow up (p value<0.0001). No patient in the study group experienced any local or systemic adverse effects.

Conclusion: The intra articular injection AMSC is safe and effective in reducing pain (as judged by VAS score) and improving the knee function as analysed by OKS in grade 2&3 KL OA patients. Small sample size being the limitation of the current study, further research is warranted with larger sample size, comparative group and longer follow up of the study cohort.

P1513

REALWORLD PRESCRIBING PATTERNS OF COMBINATION THERAPY WITH DENOSUMAB AND TERIPARATIDE (COMBIDATA) AMONG INDIAN ORTHOPAEDICIANS: A CROSSSECTIONAL SURVEY

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Introduction

Combination therapy with denosumab and teriparatide (COMBI-DATA) has emerged as a strategy for managing patients with severe or complex osteoporosis, particularly those at very high fracture risk. Despite growing clinical interest, realworld patient selection, prescribing and monitoring patterns remain less documented in Indian Orthopaedic practice. The COMBIDATA survey aimed to capture perspectives and prescribing trends relating to this combination therapy among Indian Orthopaedicians.

Materials and Methods

A crosssectional, questionnairebased survey was conducted among practising Orthopaedicians across India. The validated digital questionnaire consisted of 22 items covering prescribing frequency, patient profiles, fracture indications, agegroup preferences, timing of denosumab initiation, DXA monitoring practices, safety, reasons for treatment discontinuation, comorbidityrelated avoidance, and alternative choices for patients with severe renal impairment. A total of 66 fully validated responses were analysed descriptively.

Results

Among 66 respondents, 92.4% reported having prescribed the denosumab–teriparatide combination. Most clinicians use the combination in 1–10% (33.3%) or 11–25% (31.8%) of their osteoporotic patients. Severe osteoporosis with fractures (72.7%) was the most frequent indication (Figure 1). Vertebral (81.8%) and hip (74.2%) fractures being the predominant sites treated. Patients aged 61–70 years were most prescribed with the combination. Denosumab was mostly added at 3 months (34.8%) or at the initiation of teriparatide (30.3%). DXA evaluation was repeated at 12 months (37.9%). The common adverse effects reported were musculoskeletal pain (59.1%) and muscle cramps (57.6%), whereas osteonecrosis of the jaw was reported as uncommon (4.5%). Cost (86.4%) and hesitation toward daily injections (54.5%) constituted the primary reasons for discontinuation. Severe renal impairment (83.3%) was the most strongly associated with avoidance of the combination; in such cases, denosumab monotherapy (54.5%) and calcitonin nasal spray (39.4%) were the preferred alternatives.

Conclusion

The COMBIDATA survey highlights the prescribing patterns of denosumab–teriparatide combination therapy in India. While the combination is widely adopted for highrisk fracture phenotypes of osteoporosis, variability exists in frequencies and monitoring approaches. Economic concerns and injectionrelated barriers remain factors influencing adherence. This underscores the need for clearer clinician and patienteducation strategies to optimise combinationtherapy outcomes in routine orthopaedic practice.

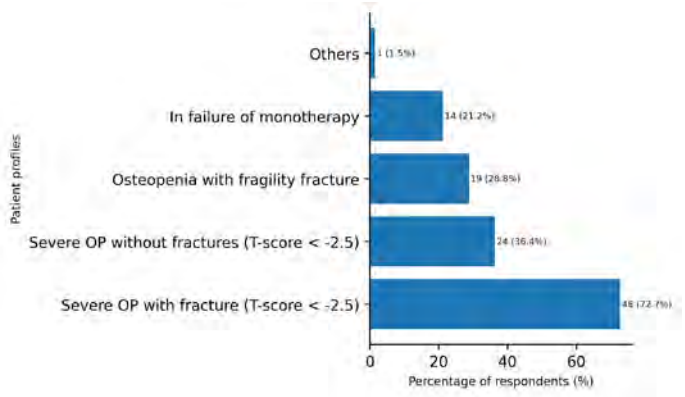


Figure 1. Patient Profiles for Combination therapy

P1514

PERCEIVED BARRIERS TO PHYSICAL ACTIVITY IN PATIENTS WITH RHEUMATOID ARTHRITIS AND SPONDYLOARTHRITIS

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Introduction : Physical activity (PA) is a cornerstone in the management of inflammatory rheumatic diseases especially Rheumatoid arthritis (RA) and spondyloarthritis (SpA). However, many patients do not achieve recommended levels of PA. This situation may be partly explained by patients' perceived barriers.

AIM : This study aimed to identify the perceived barriers to physical activity within patients with rheumatoid arthritis (RA) and spondyloarthritis (SpA).

Methods : We conducted a cross-sectional study that included patients with RA recruited from the rheumatology department of Mongi Slim Hospital. Sociodemographic data as well as those related to the disease were transcribed.

Perceived barriers were assessed using the Exercise Barriers Scale (EBBS), which comprises four subscales. Statistical significance was fixed for $p<0.05$.

Results : In total, 100 patients were included (60 RA and 40 SpA). The mean age was 51 ± 14 years old. There was a female predominance (sex ratio F/M =1.85). The mean disease duration was 11.8 ± 7,2 years. RA was immunopositive in 83% and erosive in 77% of cases. Twenty patients had axial and peripheral spondyloarthritis (SpA) (50%). SpA was primary in 28 patients (70%), associated with inflammatory bowel disease (IBD) in 9 patients (23%), and with psoriasis in 3 patients (8%).

The mean EBBS "barriers" subscore was 31.8 ± 9.9. This mean was 32.6 ± 10.2 [14–55] in patients with rheumatoid arthritis (RA) and 30.4 ± 9.2 [14–52] in patients with spondyloarthritis (SpA). The main barrier to physical activity reported by patients was: "I am too fatigued to exercise." The EBBS "barriers" subscore was significantly associated with female gender ($p = 0.007$), low educational level ($p = 0.01$), occupational status, particularly manual labor ($p = 0.02$), rural living environment ($p = 0.01$), and the presence of psoriasis ($p = 0.02$).

Conclusion : Our study revealed that higher perceived barriers were linked to greater disease impact, emphasizing the need for tailored interventions, to encourage physical activity among patients with RA and SpA.

P1515

ASSESSMENT OF PHYSICAL ACTIVITY IN CHRONIC INFLAMMATORY RHEUMATIC DISEASES

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Introduction :
Physical activity (PA) is recognized as a key component for the management of Chronic Inflammatory Rheumatic Diseases (CIRD) such as Rheumatoid arthritis (RA) and spondyloarthritis (SpA), contributing to improved disease outcomes, physical function, and quality of life. Despite this fact, previous studies have shown lower levels of PA compared with the general population.
AIM :
This study aims to assess the level of PA in patients with RA and SpA and to identify factors associated with active engagement.
Methods :
We conducted a cross-sectional study involving patients diagnosed with CIRD, recruited from the rheumatology department of Monji Slim Hospital. Sociodemographic data as well as disease-related characteristics were transcribed (medical history, educational level, occupation, marital status, living setting). The level of PA was assessed using the Global Physical Activity Questionnaire (GPAQ). Statistical significance was fixed for $p<0.05$.
Results :
The study included 100 patients 60 with RA and 40 with SpA, with a female predominance (sex ratio F/M =1.85). The mean age was of 51 ± 14 years old.
Regarding educational levels, 25% had a university level or higher, 30% had a secondary level, 26% had a primary level, and 19% were illiterate. In terms of occupation, 37% were employed, 43% were unemployed, and 20% were retired.
As for marital status, 69% were maried, 4% were single, 28% were widowed, and 8% were divorced. Seventy-six percent of patients lived in urban areas, while 24% resided in rural settings.
The mean disease duration was 11.8 ± 7,2 years. RA was immunopositive and erosive in the majority of cases (83 % and 77%). The mean erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) were 28,5 ± 24 and 17,2 ± 32, respectively.
The mean Disease Activity Score (DAS28-ESR) was 3.6 ± 1.2, and the mean ASDAS-CRP was 2.3 ± 1.1.
The median total PA was 6840 MET-minutes/week [2175–12390].
Physical activity was negatively correlated with ESR ($p = 0.048$), ASDAS-CRP ($p = 0.029$), and BASFI ($p = 0.026$).
Conclusion :
Our study showed that Physical activity was inversely associated with inflammatory markers, disease activity, and functional impairment. Based on these findings, it appears essential to highlighting its potential role as an important component of disease management.

P1516

PERCEIVED BENEFITS OF PHYSICAL ACTIVITY IN CHRONIC INFLAMMATORY RHEUMATIC DISEASES

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Introduction :
Physical activity (PA) is a key determinant of health in patients with chronic inflammatory rheumatic diseases (CIRD), particularly rheumatoid arthritis (RA) and spondyloarthritis (SpA). These include improved physical function, reduced disease-related symptoms, and enhanced quality of life. Exploring patients' perceptions of these benefits can help tailor interventions to increase PA participation.
AIM :
The objectives of this study were to assess patients' perceptions of PA-related benefits among patients with CIRDs and to identify associated factors.
Methods :
This was a cross-sectional study including patients followed for RA or SpA. Sociodemographic data and disease-specific characteristics were collected. The level of PA was assessed using the Global Physical Activity Questionnaire (GPAQ). Perceptions of PA benefits were explored using the Exercise Benefits Scale (EBBS), which includes five subscales for benefits, with a score ranging from 28 to 112.
Results :
A total of 100 patients were included, 60 with RA and 40 with SpA, comprising 65 women and 35 men, with a mean age of 51 ± 14 years.
The median total PA was 6840 MET-minutes/week [2175–12390]. The mean EBBS "benefits" subscore was 96.4 ± 15.3 (94.2 ± 14.8 in RA vs. 99.7 ± 15.5 in SpA; $p=0.07$). The most strongly perceived benefit of PA was mental health improvement (3,68±0,6).
(2,88±1,14). A favorable perception of PA was independently associated with male gender ($p = 0.001$; $\beta = 15.364$ [6.892; 23.836]), higher educational level ($p = 0.006$; $\beta = 5.777$ [1.661; 9.893]), urban living environment ($p = 0.001$; $\beta = -17.032$ [−26.998; −7.066]), marital status ($p = 0.014$; $\beta = 4.380$ [0.912; 7.849]), SpA diagnosis ($p = 0.02$; $\beta= 4.994$ [0.818; 9.170]), and lower erythrocyte sedimentation rate ($p = 0.019$; $\beta= -0.279$ [−0.511; −0.047]).
Conclusion:
Integrating the assessment of PA perceptions into the management of patients with CIRDs appears essential to identify barriers and to tailor interventions accordingly.

P1517

SPECIFIC FEATURES OF PHYSICAL ACTIVITY IN PATIENTS WITH SPONDYLOARTHRITIS (SPA)

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Introduction :
Spondyloarthritis (SpA) is a chronic inflammatory rheumatic disease associated with significant functional impairment which negatively affects patients' quality of life. A major consequence of this condition is reduced physical activity (PA).
AIM :
The aim of this study is to investigate the impact of spondyloarthritis on physical activity.
Methods :
We conducted a cross-sectional study including patients diagnosed with spondyloarthritis according to the [ASAS] classification criteria recruited from the rheumatology department of Mongi Slim Hospital. Sociodemographic and clinical data were collected. Patients also completed a self-administered questionnaire to assess their global physical activity questionnaire (GPAQ) scores. Statistical significance was fixed for $p<0.05$.
Results :
The study included 40 patients with SpA :sixteen women (40%) and twenty-four men (60%), with a gender ratio of 1.5. The mean age was 44.5 ± 13.1 years. Eight patients (20%) had office jobs, 11 (27%) performed manual labor, six patients (15%) were retired, and 15 (38%) were unemployed.
Twenty patients had both axial and peripheral articular SpA (50%). SpA was primary in 28 patients (70%), associated with IBD in nine patients (23%), and with psoriasis in three patients (8%). The mean disease duration of SpA was 11.8 ± 7.2 years. In terms of disease activity, the mean erythrocyte sedimentation rate (ESR) was 28.5 ± 24 mm, and the mean C-reactive protein (CRP) level was 17.2 ± 32 mg/L. The mean BASDAI score was 2.4 ± 1.7, with 75% of patients in remission. The mean ASDAS-CRP score was 2.3 ± 1.1, with 18% of patients exhibiting low disease activity. The mean LEI score was 2.3 ± 1.6. and the mean BASFI score was 3.5 ± 2.3.
Twenty-one patients (53%) had hip involvement (coxitis), which required surgery in 13% of cases. In patients with SpA (n = 40), the median total physical activity was 6860 MET-min/week. Regarding activity levels, 8% had low, 23% moderate, and 70% high total physical activity. The median daily duration of total physical activity was 244 minutes, including 111 minutes of work-related activity, 45 minutes of transport-related activity, and 30 minutes of leisure-time activity. The median percentage of total daily activity attributable to work, transport, and leisure was 53.3%, 18.7%, and 15.9%, respectively. Median daily sedentary time was 105 minutes .
Conclusion :
Patients with spondyloarthritis exhibit moderate to high levels of physical activity despite functional limitations, with work-related activity contributing most to total daily activity. Sedentary time remains relatively low, highlighting the potential for maintaining an active lifestyle. Targeted interventions could further promote leisure-time physical activity to improve overall health and quality of life in this population.

P1518

PASSIVE HIP STIFFNESS AND MEDIAL KNEE PAIN SENSITIVITY: A PRELIMINAR CROSS-SECTIONAL STUDY

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Objectives: Knee Osteoarthritis (KOA) pain involves biomechanical mechanisms and sensitization. While hip strength is well-studied, the influence of passive stiffness on pain sensitivity remains underexplored. This preliminary study analyzed the association between passive hip stiffness and pressure pain threshold (PPT), investigating whether KOA modifies this relationship.
Methods: This preliminary cross-sectional analysis included 25 participants (20 with KOA and 5 without KOA). Separate multiple linear regression models were used to examine the association between PPT and passive hip joint stiffness (measured in degrees, where higher values indicate lower stiffness), adjusting for age. PPT was assessed at three sites: 3 cm medial to the knee joint line, the ipsilateral tibialis anterior muscle, and the contralateral forearm. Knee pain status was included as a categorical variable (0 = no osteoarthritis, 1 = osteoarthritis). An interaction term between hip stiffness and knee pain status was included to assess whether the association between stiffness and PPT was modified by the presence of osteoarthritis. Statistical analyses were performed in RStudio, with significance set at $p < 0.05$.
Results: Participants (mean age 58.6±9.6; 68% female) had a mean pain intensity of 5.0±2.8. For medial knee PPT, the model explained 44.1% of the variance (R^2=0.44, p=0.005). A significant interaction was found (p=0.007): greater hip flexibility correlated with higher pain thresholds in controls, but with lower thresholds (increased pain responsiveness) in the KOA group (Figure 1). No significant associations were found for secondary sites, indicating the effect was specific to the medial knee.
Conclusion: These preliminary findings suggest that passive hip stiffness is differentially associated with local pain sensitivity depending on the presence of knee osteoarthritis. While greater hip flexibility appears to be associated with reduced pain sensitivity in individuals without KOA, the opposite pattern was observed in those with KOA, indicating a potential maladaptive biomechanical–sensory interaction in this population. Further studies with larger samples and longitudinal designs are needed to confirm these associations and to clarify their clinical relevance.

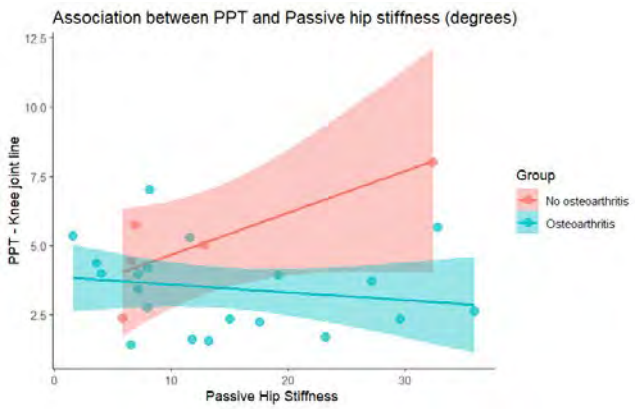


Figure 1 - Interaction effect of passive hip stiffness on medial knee pressure pain threshold (PPT) stratified by group.

P1519

THE MODERATING ROLE OF PHYSICAL ACTIVITY IN THE RELATIONSHIP BETWEEN METABOLIC MARKERS AND CARDIOVASCULAR RISK IN OSTEOARTHRITIS: OBESE VS. NON-OBESE

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Objective: To compare the association between cardiometabolic markers and cardiovascular risk in obese versus non-obese individuals with osteoarthritis and assess moderation by physical activity. **Methods**: Blood samples were collected after a 12-hour fast for analysis of lipid and glycemic profiles. Muscle function was assessed with the 30-second Chair Stand Test using an armless chair. Physical activity was measured objectively using an activPAL accelerometer (right thigh, 7 days), with valid data defined as ≥10 hours/day for ≥5 days, providing measures of sitting time, sit-to-stand transitions, step count, and stair use. **Results**: The study included 61 individuals with osteoarthritis, divided into obese (n=30; age: 59.3±9.7 years; 64.5% female, 35.5% male) and non-obese (n=31; age: 60.3±9.7 years; 63.3% female, 36.7% male) groups. Obese participants showed significantly higher weight, waist and hip circumference, and BMI (all p<0.001). Borderline differences were observed for fasting glucose and visceral adipose tissue area, whereas height, waisttohip ratio, HDL, triglycerides, sittostand performance, and daily step count did not differ between groups.In multiple linear regression analysis (predictors: VAT area, BMI, waist-to-hip ratio), predictive patterns differed according to nutritional status. For fasting glucose, the model was significant only in the non-obese group (p=0.040), with waist-to-hip ratio as a positive predictor. For triglycerides, no model was significant. For HDL, the model fit was excellent in the non-obese group (p=0.0003), with BMI as a negative predictor, and marginal in the obese group (p=0.099). Additional models incorporating functional variables (sittostand and steps/day) showed no significant associations with metabolic markers, suggesting that adipositymetabolic relationships are linear only in nonobese individuals, whereas more complex, nonlinear mechanisms likely dominate in obesity. **Conclusion**: The association between adiposity and metabolic markers in osteoarthritis differs by obesity status. In non-obese individuals, waist-to-hip ratio was linearly related to fasting glucose, and BMI to HDL levels. These linear associations were absent in obese individuals, suggesting the predominance of alternative pathways, such as inflammation and insulin resistance. The lack of correlation with functional measures underscores the complex, multifactorial nature of metabolic regulation in this population, highlighting the need to investigate nonlinear pathways for targeted management.

P1520

ASSOCIATION OF SARCOPENIA-RELATED INDICES WITH SELF-REPORTED PAIN, STIFFNESS, AND PHYSICAL FUNCTION IN KNEE OSTEOARTHRITIS

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Objective

To investigate the association between sarcopenia-related indices, represented by muscle function and appendicular lean mass, and pain, stiffness, and perceived physical function in individuals with knee osteoarthritis (KOA).

Methods

This cross-sectional study included individuals of both sexes, aged 40–80 years, diagnosed with KOA according to the American College of Rheumatology criteria. Muscle function was assessed using the 30-Second Chair Stand Test (30s-CST). Body composition was evaluated by dual-energy X-ray absorptiometry, and appendicular lean mass was adjusted for body size. Pain sensitivity was assessed by pressure pain threshold at the medial joint line of the symptomatic knee using digital algometry. Pain, stiffness, and physical function were assessed using the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC). Associations were examined using multiple linear regression models adjusted for age, sex, and pain sensitivity.

Results

Seventy-seven participants were included (mean age 58.2 ± 9.4 years; 64.9% women). Mean performance on the 30s-CST was 9.7 ± 2.8 repetitions, and the mean WOMAC total score was 37.6 ± 18.5 points. Appendicular lean mass showed a mean value of 7.39 ± 2.07, while pressure pain threshold demonstrated high variability (246 ± 145 kPa). Muscle function was inversely and independently associated with WOMAC scores (β = −2.36; p = 0.0011*; 95% CI: −11.22 to −2.93), as was appendicular lean mass (β = 3.44; p = 0.0027*; 95% CI: 2.21 to 10.15), jointly explaining 27% of the outcome variability. Age (p = 0.298; 95% CI: −2.52 to 8.11) and pressure pain threshold (p = 0.713; 95% CI: −6.82 to 4.69) were not significantly associated with WOMAC scores.

Conclusions

Sarcopenia-related indices, represented by muscle function and appendicular lean mass, were associated with the severity of pain, stiffness, and perceived disability in individuals with knee osteoarthritis, even after adjustment for age, sex, and pain sensitivity. In contrast, age and pain sensitivity did not significantly contribute to the explanation of WOMAC scores.

Disclosure of Conflict of Interest

The authors declare no conflicts of interest.

P1521

DIVERGENT MUSCLE–METABOLIC AGING TRAJECTORIES IN OLDER WOMEN WITH BREAST CANCER TREATED WITH AROMATASE INHIBITORS VERSUS SELECTIVE ESTROGEN RECEPTOR MODULATORS: A REAL-WORLD LONGITUDINAL STUDY

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Background: Endocrine therapy in older women with hormone receptor–positive breast cancer may substantially influence aging-related outcomes beyond cancer control. While Aromatase Inhibitors (AI) and Selective Estrogen Receptor Modulators (SERM) differ in their estrogenic effects, their comparative impact on muscle integrity, metabolic stability, and downstream fall and fracture risk remains insufficiently characterized. Sarcopenia is a key determinant of frailty and skeletal outcomes, yet objective muscle measures are rarely available in routine oncology care.

Methods: We conducted a large population-based longitudinal cohort study of women aged ≥50 years with breast cancer treated with AI or SERM. Propensity score matching balanced baseline demographic, clinical, and metabolic characteristics. Longitudinal changes in anthropometric, cardiometabolic, and nutritional biomarkers serving as proxies of muscle health (serum albumin and total protein) were assessed using linear mixed-effects models. Lipid trajectories, including LDL variability, were evaluated descriptively. Falls and fractures were assessed using Kaplan–Meier analyses. Mean follow-up was approximately 3 years.

Results: Among 4,987 women treated with endocrine therapy, 1,632 (1,040 AI users and 592 SERM users) were included in the propensity score–matched longitudinal analysis. BMI trajectories did not differ significantly between treatment groups, although modestly greater weight loss was observed among AI users. Markers relevant to sarcopenia risk showed significantly different longitudinal patterns: AI therapy was associated with greater declines in serum albumin and total protein over time, particularly among women aged 70–79 years ($p<0.01$). SERMs were associated with less favorable cardiometabolic trajectories, including greater increases in systolic blood pressure and progressive elevations in total and LDL cholesterol. LDL trajectories under AI therapy demonstrated greater dispersion over time, indicating increased LDL variability despite similar mean changes. No significant differences were observed in fall or fracture incidence between groups.

Figure 1: Treatment Effects Over Time on Clinical Parameters
Longitudinal trajectories of (A) BMI, (B) Weight, (C) Systolic Blood Preassure, (D) Albumin, (E) Total protein, (F) Total cholesterol, and (G) LDL, comparing Aromatase Inhibitors (blue circles) versus SERM=Tamoxifen (orange squares) over 5 years. Data points represent means within 6-month time bins with 95% confidence intervals. Solid lines connect observed means; dashed lines show linear trends. The β coefficient represents the treatment-by-time interaction, indicating the difference in annual rate of change (SERM=Tamoxifen minus Aromatase Inhibitor). Positive β indicates SERM=Tamoxifen increases more (or decreases less) per year than Aromatase Inhibitors. P-values from linear mixed models.

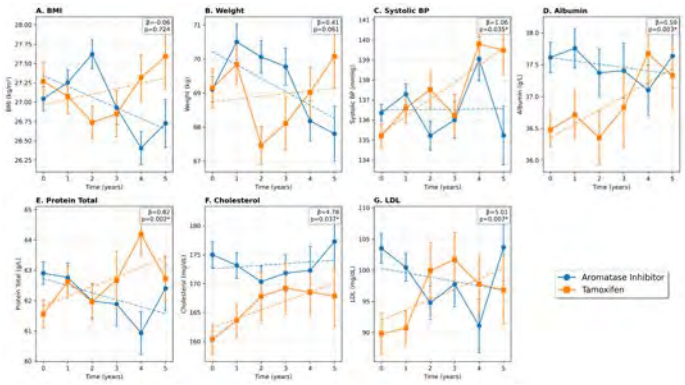
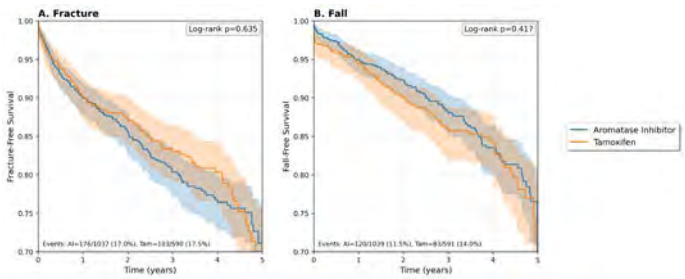


Figure 2. Kaplan–Meier estimates of fracture-free (A) and fall-free (B) survival according to endocrine therapy (aromatase inhibitors vs tamoxifen). Shaded areas indicate 95% confidence intervals.



Conclusions: Endocrine therapy in older women with breast cancer is associated with distinct aging-related trade-offs. Aromatase inhibitors are linked to nutritional biomarker decline suggestive of early sarcopenic vulnerability, whereas SERMs are associated with adverse cardiometabolic changes. These findings highlight the importance of integrated bone–muscle–metabolic assessment and geriatric-informed monitoring in aging cancer survivors.
Why this version is IOF-savvy

P1522

DOES EXCESSIVE SUGAR INTAKE CONTRIBUTE TO SARCOPENIA IN RHEUMATOID ARTHRITIS?

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Objective: To examine the association between dietary sugar intake and sarcopenia in female patients with rheumatoid arthritis (RA).
Material and Methods: A monocentric cross-sectional study was conducted over a 6-month period, including female patients with RA who met the 2010 ACR-EULAR criteria. Demographic, clinical, and paraclinical

data related to RA were collected.
Muscle mass and strength were measured to assess sarcopenia. Appendicular skeletal muscle mass index (ASMI) was assessed using both bioelectrical impedance analysis (BIA) and dual-energy X-ray absorptiometry (DEXA). ASMI was obtained by dividing appendicular muscle mass by height squared. Muscle strength was evaluated with a handgrip dynamometer. Sarcopenia was defined as an ASMI ≤ 5.5 kg/m² and a handgrip strength <16 kg.
Dietary sugar intake was assessed using a 24-hour dietary recall. Intake was evaluated according to World Health Organization recommendations, with consumption exceeding 100 g/day considered excessive.
Results: A total of 52 women were enrolled in the study. The mean age was 58 ± 8 years [40–76], and the mean duration of rheumatoid arthritis was 9 ± 6 years [1–30]. RA was seropositive in 90% and erosive in 90% of patients. The mean DAS28-CRP score was 4 ± 2 [1.5–6.5]. All patients received at least one conventional DMARD, and 40% had been switched to biologic therapy.
Mean handgrip strength was 9 ± 6 kg [2–26], and mean ASMI was 7 ± 1 kg/m² [5–11] by BIA and 6 ± 1 kg/m² [4–9] by DEXA. Sarcopenia was identified in 19% of patients (n = 10).
Mean daily sugar intake was 99 ± 33 g [58–161] in sarcopenic patients and 100 ± 34 g [39–182] in non-sarcopenic patients. Excessive intake was noted in 50% of sarcopenic and 40% of non-sarcopenic patients. This difference did not reach statistical significance (p = 0.698).
Conclusion: No significant association was found between dietary sugar intake and sarcopenia in this female RA patients' cohort.

P1523

IS SERUM MYOSTATIN ASSOCIATED WITH SARCOPENIA IN KNEE OSTEOARTHRITIS?

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Objective: To investigate the association between serum myostatin levels and sarcopenia in female patients with knee osteoarthritis (OA).
Material and Methods: Female patients with knee osteoarthritis (OA) fulfilling the ACR classification criteria were enrolled. We collected demographic, clinical, and paraclinical data.

The severity of knee OA was graded according to the Kellgren–Lawrence (KL) scale, from 0 (no radiographic OA) to 4 (severe OA), based on joint space narrowing, osteophyte formation, subchondral sclerosis, and bone deformities.

Sarcopenia was assessed through both muscle strength and muscle mass. Handgrip strength was measured using a dynamometer, and muscle mass was evaluated via bioelectrical impedance analysis (BIA) and dual-energy X-ray absorptiometry (DEXA). The appendicular skeletal muscle mass index (ASMI) was calculated by dividing appendicular lean mass by the square of the patient's height. Sarcopenia was defined by an ASMI ≤ 5.5 kg/m² and a handgrip strength <16 kg.
Venous blood samples were obtained from all participants to determine serum myostatin levels using an ELISA kit. Reference values ranged from 1,264 to 8,588 pg/mL.
Results: Thirty female patients were included, with a mean age of 62±8 years [48-74]. The mean knee OA duration was 40±28 months [8-120]. Fifty percent of patient had stage II knee OA according the KL grading. Sarcopenia was diagnosed in 10% (n=3) of patients.

Mean serum myostatin levels were 1400±443pg/mL [1136-1912] in sarcopenic patients versus 1738±829 pg/mL [149-3859] in non-sarcopenic patients.
Correlation analysis revealed no significant association between serum myostatin and sarcopenia (p=0.207).
Conclusion: Serum myostatin levels were not associated with sarcopenia in female patients with knee osteoarthritis. These results suggest that myostatin has limited value as a biomarker for early muscle loss in knee OA, and larger studies are needed to further explore this association.

P1524

CORTICOSTEROID USE AND SARCOPENIA IN RHEUMATOID ARTHRITIS: IS THERE A LINK?

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Objective: To assess the association between corticosteroid use and sarcopenia in patients with rheumatoid arthritis (RA).
Material and Methods: A cross-sectional study included female patients with RA meeting the ACR/EULAR 2010 criteria. Demographic, clinical, paraclinical and therapeutic data of participants were collected. Corticosteroid use and the prednisone-equivalent dose in milligrams (mg) were recorded.
Muscle mass was assessed by both bioelectrical impedance analysis (BIA) and dual-energy X-ray absorptiometry (DEXA). The appendicular skeletal muscle mass index (ASMI) was calculated as appendicular muscle mass divided by height squared.
Muscle strength was determined by a handgrip test using a dynamometer. Sarcopenia was diagnosed if ASMI was ≤ 5.5 kg/m² combined with a handgrip strength < 16 kg.
Results: Fifty-two female patients were included. The average age was 58±8 years [40-76]. The mean duration of RA progression was 9±6 years [1-30]. The mean DAS28-CRP was 4±2 [1.5-6.5]. Active disease with a DAS28-CRP > 3.2 was noted in 92% (n=48) of patients. All our patients have had at least one conventional synthetic disease-modifying antirheumatic drug. Biologics were used in 40% of patients. Corticosteroids were still ongoing in 77% of patients at the study time with an average dose of 6.3±2 mg of prednisone per day [2.5-10]. Sarcopenia was detected in 19% (n=10) of patients with a mean hand grip test of 9±6 kg [2-26]. The mean ASMI was 7±1 kg/m² [5-11] by BIA and 6±1 kg/m² [4-9] by DEXA.
When comparing sarcopenic and non-sarcopenic patients, corticosteroids were used in 100% and 98% of cases, respectively, with respective mean daily prednisone doses of 6.0 ± 2.4 mg and 6.1 ± 2 mg. No significant association was found between sarcopenia and corticosteroid use (p = 1) or corticosteroid dose (p = 0.663).
Conclusion: In this female RA cohort, no association was found between corticosteroid use or dose and sarcopenia.

P1525

IS SERUM BDNF A POTENTIAL BIOMARKER OF SARCOPENIA IN RHEUMATOID ARTHRITIS?

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Objective: To explore the association between serum brain-derived neurotrophic factor (BDNF) and sarcopenia in patients with rheumatoid arthritis (RA).
Material and Methods: Female patients with RA fulfilling the 2010 ACR–EULAR classification criteria were included. Demogr aphic data as well as clinical and paraclinical RA parameters were collected.

Sarcopenia was assessed based on its two domains: muscle strength and muscle mass. Muscle strength was evaluated using a handgrip strength test performed with a dynamometer. Muscle mass was assessed by bioelectrical impedance analysis (BIA) and dual-energy X-ray absorptiometry (DEXA). The appendicular skeletal muscle mass index (ASMI) was calculated by dividing appendicular muscle mass by height squared.

Sarcopenia was defined as an ASMI ≤ 5.5 kg/m² combined with a handgrip strength < 16 kg.

Serum BDNF levels were measured in 29 patients using venous blood samples and analyzed by ELISA. Normal reference values ranged from 6,186 to 42,580 pg/mL.
Results: Fifty-two female patients were included. The mean age was 58 ± 8 years [40–76]. RA was seropositive in 90% and erosive in 90% of patients. The mean disease duration was 9 ± 6 years [1–30]. Ninety-two percent of patients (n=48) had active disease with a DAS28-CRP > 3.2. All patients received at least one conventional synthetic DMARD, and 40% (n=21) were treated with biologics.
The mean handgrip strength was 9 ± 6 kg [2–26]. The mean ASMI was 7 ± 1 kg/m² [5–11] by BIA and 6 ± 1 kg/m² [4–9] by DEXA. Sarcopenia was diagnosed in 19% of patients (n=10).
The mean serum BDNF level was 184.8 ± 119.9 pg/mL in sarcopenic patients versus 136.1 ± 50 pg/mL in non-sarcopenic patients, with no statistically significant difference (p=0.258).
Moreover, only one non-sarcopenic patient had a low BDNF level, while all sarcopenic patients had BDNF levels within the normal range, with no significant difference between groups (p=1).
Conclusion: In this cohort, serum BDNF levels were not associated with sarcopenia in RA patients.

P1526

DO SOCIODEMOGRAPHIC FACTORS CONTRIBUTE TO SARCOPENIA IN RHEUMATOID ARTHRITIS PATIENTS?

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Objective: To investigate the association between sociodemographic factors and sarcopenia in patients with rheumatoid arthritis (RA).
Material and Methods: Female patients with RA who met the 2010 ACR-EULAR criteria were enrolled in this study. We collected sociodemographic, clinical, and paraclinical data.
Sarcopenia was assessed by measuring both muscle strength and muscle mass. Muscle strength was evaluated using a handgrip test with a dynamometer, while muscle mass was determined through bioelectrical impedance analysis (BIA) and dual-energy X-ray absorptiometry (DEXA). The appendicular skeletal muscle mass index (ASMI) was calculated as appendicular muscle mass divided by height squared. Sarcopenia was defined as an ASMI ≤ 5.5 kg/m² combined with handgrip strength < 16 kg.
Results: Fifty-two female patients were included in this study, with a mean age of 58 ± 8 years [40–76]. Among the participants, 35% (n = 18) lived in rural areas. Most patients were married (88%, n = 46), while 4% (n = 2) were single and 8% (n = 4) were widowed. Regarding educational level, 46% (n = 24) had primary school education, and 36% (n = 19) were illiterate. Forty-six percent (n = 24) were unemployed.
The mean disease duration was 9 ± 6 years [1–30]. RA was seropositive and erosive in 90% of cases. The mean DAS28-CRP score was 4 ± 2 [1.5–6.5], with active disease (DAS28-CRP > 3.2) observed in 92% (n = 48) of patients. Mean handgrip strength was 9 ± 6 kg [2–26]. Mean ASMI was 7 ± 1 kg/m² [5–11] by BIA and 6 ± 1 kg/m² [4–9] by DEXA. Sarcopenia was present in 19% of patients (n = 10).
No significant association was observed between sarcopenia and sociodemographic factors, including age (p = 0.368), living area (p = 1), marital status (p = 0.360), educational level (p = 0.468), or professional status (p = 1).
Conclusion: In this cohort, sarcopenia occurred independently of sociodemographic factors in female patients with RA.

P1527

IS PAIN RELATED TO SARCOPENIA IN KNEE OSTEOARTHRITIS?

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Objective: To investigate the link between pain and sarcopenia in patients with knee osteoarthritis (OA).
Material and Methods: A cross-sectional study included female patients with knee osteoarthritis (OA) fulfilling the ACR classification criteria. Demographic, clinical, and paraclinical data were collected.
Radiographic severity of knee OA was assessed using the Kellgren–

Lawrence (KL) grading system, ranging from grade 0 (no radiographic OA) to grade 4 (severe OA), based on joint space narrowing, osteophyte formation, subchondral sclerosis, and bone deformities.
Sarcopenia was evaluated by the assessment of muscle strength and muscle mass. Muscle strength was measured by handgrip testing with a dynamometer, while muscle mass was assessed using bioelectrical impedance analysis (BIA) and dual-energy X-ray absorptiometry (DEXA). The appendicular skeletal muscle mass index (ASMI) was calculated as appendicular lean mass divided by height squared. Sarcopenia was defined by an ASMI ≤ 5.5 kg/m² combined with handgrip strength < 16 kg. Pain intensity was assessed using a visual analog scale (VAS) ranging from 0 (no pain) to 10 (worst imaginable pain).
Results: Thirty female patients were enrolled. The mean age was 62 ± 8 years [48–74], and the mean duration of knee OA was 40 ± 28 months [8–120]. According to the KL grading, 50% of patients had stage II knee OA and 37% had stage III knee OA.
The mean handgrip strength was 11±4 kg [6-23]. The mean ASMI was 8±1 kg/m² [5-9] by BIA and 7±1 [4-9] kg/m² by DEXA. Sarcopenic was present in 10% (n=3) of patients.
The mean VAS pain score was 4.2 ± 1.8 [2–6]. No significant association was found between sarcopenia and pain assessed by VAS (p = 0.276).
Conclusion: No association was found between sarcopenia and knee pain in this female OA cohort.

P1528

JOINT DEFORMITIES AND SARCOPENIA IN RHEUMATOID ARTHRITIS: INSIGHTS INTO THEIR ASSOCIATION

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Objective: To investigate a potential association between joint deformities and sarcopenia in woman with rheumatoid arthritis (RA).
Material and Methods: We conducted a monocentric cross-sectional. Female patients with RA meeting the 2010 ACR-EULAR criteria were enrolled. Demographic, clinical, and paraclinical data related to RA were collected. Sarcopenia was assessed based on both muscle strength and muscle mass. Muscle strength was measured using a handgrip dynamometer, while muscle mass was determined via the appendicular skeletal muscle index (ASMI), calculated as appendicular muscle mass divided by height squared. Appendicular muscle mass was obtained using bioelectrical impedance analysis (BIA) and dual-energy X-ray absorptiometry (DEXA). Sarcopenia was defined by an ASMI ≤ 5.5 kg/m² and a handgrip strength < 16 kg.
Results: Fifty-two women were enrolled, with a mean age of 58±8 years [40-76]. The mean disease duration was 9±6 years [1-30]. RA was seropositive and erosive in 90% of patients, respectively. The mean DAS28-CRP score was 4±2 [1.5-6.5] and 92% (n=48) of patients had active disease (DAS28-CRP > 3.2). The mean Health Assessment Questionnaire (HAQ) was 1.1±0.6 [0.1-2.5].
All participants had received at least one conventional treatment and 40% were treated with biologics.
The mean handgrip strength was 9±6 kg [2-26]. The mean ASMI was 7±1 kg/m² [5-11] by BIA and 6±1 [4-9] kg/m² by DEXA. Nineteen percent (n=10) of patients were sarcopenic.
Joint deformities were observed in 80% (n = 8) of sarcopenic patients compared with 36% (n = 15) of non-sarcopenic patients, with a statistically significant difference (p = 0.015).
Conclusion: In this cohort, joint deformities were associated with sarcopenia in female patients with RA.

P1529

ARE SARCOPENIA AND FUNCTIONAL IMPAIRMENT ASSOCIATED IN KNEE OSTEOARTHRITIS?

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Objective: To explore a potential association between sarcopenia and the Lequesne algofunctional index (AFI) in patients with knee osteoarthritis.
Material and Methods: Female patients with knee osteoarthritis (OA) fulfilling the ACR classification criteria were included. Demographic, clinical, and paraclinical data were collected.
Radiographic severity of knee OA was evaluated using the Kellgren–Lawrence (KL) grading system, ranging from grade 0 (no radiographic OA) to grade 4 (severe OA), based on joint space narrowing, osteophyte formation, subchondral sclerosis, and bone deformities.
Sarcopenia was assessed through the evaluation of muscle strength and muscle mass. Muscle strength was measured using a handgrip test with a dynamometer, while muscle mass was assessed by bioelectrical impedance analysis (BIA) and dual-energy X-ray absorptiometry (DEXA). The appendicular skeletal muscle mass index (ASMI) was calculated as appendicular lean mass divided by height squared. Sarcopenia was defined as an ASMI ≤ 5.5 kg/m² combined with handgrip strength < 16 kg. Functional impairment related to knee OA was assessed using the Lequesne AFI, which includes three domains: pain, walking distance, and difficulties in daily activities. A score > 8 indicates major to extreme disability.
Results: This study included 30 female patients with a mean age of 62 ± 8 years [48–74]. The mean disease duration was 40 ± 28 months [8–120], and 50% of participants had stage II knee OA according to the KL grading system.
Mean handgrip strength was 11 ± 4 kg [6–23]. The mean ASMI was 8 ± 1 kg/m² [5–9] by BIA and 7 ± 1 kg/m² [4–9] by DEXA. Sarcopenia was identified in 10% of patients (n = 3).
The mean Lequesne algofunctional index (AFI) was 8.7 ± 3.3 [5.5–12] in sarcopenic patients versus 9.4 ± 3.7 [3.5–17.5] in non-sarcopenic patients, with no statistically significant difference (p = 0.753).
Major to extreme disability was observed in two sarcopenic patients and seventeen non-sarcopenic patients, with no significant difference between groups (p = 1).
Conclusion: No significant association was observed between sarcopenia and Lequesne AFI score in female patients with knee OA.

P1530

DETERMINANTS OF AVASCULAR NECROSIS AND ASSOCIATED OUTCOMES IN SYSTEMIC LUPUS ERYTHEMATOSUS: A PROPENSITY-MATCHED ANALYSIS FROM A MULTI-CENTER DATABASE

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Background: Avascular necrosis (AVN) is a serious and potentially disabling complication of systemic lupus erythematosus (SLE), often resulting from vascular injury, immune-mediated inflammation, and corticosteroid exposure. The condition contributes substantially to morbidity in SLE through pain, reduced mobility, and need for surgical intervention. While corticosteroid use is a recognized risk factor, the relative influence of demographic, clinical, and treatment-related factors remains unclear. Prior studies have been limited by small sample sizes and single-center data.

Objectives: To identify demographic, clinical, and therapeutic factors associated with avascular necrosis in patients with systemic lupus erythematosus using a large, real-world multicenter database.

Methods: We conducted a multi-center, retrospective cohort analysis using the TriNetX research platform. Two cohorts were defined based on ICD-10 coding: SLE patients with AVN of the hips, shoulders, knees, or ankles after diagnosis of SLE and those without AVN. Patients with confounding autoimmune conditions such as rheumatoid arthritis, systemic sclerosis, dermatomyositis, polymyositis were excluded. Propensity score matching (1:1) was performed across 61 demographic, diagnostic, procedural, and medication variables to balance baseline characteristics. Outcomes assessed within one year after index included SLE flare (defined by flare-related medication use), emergency visits, hospitalizations, and all-cause mortality. Risk differences, risk ratios, and hazard ratios were calculated using TriNetX analytic tools with a significance threshold of $p<0.05$.

Results: A total of 3,852 patients with SLE and AVN and 142,731 SLE patients without AVN met inclusion criteria. After 1:1 propensity score matching across 61 demographic, clinical, and treatment variables, 3,532 patients remained in each cohort. Before matching, patients with AVN were younger ($p<0.001$), more often Black or African American ($p<0.001$), and had higher rates of comorbidities including hypertension, chronic kidney disease, and end-stage renal disease ($p<0.001$). Glucocorticoid and immunosuppressant use was also more common in the AVN cohort ($p<0.001$). After matching, baseline characteristics were well balanced between groups (all $p>0.05$). Patients with AVN experienced higher 1-year rates of ER visits (23.6% vs. 21.1%; $p=0.046$) and hospitalizations (29.5% vs. 22.6%; $p<0.001$).

In the matched analysis, flare rates (defined by belimumab, rituximab, or mycophenolate use) were similar between cohorts ($p=0.719$). Kaplan–Meier analysis demonstrated no difference in 1-year flare-free survival ($p=0.36$). No significant differences were observed in cardiovascular, infectious, or renal complications. All-cause mortality was comparable ($p=0.118$).

Conclusion: Overall, SLE patients with AVN exhibited greater healthcare utilization, but similar flare and mortality outcomes compared to matched SLE patients without AVN.

P1531

FACTORS ASSOCIATED WITH FRACTURE RISK IN SYSTEMIC LUPUS ERYTHEMATOSUS: A REAL-WORLD PROPENSITY-MATCHED COHORT STUDY

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Background: Fractures are a common but often overlooked complication of systemic lupus erythematosus (SLE). Chronic inflammation, corticosteroid exposure, and premature osteoporosis contribute to skeletal fragility, yet the long-term systemic consequences of fractures in SLE remain poorly defined. Understanding these associations could inform preventive and therapeutic strategies to reduce morbidity and mortality in this high-risk population.

Objectives: To determine whether fractures are associated with increased cardiovascular, infectious, and mortality outcomes in patients with SLE using a large, real-world electronic health record dataset.

Methods: This retrospective study utilized the TriNetX global federated research network, which includes data from 110 healthcare organizations. Adults (≥ 18 years) with an SLE diagnosis were divided into two cohorts: those with any fracture after SLE diagnosis (n = 6,878) and those without fracture (n = 142,276). Patients with overlapping autoimmune diseases were excluded. Propensity score matching (1:1) was performed across 72 demographic, clinical, and treatment variables, yielding two balanced groups of 6,673 patients each. Outcomes were analyzed using risk difference, risk ratio, odds ratio, and Kaplan–Meier survival analyses. Outcomes included heart failure, myocardial infarction, stroke, urinary tract infection (UTI), sepsis, mortality, and avascular necrosis (AVN) surgery.

Results: Before matching, patients with SLE + fracture were older (60.7 ± 14.5 vs 47.0 ± 15.6 years, p<0.001) and had higher rates of hypertension (65% vs 32%), diabetes (25% vs 11%), CKD (28% vs 11%), hypocalcemia (4.1% vs 1.1%), and corticosteroid use (prednisone 51% vs 31%, p<0.001). After matching, all baseline characteristics were well balanced. Compared with matched SLE patients without fractures, those with fractures had higher risks of heart failure (13.3% vs 10.1%; RR 1.32, p<0.001), myocardial infarction (5.8% vs 4.4%; RR 1.31, p=0.001), stroke (5.5% vs 4.1%; RR 1.34, p<0.001), UTI (18.0% vs 13.8%; RR 1.30, p<0.001), sepsis (12.0% vs 7.3%; RR 1.64, p<0.001), mortality (19.0% vs 13.3%; RR 1.44, p<0.001), and surgery for AVN (2.6% vs 0.7%; RR 3.58, p<0.001). Kaplan–Meier curves demonstrated significantly lower survival in the fracture group (HR 1.43, 95% CI 1.31–1.56, p<0.001).

Conclusion: In this large, propensity-matched cohort, fractures in patients with SLE were independently associated with increased cardiovascular events, infections, and mortality. These findings underscore the systemic impact of skeletal fragility and highlight the importance of early bone health assessment and fracture prevention in the comprehensive management of SLE.

P1532

CLINICAL OUTCOMES AND COMORBIDITY BURDEN AFTER HIP FRACTURE IN SYSTEMIC LUPUS ERYTHEMATOSUS: A PROPENSITY-MATCHED COHORT STUDY

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Background: Patients with systemic lupus erythematosus (SLE) are at increased risk of osteoporosis and fragility fractures due to disease-related inflammation, corticosteroid use, and comorbid conditions. However, the long-term outcomes and comorbid burden of SLE patients who sustain hip fractures remain poorly defined.

Objectives: To compare demographic, clinical, and outcome characteristics of SLE patients with versus without hip fracture, and to identify comorbid and treatment factors associated with adverse outcomes.

Methods: Data were obtained from the TriNetX Research Network (110 healthcare organizations). Two cohorts of adults with SLE (≥18 years) were identified: (1) SLE with hip fracture after SLE diagnosis (n=1,788) and (2) SLE without hip fracture (n=148,398). Patients with other autoimmune diseases (e.g., RA, systemic sclerosis, myositis) were excluded. Propensity score matching (1:1) was performed across 72 demographic, clinical, and medication covariates, resulting in 1,735 patients per group. Outcomes including cardiovascular events, infections, mortality, and hospitalization were compared using risk and Kaplan–Meier survival analyses.

Results: Before matching, SLE patients with hip fractures were significantly older (mean 63.5 vs. 47.4 years, $p<0.001$) and had higher prevalence of hypertension, chronic kidney disease, vitamin D deficiency, and hypocalcemia (all $p<0.001$). They were more likely to use corticosteroids, diuretics, bisphosphonates, and biologic or immunosuppressive agents including tacrolimus and rituximab (all $p<0.001$). After matching, demographic and comorbidity profiles were balanced.

In outcome analyses, SLE patients with hip fractures had significantly higher risks of sepsis ($p<0.001$), urinary tract infection ($p=0.007$), mortality ($p<0.001$), hospitalization ($p<0.001$), and emergency visits ($p<0.001$). Surgery for avascular necrosis was nearly tenfold more frequent among those with prior hip fracture ($p<0.001$).

Patients with a hip fracture demonstrated significantly worse Kaplan–Meier survival curves for multiple outcomes, including UTI, sepsis, mortality, ER visits, hospitalizations, and surgery for AVN. In contrast, no significant survival differences were observed for cardiovascular outcomes (heart failure, myocardial infarction, stroke) or herpes zoster.

Conclusion:

Among patients with SLE, those who experienced hip fractures demonstrated markedly greater comorbid burden and worse clinical outcomes, including higher infection rates, mortality, and hospitalization risk. Despite adjustment for confounders, the post-fracture period was associated with persistent vulnerability. These findings underscore the need for aggressive prevention, early bone health management, and close post-fracture surveillance in SLE populations.

P1533

NEURO-IMMUNE AXIS IN DIABETIC BONE LOSS: EVIDENCE FOR SUBSTANCE P-MEDIATED INFLAMMATION FROM HPLC-BASED ANALYSIS

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Objective(s)

To investigate the role of the neuro-immune axis—specifically Substance P (SP), mast cell activation, and pro-inflammatory cytokines—in mediating bone loss associated with Type 1 Diabetes Mellitus (T1DM).

Material and Methods

A streptozotocin-induced T1DM rat model was used to examine neuro-immune interactions in bone. SP concentrations in serum and bone were quantified by high-performance liquid chromatography (HPLC). Serum tryptase, cytokines (IL-1β, IL-6, TNF-α), mast cell counts, and bone resorption markers were measured using ELISA and histological analysis. Data were analyzed by one-way ANOVA ($p < 0.05$). All animal procedures were approved by the 'Animal Research Ethics Committee' of the College of Medicine and Health Sciences, UAE University (ERA_2017_5592).

Results

The T1DM group exhibited markedly higher SP levels in serum ($p < 0.05$) and bone ($p < 0.01$) compared to controls. Key pro-inflammatory cytokines were elevated, including IL-1β ($p = 0.0028$) and IL-6 ($p = 0.03$), while TNF-α and serum tryptase showed non-significant upward trends. Quantitative analysis confirmed that the increase in mast cell numbers in the diabetic group was statistically significant ($p = 0.03$). These findings indicate a diabetes-associated pro-inflammatory state in bone tissue, with IL-1β, IL-6, and mast cell activation playing prominent roles. Elevated SP levels parallel this inflammatory response, suggesting activation of a neuro-immune mechanism that amplifies local bone turnover.

Conclusion

Enhanced SP signaling, mast cell activation, and pro-inflammatory cytokine release contribute to diabetic bone loss through neuro-immune mechanisms. Targeting SP-mediated pathways may represent a novel therapeutic approach to reduce bone fragility in T1DM.

Acknowledgments

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Disclosure Statement

The authors declare no conflicts of interest related to this study.

P1534

INCIDENCE OF BONE FRACTURE IN TYPE 2 DIABETES: A POPULATION-BASED COHORT STUDY

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Background
Musculoskeletal complications of diabetes mellitus (DM), including impaired bone quality and increased fracture risk, are increasingly recognized as important contributors to morbidity, even in individuals with preserved or elevated bone mineral density. This study aimed to estimate the incidence of first bone fracture in individuals with Type 2 Diabetes (T2D) compared with those without diabetes at baseline. Additionally, we examined the relationship between T2D and fracture incidence while controlling for demographic and sociodemographic factors.
Methods
We conducted a population-based cohort study using a 2,000,000 random sample of individuals aged ≥18 years from the UK Clinical Practice Research Datalink (CPRD) Aurum, with linkage to Hospital Episode Statistics (HES). Study start was defined as 1 January 2007, at which time T2D status was ascertained based on a recorded diagnosis on or before that date. The comparison group comprised individuals without T2D, T1D, and gestational diabetes(GDM) at baseline. Individuals with a documented history of bone fracture prior to baseline were excluded. Fracture incidence rates were calculated per 1,000 Person-Years (PY) with corresponding Poisson confidence intervals. Incidence rate ratios were estimated using Poisson regression models with the logarithm of person-years as an offset; multivariable models were adjusted for age, sex, socioeconomic deprivation (Index of Multiple Deprivation decile), and ethnicity.
Results
The cohort included 770,641 individuals (28,149 with T2D; 742,492 without diabetes). Participants with T2D were older than the comparison group (mean age 66.0±14.2 vs 47.2±18.2 years) and had shorter mean follow-up (8.7±6.3 vs 10.6±7.0 years). Over 245,449 PY in the T2D group and 7,867,206 PY in the control group, 5,362 and 90,587 fractures occurred, respectively. Incidence Rate(IRs) were 21.8 per 1,000 PY (95% CI 21.3–22.4) in T2D and 11.5 per 1,000 PY (95% CI 11.4–11.6) in those without diabetes. The crude IRR was 1.90 (95% CI 1.85–1.95); after adjustment, baseline T2D remained associated with higher fracture incidence (adjusted IRR 1.25, 95% CI 1.21–1.28).
Conclusions
In this large population-based cohort with long follow-up (18 years), baseline T2D was associated with a substantially higher incidence of first bone fracture than in individuals without diabetes. Although the crude association was markedly attenuated after adjustment for age and sociodemographic factors, T2D remained independently associated with increased fracture incidence. These findings support targeted fracture risk assessment and prevention strategies for people with T2D.
Keywords
Type 2 diabetes, bone fracture, incidence rate, CPRD.

P1535

CASE SERIES: THE EFFECT OF IV ZOLENDRONIC ACID INFUSION IN TREATMENT OF TUMOR INDUCED HYPERCALCEMIA FOR FEMORAL FRACTURE PATIENTS

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Aims and objective: To look Into the cause of Hypocalcemia after treatment of hypercalcemia according to national guidelines.
Case1
82year old female was admitted with distal femur fracture and had open reduction & internalfixation
She was known to have IgA Keppa Myeloma, CKDsatge 4 secondary to obstructive uropathy and tumor. She had have bilateral nephropathy.
Investigation revealed that her preoperative adjusted calcium was 2.96mmol/l,phosphate normal and alkaline Phosphatese 932U/L. Parathyroid hormone were not done.
Her adjusted calcium on 3rd postoperative day was 3.18 along withlow phosphate, EGFR 55ml/mim
And IV Zolendronic acid 4 mg infusion was given
Vitamin D level was done on 4th day after Zolendronic acid infusion,which was 20 nmol/l(VitaminD Deficiency).
Adjusted calcium started decreasing next day of infusion and went into hypocalcemia range on day 4 of Zolendronic acid infusion along with low phosphate. By 7th day it was as low as1.86mmol/l, Vitamin D Level was 30, Parathyroid hormone level was 44.9pmol/l
Patient received double oral dose & IV supplement of calcium and oral & IM supplement of Vitamin D, when it was first identified on 4 of hypocalcemia.
It then started improving on day 8 when vitaminD level were 58nmol/l (sufficient)and adjustedcalcium was in normal range on day 9.
Case2
80year old male was admitted with pathological fracture neck of femur and had intrmedullary nail done
He was known to have metastatic prostate cancer , type2 diabetes, and hypothyroid.
Investigation revealed that his 5th post -operative day was 2.81 mmol/l(normal2.2-2.6mmol/l)and phosphate was normal, alkaline phosphate 204U/L,EGFR 66ml/min. By post operative day 6 adjusted calcium increased to 3.05 mmol/l,phosphate remained normal VitaminD was 29mmol/l(vitamin D Deficiency), parathyroid level was 1pmol/l
IV Zolendronic acid 4 mg infusion was given
Adjusted calcium started decreasing and went into Hypocalcemia range on day 4 of zolendronic acid infusion along with low phosphate. By 6th day it was as low as 1.86mmol/l, vitamind was not checked. Parathyroid hormone levelwas 35.8pmol/l.
It then started improving on day7 and Vitamin D level 65mmol/l(sufficient)and was in normal range on day 8.
Conclusion: Treatment of hypercalcemia without replacing vitamin D deficiency resulted into Hypocalcemia and Calcium came in normal range once VitaminD was in normal range inspite of doubling calcium dose in patients with femoral fracture patients

P1536

PROTEOMIC PROFILING OF SYNOVIAL FLUID IN ACL INJURIES, HEALTHY CONTROLS, AND OSTEOARTHRITIS PATIENTS

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Objective:
Anterior cruciate ligament (ACL) injuries are a significant risk factor for post-traumatic osteoarthritis (PTOA), with early biochemical changes in the joint playing a pivotal role in disease progression. This study performed for the first time an intradonor comparison of the proteomic profiles of synovial fluid (SF) from ACL-injured verus contralateral (healthy) knees and osteoarthritis (OA) controls. We aim to identify injury-specific alterations in the proteome that are characteristic of early signs of degeneration and inflammation.
Material and Methods:
Synovial fluid was collected during surgery of ACL-injured (6) and contralateral healthy (5) knees of patients enrolled 1-6 months post-injury and of OA patients (7). Proteomic analysis was performed using liquid chromatography-tandem mass spectrometry (LC-MS/MS) and differential protein expression analyzed. Furthermore pathway-enrichment analysis was performed.
Results:
A total of 3 037 proteins with abundant expression were identified across all groups. Periostin was one of the most significantly up-regulated proteins in injured knees compared to healthy knees (log2fc = 3.3, $p < 0.001$) and in OA versus healthy knees (log2fc = 1.1, $p < 0.001$). However, periostin was down-regulated in OA versus injured knee SF (log2fc = -1.6, $p < 0.001$). Additional proteins also showed significant alterations between groups. Pathway-enrichment analysis revealed that extracellular matrix (ECM) organization pathways were up-regulated in injured compared to healthy controls (log2fc = 0.078, $p < 0.001$). Conversely, immune system pathways were significantly down-regulated in ACL-injured knees (log2fc = -0.5, $p < 0.001$), with the highest entity ratio (0.17), indicating a high number of associated proteins.
Conclusion:
Our findings confirm that periostin is one of the key proteins associated with ACL injuries and may contribute to early osteoarthritis progression. Additionally, the down-regulation of immune system pathways in ACL-injured knees suggests a disrupted inflammatory response, potentially impairing tissue repair and exacerbating PTOA.

P1537

LACTOBACILLUS ACIDOPHILUS (LA) SUPPLEMENTATION MITIGATES INFLAMMATORY BONE LOSS BY MODULATING THE ILC3-ILCREG CELL AXIS

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Introduction: Immunoporotic potential of the "Treg-Th17" cell-axis has been extensively studied in post-menopausal osteoporosis (PMO). However, the role of Innate Lymphoid Cells (ILCs), which represent the innate counterpart of helper-T cell subsets, is yet to be explored in PMO. Additionally, while our laboratory has demonstrated immunomodulatory potential of probiotics in regulating the "Treg-Th17" cell-axis, their effects on the ILCs remain unexplored. Therefore, this study aims to examine the potential of the probiotic Lactobacillus acidophilus (LA) to modulate the "ILC3-ILCreg" cell axis in a murine model of Osteoporosis.
Materials & Methods: Building on the novel concept of "Immunoporosis", we investigated the role of the "ILC3-ILCreg" cell axis in PMO and evaluated the Immunoporotic potential of LA supplementation in restoring the same. Female (C57BL/6J) mice were ovariectomized (OVX) and divided into Sham, OVX and OVX+LA groups (n=6/group). 45 days post-surgery, mice were sacrificed, allowing us to evaluate a range of osteoimmune parameters (ILC3-ILCreg, Treg-Th17) in the bone-marrow and mucosal tissues, along with serum cytokines (IL-17, IL-10, IL-22, etc.), and micro-CT analysis.
Results: Interestingly, our findings reveal that PMO conditions significantly disrupted gut integrity and enhanced RORγt+CCR6+ ILC3s, which was accompanied by a concomitant reduction in the anti-inflammatory ILC populations, i.e. RORγt+CCR6- ILC3s and GATA3+IL10+ ILCregs. Concomitantly, serum cytokine balance was tipped towards the inflammatory phenotype, suggesting a crucial role of the ILC3-ILCreg cell axis in inflammatory bone loss in OVX mice. Notably, the administration of LA ameliorates these effects by restoring the osteoimmune profiles (*in vivo* and *in vitro*),
Conclusions: Our findings for the first time provide compelling evidence for the osteoprotective potential of LA by modulating the ILC3-ILCreg cell-axis in the murine model of PMO, thus paving the way for clinical applications.

P1538

SYNOVIAL FLUID CELL TRANSCRIPTOMICS IDENTIFIES NEUTROPHIL ASSOCIATED MOLECULAR SIGNATURE LINKED TO OSTEOARTHRITIS SEVERITY

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Background/Objective
We have established that synovial fluid (SF) is a key modulator in osteoarthritis (OA) pathophysiology, functioning as a pro-inflammatory niche that drives immune cell activation and differentiation. Although other immune cells have been studied in OA, the role of neutrophils, the key effectors of innate immunity, remains underexplored. Evidence indicates that neutrophils influence chronic inflammation through chemokine-driven recruitment, degranulation, reactive oxygen species generation, and neutrophil extracellular trap (NET) formation. This study aims to define neutrophil associated transcriptomic signatures within SF-cell transcriptome and elucidate its contribution to OA progression.
Materials and Methods
SF samples were collected from clinically and radiographically confirmed knee OA patients (40–75 years, Indian Asian) classified by Kellgren Lawrence (KL) grading system. A subset of these samples (n=20; five per grade) selected for transcriptomic profiling. Total RNA was isolated from SF cells, purified, quality checked and sequenced (NovaSeq X Plus, 150 bp paired-end, ~40M reads/sample). Demultiplexed FASTQ files were processed and aligned using Strand NGS v4.1. Differential gene

expression analysis was performed with KL grade-I samples as the reference control.

Results

Transcriptomic profiling of SF cells across KL grades showed major alterations in neutrophil associated pathways including activation, degranulation, and NET formation. Differential expression of neutrophil effector genes (ELANE, MPO, PRTN3, CTSG, AZU1, LTF, DEFA4) indicated enhanced degranulation, while upregulation of the neutrophil activation marker CD177 highlighted the presence of primed and migratory neutrophil subset. Grade dependent increases in neutrophil attracting chemokines (CXCL1, 2, 3, 5, and 8), DAMP associated S100 alarmins, oxidative burst and adhesion molecules further sustained neutrophil recruitment and activation. These findings highlight neutrophils as major contributers of synovitis and reinforce the concept of OA as a disease with significant innate immune activation.

Conclusion

Our findings demonstrate that OA progression involves a distinct shift in SF transcriptome, with neutrophil associated genes driving grade dependent inflammation. Higher KL grades showed strong upregulation of ELANE, MPO, CTSG, PRTN3, S100A8/A9/A12, CXCL chemokines, and CD177, indicating enhanced neutrophil activation, degranulation, and NET-related activity. This neutrophil associated signature suggests innate immune dysregulation, triggered by cartilage degradation products. These results highlight significance of neutrophils as a major inflammatory component in progressive OA and underscore their potential as biomarkers of disease severity and as therapeutic targets.

P1539

IMPACT OF ANKLE CENTER DEVIATION ON PROXIMAL TIBIAL CUT ANGLE IN TOTAL KNEE ARTHROPLASTY: A RADIOGRAPHIC SIMULATION STUDY

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Objectives

Accurate identification of the ankle center is essential for restoring neutral mechanical alignment in total knee arthroplasty (TKA). In clinical practice, ankle center estimation may be inaccurate due to soft tissue coverage and challenges in intraoperative landmark identification, potentially altering the tibial mechanical axis and resulting in proximal tibial cut malalignment. Patient anatomy, particularly tibial length, may influence the magnitude of this alignment error. This study aimed to quantify the effect of ankle center deviation on proximal tibial cut angle deviation using radiographic simulation and to evaluate whether tibial length modifies this relationship.

Design and Methods

This radiographic simulation study included 100 preoperative long-leg standing radiographs from patients with osteoarthritis undergoing TKA. The tibial mechanical axis was defined from the knee center to the ankle center. The ankle center was systematically shifted by 5, 10, 15, and 20 mm to simulate ankle center misidentification, and the resulting proximal tibial cut angle deviation was measured. Participants were stratified into three tibial length groups, and differences across groups were evaluated.

Results

Varus alignment was present in 90% of cases, with a mean hip–knee–ankle angle of 11.9 ± 5.6°. Proximal tibial cut deviation increased stepwise with greater ankle center shift. Based on averaged measurements, the mean deviation was 1.02 ± 0.13° at 5 mm, 1.65 ± 0.44° at 10 mm, 2.51 ± 0.46° at 15 mm, and 3.41 ± 0.46° at 20 mm. The deviation range also increased accordingly (5 mm: 1–2°; 10 mm: 1–2.25°; 15 mm: 2–3°; 20 mm: 3–4°). Significant differences between tibial length groups were observed across all deviation levels ($p \leq 0.045$).

Conclusion

Ankle center misidentification leads to progressively increased proximal tibial cut malalignment and may reach clinically relevant errors at larger deviations. Shorter tibial length appears to increase susceptibility to alignment error, emphasizing the importance of precise ankle center determination during TKA.

P1540

IMPACT OF ADALIMUMAB AND UPADACITINIB ON THE RISK OF FRAGILITY FRACTURES IN PATIENTS WITH RHEUMATOID ARTHRITIS AND DIABETES MELLITUS

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Introduction: The aim of this study was to evaluate differences in bone mineral density (BMD) and the incidence of fragility fractures between patients with rheumatoid arthritis (RA) treated with adalimumab (ADA) and upadacitinib (UPA), as well as to examine the association of diabetes mellitus (DM) with fracture risk in these therapeutic groups. **Materials and Methods:** A total of 28 patients with rheumatoid arthritis were included, 14 treated with ADA and 14 with UPA. Demographic and osteodensitometric data were collected, and parameters were compared between the two groups. **Results:** The overall mean age was 59.64±8.86 years, with 19 female patients (67.9%). Patients were divided into ADA and UPA treatment groups. The mean BMD at L1–L4 was 0.991, with a mean T-score of −1.668. The mean BMD at the left hip was 0.994, with a T-score of −1.63, while the mean BMD at the right hip was 0.988, with a T-score of −1.68. Normal bone density was observed in 5 patients (17.9%), osteoporosis in 8 (28.6%), and osteopenia in 15 (53.6%). A higher number of osteoporosis cases was recorded in the ADA group (6 patients). Fragility fractures occurred in 6 patients (21.4%), of which 4 were in the UPA group. Diabetes mellitus was present in 8 patients (28.6%), equally distributed between groups. In the UPA group, a significant association was found between DM and fragility fractures ($p<0.05$), whereas no such correlation was observed in the ADA group. **Conclusion:** A greater number of osteoporosis cases were registered in the ADA group, indicating a less favorable profile compared to UPA. Fragility fractures occurred in 21.4% of patients, more frequently in the UPA group. DM was present in 28.6% of patients, evenly distributed across both groups. A statistically significant association between diabetes and fragility fractures was confirmed in the UPA group, while no correlation was found in the ADA group. These findings highlight the considerable burden of reduced bone mass in patients with RA and suggest potential differences in the effects of ADA and UPA therapy, with particular emphasis on the association between DM and fracture risk in the UPA group.

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P1541

MORE THAN JUST A FALL:THE SILENT BURDEN OF CALCIUM AND VITAMIN D3 DEFICIENCIES IN INDIAN ADULT FRACTURE PATIENTS:EVIDENCE FROM A TERTIARY CARE CENTER

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OBJECTIVES

To evaluate serum calcium and vitamin D3 levels in adult patients admitted with fractures and to asses their association with fracture mechanisms, with the aim of identifying potentially modifiable metabolic risk factors.

MATERIAL AND METHODS

This prospective observational study was conducted over 1 year period at a tertiary care teaching hospital in South India. Patients aged 18 years and above admitted with radiologically confirmed fractures were included. Serum calcium and vitamin D3 levels were assessed at admission as part of standardized biochemical evaluation. Patients with known endocrine,metabolic,or hematological disorders affecting calcium or vitaminD metabolism were excluded. Demographic details, fracture patterns and mechanisms of injury were recorded using a predefined proforma. Data were analyzed descriptively.

RESULTS

A total of 96 patients satisfied the inclusion criteria. Low serum calcium levels were observed in 78 patients ,while an additional 10 patients demonstrated low-normal calcium values,vitamin D3 deficiency was identified in 66 patients, and 24 patients had insuffient vitamin D3 levels. Low velocity trauma,including simple falls accounted for fractures in 54 patients ,suggesting a substantial burden of underlying metabolic bone compromise rather than high energy injury alone

CONCLUSION

This study demonstrates a high prevalance of vitamin D3 defiency and suboptimal calcium levels among adult fracture patients,particularly those sustaining low energy injuries. These finding highlights the silent burden of metabolic bone diseases in fracture populations. Routine screening and early correction of calcium and vitamin D3 deficiencies may represent a simple and cost effective strategy to reduce fracture risk and improve long term musculoskeletal outcomes. Incorporation of metabolic bone health assessment into standard fracture management protocols should be considered ,especially in aging population.

ACKNOWLEDGEMENT

Nil

DISCLOSURES

The authors declare no conflicts of interests

P1542

INTER-JOINT COORDINATION STRATEGIES AND VARIABILITY DURING GAIT IN KNEE OSTEOARTHRITIS: A PILOT BIOMECHANICAL STUDY

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Objective:

To investigate inter-joint coordination strategies during gait in patients with knee osteoarthritis (KOA), with a particular focus on coordination variability as an indicator of movement adaptability.

Material and Methods:

Eight patients with KOA underwent three-dimensional gait analysis during level walking. Following a standardized approach for continuous relative phase (CRP) calculation(1), sagittal-plane hip–knee and knee–ankle coordination were quantified. Coordination variability was assessed using the coefficient of variation (CV) across repeated trials as a measure of movement flexibility. Comparisons were performed between the affected and contralateral limbs.

Results:

Mean CRP values demonstrated comparable inter-joint coordination between limbs (hip–knee: $p = 0.441$, $d = 0.289$; knee–ankle: $p = 0.920$, $d = 0.037$), consistent with previous observations in osteoarthritis-related gait (3, 4). In contrast, coordination variability revealed a notable shift in movement strategy. Specifically, hip–knee coordination variability was reduced on the affected side, approaching statistical significance ($p = 0.061$) and exhibiting a large effect size (Cohen's $d = 0.788$). Knee–ankle coordination variability showed negligible differences between limbs ($p = 0.803$, $d = 0.092$).

Conclusion:

While average inter-joint coordination patterns appear resilient to unilateral KOA, movement adaptability (variability) is compromised on the affected limb. The large effect size ($d = 0.788$) for proximal coordination variability supports a highly stereotypical, "co-rigid" movement strategy, likely adopted to enhance joint stability at the expense of flexibility. These pilot findings suggest that coordination variability is a more sensitive biomechanical marker than mean kinematics for detecting motor control alterations in KOA, justifying its inclusion in larger longitudinal investigations.

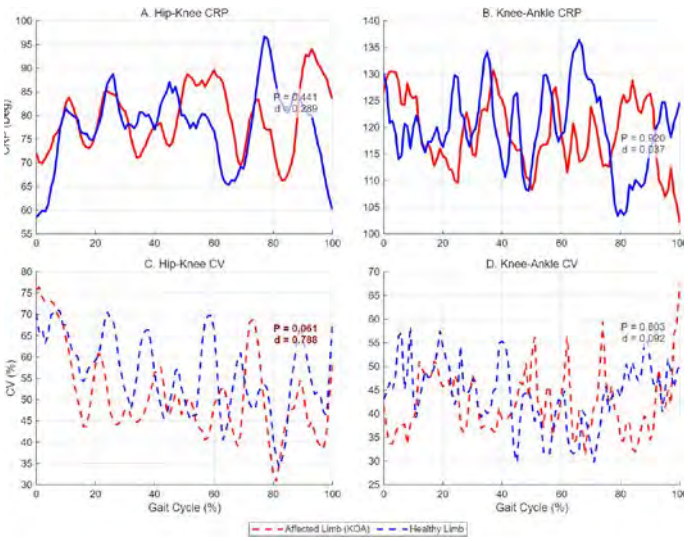
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P1543

RECONSIDERING AGE TRESHOLD FOR OSTEOPOROSIS SCREENING IN MEN: EVIDENCE FROM THE IRANIAN MULTICENTER OSTEOPOROSIS STUDY (IMOS)

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Objective
Osteoporosis in men remains underdiagnosed and undertreated, partly due to later recommended ages for screening compared with women. Current international guidelines recommend bone mineral density assessment using dual-energy X-ray absorptiometry in men aged 65 years and older, or earlier in the presence of major risk factors. However, growing evidence suggests that clinically relevant osteoporotic manifestations may occur at younger ages. This study evaluated age-related changes in bone mineral density, fracture risk, and clinical indicators of osteoporosis among men aged 50 years and older, and assessed whether osteoporotic manifestations occur before the guideline-recommended screening age.

Materials and Methods
This cross-sectional analysis used data from the Iranian Multicenter Osteoporosis Study (IMOS). Male participants aged 50 years and older were categorized into six age groups: 50–54, 55–59, 60–64, 65–69, 70–74, and 75–79 years. Bone mineral density at the femoral neck was measured using dual-energy X-ray absorptiometry. Outcomes included major osteoporotic fracture risk and hip fracture risk, assessed with and without bone mineral density, as well as history of minor trauma fractures and height loss, collected through standardized IMOS questionnaires. Statistical analyses were performed using appropriate methods. One-way analysis of variance with Bonferroni post-hoc tests was used for continuous variables, and chi-square tests for categorical variables.

Results
Approximately 650 men were analyzed. Mean femoral neck bone mineral density showed a significant age-related decline, with a reduction observed before 65 years ($p < 0.001$). Significant differences across age groups were observed for major osteoporotic fracture risk and hip fracture risk, with and without bone mineral density (all $p < 0.001$). Men aged 50–64 years demonstrated measurable reductions in bone mineral density and clinically relevant fracture risk. Clinical indicators, including self-reported minor fractures and height loss, were present among men younger than 65 years.

Conclusion
Osteoporotic changes and clinically relevant fracture risk are present in men before 65 years. These findings suggest that the current age threshold for osteoporosis screening in men may warrant reconsideration. Earlier screening strategies, beginning in the sixth decade of life, may improve early detection and prevention of osteoporotic fractures in men.

P1544

THE IMPACT OF TOBACCO USE ON FALL-RELATED INJURIES IN THE NORTH AFRICA AND MIDDLE EAST REGION FROM 1990 TO 2023

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Objective: To examine the contribution of tobacco use to the burden of fall-related injuries in the North Africa and Middle East region over the period 1990–2023.

Material and Methods: Age-standardized DALY and mortality rates for falls attributable to tobacco use were analyzed using Global Burden of

Disease 2023 data from 1990 to 2023, stratified by sex.
Results: Tobacco-attributable fall injury burden showed a gradual downward trend. The age-standardized DALY rate decreased from 3.43 per 100,000 in 1990 to 2.98 in 2023. Men consistently bore a much higher burden than women: male DALY rates declined from 5.80 to 4.97 (with deaths dropping from 0.13 to 0.095 per 100,000), whereas female rates were very low and nearly unchanged (around 1.00 to 0.98; deaths 0.019 to 0.013).
Conclusions: Although the overall burden of falls attributable to tobacco use has modestly declined, the pronounced male predominance persists. This pattern underlines the importance of continued tobacco control efforts and integrated fall-prevention programs, particularly targeting men. Public health authorities should address the synergistic risks of smoking and injury by prioritizing interventions (e.g., smoking cessation support, bone health improvement, and safety education) that can further reduce fall-related morbidity and mortality.

P1545

NATIONAL EXPOSURE TREND TO A DIET LOW IN MILK IN IRAN FROM 1990–2023

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Material and Methods: This analysis used age-standardized Summary Exposure Values (SEVs) for insufficient milk intake derived from the Global Burden of Disease 2023 data for Iran. Data spanned the years 1990 to 2023 and were stratified by sex. Temporal trends were analyzed to identify patterns and disparities in exposure risk over time.

Results: In Iran, the age-standardized Summary Exposure Value (SEV) for low milk consumption remained extremely high with minimal change over 1990–2023. The SEV was 69.23 per 100 in 1990 and only slightly lower at 67.53 in 2023, indicating persistently widespread inadequate milk intake. A pronounced gender gap was observed: women consistently had near-saturation risk levels (SEV ~94.1, dropping slightly to 91.8), reflecting severe nutritional insufficiency, whereas men maintained much lower risk exposures (SEV 45.7 to 43.6) throughout the period.

Conclusions: The persistently high risk exposure to low milk intake — especially among Iranian women — highlights a critical public health challenge for bone health and nutrition. Stagnant progress in improving dairy consumption suggests that current dietary interventions have been insufficient. Health policymakers should prioritize targeted nutritional programs and education to increase calcium-rich food intake (or fortified alternatives), addressing the wide gender disparity and mitigating future osteoporosis and fracture risks associated with poor nutrition.

P1546

EPIDEMIOLOGICAL TREND OF LOW BACK PAIN PREVALENCE IN IRAN, 1990–2023

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Objective: To examine long-term trends in the prevalence of low back pain (LBP) in Iran from 1990 to 2023.
Material and Methods: This study utilized Global Burden of Disease 2023 estimates to assess the prevalence of low back pain in Iran over a 33-year period. Age-standardized prevalence rates were extracted for the years 1990 to 2023, disaggregated by sex. Temporal trends and gender differences were examined to identify epidemiological patterns in low back pain burden.
Results: In Iran, the age-standardized prevalence of LBP declined slightly from 10,148.89 per 100,000 in 1990 to 9,147.41 in 2023. The trend was characterized by periods of modest decreases (notably around 1995–2000 and again after 2020) separated by long intervals of stagnation. A distinct gender disparity persisted: men experienced a more pronounced reduction in LBP prevalence (from 8,310.36 to 7,064.97) than women, whose prevalence remained higher and decreased only marginally (from 12,092.23 to 11,270.74).
Conclusions: Iran has seen only a minor reduction in LBP prevalence over three decades, and the burden remains substantial — particularly among women. The plateauing of rates for many years and the persistent female disadvantage indicate that past interventions may have been insufficient or unevenly effective. These findings call for renewed, gender-sensitive public health efforts to prevent and manage LBP, such as workplace ergonomic programs, chronic pain management services, and targeted outreach to support women's musculoskeletal health.

P1547

PREVALENCE AND DETERMINANTS OF SARCOPENIA IN THE BIRJAND LONGITUDINAL AGING COHORT IN IRAN

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Objective: To determine the prevalence of sarcopenia and identify its key determinants among older adults in the Birjand Longitudinal Aging Cohort, Iran.

Material and Methods: This cross-sectional study utilized baseline data from the Birjand Longitudinal Aging Study (BLAS), a prospective cohort of community-dwelling older adults aged ≥60 years in Birjand, Iran. A total of 1,348 participants were included. Probable sarcopenia was defined according to the EWGSOP2 guidelines, based on low muscle strength (measured via handgrip strength). Participants were stratified by sex and age (<75 vs. ≥75 years). Data were analyzed using Stata software, utilizing chi- square tests to assess the statistical significance of differences in prevalence rates across demographic subgroups.

Results: In a sample of 1,348 seniors from the Birjand Aging Cohort, the overall prevalence of probable sarcopenia was 41.3%. Age was the dominant determinant: sarcopenia prevalence nearly doubled from 33.4% in adults under 75 years to 65.4% in those aged 75 and above (P<0.001). Females had a slightly higher prevalence (43.3%) than males (39.2%), but this sex difference was not statistically significant (P=0.121).

Conclusions: Sarcopenia affects roughly two out of every five older adults in this cohort, identifying it as a major public health concern in the aging population. The steep increase in sarcopenia with advanced age clearly demonstrates the need for early preventive interventions (such as resistance exercise, protein supplementation, and routine muscle function screening) well before age 75. The absence of a significant gender difference suggests that such interventions should be broadly applied to all older adults. Healthcare planners should prioritize sarcopenia detection and management as part of healthy aging strategies to reduce disability and improve quality of life for Iran's elderly.

P1548

THE ROLE OF TOTAL HIP BONE MINERAL DENSITY IN THE DIAGNOSIS OF OSTEOPOROSIS

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Objective

Bone mineral density differs across skeletal sites due to variations in bone composition and structure. To standardize diagnosis, the World Health Organization (WHO) defines osteoporosis as a T-score ≤ −2.5 at any of three key sites: lumbar spine (L1–L4), femoral neck, and total hip. This study aimed to describe and compare T-score patterns at these three sites in Iranian men and women aged 50–89 years.

Material and Methods

This study used data from the Iranian Multicenter Osteoporosis Study (IMOS), a cross-sectional, population-based survey of adults aged ≥50 years from urban and rural regions of Iran. Bone mineral density was measured at the L1–L4 spine, femoral neck, and total hip using standardized protocols. Participants were grouped into 5-year age categories from 50 to 89 years, and median T-scores were evaluated separately in men and women.

Results

In both sexes and across all age groups, median T-scores at the total hip were consistently higher than those at the lumbar spine and femoral neck. The spine and femoral neck showed similar age-related declining patterns and generally lower T-scores compared with the total hip. Osteoporosis was identified in 22.10%, 14.92%, and 2.64% of participants at the lumbar spine, femoral neck, and total hip, respectively. No age group demonstrated osteoporosis at the total hip in the absence of osteoporosis at the spine or femoral neck. Based on these findings, inclusion of the total hip T-score did not alter the diagnosis of osteoporosis in this population.

Conclusions

Among Iranian adults aged 50–89 years, lumbar spine and femoral neck measurements show lower T-scores and greater sensitivity to bone loss compared with the total hip. These findings underscore the importance of spine and femoral neck assessment for osteoporosis detection.

P1549

METABOLOMIC MARKERS WERE ASSOCIATED WITH MUSCLE MASS OVER TIME IN PATIENTS WITH TYPE 2 DIABETES

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Objectives
Patients with Type 2 Diabetes (T2D) are at high risk of sarcopenia or muscle mass decline. However, the underlying biological mechanism of muscle mass decline in T2D is unclear. Plasma metabolomics is gaining increasing recognition for use in understanding metabolic processes and monitoring diseases. We investigated how plasma metabolomics were associated with muscle mass longitudinally in T2D.
Materials and Methods
This was a prospective study on 897 patients with T2D recruited from Singapore Macroangiopathy and Microvascular Reactivity in Type 2 Diabetes (SMART2D) cohort. We used bioimpedance analysis to quantify appendicular skeletal muscle (ASM) mass which was divided by body mass index (BMI) to yield ASM/BMI at baseline and follow-up. Plasma metabolites were quantified by nuclear magnetic resonance (NMR). Linear regression was used to examine the association between plasma metabolites and ASM/BMI at follow-up, adjusting for age, gender, ethnicity, baseline ASM/BMI and follow-up period with Benjamini-Hochberg (BH) correction.
Results
The mean age was 58.9 ± 10.0. The median duration of follow-up was 5.0 years (IQR 4.4-6.2). 54 metabolites were associated with follow-up ASM/BMI with adjusted coefficients ranging -0.036 to 0.023 (BH-adjusted p <0.05). Creatinine, relative lipoprotein lipid concentration (e.g. triglycerides (TG) to total lipids ratio in intermediate-density lipoprotein (IDL), phospholipids to total lipids ratio in medium high-density lipoprotein (HDL)), fatty acids (e.g. ratio of monounsaturated fatty acids (MUFA) to total fatty acids, and MUFA), lipoprotein classes (e.g. TG in medium low-density lipoprotein, TG in small HDL), glycoprotein acetyls related to inflammation, and pyruvate related to glycolysis were associated with reduced muscle mass at follow-up.
Conclusions
Plasma metabolites were associated with muscle mass at follow-up. The findings were suggestive of glucolipotoxicity and inflammation as drivers of muscle mass decline. These metabolites are potentially useful to track the muscle mass changes for sarcopenia prevention in T2D.

P1550

USING RESEARCH TO TRANSFORM HEALTH POLICY FOR PATIENTS WITH FRAGILITY FRACTURE IN BRITISH COLUMBIA, CANADA

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Objective: Fracture Liaison Service (FLS) is an effective post-fracture care model to reduce repeat fragility fractures and improve quality of life for older adults. An implementation science research team successfully implemented the first FLS in British Columbia (BC), Canada and spread FLS to three additional hospitals. The team is now using research methods to integrate FLS into routine orthopedic care in BC.
Material and Methods: The team – health providers, people with lived experience, academics, health sector decision makers and policy makers – brought together expertise in fracture prevention, research methods, patient experience, knowledge translation and health policy. Research methods included: a series of rapid literature reviews relevant to FLS scale-up and spread, a costing analysis of the impact of FLS spread in BC, a comparative policy review case study of FLS in other Canadian jurisdictions and a deliberative dialogue workshop with diverse stakeholders across Canada to provide input to shape the final BC FLS policy options.
Results: Literature reviews and costing analysis confirm that FLS is effective in preventing repeat fractures and associated health care costs. Patient-related factors important for FLS effectiveness include knowledge of osteoporosis, perceived treatment benefits, and trust with health providers. Successful FLS implementation strategies include primary care provider engagement, patient-centred approaches, adapting to local context, adopting team-based approaches, use of virtual technology and a stepwise approach to FLS spread. Barriers to implementation include lack of dedicated funding, shortage of primary care providers and limited experience reaching rural communities and specific populations (e.g., Indigenous peoples). Outputs from our research include 1) a policy brief (Canadian Institutes of Health Research website), 2) a detailed FLS spread business case and implementation plan for BC and 3) integration of FLS spread into the BC Ministry of Health's *Age Forward Strategy* (2024), a prevention-focused health strategy and action plan supporting older adults' needs.
Conclusion: A multi-disciplinary team, that included policy makers, successfully used research methods to transform the health system to benefit patients with fragility fractures.

P1551

AGREEMENTS OF DIAGNOSTIC BONE MINERAL DENSITY RESULTS BETWEEN SUPINE AND STANDARD POSITIONS

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Background: Osteoporosis is a common health problem among older adults and is associated with an increased risk of fractures. Bone mineral density (BMD) measurement using dual-energy X-ray absorptiometry (DXA) with standard positioning is the primary diagnostic method. However, some patients have physical limitations that prevent them from being positioned in a standard manner. Supine-position DXA scanning has recently been introduced to improve accessibility; however, its diagnostic agreement with standard positioning remains unclear. **Objective:** To evaluate the agreement and compare BMD and T-score values obtained from anteroposterior (AP) spine measurements between supine and standard positions. **Methods:** This prospective study included postmenopausal women aged ≥50 years and men aged ≥60 years who underwent BMD measurement at Rajavithi Hospital, Thailand, between December 2024 and June 2025. A total of 60 participants were enrolled. **Results:** The mean age of the participants was 69.8 ± 8.8 years; 5 participants (8.3%) were men and 55 (91.7%) were women. BMD and T-score measurements obtained from supine and standard positions demonstrated almost perfect agreement, with ICCs of 0.995 ($p < 0.001$) for both parameters. No statistically significant differences were observed between positions for BMD ($Z = -1.280$, $p = 0.201$) or T-score ($Z = -1.777$, $p = 0.076$). Agreement in T-score–based diagnostic classification was high, with a 95.0% agreement rate and a Cohen's kappa value of 0.919 ($p < 0.001$). All discrepancies occurred between adjacent diagnostic categories. **Conclusion:** Supine-position AP spine DXA provides BMD and T-score results comparable to those obtained with standard positioning, supporting its clinical use in patients with positioning limitations.

P1552

CASE SERIES: CHRONIC LOW-GRADE INFLAMMATION AS A SHARED ETIOPATHOGENIC FACTOR IN OSTEOPOROSIS AND CHRONIC CORONARY SYNDROME

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Background:
Chronic low-grade inflammation ("inflammaging") contributes to endothelial dysfunction, atherosclerotic progression, and disruption of bone remodeling. This case series evaluates patients presenting with both chronic coronary syndrome (CCS) and osteoporosis, focusing on inflammatory markers as a potential shared mechanism.
Material and Method:
A case series study with 3 postmenopausal women presenting with osteoporosis and chronic coronary syndrome. Laboratory inflammatory markers including hsCRP, Lipoprotein (a), Interleukin 6 (IL-6), Vitamin D and diagnostic imaging with Multi Slice Coronary Angiography (MSCT) and DEXA.
Results:
Case 1: Female, 72 years, Hypertension, dyslipidemia, postmenopausal status, Exertional chest discomfort, chronic back pain DXA: T-score −2.7 (lumbar spine), MSCT : Non-obstructive but diffusely atherosclerotic arteries, hs-CRP: 4.8 mg/L (↑), IL-6: mildly elevated, Vitamin D 16,7
Case 2: Female, 65 years, with a type 2 diabetes, obesity (BMI 31), sedentary lifestyle, Fatigue, reduced exercise tolerance, height loss over 5 years, DXA: T-score −2.2 (femoral neck), MSCT: calcified plaques and obstructive LAD (Agatston score 380), hs-CRP: 6.2 mg/L (↑) IL-6: elevated, HbA1c 7.8%, Vit D 21
Case 3: Female, 79 years, with a rheumatoid arthritis moderate disease activity, long-term low-dose glucocorticoids, Vertebral compression fractures, stable angina, DXA: T-score −3.3 (lumbar spine), MSCT: Obstructive coronary LAD and Cx, ESR: 48 mm/h (↑), hs-CRP: 7.9 mg/L (↑) Vit D 7,9
Conclusion:
Evidence of chronic coronary syndrome and osteoporosis with elevated inflammatory markers suggests inflammation as a shared pathophysiologic driver. Metabolic low grade chronic inflammation contributes to both skeletal fragility and accelerated coronary plaque formation.

P1553

IDENTIFYING SERUM BIOMARKERS FOR EARLY DIAGNOSIS AND PROGNOSIS OF LUNG INVOLVEMENT IN SYSTEMIC CONNECTIVE TISSUE DISEASES: FROM PATHOGENESIS TO CLINICAL PRACTICE

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Introduction. The need for serum biomarkers for early detection of lung involvement in diffuse connective tissue diseases (DCTDs) like systemic lupus erythematosus (SLE) and systemic sclerosis (SSc) persists. The detection of antibodies to elastin and elastase appears to be a promising direction in the search for new immunological markers of pulmonary involvement in DCTDs.
Objective. To conduct a comparative analysis of serum levels of antibodies to elastin and elastase in patients with SLE and SSc, assess their association with the presence of lung involvement.
Materials and Methods. A single-center prospective study included 65 patients with SLE (60 women, 5 men; mean age 42.5 ± 12.1 years; mean disease duration 8.4 ± 6.7 years) and 50 patients with SSc (38 women, 12 men; mean age 43.2 ± 14.6 years; mean disease duration 10.6 ± 8.2 years). The control group consisted of 30 apparently healthy donors matched for sex and age. Lung involvement was detected in 34 (52.3%) SLE patients: pleuritis – 21 (62%), alveolitis – 8 (23%), pneumosclerosis – 5 (15%). In the SSc group, lung involvement was diagnosed in 45 patients (90%): pneumofibrosis – 26 (58%), signs of pulmonary hypertension – 12 (27%), pleuritis – 7 (15%).

Results. Baseline levels of antibodies to elastin and elastase in patients with SLE and SSc were significantly higher than in the control group ($p<0.05$). In SLE, no statistically significant differences were found in the levels of antibodies to elastin and elastase between subgroups of patients with or without clinically and instrumentally confirmed lung involvement ($p=0.074$; $p=0.057$, respectively). In the SSc group, a significant correlation was found between antibodies to elastin and lung involvement ($p=0.003$). However, in the SSc group, differences in antibodies to elastase between subgroups with and without lung involvement did not reach statistical significance ($p=0.056$). Correlation analysis in the SSc group also revealed an association between antibodies to elastin and fibrotic changes ($p<0.05$).
Conclusion. The level of antibodies to elastin demonstrates an association with lung involvement in DCTDs, especially in SSc, which allows them to be considered as a promising laboratory marker for early detection and monitoring of the progression of pulmonary pathology in patients with SSc.

P1554

CANAKINUMAB AS A BIOLOGICAL THERAPY OPTION FOR RESISTANT ADULT STILL'S DISEASE

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Introduction. Adult-onset Still's disease (AOSD) is a rare systemic inflammatory disorder of autoimmune origin characterized by multiorgan damage. Standard treatment regimens, including glucocorticosteroids and synthetic disease-modifying antirheumatic drugs, do not always control disease activity, necessitating the use of targeted biologic agents.
Objective: To demonstrate the specific management strategy for adult Still's disease patients with insufficient efficacy of standard therapy.
Materials and Methods. Patient M., 23, diagnosed with AOSD a year ago, presented to the rheumatology department with complaints of low-grade fever (up to 38.0°C), severe pain and swelling of the knee and wrist joints with limited function, and an erythematous maculopapular rash on the skin of the trunk, worsening with hyperthermia. Laboratory examination data on admission revealed high inflammatory activity: neutrophilia, ESR of 52 mm/h, C-reactive protein of 45 mg/L, and hyperferritinemia (800 µg/L).
Results. The patient received methotrexate 20 mg/week and prednisolone 20 mg/day without significant clinical and laboratory response. Due to resistance to the therapy, the interleukin-1β (IL-1β) inhibitor canakinumab 300 mg subcutaneously every 4 weeks was prescribed against the background of a gradual reduction in the dose of prednisolone. Positive changes were noted after the first canakinumab injection: normalization of body temperature, regression of joint syndrome, and disappearance of skin rashes. After 4 months of therapy, complete clinical and laboratory remission was achieved: normalization of inflammatory markers (CRP ≤ 5 mg/L, ferritin 180 ng/mL) and neutrophils. Due to this improvement, the prednisolone dose was reduced to 10 mg/day without recurrence of symptoms. Canakinumab therapy was well tolerated, with no adverse effects reported.
Conclusions. Canakinumab therapy can be considered as the treatment of choice in patients with hormone-resistant forms of AOSD, providing a rapid and sustained clinical response combined with a favorable safety profile. These data confirm the key role of IL-1β in the pathogenesis of AOSD and support its targeted blockade as part of a treatment strategy.

P1555

RESISTIN AS A PROMISING BIOMARKER OF METABOLIC SYNDROME IN PATIENTS WITH DIFFUSE CONNECTIVE TISSUE DISEASES

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Introduction. The pathogenesis of metabolic syndrome (MS) in systemic lupus erythematosus (SLE) and systemic sclerosis (SSc) includes both traditional and specific factors: chronic systemic inflammation, immune dysregulation, and the impact of therapy. Adipokines, particularly resistin, are considered key mediators linking metabolic disturbances with the immune-inflammatory activity of the disease. However, data on resistin in SLE and SSc remain contradictory and require systematization.
Objective. To systematically analyze current data on the role of resistin as a potential biomarker of metabolic disturbances in patients with SLE and SSc.
Materials and Methods. A search and analysis of publications in PubMed, Google Scholar, and eLibrary databases for the period 2020-2025 was conducted using the keywords "resistin," "adipokines," "metabolic syndrome," "insulin resistance," "SLE," and "SSc," taking into account the level of evidence of the data presented.
Results. Most studies describe a significant increase in serum resistin levels in patients with SLE compared to healthy controls (Kuo C.Y. et al., 2020). An association between resistin and metabolic syndrome in SLE was established: its levels were significantly higher in patients with SLE and metabolic syndrome compared to SLE patients without metabolic syndrome ($p < 0.001$). Meta-regression analysis revealed a direct correlation between resistin levels and the degree of insulin resistance (HOMA-IR) in SLE (Kuo C.Y. et al., 2020). However, in another study, high resistin concentrations were negatively associated with MS, highlighting the inconsistency of the data (Apostolopoulos D. et al., 2020). Unlike SLE, no differences in resistin concentrations were found between the MS and non-MS groups in SSc. Furthermore, a positive correlation was found between resistin and SLE disease activity (Kuo C.Y. et al., 2020) and the presence of lupus nephritis (Chougule D. et al., 2025).
Conclusions. Resistin is a promising biomarker in SLE. Its serum level not only reflects the presence of concomitant metabolic disorders but also correlates with disease activity and specific organ damage (nephritis). Large, prospective, multicenter studies with a consistent design are needed to clarify the diagnostic and prognostic value of resistin.

P1556

DIAGNOSTIC FEATURES OF INFECTIOUS ENDOCARDITIS IN PATIENTS WITH ANKYLOSING SPONDYLOARTHRITIS

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Introduction. Diagnosis of infective endocarditis (IE) in patients with autoimmune pathology can be challenging, as its clinical and laboratory manifestations can mimic an exacerbation of the underlying disease. The greatest difficulties arise in patients receiving therapy with biologic agents.

Objective. To describe a clinical case of IE in a patient with ankylosing spondylitis (AS) and analyze factors complicating its diagnosis during immunosuppressive therapy.

Materials and Methods. A 38-year-old man diagnosed with AS received etanercept. The patient complained of a three-week low-grade fever, arthralgia and swelling of the knee and ankle joints, myalgia, unexplained weight loss of 6 kg over the past month, and the development of a hemorrhagic rash on the skin of the lower extremities. Objectively: the skin is pale; multiple petechiae 1-2 mm in diameter are present on the shins and thighs. Cardiac auscultation revealed a systolic murmur in the second intercostal space on the right and at Botkin's point. Joint syndrome manifested as swelling of the knee joints without signs of hyperemia or hyperthermia, with limited range of motion and moderate tenderness.

Results. Laboratory signs of systemic inflammation: leukocytosis with a neutrophilic shift, an increase in the erythrocyte sedimentation rate and the level of C-reactive protein. The hemogram revealed normochromic anemia and thrombocytopenia. Biochemical profile: hypoalbuminemia and signs of impaired renal function: eGRF=42 ml/min/1.73 m². General urine analysis revealed proteinuria, erythrocyturia and leukocyturia. Bacteriological blood culture verified the causative agent - Streptococcus oralis. Echocardiography revealed signs of vegetation on the aortic valve leaflets and aortic regurgitation of I-II degrees. Renal ultrasound revealed increased parenchymal echogenicity and thickened renal pelvis, consistent with nephritis.

Conclusions. This clinical case highlights the need for caution regarding IE in patients receiving biologic agents and the importance of conducting diagnostic workup when fever and new systemic symptoms develop. It is important to adhere to the recommended antibiotic prophylaxis for IE before invasive procedures in rheumatology patients receiving immunosuppressive therapy.

P1557

THE ROLE OF THE APELINERGIC SYSTEM IN THE PATHOGENESIS AND SEVERITY ASSESSMENT OF OSTEOARTHRITIS: DIAGNOSTIC AND THERAPEUTIC POTENTIAL

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Introduction. Most studies indicate the involvement of the apelinergic system (apelin/APJ) in the pathogenesis of osteoarthritis (OA). However, data on its relationship with the clinical and radiological severity of the disease and its diagnostic value remain fragmented and require systematization.

Objective. To analyze current scientific data on the diagnostic and prognostic value of apelin/APJ as a biomarker for assessing the severity of osteoarthritis.

Materials and Methods. A search of publications in the international databases PubMed and Google Scholar was conducted without restrictions on the year of publication, with an emphasis on articles published between 2020 and 2025. The apelinergic system, represented by apelin and its receptor (apelin/APJ), is widely expressed in numerous tissues, particularly bone, joint, and muscle (Luo J., 2021). This review focuses on the effects of apelin/APJ on the course of OA. Fifteen studies were included in this systematic review.

Results. Apelin is involved in the pathogenesis of OA by regulating synovial angiogenesis and cartilage catabolism (Wang YH, 2020). Apelin/APJ stimulates chondrocyte proliferation and increases the expression of catabolic factors that break down proteoglycans (Luo, 2021; Jia S, 2023). Hu PF et al. described an increase in apelin in serum and synovial fluid in OA compared to controls ($p < 0.05$). A direct correlation was established between apelin and OA severity ($r=0.5498$; $p=0.0003$). Higher apelin levels in women ($p<0.05$) may explain gender differences in the prevalence and incidence of OA.

Conclusions. These data suggest that apelin is involved in the pathophysiology of OA. The established correlation between apelin concentration and clinical severity of OA supports its potential as a diagnostic marker. Inhibition of the apelin/APJ system represents a potential target for targeted OA therapy. Further research is needed to fully elucidate the role of apelin in cartilage metabolism.

P1558

PREVALENCE AND PREDICTORS OF OSTEOPOROSIS IN POSTMENOPAUSAL WOMEN

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Objective(s): The objective is to determine the prevalence of osteoporosis and to analyze clinical and densitometric parameters associated with osteoporosis in postmenopausal women treated at a tertiary rehabilitation clinic.

Material and Methods: This cross-sectional study included 107 postmenopausal patients examined at the Clinic for Physical Medicine and Rehabilitation, University Clinical Center of Vojvodina. Bone mineral density (BMD) was measured by dual-energy X-ray absorptiometry. Demographic data, duration of menopause, body mass index (BMI), presence of clinical risk factors, FRAX scores (hip fracture and major osteoporotic fracture probability), and SARC-F questionnaire scores were collected. Statistical analysis included Student's t-test and logistic regression, with $p < 0.05$ considered statistically significant.

Results: The median age of participants was 64 years (range 40–89), and the mean duration of menopause was 15.5 years (range 1–42). Osteoporosis was diagnosed in 30 patients (28%), while osteopenia was diagnosed in 51 patients (47.7%). The mean BMI was 25.8 (range 17.4–44.6). The SARC-F questionnaire was ≥4 in 60 patients (56.1%). A statistically significant difference in right hip BMD was observed between patients with a duration of menopause >15 years and those with <15 years ($p < 0.01$). Mean right hip BMD was lower in patients with menopause duration >15 years (0.8059 ± 0.130) compared to those with <15 years (0.8803 ± 0.1289). Higher FRAX hip fracture probability (OR 6.2; 95% CI 2.46–15.60; $p = 0.0001$) and FRAX major osteoporotic fracture probability ($p = 0.0031$) were significantly associated with the presence of osteoporosis. Other analyzed factors, including duration of menopause, BMI, presence of clinical risk factors, and SARC-F score, were not independently associated with osteoporosis.

Conclusion(s): Osteoporosis was identified in more than one-quarter of the examined postmenopausal patients. Longer duration of menopause was associated with lower hip bone mineral density. Women diagnosed with osteoporosis exhibited significantly higher FRAX hip and major osteoporotic fracture probabilities. These findings highlight the coexistence of low bone mass and increased estimated fracture risk in postmenopausal women.

P1559

RISK OF FRAGILITY FRACTURES IN INDIVIDUALS WITH AND WITHOUT HIV INFECTION: A POPULATION-BASED MATCHED CASE–CONTROL STUDY

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Purpose

Patients with human immunodeficiency virus (HIV) infection are at increased risk of comorbidities, including osteoporosis, which predisposes them to fragility fractures (FFs). Evidence from Asian populations is limited. This study investigated the risk of FFs in an Asian population with and without HIV infection.

Methods

We conducted a nationwide retrospective matched cohort study using Taiwan's National Health Insurance Research Database. A total of 3,994 individuals with HIV infection and 15,976 matched controls were identified (1:4 ratio). Matching variables included age, sex, income, urbanization, liver cirrhosis, diabetes mellitus, renal failure, and hepatitis B and C infection. Fragility fractures were identified using ICD-9-CM codes, and Cox proportional hazards models estimated hazard ratios (HRs) with 95% confidence intervals (CIs).

Results

The incidence of overall fragility fractures (AFF) was similar between HIV-infected and uninfected individuals (12.9% vs. 11.9%, P = 0.097). However, HIV infection was associated with a significantly higher risk of hip fragility fracture (HFF) (HR 2.22, 95% CI 1.62–3.06, P < 0.001). Risk factors for FFs included age >50 years, modified Charlson Comorbidity Index ≥2, hypertension, and diabetes mellitus. Antiretroviral therapy (ART) mitigated overall fracture risk and was associated with substantially lower postoperative mortality after fracture surgery (9.4% vs. 36.1%).

Conclusion

HIV infection was associated with increased hip fracture risk in this Asian population. ART conferred protective effects on overall fracture risk and survival after fracture, underscoring its net clinical benefit despite skeletal concerns. These findings support targeted bone health monitoring and preventive strategies in individuals with HIV infection.

P1560

HOUNSFIELD UNIT VALUES OF CERVICAL VERTEBRAE PREDICT TITANIUM MESH CAGE SUBSIDENCE AFTER ANTERIOR CERVICAL CORPECTOMY AND FUSION

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Objective(s)

Titanium mesh cage (TMC) subsidence after anterior cervical corpectomy and fusion (ACCF) may cause segmental kyphosis, recurrent neurological symptoms and mechanical failure. Bone mineral density is a major determinant of subsidence risk, but dual-energy X-ray absorptiometry does not accurately reflect local cervical vertebral bone quality. This study evaluated the predictive value of preoperative Hounsfield unit (HU) measurements from computed tomography for TMC subsidence after ACCF and sought to define a clinically useful HU threshold.

Material and Methods

We retrospectively analysed 64 patients who underwent one- or two-level ACCF with TMCs for cervical degenerative or compressive pathology between March 2011 and December 2019. Preoperative cervical computed tomography was used to measure HU values in vertebral bodies adjacent to the TMC using standardised elliptical regions of interest that avoided cortical bone and vascular channels. Subsidence was defined as segmental height loss greater than 3 mm on lateral radiographs compared with immediate postoperative measurements. Radiographic assessments were performed at baseline, postoperatively and at a mean follow-up of 19.3 ± 7.9 months. Patients were divided into subsidence and non-subsidence groups. Receiver operating characteristic (ROC) curve analysis was used to determine the optimal HU cut-off for predicting subsidence.

Results

TMC subsidence occurred in 22 of 64 patients (34.4 per cent). Mean HU values of adjacent vertebrae were significantly lower in the subsidence group than in the non-subsidence group (317.3 ± 32.3 vs 363.1 ± 25.2, $p < 0.001$). ROC analysis yielded an area under the curve of 0.859. An HU cut-off of 330.5 provided 100 per cent sensitivity and 72.7 per cent specificity for predicting subsidence. Patients with HU values below 330.5 had a markedly higher subsidence rate than those with HU values at or above this threshold.

Conclusion(s)

Preoperative cervical HU measurements are strongly associated with TMC subsidence after ACCF and offer a practical surrogate for local vertebral bone quality. An HU threshold of 330.5 may be used to identify high-risk patients, guide reconstruction strategies and tailor perioperative management in individuals with compromised cervical bone strength.

Disclosures

The authors declare no conflicts of interest related to this work.

P1561

MRI-BASED ENDPLATE BONE QUALITY SCORE PREDICTS CAGE SUBSIDENCE AFTER SINGLE-LEVEL ANTERIOR CERVICAL DISCECTOMY AND FUSION

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Objective(s)

Cage subsidence after anterior cervical discectomy and fusion (ACDF) may result in segmental kyphosis, recurrent radiculopathy and mechanical failure. Bone quality is central to subsidence risk, yet dual-energy X-ray absorptiometry (DEXA) does not adequately capture local cervical endplate strength. This study evaluated an MRI-based endplate bone quality (EBQ) scoring method for predicting cage subsidence after single-level ACDF and compared its predictive performance with that of DEXA-derived bone mineral density.

Material and Methods

We retrospectively analyzed 160 patients who underwent single-level ACDF from C3 to C7 between 2008 and 2016. All procedures used either a zero-profile anchored cage (n = 90) or a plate–cage construct (n = 70). Preoperative cervical MRI was used to assign an EBQ score to the operative segment based on endplate signal intensity and morphology. Systemic bone mineral density was assessed using DEXA. Clinical outcomes included visual analogue scale scores for neck and arm pain and Neck Disability Index, recorded preoperatively and at follow-up. Radiographic parameters included disc height, cage subsidence, fusion status and time to motion stabilisation on dynamic radiographs. Cage subsidence was defined as radiographic loss of disc height with visible cage sinking into the endplate. Associations between implant type, EBQ, DEXA and subsidence were evaluated using appropriate statistical tests, with $p < 0.05$ considered significant.

Results

Both constructs provided significant improvement in pain and disability, with similar fusion rates at final follow-up. The zero-profile group showed greater disc height loss (2.26 ± 1.00 mm versus 1.76 ± 1.13 mm, $p = 0.004$) and a higher subsidence rate (24.44 per cent versus 11.43 per cent, $p = 0.036$) compared with the plate–cage group. Higher EBQ scores, indicating poorer endplate quality, were associated with an increased risk of cage subsidence. The EBQ method showed superior predictive accuracy for subsidence risk compared with DEXA, which was less discriminative for local endplate failure. Delayed motion stabilisation was also linked to greater disc height loss and higher subsidence rates.

Conclusion(s)

An MRI-based EBQ scoring method provides a targeted assessment of cervical endplate bone quality and improves prediction of cage subsidence after single-level ACDF compared with DEXA alone. Incorporating EBQ into preoperative planning may help identify high-risk patients, guide construct selection and optimise strategies to reduce implant-related complications.

Disclosures

The authors declare no conflicts of interest related to this work.

P1562

SHORT-SEGMENT BONE CEMENT–AUGMENTED PEDICLE SCREW FIXATION COMBINED WITH BONE GRAFTING FOR KÜMMELL DISEASE WITH SEGMENTAL INSTABILITY

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Objective(s)
Percutaneous kyphoplasty and vertebroplasty are widely used for Kümmell disease, but they may be insufficient in cases with segmental instability. The objective of this study was to evaluate the clinical and radiological efficacy of short-segment bone cement–augmented pedicle screw fixation combined with bone grafting for the treatment of Kümmell disease with segmental instability.

Material and Methods
This retrospective study included 23 patients with Kümmell disease and segmental instability treated with short-segment bone cement–augmented pedicle screw fixation combined with bone grafting between January 2021 and January 2024. Clinical outcomes were assessed using the visual analog scale (VAS) for back pain and the Oswestry Disability Index (ODI) preoperatively, one week postoperatively and at final follow-up. Radiological parameters included vertebral anterior height and kyphotic Cobb angle. Operative time, intraoperative blood loss, length of hospital stay and complications were recorded. Fusion status was evaluated on follow-up imaging.

Results
VAS scores, ODI scores, vertebral anterior height and kyphotic Cobb angles improved significantly from preoperative assessment to one week after surgery and to final follow-up ($p < 0.05$). VAS and ODI at final follow-up were significantly lower than at one week postoperatively ($p < 0.05$), whereas vertebral anterior height and kyphotic Cobb angle were maintained without significant loss between one week and final follow-up ($p > 0.05$). Solid fusion was achieved in 21 of 23 patients (91.3 per cent). No serious complications, such as neurological deterioration or symptomatic cement leakage, were observed.

Conclusion(s)
Short-segment bone cement–augmented pedicle screw fixation combined with bone grafting is a safe and effective option for Kümmell disease with segmental instability. This technique provides substantial pain relief and functional improvement, restores and maintains vertebral height and kyphosis correction and is associated with a low complication rate.

Disclosures
The authors declare no conflicts of interest related to this work.

P1563

IMPROVING SURGICAL OUTCOMES IN OSTEOPOROTIC SPINE PATIENTS THROUGH PERIOPERATIVE BONE HEALTH OPTIMIZATION

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Materials and Methods: This review synthesizes contemporary guidelines, systematic analyses, randomized trials, and biomechanical studies addressing perioperative optimization in osteoporotic patients undergoing orthopedic surgery of the spine. Topics include screening strategies, pharmacologic management, vitamin D supplementation, and surgical techniques.
Results: Dual-energy X-ray Absorptiometry (DEXA) remains foundational for the diagnosis of osteoporosis, but CT-based Hounsfield unit (HU) quantification demonstrates stronger correlation with trabecular bone strength, vertebral microarchitecture, pedicle screw fixation strength, and fusion success. HU thresholds of <110 for osteoporosis and <135 for osteopenia offer >90% specificity, and preoperative HUs < 97.9 predict postoperative instrumentation failure. Vitamin D deficiency is an independent predictor of nonunion, increasing the risk of failed fusion and prolonging time to union. Supplementation shortens time to fusion and reduces postoperative pain.
Recent evidence suggests that teriparatide improves long-term fusion rates, decreases screw loosening, enhances pedicle fixation strength, and outperforms biphosphonates in meta-analyses. Biphosphonates remain beneficial for reducing postoperative vertebral fractures and improving pain and disability scores. Romosozumab and abaloparatide show promise but require additional data.
Surgical strategies include cement augmentation, which provides the greatest improvement in pullout strength regardless of screw design. Expandable screws and hydroxyapatite-granule augmentation offer alternative fixation strategies with reduced leakage and thermal risk. Fenestrated, cement-augmented screws reduce revision rates in osteoporotic patients.
Conclusions: Spine surgery in osteoporotic patients requires a multidisciplinary approach to bone health optimization incorporating bone quality assessment, correction of vitamin D deficiency, initiation of osteoanabolic therapy when indicated, and enhanced fixation strategies. Adoption of these evidence-based protocols may improve outcomes in this growing patient population.

P1564

THE RELATIONSHIP BETWEEN CORONARY ARTERY CALCIFICATION AND VASCULAR WALL STIFFNESS PARAMETERS IN PATIENTS WITH CORONARY ARTERY DISEASE AND TYPE 2 DIABETES MELLITUS

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Background: Bone mineral metabolism disorders and cardiovascular diseases, as age-associated pathologies, share not only similar risk factors but also common pathogenic mechanisms, explaining their close relationship.

Objectives : The aim of the study was to identify the relationship between vascular wall stiffness and bone mineral density in patients with coronary heart disease and type 2 diabetes.
Materials and methods: A total of 40 patients with coronary artery disease (CAD) were included in the study, 21 of whom were women aged 55 to 75 years (mean age 65.8 ± 4.7 years) and 19 were men aged 55 to 73 years (mean age 63.1 ± 4.2 years). The study included patients who signed voluntary informed consent, had at least one coronary artery (CA) stenosis of 50% or more (according to coronary angiography), or had a history of myocardial infarction, hospitalized for which more than 60 days before inclusion in the study. Among the patients, 8 people had type 2 diabetes. Patients underwent serum levels of phosphorus, calcium, alkaline phosphatase (ALP), 25(OH) vitamin D3, and lipid profile. Instrumental examinations included 24-hour monitoring of blood pressure and arterial stiffness parameters using the BPLab monitor and multispiral computed tomography (MSCT) of the coronary arteries with Agatston coronary calcium index calculation (SIEMENS SomatomPerspective 64/128 ECO CT). Statistical analysis was performed using StatTech v. 4.8.5. Quantitative parameters were assessed for compliance with normal distribution using the Shapiro-Wilk test. Quantitative parameters with a normal sample distribution were described using arithmetic means (M) and standard deviations (SD). Differences were considered statistically significant at $p < 0.05$.
Results: Among the 40 patients included in the study, 25 patients showed a moderate correlation with mean aortic pressure (0.428, P=0.006), pulse pressure amplification index (r=0.425, P=0.006), and mean pulse pressure (r=0.433, P=0.005).
Results: Among 40 patients included in the study, 25 had multivessel coronary artery disease, including 6 patients with type 2 diabetes. All examined individuals had signs of coronary artery calcification. In patients with multifocal atherosclerosis, a pronounced direct relationship with the degree of coronary artery calcification was noted; in individuals with multivessel disease, the Agatston index, which determines the degree of coronary artery calcification, was significantly higher (1519 CI versus 840 CI). When analyzing markers of phosphorus-calcium metabolism, a negative relationship was observed between the serum phosphorus level in the blood and the calcium index value according to MSCT of the coronary arteries ($r = 0.556$, $p < 0.001$), as well as with the parameters of vascular wall rigidity. Serum phosphorus level showed a direct moderate relationship with mean aortic pressure (0.428, P=0.006), pulse pressure amplification index (r=0.425, p=0.006) and mean pulse pressure (r=0.433, p=0.005).
Conclusions: Thus, the degree of coronary artery calcification is directly related to the prevalence of atherosclerotic lesions in the coronary artery system. Multivessel disease was observed in almost all patients with diabetes. Some parameters of arterial stiffness were correlated with phosphorus levels, the latter being negatively correlated with the calcium index.

P1565

LEGG-CALVE-PERTHES DISEASE IN A FEMALE WITH THREE GENERATIONS OF FAMILY MEMBERS: A CASE REPORT

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Introduction:
Legg-Calve-Perthes disease (LCPD) is an avascular necrosis affecting the femoral head. It is characterized as a developmental anomaly of the hip, manifested by delayed and irregular ossification of the femoral epiphyseal nucleus. LCPD is predominantly observed in young males and is uncommon in girls. The presentation of LCPD in female patients has been reported as later in onset and associated with certain high-impact activities.
We present a case report of a 10-year-old female diagnosed with LCPD, with a family history of osteonecrosis of the femoral head in three generations with a focus on the potential genetic predisposition.
Case:
We present the case of a 10-year-old female patient who presented with limping and mechanical pain in the hip joint that had begun 3 years earlier. The pain increased with physical activity. There was no history of trauma and nothing of note in her medical history. On interrogation, we found a family history of head femoral osteonecrosis the brother, the father, the paternal uncle, and three aunts as well as the paternal grandfather. On examination, the child had bilateral hip pain and a limited range of motion. She was also noted to have an antalgic gait with a limp. Radiographs of the pelvis showed flattened and sclerotic femoral epiphysis. Blood tests showed a normal erythrocyte sedimentation rate (ESR) of 6 mm/h. All other blood tests including full blood count, C reactive protein, and bone profile tests were normal. Rheumatoid factor, anti-nuclear antibodies, liver function tests, proteins C and S, anti-phospholipid antibodies, and Hemoglobin electrophoresis came normal, ruling out other causes of aseptic necrosis of the femoral epiphysis. An MRI provided additional confirmation of the diagnosis of Perthes disease, revealing a bilateral avascular necrosis and collapse of the femoral capital epiphysis with transphyseal revascularization. The female sex, bilateral involvement, and family history of affected relatives in three generations were suggestive of a potential genetic component. Genetic analysis was indicated to identify the mutation of the COL2A1 gene of the 12q13 chromosome described in familial cases of LCPD.
Therapeutic management included antalgics as well as physiotherapy and rehabilitation. The case was also discussed with a pediatric orthopedic and concluded with a non-surgical indication.
The patient regained her normal activity and was advised to avoid impact activity and is seen regularly in the outpatient clinic with radiological follow-up. The younger sibling was convoked for screening through a clinical examination and a pelvis x-ray.
Discussion: While the reviewed literature provided evidence of cases of LCPD running in families, and epidemiological studies suggested a genetic role, twin studies reported no significant concordance (1,2).

Genetic factors have been suggested in the development of the disorder. Thus, COL2A1 alterations should be further studied to clarify their role in the pathogenesis and etiology of the LCPD.

Conclusion:

Understanding the genetic basis of LCPD will have significant implications for prognosis, treatment, and genetic counseling. In fact, genetic analysis and screening should be considered in LCPD with familial and/or bilateral cases.

Ethics: We have no conflicts of interest to disclose.

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P1566

CHRONIC PAIN FOLLOWING TOTAL HIP ARTHROPLASTY: PREVALENCE, MECHANISMS, AND IMPACT ON QUALITY OF LIFE

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Background:

Total hip arthroplasty (THA) is an effective intervention for advanced hip osteoarthritis. Although most patients experience substantial postoperative pain relief, a significant proportion develop chronic postsurgical pain (CPSP), which may negatively affect physical function, mental health, and overall quality of life.

Objectives:

To determine the prevalence of CPSP after THA, characterize its underlying pain mechanisms, and assess its impact on quality of life. Methods Methods We conducted a cross-sectional study of patients evaluated after THA. Chronic postsurgical pain was identified and classified into nociceptive, neuropathic, and nociplastic components using validated tools: Visual Analogue Scale (VAS), DN4 questionnaire, PainDETECT questionnaire, and the Central Sensitization Inventory (CSI). Quality of life was assessed using the Short Form-36 (SF-36), including Physical (PCS) and Mental (MCS) Component Summary scores. Comparative analyses were performed between patients with and without CPSP.

Results:

Among the 51 included patients (mean age 51.6 ± 17.6 years; 38 men, 15 women): Chronic nociceptive pain was observed in 27.4% of patients (mean VAS: 45.5 ± 19.4). Neuropathic pain features were identified in 19.6% of patients using DN4 and in 21.6% using PainDETECT. Nociplastic pain was present in 19.6% of cases (mean CSI: 22.5 ± 16.7), and 21.5% of patients exhibited moderate to severe central sensitization (CSI > 40). Nociceptive pain was associated with significantly higher anxiety and depression scores (HAD-A 7.3 ± 3.3 vs 4.6 ± 1.2; HAD-D 8.2 ± 3.1 vs 4.7 ± 1.4; $p < 0.001$) and with marked impairment in quality of life, both physical ($r = -0.65$; $p < 0.001$) and mental ($r = -0.56$; $p < 0.001$). Neuropathic pain was more frequent among sedentary patients (OR = 4.7; $p = 0.002$) and those with chronic inflammatory rheumatism (OR = 2.9; $p = 0.028$) and was associated with significant reductions in both physical ($r = 0.39$; $p = 0.002$) and mental ($r = 0.38$; $p = 0.003$) SF-36 scores. Finally, nociplastic pain correlated with pain intensity and psychological scores ($p < 0.01$), was associated with chronic inflammatory rheumatism ($p = 0.04$), and led to moderate but significant decreases in both physical ($r = 0.28$; $p = 0.045$) and mental ($r = 0.29$; $p = 0.036$) quality of life.

Conclusions:

Chronic postsurgical pain after THA is frequent and multifactorial, with nociceptive, neuropathic, and nociplastic components. All pain phenotypes are associated with impaired physical and mental quality of life. Psychological factors and underlying chronic inflammatory disease appear to contribute to CPSP development, whereas early rehabilitation may help prevent persistent nociceptive pain.

P1567

TINGLING AND BURNING AFTER HIP REPLACEMENT: CHRONIC NEUROPATHIC PAIN, RISK FACTORS, AND QUALITY OF LIFE

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Background:

Neuropathic chronic postsurgical pain (CPSP) is increasingly recognized after THA. It is frequently multifactorial, often involving central sensitization, and can severely impair physical function and quality of life.

Objectives:

To identify factors associated with chronic neuropathic CPSP after THA and evaluate its impact on quality of life.

Methods : Neuropathic pain was assessed using DN4 and PainDETECT questionnaires. Anxiety and depression were evaluated using HADS, and quality of life using the SF-36. Associations with demographic, clinical and rehabilitation-related variables were analyzed.

Results:

Neuropathic CPSP was present in 11 patients (21.6%). No significant associations were found with age, sex, diabetes, or type of osteoarthritis. Neuropathic pain was more frequent in patients with chronic inflammatory rheumatic diseases (OR = 2.9; 95% CI [1.1–7.9]; $p = 0.028$) and in those with a sedentary lifestyle (OR = 4.7; 95% CI [1.6–13.4]; $p = 0.002$). Patients with neuropathic CPSP exhibited higher anxiety (8.8 ± 3.5 vs 5.3 ± 2.1; $p < 0.001$) and depression scores (8.9 ± 3.5 vs 6.1 ± 2.6; $p = 0.005$). Neuropathic pain was significantly associated with reduced SF-36 physical (PCS: $r = -0.39$; $p = 0.002$) and mental (MCS: $r = -0.38$; $p = 0.003$) component scores. Postoperative rehabilitation and analgesic use were not significantly associated.

Conclusions:

Approximately one-fifth of patients developed chronic neuropathic CPSP after THA. This condition was associated with chronic inflammatory rheumatic diseases, physical inactivity and psychological distress, and was responsible for significant impairment in both physical and mental quality of life.

P1568

NOCIPLASTIC PAIN AFTER HIP REPLACEMENT SURGERY: THE COMPONENT WE OFTEN MISS

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Background:
Nociplastic pain, driven by central sensitization rather than ongoing tissue or nerve damage, represents an under-recognized mechanism of chronic postsurgical pain (CPSP) and is rarely assessed in routine clinical practice. Although total hip arthroplasty (THA) generally provides substantial pain relief and functional improvement, a subset of patients develops persistent nociplastic pain, compromising postoperative outcomes.
Objectives:
To identify factors associated with chronic nociplastic CPSP after THA and to evaluate its impact on quality of life.
Methods : Patients who had undergone THA were included. Demographic and clinical data were collected, including age, sex, body mass index (BMI), comorbidities (diabetes, hypertension), presence of inflammatory rheumatic diseases (rheumatoid arthritis, spondyloarthritis), and postoperative rehabilitation. Nociplastic pain was assessed using the Central Sensitization Inventory (CSI). Anxiety and depression were evaluated using the Hospital Anxiety and Depression Scale (HADS). Health-related quality of life was measured with the SF-36 questionnaire.
Results :
Fifty-one patients were included (mean age 51.6 ± 17.6 years; 38 men, 15 women). Most patients lived in urban areas (68.2%) and were sedentary (68.6%). Hypertension (45.1%) and diabetes mellitus (37.3%) were the most frequent comorbidities. Secondary hip osteoarthritis related to chronic inflammatory rheumatic diseases accounted for 58% of surgical indications. Chronic nociplastic CPSP was identified in 9 patients (19.6%). Their mean age was 54.2 ± 16.8 years, and mean BMI was 24.8 ± 3.2 kg/m²; six were men and three women. Four patients (44.4%) had underlying inflammatory rheumatic disease, two (22.2%) had diabetes, and three (33.3%) had hypertension. The mean CSI score was 22.5 ± 16.7, and 11 patients (21.5%) demonstrated moderate to high central sensitization (CSI > 40). Nociplastic CPSP was significantly associated with chronic inflammatory rheumatism ($p = 0.04$) and higher anxiety ($p < 0.001$) and depression scores ($p < 0.01$). No significant associations were observed with age, sex, BMI, physical activity, osteoarthritis type, or postoperative analgesic or rehabilitation strategies. Nociplastic pain was negatively correlated with SF-36 physical (PCS: $r = -0.28$; $p = 0.045$) and mental (MCS: $r = -0.29$; $p = 0.036$) component scores.
Conclusions:
Approximately one-fifth of patients developed chronic nociplastic CPSP following THA. This painphenotype was strongly associated with chronic inflammatory rheumatic disease and psychological distress, and was responsible for significant impairment in quality of life. Early identification of high-risk patients and implementation of multidisciplinary management strategies, including psychological support and individualized rehabilitation, are essential to optimize postoperative recovery.

P1569

ASSOCIATION BETWEEN TNF -308 G>A (RS1800629) GENE POLYMORPHISM AND RESPONSIVENESS TO TNF BLOCKERS IN RHEUMATOID ARTHRITIS TUNISIAN PATIENTS

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Background:
The advent of biotherapies, including anti-TNFα agents, marked a turning point in the management of patients with chronic inflammatory rheumatic diseases by achieving disease control. However, a substantial proportion of patients do not respond to these agents. Among the sources of variability in this response, several polymorphisms have been proven to influence the response to anti-TNFα agents. Among them, an association between single nucleotide polymorphisms (SNPs) -308 G/A and response to antiTNF agents has been studied with conflicting results.
Objectives:
The aim of our study was to study the impact of this polymorphism on the therapeutic response to anti TNFα, bioavailability and immunogenicity in patients with Rheumatoid arthritis (RA).
Methods:
This is a cross-sectional, multicentric study from 2016 to 2019, patients with RA treated with TNF blockers for 6 months. Blood samples were collected for each patient immediately prior to drug administration. Quantitative measurements of the residual drug concentration (DC) and anti-drug antibodies (ADAb) were carried out by a commercial enzyme-linked immunosorbent assay (ELISA) kit (Promonitor®). Genotyping for SNP -308 was done by PCR-RFLP technique: 3 genotypes were found: G/G, A/A and G/A. EULAR criteria were considered to determine treatment response
Results:
Thirty-two RA patients were included. They were treated with TNF blockers for 6 months: 14 received Infliximab, 13 Adalimumab and 5 Adalimumab. Regardless of biologic type, 18 patients (58,1%) responded to treatment and 7 patients (21,8%) developed ADAb. The molecular study revealed that the heterozygous G/A genotype of SNP-308(G/A) was significantly associated with a decrease in median DAS28 after 6 months of treatment, compared to the heterozygous G/G genotype ($p=0.039$). Moreover, the G/A genotype was more prevalent in patients with a good EULAR response compared to non-responders. In addition, the heterozygous genotype G/A was associated with a significantly higher median DC rate than that found in G/G genotype patients ($p=0.0032$). However, this SNP did not correlate with the variation of the immunogenicity (production of ADAb) of these molecules.
Conclusion:
The -308G/A polymorphism might be a predictive factor of anti-TNFα therapeutic efficacy in rheumatoid arthritis. Additional larger-scale prospective studies accounting for other factors of variability in TNFblockers response are needed to confirm or refute the results of our cohort.

P1570

IMPACT OF THE TNF-A −308 G/A POLYMORPHISM ON ANTI-TNF RESPONSE, BIOAVAILABILITY, AND IMMUNOGENICITY IN SPONDYLOARTHRITIS

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Background:
The introduction of biotherapies, particularly tumor necrosis factor alpha (TNF-α) inhibitors, has substantially improved disease control in patients with chronic inflammatory rheumatic diseases, including spondyloarthritis (SpA). Nevertheless, a significant interindividual variability in therapeutic response persists. Genetic factors, notably single nucleotide polymorphisms (SNPs) affecting inflammatory pathways, have been suggested as potential contributors to this variability. Among them, the TNF-α −308 G/A polymorphism has been investigated, with inconsistent results regarding its influence on response to anti-TNF agents.
Objectives:
The aim of this study was to evaluate the impact of the TNF-α −308 G/A polymorphism on therapeutic response, bioavailability, and immunogenicity of anti-TNFα agents in patients with spondyloarthritis.
Methods:
This was a cross-sectional, multicentric study conducted between 2016 and 2019, including patients with SpA treated with TNF blockers for at least 6 months. Blood samples were collected immediately prior to drug administration. Residual drug concentrations (DC) and anti-drug antibodies (ADAb) were measured using a commercial enzyme-linked immunosorbent assay (ELISA) kit (Promonitor®). Genotyping of the TNF-α −308 G/A polymorphism was performed using the PCR-RFLP technique, identifying three genotypes: G/G, G/A, and A/A. Therapeutic response was assessed using changes in BASDAI and BASFI scores, as well as BASDAI20 and BASDAI50 responses at 6 months.
Results:
Forty-one patients with SpA were included. The reduction in BASDAI and BASFI at 6 months was greater among patients carrying the heterozygous G/A genotype compared with those with the G/G genotype; however, these differences did not reach statistical significance. Similarly, BASDAI20 and BASDAI50 responses were more frequent in G/A carriers, without significant association. No significant relationship was observed between the TNF-α −308 G/A polymorphism and residual drug concentrations or the development of ADAb in SpA patients. Nevertheless, ADAb-negative patients exhibited a significantly greater percentage of BASDAI improvement compared with ADAb-positive patients (p=0.037).
Conclusion:
In spondyloarthritis, the TNF-α −308 G/A polymorphism was not significantly associated with therapeutic response, bioavailability, or immunogenicity of anti-TNFα agents. These findings suggest a limited predictive value of this SNP in SpA, highlighting the need for larger prospective studies to better clarify the genetic determinants of anti-TNF response in this population.

P1571

DIFFERENTIAL IMPACT OF THE TNF-A -308 G/A POLYMORPHISM ON ANTI-TNF AGENTS RESPONSE IN RHEUMATOID ARTHRITIS AND SPONDYLOARTHRITIS

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Background:
Despite shared inflammatory pathways, rheumatoid arthritis (RA) and spondyloarthritis (SpA) show heterogeneous responses to tumor necrosis factor-α (TNF-α) inhibitors. Genetic variability, particularly single nucleotide polymorphisms (SNPs) within the TNF-α gene promoter, may contribute to this inter-disease variability. However, comparative data evaluating the influence of the TNF-α −308 G/A polymorphism on treatment response across different inflammatory rheumatic diseases remain scarce.
Objectives:
To comparatively assess the impact of the TNF-α −308 G/A polymorphism on therapeutic response, drug bioavailability, and immunogenicity of anti-TNF agents in patients with RA and SpA.
Methods:
A multicentric cross-sectional study included 73 patients treated with anti-TNF therapy for 6 months (32 RA, 41 SpA). Genotyping of the TNF-α −308 G/A polymorphism was performed using PCR-RFLP. Residual drug concentrations and anti-drug antibodies were quantified by ELISA (Promonitor®). Treatment response was evaluated using ΔDAS28 and EULAR criteria in RA, and ΔBASDAI, ΔBASFI, BASDAI20, and BASDAI50 responses in SpA.
Results:
In RA patients, the heterozygous G/A genotype was significantly associated with a greater reduction in disease activity (ΔDAS28) and higher residual drug concentrations compared with the G/G genotype. In contrast, although SpA patients carrying the G/A genotype showed a trend toward improved clinical outcomes, no statistically significant association was observed. No correlation between the TNF-α −308 G/A polymorphism and anti-drug antibody formation was found in either disease group.
Conclusion
The TNF-α −308 G/A polymorphism exhibits a disease-specific predictive value, significantly influencing therapeutic response and drug bioavailability in RA but not in SpA. These findings underscore fundamental differences in the pharmacogenetic determinants of anti-TNF efficacy across inflammatory rheumatic diseases and support a more individualized, disease-oriented approach to biologic therapy.

P1572

TOWARDS A CORE OUTCOME SET FOR SARCOPENIA INTERVENTION STUDIES: RESULTS FROM A DELPHI STUDY

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Objective: A Core Outcome Set (COS) specific to sarcopenia is currently being developed to address the significant heterogeneity observed in outcome assessment in clinical trials. A COS is defined as "*an agreed standardized set of outcomes that should be measured and reported, as a minimum, in all clinical trials in a specific disease*". The development process involves several steps: a scoping review identifying 253 outcomes, patient interviews leading to 3 additional outcomes, the present Delphi study, and a final consensus process conducted by a multidisciplinary working group. Therefore, this study aims to establish expert consensus on the most relevant outcomes to inform the development of a COS for sarcopenia clinical trials.

Material and methods: A two-round Delphi study including international experts in sarcopenia evaluated 34 outcomes derived from the scoping review and patient interviews. Experts rated the importance of each outcome for inclusion in a common COS applicable to all intervention types and in intervention-specific sub-COSs (exercise, nutrition, and pharmacological) using a 9-point Likert scale (1 = not important; 9 = critically important). Consensus was defined as ≥75% of ratings between 7–9 ("consensus in") or ≥15% between 1–3 ("consensus out"). Expert voting was supported by Welphi software, and descriptive analyses were performed using RStudio.

Results: A total of 133 (round I) and 80 experts (round II) completed the survey. After completion of both rounds, 16 outcomes reached consensus for inclusion in the common COS. These outcomes, listed in descending order of consensus (≥75%), included muscle strength, falls, sarcopenia status, physical performance, mortality, physical status, activities of daily living, quality of life, frailty status, nutritional status, muscle mass, need for assistance, institutionalization, hospitalization, adverse events, and muscle power. Additional outcomes reached consensus only within intervention-specific sub-COSs. For example, appetite reached consensus for nutrition-based interventions, while cardiopulmonary function reached consensus for exercise-based interventions.

Conclusion: The selected outcomes will inform the final stage of the COS development process to establish consensus on outcomes for sarcopenia trials.

P1573

TARGETING FRACTURE RISK IN RHEUMATOID ARTHRITIS AND OSTEOPOROSIS: THE ROLE OF BONE MINERAL DENSITY (BMD), FRAX, AND SEROLOGICAL STATUS

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Objectives. To assess the ten-year risk of osteoporotic fractures in patients with rheumatoid arthritis (RA) and osteoporosis, and to examine the association between FRAX scores and bone mineral density (BMD) parameters, clinical and laboratory markers of disease activity, and serological status.

Materials and Methods. This cross-sectional study included 30 patients with RA and osteoporosis. Anthropometric parameters, including body mass index (BMI), were recorded. BMD was assessed by dual-energy X-ray absorptiometry and expressed as T-scores of the lumbar spine (L1–L4) and femoral neck. Ten-year fracture probability was calculated using FRAX for major osteoporotic and hip fractures. Laboratory evaluation included RF, anti-CCP antibodies, erythrocyte sedimentation rate, and C-reactive protein. Data on glucocorticoid use, DMARD therapy, and osteoporosis treatment were analyzed.

Results. The study population included 28 women (93%) and 2 men (7%), with a mean age of 63.9 ± 6.2 years and mean BMI of 27.1 ± 2.3 kg/m². Mean RA duration was 19.4 ± 7.1 years. The mean lumbar spine T-score was −2.56 ± 1.11, and the mean femoral neck T-score was −1.94 ± 1.11. RF positivity was observed in 93% of patients and anti-CCP positivity in 87%. Glucocorticoids and DMARDs were given, 87% of patients receiving them. A history of prior osteoporotic fracture was present in 23% of patients. The mean ten-year FRAX probability was 16.19% for major osteoporotic fracture and 8.06% for hip fracture. A statistically significant negative correlation was found between FRAX score for major osteoporotic fracture and femoral neck T-score ($r = -0.43$; $p = 0.018$), confirming that lower BMD is associated with higher fracture risk. Seropositive patients showed higher inflammatory activity and a trend toward higher FRAX-estimated fracture risk. Long-term glucocorticoid exposure was associated with lower T-scores and increased FRAX risk, whereas stable DMARD therapy was associated with lower inflammatory markers and reduced fracture risk.

Conclusion. Patients with RA and osteoporosis are at markedly increased risk for osteoporotic fractures. Seropositivity amplifies inflammatory burden and fracture risk, highlighting the importance of integrated fracture risk assessment using FRAX and BMD-derived T-scores. Early identification of high-risk patients is essential for targeted osteoporosis management and fracture prevention in RA.

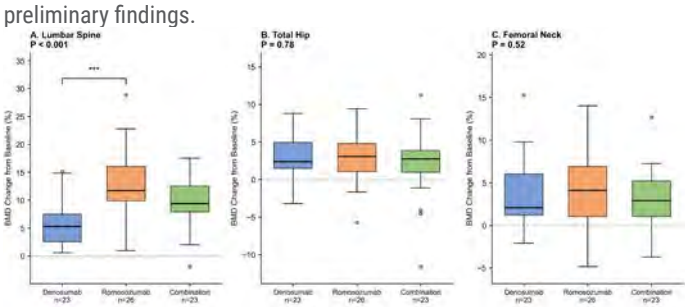
P1574

ROMOSOZUMAB AND DENOSUMAB, ALONE OR COMBINED, IN POSTMENOPAUSAL OSTEOPOROSIS: PRELIMINARY RESULTS FROM A THREE-ARM RANDOMIZED PILOT TRIAL

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Background
Romosozumab and denosumab are effective therapies for postmenopausal osteoporosis, yet their comparative and combined effects remain incompletely defined. This pilot randomized trial evaluated the short-term efficacy of romosozumab and denosumab, alone or in combination, on bone mineral density (BMD).
Methods
In this single-center, three-arm randomized pilot trial, postmenopausal women with osteoporosis were allocated to denosumab alone, romosozumab alone, or combined therapy. BMD at the lumbar spine, total hip, and femoral neck was assessed at baseline, 3 months, and 6 months. The primary outcome was percentage change in lumbar spine BMD at 6 months. Between-group differences were analyzed using nonparametric methods.
Results
Eighty-six participants were randomized, and 73 (84.9%) completed 6-month follow-up. Median lumbar spine BMD increased by 5.29% with denosumab, 11.73% with romosozumab, and 9.40% with combination therapy ($P < 0.001$). Both romosozumab and combination therapy achieved significantly greater lumbar spine BMD gains than denosumab alone, whereas no significant difference was observed between romosozumab and combination therapy. No significant between-group differences were detected for total hip or femoral neck BMD. At the lumbar spine, responder rates for BMD increase >6% were higher with romosozumab (85%) and combination therapy (87%) than with denosumab alone (44%).
Conclusions
In this three-arm randomized pilot trial, romosozumab, alone or combined with denosumab, was associated with greater short-term lumbar spine BMD gains compared with denosumab alone, while combination therapy did not demonstrate additional benefit over romosozumab monotherapy. Larger trials with longer follow-up are warranted to confirm these preliminary findings.



P1575

DETERMINANTS OF MORTALITY AFTER HIP-FRACTURE SURGERY IN THE ELDERLY: FACTORS BEYOND AGE

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Mortality following hip-fracture surgery in older adults remains substantial, while the associated risk factors remain incompletely defined and controversial. This study included 270 patients aged ≥60 years who underwent unilateral proximal femur fracture surgery at a tertiary center between 2018 and 2020, all managed under a fast-track orthogeriatric pathway. Survival status was determined from hospital records and follow-up. The median patient age was 83 years (IQR 75–88), 57% were female, and 67% were ASA class III. During a median follow-up of 14 months, 51 deaths (18.9%) occurred, with cumulative survival rates of 92.5%, 85.7%, 69.4%, and 67.1% at 6, 12, 24, and 30 months, respectively. Anthropometric indices such as calf and arm circumference, handgrip strength, and BMI were not significant predictors. Cox regression revealed that advanced age (HR 1.05 per year, CI 1.02 - 1.09, p=0.002), male sex (HR 2.07, 1.18 -3.61, p=0.011), and ASA III versus II (HR 5.52, 1.98 -15.39, p=0.001) were associated with higher mortality. Each 1 g/dL increase in day-1 postoperative hemoglobin correlated with increased mortality risk (HR 1.33, 1.17 - 1.51, p<0.001), whereas each 1 mg/dL rise in serum creatinine was protective (HR 0.79, 0.69 - 0.90, p<0.001). In conclusion, advanced age, male sex, higher ASA grade, elevated postoperative hemoglobin, and lower serum creatinine independently predict mid-term mortality after hip-fracture surgery in elderly patients, suggesting that these readily available parameters may facilitate early risk stratification and guide postoperative management.

P1576

SECONDARY OSTEOPOROSIS IN A PATIENT WITH NEUROSARCOIDOSIS ASSOCIATED WITH HYPOPITUITARISM

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Introduction: Neurosarcoidosis may involve the hypothalamic–pituitary axis, leading to hypopituitarism and subsequent endocrine dysfunctions. Among these, hypogonadotropic hypogonadism and long-term exposure to glucocorticoid therapy are major contributors to secondary osteoporosis.
Case Presentation: A 48-year-old woman with biopsy-confirmed systemic sarcoidosis developed progressive neurological symptoms, including seizures, headaches, cognitive impairment, and somnolence. MRI revealed pituitary infundibulum thickening and leptomeningeal enhancement, suggesting neurosarcoidosis. Hormonal evaluation demonstrated hypothyroidism, low gonadotropins (FSH and LH) and clinical evidence of diabetes insipidus, confirming hypothalamo-pituitary dysfunction. The resulting hypoestrogenism due to hypogonadotropic hypogonadism, combined with prior glucocorticoid therapy, placed the patient at high risk for secondary osteoporosis, a well-recognized

complication of both estrogen deficiency and long-term steroid exposure. DEXA scan showed reduced bone mineral density consistent with osteoporosis (T-score: L1-3.0, L2 -4.2, L3 -3.3, L4-3.9, L1-L4 -3.6; Neck left -3.2, Total left -3.2, Neck right -3.0, Total right -2.8). Laboratory findings showed low levels of osteocalcin (3.74 ng/ml) and normal levels of beta-cross laps (0.249 ng/ml), serum ionized calcium Ca^{2+} (1.23 mmol/L), PTH (37.7 pg/ml) and vitamin D3 (47.25 ng/ml). Treatment included immunomodulatory therapy, hormone replacement therapy with Levothyroxine, dopamine D2 receptor agonist (Cabergoline), analogue of vasopressin (Desmopressin) and anticonvulsants, which led to clinical improvement. Once osteoporosis was confirmed, oral bisphosphonate therapy was added to her treatment plan. This, alongside the broader therapeutic strategy, contributed to the patient's overall clinical improvement.

Conclusion: This case underscores the importance of recognizing endocrine contributors to bone loss in neurosarcoidosis. Hypoestrogenism due to hypopituitarism and chronic glucocorticoid exposure are major etiologic factors contributing to secondary osteoporosis in affected patients. However, these patients also have abnormal calcium metabolism and underlying inflammation which increases their risk of osteoporosis. Early identification and proactive bone health management are essential to prevent long-term skeletal complications.

Keywords: Neurosarcoidosis, Hypopituitarism, Hypoestrogenism, Glucocorticoids, Secondary Osteoporosis.

P1577

TOWARDS CLINICALLY ROBUST AI: INVESTIGATING THE TRADE-OFF BETWEEN ANATOMICAL CONTEXT AND NOISE SUPPRESSION IN HIP X-RAYS FOR OSTEOPOROSIS CLASSIFICATION

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Background: Osteoporosis is a systemic skeletal disorder marked by reduced bone mass and microarchitectural deterioration, which substantially increases the risk of fragility fractures and their associated morbidity and costs. DualEnergy Xray Absorptiometry (DEXA) remains the clinical gold standard for assessing bone mineral density and diagnosing osteoporosis [1], but its use is constrained by equipment availability and workflow limitations, particularly in resourcelimited or highthroughput settings. In contrast, hip radiographs are inexpensive, widely available, and routinely acquired for trauma and degenerative conditions, creating an opportunity for opportunistic osteoporosis screening without additional radiation exposure or appointments. Recent advances in deep learning have shown that Convolutional Neural Networks (CNNs) can extract subtle radiographic signatures of low bone mineral density from plain films, achieving performance comparable to or complementing DEXA in several cohorts. However, these models are vulnerable to domain shifts caused by differences in acquisition protocols, presence of radiographic tags, implants, and other background artifacts that may distract the network from clinically relevant anatomy. Furthermore, CNNs are known to rely heavily on local texture cues, which raises concern that overly cropped inputs could strip away essential anatomical context needed for robust predictions. This study focuses on how data preprocessing, specifically masking versus cropping—modulates the stability and generalizability of CNNbased osteoporosis classifiers built from hip radiographs.

Objective: A retrospective cohort of 784 anteroposterior hip radiographs paired with groundtruth DEXA diagnoses was collected from Chulabhorn Hospital, representing a realworld spectrum of positioning, body habitus, and hardware. Osteoporosis status was defined according to standard Tscore thresholds at the femoral neck or total hip, and images were split into training, validation, and test sets at the patient level to prevent leakage [2]. Five Deep Convolutional Neural Network architectures were evaluated: VGG16, DenseNet121, Inception V3, Xception, and ConvNeXtBase, each initialized with generic pretraining and adapted for binary osteoporosis classification. To interrogate the role of preprocessing, five data curation strategies were implemented. The baseline used original radiographs with minimal resizing and normalization. ROI Masking preserved the pelvis and proximal femur while suppressing surrounding pixels, thereby removing tags and extraneous soft tissue but retaining global geometry. In parallel, three ROICropping variations produced focused patches centered on the femoral neck, unilateral crops (left or right hip), and more aggressive crops with reduced pelvic context. All strategies shared the same augmentation pipeline, including modest rotations and flips, to ensure that differences in performance could be attributed primarily to masking versus cropping decisions. Models were trained using standard optimization with early stopping guided by validation loss. Performance on the independent test set was summarized using area under the receiver operating characteristic curve, accuracy, sensitivity, specificity, and F1score. Stability was assessed by running each configuration across multiple random seeds, examining the smoothness of learning curves and quantifying variability in performance metrics across runs. Lower variance and less oscillatory training dynamics were interpreted as evidence of greater robustness.

Methods: A retrospective cohort of 784 anteroposterior hip radiographs paired with groundtruth DEXA diagnoses was collected from Chulabhorn Hospital, representing a realworld spectrum of positioning, body habitus, and hardware. Osteoporosis status was defined according to standard Tscore thresholds at the femoral neck or total hip, and images were split into training, validation, and test sets at the patient level to prevent leakage. Five Deep Convolutional Neural Network architectures were evaluated: VGG16, DenseNet121, Inception V3, Xception, and ConvNeXtBase, each initialized with generic pretraining and adapted for binary osteoporosis classification [3]. To interrogate the role of preprocessing, five data curation strategies were implemented. The baseline used original radiographs with minimal resizing and normalization. ROI Masking preserved the pelvis and proximal femur while suppressing surrounding pixels, thereby removing tags and extraneous soft tissue but retaining global geometry. In parallel, three ROICropping variations produced focused patches centered on the femoral neck, unilateral crops (left or right hip), and more aggressive crops with reduced pelvic context. All strategies shared the same augmentation pipeline, including modest rotations and flips, to ensure that differences in performance could be attributed primarily to masking versus cropping decisions. Models were trained using standard optimization with early stopping guided by validation loss. Performance on the independent test set was summarized using area under the receiver operating characteristic curve, accuracy, sensitivity, specificity, and F1score. Stability was assessed by running each configuration across multiple random seeds, examining the smoothness of learning curves and quantifying variability in performance metrics across runs. Lower variance and less oscillatory training dynamics were interpreted as evidence of greater robustness.

Results: Across all architectures, ROI Masking consistently matched or exceeded the performance of both raw and cropped inputs while demonstrating markedly improved training stability (Figure 1). VGG16 trained on masked images provided the most striking example: it

achieved the highest and most reproducible performance metrics, with narrow confidence intervals and smooth, convergent learning curves across repeated runs. This pattern suggests that when background noise is removed but anatomical context is preserved, texturebiased networks such as VGG16 can better focus on the trabecular and cortical signatures of osteoporosis rather than overfitting to spurious background patterns. In contrast, aggressively cropped inputs produced volatile learning curves characterized by oscillations and occasional divergence, particularly in deeper or more complex architectures. These models exhibited greater variability in test performance and appeared more vulnerable to cases with atypical projection angles, degenerative changes, or metallic implants, all of which may require broader anatomical context for correct interpretation. Although some cropped configurations achieved seemingly high training accuracy, they frequently failed to maintain this advantage on the test set, indicating overfitting to limited local textures. Using unprocessed raw radiographs yielded intermediate performance. While these models retained full anatomical context, their attention maps often highlighted cassette labels, collimation edges, or unrelated soft tissue, suggesting that the networks were partially distracted by artifacts. Compared with masked inputs, raw images led to slightly lower mean performance and greater runtorun variability, underscoring the detrimental influence of uncontrolled background features. Qualitative visualization of model attention supported the quantitative results: masked models focused primarily on the femoral head, neck, and intertrochanteric region, while cropped and raw models more frequently attended to nondiagnostic areas.

Conclusion: This study shows that datacentric preprocessing is a decisive factor in the robustness of deep learning models for opportunistic osteoporosis screening from hip radiographs. ROI Masking, which attenuates background noise while preserving the full geometric configuration of the pelvis and proximal femur, consistently enhances both performance and training stability across multiple CNN architectures. The particularly strong performance of masked VGG16 indicates that even architectures with pronounced texture bias can be steered toward clinically meaningful cues when preprocessing aligns the visual input with anatomical priors. Conversely, aggressive cropping that narrows the field of view around the femoral neck undermines stability and generalization, likely by removing spatial references needed to interpret projection quality, rotation, and bilateral differences in bone density. These findings caution against overreliance on tightly cropped patches and instead advocate for preprocessing pipelines that maintain global anatomical context while actively suppressing irrelevant background information. From a translational perspective, implementing maskingbased curation could make CNN models more resilient to variation across radiography systems and clinical environments, thereby supporting scalable, opportunistic screening programs that leverage routine hip radiographs to triage patients for confirmatory DEXA and early osteoporosis intervention.

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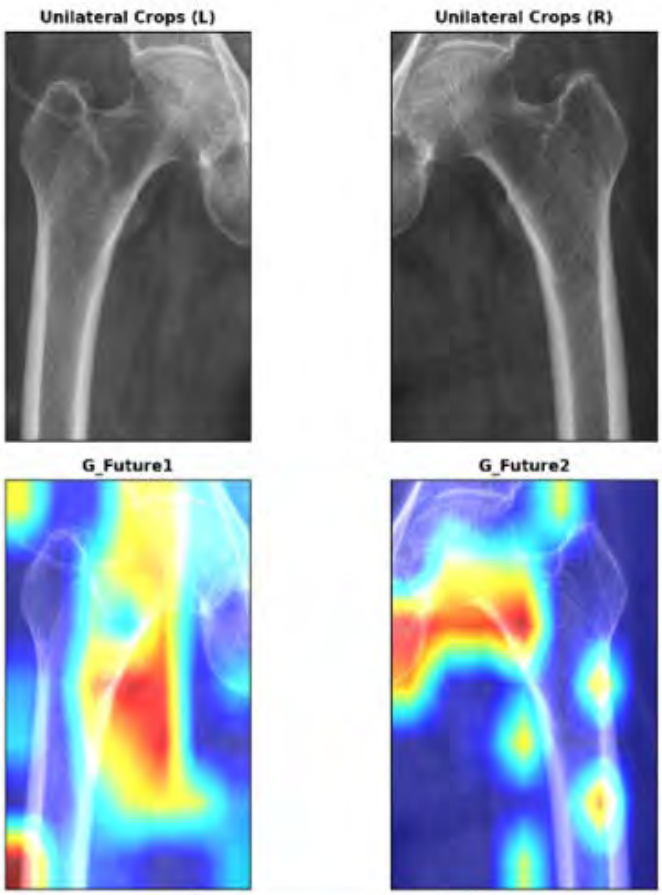


Figure 1

P1578

INTRA-ARTICULAR INJECTIONS FOR KNEE OSTEOARTHRITIS: A REVIEW OF NON-SURGICAL STRATEGIES

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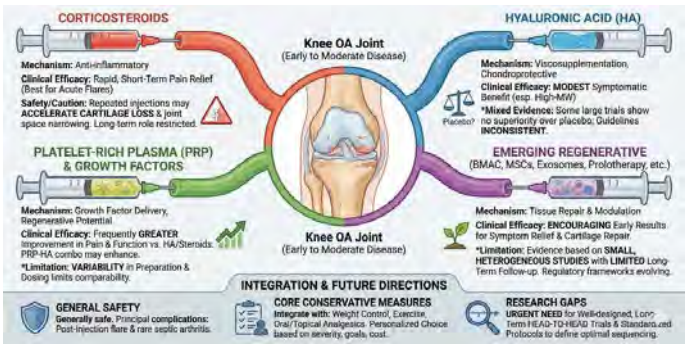
Objectives: Knee osteoarthritis (OA) remains the most prevalent and disabling joint condition, often leading to total knee replacement. However, many patients present with early or moderate disease or prefer to delay surgery, highlighting the importance of effective non-surgical interventions. Intra-articular (IA) injections have become central to conservative OA management. This review aims to succinctly present current evidence on IA injectables, focusing on their mechanisms, clinical effectiveness, safety profiles, and guideline recommendations, to support individualized, non-surgical care for knee OA.

Materials and Methods: This narrative review synthesizes findings from

randomized controlled trials, prospective studies, systematic reviews, network meta-analyses, and authoritative clinical guidelines (AAOS, OARSI, EULAR). The injectables considered include IA corticosteroids, hyaluronic acid (HA), platelet-rich plasma (PRP), bone marrow aspirate concentrate (BMAC), mesenchymal stem cells (MSCs), exosomes, growth factor concentrates, glucose prolotherapy, saline, and atelocollagen-based therapies. Outcomes assessed were pain relief, joint stiffness, functional improvement, cartilage effects, safety, and regulatory or translational challenges.

Results: IA corticosteroids offer prompt pain relief, making them suitable for acute exacerbations, but repeated use is linked with cartilage loss, limiting their long-term application. HA delivers modest benefits in symptoms, especially with high-molecular-weight formulas, due to its lubricating and anti-inflammatory properties; however, its superiority over placebo is debated, and clinical guidelines vary in their support. PRP, plasma rich in growth factors, often yields greater improvements in pain and function than HA or corticosteroids, and combining PRP with HA may further enhance results. Nonetheless, disparities in PRP preparation and dosing complicate comparisons. Emerging regenerative treatments—such as BMAC, MSCs, exosomes, targeted growth factors, glucose prolotherapy, and atelocollagen—appear promising for easing symptoms and repairing cartilage. However, existing research is limited, relying mainly on small, diverse studies with brief follow-up periods. Overall, IA injections are generally safe, with post-injection flare and rare septic arthritis as the main risks. Regulatory standards for advanced biologics are still evolving.

Conclusions: IA injection therapies are a vital component of non-surgical management for knee OA, providing meaningful pain relief and improved function, and potentially delaying the need for surgery when combined with core conservative measures such as weight management, exercise, and analgesics. Corticosteroids should be reserved for occasional flares, while HA, PRP, and regenerative injectables should be tailored to disease stage, patient preferences, costs, and local regulations. There is an urgent need for robust, long-term, comparative studies and standardized treatment protocols to establish the best use and combinations of IA therapies in personalized OA care.



P1579

PREFER STUDY: PATIENT-REPORTED PREFERENCES, SATISFACTION AND INTENTION TO PERSIST WITH OSTEOPOROSIS PHARMACOTHERAPY

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Objectives

Poor long-term persistence with osteoporosis pharmacotherapy remains a major barrier to fracture prevention. This study aimed to quantify patient-reported treatment experiences and preferences, examine their relationship with satisfaction and intention to persist with therapy, and generate structured data to inform preference-sensitive clinical decision support.

Material and Methods

A cross-sectional, anonymous online survey was conducted among adults with a diagnosis of osteoporosis (n=403). Data collected included demographics, treatment history, satisfaction, perceived benefits, side-effects, beliefs about medication, and intention to continue therapy. Patient preferences for key treatment attributes were quantified using Maximum Difference (MaxDiff) scaling. Multivariable regression and structural equation modelling (SEM) were used to assess relationships between treatment experience, satisfaction, and persistence intention.

Results

Among 403 respondents (90% women; 43% aged 65–74 years), 191 (47%) were currently receiving osteoporosis medication. Mean treatment satisfaction was 5.0/10, and perceived side-effect burden was 3.3/10. Intention to continue treatment was high (mean 2.55/3), while side-effects were the most commonly reported reason for discontinuation (31%).

MaxDiff analysis identified fracture risk reduction as the most valued treatment attribute, followed by fewer common side-effects, low likelihood of serious adverse effects, low cost, infrequent dosing (annual), and fixed-duration treatment. SEM demonstrated that perceived treatment benefit positively influenced satisfaction ($p<0.01$), while side-effects negatively influenced satisfaction ($p<0.001$). Satisfaction strongly predicted intention to persist with therapy ($B=0.11$, $p<0.001$), mediating the relationship between treatment experience and continuation. Exploratory analyses suggested higher satisfaction among users of anabolic therapies and romosozumab, although only romosozumab reached statistical significance. Route of administration was not independently associated with satisfaction. Among non-treated participants (n=212), concerns about side-effects (52%) and preference for non-pharmacological management (18%) were the most common reasons for non-use.

Conclusions

Patient satisfaction, driven primarily by perceived efficacy, tolerability, and convenience, is a key determinant of intention to persist with osteoporosis pharmacotherapy. Quantifying patient preferences alongside treatment experience provides clinically relevant insights that may support more individualised, preference-aligned treatment selection. These data offer a foundation for decision-support approaches that integrate patient values with evidence-based recommendations to improve long-term adherence in osteoporosis care.

P1580

EARLY EXPERIENCE OF ROMOSOZUMAB USE IN POSTMENOPAUSAL WOMEN

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Objectives
To examine the initial use of Romosozumab within a specialist UK hospital, describing the effectiveness, safety, and treatment persistence in a real-world cohort of postmenopausal women.
Methods
A retrospective observational analysis of postmenopausal women who initiated Romosozumab between Aug 2022 and Dec 2023. All patients met UK/NICE prescribing criteria, which included being at high fracture risk and having sustained a major osteoporotic fracture (spine, hip, foream, proximal humerus) within the previous 24 months. Baseline demographic data, fracture history, prior osteoporosis therapies, and cardiovascular risk factors were collected. Changes in bone mineral density (BMD) at the lumbar spine and total hip were assessed using dual-energy X-ray absorptiometry (DXA). Adverse events and treatment discontinuation were recorded.
Results
In total, initial full data was available on 58 patients, median age 66.5 years (range 53-88). A majority of women had previously received bisphosphonates (n=30, 55%), although 15 (26%) were treatment naive. Vertebral fractures were the most common index fracture (n=30, 52%). The patients were osteoporotic at spine (mean T-score -2.7) and femoral neck (mean T-score -2.7), and were deemed to be high risk (mean 10-year risks for major osteoporotic fracture of 24.1% and for hip fracture of 10.3%)
At 12 months, Romosozumab treatment was associated with substantial increases in BMD at lumbar spine (10.1%) and total hip (3.3%). Treatment persistence was high, with 93% completing the planned course. Follow-on antiresorptive treatment was prescribed, with Zoledornate (n=28, 48%) and Denosumab (21, 36%) being the most widely used. Follow-up duration was too short inorder to determine the relative effectiveness of either treatment 12 months after cessation of osteoanabolic. Romosozumab was generally well tolerated, with minor injection-site reactions and musculoskeletal symptoms being the common reported adverse events. There were no cardiovascular events or fractures during the observation period.
Conclusions
In this real-world UK cohort of 58 women with severe osteoporosis, Romosozumab was associated with significant improvements in BMD at spine and hip. It also appeared safe and well tolerated. Longer term follow-up will help determine the optimal treatment strategy and sequencing for postmenopausal women at high fracture risk.
Disclosures
TG, JB and RK have received honoraium for educational activities/ lectures from UCB

P1581

TECHNOLOGY-DRIVEN INNOVATIONS IN OSTEOPOROSIS: ARTIFICIAL INTELLIGENCE SCREENING AND MECHANOTRANSDUCTION DEVICES

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Objective(s): To evaluate the diagnostic accuracy of deep learning (DL) models for opportunistic screening and the clinical efficacy of wearable mechanobiological devices for fracture prevention.
Material and Methods: A systematic review (PubMed, Scopus, 2021–2026) analyzing artificial intelligence (AI) algorithms for bone density assessment via routine imaging and the effectiveness of vibration therapy was conducted. Key endpoints included Area Under the Curve (AUC) for diagnosis and vertebral strength preservation for therapy.
Results: DL models utilizing incidental imaging (X-ray, CT) demonstrated high accuracy. Specifically, a facial 2D-image analysis algorithm achieved 92–93% accuracy (AUC ~0.98) in classifying bone status [1]. In prevention, a wearable belt utilizing targeted mechanotransduction showed an 85% reduction in vertebral density loss and an 83% reduction in strength loss compared to placebo when used >3 times/week [2]. Additionally, smart airbag belts reduced hip fracture incidence to 2.2% vs 11.4% in the control group (p=0.003) [3].
Conclusion(s): AI facilitates scalable non-invasive screening, while mechanobiological wearables provide effective prophylaxis for osteopenic patients, significantly reducing fracture risk without systemic pharmacological intervention.
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P1582

EMERGING THERAPEUTIC TARGETS IN OSTEOPOROSIS: SENOLYTICS AND MICROENVIRONMENT MODULATION

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Objective(s): To analyze the therapeutic potential of targeting cellular senescence and novel molecular regulators of bone turnover in osteoporosis management.
Material and Methods: Analysis of preclinical and clinical data (PubMed, Scopus, 2021–2026) regarding the impact of senolytic agents and specific regulatory proteins (Sfrp4, BAMBI) on bone tissue regeneration.
Results: Accumulation of senescent cells was found to drive a pro-inflammatory phenotype (SASP) that inhibits osteogenesis [1]. Senolytic

therapy (combination of dasatinib and quercetin) demonstrates the ability to selectively eliminate these cells, attenuating age-related bone degradation [1]. Furthermore, the Sfrp4 protein was identified as critical for maintaining skeletal stem cell functionality required for fracture repair [2], while modulation of the "gut-bone" axis via nutraceuticals improved mineralization [3].

Conclusion(s): The shift from traditional antiresorptive drugs to regenerative strategies targeting microenvironment rejuvenation and stem cell modulation offers a fundamentally novel approach to restoring bone architecture in elderly patients.

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P1583

MULTIDIMENSIONAL BARRIERS TO OSTEOPOROSIS SCREENING AND THE EMERGING ROLE OF ARTIFICIAL INTELLIGENCE: A SYSTEMATIC REVIEW

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Objective The study aimed to analyze patient, physician, and systemic barriers to osteoporosis screening and evaluate the efficacy of artificial intelligence (AI) and opportunistic screening in bridging the global diagnostic gap.

Material and Methods A comprehensive review of literature published between 2020 and 2025 was conducted using PubMed and global health reports. Was analyzed data regarding screening adherence rates, physician surveys on diagnostic ordering, reimbursement policies, and performance metrics of AI algorithms applied to non-contrast computed tomography (CT) and dental panoramic radiographs (DPRs).

Results Analysis indicates a persistent global treatment gap where approximately 71-80% of high-risk individuals remain undiagnosed. Physician-level barriers are dominated by patient nonadherence (63%), cost concerns (56%), and time constraints (51%). Patient barriers stem primarily from low disease awareness ("silent nature"), fear of medication side effects, and socioeconomic disparities. Systemically, declining reimbursement for dual-energy X-ray absorptiometry (DXA) has reduced infrastructure availability. However, emerging solutions show promise: AI models analyzing routine CT scans demonstrated 99% agreement with manual radiologist assessment for trabecular attenuation. Similarly, AI-assisted analysis of DPRs achieved a pooled sensitivity of 87.9% and specificity of 81.9% for detecting low bone mass.

Conclusion Current screening strategies based solely on dedicated DXA are insufficient due to systemic and behavioral barriers. Transitioning to absolute fracture risk assessment and integrating AI-driven opportunistic screening into routine clinical workflows offers a scalable, cost-effective strategy to identify untreated high-risk populations and prevent fragility fractures.

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Disclosures The author declares no conflicts of interest.

P1584

IMPACT OF PATIENT EDUCATION ON TREATMENT ADHERENCE AND CLINICAL OUTCOMES: A SYSTEMATIC REVIEW

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Objective(s) To analyze the extent of treatment non-adherence in chronic and acute conditions, evaluate the biological and economic consequences, and determine the efficacy of educational interventions (pharmacist-led, digital, and multidisciplinary) in improving patient outcomes.

Material and Methods A structured literature review was conducted using PubMed, Scopus, and Web of Science databases (2019–2025). The analysis focused on the "Information-Motivation-Behavioral Skills" (IMB) model, comparing standard care with educational strategies. Key endpoints included adherence rates (measured by pharmacy claims and biomarkers like HbA1c or drug levels), clinical stability, and economic burden.

Results Non-adherence affects approximately 50% of patients with chronic diseases, contributing to €125 billion in annual healthcare costs in Europe. Low adherence drives pathogenesis, such as increased organ damage and tacrolimus variability (IPV) in transplant recipients. Education significantly improves health literacy ($r \approx 0.22$), which correlates with adherence ($r \approx 0.16$). Interventions utilizing mHealth and remote monitoring showed the highest efficacy (OR=5.65), while general health education doubled adherence odds (OR=2.42). In acute care, pharmacist counseling improved antibiotic course completion (OR=1.45). Digital tools and simplified content (via AI) effectively addressed cognitive barriers and misconceptions.

Conclusion(s) Patient education is a fundamental therapeutic mechanism, not merely an adjunct. By transforming patient beliefs and enhancing self-management skills, tailored educational programs significantly reduce morbidity and healthcare waste. Multidisciplinary approaches combining human interaction and digital health are critical for closing the gap between prescribed therapy and real-world effectiveness.

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P1585

DIAGNOSTIC ERRORS AND EMERGING PARADIGMS IN OSTEOPOROSIS MANAGEMENT

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Objective(s). To analyze the prevalence of clinical diagnostic errors in osteoporosis, specifically technical pitfalls in Dual-energy X-ray Absorptiometry (DXA), and to evaluate the utility of advanced modalities including Quantitative Computed Tomography (QCT) and Artificial Intelligence (AI) in improving detection accuracy.
Material and Methods. A comprehensive review of recent literature (2021-2026) was conducted, integrating data on diagnostic discrepancies, secondary osteoporosis etiologies (e.g., celiac disease, CKD), and novel screening tools. The analysis compared standard BMD-centric protocols against volumetric imaging and AI-assisted algorithms.
Results. Current data indicate that up to 90% of DXA reports may contain technical or interpretation errors, such as misclassification of artifacts (osteophytes) or incorrect positioning, which often mask bone loss [1]. Routine radiographs fail to detect vertebral fractures in approximately 34% of cases. QCT identifies significantly more patients with osteoporosis than DXA in discordant populations. Furthermore, deep learning models applied to routine CT scans have demonstrated high diagnostic performance with an Area Under the Curve (AUC) of up to 0.96 [2]. The omission of bone turnover markers (P1NP, CTX-1) and neglect of secondary causes further exacerbate diagnostic gaps.
Conclusion(s). Effective fracture prevention requires transcending the limitations of standard DXA through rigorous quality control and the integration of precision tools. Adopting QCT, biochemical monitoring, and AI-driven opportunistic screening is essential to minimize diagnostic errors and address the global burden of osteoporosis.
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Disclosures. The author declares no conflicts of interest.

P1586

OBESITY AS A DETERMINANT OF ACCELERATED STRUCTURAL DECLINE IN GONARTHROSIS: A COMPREHENSIVE ANALYSIS OF BIOMECHANICAL, METABOLIC, AND PHARMACOLOGICAL FRAMEWORKS

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OBJECTIVE To investigate obesity as a key determinant of rapid knee osteoarthritis (KOA) progression and evaluate the therapeutic efficacy of metabolic interventions, specifically glucagon-like peptide-1 (GLP-1) receptor agonists.
MATERIAL AND METHODS A systematic review of current literature was conducted to analyze the biomechanical and inflammatory mechanisms linking obesity to accelerated KOA. Data on predictive biomarkers (urinary CTX-II, MRI-detected bone marrow lesions) and clinical outcomes from recent pharmacological trials were synthesized to assess disease-modifying strategies.
RESULTS Obesity drives rapid KOA progression through a "whole joint" toxicity model that combines mechanical overload with meta-inflammation mediated by adipokines such as leptin and resistin [1]. This degenerative trajectory is significantly accelerated by comorbid depression and sarcopenia. Clinical evidence indicates that weight loss exceeding 10% is required to mitigate these risks. The STEP-9 trial demonstrated that the GLP-1 receptor agonist semaglutide reduced body weight by 13.7% and achieved a mean reduction in the WOMAC pain score of 41.7 points, significantly outperforming placebo [2]. These findings highlight the dual benefit of targeting metabolic pathways to alleviate symptoms and potentially slow structural decline.
CONCLUSION Obesity is a major modifiable predictor of rapid KOA progression. Integrating metabolic management via GLP-1 receptor agonists with weight loss strategies represents a paradigm shift in preventing joint failure and improving patient quality of life.
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DISCLOSURES The author declares no conflicts of interest.

P1587

INSULIN RESISTANCE AS A MECHANISTIC DRIVER OF METABOLIC OSTEOARTHRITIS: FROM MOLECULAR PATHWAYS TO THERAPEUTIC TARGETS

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Objective(s) To synthesize evidence linking insulin resistance (IR) to osteoarthritis (OA) pathogenesis, defining the "metabolic OA" phenotype, and to evaluate the efficacy of insulin-sensitizing agents as disease-modifying strategies.
Material and Methods A narrative review of literature (PubMed, Scopus, Web of Science; 2019–2025) was conducted. Selection criteria focused on studies analyzing molecular crosstalk between type 2 diabetes and OA, biomarkers of metabolic dysregulation (e.g., TyG index, METS-IR), and clinical outcomes of repurposing metabolic drugs (metformin, GLP-1 agonists) for joint preservation.
Results Current data confirms that IR contributes to OA beyond mechanical loading, establishing a distinct metabolic phenotype. Systemically, IR correlates with chronic low-grade inflammation mediated by adipokines (leptin, resistin) and cytokines (TNF-alpha, IL-6), which degrade cartilage matrix. At the cellular level, osteoarthritic chondrocytes and synovial fibroblasts exhibit impaired insulin signaling (defective Akt phosphorylation) and GLUT-1 dysregulation, exacerbating oxidative stress and matrix metalloproteinase production. Epidemiologically, elevated metabolic scores for insulin resistance (METS-IR) are linear

predictors of OA prevalence and severity. therapeutically, metformin demonstrates potential to retard cartilage degeneration via AMPK activation, while GLP-1 receptor agonists reduce synovial inflammation and improve clinical outcomes in knee OA patients.
Conclusion(s) Insulin resistance is a fundamental driver of joint degeneration in metabolic OA. Integrating metabolic phenotyping into OA management and repurposing anti-diabetic therapies offer promising avenues for halting disease progression.
Disclosures The author declares no conflicts of interest.

P1588
OSTEOPOROSIS AND COGNITIVE IMPAIRMENT: CLINICAL PARALLELS AND SHARED MECHANISMS

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OBJECTIVE(S) To explore the bidirectional relationship between osteoporosis (OP) and cognitive impairment (CI), identifying shared risk factors and underlying molecular mechanisms to improve clinical management of aging populations.
MATERIAL AND METHODS A comprehensive review of recent epidemiological studies and meta-analyses was conducted to evaluate the association between bone mineral density (BMD) and cognitive function. The analysis focused on shared pathophysiology, including the "bone-brain axis," hormonal pathways, and biomarkers such as osteocalcin, RANKL/OPG, and Wnt/β-catenin signaling.
RESULTS Epidemiological data indicate a robust bidirectional link; patients with CI have a 1.56-fold increased risk of developing OP (RR=1.56; 95% CI 1.30–1.87) [1]. Conversely, patients with diagnosed OP show a significantly higher risk of developing dementia (HR=1.80), with the risk nearly doubling in those with osteoporotic fractures [2]. Shared mechanisms include estrogen deficiency, chronic inflammation, and disruption of the Wnt/β-catenin pathway, which regulates both bone formation and synaptogenesis. Osteokines like osteocalcin cross the blood-brain barrier, directly linking bone remodeling to neuronal function.
CONCLUSION(S) OP and CI are interconnected conditions of aging, sharing common etiological pathways beyond simple co-morbidity. Recognizing the "bone-brain axis" allows for better risk stratification. Integrated screening strategies targeting both bone health and cognitive function are essential for early intervention and improved patient outcomes.
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Disclosures: The author declares no conflicts of interest.

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OSTEOARTHRITIS AND QUALITY OF LIFE: A JOINT-SPECIFIC REVIEW

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Objective To evaluate the differential impact of osteoarthritis (OA) phenotypes on health-related quality of life (HRQoL), analyzing clinical and epidemiological data across knee, hip, hand, and spine localizations.
Material and Methods A comprehensive review of Global Burden of Disease (GBD) 2019 data and recent clinical studies was conducted. We analyzed HRQoL metrics (SF-36, EQ-5D), prevalence trends, and biopsychosocial factors affecting patients with site-specific OA.
Results OA is a complex "whole-joint" pathology whose global prevalence increased by 113% between 1990 and 2019, affecting approximately 528 million individuals [1]. Knee OA remains the most prevalent form, significantly impairing mobility and increasing cardiovascular mortality risk due to forced sedentary behavior. Hip OA is associated with profound utility loss and social isolation, with patients reporting substantial decrements in vitality. Hand OA affects manual dexterity and aesthetic self-perception, often leading to stigmatization, while spine OA is a primary driver of chronic pain and disability-adjusted life years (DALYs) [1]. Psychological comorbidities, including depression and anxiety, are prevalent and exacerbate pain perception through central sensitization mechanisms, further degrading HRQoL [2].
Conclusion OA imposes a substantial, site-dependent burden on HRQoL. Effective management requires a shift from a purely structural focus to a multimodal, biopsychosocial approach targeting the specific functional and psychological impairments associated with each joint phenotype.
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P1590
INSULIN RESISTANCE AND OSTEOPOROSIS: PATHOGENESIS, CLINICAL ASSOCIATIONS, AND THERAPEUTIC STRATEGIES

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Objective: To elucidate the mechanisms linking insulin resistance (IR) to skeletal fragility and evaluate clinical implications for osteoporosis management.
Material and Methods: A comprehensive review of recent literature (2020–2025) and clinical data, including findings from the NHANES and MIDUS II studies, was conducted. The analysis focused on molecular pathways (PI3K/Akt/mTOR), bone turnover markers, and the impact of anti-diabetic therapies on bone health.

Results: Despite the anabolic potential of insulin via the PI3K/Akt pathway, systemic IR is associated with a "diabetic bone paradox"—preserved or increased bone mineral density (BMD) alongside elevated fracture risk [1]. Mechanisms driving this fragility include chronic inflammation, oxidative stress, and the accumulation of advanced glycation end-products (AGEs), which compromise collagen quality and suppress osteoblast function [2]. Clinical data indicate that while metformin exerts osteoprotective effects, thiazolidinediones are associated with bone loss. Furthermore, standard BMD assessment often underestimates fracture risk in IR patients due to cortical porosity not captured by DXA.
Conclusion(s): IR acts as a silent pathogen for skeletal health, degrading bone quality independent of bone mass. Metabolic management is crucial for fracture prevention, and therapeutic strategies should prioritize agents that preserve bone integrity.
Disclosures: The author declares no conflicts of interest.
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P1591

ASSOCIATION OF KNEE AND HIP OSTEOARTHRITIS WITH INCIDENT DISABILITY: THE ROAD STUDY

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[Objective] We investigated the association between knee and hip osteoarthritis (OA) and the incidence of disability among Japanese men and women using data from a large-scale population-based cohort study, the ROAD (Research on Osteoarthritis/Osteoporosis Against Disability).
[Methods] Among participants aged 65 years or older who had not received disability certification at baseline in the ROAD study, 2,130 individuals (785 men and 1,345 women; mean age, 75.4 years) were included. Baseline radiographs of both knees and hips were evaluated using the Kellgren–Lawrence (KL) grading system. Radiographic knee and hip OA were defined as a KL grade ≥2, and severe knee and hip OA as a KL grade ≥3. Information on new disability certification was obtained during follow-up surveys conducted at 3, 7, and 10 years after baseline. Incident cases of disability were identified, and incidence rates were calculated using the person-year method. Cox proportional hazards models adjusted for age, sex, body mass index, and residential area at baseline were used to examine the associations between OA and incident disability.
[Results] The incidence rate of disability was 28.0 per 1,000 person-years (21.5 in men and 31.7 in women) and was significantly higher in women. The incidence rate increased significantly with age in both sexes. Adjusted Cox regression analyses showed that the hazard ratios (HRs) for incident disability were 1.03 (95% confidence interval [CI]: 0.83–1.30) for knee OA, 1.31 (95% CI: 1.03–1.66) for severe knee OA, 1.81 (95% CI: 1.03–2.94) for hip OA, and 1.06 (95% CI: 0.81–1.37) for severe hip OA. Significant associations were observed for severe knee OA and hip OA.
[Conclusion] In this large-scale population-based cohort with up to 10 years of follow-up, severe knee osteoarthritis and hip osteoarthritis were significantly associated with an increased risk of incident disability among individuals aged 65 years and older.

P1592

RADIOFREQUENCY ECHOGRAPHIC MULTISPECTROMETRY (REMS) IN OBESE TYPE 2 DIABETIC PATIENTS

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Objective: To evaluate the effectiveness of Radiofrequency Echographic MultiSpectrometry (REMS) comparing with Dual-energy X-ray Absorptiometry (DEX) in type 2 diabetic patients with overweight or obesity.
Material and Methods: 13 men and 22 women with type 2 diabetes mellitus (DM2) with body mass index (BMI) ≥25 kg/m2 were included in the study. Patients having osteoporosis, low-density fractures or those receiving specific therapy for osteoporosis were not included. All the patients underwent both DEX and REMS. Bone mineral density in vertebrae and femur neck, diabetic history, glucose-lowering therapy were analyzed. Thereafter 20 patients were administered GLP-1RA for body weight reduction. Baseline all patients both underwent REMS and DEXA. Subsequently, REMS in them after 6 months was conducted to compare the REMS bone density parameters, effectiveness of vertebrae visualization and the scanning depth required.
Results: Among 35 diabetic patients aged 60 [55; 67] years 7 patients (20%) were overweight (BMI 26.5 [25.7; 28.5], 17 (48.5%) had obesity 1 class (BMI 32.0 [31.4; 33.5]), 9 (25.7%) had obesity 2 class (BMI 36.4 [36.0; 38.5]) and 2 patients (5.7%) had obesity 3 class (BMI 42.9 [41.5; 43.3] kg/m2). All the patients received metformin, while 57% were also treated with GLP-1RA, 31% with SGLT2i, 6% with DPP4i and 20% with insulin. According to DEX, 30 patients had normal T-score in L1-L4, 3 had osteopenia, 2 had osteoporosis. According to REMS, 23 patients had normal T-score, 10 had osteopenia, 2 had osteoporosis, discordant values of DEX and REMS were observed in 13 cases (37%). DEX revealed normal values in femur neck among 22 patients, osteopenia in 12 patients and one case of osteoporosis. At the same time, REMS showed normal values in 27 patients, osteopenia in 8 cases and no cases of osteoporosis, discordant data were obtained in 11 cases (31%). We did not notice any correlation of discordant data with obesity class or glucose-lowering therapy. The loss of 7.0 [5.0; 11.0] kg (6.5 [5.5; 7.5] % from baseline) during 6 months of GLP-1RA therapy was associated with improved vertebral visualization (4 vs 3 vertebrae at baseline), though scanning depth or T-score did not significantly change.
Conclusion(s): REMS can be used as an adjunct to DXA in obese patients with T2DM, but its potential as a standalone diagnostic method requires further investigation. Moderate weight loss does not significantly affect REMS results.

P1593

PREOPERATIVE ABALOPARATIDE FOLLOWED BY POSTOPERATIVE ZOLEDRONIC ACID SYNERGISTICALLY ENHANCES FRACTURE HEALING IN RAT FEMORAL OSTEOTOMY MODEL

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Background: Delayed fracture healing can markedly delay a patient's return to daily activities. Abaloparatide (Abalo), an osteoporosis medication, may exert strong anabolic effects on bone, with several reports suggesting its potential to improve fracture healing. However, few studies have examined its combined use with bisphosphonates, which possess antiresorptive properties. We investigated whether preoperative Abalo administration followed by postoperative zoledronic acid (ZA) could synergistically promote fracture healing.

Methods: Fifty-six male Sprague–Dawley rats (9 weeks old) were randomly assigned to four groups: control (n=14), Abalo (preoperative Abalo for 6 weeks; 30 μg/kg, subcutaneously, 5 days/week, n=14), ZA (single ZA administration immediately after surgery; 0.1 mg/kg, subcutaneously, n=14), and Abalo + ZA (n=14). After 6 weeks of Abalo treatment, a right femoral midshaft osteotomy model was created. At 2 and 4 weeks post-osteotomy, bilateral femurs were harvested from seven rats per group. Radiographic evaluation, micro-CT for bone morphometry, and three-point bending tests for mechanical strength were performed. Serum and periosteal samples were collected to assess bone turnover markers (P1NP and CTX-1) and the expression of bone formation/resorption–related genes (*Runx2*, *BMP2*, and *RANKL*) by RT-PCR. Histological evaluation was conducted by toluidine blue staining of undecalcified specimens.

Results: Radiographs demonstrated enhanced callus formation and accelerated fracture healing in Abalo and Abalo+ZA groups compared with ZA and control groups, consistent with histological observations. Micro-CT at 4 weeks revealed a significantly higher trabecular bone volume fraction in the right femur of the Abalo+ZA group than in the control group. In the left femur, cortical and trabecular bone mineral density was significantly higher in Abalo and Abalo+ZA groups. On mechanical testing, the Abalo+ZA group had the highest maximum yield load and bending stiffness but the lowest Young's modulus.

Conclusion: Preoperative Abalo plus postoperative ZA treatment improved bone microarchitecture and fracture healing, which contributes to an earlier return to activity in planned fracture cases, such as osteotomy procedures in clinical settings.

P1595

DIGITAL FOUR-DOMAIN SCREENING IDENTIFIES MUSCULOSKELETAL DYSFUNCTION BEFORE PAIN ONSET: ACTIVITY LEVEL AS PRIMARY MODIFIABLE RISK FACTOR

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Objective(s)

Musculoskeletal disorders affect 1.71 billion people globally, yet functional decline precedes pain by years. We validated a digital screening tool to identify at-risk workers before symptoms develop, examining whether activity or pain better predicts functional capacity.

Material and Methods

We analyzed 243 working adults (mean age 42.4 years, 58% female) completing digital MSK assessments. The tool evaluated strength, balance, flexibility, and dynamic posture via self-administered interface. Using known-groups validation, we compared high-activity (≥3 sessions weekly, n=61) versus low-activity (≤1 weekly, n=37), and pain-free (n=35) versus moderate-severe pain (≥4/10, n=66). Analyses included Mann-Whitney U tests, Cohen's d, and Youden's Index.

Results

Among 143 completers, activity showed superior discrimination. High-activity individuals scored 12.35 points higher (76.5 vs 64.1, $p<0.001$, $d=0.889$), substantially exceeding pain effects (74.7 vs 67.5, $p=0.034$, $d=0.447$). Benefits persisted across ages 20-39 ($d=0.824$) and 40-59 ($d=0.926$). Low-activity workers with minimal pain showed marked impairment, representing high-risk individuals missed by symptom screening. Optimal threshold (score <67) showed specificity 93.8%, sensitivity 73.7%, OR=42.0 ($p<0.0001$). Novel gender interaction: pain impaired male function (11.42-point reduction, $p=0.035$, $d=0.700$) but not females (1.21 points, $p=0.664$, $d=0.085$).

Conclusion(s)

Digital screening identifies MSK risk before pain develops. Activity proves the strongest modifiable predictor, supporting proactive screening over symptom-based approaches. Low-activity asymptomatic workers represent critical intervention targets. The validated threshold enables evidence-based stratification with minimal false positives. Digital format addresses scalability barriers for population implementation. Gender-specific pain-function relationships warrant further investigation.

Disclosures

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P1596

FIVE-DOMAIN FUNCTIONAL IMPACT OF PAIN INTENSITY IN 18,371 ADULTS WITH MUSCULOSKELETAL PAIN

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Background While pain intensity assessment using Visual Analogue Scale (VAS) is routine in musculoskeletal practice, the precise relationship between subjective pain ratings and objective functional outcomes across multiple life domains remains inadequately quantified. This study establishes comprehensive dose-response relationships between pain severity and five key outcome domains in a large-scale analysis.

Methods Cross-sectional analysis of 18,371 working adults with musculoskeletal pain who completed standardized assessments through a digital workplace health platform. Pain intensity (VAS 1-10) was correlated with work absenteeism, healthcare-seeking behavior, productivity impact, mental health impact, and social wellbeing. Logistic regression calculated odds ratios with 95% confidence intervals for each VAS level versus baseline (VAS 1), controlling for demographics and pain characteristics.

Results All five domains demonstrated statistically significant dose-response relationships (all p<0.0001). Absenteeism rates increased from 9.9% at VAS 1 to 41.2% at VAS 10 (OR=6.4, 95% CI 4.2-9.8). Healthcare-seeking rose from 27.9% to 76.3% (OR=8.3, 95% CI 5.3-13.1). Productivity impact escalated from 28.4% to 81.6% (OR=11.2, 95% CI 7.3-17.1). Mental health impact increased from 12.3% to 61.4% (OR=11.4, 95% CI 7.2-17.9). Social wellbeing impact rose from 13.0% to 65.8% (OR=12.8, 95% CI 8.1-20.4). A critical inflection point emerged at VAS 4, where productivity impact doubled (28.4% to 60.0%), mental health impact doubled (12.3% to 24.5%), and social impact more than doubled (13.0% to 29.9%).

Conclusions This study provides the most comprehensive quantification to date of pain intensity's functional significance across multiple life domains in musculoskeletal pain. The consistency of dose-response relationships, with effect sizes ranging from 6-fold to 13-fold increases, validates VAS as a meaningful predictor of real-world outcomes beyond subjective experience. VAS 4 emerges as a robust, evidence-based intervention threshold with profound implications for productivity, mental health, and social functioning. These findings support early intervention strategies in musculoskeletal pain management and provide empirical benchmarks for outcome measurement and treatment target setting.

P1598

EARLY POSTOPERATIVE VITAMIN D INSUFFICIENCY DESPITE MUSCULOSKELETAL IMPROVEMENT AFTER BARIATRIC SURGERY: IMPLICATIONS FOR METABOLIC BONE HEALTH

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Objective

To evaluate early changes in serum 25-hydroxyvitamin D (25(OH)D) and bone-related biochemical markers during the first four months after bariatric surgery and to assess concurrent changes in obesity-related joint symptoms.

Material and Methods

This retrospective observational study included 27 adults (17 women, 10 men) who underwent bariatric surgery at a general medical clinic in Batumi, Adjara, Georgia. Assessments were performed preoperatively (T0), at 1 month (T1), and at 4 months (T3) postoperatively. Body mass index (BMI), serum 25(OH)D, alkaline phosphatase (ALP), and ionized calcium were recorded at each timepoint. All patients received routine postoperative supplementation with a multivitamin preparation and additional vitamin D. Vitamin D status was defined as deficiency (<20 ng/mL), insufficiency (20–29 ng/mL), or sufficiency (≥30 ng/mL). A subset of patients had radiographically confirmed gonarthrosis and/or coxarthrosis with chronic joint pain prior to surgery. Longitudinal changes were analyzed using paired statistical tests.

Results

Vitamin D deficiency or insufficiency was common at baseline. Significant BMI reduction was observed at T1 and T3, reflecting rapid postoperative weight loss. Patients with preoperative knee or hip osteoarthritis frequently reported reduced joint pain, improved mobility, and enhanced functional capacity, including the regained ability to cross their legs, with overall improvement in quality of life. Mean 25(OH)D levels increased during follow-up; however, a substantial proportion of patients remained vitamin D insufficient at 4 months despite routine multivitamin and vitamin D supplementation. ALP demonstrated a rising trend over time, whereas ionized calcium remained within the reference range.

Conclusion

Early after bariatric surgery, marked improvement in weight-related joint symptoms occurs alongside persistent vitamin D insufficiency and biochemical changes suggestive of altered bone metabolism. This divergence between symptomatic musculoskeletal benefit and potential skeletal vulnerability underscores the need for early metabolic bone monitoring and individualized vitamin D replacement in the post-bariatric population.

Disclosures None.

P1599

PARICALCITOL INCREASES THE EXPRESSION OF VITAMIN D RECEPTORS IN MURINE LIVER BUT SHOWS HEPATOXICITY IN HIGH DOSES

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Background. Paricalcitol (PC) (19-nor-1,25-dihydroxyvitamin D2) is a synthetic analogue of D2 that binds to the vitamin D receptor and prevents the secretion of parathyroid hormone. The drug is widely used to treat and prevent secondary hyperparathyroidism in chronic renal failure. In addition, there is evidence of the anti-inflammatory and antioxidant properties of PC. Studies have shown that vitamin D receptors (VDRs) can be a promising target in osteoporosis. However, the effect of PC on the state of liver cells, which are the most important site of its metabolism, is devoted to single publications.

Aim. To study the effect of intraperitoneal administration of different doses of paricalcitol on the degree of activation of vitamin D receptors and to conduct a morphological assessment of the state of liver tissue in mice.

Materials and methods. The experiment involved male BALB/c mice without external pathological signs, weighing 16–18 g and aged 4–6 weeks. The animals were given paricalcitol intraperitoneally at a dose of 25 ng/mouse, 50 ng/mouse and 100 ng/mouse on days 1, 2, 4 and 7. Histological assessment of liver tissues of animals removed from the experiment on day 10 was performed according to generally accepted histological methods. Immunohistochemical examination was performed automatically in a Bond-Max immunohistostainer (Leica, Germany). Primary rabbit polyclonal antibodies to the vitamin D receptor were used.

Results and its discussion. The introduction of PC in different doses consistently increased the total number of liver cells expressing VDR, mainly due to immune cells. An increase in the percentage of intensely stained non-parenchymatous cells (++++ and +++) was observed by the 21st day of the experiment and amounted to 56.0% in subgroup 2.2, 46.6% and 4.2 – 48.0%, in the control group this value was 39.5%. The liver tissue structure closest to the control was observed in animals that received PC at a dose of 25 ng/mouse. In the groups of mice where the animals received PC at doses of 50 ng/mouse and 100 ng/mouse, certain microscopic changes were noted, mainly of a dystrophic and discirculatory nature, which reflected the toxic effect of these doses of PC on the metabolism of hepatocytes.

Conclusion. The introduction of different doses of paricalcitol leads to an increase in VDR expression mainly in non-parenchymatous liver cells that perform immune functions. VDR expression in hepatocytes of all subgroups increased by the 10th day of observation and decreased by the 21st day, which was probably due to the death of these cells. Microscopic examination showed that the use of PC in healthy mice leads to certain dose-dependent changes in the liver, the least toxic dose of PC is 25 ng/mouse.

P1601

ANTIDEPRESSANT USE AND RECURRENT FALLS AND FRACTURES IN COMMUNITY-DWELLING OLDER ADULTS WITH DEPRESSION: FINDINGS FROM THE ASPREE COHORT

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Background: Antidepressant use among older adults in Australia is notably high, representing the most commonly used mental health-related medication, but only a few studies have compared the risk of recurrent falls and fractures across antidepressant classes. This study aimed to investigate the potential link between antidepressant treatment classes and recurrent falls and fractures among older adults with depressive symptoms.

Methods: This study draws upon data from the ASPirin in Reducing Events in the Elderly (ASPREE) clinical trial and ASPREE-Fracture sub-study. The study population for this study is older adults with depressive symptoms and a total of 3,224 participants with either depressive symptoms (CES-D-10 ≥ 8) or using antidepressants at the baseline were included. The outcomes for this study were the occurrence of falls and fractures as recurrent events. The Anderson-Gill model was used to estimate hazard ratios (HRs) associated with antidepressant exposure, adjusting for potential confounding variables.

Results: During the follow-up period, 508 participants experienced one or more serious falls (incidence rate of 116.1 per 10,000 person-years (PYs)), and 510 participants experienced one or more fractures (incidence rate of 117.3 per 10,000 PYs). We observed a 27% increase in the risk of recurrent falls among participants using any antidepressant medication (aHR = 1.27; 95% CI: 1.06-1.54) and a 44% increase among those using first-line antidepressant medication (aHR = 1.44; 95% CI: 1.15-1.79). In the analysis by antidepressant class, similar results were found for participants taking selective serotonin reuptake inhibitors (SSRIs), whereas associations for tricyclic antidepressants (TCAs) were not statistically significant. For recurrent fractures, the estimated rate was not significantly higher among participants using any antidepressant (aHR = 1.17; 95% CI: 0.98-1.41) and significantly higher among those using first-line antidepressants (aHR = 1.29; 95% CI: 1.03-1.61) and SSRIs (aHR = 1.26; 95% CI: 1.02-1.56).

Conclusions: The overall antidepressant use, first-line antidepressants, and SSRIs were significantly associated with the higher risk of recurrent serious falls, and first-line antidepressants and SSRIs were significantly associated with the higher risk of recurrent fractures. These risks were higher among male participants than female.

Keywords: antidepressants; depression; recurrent falls; recurrent fractures; geriatrics; bone health

P1602

SIGNIFICANT BONE MINERAL DENSITY RECOVERY FOLLOWING TERIPARATIDE THERAPY IN A 30-YEAR-OLD PRIMIPAROUS WOMAN WITH MULTIPLE VERTEBRAL FRACTURES

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Background: Pregnancy- and Lactation-Associated Osteoporosis (PLO) is a rare but debilitating condition characterized by low bone mineral density (BMD) and fragility fractures, typically occurring in the third trimester or the early postpartum period.
Case Presentation: A 30-year-old woman (Height: 162.0 cm, Weight: 56.0 kg) presented with severe back pain and stiffness two months after delivering her first child. Four months following the onset of symptoms (six months postpartum), clinical evaluation confirmed multiple vertebral fractures. Initial diagnostic imaging via Dual-energy X-ray Absorptiometry (DXA) on October 24, 2022, revealed:

• AP Spine (L1-L4): BMD of 0.656 g/cm², Z-score (-4.4), indicating very low bone mass for her age.

• Total Left Femur: BMD of 0.662 g/cm² with a Z-score of -2.7.

• Trabecular Bone Score (TBS): 1.248 (Z-score -2.1), reflecting partially degraded bone microarchitecture.

Results: The patient immediately discontinued breastfeeding and was initiated on a therapeutic regimen consisting of Calcium Carbonate, Vitamin D and Forsteo (Teriparatide). After 1.5 years of treatment, the patient demonstrated a robust clinical response with significant bone mass accrual:

• Spine BMD increase: 12%.

• Total Femur BMD increase: 6%.

• TBS: was impruved: 1.330 (Z-score -1,2).

Conclusion: Following the 18-month course of anabolic therapy, the patient's skeletal status improved from osteoporosis to osteopenia. The patient remains stable and is currently planning a subsequent pregnancy. This case highlights the efficacy of Teriparatide in restoring bone density and microarchitecture in severe cases of PLO.

P1603

RELATIONSHIP BETWEEN THE CROSS-SECTIONAL AREA OF THE GLUTEUS MAXIMUS MUSCLE AND BONE MINERAL DENSITY OF THE FEMUR IN PATIENTS WITH PROXIMAL FEMUR FRACTURE: CROSS-SECTIONAL ANALYSIS OF MUSCLE BONE UNITS ACROSS DIFFERENT AGE GROUPS

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Objectives
This study examined the relationship between the cross-sectional area (CSA) of the gluteus maximus muscle and bone mineral density (BMD) of the femur in patients with proximal femur fractures, and clarified the characteristics of age-related muscle and bone interactions.
Methods
Fifty-seven patients with proximal femur fractures were divided into three groups: 65–79 years (Group I), 80–89 years (Group II), and ≥90 years (Group III). BMD of the unfractured femur was measured using dual X-ray absorptiometry. The contralateral gluteus maximus muscle CSA was analyzed at the level of the greater trochanter using measurement equipment in the electronic patient chart. Statistical analysis was performed using R Commander software. Pearson's correlation coefficient was calculated to determine the relationship between CSA and BMD. Statistical significance was set at $p < 0.05$.
Results
A significant positive correlation was observed between the gluteus maximus CSA and total femur BMD in groups I ($r = 0.489$) and II ($r = 0.592$) (all $p < 0.05$).
Conclusion
The characteristics of muscle and bone interactions tend to increase with age, suggesting that strengthening exercises among the gluteus maximus muscles are essential for sustaining BMD.

P1604

CLINICAL EXPERIENCE WITH ROMOSOZUMAB IN PATIENTS WITH OSTEOPOROSIS: A MULTICENTRE DESCRIPTIVE STUDY

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Introduction/Objective

Romosozumab is a monoclonal antibody directed against sclerostin, with dual anabolic and antiresorptive effects, approved for the treatment of severe osteoporosis in postmenopausal women and men at high risk of fracture. Evidence from real-world clinical practice is limited. The objective of this study is to describe the baseline characteristics, treatment efficacy, and adverse events in patients treated with romosozumab at two referral hospitals.

Methods

A descriptive, observational study was conducted in patients with osteoporosis who started romosozumab between 2023 and 2025. Demographic variables, history of fractures, previous treatments, adverse effects, discontinuation, and availability of densitometry (DEXA) were collected at the end of 12 months of treatment.

Results

Thirty-one patients were included, with a mean age of 69.3 years, most of whom were women (96.8%). Eighty-three point nine per cent had previous fractures, mainly vertebral. Previous treatments: bisphosphonates in 18 patients (58.1 per cent), denosumab in 21 (67.7 per cent), and teriparatide in 9 (29.0 per cent).

To date, 19 patients (61.3%) have completed one year of treatment; post-treatment DEXA scans are available for comparative analysis in 15 of them. An improvement in bone mineral density (BMD) was observed, with a mean increase in T-score of +0.71 in the spine.

To date, 19 patients (61.3%) have completed one year of treatment; post-treatment DEXA scans are available for comparative analysis in 15 of these patients. An improvement in bone mineral density (BMD) was observed, with a mean increase in T-score of +0.71 in the lumbar spine and +0.21 in the femoral neck. These findings reflect the anabolic efficacy of the drug, with a more marked effect in the lumbar spine and a more modest but relevant response in the femoral neck, consistent with what has been described in pivotal trials. In no case were new fractures, adverse effects, or discontinuation of the drug reported.

Conclusions

In this multicentre cohort, romosozumab showed a favourable safety profile, good persistence and a consistent densitometric response, supporting its usefulness in real-world clinical practice.

P1605

A COMPARISON OF FRACTURE PATTERNS BETWEEN CEMENTED AND UNCEMENTED FEMORAL STEM FOR PERIPROSTHETIC FRACTURE AFTER BIPOLAR HEMIARTHROPLASTY

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Objective

Previous studies established that the "reverse clamshell" fracture pattern did not show a significant association with either cemented or uncemented stem fixation. Furthermore, it has been proposed that identifying fracture patterns aids surgeons in recognizing stem instability, a critical factor in deciding between internal fixation and revision arthroplasty. Acknowledging a gap in validating these findings across different populations, this study aims to compare periprosthetic femoral fracture (PPF) patterns between cemented and uncemented stems following bipolar hemiarthroplasty, identify associated risk factors, and evaluate whether specific fracture patterns should influence the choice between fixation and arthroplasty to optimize outcomes.

Material and Methods

This retrospective cohort study analyzed patients undergoing bipolar hemiarthroplasty for femoral neck fractures. Patients were stratified into two groups based on stem type: cemented and uncemented. PPF cases were identified and classified using the Vancouver system; B2 fractures were further sub-classified into burst, clamshell, reverse clamshell, or spiral patterns. Risk factors were assessed through multivariate analysis. Clinical outcomes were compared between fixation and revision arthroplasty groups specific to each fracture morphology.

Results

A total of 607 hemiarthroplasties were analyzed (430 uncemented and 177 cemented). The overall PPF rate was 5.77% (35/607). Significant risk factors for PPF included heart failure (p = 0.016), Parkinson's disease (p = 0.024), and dementia (p = 0.037). Cemented stems were associated with a significantly higher rate of early pulmonary embolism compared to uncemented stems (5.08% vs. 1.40%, p = 0.017). Regarding B2 fractures, the distribution of fracture patterns did not significantly differ between stem types (p = 0.248), consistent with previous reports, although a trend toward reverse clamshell patterns was observed in cemented stems (50%) and spiral patterns in uncemented stems (62.5%). In terms of decision-making, revision arthroplasty exhibited trends toward higher functional scores compared to fixation in both reverse clamshell and spiral patterns.

Conclusion

Cemented stems were associated with higher rates of early pulmonary embolism and a numerical trend toward increased PPF incidence. While fracture patterns did not significantly differ by stem type, morphological trends were evident. Importantly, for decision-making in B2 fractures, our data suggest that revision arthroplasty may offer superior functional outcomes over fixation for specific patterns such as reverse clamshell and spiral. This indicates that fracture pattern recognition remains a vital, though not exclusive, guide for surgical strategy.

Reference: (1)(Karam, Campbell et al. 2020)

P1606

MANAGEMENT OF FRACTURE-RELATED OSTEOPOROSIS IN A PREMENOPAUSAL WOMAN WITH ACHONDROPLASIA TREATED WITH TERIPARATIDE

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Objective: Achondroplasia is the most common skeletal dysplasia due to FGFR3 gene mutation, with a reported prevalence of approximately 1 in 20 000 individuals. We report a case of severe osteoporosis with multiple vertebral fractures in a premenopausal woman with achondroplasia and document the effects of anabolic therapy with teriparatide.
Materials and Methods: A 37-year-old female with a lifelong diagnosis of achondroplasia was referred to our osteoporosis clinic for musculoskeletal pain. She reported regular menses, had a body mass index (BMI) of 55.8 kg/m² and no prior osteoporosis treatment. Dual-energy X-ray absorptiometry (DXA) revealed osteoporosis (spine Z-score: −3.1; BMD: 0.828 g/cm²; femoral neck Z-score: −2.5; BMD: 0.693 g/cm²) and radiographs showed multiple vertebral fractures. Laboratory evaluation demonstrated severe 25-OH vitamin D deficiency (13 ng/mL), corrected with supplementation; other bone turnover indices (β-crosslaps, P1NP, BGP, PTH, calcium) were within normal limits. Secondary causes of osteoporosis were excluded. Treatment with teriparatide was initiated along with calcium and vitamin D supplementation.
Results: After 10 months of therapy, DXA showed marked improvement in bone density at the spine (Z-score: −1.2; BMD: 1.068 g/cm²) and femoral neck (Z-score: −1.9; BMD: 0.757 g/cm²). No new fractures were documented during follow-up.
Conclusion: Although achondroplasia is not classically associated with osteoporosis, case reports indicate osteopenia/osteoporosis in affected adults. This is, to our knowledge, the first report of teriparatide use in a patient with achondroplasia and fracture-related osteoporosis, with significant increases in bone mineral density and absence of new fractures after 10 months. These preliminary data suggest potential effectiveness of anabolic therapy in this rare clinical scenario, warranting further research.

P1607

HETEROGENEOUS QUALITY-OF-LIFE TRAJECTORIES AFTER GERIATRIC HIP FRACTURE SURGERY: A ONE-YEAR GROWTH MIXTURE MODELING STUDY

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Background
Hip fractures represent a major cause of morbidity among older adults. Recovery following hip fracture surgery is highly heterogeneous, and longitudinal changes in quality of life (QoL) are not adequately captured by cross-sectional assessments. Identifying distinct QoL trajectories and their associated factors may facilitate risk stratification and individualized rehabilitation strategies. This study aimed to characterize one-year QoL trajectories after hip fracture surgery and to determine baseline predictors of trajectory membership.
Methods
We conducted a longitudinal cohort study using data from a hip fracture registry at a tertiary medical center. QoL was assessed using the EuroQol five-dimension three-level questionnaire (EQ-5D-3L) at admission, 6 months, and 12 months postoperatively. Growth mixture modeling was applied to identify latent subgroups with distinct QoL trajectories. Baseline demographic, clinical, and functional variables were compared across trajectory classes. Multinomial logistic regression was used to identify factors independently associated with trajectory membership.
Results
A total of 382 patients (mean age 80.2 years; 71.3% women) were included. Four distinct QoL trajectories were identified: (1) consistently high QoL (60.47%), characterized by stable, near-optimal QoL; (2) partially declined then stable (21.99%), showing a moderate decline at 6 months followed by stabilization; (3) notably decreased QoL (12.83%), demonstrating a steep and persistent decline and representing the poorest recovery profile; and (4) recovered QoL (4.71%), characterized by low baseline QoL with gradual improvement over one year. Multivariate analysis revealed that osteosarcopenia, lower pre-fracture EQ-5D-3L utility scores, and poorer activities of daily living were independently associated with the notably decreased QoL trajectory, while older age and cognitive impairment predicted membership in the partially declined then stable group. No baseline variables significantly predicted the recovered trajectory.
Conclusion
Older adults undergoing hip fracture surgery follow distinct and clinically meaningful QoL trajectories during the first postoperative year. Age, musculoskeletal health, cognitive status, baseline QoL, and functional independence are key determinants of unfavorable trajectories. Early identification of high-risk patients may enable personalized interventions aimed at preserving quality of life and preventing long-term decline.

P1608

THE RELATIONSHIP OF OSTEOPOROSIS WITH A NOVEL MEASURE OF SOCIOECONOMIC STATUS

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Objective: Osteoporosis may be associated with a lower socioeconomic status (SES). Our objective was to test the hypothesis that women with lower SES are at greater risk of osteoporosis, using a novel measure of individual SES.
Material and Methods: We analyzed retrospective data from a large primary care practice in the Midwestern U.S. states of Minnesota, Wisconsin, and Iowa. All empaneled women, aged 66 years and older in 2022, were eligible for inclusion. We identified the first bone density test completed in the 16 years between 2007 and 2022. Using a large language model, bone density data were extracted from varying bone density report formats. Individual level housing-based socioeconomic status was determined with the Housing-Based Socioeconomic Status (HOUSES) index, linking patient to publicly available property data. Four property items (square footage of housing unit, estimated building value, number of bedrooms, and number of bathrooms) were used to calculate a composite standardized z-score. The HOUSES index was stratified

into quartiles, with Q1 representing the lowest SES. An advantage of the HOUSES index is that it does not depend on patient-reported data, which is more often incomplete or missing for those of lower SES.
Results: Of the 11,196 women included, 8538 (76.3%) had completed at least one bone density measurement in the prior 16 years. Hip and lumbar spine T-scores were extracted for 6507 and 6772 women, respectively. The lowest T-score at any hip site was used for analysis. Overall, the prevalence of hip and lumbar spine T-scores of -2.5 or less was 6.9% and 4.8%, respectively. The mean hip and lumbar spine T-scores were -0.7±1.3 and 0.0±1.6, respectively, and hip and lumbar spine osteopororsis were not related with HOUSES quartiles (P=0.16 and 0.12, respectively). In a mixed model analysis adjusting for age, race, medical comorbidities, and rural residence, the lowest HOUSES quartile did not have a greater risk of osteoporosis at any site compared with the highest quartile (OR 1.26, 95%CI 0.98 to 1.63).
Conclusion: Women with lower SES in a U.S. Midwest primary care setting were not at greater risk of osteoporosis than those of higher SES.

P1609

SAGITTAL BALANCE, A SPINOPELVIC PARAMETER PREDICTOR OF QUALITY OF LIFE ONE YEAR AFTER AN OSTEOPOROTIC VERTEBRAL FRACTURE

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Objective: Preserving quality of life (QoL) is an important therapeutic goal after an osteoporotic fracture event. Therefore, it is mandatory to better identify factors that may adversely affect QoL following an osteoporotic fracture.
Assessing the predictive value of anthropometric parameters, including spinopelvic parameters, in the evolution of QoL after the occurrence of an osteoporotic vertebral fracture (VF).
Material and Methods: Patients aged over 60 with a recent VF less than 8 weeks prior to inclusion were followed prospectively. Quality of life was assessed at inclusion (M0), at month 6 (M6) and 12 (M12) after inclusion, using the EQ-5D-3L questionnaire. Front and lateral plain X-rays of the entire spine were performed at M0 and M12 allowing measurements of spinopelvic parameters. Associations between QoL at M12 and factors at inclusion, likely to influence its evolution, were evaluated.
Results: Fifty-one patients, including 40 women, aged 75±9 years with a mean BMI of 26.4±5kg/m^2, were included. Thirteen patients were not reviewed due to death, significant cognitive impairment or loss to follow-up. At M0, mean values of sagittal vertical axis (SVA) and pelvic tilt (PT) were 67.6 ± 41.5 mm and 22.5 ± 8.5 degrees, respectively, values higher than normal range. Lumbar lordosis (LL) 46.1 ± 16.7 degrees, lower than normal range.Management of VF varied, dependent on pain course and VF severity, including brace wearing (21) percutaneous surgical osteosynthesis (10) and vertebroplasty (5).
Among baseline characteristics including all spinopelvic parameters, QoL at M12 was negatively associated with age (p<0.001), history of osteoporotic fracture (p<0.5) and SVA at M0 (p<0.01). Whereas QoL progressively increased on average between M0 and M12 (p<0.006), we determined two different SVA threshold values that were predictive of QoL: a VSA < 40 mm and a VSA > 70 mm were associated with the highest QoL and the lowest QoL values, respectively.
Conclusion: Among factors identified as predictors of a poor QoL following VF at 1 year, SVA was the only factor that could be corrected. Therefore, implementing treatment aiming to maintain a low SVA could improve QoL.

P1610

THE EVALUATION OF DXA PARAMETERS IN PATIENTS WITH NON-ALCOHOLIC FATTY LIVER DISEASE

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Objective:
To assess bone mineral density (BMD) and trabecular bone score (TBS) in patients with non-alcoholic fatty liver disease (NAFLD) depending on gender and age.
Materials and methods:
In a cross-sectional study involving 54 women (mean age 56.29±10.13 years) and 30 men (mean age 50.96±11.22 years), anthropometric, instrumental (BMD L1-L4 and in femoral neck (FN), T- and Z-scores, TBS) and laboratory (AlAT, AsAT, total calcium, phosphate, parathyroid hormone (PTH), 25(OH)-vitamin D3) indices were determined. AsAT/AlAT ratio and the Fibrosis 4 Index (FIB-4) were also calculated. TBS was classified according to the meta-analysis of McCloskey et al. (2016).
Results:
Decreased bone mass (osteopenia) was found in 57.2% of postmenopausal women and in 14.8% of men. The FIB-4 was significantly higher in women than in men : 1.022 (0.743; 1.488) versus 0.963 (0.780; 1.608), respectively (p = 0.033); its value was higher than 1.30 (F ≥3 on the METAVIR scale – significant liver fibrosis) in 3 men and 7 women.
BMD FN correlated positively with AsAT/AlAT (r = 0.311; p = 0.007) and FIB-4 (r = 0.343; p = 0.018), while BMD L1-L4 showed no relationship with liver disease indices. Decreased TBS values (<1.310) were detected in 5 men (16.67% of their number) and 9 women (also 16.67%).
A significant negative correlation between TBS and the AsAT/AlAT ratio was found in men (r = -0.360; p = 0.021), but not in women. A negative correlation was also established between TBS and FIB-4 in both men (r = -0.330; p = 0.019) and women (r = -0.127; p = 0.044).
Conclusion:
More than half of examined postmenopausal women or men over 50 years old with NAFLD had osteopenia. A positive correlation was observed between BMD FN and indices reflecting liver disease progression (AsAT/AlAT ratio and FIB-4), but not for BMD L1-L4. Significant negative correlation between TBS and the AsAT/AlAT, as well as between TBS and FIB-4, was revealed, which may indicate that the state of bone microstructure is linked with the severity of hepatocyte destruction. Such discordant results may be caused by insufficient sensitivity of BMD as a marker of bone tissue condition in NAFLD.

P1611

CALCIUM ISOTOPE RATIO MEASUREMENT (CIM) FOR MONITORING RESPONSE TO OSTEOPOROSIS TREATMENT

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Objectives

Calcium isotopes are calcium atoms that share the same number of protons but differ in neutron number. Lighter calcium isotopes are preferentially incorporated into bone, leading to natural variations in the relative abundances of isotopes in serum. The calcium isotope measurement (CIM) expresses this variation and has emerged as a tool for investigating calcium metabolism in health and disease; CIM reflects shifts in net bone calcium balance and typically moves toward more positive values following antiresorptive therapy.

We assessed CIM for monitoring bisphosphonate treatment using the least significant change (LSC) and premenopausal female median values, and compared it with procollagen I N-propeptide (PINP) and C-telopeptide of type I collagen (CTX).

Material and methods

We measured the fasting Ca-44 to Ca-42 isotope ratio ($d^{44/42}Ca$ ‰) using multicollector inductively coupled plasma mass spectrometry (MC-ICP-MS) and PINP and CTX using an automated immunoassay analyser (IDS-iSYS).

We used samples from 41 postmenopausal women measured weekly for 8 weeks to estimate means and precision error and calculated the LSC (LSC = 2.77 × precision error). We establish the premenopausal median in 118 healthy women aged 30 to 45 years. We used serum samples from 46 postmenopausal women with osteoporosis who were randomised to oral bisphosphonates (TRIO Study) for 96 weeks. We measured CIM and BTM at baseline and after 13 weeks of therapy. We compared the proportions of treatment responders.

Results

After 13 weeks of bisphosphonate treatment, we observed an increase in CIM greater than the LSC in 35 out of 46 women (76%), a decrease in 44 out of 53 (83%) for PINP (p=0.18), and 23 out of 54 for CTX (p=0.004). Applying the median for premenopausal women, CIM exceeded the median in 42 out of 46 (91%), similarly to PINP (52 out of 53, 98%, p=0.125) and CTX (46 out of 53, 87%, p=0.72) (figure).

Conclusion

CIM performed comparably to PINP and better than CTX for assessing response to bisphosphonates in postmenopausal women.

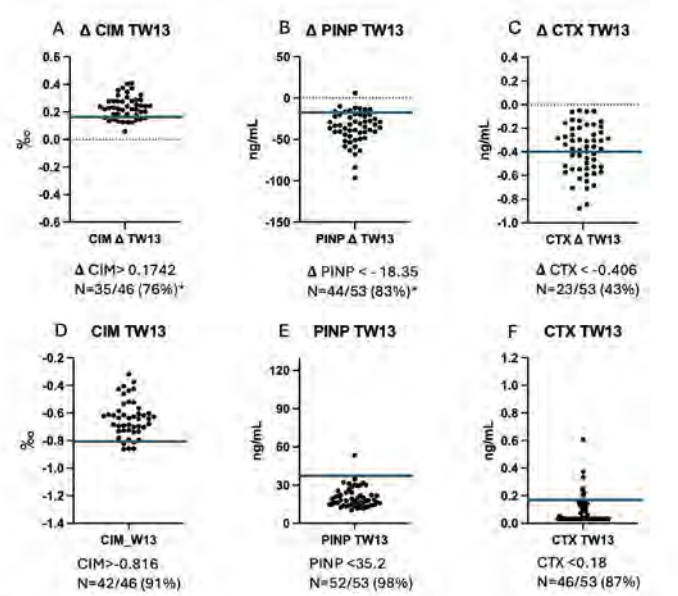


Figure - Scatter plots showing number and proportion of participants exceeding the least significant change (LSC) for CIM (A), PINP (B) , CTX (C) and the median for premenopausal women CIM (D), PINP (E) , CTX (F) . Cochrane test for comparison of proportions LSC p<0.001 *p<0.001 compared to CTX; Median premenopausal women (p=0.05)

P1613

DHPR INHIBITION ATTENUATES FORCE DECREASE BUT DOES NOT PREVENT ATROPHY IN THE THREE-DAY UNLOADED RAT SOLEUS MUSCLE

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OBJECTIVE: The depolarization of the sarcolemma is one of the first effects of unloading on skeletal muscle[1]. We hypothesized that unloading-induced activation of the dihydropyridine receptor (DHPR), a voltage-sensitive L-type Ca^{2+} channel, and depolarization of the sarcolemma trigger intracellular Ca^{2+} release from the sarcoplasmic reticulum and activation of Ca^{2+}-dependent signaling pathways resulting in muscle atrophy. Nifedipine, a DHPR calcium channel blocker, was used to study the role of DHPR in the regulation of signaling pathways during three days of rat soleus muscle unloading.

MATERIAL AND METHODS: Male Wistar rats were assigned at random to one of the three experimental groups: control with placebo (8 rats), unloading for 3 days, injected with placebo (8 rats), unloading for 3 days, injected with DHPR inhibitor nifedipine (8 rats; 5 mg/kg of body weight per day intraperitoneally).

RESULTS: Inhibition of DHPR during unloading attenuates the decrease of soleus muscle contractile properties, prevents the accumulation of ATP, ROS, and Ca^{2+} content in the sarcoplasm and the mitochondria, blocks the decrease of the PGC1alpha mRNA expression, and Junctophilin-1

proteolysis.
CONCLUSIONS: Inhibition of DHPR with nifedipine during three days of soleus muscle unloading attenuates the decrease of muscle contractile properties, blocks unloading-induced increase in the accumulation of ATP, ROS, Ca^{2+} content in the sarcoplasm and the mitochondria, and prevents the decrease in the PGC1alpha mRNA expression and Junctophilin-1 proteolysis. The improved contractile properties of the unloaded soleus muscle in nifedipine-treated rats could be mediated by the prevention of calpain-mediated degradation of the cytoskeletal proteins. Preventing a decline in muscle contractile properties during unloading by lowering Ca^{2+} levels with nifedipine might help to develop an effective preventive measure for the early stages of hypokinesia in humans.
The current study was supported by the Russian Science Foundation (RSF; project No. 24-15-00088, TLN).
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P1614
CYSTICERCOSIS OF THE BRAIN (CLINICAL CASE)

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Introduction. Cerebral cysticercosis is a rare disease caused by the larval stage of the pork tapeworm (Taenia solium). Humans become infected by consuming undercooked pork. In some cases, humans can become infected with oncospheres through oral ingestion from an infected person or through self-infection (autoinfection) when oncospheres are ingested from the intestines during vomiting, or by consuming unwashed vegetables grown in soil fertilized with contaminated waste. As a result of infection with oncospheres, the cysts (cysticerci) can develop in the subcutaneous tissue, muscles, eyes, and often the brain, causing a serious human disease called cysticercosis.
Cysticerci appear as transparent vesicles 0.5-1.5 cm in diameter, filled with a colorless fluid. The head, which has the same structure as that of an adult tapeworm, is visible as a white dot inside. Cysticerci form within 2-4 months. They survive in the human body for 3-6 years, after which they die and calcify. The parasite's lifespan in the brain ranges from 5 to 30 years.
The pork tapeworm, or armed tapeworm (Taenia solium), is no more than 3 meters long. The pork tapeworm inhabits the small intestine of humans. The segments are excreted in the feces. If pigs ingest oncospheres (by eating contaminated feed or the feces of an infected person), the oncospheres develop in the muscles of these animals, which are structurally similar to those of the beef tapeworm. Prevention includes mandatory identification and treatment of patients, the construction of well-equipped indoor toilets on farms, the indoor housing of pigs, and the requirement for meat to undergo veterinary and sanitary inspection.
Material and methods of study. Patient L. serves as an example. A 6-year-old child presented to the Minsk Regional Children's Clinical Hospital with decreased vision in the right eye and convergent strabismus. The vision loss had been noticed for half a year.
Neurological status: active, answers questions correctly. Cranial nerve symptoms include convergent strabismus in the right eye, amblyopia on the right, and dyslalia. Peristaltic tendon reflexes are D=S. Babinski's sign is bilateral. The patient is stable in the Romberg position and performs the finger-to-nose test accurately. Gait is stable. There are no changes in the general blood and urine tests or the blood biochemistry. Ophthalmologist examination revealed the right eye was pale pink, with clear borders and normal vascularity. The left eye was normal. Diagnosis: optic nerve atrophy in the right eye, convergent strabismus with a paretic component (OD), vis OD – light perception, OS – 1.0.
X-ray computed tomography of the brain: Multiple calcifications up to 0.5 cm in diameter were detected in both cerebral hemispheres. There was asymmetrical (D>S) dilation of the ventricular system (lateral ventricles), with a change in the configuration of the anterior horn of the right lateral ventricle (to a spherical shape), measuring 1.8 x 1.9 cm in transverse dimension. The septum pellucidum was shifted to the left by 0.5 cm. The remaining sections of the ventricular system were moderately dilated.
Conclusion: CT scan revealed signs of cerebral cysticercosis in the calcification stage. Internal hydrocephalus. Severe deformation of the right lateral ventricle, likely due to the presence of a cysticercus bubble.
Abdominal ultrasound revealed no abnormalities. Stool analysis revealed no helminth eggs.
A neurosurgeon examined the patient. Diagnosis: Sequelae of a previous neuroinfection. A CT scan of the brain revealed isolated dilation of the body of the right lateral ventricle without disruption of cerebrospinal fluid circulation. Neurosurgical treatment is not required.
An infectious disease specialist examined the patient and recommended antiparasitic therapy, including albendazole for 10-14 days at 15 mg/kg per day in two divided doses. An ELISA test for antibodies to Taenia solium was recommended, and antibodies were detected.
Results and discussion. The most common clinical manifestation of cerebral cysticercosis is seizures. Seizures can be generalized (with loss of consciousness) or partial (twitching of the limbs without loss of consciousness). Seizures are often persistent, difficult to stop, and drug-resistant. Patients are required to take anticonvulsants for a long time, either alone or in combination, such as carbamazepine, depakine, lamictal, or topamax.
Depending on the underlying cerebral disorders, there are five main syndromes of this disease: hypertensive, occlusive, epileptic (convulsive), meningoencephalitic, and psychopathological. Depending on the location of the parasite, cysticercosis is classified as supratentorial (of the cerebral cortex and meninges, intraventricular, and mixed forms), infratentorial (of the fourth ventricle, posterior fossa cisterns, and mixed forms), and generalized. A special variant, racematous or branched (usually localized in the pia mater at the base of the brain and can extend to the spinal cord), is also distinguished.

P1615

DEMYELINISATION PROCESS RATE IN TEENAGERS

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Background and Aims
127 multiple sclerosis patients 15 to 19 years old were examined
Methods
CT and MRI of cerebrum and spinal cord, conventional clinical methods, immunoassays and a patented radioimmunobiological assay for measuring the myelinotoxic activity (MTA) of blood serum and spinal fluid were used.
Results
The MRI findings (decreasing T-1W signal and increasing T-2W signal) were diagnostically important in 91.4% of cases and the CT findings were important in 42.6% cases. Four groups of patients were distinguished: (1) latent phase (16.6%), (2) slow progradient phase (33.1%), (3) acute phase (35.4%) and (4) fast progradient phase (14.9%). Characteristic of group 1 were slight increase in MTA of blood serum (average of 7.6 units compared to 3.9 in control group), decreased CD4+ (33.9% compared to 40.1% in control) and increased CIC levels (94.65 optical units compared to 69.32 in control). In group 2 with MTA level as high as 22.1, clear decrease of T-lymphocyte, CD22+, CD4+ and CIC levels was noted, along increase in CD8+ level and weak induction of TNF-α. In group 3 MTA level was 40.2 units coupled with increased CD8+, IL-2P+, Ig G, A, M, TNF-α, IL-8 and CIC and decreased T-lymphocyte and CD22+ levels. In group 4 MTA level was as high as 79.3; high level of CD4+, CD8+, IL-2P+, IgG, IgM, IgA and CIC and low level of T-lymphocytes and CD22+ were noted.
Conclusions
Measurement of blood serum MTA in combination with immunoassay and MRI findings helps to correctly estimate the rate of dymelinization

P1616

TAY-SACHS DISEASE. CLINICAL OBSERVATION

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Tay-Sachs disease is a genetically determined disorder of ganglioside metabolism, characterized by increased levels of gangliosides in the gray matter of the brain, liver, and spleen.
K.D., a girl aged 1 year 5 months, complains of developmental delays: she cannot hold her head up, roll over, sit, walk, or speak. At 1 year 4 months, she began experiencing seizures involving brief jerking of her limbs. She was treated twice in the neurology department before 1 year 5 months due to delayed psychomotor development and underwent genetic evaluation to confirm the diagnosis. Objectively: the head is macrocephalic, she cannot hold her head up, the anterior fontanelle is closed, she cannot roll over, cannot sit, or walk. She has divergent strabismus. Muscle tone in the limbs is sharply reduced, and there is no support. Periosteal tendon reflexes are decreased.
Conclusion: CT scan shows signs of mixed hydrocephalus. Ophthalmologist. Diagnosis: Tay-Sachs disease. Partial atrophy of the optic nerves in both eyes.
Genetic testing results:
1. Mitochondrial DNA was analyzed at the Institute of Genetics and Cytology of the National Academy of Sciences of Belarus (Non-chromosomal Pathology Laboratory) for the T8993 G mutation (maternally inherited Leigh syndrome) and A3343 G (MELAS syndrome), as well as for large MT DNA deletions. PCR analysis of DNA samples isolated from leukocytes was performed. DNA analysis revealed no such mitochondrial genomic abnormalities.
2. Lysosomal enzyme activity in leukocytes: decreased β-hexosaminidase A activity: 10.7; 7.2 mmol/g. Diagnosis: GM2 gangliosidosis. Tay-Sachs disease. The risk of having a child with such diseases in a family is 25%—high. DNA samples from the affected girl and her parents were sent to the Medical Genetic Research Center of the Russian Academy of Medical Sciences in Moscow for partial analysis of the HEXA gene (Tay-Sachs disease, H1H 272800).
Treatment is symptomatic; specific enzyme replacement therapy has not been developed. The girl received anticonvulsants: depakine, carbamazepine, topamax, as well as diacarb, asparkam, and emoxipin.

P1617

GROWTH AND FORMATION OF L3 VERTEBRA IN WHITE RATS AFTER IMPLANTATION OF BIOGENIC HYDROXYAPATITE CONTAINING SELENIUM

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Objective of the study was to investigate growth dynamics of the L3 vertebra after implantation of hydroxyapatite material OK-015 containing 0.15%, 0.30%, and 0.50% of selenium.
Material and methods. 175 male rats weighing 135-145 g were divided: A-group comprised intact rats, B-group comprised animals with a defect in tibia, C-group comprised animals with the defects filled with pure hydroxyapatite (OC-015). In animals of the Sel-1-3-groups the same defects were filled with OC-015 containing 0.15%, 0.30%, and 0.50% of selenium. Upon 7, 15, 30, 60, and 90 days after surgery L3 vertebrae were collected and measured using standard methods.
Results. In animals of the B-group width of L3 body on the 7th and the 30th days after surgery was lower than that of the A-group by 5.14% and 4.48%, antero-posterior size in the same area decreased by 4.73%, 6.63%, 5.79%, and 5.88% in the period from the 15th to the 90th day. Body height decreased by 5.74% and 6.07% on the 30th and the 60th days. In animals of the C-group in comparison with the B-group width and antero-posterior size decreased by 5.24% and 4.35% on the 15th day. Body width on the 30th and 60th days increased by 5.33% and 4.47%, body height increased by 5.26% and 3.85% on the 60th and 90th days. In the Sel-1-2-groups in comparison with the C-group body width increased by 4.55% and 5.84% on the 15th day. In the Sel-3-group, body width on the 7th and the 15th days increased by 5.96% and 5.19%.
Conclusion. Selenium-containing hydroxyapatite implants have an optimizing effect on growth of undamaged bones. The most effective selenium concentration for optimization is 0.50%.

P1618

AI-DRIVEN DIAGNOSTIC RECOGNITION AND RISK ASSESSMENT FOR OSTEOPOROSIS, OSTEOARTHRITIS, AND MUSCULOSKELETAL PATHOLOGIES: A MULTI-TASK DEEP LEARNING FRAMEWORK

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Background: The co-occurrence of Osteoporosis and Osteoarthritis presents a formidable challenge to global public health, requiring sophisticated diagnostic tools to navigate the complexities of bone density attrition and articular degeneration. Traditional computational approaches often analyze these conditions in isolation, failing to capture the synergistic risks necessary for holistic patient safety and early preventive intervention.
Purpose: This investigation introduces a multi-task AI framework designed to bridge this gap by concurrently identifying disease progression phases, monitoring metabolic biomarkers, and ensuring rigorous adherence to evidence-based clinical protocols to optimize orthopedic recovery.
Methods: Utilizing a transformer-based deep learning architecture, the study synthesized longitudinal data from a cohort of 870 participants (ages 15–75), integrating high-resolution 3D reconstructions with multiomics profiles. The system comprises three core technological pillars: First **Disease Recognition:** A Temporal Transformer Network classifies stages of musculoskeletal degradation. Second, **Biomarker Tracking:** A predictive algorithm monitors 15 specific biological indicators of skeletal dysfunction. Third, **Safety Assessment:** A Visual-Semantic Embedding Network evaluates diagnostic compliance relative to critical anatomical and metabolic landmarks.
Results: The framework achieved a diagnostic accuracy of **89.4%** and demonstrated **95.2%** sensitivity in identifying high-risk thresholds for bone and joint failure. Implementation led to a **19%** acceleration in diagnostic timelines and a **22%** reduction in secondary complications compared to conventional standards.
Conclusion: By synthesizing molecular data with real-time imaging, this AI-driven framework offers a robust roadmap for precision-based orthopedic medicine, facilitating proactive and individualized therapeutic care.

P1619

INTRA-RATER RELIABILITY OF QUANTITATIVE SENSORY TESTING IN INDIVIDUALS WITH KNEE OSTEOARTHRITIS

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Objectives: Reliability of QST in knee osteoarthritis (OA) remains under-examined. This study aimed to determine the intra-rater reliability of thermal and pressure QST parameters, following the DFNS protocol, in individuals with knee OA.

Material and methods: A test–retest reliability study was conducted with 22 adults with clinically diagnosed knee OA. Two identical QST sessions, 24 hours to 14 days apart, were completed by the same trained examiner. Testing was performed at the area of maximal pain on the affected knee and at a contralateral foot control site. Measures included cold detection threshold (CDT), warm detection threshold (WDT), cold pain threshold (CPT), heat pain threshold (WPT), and pressure pain threshold (PPT). Intraclass correlation coefficients [ICC(3,1), 95% CI] were calculated. Ethical approval was obtained from Ulster University.

Results: Participants had a mean age of 64.7 years (SD 12.6); 72.7% were female. Preliminary analyses showed ICCs at the knee ranging from moderate to excellent: CDT 0.78 (0.55–0.91), WDT 0.36 (−0.48–0.41), CPT 0.78 (0.52–0.90), WPT 0.64 (0.28–0.84), and PPT 0.88 (0.73–0.95). At the control site, ICCs were generally higher: CDT 0.97 (0.92–0.99), WDT 0.74 (0.46–0.89), CPT 0.92 (0.82–0.97), WPT 0.78 (0.53–0.91), and PPT 0.85 (0.65–0.94). Variability was greater in temperature detection thresholds than in pain thresholds.

Conclusions: Preliminary findings indicate that the DFNS protocol can be applied consistently in people with knee OA. Pressure pain thresholds demonstrated the highest intra-rater reliability, while thermal pain thresholds showed moderate to good reliability. These results support the feasibility of QST for future mechanistic and sensory profiling research in OA.

Disclosures: No conflicts of interest.

P1620

THE COMBINED PREDICTIVE VALUE OF QUANTITATIVE SENSORY TESTING AND PSYCHOLOGICAL FACTORS ON TOTAL KNEE ARTHROPLASTY OUTCOMES: A SYSTEMATIC REVIEW

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Objectives: To synthesise evidence on whether combining pre-operative Quantitative Sensory Testing (QST) with psychological measures improves prediction of post-operative pain, function, or quality of life following total knee arthroplasty (TKA).

Material and Methods: Systematic searches of Medline, Embase, CINAHL, Scopus, PsycINFO and OpenGrey identified studies assessing adults undergoing primary TKA with pre-operative QST and psychological assessments and outcomes ≥6 months post-surgery. Two reviewers performed screening, extraction, and risk-of-bias assessment using QUIPS. Certainty of evidence was rated with GRADE. Due to heterogeneity in QST protocols, psychological measures, and outcome definitions, findings were synthesised narratively.

Results: Eight studies (n=1,405) met inclusion criteria; five evaluated combined predictive models. Combinations such as conditioned pain modulation with catastrophising, or temporal summation with anxiety, produced modest improvements in prediction compared with individual factors, typically explaining 9–20% of variance in post-operative pain or function. Predictive accuracy remained limited (AUC ≤0.70). Evidence was inconsistent, with very low certainty due to methodological variability, small samples, and risks of confounding.

Conclusions: Current evidence provides limited support for the combined use of QST and psychological measures to predict post-TKA outcomes. Although certain combinations show potential, existing models remain weak and inconsistent. Standardised QST procedures, consistent psychological instruments, and robust prognostic modelling are needed to clarify their joint value and determine whether integrated assessments can meaningfully support pre-operative risk stratification.

Disclosures: The authors report no conflicts of interest.

P1621

ADVANCING BONE HEALTH IN PREGNANCY: EVIDENCE FROM THE POI PROJECT USING REMS TECHNOLOGY

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Objective(s): Pregnancy-related osteoporosis is characterised by increased bone loss and higher risk of fragility fractures, especially during the third trimester and the early stages of breastfeeding. However, the use of ionizing diagnostic methods has limited early diagnosis. This study aimed to monitor changes in bone mineral density and skeletal fragility during pregnancy and breastfeeding using the Radiofrequency Echographic Multi Spectrometry (REMS) technology integrated with clinical and nutritional data.

Materials and Methods: This study was conducted within the framework of the "Progetto Osteoporosi in Gravidanza (POI)" project from different centres in Italy. The inclusion criteria were: healthy Caucasian women in their first trimester of pregnancy. At the time of recruitment (T1), all participants underwent REMS densitometric scans of the proximal femur and completed the Predimed and AFEF questionnaires developed by the Fragility Fracture Observatory (FFO, Italy), to collect information on dietary habits and skeletal risk factors. Participants were re-evaluated in the third trimester of pregnancy (T2) through REMS ultrasound scanning of the femoral neck and the Predimed and AFEF questionnaires. Densitometric changes were analysed using paired *t*-tests.

Results: A total of 156 healthy women in their first trimester was recruited for the study (mean age = 32.7 ± 5.3 years and mean BMI = 23.4 ± 4.2 kg/m²). Among these, 36% received a diagnosis of osteopenia (-1 < T-score < -2.5). To date, 28 patients have completed the follow-up at the third trimester. In this subgroup, a ~1.3% significant reduction in BMD was observed (BMD T1 = 0.767 ± 0.06 g/cm$^{2;}$ BMD T2 = 0.757 ± 0.07 g/cm^2; p = 0.01).

Conclusion(s): Although the study is ongoing, the results show that 36% of women received a diagnosis of osteopenia in the first trimester, with a tendency to worsen over time. The study highlights the importance of constant and early bone monitoring for preventive purposes in pregnant women. Thanks to its non-ionizing and accessible nature, REMS enables broad access to this patient group. Integrating nutritional assessment with REMS-based monitoring may support the development of a risk chart to prevent bone fragility during pregnancy and breastfeeding.

P1623

HYALURONIC ACID IN OSTEOARTHRITIS, MOLECULAR WEIGHT MATTERS

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Introduction: Osteoarthritis (OA) is a serious social and economic burden for the world's population. At the same time, knee joint OA (KJ) occupies one of the leading positions. Intra-articular injections of high-molecular hyaluronic acid are one of the well-known means of helping patients with OA KJ. However, there is little data in the literature on the effectiveness of such drugs, depending on the frequency of administration.

The purpose of the study: to evaluate the effectiveness of a single or double injection of a high molecular weight hyaluronic acid preparation with chondroitin sulfate in post-traumatic OA KJ

Materials and methods: We evaluated the treatment results of 61 patients with post-traumatic OA KJ. High molecular weight hyaluronic acid with chondroitin sulfate was injected into the knee joint cavity of all patients, 36 patients received a single injection and 25 received a double injection with an interval of 7 days. To evaluate the results, the pain intensity was determined on a visual analog scale (VAS) and the total score on a numerical rating scale (NRS) before the start of treatment, 1, 3, 6 and 12 months after the course of intraarticular injections of hyaluronic acid by telephone interview.

Results: The overall results were distributed and showed the following figures: pain during movement at baseline, after 2 weeks, 1, 3, 6, 12 months was 6,7±3,1, 4,0±3,2, 4,3±3,1, 4,6±2,8, 4,5±2,5, 5,3±1,4 see VAS. The pain at rest was 2,7±3,1, 1,5±2,6, 1,8±2,6, 2,1±2,6, 2,2±1,8, 2,6±1,3 see VAS. The function indicators at baseline, after 2 weeks, 1, 3, 6, 12 months were 4,9±3,6, 3,5±2,9, 4,2±2,9, 4,0±3,2, 3,5±2,7, 4,3±1,9 according to the NRS. In the first group, there are similar indicators: pain when moving 6,7±3,1, 4,0±3,2, 4,3±3,1, 4,6±2,8, 4,5±2,5, 5,3±1,4 See VAS, in peace 2,7±3,1, 1,5±2,6, 1,8±2,6, 2,1±2,6, 2,2±1,8, 2,6±1,3 see VAS, function 4,9±3,6, 3,5±2,9, 4,0±2,9, 4,0±3,2, 3,5±2,7, 4,3±1,9 according to the NRS. In the second group, pain during movement initially, after 2 weeks, 1, 3, 6, 12 months 5,6±2,1, 3,3±1,7, 3,6±1,8, 3,4±1,6, 3,7±2,4,3,0±1,2 See VAS, the pain is at rest 2,6±2,4, 1,9±1,7, 1,8±1,6, 1,8±1,7, 1,5±2,1, 0,6±1,0 see VAS, function 4,0±3,1, 3,3±2,6, 3,6±2,7, 3,4±2,6, 3,3±3,1, 2,6±1,7 according to the NRS.

Conclusions: A two-time injection of high molecular weight hyaluronic acid with chondroitin sulfate with an interval of 7 days has a higher effectiveness in reducing pain and increasing function.

P1624

THE USE OF VALGATING ORTHOSES IN DEFORMING OSTEOARTHRITIS OF THE KNEE JOINT

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Deforming osteoarthritis of the knee joint (OA KJ) with a predominantly hallux valgus angle has high rates of disability worldwide. The extensive possibilities of conservative therapy make it possible to delay surgical treatment. In recent years, orthotics have been actively complementing an integrated approach to the prevention and treatment of OA KJ. With deforming OA KJ with a predominance of varus deviation, unloading valgating orthoses are increasingly used. However, there is relatively little data in the literature on the use of functional, unloading (varus-valgus) orthoses.

The purpose of the study: To evaluate the effectiveness and safety of the use of an unloading, valgating orthosis in patients with OA 3st and varus deformity of the knee joint.

Material and methods: The study involved 20 patients with OA 3 st. and varus deformity of the KJ, 30.0% of them were men and 70.0% of women, average age 64.5±8.9 years, BMI 30±3.4. To confirm the stage and deformity of the KJ, all patients performed an X-ray under stress. The inclusion criteria were: Osteoarthritis of the knee joint stage III according to Kellgren-Lawrence, established according to clinical and X-ray examination, age from 45 to 85 years, visually analog scale (VAS) of pain ≥40mm. All patients used a functional, unloading (varus-valgus) orthosis for 3 months. The orthosis was adjusted four times every 7 days for 4 weeks. The result was evaluated 1 hour after using the orthosis in the clinic, as well as after 1-3 months, according to outpatient examination and card filling. The assessment was carried out by filling out the VAS and Knee Injury and Osteoarthritis Outcome Score (KOOS) questionnaires.

Result: According to the results of the assessment, 14 patients noted a significant decrease in pain intensity, but the dynamics of functional indicators was insignificant. The average pain and function indicators among all patients were: VAS initially 49.0±11.3, in the first hour of use 27.0±13.9, after 1 month. 18.0±9.7, after 3 months. 15.0±8.5. KOOS initially, after 1 and 3 months 48±10,3, 56,7±10,6, 60,0±10,6. No adverse reactions were observed with the use of a functional, unloading (varus-valgus) orthosis.

Conclusions: The relief (varus-valgus) orthosis significantly reduces the intensity of pain starting from the first hours of its use and maintains positive dynamics throughout the wearing of the orthosis, however, it does not affect the function of the joint.

P1625

PERIARTICULAR ADMINISTRATION OF LOW MOLECULAR WEIGHT HYALURONIC ACID IN RHEUMATIC DISEASES

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Rheumatic pathology of the periarticular soft tissues (RPPT), which includes tendinitis, enthesitis, fasciitis, is the cause of acute and chronic pain. Treatment of breast cancer is based on the combined use of nonsteroidal anti-inflammatory drugs, physiotherapy, rehabilitation, as well as local injection therapy (LIT), including the administration of hyaluronic acid (HA). However, there is relatively little data on the evaluation of the effectiveness of the use of LIT with HA in these pathologies.

The purpose of the study: to evaluate the efficacy and safety of LIT HA 500-730 kDa in patients with various RPPT.

Material and methods: The study included 30 patients with various types of RPPT (subacromial impingement syndrome (SIS), lateral/medial epicondylitis, plantar fasciitis), 10 people with each pathology. (40.0% of men and 60.0% of women, age 56.1±14.9 years). All patients underwent LIT with the use of low-molecular-weight HA in the subcutaneous region for 3 injections with an interval of 7 ± 2 days. The inclusion criteria were: Age ≥ 18 years, diagnosed by clinical and instrumental parameters (MRI) of RPPT: SIS, lateral/medial epicondylitis, plantar fasciitis, moderate or severe pain (≥40 mm on a visually analog pain scale, VAS 0-100) for more than 3 months, insufficient effect from previous therapy with glucocorticoids, the need for regular administration of nonsteroidal anti-inflammatory drugs. The result of the treatment was assessed after 1 and 3 months according to a telephone survey. The study was approved by the local ethics committee.

Result: On the background of treatment, we received the following results: with SIS, your baseline, after 1 and 3 months, was 57,5 ±15,8, 37,5±13,8, 33,7± 14,0, ASES is initial, after 1 and 3 months. 54,2±13,7, 64,5±10,3, 65,5±9,8. With lateral epicondylitis, VAS initial, after 1 and 3 months. made up 54,0 ±13,4, 35,0±9,7, 34,0± 11,0, The Mayo Elbow questionnaire was initial, after 1 and 3 months. It was compiled 72,0 ±11,5, 79,2±9,0, 82,7± 7,7. In plantar fasciitis, the initial VAS after 1 and 3 months was 60.0 ±16.5, 36.6±19.3, 34.4± 15.8. Functional index of the foot at baseline, after 1 and 3 months. Compiled 47,2%±22,8, 39,6%±29,7, 39,0%±29,9. During the study, no adverse reactions were observed during the LIT.

Conclusions: Low molecular weight LIT GLCs are an effective and safe method of treating breast cancer of various localization.

P1626

MODERN APPROACHES TO REHABILITATION AFTER LIGAMENTOUS INJURIES OF THE KNEE JOINT

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Objective: Ligamentous injuries of the knee joint (ACL, PCL, MCL, LCL) represent a significant proportion of sports-related trauma and are a leading cause of long-term instability and dysfunction. Despite extensive surgical and conservative methods, meta-analyses indicate a persistent rate of unsatisfactory outcomes (10-25%), including re-injuries, development of post-traumatic osteoarthritis, and incomplete functional recovery. This review aims to analyze contemporary evidence-based rehabilitation protocols, their efficacy, and selection criteria to optimize patient outcomes.

Material and Methods: A systematic literature search was conducted in PubMed, Cochrane Library, and Google Scholar databases for the period 2015-2025. Keywords included: "knee ligament rehabilitation," "ACL rehabilitation protocol," "neuromuscular training," "cryotherapy," "electrostimulation." Inclusion criteria were randomized controlled trials (RCTs), systematic reviews, and clinical guidelines. A total of 47 relevant publications were selected for analysis.

Results: Modern rehabilitation is based on principles of early protected mobilization and criterion-based progression, tailored to the type of injury, treatment (conservative/arthroscopic reconstruction), and individual patient goals (return to sport/activities of daily living). Early Postoperative/Post-Traumatic Phase (0-6 weeks): The focus has shifted from passive Continuous Passive Motion (CPM) therapy, whose efficacy remains debated, towards edema and pain control (RICE protocol, cryotherapy), restoration of full extension, and quadriceps activation using neuromuscular electrical stimulation (NMES). NMES has demonstrated superiority over voluntary exercise alone in overcoming arthrogenic muscle inhibition. Strength and Proprioception Restoration Phase (6-12 weeks and beyond): Therapeutic exercise progresses from closed to open kinetic chain exercises, advancing from isometric to concentric and eccentric loading. Hydrokinesiotherapy is utilized not only in later stages but also early on to facilitate movement in a reduced-gravity environment. A critical component is proprioceptive and neuromuscular training (balance exercises, unstable surfaces), which significantly reduces the risk of re-injury. Return-to-Activity Preparation Phase (4-9 months): Biofeedback (BFB) training devices are used to correct movement patterns, while mechanotherapy (isokinetic dynamometers) provides objective assessment of strength deficits. Massage is primarily employed as an adjunct for soft tissue management.

Conclusions: Effective rehabilitation requires a strict criterion-based progression and an individualized approach, focused on current functional capacity rather than fixed calendar timelines. Protocols incorporating early neuromuscular electrical stimulation (NMES), eccentric training, and mandatory proprioceptive-neuromuscular components have the strongest evidence base for efficacy. The success of rehabilitation should be measured by objective benchmarks—not merely a "return to prior function"—including a limb symmetry index >90% (isokinetic testing), successful functional performance tests (e.g., hop tests), and psychological readiness (e.g., ACL-RSI scale). Promising future directions include the use of telemedicine and wearable sensor technology for monitoring adherence and load management in outpatient settings.

P1627

CHRONIC PURULENT SACROILIITIS MIMICKING ANKYLOSING SPONDYLITIS: A CASE REPORT HIGHLIGHTING DIAGNOSTIC PITFALLS

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Objective: Ankylosing spondylitis (AS) is a common cause of inflammatory back pain and sacroiliitis. However, infectious processes, such as purulent sacroiliitis, can present with similar clinical and radiographic features, leading to misdiagnosis and delayed treatment.

Objective: To present a challenging clinical case of chronic purulent sacroiliitis initially misdiagnosed as AS and to discuss key differential diagnostic features.

Case Presentation: A 24-year-old male presented with chronic inflammatory low back pain, morning stiffness, and evening fever (up to 38°C). History included significant back trauma in 2025. Initial workup revealed elevated acute-phase reactants (ESR 55 mm/h, positive CRP). Radiographs and CT scan demonstrated bilateral sacroiliitis (asymmetric, right > left) and syndesmophyte formation in the lumbar spine, resembling a "bamboo spine" pattern. Based on imaging findings, a provisional diagnosis of AS was made.

Diagnostic Reevaluation: Despite meeting the modified New York criteria (1984) for AS radiographically, several atypical features prompted further investigation: 1) Marked asymmetry of sacroiliac involvement; 2) Unusual cystic and destructive bone changes on CT adjacent to the right sacroiliac joint; 3) Negative HLA-B27 antigen. Subsequent pelvic MRI revealed a right-sided chronic purulent sacroiliitis with a fistulous tract and a soft-tissue abscess in the gluteal region. The final diagnosis was corrected to chronic pyogenic sacroiliitis.

Conclusion: This case underscores the critical importance of differential diagnosis in patients with suspected AS. Atypical features such as highly asymmetric or unilateral sacroiliitis, prominent cystic/destructive changes on advanced imaging (CT/MRI), absence of HLA-B27, and presence of systemic symptoms like fever should serve as "red flags" prompting a search for alternative diagnoses, including infectious spondylodiscitis or sacroiliitis. MRI is the imaging modality of choice for identifying soft-tissue involvement and abscess formation. A multidisciplinary approach involving rheumatologists, radiologists, and surgeons is essential for accurate diagnosis and management.

P1628

THE ROLE OF NAILFOLD VIDEOCAPILLAROSCOPY IN ASSESSING THE RISK OF PULMONARY ARTERIAL HYPERTENSION AND DIGITAL ISCHEMIC COMPLICATIONS IN SYSTEMIC SCLEROSIS: A COMPARATIVE STUDY

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Objective: Pulmonary arterial hypertension (PAH) remains a leading cause of mortality in systemic sclerosis (SSc). Despite the shared pathogenesis of microvascular damage in SSc-associated PAH and Raynaud's phenomenon (RP), the predictive value of nailfold videocapillaroscopy (NVC) for PAH risk stratification remains debatable. The aim of our study was a comparative analysis of capillaroscopic patterns and the frequency of digital ischemic complications in SSc patients with and without PAH.

Methods: A single-center cross-sectional study included 116 patients meeting the 2013 ACR/EULAR criteria, divided into two groups: SSc-PAH (n=51) and SSc without PAH (n=65). PAH diagnosis was confirmed by right heart catheterization (mean pulmonary arterial pressure ≥25 mm Hg, pulmonary artery wedge pressure ≤15 mm Hg). All participants underwent standardized NVC of the 2nd–5th fingers of both hands. Capillaroscopic findings were classified qualitatively (normal, early, active, late scleroderma patterns according to Cutolo et al.) and semi-quantitatively (capillary density, presence of giant capillaries, microhemorrhages, avascular areas). History of RP, presence and time to onset of digital ulcers (DU), and severe ischemic complications (gangrene, amputation) were also analyzed.

Results: RP was present in 100% of patients in both groups. The distribution of scleroderma NVC patterns showed no statistically significant intergroup differences ($p>0.05$, χ^2 test): the late pattern was predominant in the SSc-PAH group (58.8% vs. 41.5% in the non-PAH group), early pattern – 33.3% vs. 24.6%, active pattern – 27.5% vs. 12.3%. The frequency of DUs was also comparable (49.0% in SSc-PAH vs. 49.2% in SSc without PAH; $p>0.05$). The median time from first SSc symptoms to DU development was 56 and 44 months, respectively ($p>0.05$). The frequency of severe ischemic complications (ischemia, gangrene, amputation) was low and did not differ between groups (9.8% vs. 12.3%; $p>0.05$).

Conclusions: Our study revealed no significant differences in capillaroscopic patterns or the nature of digital vascular complications between SSc patients with and without PAH. These findings suggest that standard NVC likely lacks independent prognostic value for the early detection of PAH in SSc patients. For PAH risk stratification, integrating NVC with other biomarkers (e.g., NT-proBNP levels, echocardiographic data, and lung diffusion function) is probably required. The search for specific capillaroscopic markers associated precisely with pulmonary vasculopathy in SSc represents a promising direction for future research.

P1629

THE INFLUENCE OF ANTHROPOMETRIC DATA ON THE RISK OF OSTEOPOROTIC HIP FRACTURES IN THE ELDERLY PATIENTS

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Objective: Osteoporosis is one of the most significant medical and social problems in gerontology, with low-energy fractures being its most severe complication. Among these, proximal hip fractures are distinguished by particularly high mortality, disability rates, and economic costs. Therefore, identifying modifiable risk factors for such fractures is a crucial task for prevention. Among the numerous risk factors for osteoporotic fractures, anthropometric indicators such as height, body weight, and body mass index (BMI) are considered key and easily assessable parameters. Low body weight and low BMI are believed to be associated with decreased bone mineral density and an increased risk of falls. However, the relationship between these indicators and the risk of hip fractures per se in the elderly, especially considering gender differences, requires clarification. Most research focuses on the female population, while data on men remain less studied.

Material and Methods: The study observed 96 women and men with osteoporotic hip fractures: of these, 56 (58.3%) were women and 40 (41.7%) were men. The control group consisted of 100 individuals: 53 (53.0%) women and 47 (47.0%) men. The patients' height and weight were measured. Body mass index (BMI) was assessed, calculated as weight divided by height squared (kg/m²). A BMI <20 kg/m² was considered low, and low body weight was defined as less than 57 kg. Weight loss of more than 10% from weight at age over 25 was considered. A questionnaire was completed by a physician during a personal or telephone interview.

Results: The average weight of women was 66.7 [62.4; 75.8] kg in the fracture group and 72.13 [67.2; 75.7] kg in the control group. It was shown that women in the hip fracture group had a statistically significantly lower body weight than women in the group without fractures (67.8 and 72.03 kg, respectively, p=0.001). BMI in the fracture group was statistically significantly lower than in the control group (25.49 [22.6; 28.33] and 27.27 [26.1; 28.2], respectively, p=0.0001).

The average weight of men was 78.9 [73.0; 87.3] kg in the fracture group and 78.6 [75.0; 85.1] kg in the control group, with no significant differences between the groups (p=0.9). It was found that men in the hip fracture group had a statistically significantly greater height than those in the group without fractures (176.2 cm and 171.4 cm, respectively, p=0.003). BMI differed statistically significantly between men with fractures and men in the control group (25.41 [23.5; 27.2] and 27.48 [26.1; 28.8], respectively, p=0.0001).

Conclusions: Thus, in the group of individuals with osteoporotic hip fractures, anthropometric data (BMI) were statistically significantly lower than in the control group for both male and female patients.

P1630

CARDIAC RHYTHM AND CONDUCTION DISORDERS IN PATIENTS WITH SERONEGATIVE SPONDYLOARTHRITIS: PREVALENCE AND RISK FACTORS

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Objectives: Cardiovascular involvement is a well-known extra-articular manifestation of seronegative spondyloarthritis (SpA), including ankylosing spondylitis (AS) and psoriatic arthritis (PsA). The relationship between electrocardiographic (ECG) changes, disease activity, HLA-B27 status, and the potential impact of drug therapy remains a subject of research.

Material and Methods: A cross-sectional study included 120 patients with SpA (78 with AS, 42 with PsA; 83 men, 37 women) and 129 control subjects without rheumatologic, inflammatory bowel, or psoriatic diseases (60 men, 69 women). The control group was older on average. All participants underwent clinical examination, laboratory tests (ESR, CRP), ECG, and echocardiography. Statistical analysis was performed using Statistica 11.0 with Mann-Whitney U, Kruskal-Wallis, Fisher's exact tests, and Spearman's correlation. P-values <0.05 were considered significant.

Results: Rhythm and conduction disorders were detected in 48 SpA patients (40.0%; 95% CI 31.5-49.0%) and in 39 controls (30.2%; 95% CI 22.7-38.8%), but the difference was not statistically significant (p=0.113). Notably, ventricular extrasystoles were significantly more frequent in the SpA group (4.2% vs 0%, p=0.025). First- and second-degree atrioventricular (AV) block was found in 10 SpA patients (8.3%; 95% CI 4.5-14.7%), with three cases of 2nd-degree block requiring pacemaker implantation. No significant association was found between ECG abnormalities and gender (p=1.000), HLA-B27 status (p=0.184), disease activity (high activity: 76.5% vs 71.2%, p=0.698), ESR (p=1.000), or CRP (p=0.791). The prevalence did not differ significantly between AS (41%) and PsA (35.7%) subgroups (p=0.856). Arterial hypertension (AH) was significantly more common in SpA patients with arrhythmias compared to those without (p=0.048). A weak positive correlation was found between PQ interval duration and both patient age (r=0.3, p=0.0005) and body weight (r=0.3, p=0.001) in the SpA group only. No significant influence of the type of therapy (NSAIDs only: 17%, conventional synthetic DMARDs: 44%, biologic DMARDs: 44%) on the development of conduction disorders was established, though these groups were not comparable at baseline.

Conclusions: Cardiac conduction disorders, particularly AV blocks, are common in patients with SpA, affecting approximately 40% in this cohort. The presence of arterial hypertension may be an additional risk factor for arrhythmias in this population. No association was found with HLA-B27, disease activity, or inflammatory markers. The observed correlation of PQ interval with age and weight in SpA patients requires further investigation. Study limitations include the age and sex mismatch between groups and the non-randomized nature of treatment allocation.

P1631

FEATURES OF SUBCLINICAL MYOCARDIAL INVOLVEMENT IN PATIENTS WITH PSORIATIC ARTHRITIS: A COMPARATIVE ECHOCARDIOGRAPHIC STUDY

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Objective: Psoriatic arthritis (PsA) is a chronic immune-mediated inflammatory disease associated with systemic inflammation, which confers an independent risk of cardiovascular disease (CVD). Current evidence indicates an increased prevalence of diastolic dysfunction and altered left ventricular (LV) geometry in PsA patients. However, the pattern of myocardial involvement, particularly of the right heart, in PsA remains understudied.

Material and Methods: This single-center comparative study included 55 patients: Group 1 – 37 patients with PsA (mean age 56.8±10.9 years); Group 2 – 18 patients with plaque psoriasis without arthritis (61.2±12.8 years). Exclusion criteria: coronary artery disease, atrial fibrillation, chronic heart failure (NYHA class II-IV), severe arterial hypertension (>180/110 mm Hg), diabetes mellitus. All participants underwent transthoracic echocardiography (Vivid E95, GE) with assessment of LV and RV systolic and diastolic function, including pulsed-wave and tissue Doppler imaging. Statistical analysis was performed using StatTech v. 4.8.11. The Mann-Whitney U test and χ^2 test were used for group comparisons. A p-value <0.05 was considered statistically significant.

Results: The groups were comparable in terms of sex, body mass index, and traditional CVD risk factors (p>0.05). Patients with PsA showed significant impairment of RV diastolic function: the tricuspid E peak was lower (47 [41.5-56] vs. 57.5 [54.3-61.3] cm/s; p<0.001), and the A peak was higher (47 [42-53] vs. 36.5 [34.5-43.8] cm/s; p=0.032), resulting in a decreased E/A ratio (1.04 [0.79-1.28] vs. 1.52 [1.37-1.54]; p<0.001). In the PsO-only group, signs of concentric LV remodeling were more common: increased interventricular septum thickness, LV posterior wall thickness, and LV mass index (p<0.05). The frequency of concentric LV hypertrophy was 92.3% in the PsO group vs. 45.9% in the PsA group, where the eccentric form predominated (54.1%; p<0.001). LV diastolic dysfunction was less frequent in the PsA group (13.5% vs. 38.9%; p=0.043).

Conclusions: Patients with PsA exhibit a distinct pattern of myocardial involvement characterized by predominant RV diastolic dysfunction and eccentric LV hypertrophy geometry. In contrast, patients with psoriasis alone more frequently demonstrate concentric LV remodeling and a higher prevalence of LV diastolic dysfunction. These differences may reflect the diverse impact of chronic inflammation in these conditions on myocardial remodeling processes and warrant further investigation considering cardiovascular risk factors and anti-inflammatory therapy.

Disclosures: All authors declare no conflict of interests.

P1632

SERUM FIBROBLAST GROWTH FACTOR 21 (FGF21) LEVEL IN RELATION TO CONSTITUTIONAL FACTORS AND COMORBIDITY IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Objective: Fibroblast Growth Factor 21 (FGF21) is a hepatokine/myokine acting as an endocrine metabolic regulator. It plays a crucial role in glucose and lipid metabolism, particularly under conditions of metabolic stress. In chronic inflammatory and metabolic diseases, including type 2 diabetes mellitus (T2DM) and obesity, circulating FGF21 levels are often elevated, which is interpreted as a compensatory response or the development of tissue resistance to its action. In rheumatoid arthritis (RA), a disease associated with systemic inflammation and high cardiometabolic risk, the role of FGF21 remains insufficiently studied, and available data are contradictory. The relationship between FGF21 levels and constitutional factors (age, BMI) and comorbidity in RA patients has not been systematically investigated.

Material and Methods: A cross-sectional study included 95 female patients with RA diagnosed according to the 2010 ACR/EULAR criteria. Exclusion criteria were: trauma or surgery within the last 3 months, acute infectious diseases, oncological pathology, and decompensated somatic conditions. Men were excluded to eliminate gender as a confounding factor. The median (interquartile range, IQR) age was 49.2 (36.7-71.7) years, disease duration was 8.9 (3.9-18.6) years, and BMI was 27.1 (25.0-31.8) kg/m². Rheumatoid factor and anti-CCP antibodies were present in 70.5% and 64.2% of patients, respectively. Statistical analysis was performed using non-parametric methods: data are presented as Me [Q1-Q3]; Spearman's rank correlation coefficient (ρ) was used to assess relationships between variables; the Mann-Whitney U test was used for intergroup comparisons. A p-value <0.05 was considered statistically significant.

Results: A significant positive correlation was found between serum FGF21 levels and body weight (ρ=0.56; p<0.0001) and BMI (ρ=0.59; p<0.0001). The correlation with age showed a trend towards significance (ρ=0.20; p=0.057). A weak but significant negative correlation was observed between FGF21 levels and RA duration (ρ=-0.22; p=0.041). Patients with comorbid T2DM (n=12) had significantly higher median FGF21 levels compared to non-diabetic patients: 1651.0 pg/mL vs. 724.0 pg/mL, respectively (p=0.026). Furthermore, FGF21 levels in the T2DM subgroup exceeded the upper limit of the reference range.

Conclusions:

The strong positive correlation of serum FGF21 with BMI in RA patients confirms the role of adipose tissue as a key target and potential source of this hormone in chronic inflammation.

The identified negative correlation with RA duration requires further investigation in longitudinal studies. It may reflect a specific dynamic of FGF21 production during the progression of RA, potentially indicating an exhaustion of adaptive metabolic responses.

The significant increase in FGF21 in RA patients with T2DM aligns with

the concept of FGF21 resistance in metabolic disorders. Elevated FGF21 in this comorbidity may serve as a biomarker of pronounced metabolic dysfunction.
This study highlights FGF21 as a potential link between RA, metabolic syndrome, and comorbidity, underscoring the importance of assessing metabolic status in the management of RA patients.

P1633

METHODS OF IMAGING DIAGNOSIS IN ANKYLOSING SPONDYLITIS: THE ROLE OF MAGNETIC RESONANCE IMAGING

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Objective: Ankylosing spondylitis (AS) is characterized by the slow progression of structural changes in the sacroiliac joints (SIJ) and spine, leading to delayed radiographic diagnosis. Magnetic resonance imaging (MRI) allows for the visualization of active inflammatory changes (bone marrow edema) at early stages, preceding the formation of erosions, sclerosis, and ankylosis.
Material and Methods: The study included 84 patients with AS (median age 27 years [IQR: 22-35], median symptom duration 3 years [IQR: 1-6]). All patients underwent pelvic radiography. MRI of the SIJ was performed in 80 (95.2%) patients, and spinal MRI in 68 (81.0%). The control group consisted of 10 patients with other joint pathologies. MRI was performed on a Philips Multiva 1.5 T scanner. The stage of sacroiliitis on radiographs was assessed according to the modified New York criteria. Active sacroiliitis on MRI was diagnosed according to ASAS criteria based on the presence of bone marrow edema in typical subchondral areas of the SIJ, detected on STIR/T2-FatSat sequences or post-contrast T1-weighted images. Structural changes (erosions, sclerosis, ankylosis, fat metaplasia) were also evaluated.
Results: Bilateral sacroiliitis (stage II-III) was detected in 62 (73.8%) patients, unilateral (stage III) in 6 (7.1%). Active sacroiliitis on MRI was diagnosed in 65% of patients in the main group. Structural changes of the SIJ (erosions, sclerosis, ankylosis, fat metaplasia) were found in 65% of patients. In the control group, active inflammatory changes in the SIJ were absent. No statistically significant correlation was found between the severity of clinical symptoms and the presence of active inflammation on MRI of the SIJ ($p>0.05$). The specificity of MRI signs of active inflammation in our sample was 100%, although they were predominantly identified in patients with already established radiographic sacroiliitis.
Conclusions: MRI is a highly specific method for detecting both active inflammation and structural damage in AS. Its high diagnostic value is confirmed by its inclusion in the modern ASAS classification criteria. The lack of a direct correlation between MRI activity and clinical symptoms emphasizes the role of imaging as an objective assessment tool. To verify early (pre-radiographic) axial spondyloarthritis, a prospective selection of patients with a shorter disease duration is required.

P1634

ASSOCIATION OF TNFAIP3, TNFA, CTLA-4, BAFF, KCNS1, AND STAT4 GENE POLYMORPHISMS WITH TREATMENT RESPONSE IN RHEUMATOID ARTHRITIS PATIENTS SWITCHING BETWEEN BIOLOGICAL AND TARGETED SYNTHETIC DMARDS

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Objective: Personalizing therapy for rheumatoid arthritis (RA) remains a pressing challenge. A promising approach is identifying genetic predictors of response to biological (bDMARDs) and targeted synthetic (tsDMARDs) disease-modifying antirheumatic drugs, particularly in patients who failed prior targeted therapy.
Material and Methods: 94 RA patients (85.1% female, mean age 47.2±13.8 years) with moderate/high disease activity (DAS28-CRP 5.38±0.90) who switched from an ineffective b/tsDMARD to an agent with a different mechanism of action. Therapy distribution: TNF-α inhibitors – 12 (12.8%), IL-6R inhibitor – 27 (28.7%), rituximab – 46 (48.9%), JAK inhibitors – 9 (9.6%). Outcome assessment: At 24 weeks, treatment response was evaluated using DAS28-CRP and EULAR criteria. Patients were categorized as responders (EULAR good/moderate response and/or DAS28-CRP ≤3.2) or non-responders (no EULAR response, DAS28-CRP >3.2). Genetic analysis: Genotyping was performed by real-time PCR. Statistical analysis: Associations were assessed using multivariate logistic regression adjusted for age, sex, baseline DAS28-CRP, and RF/ACPA seropositivity. Results are presented as odds ratios (OR) with 95% confidence intervals (CI).
Results: Responder and non-responder groups (n=47 each) were comparable in key clinical and demographic parameters. After adjustment for confounders, independent associations were found:
Risk of non-response: Carriage of the T allele of TNFAIP3 rs10499194 (CT+TT genotypes) (OR=2.84; 95% CI: 1.23–6.56; p=0.013) and the T allele of STAT4 rs7574865 (GT+TT genotypes) (OR=3.18; 95% CI: 1.36–7.46; p=0.007).
Factors for better response: Carriage of the minor T allele of BAFF rs9514828 (CT+TT genotypes) (OR=0.25; 95% CI: 0.10–0.66; p=0.004) and the minor G allele of KCNS1 rs734784 (AG+GG genotypes) (OR=0.29; 95% CI: 0.12–0.74; p=0.008).
For TNFA rs1800629, a multiplicative model was significant (G vs A allele: OR=3.12; 95% CI: 1.10–9.03; p=0.037). For *CTLA-4* rs231775, a superdominant model was significant (AA+GG vs AG genotypes: OR=2.60; 95% CI: 1.14–6.25; p=0.022).
Conclusions: In this study, polymorphisms in TNFAIP3 (rs10499194), BAFF (rs9514828), KCNS1 (rs734784), and STAT4 (rs7574865) genes were identified as potential independent genetic markers of treatment response after switching b/tsDMARD classes in RA. These findings require validation in independent, larger cohorts and may contribute to developing personalized treatment selection algorithms in the future.

P1635

COMPARATIVE ANALYSIS OF SPONTANEOUS AND INDUCED MONOCYTIC EXTRACELLULAR TRAP FORMATION IN RHEUMATOID ARTHRITIS AND OSTEOARTHRITIS: PATHOGENETIC AND DIAGNOSTIC ASPECTS

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Objective: Dysregulation of innate immunity plays a key role in the pathogenesis of rheumatoid arthritis (RA) and osteoarthritis (OA). Recently, particular attention has been paid to the formation of monocytic extracellular traps (METs). In contrast to the relatively well-studied neutrophil extracellular traps (NETs), the mechanisms of MET formation (METosis) and their contribution to inflammation chronicity in RA and OA remain insufficiently studied. A comparative analysis of spontaneous and induced METosis depending on disease activity may contribute to understanding the pathogenetic differences between autoimmune (RA) and degenerative-inflammatory (OA) processes, as well as to the search for new differential diagnostic markers.

Material and Methods: The study included 37 RA patients (ACR/EULAR 2010 criteria), 35 OA patients, and 33 conditionally healthy donors (control). RA patients were in remission at inclusion (DAS28 ≤ 2.6), OA patients were not in an exacerbation phase. During follow-up, 17 (45.9%) RA patients developed active disease (DAS28 >3.2), and 25 (71.4%) OA patients developed synovitis flare-up. Peripheral blood monocytes were isolated by density gradient centrifugation using iodixanol (1.068 g/mL) according to an originally modified protocol. Cell viability and population purity were assessed using trypan blue staining and Romanowsky-Giemsa staining. METosis was induced by phorbol 12-myristate 13-acetate (PMA, 100 nM). MET formation was quantified by fluorescence microscopy using Sytox Green. Statistical analysis was performed using STATISTICA 11. Results are presented as median and 95% confidence interval (CI). Differences between groups were assessed based on the absence of 95% CI overlap.

Results: The rates of spontaneous and PMA-induced METosis were significantly higher in RA and OA patients compared to the control group (5.5% [4.3-6.7] and 18.1% [15.4-20.8], respectively). In RA remission, values were 8.7% [8.3-9.1] and 26.2% [24.5-27.9], while in active RA they reached 18.1% [17.8-18.4] and 38.2% [38.0-38.4]. In OA patients without flare-up, the rates were 7.9% [7.1-8.7] and 21.7% [19.2-24.2], and during synovitis – 15.0% [14.5-15.5] and 30.2% [28.1-32.3]. Upon disease activation, the relative increase in spontaneous METosis was more pronounced than that of induced METosis: +108.1% vs. +45.8% in RA and +89.9% vs. +39.2% in OA. The ratio of spontaneous to induced METosis levels was higher in active RA (2.8) than in exacerbated OA (2.3).

Conclusions: The obtained data indicate a significant increase in MET formation, especially spontaneous, in active RA and OA, confirming the involvement of METosis in the pathogenesis of chronic inflammation. The more pronounced dynamics of spontaneous METosis in RA likely reflect fundamental differences in innate immune activation in autoimmune versus degenerative joint diseases. MET parameters, particularly the ratio of spontaneous to induced forms, may be considered as promising auxiliary markers for differential diagnosis and disease activity assessment. Further studies accounting for anti-inflammatory therapy are required to evaluate METs as a potential therapeutic target.

P1636

THYROID NODULES AND SUBCLINICAL HYPOTHYROIDISM ARE COMMON IN ARMENIA

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Objectives: Bone health is heavily influenced by thyroid condition, and Armenia historically faced endemic goiter due to iodine insufficiency. This is now alleviated by widespread fortification of salt, however it is remains unknown if this has influenced the prevalence of thyroid hormone, antibody, or ultrasound abnormalities.

Material and Methods: Between Dec 2022 and Apr 2025, we randomly selected participants in a population-weighted geographical distribution representing all provinces of the Armenia. All underwent thyroid ultrasound on site, and blood was obtained for TSH (with reflex to free T4) and TPO or TRAb as indicated. A subset underwent TPO screening regardless of TSH level. The study was approved by the IRB of Columbia University and the Ethics Committee of Yerevan State Medical University.

Results: A total of 2170 participants from 64 sites were enrolled (71% female, average age 47), of which 102 were excluded from analysis for missing data. Mean TSH of the middle 90% of female participants was 2.52. Of all female participants, 23 (1.57%) had low TSH; overall prevalence of Graves' autoimmune hyperthyroidism was 0.27%. Of all female participants, 215 (14.68%) had elevated TSH, of whom 44 (3.00%) had low FT4 and the overall prevalence of Hashimoto's autoimmune hypothyroidism was 2.39%. Mean TSH of the middle 90% of the male participants was 1.93. Of the male participants, 6 (1.00%) had low TSH and 47 (7.79%) had high TSH; overall prevalence of Graves' was 0.17% and of Hashimoto's was 1.49%. Nodules were noted in nearly 40% of all participants, with enlarged thyroid in 6.00%. There was no significant relationship between age and TSH, age and thyroid size, or TSH and size among the men or women. Of the 1557 randomly screened, 20.17% had elevated TPO, and of those, only 10.51% (2.12% of the total) had clinically significant Hashimoto's.

Conclusion: Subclinical hypothyroidism is common among women in Armenia as is the presence of thyroid nodules, however the prevalence of clinically relevant thyroid dysfunction and autoimmune thyroid disease is reassuringly low, approximately on par with prior large epidemiologic studies in other countries.

P1637

RELATIONSHIP OF LIPOPOLYSACCHARIDE BINDING PROTEIN LEVEL WITH DISEASE ACTIVITY ON THE DAS28 SCALE IN PATIENTS WITH GOUT

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Objective: To analyze the relationship of lipopolysaccharide binding systems (LBPs) in the development and maintenance of inflammation in gout.
Materials and methods: Blood sampling was performed in patients with gout and the level of LBP in the blood plasma of 42 patients with gout was studied. The LBP concentration in plasma was measured by solid-phase enzyme immunoassay (ELISA) using Cloud Clone Corp. kits. (Hubei, China). Statistical data analysis was performed using IBM SPSS Statistics 26 software.
Results:A statistical analysis of the data of patients with gout revealed a significant positive correlation between the level of lipopolysaccharide-binding protein (LBP) and the degree of disease activity on the DAS28 scale (Spearmen correlation coefficient r = 0.61, p < 0.001; n = 38). The average LBP level was 14.18 ng/ml [10.87; 17.4], and the average DAS28 index was 4.1 [3.3; 5.1]. These data may indicate an association of systemic inflammatory activity with impaired barrier function and increased exposure to lipopolysaccharides in patients with gout, which confirms the pathogenetic significance of LBP as a potential biomarker of disease activity. The identification of a significant correlation between LBP and DAS28 highlights the prospects for further research on the role of endotoxinemia in the formation of severe forms of gout and may contribute to the search for new therapeutic targets.
Conclusion: The study showed that the level of lipopolysaccharide-binding protein (LBP) in patients with gout significantly correlates with the activity of the disease on the DAS28 scale. The revealed dependence confirms the involvement of endotoxin-limiting systems in maintaining chronic inflammation in gout and highlights the pathogenetic relationship between LBP and gout activity. The results obtained allow LBP to be considered not only as a potential biomarker of disease activity, but also shows that a disease such as gout has a multifactorial etiology.

P1638

THE EFFECTS OF TIBIAL FRACTURE MODELING AFTER 60-DAY ADMINISTRATION OF SODIUM BENZOATE OR TARTRAZINE ON THE MICROELEMENTAL COMPOSITION OF THE MANDIBULAR RAMUS IN WHITE RATS

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Objective of the study was to establish changes in the micro elemental content of the mandible of white rats with tibial defect (TB) after 60-day administration of sodium benzoate (SB) or tartrazine (TTZ).
Material and methods. 210 white rats weighing 200–210 g, were divided into 6 groups: group 1 — control; groups 2 and 3 — rats that received SB intragastrically in dosage of 1000 mg/kg/day or TTZ in dosage of 1500 mg/kg/day; group 4 — rats with a defect in the tibia. Groups 5 and 6 — rats with defect in the tibia after the end of the challenge. The content of copper and manganese in the ramus of mandible was determined using atomic two-photon absorptiometry.
Results. In group 2, the copper content from day 3 to day 24 decreased by 6.87-16.99%, and the manganese content from day 10 to day 45 decreased by 6.30-12.72%. In group 3, from day 3 to day 45, the copper content was lower than that of group 1 by 5.04-17.61%, and the manganese content decreased by 6.51-10.69%. In group 5, the manganese content by days 10 and 15 decreased by 7.54% and 8.51%, and the copper content by days 15 and 45 decreased by 8.02% and 4.78%. In group 6, the copper and manganese content from day 10 to day 45 was lower than the values of group 3 by 5.12%, 7.42%, 5.70% and 5.66%, and by 6.93%, 8.50%, 9.82% and 7.78%.
Conclusion. Exposure of experimental animals to SB or TTZ is accompanied by depletion of the microelement composition of the mandible. Damage to the TB against this background is accompanied by an aggravation of the identified changes.

P1639

THE OSTEOPOROSIS CARE SITUATION – A QUALITATIVE STUDY ON CLINICAL ERRORS OF PHYSICIANS IN SOUTHERN GERMANY

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Objectives: The persistent osteoporosis care gap poses a significant healthcare challenge. In this qualitative interview study, physicians' clinical errors in the diagnosis and treatment of osteoporosis, as well as the possible reasons and causes, were categorized and analyzed.

Material and Methods: From June 2020 to November 2021 interviews with 30 physicians involved in osteoporosis care were conducted. Using a semi-standardized guideline, the physicians were surveyed on the diagnosis and treatment of osteoporosis. The primary source for the questionnaire was the DVO guideline 2017 (current at data collection). Transcription was done according to Dresing and Pehl. The qualitative content analysis was performed using the approach by Kuckartz and was computer-aided by the qualitative analysis software MAXQDA.

Results: The final category system formed the thematic structure of the analysis steps. In total, the system comprised approximately 92 individual categories, distributed across up to six hierarchical levels. Clinical errors were categorized as diagnostic errors, therapeutic errors, and faulty base for decision-making and corresponding subcategories. The analysis revealed pronounced heterogeneity in the care processes and the associated expert knowledge.
47% of the 30 respondents had not read the current osteoporosis guideline at the time of the survey. Of the 16 respondents who had read the guideline, 31% stated that the guideline was incomprehensible and too complex for application. This was also reflected in the coding frequency. The most frequently coded diagnostic errors were insufficient knowledge of: (1) risk profile (93%) and (2) basic diagnostic recommendations (87%).
Regarding therapeutic errors, these were inaccurate knowledge of: (1) side effects and consequences (90%), (2) specific treatment indications (77%), (3) follow-up (73%), and (4) incorrect context generation and interpretation (63%).

Systemic causes of the care gap were found, among others, insufficient DXA cost coverage and budgeting for specific medications. Systemic diagnostic errors included unclear responsibilities and inefficient processes.

Conclusions: Inadequate knowledge base and the subsequent misapplication or omission of guideline recommendations contribute to the deficient provision of osteoporosis care.

Overly complex guidelines complicate practical implementation and serve as a deterrent. The results of this study can inform research on clinical errors in osteoporosis and develop new approaches for revising guidelines and training concepts.

P1640

A TAXONOMY OF CLINICAL ERRORS IN OSTEOPOROSIS CARE – RESULTS OF A PROSPECTIVE QUALITATIVE STUDY IN SOUTHERN GERMANY

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Objectives: The osteoporosis care gap is a worldwide phenomenon with inadequate treatment decisions leading to underdiagnosis and suboptimal therapy. The aim of this study was to categorize and analyze clinical errors (diagnostic and therapeutic errors) made by physicians in the context of osteoporosis care and develop a taxonomy that incorporates clinical and therapeutic reasoning, while synthesizing on pre-existing models and delve deeper into aspects of therapeutic reasoning.

Material and Methods: From June 2020 to November 2021 interviews with 30 physicians from 12 medical fields involved in osteoporosis care were conducted. Using a semi-standardized guideline, the physicians were surveyed on the diagnosis and treatment of osteoporosis. Transcription was done according to Dresing and Pehl. Qualitative content analysis was performed using the approach by Kuckartz and was computer-aided by the qualitative analysis software MAXQDA.

Results: The developed category system was an adaptation on pre-existing studies and medical malpractice definitions in Germany. It was further modified to the gathered qualitative data. Among the new categories developed in this study: (1) faulty base for decision making with subcategories (1.1) relying on external opinions and (1.2) gut feeling/personal experience, (2) organizational diagnostic error: unclear responsibilities, (3) systemic therapeutic errors with (3.1) budgeting influences drug selection, (4) therapeutic faulty context generation and interpretation: meshing of osteoporosis and oncological therapy (therapeutic misidentification), (4.1) issues with implementing the guideline in treatment, (5) error of omission with (5.1) no regular dental checkups. Code-Relations Models revealed, inter alia, an interference between faulty data gathering in diagnostics and faulty therapeutic knowledge regarding the risks, side effects, and consequences of specific osteoporosis medications.

Conclusions: Clinical errors in osteoporosis care are multifactorial, encompassing both diagnostic and therapeutic errors. A comprehensive understanding of the underlying causes and reciprocal relationships requires an integrated consideration of the two. The identified dominant problems involved cognitive (faulty knowledge and implementation) and systemic factors in diagnostic and therapeutic processes.

This study is one of the first to build on pre-existing models and its categorical framework is foundational for the refinement of therapeutic reasoning and its applicability across other medical fields.

P1641

TREATMENT OF OSTEOPOROSIS IN THE FIELD OF RHEUMATOID ARTHRITIS

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Background. Individuals with RA are at increased risk of developing osteoporosis. Chronic inflammation associated with RA, medications used to treat the disease, particularly prednisone and other corticosteroid ("steroids") drugs, all contribute to this risk. Inadequate intake or absorption of bone-building calcium, and less exercise due to fatigue and pain, may contribute to reduction in bone formation, bone mineral fractures due to osteoporosis than the average population, as well as a 40% increase in hip fractures, as well as loss of height and periodontal bone loss (loss of bone around the teeth in the jaw and skull).
Objectives. This study aims to identify the risk of fractures of osteoporosis in patients with RA with a prolonged treatement with corticosteroids. On the other hand we will evaluate how Osteoporosis has changed under treatment with Alendromat.
Methods. The study included 68 cases presented at the Rheumatology ward, QSUT and Trauma Hospital Tirana, Albania who had been under systematic treatment with AIJS for some time and have developed fractures due to Osteoporosis. Cases has been taken from patient with AR witch have developed fractures due to Osteoporosis.
Results. In the sample taken in the study, it was found 82 % (56) of the patients with AR developed Osteoporosis. It is known that the usage for a prolonged time of AIJS increase the risk of these condition. From this, 89% (61) patients have developed fractures due to Osteoporosis.52% (30) patients have fracture of bachin, 32% (18) patients developed fracture of toracal colon, 28% (16) patients fracture of femur. After the treatment with bisphosphonate (Alendronat) for more than 3 years it was seen that there was a significant improvement in the reduction of fractures. We have a reduction in the number of cases with fractures over 68% (38) patients of the cases that had developed at least one such before. At the same time in these patientis DEXA showed noticeable improvements.
Conclusions Loss of bone mineral density occurs naturally with the normal aging process. Rheumatoid arthritis and its treatment with corticosteroids can increase an individual's chance of developing a low bone mineral state such as osteopenia or osteoporosis.
Screening tests to identify poor bone mineralization are important along with treatment with Alendronat. Conservative measures such as diet, supplements, exercises and fall prevention are all important to include in a bone-healthy lifestyle. We have a reduction in the number of cases with fractures over 68% (38) patients of the cases that had developed at least one before.
Key words: *Reumatoid Arthritis, Osteoprosis, AIJS, Fracture, bisphosphonate (Alendromat)*

P1642

RELATIONSHIP BETWEEN EPIGENETIC AGE ACCELERATION AND PHYSICAL FUNCTION IN OLDER ADULTS WITH SARCOPENIA

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Objective: to evaluate biological age acceleration (BAA) using two DNA methylation (DNAm)–based epigenetic clocks (GrimAge and PhenoAge) and to examine the associations between DNAmderived epigenetic clocks measures and physical functioning in older adults with and without sarcopenia.
Materials and Methods: A total of 238 participants were included: 64 communitydwelling older adults aged 65–96 years with sarcopenia (men n=20; women n=44) and 174 controls aged 65–75 years (men n=80; women n=94). Sarcopenia was defined according to EWGSOP2 criteria. Body composition and physical function (handgrip strength, gait speed) were assessed. DNA was extracted from blood leukocytes using the PureLink Genomic DNA Mini Kit. DNA was bisulfiteconverted using the Zymo EZ DNAm kit and analyzed with the Illumina Infinium MethylationEPIC v2.0 array, generating methylation data across ~850,000 CpG sites. DNAm-based epigenetic age was calculated in RStudio using the dnaMethyAge package and two validated clocks: PhenoAge and GrimAge. BAA was defined as the residual from regressing epigenetic age on chronological age, representing individual deviation from expected biological aging.
Results: No significant differences in BAA were found between sarcopenia and control groups using PhenoAge (p=0.225) or GrimAge (p=1.000). In the sarcopenia group, gait speed ranged 0.368–0.872 m/s, handgrip strength 4.00–28.67 kg, and muscle mass index 4.50–8.72 kg/m². BAA was not associated with gait speed or muscle mass index in either model. However, in the GrimAge model, BAA showed a significant positive association with handgrip strength (r=0.277, p=0.04). These differences may reflect the distinct orientations of the models: PhenoAge captures physiological aging processes, whereas GrimAge is more strongly linked to systemic biological aging and mortality risk.
Conclusion: Biological age acceleration estimated by PhenoAge and GrimAge did not differ significantly between older adults with and without sarcopenia, suggesting that accelerated epigenetic aging was not directly associated with sarcopenia in this sample. Although GrimAgebased biological age acceleration was positively associated with handgrip strength, this relationship likely reflects the broader systemic and mortalityrelated components captured by GrimAge rather than direct links to muscle function.
This project has received funding from the Research Council of Lithuania (LMTLT), agreement No S-MIP-22-36.

P1643

THE INFLUENCE OF THE C-159T POLYMORPHISM OF THE CD14 GENE ON THE CLINICAL MANIFESTATION OF ANKYLOSING SPONDYLITIS AND THE FORMATION OF CARDIOVASCULAR RISK

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Objective: To evaluate the role of the C-159T polymorphism of the CD14 gene on the disease course and cardiovascular risk (CVR) in ankylosing spondylitis (AS).

Materials and Methods: The study included 176 patients diagnosed with AS. Genotyping of the C-159T polymorphism of the CD14 gene was performed using polymerase chain reaction.

Results. Patients with the TT genotype had the lowest BASMI index at a statistically significant level (CC 5.0 [3.0; 6.0] vs. CT 5.0 [4.0; 8.0] vs. TT 4.0 [3.0; 5.0], p=0.014, p2.3=0.016. CC homozygotes had the lowest HDL level (CC 1.4 [1.1; 1.6] vs. CT 1.8 [1.3; 2.3] vs. TT 1.6 [1.5; 1.9], p=0.026).

Carriage of the C allele in both hetero- and homozygotes was associated with a higher incidence of spondylitis at a statistically significant level (CC 32 (42.1%) vs. CT 8 (36.4%) vs. TT 14 (18.9%), p1,3=0,003, p=0,008). TT homozygotes had the highest frequency of detection of radiographic stage 2 of sacroiliitis (CC 40 (52.6%) vs. CT 10 (45.5%) vs. TT 58 (78.4%), p2,3=0.036), while carriage of the C allele determined more pronounced radiographic changes in the form of 3 (CC 16 (21.1%) vs. CT 6 (27.3%) vs. CC8 (10.8%)) and 4 radiographic stages (CC 20 (26.3%) vs. CT 6 (27.3%) vs. TT 8 (10.8%), p2,3=0.049). TT homozygotes had the highest frequency of radiographic stage 0 coxitis (CC 14 (17.9%) vs. CT 0 (0.0%) vs. TT 16 (21.1%), p1.2=0.033, p2.3=0.019). While CT heterozygotes had radiographic stage 3 coxitis most often (CC 8 (10.3%) vs. CT 8 (36.4%) vs. TT 10 (13.2%), p1.2=0.004, p2.3=0.014). A significantly higher frequency of extraskeletal manifestations was recorded in CC homozygotes (CC 24 (30.8%) vs. CT 2 (9.1%) vs. TT 14 (8.4%), p1.2=0.041, p=0.05).

The frequency of detection of hypertension was lowest in patients with genotype CT (CC 26 (41.9%) vs. CT 2 (10.0%) vs. TT 32 (45.7%), p1.2=0.026, p2.3=0.005, p=0.014). Carriers of the CT genotype significantly more often had hyperuricemia (CC 6 (8.3%) vs. CT 6 (33.3%) vs. TT 8 (11.1%), p1.2=0.013, p2.3=0.049, p=0.014).

Conclusion. Identification of the C-159T SNP of the CD14 gene is useful in predicting the progressive course of AS, as well as the development of comorbid pathology associated with CVR.

P1644

THE IMPACT OF PHYSIOTHERAPY ON BONE MINERAL DENSITY IN WOMEN WITH POSTMENOPAUSAL OSTEOPOROSIS AFTER ONE YEAR OF TREATMENT

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Introduction: Osteoporosis is most common in post-menopausal women, due to loss of trophic support for bone tissue from sex hormones. Drug therapy decreases the risk of fracture, thus influencing on the mechanism of bone remodeling. Non-pharmacological interventions include specific exercises for osteoporosis that improve muscle strength and balance, decrease pain, maintains bone mineral density and improve quality of life.
Objective: To demonstrate the impact of physical therapy on bone mineral density (BMD) after one year of treatment.
Material and method: In the Clinic for Physical Medicine and Rehabilitation, Skopje we did a research on 90 patients with postmenopausal osteoporosis who were divided into three groups.The first group of 30 patients with exercise and physical modalities, the second group of 30 patients with exercise and the control group of 30 patients. BMD was determined by dual-energy x-ray absorptiometry BMI at admission and last control.
Results: Patients were with a mean age of 60.64±6.7 years. According to the level of education, patients with completed high school predominated (48.91%). Patients of the three groups did not differ significantly in terms of menopausal status (p=0,299), and for the number of risk factors present (p=0,444). Patients of the three groups did not differ significantly in BMI at admission and last control. The three groups of subjects didn't have significantly different BMD at the lumbar spine (p = 0.68, p = 0.72) and at the hip (p = 0.16, p = 0.06).
Conclusion: The time period for practicing the exercises is short for improving bone mineral density. However, research shows that it is important for maintaining it, which does not increase the risk of the consequences of osteoporosis.
Key words: physiotherapy, BMD, postmenopausal osteoporosis

P1645

THE INFLUENCE OF TIME FROM INJURY TO SURGERY OF ANTERIOR CRUCIATE LIGAMENT ON QUALITY OF LIFE

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The injury of anterior cruciate ligament (ACL) is one of the most common injuries in sport. Surgical treatment for these injuries is the most commonly used, because conservative treatment does not give adequate results. The aim of this study is to determine whether the time between the occurrence of ACL injury and the operation has an impact on quality of life.
This retrospective study included 791 participants who underwent the reconstruction of the ACL at the Clinic for Orthopedic Surgery and Traumatology of the Clinical Centre of Vojvodina. Based on the time from which injury occurred, participants were divided into 7 groups (0 – 3 months, 3 – 6 months, 6 – 9 months, 9 – 12 months, 12 – 24 months, 24 – 60 months, ⩾60 months). A questionnaire on the quality of life after the reconstruction of the anterior cruciate ligament was used to collect data. A statistically significant difference ($p = 0.000$; $p \leqslant 0.05$) was found between the impact of the injury on the quality of life and the time between injury and reconstruction. Significant increase in Tegner score was observed in relation to time from injury to surgery, while in Lysholm score there was no statistically significant difference between groups. A statistically significant difference between the groups exists in the associated injury ($p = 0.000$; $p \leqslant 0.05$). The most common joint injury is medial meniscus injury, except in the group where the subjects have been operated after more than 60 months after the injury, where the most common is the injury of both meniscuses.
A statistically significant difference exists in the return time to running, training, and competitive activity, where patients who have previously been operated have returned to these activities faster. BMI score increases with time between injuries and surgery.

P1646

SINGLE-STAGE MINCED CARTILAGE REPAIR: CLINICAL IMPROVEMENT DESPITE INCOMPLETE EARLY MRI MATURATION

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Objective
To prospectively evaluate the short- and mid-term clinical outcomes of single-stage repair of knee articular cartilage defects using minced cartilage combined with fibrin glue.
One of the major challenges in the treatment of medium and large chondral defects is the selection of an optimal treatment strategy, which should be based not only on defect size but also on the presence of additional risk factors and associated lesions.
Materials and Methods
The outcomes of 27 patients (n = 27) with grade III–IV chondral lesions of the medial femoral condyle according to the ICRS classification were evaluated. Cartilage defects were assessed using MRI (1.5 T) and arthroscopic examination. Defect repair was performed using autologous minced cartilage fixed with fibrin glue.
MRI assessment of repair tissue maturation was conducted at 6 months postoperatively using the MOCART score. Clinical outcomes were evaluated using the KOOS and Lysholm scoring systems preoperatively and at 3, 6 and 12 months after surgery.
Results. A total of 27 patients were included, with a mean age of 37.96 ± 6.29 years; 15 patients (56%) were female and 12 (44%) male. The mean body mass index (BMI) was 27.92 ± 3.08 kg/m².
All patients presented with ICRS grade III–IV cartilage defects of the medial femoral condyle: grade III in 15 patients (55.6%) and grade IV in 12 patients (44.4%). The mean defect size was 2.44 cm² (range 1.3–3.5

cm²). Smoking was reported in 8 patients (29.6%).
The mean KOOS score improved from 65.3 ± 2.62 preoperatively to 70.04 ± 2.39 at 3 months, 73.2 ± 2.5 at 6 months, and 77.26 ± 2.63 at 12 months postoperatively (p = 0.006).
The Lysholm score increased from 67.6 ± 5.21 preoperatively to 75.14 ± 4.9 at 3 months, 81.07 ± 5.24 at 6 months, and 85.92 ± 3.59 at 12 months (p = 0.011).
Significant clinical improvement was observed between preoperative and 3-month postoperative assessments for both the Lysholm (p = 0.001) and KOOS (p = 0.001) scores.
The mean MOCART score at 6 months was 55.56 ± 4.46, indicating incomplete maturation of the repair tissue at this time point.
Correlation analysis revealed a significant moderate positive correlation between defect size and BMI (r = 0.58, p = 0.002), suggesting a negative impact of increased body weight on cartilage defect size. A significant moderate negative correlation was found between defect size and the 6-month MOCART score (r = −0.52, p = 0.005).
Conclusion. Single-stage minced cartilage repair with fibrin glue demonstrates favorable clinical and MRI outcomes in small to medium-sized knee cartilage defects. Further studies are required to evaluate long-term results and the applicability of this technique in large chondral defects.

P1647

LIMITATIONS OF BONE MINERAL DENSITY AND FRAX FOR FRACTURE RISK ASSESSMENT IN A DIABETIC PATIENT ON ANDROGEN DEPRIVATION THERAPY

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Introduction: Androgen deprivation therapy (ADT) is a well-recognized cause of rapid bone loss and increased fracture risk. Although FRAX is often recommended for fracture risk assessment, it does not account for ADT and therefore underestimates risk. No validated FRAX adjustments for ADT exist.
Case report: A 74-year-old man with type 2 diabetes mellitus, treated with basal insulin, vildagliptin, and pioglitazone, had been receiving ADT for metastatic prostate cancer over the previous 14 months, with a favorable oncologic response. Dual-energy X-ray absorptiometry was performed. His height was 187 cm, weight 85 kg, and lumbar spine, total hip, and femoral neck T-scores were 0.2, −0.4, and -0.3, respectively, with a femoral neck bone mineral density (BMD) of 0.828 g/cm². FRAX using only BMD (secondary osteoporosis is already accounted for in the FRAX model when BMD is included) showed low fracture probabilities: 10-year major osteoporotic fracture (MOF) risk of 2.7% and hip fracture risk of 0.7%. When rheumatoid arthritis as a surrogate risk factor was added to BMD, FRAX estimates increased modestly (MOF: 3.6%; hip fracture: 1.0%). When the FRAXplus adjustment for diabetes duration of more than 10 years was applied, the MOF risk increased to 4.6% and the hip fracture risk to 1.9%. Only when FRAX was calculated without BMD but including secondary osteoporosis (hypogonadism), slightly higher risks were observed (MOF: 6.2%; hip fracture: 3.1%). Taking into account high-risk comorbidities, the patient was administered a single dose of zoledronate. Nevertheless, he sustained a hip fracture 8 months later, never recovered, and died two months thereafter.
Conclusion: This case aligns with findings from large series showing that BMD-derived FRAX indicated lower fracture risk in men with prostate cancer compared to FRAX without BMD. Osteoporosis assessment in ADT is a significant clinical challenge. Although BMD measurements and FRAX estimates are included in some oncology guidelines, they should be used only for basic bone assessment. Treatment decisions should not rely on them, as men receiving ADT may be at high fracture risk even with normal BMD. Emerging evidence underscores the importance of clinical judgment and suggests that timely, likely preventive, and more aggressive therapeutic strategies may be warranted.

P1648

SURGICAL MANAGEMENT OF SEVERE CRANIOFACIAL HYPEROSTOSIS IN A WOMAN WITH A HIGH BONE MASS DISORDER

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Background
High-bone-mass phenotypes associated with impaired sclerostin signaling provided the basis for the development of romosozumab, yet these disorders lack disease-modifying therapy. Management of severe generalized hyperostosis remains symptom-driven and may require complex surgical intervention.
Case presentation
A female patient presented at age 30 after an incidental finding of generalized skeletal hyperostosis. Imaging revealed cortical thickening of long bones, sclerotic vertebrae, hypertrophic metatarsal, metacarpal, and phalangeal bones, homogeneous cranial hyperostosis, and enlarged facial bones. Lumbar and hip bone mineral density was markedly elevated (Z-scores +10 to +13). Digital deformities suggested a sclerosteosis-like phenotype, although genetic testing did not identify a causative mutation. Intracranial volume was reduced without cranial nerve impairment. After an 8-year gap, progressive complications developed, including exophthalmos, torus palatinus, severe nasal obstruction, and obstructive sleep apnea. Occipital bone thickness reached 35 mm without evident intracranial compression. The first surgical procedure included bilateral remodeling of the orbital rims, floors, and roofs; extensive mandibular body osteotomy with tangential cortical reduction and reshaping; and widening of the nasal airway from the piriform aperture to the choanae. Two years later, a second procedure was performed to correct residual deformities, which involved additional bilateral mandibular cortical remodeling and contouring of the orbital roofs. During further follow-up, the patient reported hearing deterioration, intermittent facial paresthesia, persistent headaches responsive to nonsteroidal anti-inflammatory drugs, residual sleep apnea, and uncontrolled arterial hypertension. Brain MRI showed parenchymal impression without cerebellar tonsillar herniation.
Conclusion
Craniofacial surgery can provide functional benefit by alleviating airway obstruction and orbital compression. However, persistent symptoms and radiological findings of limited intracranial reserve underscore the constraints of surgical intervention, warranting long-term multidisciplinary surveillance.

P1649

EVALUATION OF BONE HEALTH AFTER CANCER DIAGNOSIS: GAPS IN BONE MINERAL DENSITY ASSESSMENT AND IMPLICATIONS FOR CLINICAL CARE

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Background: Cancer-induced bone loss (CIBL) is a frequent complication of malignancy and its treatments, yet skeletal risk assessment remains inconsistently implemented in routine care. Real-world data describing bone mineral density (BMD) evaluation across unselected cancer populations are limited.

Objectives: To evaluate utilization, timing, and results of dual-energy X-ray absorptiometry (DXA) following a new cancer diagnosis in a large real-world cohort.

Methods: We conducted a retrospective cohort study including adults with a first cancer diagnosis between 2015 and 2024 treated within a large private healthcare network in Israel. DXA performance, timing relative to diagnosis, cancer type, sex, and BMD outcomes were analyzed. Osteopenia and osteoporosis were defined using WHO criteria based on the lowest T-score across measured sites.

Results: Among 21,112 patients (mean age 60.2 ± 13.1 years; 77% women), only 7,496 (35.5%) underwent DXA at any time following cancer diagnosis, and early assessment within 6 months was uncommon (7.3%). DXA utilization was markedly lower in men than in women (15.0% vs. 41.7%) and varied substantially by cancer type, being highest in breast (42.2%) and prostate cancer (30.0%), while remaining below 15% in most other malignancies. Median time from cancer diagnosis to DXA was 14.8 months. Among patients undergoing DXA, 59.7% already had abnormal BMD: 45.2% osteopenia and 14.5% osteoporosis.

Conclusions: In real-world oncology practice, BMD assessment after cancer diagnosis is infrequent, delayed, and strongly influenced by sex and cancer type rather than overall skeletal risk. The high prevalence of low bone mass at first DXA suggests missed opportunities for early identification and prevention of CIBL. These findings support more systematic integration of bone health evaluation into oncology and survivorship care pathways.

Figure 1. DXA Utilization by Cancer Type

Legend: Proportion of patients undergoing DXA assessment following cancer diagnosis, stratified by cancer type. **Hematologic malignancies were identified using an organ-based classification and may be under-ascertained.*

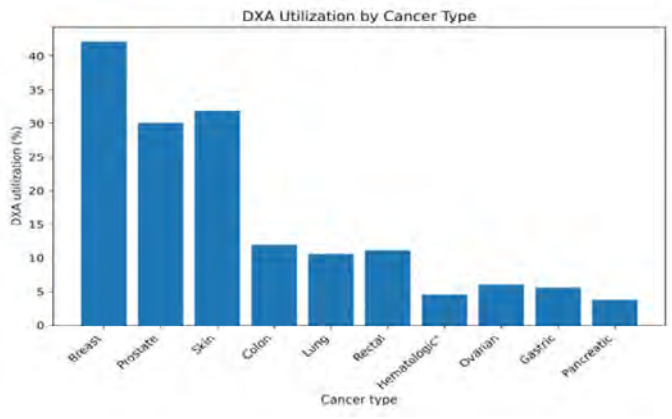
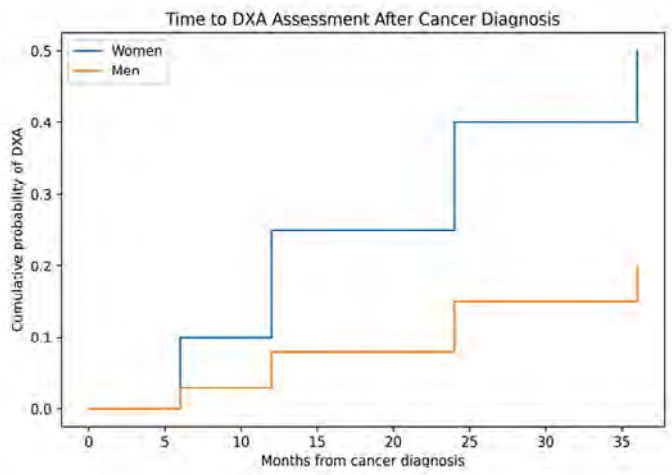


Figure 2. Time to DXA Assessment after Cancer Diagnosis

Legend: Kaplan–Meier curve showing cumulative incidence of DXA assessment following cancer diagnosis, stratified by sex.



P1650

UNRECOGNIZED SKELETAL FRAGILITY IN MEN AGED ≥70 YEARS: REAL-WORLD EVIDENCE FROM SYSTEMATIC DXA SCREENING

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Background: Osteoporosis screening guidelines for men remain inconsistent internationally, with the 2025 U.S. Preventive Services Task Force concluding that evidence is insufficient to recommend for or against screening, specifically citing lack of real-world prevalence data from systematic screening programs. Most existing prevalence estimates derive from small epidemiologic studies or clinic-based samples subject to selection bias. We evaluated the real-world prevalence of low bone mineral density (BMD) in men aged ≥70 years using data from the largest systematic screening initiative ever reported.

Methods: We analyzed DXA examinations performed between 2014-2024 at Assuta Medical Centers using GE Lunar densitometers, within a large Israeli integrated healthcare organization (Maccabi Health Services, 2.5 million members). An alert-based systematic screening initiative was implemented whereby primary care physicians received computerized prompts for all male patients aged ≥70 years without prior osteoporosis diagnosis or recent DXA testing. This approach approximates systematic screening implementation while preserving clinical decision-making. BMD was measured at lumbar spine and hip using standardized GE Lunar protocols and classified by T-score per World Health Organization criteria: osteoporosis (≤-2.5), osteopenia (-1.0 to -2.5), or normal (≥-1.0). Demographic and clinical characteristics including age, body mass index (BMI), smoking status, and diabetes prevalence were analyzed by BMD category. Analyses were performed per DXA examination and stratified by age (70–75, 75–80, ≥80 years). The cohort represents a screening-dominant, age-eligible population, although individual referral indications could not be fully ascertained.

Results: Among 57,433 DXA examinations in men aged ≥70 years, 39,779 had complete data allowing classification by the lowest T-score across all sites. Using this conservative definition, 48.8% met criteria for osteopenia and 18.3% for osteoporosis, such that 67.1% demonstrated low BMD. Men aged 70–75 years comprised the majority of examinations (n = 26,378). In this key screening-eligible group, 49.3% were osteopenic and 15.5% met criteria for osteoporosis using the lowest-site definition. Osteoporosis prevalence increased progressively with age, reaching 20.6% at ages 75–80 and 29.4% among men aged ≥80 years. Using the hip-based femoral neck definition, osteoporosis prevalence was more moderate but remained clinically meaningful: 13.8% at ages 70–75, 19.2% at 75–80, and 27.8% at ≥80 years, confirming a substantial burden of clinically relevant skeletal disease already present at the lower boundary of screening age. After excluding DXA examinations with indications suggestive of prior fracture, malignancy, or chronic glucocorticoid use, hip-based osteoporosis prevalence was approximately 11% among men aged 70–75 years, increasing to ~15–16% at ages 75–80 and ~22–24% among men aged ≥80 years.

Table: Prevalence of Osteoporosis by Age Group and Diagnostic Definition (Screening-Enriched Estimates After Excluding Likely Clinical Referrals)

Age group (years)	DXA exams included*	Hip-based osteoporosis (femoral neck)	Osteoporosis by lowest T-score (all sites)
70–75	~21,000	~10.5–11.0%	~13–14%
75–80	~6,600	~15–16%	~19–20%
≥80	~3,900	~22–24%	~27–29%
Overall ≥70	~31,500	~12–13%	~16–18%

*DXA examinations remaining after conservative exclusion of records with indications suggestive of **prior fracture, malignancy, or chronic glucocorticoid use**, based on referral text, diagnoses, and medication fields.

Conclusion: In this large real-world cohort of DXA examinations in men aged ≥70 years, low bone mass was highly prevalent regardless of definition. Importantly, a substantial burden of osteopenia and osteoporosis was already evident among men aged **70–75 years**, the population most relevant for screening decisions. By providing large-scale, age-stratified data from a systematic, age-based screening context, these findings directly address the evidence gap identified by the USPSTF and support reconsideration of osteoporosis screening strategies in older men.

P1651

HIP AXIS LENGTH ADDS INDEPENDENT INFORMATION BEYOND BMD FOR PREVALENT FRAGILITY FRACTURE IN POST-MENOPAUSAL WOMEN REFERRED FOR DXA

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Objective(s):
To determine whether hip axis length (HAL) from hip structural analysis is independently associated with prevalent fragility fracture beyond bone mineral density (BMD) and clinical predictors in post-menopausal women referred for DXA.
Material and Methods:
Retrospective observational cohort of post-menopausal women undergoing DXA (June 2014-October 2024). Data were anonymised routinely collected NHS DXA service records from a DXA scanner in the North West of England; research ethics approval was obtained. Outcome was prevalent fragility fracture (yes/no). Multivariable logistic regression included age, BMI, rheumatoid arthritis, current smoking, excess alcohol (>14 units/week), years since menopause, DXA abdominal fat percentage, IMD quintiles and BMD. Parallel models compared L1-L4, femoral neck and total hip BMD because fracture-risk estimates vary by skeletal site. HAL (mean of left/right) was added to each model. Effects were per SD (BMD per SD decrease, HAL per SD increase). Discrimination was assessed using AUROC.
Results:
Among 4,078 women, prevalent fragility fracture was 46.7%. In complete cases with HAL (n=2,692), longer HAL was independently associated with fracture in the spine model (aOR 1.16, 95% CI 1.07-1.25, p=0.000295),

with consistent associations in femoral neck (aOR 1.14, 95% CI 1.05-1.23, p=0.00121) and total hip models (aOR 1.11, 95% CI 1.03-1.20; p=0.00802). Lower BMD remained strongly associated across sites (aOR per SD decrease: spine 1.41, 95% CI 1.29-1.53, femoral neck 1.39, 95% CI 1.27-1.52, total hip 1.43, 95% CI 1.30-1.58, all p≤1.5×10⁻¹²). Adding HAL modestly improved discrimination (AUROC spine 0.608 to 0.614, femoral neck 0.605 to 0.611, total hip 0.610 to 0.614).

Conclusion(s):

HAL provided independent and incremental information beyond BMD and traditional predictors in a real world DXA cohort, supporting consideration of selected hip geometry measures to complement BMD based fracture risk assessment. Prospective validation using incident fracture outcomes is required to confirm clinical utility.

Disclosures: None.

Table 1. Adjusted associations and discrimination with and without HAL. ORs are adjusted per SD (BMD per SD decrease, HAL per SD increase).

Model	n	BMD OR (95% CI)	HAL OR (95% CI)	AUROC base	AUROC +HAL
Spine	2692	1.41 (1.29-1.53)	1.16 (1.07-1.25)	0.608	0.614
Femoral neck	2692	1.39 (1.27-1.52)	1.14 (1.05-1.23)	0.605	0.611
Total hip	2692	1.43 (1.30-1.58)	1.11 (1.03-1.20)	0.610	0.614

P1652

EFFECTIVENESS AND SAFETY PROFILE OF DENOSUMAB VS ALENDRONATE. A COMPARATIVE STUDY

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Objective: We aimed to explore the comparative effectiveness and safety of denosumab and alendronate in the same group of patients with primary or secondary osteoporosis.

Material and Method: This is a retrospective cohort study, which included 120 patients diagnosed with osteoporosis through DEXA scan. The mean age of participants was 55.3(SD 2.4), ranging from 42 to 74 years old. Out of 120 patients,17 were male(14%) and 103 were female (86%). Out of 103 women included in the study,92 were postmenopausal women. All the patients were treated for the first two years with oral bisphosphonates, once a week(alendronate 70 mg). A DEXA scan was demanded every 12 months. Then another DEXA scan was performed after 1 year for all patients who were included later to receive denosumab.

Results: Out of 120,3 patients died during the first two years(old age, cardiovascular disease, autoimmune disease). Of the rest of 117 patients,35 patients(30%) after two years of treatment were then classified as osteopenia. To the other 82 patients, the therapy with alendronate didn't succeed in treating osteoporosis or was interrupted due to adverse events, mainly gastrointestinal (10 patients). Switching to denosumab 60 mg once every six months was proposed to all 82 remaining patients, and 75 accepted the medication. After two pre-filled syringes with Denosumab, a DEXA scan showed a better improvement of T-score compared to two years of alendronate. Also, no therapy interruption was observed.

Conclusion: The therapy with Denosumab 60 mg/ml, sc, showed better efficacy and safety than alendronate to the same group of patients regardless of the cause of osteoporosis or gender of the patients.

P1653

DYNAMIC ASSESSMENT OF VERTEBRAL FRACTURES IN CHILDREN WITH OSTEOGENESIS IMPERFECTA

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Objective: Osteogenesis imperfecta (OI) is one of the most common diseases associated with the primary osteoporosis in children. They often experience multiple vertebral fractures (VF). During childhood and adolescence, bone modeling prevails over remodeling, which allows the deformed vertebra to return to its original anatomical shape, the so-called reshaping. The aim of study was to evaluate the capabilities of the densitometric method in assessing VF in children with OI.

Methods. The study group of 67 children aged 11 (7; 13) years old, with established OI was examined. Anthropometry, general clinical examination, DXA with analysis of the spine using a program for vertebral fractures assessment (VFA) were performed. We used the Genant's classification. Statistical processing was performed using the program Statistica 10.0.

Results A total of 201 DXA-scanogram were evaluated with an interval of 12, 24 months between studies. A total of 37% (n=25) patients with OI had the VF. The most common localization of VF was the thoracic spine, specifically of the Th12 vertebra (n=12). In the subgroup of children with VF 17 (69%) patients had two or more at the same time. Over a two-year follow-up period, new VF were detected in 10% (n=7) of patients with no VF at baseline. Among children with existing deformities 12% (n=3) experienced progression of VF or the development of new VF in other spinal segments. However, some patients (n=4) (primarily those with grade 1 fractures) experienced an increase in vertebral height with restoration of their shape (reshaping), during bisphosphonate therapy.

Conclusion. The VFA densitometric assessment of the spine in patients with OI has high diagnostic potential in clinical practice. Furthermore, this method involves minimal radiation exposure (0.083 mSv), which is particularly important for children, and allows for a comprehensive assessment of bone mineral density and morphological changes in the vertebrae. VF are quite common (in 37% of patients with OI in our study) and are asymptomatic. Early diagnosis allows restoration of vertebral body structure during treatment. This phenomenon, unique to the pediatric skeleton, necessitates the inclusion of densitometric assessment of the VFA in the routine examination of such patients.

P1654

PATIENT PREFERENCES FOR TRACKER PIN–RELATED INCISION CONFIGURATIONS IN ROBOTIC-ASSISTED TOTAL KNEE ARTHROPLASTY

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Objective: Robotic-assisted total knee arthroplasty (TKA) requires tracker pin placement, which may result in different incision configurations, ranging from a single longer midline incision to a midline incision with additional stab incisions. Although clinical outcomes across pin placement strategies appear comparable, patient preferences regarding incision design remain unclear.
Methods: This cross-sectional observational study was conducted at a tertiary university hospital. A total of 101 patients with knee osteoarthritis were recruited consecutively. Three incision configurations related to tracker pin placement were presented using standardized lower-limb models: (A) all-inside (longest single midline incision), (B) femoral pin in–tibial pin out (medium-length midline incision plus two tibial stab incisions), and (C) pin outside (shortest midline incision plus four stab incisions). Participants rated their preference for each design using a 5-point Likert scale and selected a single preferred option. Cosmetic and recovery concerns were assessed using five Likert-scale items.
Results: The mean age was 63.8 ± 5.8 years, and 86.1% of participants were female. Among incision-related concerns, postoperative scarring received the highest ratings, followed by the importance of recovery time, whereas concern about incision length and the number of incisions were lower; perceived impact of incision size on postoperative confidence was intermediate. Preference scores showed a numerical ranking (all-inside 3.41 ± 1.27; femoral pin in–tibial pin out 3.05 ± 1.13; pin outside 2.81 ± 1.45) without a statistically significant difference ($\chi^2 = 5.52$, $p = 0.063$). When selecting a single preferred option, 46.5% chose the all-inside configuration, 25.7% selected femoral pin in–tibial pin out, and 27.7% selected the pin-outside configuration.
Conclusions: No clear differences in overall preference were observed among incision configurations. Patients may prioritize concerns related to postoperative scarring and recovery expectations over incision length or the number of incisions. Therefore, when multiple technically acceptable pin placement strategies are available, incision planning may reasonably be guided by surgeon preference and technical considerations.

P1655

PREVENTION AND TREATMENT OF OSTEOPOROSIS IN BREAST CANCER PATIENTS UNDERGOING ENDOCRINE THERAPY: A RECOMMENDED APPROACH AND OUR EXPERIENCE

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BACKGROUND: A significant adverse effect of long-term aromatase inhibitor (AI) therapy in patients with hormone receptor–positive (HR+) early non-metastatic breast cancer is bone loss leading to osteoporosis and fractures. Treatment initiation is traditionally based on a T-score ≤ −2.5 or manifest osteoporosis; however, most fractures occur in patients with osteopenia who are not treated until a fracture develops.
PURPOSE: To propose a management approach based on current European recommendations and our 10-year follow-up data.
METHODS: A total of 90 postmenopausal women with osteopenia treated with AI were prospectively followed over a 5-10-year period.
RESULTS: AI therapy causes significant and continuous bone mineral density (BMD) loss in the lumbar spine and hip, regardless of baseline BMD. A marked BMD decline during the first 1–2 years predicts further bone loss over the next 5 years. Baseline osteopenia (T-score < −1.5) combined with rapid BMD loss is associated with a higher incidence of osteoporosis during 5 years of AI therapy (21% vs. 3%). During treatment, 14 new low-trauma fractures occurred in 11 women (12%) without baseline osteoporosis or prevalent fractures. After 5 years of AI therapy, BMD loss is only partially reversible in the lumbar spine, while hip BMD remains unchanged. Prolonged AI therapy (>5 years) results in further hip BMD loss. Vitamin D deficiency is common, and supplementation is recommended. Early antiresorptive therapy prevented increased bone resorption and improved BMD compared with delayed treatment.
CONCLUSION: In non-osteoporotic patients treated with AIs, routine assessment of fracture risk and close monitoring throughout the duration of treatment are necessary. Timely initiation of antiresorptive therapy, even in patients with osteopenia or documented accelerated BMD loss, is essential to ensure effective prevention of bone loss.
Keywords: aromatase inhibitors, breast cancer, bone loss, fractures, osteoporosis management

P1657

DESCRIPTION OF THE FIRST FRACTURE LIAISON SERVICE IN MOROCCO: EXPERIENCE FROM THE MILITARY HOSPITAL OF RABAT – PRELIMINARY RESULTS -

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Background:
Fragility fractures represent a major public health issue due to the high risk of secondary fractures, associated morbidity, and economic burden. In Morocco, osteoporosis and its prevention remain largely neglected. Structured post-fracture care programs, internationally known as Fracture Liaison Services (FLS), exist in several countries, but no organized service had been implemented in Morocco until now. This study aims to describe the implementation of the first FLS in the country, at the Military Teaching Hospital of Rabat.
Methods:
This prospective observational study was conducted at the Military Teaching Hospital Mohammed V of Rabat from October 2025 to October 2026 and included patients aged ≥50 years with suspected fragility fractures. High-energy traumatic fractures and non-osteoporotic pathological fractures were excluded.
Patients were identified in the emergency, traumatology, and rheumatology departments through a nurse-led standardized questionnaire and referred to a dedicated one-day Fracture Liaison Service (FLS) clinic for rheumatological evaluation (Figure 1). All patients underwent bone mineral density (BMD) assessment and a phosphocalcic laboratory workup performed in the same laboratory. Osteoporosis was defined as a T-score ≤ −2.5, and vitamin D deficiency as serum 25-hydroxyvitamin D levels <21 ng/mL.

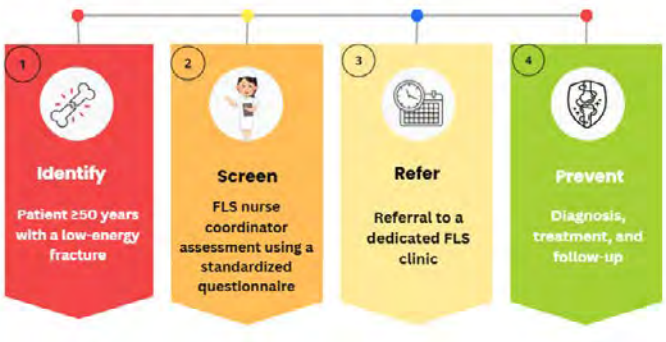


Figure 1. FLS identification pathway
Results:
To date, 80 patients have been reported to the FLS, of whom 50 had a confirmed fragility fracture. The median age was 67.5 years [61–76], with a female predominance (59.2%). Fractures mainly involved the hip, followed by the wrist, humerus, and vertebral column. Vertebral fractures were identified by lateral vertebral assessment (LVA) in 15 patients, with L3 being the most frequently affected vertebra. Eight patients had a history of prior fragility fractures.
Bone densitometry revealed osteoporosis in the majority of patients, while 10 had osteopenia. A vitamin D deficiency was observed in 20 patients, and vitamin D and calcium supplementation was initiated in 35 patients.
The median delay between index fracture occurrence and initiation of anti-osteoporotic treatment was 97.5 days [28–145]. Two patients refused therapy, one received teriparatide, and the remainder were treated with zoledronic acid.
Conclusion:
This study demonstrates the feasibility of implementing a Fracture Liaison Service in Morocco, enabling early identification of fragility fractures and providing a structured framework for secondary fracture prevention.

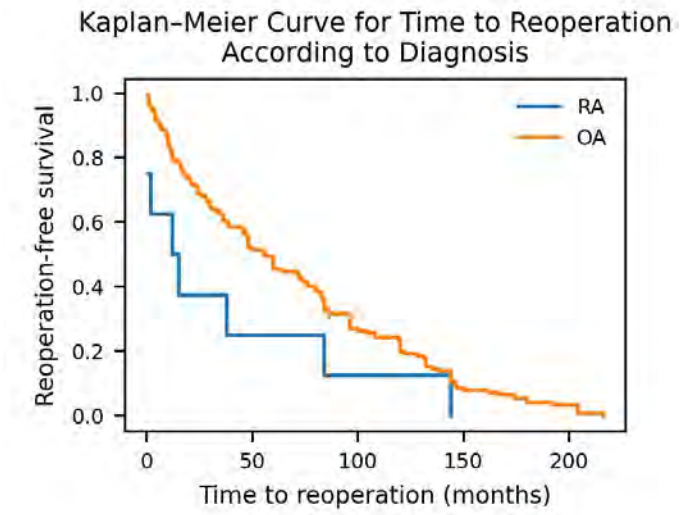
P1658

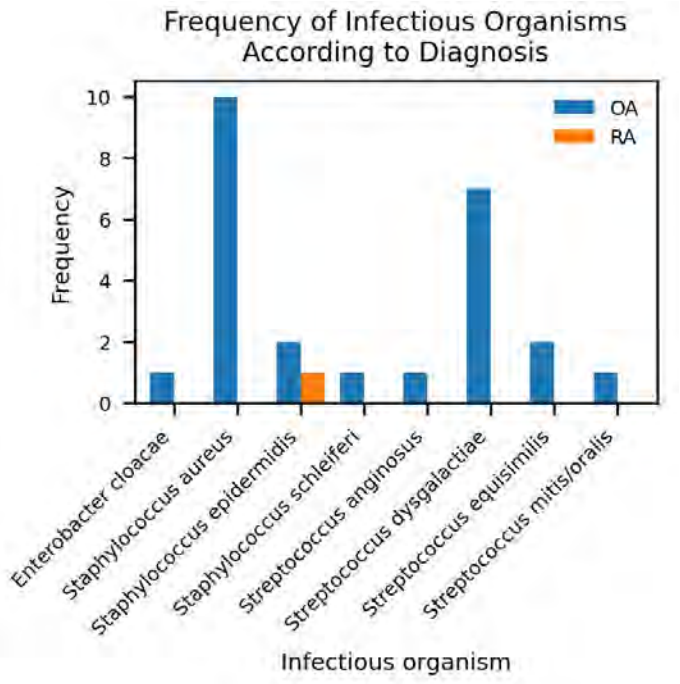
DIFFERENCES IN REOPERATION PATTERNS BETWEEN RHEUMATOID ARTHRITIS AND OSTEOARTHRITIS FOLLOWING TOTAL KNEE ARTHROPLASTY

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Objective
Total knee arthroplasty (TKA) is an established treatment for end-stage knee osteoarthritis (OA), while rheumatoid arthritis (RA), a systemic inflammatory disease, may also lead to progressive joint destruction requiring TKA. However, differences in reoperation patterns between patients with OA and RA remain unclear. The objective of this study was to investigate differences related to reoperation after TKA between patients with OA and those with RA.
Materials and Methods
This retrospective study included patients who underwent primary or revision TKA at a single tertiary university hospital between March 2003 and December 2022. Only patients with a confirmed diagnosis of RA or OA were included. Reoperation rates, causes of reoperation, microbiologically identified organisms, and time to reoperation were compared between the two groups using multivariable logistic regression, Kaplan–Meier survival analysis, and Cox proportional hazards models.
Results
A total of 5,245 patients were analyzed, including 157 patients with RA (3.0%) and 5,088 patients with OA (97.0%). Patients with RA were significantly younger than those with OA (69.8 ± 6.8 vs. 72.5 ± 6.4 years, $p < 0.001$) and had higher inflammatory markers, including ESR (43.5 ± 31.9 vs. 26.6 ± 22.6 mm/hr, $p < 0.001$) and CRP (1.8 ± 2.3 vs. 0.8 ± 2.1 mg/dL, $p < 0.001$). Overall reoperation rates were similar between groups. Infection accounted for the largest proportion of reoperations in the RA group (50.0%), whereas loosening was the most common cause of reoperation in the OA group (45.9%) ($p = 0.099$). Due to the limited number of microbiologically identified cases, no significant difference in pathogen distribution was observed, and Staphylococcus aureus was the most frequently isolated organism in both groups. RA was not an independent predictor of reoperation in multivariable logistic regression. Kaplan–Meier analysis showed a trend toward shorter reoperation-free survival in RA patients, and Cox regression demonstrated an increased but non-significant risk of earlier reoperation in RA patients (hazard ratio 1.90, 95% CI 0.92–3.90).
Conclusion
Although overall reoperation rates after TKA were comparable between RA and OA patients, the leading cause of reoperation differed, with infection predominating in RA patients and loosening in OA patients. These findings suggest that postoperative outcomes in RA patients may be more closely related to inflammatory burden than to RA diagnosis itself.





P1659

PATIENT PROFILE AND FUNCTIONAL IMPACT OF KNEE OSTEOARTHRITIS: A COMPARISON ACCORDING TO RADIOGRAPHIC SEVERITY

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Introduction
Knee osteoarthritis (KOA) is a heterogeneous disease in which patient profile and functional impairment varies according to radiographic severity.

Objective
To evaluate patient profile and functional impact of early-stage versus advanced-stage of KOA

Methods
This analytical study included patients followed for KOA in the rheumatology department.. Patients were classified into two groups based on Radiographic severity: early KOA ((Kellgren–Lawrence [KL] (1–2) and advanced KOA (KL 3–4). Comparisons were performed for demographic characteristics and clinical indicators of functional impairment.

Results
We included 143 patients with KOA. Cases with advanced KOA were significantly older and had a longer disease duration than those with early KOA ($p<0.001$). Sex distribution was comparable between groups ($p = 0.5$). From a functional perspective, advanced KOA was associated with higher pain intensity (VAS scores, $p = 0.002$) and more handicap and severe functional impairment, reflected by higher Lequesne index score ($p<0.001$) and significantly lower KOOS scores across all domains (pain, symptoms, activities of daily living, sport/recreation, and knee-related quality of life ($p\leq0.003$).Regarding treatment patterns, patients with KL grades 3–4 used analgesics more frequently than those with early-stage disease ($p = 0.02$). No significant differences were observed in NSAID use ($p= 0.47$). Lifestyle factors were not significantly associated with radiographic severity, with no significant difference in physical activity ($p = 0.43$) and functional rehabilitation ($p = 0.19$). groups. Clinically, advanced KOA was associated with more frequent joint limitation ($p = 0.006$) and increased use of walking aids ($p = 0.003$). Advanced forms were also significantly associated with combined femorotibial and femoropatellar involvement ($p<0.001$).

Conclusion
Advanced knee osteoarthritis is associated with substantially higher functional impairment, and handicap. Increased analgesic use, joint limitation, and reliance on walking aids appear to be strong clinical markers of advanced disease.

P1660

EFFECT OF DOUBLE PLATELET-RICH PLASMA INJECTIONS ON PAIN, FUNCTION, AND DISABILITY IN EARLY- STAGE KNEE OSTEOARTHRITIS:

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Introduction
Early-stage knee osteoarthritis (KOA) represents a key therapeutic window during which biological treatments may favorably influence pain symptoms and functional outcomes. Platelet-rich plasma (PRP) has emerged as a promising option.

Objective
To evaluate the effect of two intra-articular PRP injections on pain, function, and handicap in patients with early-stage knee osteoarthritis after three months of follow-up.

Methods
This prospective study included patients with early-stage KOA (Kellgren–Lawrence grades (KL) 1–2) followed in the rheumatology department of Charles Nicolle Hospital, who received two intra-articular PRP injections,

at a three-week interval. Pain intensity was assessed using the visual analog scale (VAS, 0–10), neuropathic pain using the DN4 questionnaire, function using the Knee injury and Osteoarthritis Outcome Score (KOOS), and disability using the Lequesne algofunctional index. Baseline-to–Month 3 comparisons were conducted. Statistical significance was set at p<0.05.

Results

Analyses included 32 patients. Pain intensity significantly decreased at three months, with mean VAS scores declining from 6.1 ± 1.5 at baseline to 2.3 ± 1.9 at Month 3, corresponding to a mean reduction of 3.8 points (p<0.001).

The neuropathic component of pain also showed significant improvement, with DN4 scores decreasing from 1.42 ± 1.75 to 0.45 ± 1.06 (p=0.001).

Function improved significantly, as reflected by an increase in the KOOS score from 68.3 ± 16.5 at baseline to 81.9 ± 19.4 at three months (p<0.001).

Finally, algofunctional disability significantly decreased, with the Lequesne index decreasing from 6.6 ± 2.7 to 3.3 ± 2.5 at Month 3 (p<0.001).

Conclusion

In patients with early-stage knee osteoarthritis, double intra-articular PRP injections were associated with significant improvements in pain, including its nociceptive and neuropathic components, as well as in function and disability at three months. These findings suggest that PRP may represent a relevant therapeutic option when introduced early in the course of knee osteoarthritis.

P1661

EFFECT OF DOUBLE PLATELET-RICH PLASMA INJECTIONS ON PAIN, FUNCTION, AND HANDICAP IN ADVANCED KNEE OSTEOARTHRITIS: A THREE-MONTH PROSPECTIVE STUDY

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Introduction

Advanced knee osteoarthritis (KOA) is associated with chronic pain and substantial functional disability, which are often inadequately controlled by conservative treatments. Platelet-rich plasma (PRP) has emerged as a biological therapeutic option with the potential to improve both pain and functional outcomes.

Objective

To evaluate the effect of two intra-articular PRP injections on pain, function, and disability in patients with advanced KOA at three months of follow-up.

Methods

This prospective study included patients with advanced KOA (Kellgren–Lawrence grades 3–4) followed in a rheumatology department, who received two intra-articular PRP injections at a three-week interval. Pain intensity was assessed using the visual analog scale (VAS, 0–10), functional disability and handicap using the Lequesne algofunctional index, and knee function using the Knee injury and Osteoarthritis Outcome Score (KOOS; symptoms, pain, activities of daily living, sport/recreation, and knee-related quality of life). Baseline-to–Month 3 comparisons were conducted, with statistical significance set at p <0.05.

Results

Among the 79 patients analyzed, mean baseline pain was (VAS score) of 6.8 ± 1.7. At three months following double PRP injection, pain intensity significantly decreased to 3.2 ± 2.4, corresponding to a mean reduction of 3.6 points (p <0.001).

A significant functional improvement was also observed. KOOS scores improved significantly across all domains: pain (54.9 ± 15.5 to 66.3 ± 20.8), symptoms (54.3 ± 18.5 to 67.4 ± 21.5), activities of daily living (57.5 ± 15.9 to 68.8 ± 21.1), sport and recreation (42.2 ± 18.8 to 50.6 ± 19.8), and knee-related quality of life (45.8 ± 15.8 to 60.6 ± 22.1) (all p< 0.001). The Lequesne index decreased from 10.6 ± 3.3 at baseline to 7.6 ± 3.1 at three months (p <0.001), indicating a reduction in algofunctional disability.

Conclusion

In patients with advanced KOA, double intra-articular PRP injections were associated with significant improvements in pain, function, and disability at three months. These findings support the potential role of PRP as a relevant symptomatic treatment option in advanced KOA.

P1662

PATIENT SATISFACTION AFTER PLATELET-RICH PLASMA INJECTIONS IN KNEE OSTEOARTHRITIS: INFLUENCE OF RADIOGRAPHIC STAGE

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Background

Patient satisfaction is an important patient-reported outcome reflecting perceived benefit beyond clinical measures in knee osteoarthritis. Understanding whether satisfaction varies according to radiographic severity may help optimize patient selection for platelet-rich plasma (PRP) therapy.

Objectives

To assess patient satisfaction three months after double intra-articular PRP injections in knee osteoarthritis and to evaluate its association with radiographic stage.

Methods

An observational study was conducted in patients with knee osteoarthritis treated with two intra-articular PRP injections at the Rheumatology Department of Charles Nicolle Hospital, Tunis. Patient satisfaction was assessed at three months using the Patient Global Clinical Impression of improvement (PGCII). Radiographic severity was classified as early stage (Kellgren–Lawrence grades 1–2) or advanced stage (grades 3–4). Satisfaction distributions were compared using the chi-square test, and an ordered trend analysis (linear-by-linear association) was performed. Results are expressed as frequencies and percentages.

Results
A total of 65 patients completed the PGCII assessment in three months. Overall, 42 patients (64.6%) reported being much improved or very much improved, indicating a high level of satisfaction with PRP treatment. An additional 12 patients (18.5%) reported minimal improvement, while 8 patients (12.3%) reported no change. Only 3 patients (4.6%) reported worsening. The overall distribution of satisfaction did not differ significantly between early and advanced radiographic stages ($p = 0.264$). However, trend analysis revealed a significant linear association, with higher levels of perceived improvement more frequently reported in patients with advanced-stage knee osteoarthritis (linear-by-linear association, $p = 0.014$).

Conclusion
Most patients reported a high level of satisfaction three months after PRP treatment for knee osteoarthritis. While overall satisfaction did not significantly differ according to radiographic stage.

P1663

IMPACT OF PREOPERATIVE NUTRITIONAL STATUS ON PROGNOSIS AFTER VERTEBROPLASTY: A RETROSPECTIVE STUDY

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Objective(s) Osteoporotic vertebral compression fractures (OVCF) are frequently associated with malnutrition in the elderly. This study aims to retrospectively analyze the impact of preoperative bone mineral density and nutritional status on 2-year functional recovery and survival rates following vertebroplasty.
Material and Methods We retrospectively reviewed data from 395 patients aged ≥50 who underwent vertebroplasty or kyphoplasty between January 2017 and December 2023. Patients were stratified into groups based on T-scores and nutritional indicators (Albumin and Geriatric Nutritional Risk Index, GNRI). We compared the clinical outcomes of the "Robust Group" (G1: non-osteoporotic with normal nutrition) against the "Double-Hit Group" (G4: osteoporosis combined with malnutrition). The primary outcomes included the Oswestry Disability Index (ODI) and all-cause mortality over a 2-year follow-up period.
Results The Double-Hit Group (G4) was significantly older (median age 80.5 vs. 76.9 years) and presented with lower Body Mass Index (median 20.8 vs. 24.5 kg/m²) compared to the Robust Group (G1). Multivariate Cox regression analysis revealed that the G4 group had a significantly higher risk of mortality (Hazard Ratio = 2.01, p=0.022). Regarding functional recovery, while both groups exhibited improvement in ODI scores post-operatively, the G4 group sustained a persistent disability gap, ending with significantly higher disability scores at 24 months compared to G1 (median ODI: 50 vs. 40, p<0.001).
Conclusion(s) Preoperative malnutrition combined with osteoporosis is a significant predictor of higher mortality and poorer functional status in patients undergoing vertebroplasty. Although surgery provides pain relief, the physiological deficits in these high-risk patients result in long-term residual disability. We suggest that postoperative care should extend beyond fracture management to include aggressive nutritional support to improve long-term prognosis.

P1664

THE EFFECTS OF EXERCISE ON INTRINSIC CAPACITY AFTER HIP FRACTURE: A SYSTEMATIC REVIEW AND META-ANALYSIS OF THE LOCOMOTION AND COGNITION DOMAINS

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[1]Geras Centre for Aging Research, Hamilton Health Sciences, Hamilton, Canada; [2]McMaster University, Hamilton, Canada; [3]McGill University, Montreal, Canada

Objective: To summarize the effect of exercise interventions in older adults following a hip fracture across intrinsic capacity locomotion and cognitive domains.
Methods: We searched EMBASE, MEDLINE, CINAHL, and CENTRAL. Eligible studies included: (i) randomized controlled trial design, (ii) older adults aged 60 years or older who experienced a hip fracture, (iii) an exercise intervention, and (iv) outcomes related to locomotor capacity. Risk of bias was assessed using the Cochrane Risk of Bias 2 (RoB-2) tool, and the certainty of evidence was evaluated using the Grading of Recommendations, Assessment, Development and Evaluation (GRADE) approach.
Results: Of 5053 records screened, 12 randomized controlled trials (N=1397 participants) met inclusion criteria. Exercise interventions after hip fracture varied in frequency (1-7 sessions per week), type (resistance, balance, endurance, or multicomponent programs), and duration (1 month –12 months). Exercise may improve physical function after hip fracture, although the certainty of evidence is low. Across six studies (n=219), exercise may reduce Timed Up and Go (TUG) time (MD −3.40 seconds, 95% confidence interval [CI] −3.78 to −3.02), exceeding the minimal clinically important difference (MCID). Across three studies (n=99), exercise may improve gait speed (MD 0.03 m/s, 95% CI 0.02 to 0.04). Across four studies (n = 184), exercise may improve endurance on the 6-minute walk test (MD 85.26 m, 95% CI 67.18 to 103.04), exceeding the MCID. Across two studies (n=56), exercise may improve performance on the 5x sit-to-stand (MD −3.36 seconds, 95% CI −5.85 to −1.06), exceeding the MCID. Only one study assessed cognition (Mini-Mental State Examination) pre- and post-intervention, precluding meta-analysis.
Conclusions: Structured exercise programs after hip fracture may have a positive effect on locomotor capacity recovery. Although cognition is central to hip fracture recovery, it is infrequently assessed in exercise trials, highlighting a gap between research outcomes and geriatric care priorities. More trials are needed to establish optimal exercise types, frequency, and duration. The ICOPE framework could be integrated as part of post-fracture rehabilitation.

P1665

AGE- AND SEX-SPECIFIC VERTEBRAL HEIGHT LOSS IN HEALTHY ASIAN OLDER ADULTS USING AUTOMATED CT MORPHOMETRY

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Objective: To define age- and sex-specific normative ranges of vertebral height loss in a healthy Asian population and assess their implications for refining vertebral compression fracture (VCF) diagnostic thresholds.
Materials and Methods: This retrospective study included 856 asymptomatic Asian adults aged 50–95 years (300 women) who underwent multidetector CT between January 2021 and March 2022. Automated morphometry measured anterior, middle, and posterior heights of T4–T12 vertebrae on mid-sagittal reformats. Maximum height loss was graded using Genant's semiquantitative method, and the vertebral level with the highest-grade VCF was identified by sex and 5-year age groups. Age-related height loss at each level was analyzed using linear regression, with sex differences tested by t-test. Normative ranges across vertebral levels were derived using normal distribution and interquartile range, and group differences were assessed using ANOVA with Scheffé post hoc testing.
Results: Among 856 subjects with complete T5–T12 vertebrae, the most severe VCFs reached ≥ grade 2 at all ages and progressed to grades 3–4 in individuals aged >70–95 years. In women, severe VCFs were mainly grades 2–3 between 50–80 years, became predominantly grade 3 after 80 years, and were concentrated at T5–T8. In men, the most severe VCFs most frequently involved T7, T11, and T12, with T9 notable; in men aged 80–95 years, T9 accounted for ~20% of the most severe VCFs. Vertebral height loss increased significantly with age ($p < 0.05$ per 10-year increment). Men showed the steepest losses at T8–T12 (slopes 0.17–0.21), whereas women showed the steepest at T8, T9, and T12 (0.16–0.18). Mean age-related slopes were identical (0.16), but baseline mean loss was higher in men (8.96%) than women (8.11%, $p < 0.05$). Mean vertebral height loss exceeded 20% at advanced ages and reached ~40% by 70–80 years, with men generally experiencing greater loss ($p < 0.05$).
Conclusion: Automated CT morphometry reveals distinct age- and sex-specific patterns of vertebral height loss and VCF distribution, supporting refinement of diagnostic thresholds to better distinguish normal aging from pathological fractures in Asian populations.

P1666

PHYSICAL ACTIVITY PATTERNS IN KNEE OSTEOARTHRITIS: INFLUENCE OF BMI AND KELLGREN–LAWRENCE GRADE

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Background
Beyond pharmacological and surgical options, physical activity (PA) is one of the most effective interventions to slow functional deterioration in knee osteoarthritis (KOA). Determinants of PA in KOA are multifactorial, and clarifying the influence of body mass index (BMI) and radiographic severity is essential to strengthen non-pharmacological strategies.

Objective
To assess the influence of BMI and radiographic severity (Kellgren–Lawrence stage) on physical activity practice in patients with KOA.

Methods
We conducted a cross-sectional study with radiographically confirmed KOA. BMI was categorized as normal (18.5–24.9 kg/m²), overweight (25–29.9), and obese (≥30). Radiographic severity was graded using the Kellgren–Lawrence (KL) system (1–4). PA practice was classified according to WHO thresholds: none (0 min/week), insufficient (1–149 min/week), or recommended (≥150 min/week).

Results
Among the 143 patients, 35 (24.4%) were normal weight, 52 (36.4%) overweight, and 56 (39.2%) obese. Mean KL stage was higher in obese patients (2.8) compared with normal-weight (2.4) and overweight (2.3). PA distribution varied across BMI groups: recommended PA was achieved by 14.3% of normal-weight, 26.9% of overweight, and only 5.4% of obese patients, while inactivity predominated in obesity (53.6%). According to radiographic severity, recommended PA was reported by 38.5% at KL1, 14.6% at KL2, 23.8% at KL3, and 7.7% at KL4, with inactivity reaching 53.8% at KL4.

Conclusion
Excess body weight was associated with more advanced radiographic severity and substantially lower adherence to recommended PA. Increasing KL stage also correlated with declining PA engagement. These findings highlight the compounded burden of obesity and structural progression in KOA, emphasizing the need for integrated strategies combining weight management and structured exercise programs to optimize outcomes.

P1667

FALL RISK AND NUTRITIONAL STATUS IN OLDER ALDULT

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Background:
Population aging is associated with an increasing burden of complex health conditions, particularly falls and nutritional disorders. Nutritional status is a key determinant of muscle strength, balance, and mobility and may therefore influence fall risk. This study aimed to evaluate the association between nutritional status and fall risk among older adults attending primary care.

Methods:
We conducted a cross-sectional study over a three-month period at the Ghedir El Golla primary care clinic. Individuals aged ≥65 years who were able to complete standardized assessments were included. Fall risk was evaluated using several indicators: number of falls (NF) in the preceding year, time spent on the ground after a fall (TSG), ability to rise independently, the Timed Up and Go test (TUG; abnormal if ≥12 s), and single-leg stance (SLS; abnormal if <5 s). Nutritional status was assessed using the full Mini Nutritional Assessment (MNA) and classified as normal (≥24 points) or at risk of malnutrition (≤23.5 points).

Results:
Thirty-eight older adults were included (mean age 76.5 ± 1.4 years; sex ratio 0.52). Most participants were illiterate (81.6%), not professionally active (63.2%), and had social health coverage (73.7%). Multimorbidity was present in 86.8% and polypharmacy in 50%.
The mean NF was 3.6 ± 0.5, the mean TSG was 7.8 ± 2.5 minutes, and 26.1% required assistance to stand after a fall. TUG was abnormal in 24% of participants, and SLS was impaired in 79%. According to the MNA, 84% of the cohort had nutritional impairment.
No significant association was observed between nutritional status and any fall risk indicator: NF (p = 0.67), TSG (p = 0.818), TUG (p = 1.00), or SLS (p = 0.587).

Conclusion:
Although nutritional impairment was highly prevalent in this population, it was not independently associated with fall risk indicators. These findings highlight the multifactorial nature of falls in older adults.

P1668

ASSOCIATION BETWEEN DEPRESSIVE SYMPTOMS AND FALL RISK INDICATORS IN OLDER ADULTS

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Background:
Falls represent a major cause of morbidity and functional decline in older adults. Depressive symptoms are also common in this population yet frequently underdiagnosed, and both conditions adversely affect autonomy and quality of life. This study aimed to examine the association between depressive symptoms and established clinical indicators of fall risk in older adults.

Methods:
We conducted a cross-sectional study among outpatients aged ≥65 years who were able to complete standardized assessments. Fall risk was evaluated using several indicators: number of falls (NF) in the preceding year, time spent on the ground after a fall (TSG), ability to rise independently, the Timed Up and Go test (TUG; abnormal if ≥12 s), and single-leg stance (SLS; abnormal if <5 s). Depressive symptoms were assessed using the 30-item Geriatric Depression Scale (GDS-30), with a score ≥10 indicating depression.

Results:
Thirty-eight participants were included (mean age 76.5 ± 1.4 years; sex ratio 0.52). Most were illiterate (81.6%), no longer professionally active (63.2%), and had social health coverage (73.7%). Multimorbidity was present in 86.8% of participants and polypharmacy in 50%.
The mean number of falls was 3.6 ± 0.5, the mean TSG was 7.8 ± 2.5 minutes, and 26.1% of patients required assistance to stand after a fall. TUG was abnormal in 24% of cases, while SLS was impaired in 79%. Depressive symptoms were highly prevalent, affecting 91.3% of the cohort.
No statistically significant associations were observed between depressive symptom severity and fall risk indicators: NF (p = 0.433), TSG (p = 0.163), TUG (p = 0.554), or SLS (p = 0.189).

Conclusion:
Although both depressive symptoms and fall risk were highly prevalent in this cohort of older adults, depressive symptoms were not associated with objective or clinical indicators of fall risk. These findings highlight the multifactorial nature of falls in older populations and suggest that determinants other than depression may play a more prominent role in fall vulnerability.

P1669

IMPACT OF VISUAL AND AUDITORY IMPAIRMENTS ON FALL RISK IN OLDER ADULTS

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Background:
Sensory impairments, particularly visual and auditory deficits, become increasingly prevalent with advancing age and may adversely affect environmental perception, postural control, and functional mobility. Falls remain a leading cause of morbidity and loss of independence among older adults. This study aimed to examine the association between visual and auditory impairments and fall risk in older adults attending primary care.

Methods:
We conducted a cross-sectional study among older adults consulting at a primary care clinic who were able to complete standardized assessments. Fall risk was evaluated using multiple indicators: number of falls (NF) during the preceding year, time spent on the ground after a fall (TSG), ability to rise independently, the Timed Up and Go test (TUG; abnormal if ≥12 s), and single-leg stance (SLS; abnormal if <5 s). Visual function was assessed using the Snellen chart, and hearing function using the whispered voice test.

Results:
Thirty-eight participants were included (mean age 76.5 ± 1.4 years; sex ratio 0.52). Most were illiterate (81.6%), not professionally active (63.2%), and had social health coverage (73.7%). Multimorbidity was present in 86.8% and polypharmacy in 50%.

The mean NF was 3.6 ± 0.5, the mean TSG was 7.8 ± 2.5 minutes, and 26.1% of participants required assistance to stand after a fall. TUG was abnormal in 24% of cases, while SLS was impaired in 79%. Sensory impairments were frequent, with reduced visual acuity and hearing impairment each affecting 71% of participants.

No statistically significant associations were found between visual impairment and functional fall risk indicators (TUG: $p = 0.179$; SLS: $p = 0.245$). Similarly, hearing impairment was not significantly associated with TUG ($p = 0.179$) or SLS ($p = 0.422$).

Conclusion:
Visual and auditory impairments were highly prevalent in this cohort of older adults. However, no significant association with functional indicators of fall risk was identified. Despite this, early detection and appropriate management of sensory deficits remain essential to enhance safety, preserve autonomy, and maintain quality of life in older populations.

P1670

IMPACT OF COGNITIVE IMPAIRMENT ON FALL RISK IN OLDER ADULTS

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Background:
Population aging is associated with a growing burden of complex health conditions, among which falls and cognitive decline play a central role. Cognitive impairment may alter attention, executive function, and motor planning, thereby compromising balance and mobility in older adults. This study aimed to evaluate the association between cognitive status and fall risk among older adults attending primary care.

Methods:
We conducted a cross-sectional study in individuals aged ≥65 years who were able to complete standardized assessments. Fall risk was evaluated using several indicators: number of falls (NF) in the preceding year, time spent on the ground after a fall (TSG), ability to rise independently, the Timed Up and Go test (TUG; abnormal if ≥12 s), and single-leg stance (SLS; abnormal if <5 s). Cognitive function was assessed using the Mini-Mental State Examination (MMSE; normal ≥24, impaired ≤23) and the Five-Word Test (FWT) by Dubois (pathological <10).

Results:
Thirty-eight older adults were included (mean age 76.5 ± 1.4 years; sex ratio 0.52). Most participants were illiterate (81.6%), not professionally active (63.2%), and had social health coverage (73.7%). Multimorbidity was present in 86.8% and polypharmacy in 50%.

The mean NF was 3.6 ± 0.5, the mean TSG was 7.8 ± 2.5 minutes, and 26.1% required assistance to stand after a fall. TUG was abnormal in 24% of participants, and SLS was impaired in 79%. According to the FWT, 52.6% had pathological scores, while 81.5% had cognitive impairment based on the MMSE.

A significant association was observed between MMSE score and TSG ($p < 0.05$). However, no significant associations were found between MMSE score and NF ($p = 0.249$), TUG ($p = 1.00$), or SLS ($p = 0.146$).

Conclusion:
Cognitive impairment was highly prevalent in this cohort and was associated with prolonged time spent on the ground after a fall. These findings suggest that cognitive decline may influence the severity and consequences of falls rather than their occurrence, supporting the integration of cognitive assessment into multidimensional fall prevention strategies in older adults.

P1671

PHYSICAL PERFORMANCE AND FUNCTIONAL AUTONOMY: IMPACT ON FALL RISK IN OLDER ADULTS

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Background
Falls are among the most serious and feared events in older adults due to their association with morbidity, loss of independence, and increased mortality. Functional autonomy is a key determinant of quality of life in aging populations, and its relationship with fall risk represents a major challenge in primary care. This study aimed to evaluate the association between fall risk indicators and functional autonomy in older adults.

Methods
A cross-sectional study was conducted among older adults attending a primary care clinic who were able to complete standardized assessments. Fall risk was evaluated using the number of falls in the previous year (NF), time spent on the ground after a fall (TSG), ability to rise independently, the Timed Up and Go test (TUG; abnormal ≥12 s), and the single-leg stance test (SLS; impaired <5 s). Functional autonomy was assessed using the Activities of Daily Living scale (ADL; 0–6) and the Instrumental Activities of Daily Living scale (IADL; 0–4). Group comparisons were performed using the Mann–Whitney test.

Results
Thirty-eight participants were included (mean age 76.5 ± 1.39 years; sex ratio 0.52). Most were illiterate (81.6%), not professionally active (63.2%), and had social health coverage (73.7%). Multimorbidity was present in 86.8% and polypharmacy in 50%.

The mean number of falls was 3.6 ± 0.5 per year, and the mean TSG was 7.83 ± 2.52 minutes; 26.1% required assistance to stand after a fall. TUG was abnormal in 24% of participants, and SLS was impaired in 79%. Functional dependency was frequent: 68.4% for ADL and 60.5% for IADL.

Participants with abnormal TUG scores had significantly lower ADL scores ($p = 0.012$) and a trend toward lower IADL scores ($p = 0.082$). Impaired SLS was strongly associated with both lower ADL and IADL scores ($p = 0.008$ and $p = 0.001$, respectively).

Conclusion
Reduced physical performance, particularly impaired balance and mobility, is strongly associated with decreased functional autonomy in older adults. These findings highlight the importance of systematic assessment of physical performance in primary care to identify individuals at high risk of functional decline and falls and to implement early, targeted preventive interventions.

P1672

IMPACT OF METHOTREXATE EXPOSURE ON BONE MINERAL DENSITY IN BIOLOGIC-TREATED RHEUMATOID ARTHRITIS

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Background:
Patients with rheumatoid arthritis (RA) are at increased risk of osteoporosis due to chronic inflammation and therapeutic exposures. Bone disorders associated with Methotrexate -which is the cornerstone in RA treatment- have been described, however, its long-term effects on bone mineral density (BMD) remain debated, particularly in patients requiring biologic DMARDs (bDMARDs).
Objectives:
To assess the effect of Methotrexate exposure on bone mineral density and osteoporosis in biologic-treated rheumatoid arthritis.
Methods:
A retrospective monocentric study included patients, aged 18 years or older, fulfilling the 1987 ACR and/or 2010 ACR–EULAR classification criteria for RA. All patients were receiving first-line bDMARD therapy for at least six months. BMD was measured by dual-energy X-ray absorptiometry (DXA) at the anteroposterior lumbar spine (LS) and femoral necks (FN). Bone mass (BM) was expressed in g/cm², and T-scores were expressed as standard deviations (SD).
Results:
Forty-six patients with RA were included. The sex ratio was 0.095. The mean age was 54.4 ± 11.7 years [31-73] and the mean age at disease onset was 44.0 ± 11.5 years [19-60]. At least one comorbidity was present in 36 patients. Methotrexate had been used prior to bDMARD initiation in 98% of patients. The mean duration of MTX exposure was 50.3 ± 47.9 months, and the mean maximum weekly dose was 17.61 ± 3.18 mg.
The mean LS BMD was 0.952 ± 0.2 g/cm², with a mean T-score of −1.75 ± 1.3 SD. At the FN, mean BMD was 0.850 ± 0.1 g/cm², with a mean T-score of −1.41 ± 1.2 SD.
No correlation was found between MTX duration and BMD at the LS ($r = −0.149$, $p = 0.408$) or FN ($r = −0.105$, $p = 0.555$). Similarly, maximum MTX dose was not correlated with LS BMD ($r = −0.042$, $p = 0.793$) or FN BMD ($r = 0.147$, $p = 0.354$).
Conclusion:
Our study showed that MTX exposure, in terms of both duration and maximum dose, was not associated with reduced bone mineral density at the lumbar spine or femoral neck. Although a high prevalence of low bone mass was observed, no suggesting detrimental effect of Methotrexate on bone was identified in our population.

P1673

DOES BODY COMPOSITION IMPACT BONE MINERAL DENSITY IN PATIENTS WITH RHEUMATOID ARTHRITIS?

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Background and objective:
Rheumatoid arthritis (RA) can be associated with altered body composition (BC), which can affect bone mineral density (BMD) and musculoskeletal health. We aimed to evaluate the impact of total, android and gynoid body composition on bone mineral density (BMD) in patients receiving biologic disease-modifying antirheumatic drugs (bDMARDs).
Methods:
A retrospective monocentric study included patients, aged 18 years or older, fulfilling the 1987 ACR and/or 2010 ACR–EULAR classification criteria for RA. All patients were receiving first-line bDMARD therapy for at least six months, initiated after failure, intolerance, or contraindication to one or more conventional synthetic DMARDs. Bone mineral density (at the anteroposterior lumbar spine (LS) and femoral necks (FN)) and BC were measured by dual-energy X-ray absorptiometry (DXA). Bone mass (BM) was expressed in g/cm², and Z-scores were expressed as standard deviations (SD). Body composition (BC) measures included android and gynoid lean and fat mass. Correlations between BC parameters and BMD or T-scores at the lumbar spine and femoral neck were analyzed.
Results :
Our study included 46 patients. The sex ratio was 0.095. The mean age was 54.4 ± 11.7 years [31-73] and the mean age at disease onset was 44.0 ± 11.5 years [19-60]. The mean LS BMD was 0.952 ± 0.2 g/cm², with a mean T-score of −1.75 ± 1.3 SD. At the FN, the mean BMD was 0.850 ± 0.1 g/cm², with a mean T-score of −1.41 ± 1.2 SD. On whole-body DXA analysis, the mean total fat mass was 45.5%, while the mean total lean mass accounted for 54.5% of BC. Regional analysis showed a higher proportion of fat mass in the gynoid region compared with the android region (50.5% vs. 49%), whereas lean mass distribution predominated in the android compartment compared with the gynoid compartment (51% vs. 49.5%).
No significant associations were observed between BC and BMD. LS BMD was not correlated with total, android, or gynoid lean mass (r = −0.14, 0 and −0.089; p = 0.931, 0.999 and 0.576, respectively) nor with total, android, or gynoid fat mass (r = 0.14, 0 and 0.089; p = 0.93, 0.999 and 0.576), while FN BMD similarly showed no associations with lean or fat mass across compartments, with near-null correlation coefficients (r = −0.019 to 0.019; all p ≥ 0.902). Consistently, T-scores at both the LS and FN were not significantly correlated with total, android, or gynoid lean mass (r = −0.187 to 0.009; p ≥ 0.22) or fat mass (r = −0.009 to 0.187; p ≥ 0.22).
Conclusion:
In biologic-treated RA patients, total and regional lean and fat mass were not associated with BMD or T-scores, indicating that body composition may have limited impact on skeletal health in this population. These findings support the need for systematic BMD assessment and targeted osteoporosis prevention, regardless of body composition.

P1674

WHICH IMPACT OF THE EULAR RESPONSE IN BIOLOGIC-TREATED RHEUMATOID ARTHRITIS ON BONE MINERAL DENSITY?

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Background:
Rheumatoid arthritis (RA) is associated with an increased risk of low bone mineral density (BMD) and osteoporosis. Biologic disease-modifying antirheumatic drugs (bDMARDs) improve disease activity, but it remains unclear whether clinical response, as defined by EULAR criteria, is associated with skeletal health.
Objectives:
To evaluate the impact of clinical response to bDMARD therapy, measured by EULAR criteria, on bone mineral density, in patients with RA.
Methods:
A retrospective monocentric study included patients, aged 18 years or older, fulfilling the 1987 ACR and/or 2010 ACR–EULAR classification criteria for RA. All patients were receiving first-line bDMARD therapy for at least six months, initiated after failure, intolerance, or contraindication to one or more conventional synthetic DMARDs. Bone mineral density was measured by dual-energy X-ray absorptiometry (DXA), EULAR response at six months was determined using DAS28 scores and categorized into three groups: non-responders, moderate responders and good responders. For analysis, patients were grouped into good/moderate responders versus non-responders. Associations between EULAR response and BMD or T-scores at the lumbar spine and proximal femur were analyzed.
Results:
Forty-six patients with RA were included. The sex ratio was 0.095. The mean age was 54.4 ± 11.7 years [31-73] and the mean age at disease onset was 44.0 ± 11.5 years [19-60]. Biologic therapies included Etanercept (43%), Adalimumab (13%), Infliximab (9%), Certolizumab (9%), Tocilizumab (9%) and Rituximab (17%). At six months, 80.4% of patients were classified as good or moderate responders according to EULAR criteria. The mean lumbar spine BMD was 0.952 ± 0.2 g/cm², with a mean T-score of −1.75 ± 1.3 standard deviations (SD). At the proximal femur, mean BMD was 0.850 ± 0.1 g/cm², with a mean T-score of −1.41 ± 1.2 SD.
EULAR response values are presented as good/moderate responders vs. non-responders. No significant differences were observed between responders and non-responders in lumbar spine BMD (0.97 ± 0.23 vs. 0.86 ± 0.1 g/cm²; p = 0.224) or proximal femur BMD (0.85 ± 0.15 vs. 0.82 ± 0.13 g/cm²; p = 0.629). Similarly, EULAR response was not associated with T-scores at the lumbar spine (−1.64 ± 1.34 vs. −2.16 ± 1.06 SD; p = 0.29) or proximal femur (−1.41 ± 1.22 vs. −1.37 ± 0.99 SD; p = 0.926).
Conclusion:
In this cohort of biologic-treated RA patients, bone mineral density and T-scores at the lumbar spine and proximal femur were not associated with EULAR-defined clinical response. These results suggest that short-term improvements in systemic inflammation and disease activity may not directly translate into measurable changes in skeletal mass.

P1675

HOW DOES BODY MASS INDEX AFFECT THE RESPONSE TO BIOLOGICS IN RHEUMATOID ARTHRITIS?

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Background:
Body mass index (BMI) reflects body composition and may influence inflammatory activity and the pharmacokinetics of biologic therapies. However, the impact of BMI on the clinical response to biologic disease-modifying antirheumatic drugs (bDMARDs), as defined by EULAR criteria, is still widely debated, which could represent a gap in the personalized management of rheumatoid arthritis (RA).
Objectives:
To evaluate the effect of anthropometric measures and clinical response to bDMARDs, as defined by EULAR criteria, in patients with RA.
Methods:
A retrospective monocentric study included patients, aged 18 years or older, fulfilling the 1987 ACR and/or 2010 ACR–EULAR classification criteria for RA. All patients were receiving first-line bDMARD therapy for at least six months, initiated after failure, intolerance, or contraindication to one or more conventional synthetic DMARDs. Anthropometric measures including weight, height and BMI were recorded. EULAR response at six months was determined using DAS28 scores and categorized into three groups: non-responders, moderate responders, and good responders. For analysis, patients were grouped into good/moderate responders versus non-responders. Associations between anthropometric measures and EULAR response were assessed.
Results:
Forty-six patients with RA were included. The sex ratio was 0.095. The mean age was 54.4 ± 11.7 years [31-73] and the mean age at disease onset was 44.0 ± 11.5 years [19-60]. The mean weight was 75.6 kg [43-98], with a mean height of 158 cm [106-178]. The mean BMI was 30.2 kg/m² [17.9–40.1]. Biologic therapies included Etanercept (43%), Adalimumab (13%), Infliximab (9%), Certolizumab (9%), Tocilizumab (9%) and Rituximab (17%). At six months, 80.4% of patients were classified as good or moderate responders according to EULAR criteria. EULAR response values are presented as good/moderate responders versus non-responders. No significant differences were observed in body weight (75.08 ± 11.52 vs. 77.67 ± 9.83 kg; p = 0.539), height (156.89 ± 10.85 vs. 162.89 ± 7.35 cm; p = 0.125), or BMI (30.31 ± 4.86 vs. 29.62 ± 5.56 kg/m²; p = 0.714) between responders and non-responders.
Conclusion:
In this cohort of biologic-treated RA patients, anthropometric measures including weight, heigh, and BMI were not associated with EULAR response at six months. These findings suggest that short-term clinical response to bDMARD therapy is independent of baseline anthropometric characteristics, highlighting the need to consider other factors when predicting treatment outcomes.

P1676

EROSIVE RHEUMATOID ARTHRITIS: WHAT IMPACT ON BONE MASS AND BONE MINERAL DENSITY?

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Background and Objectives:
Rheumatoid arthritis (RA) is characterized by chronic inflammation that can lead to joint erosion and systemic bone loss. While erosive disease reflects localized structural damage, its association with systemic bone mineral density (BMD) remains no clearly defined. We aimed to evaluate the erosive status in biologic-treated rheumatoid arthritis and its effect on bone mineral density.
Methods:
A retrospective monocentric study included patients, aged 18 years or older, fulfilling the 1987 ACR and/or 2010 ACR–EULAR classification criteria for RA. All patients were receiving first-line bDMARD therapy for at least six months, initiated after failure, intolerance, or contraindication to one or more conventional synthetic DMARDs. Bone mineral density was measured by dual-energy X-ray absorptiometry (DXA). Erosive status was determined based on radiographic evidence. Associations between erosive status and BMD or T-scores at the lumbar spine and proximal femur were analyzed.
Results:
A total of 46 patients with RA were included. The sex ratio was 0.095. The mean age was 54.4 ± 11.7 years [31-73]. An erosive disease profile was present in 87% of patients. Biologic therapies included Etanercept (43%), Adalimumab (13%), Infliximab (9%), Certolizumab (9%), Tocilizumab (9%) and Rituximab (17%). The mean lumbar spine BMD was 0.952 ± 0.2 g/cm², with a mean T-score of −1.75 ± 1.3 standard deviations (SD). At the proximal femur, mean BMD was 0.850 ± 0.1 g/cm², with a mean T-score of −1.41 ± 1.2 SD.
Erosive RA status is presented as erosive vs. non-erosive RA. No significant differences were observed between erosive and non-erosive RA in lumbar spine bone mineral density (0.94 ± 0.22 vs. 1.02 ± 0.16 g/cm2; p = 0.383), femoral neck bone mineral density (0.84 ± 0.14 vs. 0.91 ± 0.15 g/cm2; p = 0.293), the T-scores at both the lumbar spine (-1.82 ± 1.3 vs. -1.26 ± 1.28 SD; p = 0.336) and the femoral neck (-1.45 ± 1.15 vs. -0.9 ± 1.27 SD; p = 0.258).
Conclusion:
In this cohort of biologic-treated RA patients, erosive disease was not associated with reduced BMD at the lumbar spine or proximal femur. These findings suggest that localized joint damage does not necessarily reflect systemic bone loss. A larger-scale study is needed to better understand the extent to which erosive status impacts bone mineral density.

P1677

GENSCIP133: A NOVEL DUAL FUNCTIONAL MOLECULE WITH PTH AND ANTI-RANKL ACTIVITIES FOR THE TREATMENT OF OSTEOPOROSIS

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Objective: GenSciP133 is a chimeric protein comprised of anti-RANKL antibody and parathyroid hormone (PTH). This study aimed to evaluate the therapeutic potential of GenSciP133 for osteoporosis through *in vitro* and *in vivo* models.

Materials and Methods:*In vitro* PTH1R activation was measured in PTH1R-expressing Saos2 cells with/without expression of RANKL. Human osteoclast differentiation as an indicator for RANKL inhibition was assessed in Raw264.7 cells. *In vivo* efficacy studies were conducted in hu-RANKL transgenic ovariectomized (OVX) mice and a closed femoral fracture mouse model. A pharmacokinetic study was performed in hu-RANKL transgenic mice.

Results: GenSciP133 exhibited comparable PTH1R activities in PTH1R and RANKL co-expressing Saos2 cells (EC_{50} = 9.5 nM), while activities in PTH1R-expressing only Saos2 cells were largely attenuated (EC_{50} = 890 nM). Additionally, GenSciP133 demonstrated comparable inhibition of osteoclast differentiation in Raw264.7 cells to denosumab. These results suggested that GenSciP133 might be able to exert synergistic effects towards increases in bone mass while minimizing undesired effects in PTH1R-expressing only tissues such as kidney to avoid renal toxicity. In the OVX mouse model, GenSciP133 dose-dependently improved bone density and femoral biomechanics at 0.3, 1, and 3 mpk. The effects at the 1 and 3 mpk groups were superior to denosumab at 10 mpk and the animals were well tolerated. In the fracture model, GenSciP133 significantly enhanced bone mineral density (BMD), biomechanics, and structural integrity of injured bones after 4 weeks of treatment. The PK study showed a half-life of GenSciP133 similar to that of denosumab, indicating potential for less frequent dosing in humans.

Conclusion: We have developed a dual anti-RANKL and PTH molecule that demonstrate robust efficacy in promoting bone formation and improving bone quality with a favorable safety profile and a low dosing frequency. The results suggested that GenSciP133 has the potential to be further developed as a promising therapeutic candidate for osteoporosis.

P1678

MULTI-CENTER VALIDATION OF A FEDERATED LEARNING-BASED ARTIFICIAL INTELLIGENCE SYSTEM FOR SCREENING LOW BONE MINERAL DENSITY USING CHEST X-RAYS

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Objective

To evaluate the diagnostic performance and generalizability of a novel artificial intelligence (AI) system trained via federated learning for opportunistic screening of low bone mineral density (T-score ≤ -2.5) using routine chest X-rays (CXRs) across two independent medical centers.

Material and Methods

We developed a deep learning model (OsteoPredict) utilizing a federated learning architecture to preserve patient data privacy, trained on 5,943 images. The system was validated retrospectively using an independent external cohort of 3,007 adult patients from two distinct tertiary medical centers who underwent same-day CXR and dual-energy X-ray absorptiometry (DXA). The ground truth was operationally defined as a lumbar spine DXA T-score of ≤ -2.5 for the entire cohort to ensure label consistency for model training. The primary endpoint was the Area Under the Receiver Operating Characteristic curve (AUROC), with sensitivity and specificity as secondary endpoints.

Results

Among 3,007 validation cases, 200 (6.7%) were identified with a T-score ≤ -2.5. The AI system demonstrated excellent discrimination with an overall AUROC of 0.942 (95% CI, 0.923-0.962), a sensitivity of 91.0%, and a specificity of 82.7%. Subgroup analyses revealed robust performance across the two different study sites (AUROC 0.947 and 0.936, respectively) and genders. Crucially, the system maintained high sensitivity in the high-risk elderly population (≥60 years), effectively minimizing false negatives in the group with the higher disease prevalence.

Conclusion

This federated learning-based AI system achieves high accuracy for detecting low bone mineral density (T-score ≤ -2.5) from standard CXRs and demonstrates robust generalization across multiple institutions. By leveraging widely available imaging data, it offers a scalable solution for opportunistic screening, effectively identifying at-risk individuals who may require further definitive DXA assessment.

Acknowledgement

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P1679

AUTOMATED VERTEBRAL COMPRESSION FRACTURE ASSESSMENT SYSTEM USING DEEP LEARNING SEGMENTATION AND GEOMETRIC MORPHOMETRY ON LATERAL SPINE X-RAYS

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Objectives: Vertebral Compression Fractures (VCFs) are often underdiagnosed due to time-consuming manual measurements. This study aims to develop a fully automated Computer-Aided Diagnosis system integrating deep learning segmentation with geometric algorithms to locate Genant's semi-quantitative (SQ) diagnostic points for rapid VCF screening.

Material and Methods: A dataset of 192 lateral spine X-ray images was collected from a medical center, containing 1,576 individual vertebrae. The dataset distribution included 1,223 normal vertebrae and 353 fractured vertebrae (comprising 198 mild, 107 moderate, and 48 severe cases). We employed Mask R-CNN with a ResNet backbone for vertebral instance segmentation, which handles overlapping vertebral shadows better than traditional semantic segmentation (e.g., U-Net). A novel post-processing algorithm corrected rotation and identified six key landmarks (corners and endplate midpoints) to calculate height loss ratios based on standard SQ criteria. Performance was evaluated using the Dice coefficient for segmentation and Area Under the Curve (AUC) for fracture classification.

Results: The proposed Mask R-CNN model achieved a Dice coefficient of 0.871, significantly outperforming the U-Net (0.842) baseline in separating adjacent vertebrae. The automated six-point localization achieved an average Mean Absolute Error (MAE) of 23.46 pixels compared to expert ground truth. In the VCF classification task, the system demonstrated a high specificity of 94.61% and an accuracy of 88.01%. Although the sensitivity was 64.65% due to the high proportion of challenging mild fractures in the dataset, the AUC reached 0.796, indicating the system's robustness in distinguishing fractures from normal anatomy.

Conclusions: This study demonstrates the feasibility of an automated "segmentation-to-measurement" pipeline. By replicating the clinical standard Genant's method and providing interpretable morphometric data, this tool holds promise for integration into clinical workflows. Its high specificity makes it particularly suitable for large-scale screening to filter out normal cases and prioritize high-risk patients for radiologist review.

P1680

ANNUALIZED BONE MINERAL DENSITY CHANGES IN BREAST CANCER PATIENTS: A REAL-WORLD EXPLORATORY COMPARISON BETWEEN TRADITIONAL CHINESE MEDICINE AND ANTI-OSTEOPOROTIC THERAPY

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• Objective

Breast cancer patients are at increased risk of accelerated bone loss due to cancer-related treatments, including anti-hormonal therapy and ovarian suppression. While anti-osteoporotic medications are commonly prescribed to mitigate bone loss, traditional Chinese medicine (TCM) is also frequently used in Taiwan. However, data comparing bone mineral density (BMD) trajectories between these treatment approaches remain limited.

• Material and Method

To compare annualized BMD changes between breast cancer patients receiving TCM and those receiving anti-osteoporotic therapy in a real-world clinical setting, we retrospectively analyzed breast cancer patients aged ≥40 years with at least two BMD measurements. The index date was defined as the first DXA examination. Patients with prior TCM or anti-osteoporotic medication use before the index date were excluded. Each patient contributed one interval between the first and second DXA examinations. Annualized BMD change was calculated. Patients were categorized according to treatment exposure during the DXA interval. Baseline characteristics were compared, and multivariable-adjusted analyses are ongoing.

• Result

A total of 737 patients were included (TCM: 58; anti-osteoporotic therapy: 679). TCM users were younger than patients receiving anti-osteoporotic therapy, while baseline BMD values were comparable between groups. No statistically significant difference in annualized BMD change was observed between groups.

• Conclusion

In this preliminary real-world analysis, TCM use in breast cancer patients was not associated with an apparent worsening of BMD trajectories compared with anti-osteoporotic therapy. Given baseline differences and the exploratory nature of this study, further multivariable-adjusted and matched analyses are warranted.

• Limitation

This study is limited by the small sample size of the TCM group, baseline imbalance in age, and the lack of propensity matching in this preliminary analysis.

P1681

OPTIMISING OSTEOPOROSIS CARE FOR INPATIENTS IN GERIATRIC MEDICINE: A QUALITY IMPROVEMENT INITIATIVE AT A TERTIARY HOSPITAL IN SINGAPORE

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Objective

To increase comprehensive osteoporosis management (case identification, investigations, calcium/vitamin D supplementation, education, appropriate follow-up plans and dental clearance plans) rates for eligible patients at Singapore General Hospital (SGH) Geriatric Medicine (GRM) from a baseline of 8% to 70% within 3 months post-intervention.

Material and Methods

In ward 63 of Singapore General Hospital, under the department of GRM, crtitical gaps in osteoporosis management were identified: low identification rates, lack of patient education, lack of clear follow-up plans and dental clearance plans.

Baseline data were collected for 158 eligible patients (≥ 65 years, with fragility fractures or osteoporosis diagnosed via a Bone Mineral Density test, excluding those bedbound, chairbound, with prognosis ≤1year or creatinine clearance ≤20 ml/min). Cause-and-effect diagram identified contributing factors to low management rates. Pareto chart prioritised four key root causes: Poor awareness and knowledge among junior doctors, lack of standardized workflows, inadequate patient/family education, and inpatient dental clearance challenges. Interventions included structured doctor training, establishment of a standardized workflow, nurse-led education, and outpatient dental clearance pathway in collaboration with the National Dental Centre.

Results

Post-intervention data were collected for 76 eligible patients. Comprehensive osteoporosis management rates improved from 8% to 80%, while 9% declined treatment and 11% received partial management. Specifically, case identification improved from 51% to 93%, calcium/vitamin D supplementation from 78% to 96%, patient education from 16% to 88%, follow-up plans from 42% to 86%, and dental clearance plans from 36% to 80%. The initiative enhanced junior doctors' confidence, empowered patients, and helped address systemic barriers to continuity of osteoporosis care.

Conclusions

This initiative demonstrated that a structured, multidisciplinary approach can significantly enhance inpatient osteoporosis management, highlighting the need to proactively address osteoporosis, a condition that is often underrecognized and undertreated during inpatient care.

P1682

NEW INDICATORS RELATED TO THE OSTEOSARCOPENIA IN THE ELDERLY: ASSESSMENT OF INTRINSIC CAPACITY

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New Indicators Related to the Osteosarcopenia in the Elderly: Assessment of Intrinsic Capacity

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Abstract

Background

While intrinsic capacity (IC) has been associated with reduced sarcopenia risk, its relationship with osteosarcopenia remains unexplored. This study aimed to elucidate the association between IC and osteosarcopenia in older adults.

Methods

This cross-sectional study enrolled outpatient patients ≥ 60 years to investigate IC-osteosarcopenia associations. IC was quantified through a multidimensional score integrating cognition, mobility, vitality, psychological, and sensory domains. Osteosarcopenia was defined as concurrent osteoporosis and sarcopenia. Participants underwent stratification based on osteoporosis/sarcopenia comorbidity status. Multivariable-adjusted logistic models assessed IC-osteosarcopenia risk gradients, with subgroup analyses exploring age/sex-specific effects and comorbidity interactions.

Results

In this cohort of 461 older adults (median age 80 years), osteosarcopenia prevalence reached 26%. Logistic regression analysis identified: cognitive [odds ratio (OR): 0.871, 95% confidence interval (CI): 0.808–0.933] and sensory (OR: 0.633, 95% CI: 0.417–0.950) impairments specifically predicted osteosarcopenia, while vitality deficits demonstrated dual risks for both sarcopenia (OR: 0.820, 95% CI: 0.725–0.920) and osteosarcopenia (OR: 0.736, 95% CI: 0.648–0.826). Locomotor impairment and psychological distress emerged as pan-risk factors across sarcopenia, osteoporosis, and osteosarcopenia. Total IC scores exhibited dose-dependent associations with all three musculoskeletal outcomes ($P < 0.05$), maintaining significance across age/sex subgroups and after confounding variables adjustment.

Conclusion

Total IC score serves as a significant predictor of osteosarcopenia in elderly patients. Cognition, mobility, vitality, psychological, and sensory domains were associated with osteosarcopenia.

Keywords aged; osteosarcopenia; osteoporosis; sarcopenia; intrinsic capacity

P1683

SYNERGISTIC EFFECTS OF BONE-FORMING THERAPY AND INTEGRATED LIFESTYLE INTERVENTION ON BMD AND FUNCTIONAL INDEPENDENCE IN PATIENTS AT VERY HIGH RISK OF FRACTURE: A CASE SERIES

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Introduction:
Management of very high-risk osteoporotic patients requires more than just pharmacological intervention. While bone-forming agents significantly increase bone mineral density (BMD), the recovery of functional mobility is paramount in preventing falls and subsequent fractures. This study evaluates a multidisciplinary approach combining anabolic therapy with structured lifestyle interventions.

Methods:
Two postmenopausal women with severe osteoporosis (baseline T-score < -3.0) were followed over 24 months. The integrated intervention protocol included:

1. **Pharmacological Therapy:** Standard course of bone-forming agents.

2. **Nutritional Optimization:** Educator-led intake of Calcium, Vitamin D3, and high-quality protein.

3. **Exercise Physiology:** Supervised individualized resistance training targeting core stability and lower-limb power. Outcome measures included DXA-derived BMD (T-score), gait stability, and independence in Activities of Daily Living (ADLs).

Results:
Significant clinical improvements were observed across all parameters:

• **BMD Gain:** Patient 1 improved from a baseline T-score of -5.3 to -2.9; Patient 2 improved from -3.5 to -2.4.

• **Functional Mobility:** Both patients demonstrated marked progress in gait velocity and balance. Notably, Patient 1 transitioned from requiring walking aids to independent outdoor ambulation.

• **Safety & Falls:** Zero fall incidents or new fragility fractures were recorded during the 24-month follow-up, indicating enhanced dynamic postural control.

Conclusion:
This case series demonstrates that bridging bone-forming therapy with professional nutritional and exercise interventions creates a potent synergistic effect. Improving muscular stability and walking independence is as critical as BMD restoration in high-risk populations. This multidisciplinary model provides a robust clinical pathway for reducing fracture risk and improving quality of life.

P1684

A MULTI-DISCIPLINARY EXPERT CONSENSUS ON VITAMIN D DEFICIENCY DIAGNOSIS AND MANAGEMENT IN SAUDI ARABIA: INSIGHTS FROM A MODIFIED DELPHI PROCESS

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Background: Vitamin D is essential for skeletal health and has been increasingly recognized for potential extraskeletal benefits. Despite this, vitamin D deficiency remains highly prevalent, with corrective efforts largely focused on skeletal outcomes while neglecting extra-skeletal effects and region-specific challenges.
Aim: This modified Delphi consensus aimed to address these gaps in the Kingdom of Saudi Arabia (KSA).
Methods: Eleven multidisciplinary key opinion leaders from KSA participated in a structured process involving a premeeting survey, two in-person meetings, and three iterative survey rounds. Consensus, predefined as ≥75% agreement, was achieved across all 38 statements, which covered the current landscape of vitamin D deficiency in KSA, strategies for correction and maintenance, monitoring practices, and safety considerations.
Results: Key recommenda&ons included: (i) vitamin D deficiency contributes to disease development, while correction improves outcomes; (ii) oral supplementation is the primary correc&ve strategy in the Saudi context; (iii) screening should be limited to patients in whom deficiency impacts disease or treatment, with empiric supplementation preferred otherwise; (iv) dosing regimens of 50,000 IU weekly for deficient or empirically treated patients and 1,000–2,000 IU daily or 50,000 IU monthly for sufficient patients; (v) indefinite maintenance with monitoring every 3–6 months for screened patients; (vi) target serum 25-hydroxyvitamin D (25(OH)D) levels of ≥30 ng/mL for the general popula&on, ≥50–<60 ng/mL for the elderly, and ≥70 ng/mL for pa&ents with comorbidities; and (vii) a strong safety profile even at high doses. This consensus provides the first Saudi-specific clinical framework for managing vitamin

D deficiency, addressing both skeletal and extra-skeletal outcomes, and offering recommendations tailored to cultural and regional contexts.

Conclusion: This modified Delphi consensus provides a region-specific, evidence-based framework for the diagnosis and management of vitamin D deficiency in Saudi Arabia. Based on both clinical reali&es and feasibility, oral vitamin D supplementa&on was iden&fied as the primary correction strategy, with recommenda&ons for empiric supplementation in symptomatic and high-risk populations and selective screening where clinically justified. The consensus further emphasized consenuous supplementation, tailored dosing goals, and monitoring strategies that account for age, comorbidities, and safety considerations. Collectively, these recommendations address critical gaps in existing guidelines by integrating cultural and regional factors, providing a practical and clinically actionable framework for improving vitamin D outcomes in Saudi Arabia. Future research should evaluate the implementation and long-term impact of these recommendations on both skeletal and extra-skeletal health outcomes.

Keywords: Vitamin D, deficiency, Saudi Arabia, Delphi consensus, supplementa&on, guidelines, endocrinology.

Table 1 summarizes the consensus statements on the current landscape of vitamin D deficiency in KSA.

Table 1. Consensus statements on the current landscape of vitamin D deficiency in KSA

Consensus Statement	%Agreement
Vitamin D deficiency is prevalent across all age groups and therapy areas.	100%
Vitamin D deficiency is especially prevalent among females of childbearing age.	91%
Vitamin D deficiency is a cofactor in the development of many skeletal and extra-skeletal conditions.	100%
The correction of vitamin D deficiency is associated with observed improvements in patients' co-existing conditions.	100%

Table 2 summarizes the consensus statements on KSA-specific Strategies for Vitamin D Correction.

Table 2: Consensus statements on KSA-specific Strategies for Vitamin D Correction

Consensus Statement	%Agreement
Fortified foods should not be the only source of vitamin D for vitamin D-deficient patients.	100%
Sun exposure should not be considered the main source of vitamin D due to the darker skin tone of the Saudi population and the risks of skin cancer.	91%
The lack of demonstrated cost-effectiveness is the main barrier against universal screening for vitamin D deficiency.	91%
Patients who are recommended for vitamin D deficiency screening are: • *Age >65 years old* • *Metabolic bone disease (especially, rickets, osteoporosis, osteopenia, chronic myalgia, hyperparathyroidism, osteomalacia)* • *Malabsorptive conditions or procedures (especially, celiac disease, bariatric surgery)* • *Chronic Kidney disease* • *Liver impairment* • *Cancers (especially, lymphoma, myeloma)*	91%
A unified and accurate serum 25(OH)D assay should be implemented across KSA to prevent the over- or underestimation of vitamin D deficiency.	91%
Patients with deficient serum 25(OH)D levels (<30 ng/mL) should be prescribed a loading vitamin D dose.	91%
Patients with deficient serum 25(OH)D levels (<30 ng/mL) are advised to receive 50,000 IU weekly supplementation.	91%
Patients with sufficient serum 25(OH)D levels should be prescribed a maintenance dose of vitamin D.	100%
Screened general population with sufficient serum 25(OH)D levels (>30ng/mL) should be prescribed a maintenance dose of vitamin D.	100%
Individuals with sufficient serum 25(OH)D level (>30ng/mL) are advised to receive 1,000–2,000 IU daily or 50,000 IU monthly.	91%
Tailoring vitamin D dose and frequency according to patients' preferences has a positive impact on adherence.	91%
Weekly dosing rather than daily improves patient adherence.	100%
Empiric vitamin D treatment is the preferred alternative strategy to vitamin D screening.	91%
Patients who are advised for empiric treatment without screening are: • *All women (especially, infertile, pregnant, and menopausal women; women with gynecological and obstetrics conditions, especially, miscarriage, pre-eclampsia, gestational diabetes, breast and cervical cancer, polycystic ovary syndrome, uterine fibroids, endometriosis, Stress incontinence)* • *Autoimmune disorders (especially, fibromyalgia, inflammatory myopathy, systemic lupus erythematosus, rheumatoid arthritis)* • *Obesity* • *Diabetes mellitus* • *Dyslipidemia* • *Thyroid disorders (hypo- and hyperthyroidism, autoimmune thyroiditis)* • *Recurrent infections* • *Patients receiving certain medications (especially, steroids, proton-pump inhibitors, anti-lipids, anti-epileptics)*	91%
Patients eligible for empiric treatment are advised to receive 50,000 IU weekly.	82%
Certain patient profiles are advised to receive a loading dose >50,000 IU/week, such as those with malabsorptive conditions.	100%

Table 3 summarizes the consensus statements on the maintenance of sufficient vitamin D levels.

Table 3: Consensus statements on the maintenance of sufficient vitamin D levels

Consensus Statement	%Agreement
Patients receiving empiric treatment are recommended to maintain their treatment indefinitely.	100%
Vitamin D treatment is maintained rather than stopped once patients achieve sufficient 25(OH)D levels.	91%
Serum 25(OH)D should be monitored in: • *Patients eligible for screening* • *Patients remaining symptomatic despite receiving supplementation* • *Patients suspected of vitamin D toxicity*	100%
Patients eligible for monitoring should be tested every 3–6 months.	100%
Patients already receiving vitamin D treatment, yet still symptomatic, should be tested for potential need for dose adjustment.	91%
Patients who were eligible for a loading dose of >50,000 IU/week should be monitored every 3-6 months for their serum 25(OH)D level, bone profile, and renal function.	91%
The goal serum 25(OH)D level should be tailored according to patients' age, gender, and co-existing conditions.	100%
The treatment goal for the general population is a serum 25(OH)D level >30 ng/mL	100%
The treatment goal for the elderly (>65 years old) population is a serum 25(OH)D level >50 ng/mL. However, it should not exceed 60 ng/mL	100%
The treatment goal for patients with comorbid conditions is a serum 25(OH)D level >70 ng/mL	100%
Vitamin D dose should be increased if the patient does not achieve the goal 25(OH)D serum level.	91%
Vitamin D dose is administered on a more frequent dosing schedule if dose escalation is required.	82%

Figure 1. Vitamin D Management Framework*‡‡



*These lists are not exhaustive, but represent the most commonly encountered conditions in KSA. Non-mentioned conditions are screened or empirically treated upon the recommendations of the treating physician.
† Treatment goal differs according to patients' age, gender, and comorbid conditions. See Table 3.
‡ Higher dosage could be recommended according to the discretion of the treating physician. See tables 2 and 3 for recommendations regarding high-dose vitamin D supplementations.

P1685

MICRONUTRIENTS LEVELS AND THEIR ASSOCIATION WITH OSTEOPOROSIS AND DEPRESSION IN ELDERLY HYPERTENSIVE PATIENTS: A CASE–CONTROL STUDY

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Background: Older hypertensive patients frequently presented with osteoporosis and depressive symptoms. Micronutrient imbalance may contribute to this overlap, yet the combined biochemical profile of this population remains underexplored.

Objective: To determine whether serum vitamin D, calcium, and zinc levels differ between elderly hypertensive patients with osteoporosis and depressive symptoms and matched hypertensive controls.

Methods: A case control study was conducted among one hundred hypertensive adults aged sixty years or older. Clinical assessments and fasting laboratory tests were performed. Independent t tests, correlation coefficients, and regression models were applied.

Results: Cases showed significantly lower calcium (9.24 ± 0.50 vs 9.61 ± 0.36 mg/dL), vitamin D (33.82 ± 16.63 vs 46.24 ± 16.00 ng/mL), and zinc levels (0.0108 ± 0.0015 vs 0.0144 ± 0.0043 mg/L) than controls, with all comparisons reaching $p < 0.001$. Strong negative correlations were

observed between micronutrients and lipid markers, including calcium with cholesterol ($r = -0.312$) and zinc with triglycerides ($r = -0.301$). In reduced regression models, lower calcium and zinc independently predicted case status.

Conclusion: Elderly hypertensive patients with osteoporosis and depressive symptoms exhibit marked and clinically relevant reductions in calcium, vitamin D, and zinc. These findings identify key biochemical vulnerabilities that may warrant targeted nutritional assessment and intervention.

Keywords: calcium, vitamin D, zinc, hypertension, hypertensive elderly, osteoporosis, depression, elderly patients, micronutrient status, biochemical profile, case control study

- Table(1) Lipid Profile Comparison

Variable	Cases mean ± SD	Controls mean ± SD	t value	p value	Cohen's d
Total cholesterol	199.82 ± 40.84	156.36 ± 28.25	6.189	<0.0001	1.32
Triglycerides	164.84 ± 63.80	120.28 ± 28.88	4.499	<0.0001	1.01
HDL	39.20 ± 6.15	43.52 ± 5.32	−3.755	0.0003	0.78
LDL	127.65 ± 41.50	88.78 ± 30.07	5.363	<0.0001	1.12

Cohen's d values above 0.8 indicate large effect sizes.

- Table (2) Micronutrient Comparison

Variable	Cases mean ± SD	Controls mean ± SD	t value	p value	Cohen's d
Serum calcium	9.2400 ± 0.4973	9.6120 ± 0.3635	−4.270	<0.0001	0.89
Vitamin D	33.8200 ± 16.6251	46.2400 ± 16.0058	−3.806	0.0002	0.76
Zinc	0.0108 ± 0.0015	0.0144 ± 0.0043	−5.697	<0.0001	1.16

- Table (3) Smoking-Stratified Analysis

Non-smokers only (n=82)

Variable	Cases mean ± SD	Controls mean ± SD	p value
Calcium	9.310 ± 0.465	9.612 ± 0.363	0.0009
Vitamin D	36.06 ± 16.44	46.24 ± 16.00	0.0020
Zinc	0.0112 ± 0.0019	0.0144 ± 0.0043	0.0004

Smokers only (n=18, all cases)

No comparison possible because all smokers were in the case group.

P1686

BONE PROTECTIVE INTERVENTIONS TO MINIMISE FRACTURE RISK IN ADULTS LIVING WITH HIV: A SYSTEMATIC REVIEW AND ANALYSIS

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Objectives:
This systematic review and analysis evaluated evidence for bone protective interventions to minimise fracture risk in people living with HIV (PLWH).
Materials and methods
Following PRISMA guidelines, Ovid MEDLINE, EMBASE and the Cochrane library were searched on 13th August 2025 using MeSH and free-text terms related to HIV, vitamin D and bone health. Eligible studies included PLWH aged >16 years, published in English within 30 years. Study quality was assessed using CASP, RoB 2 and ROBINS-I tools. Quantitative data were standardised and analysed in Microsoft Excel, with visualisation in R (ggplot2). Significant heterogeneity precluded meta-analysis. Findings were narratively synthesised with reference to graphical outputs.
Results
Database searches identified 1632 studies, 17 met inclusion criteria, 11 contributed to statistical analysis and 6 to narrative synthesis. Studies (9 RCTs and 8 observational) included 1402 PLWH (aged 20.9-56.5 years). 11 statistically analysed studies described mean vitamin D3 800-5000 IU/day for 12 - 156 weeks. Doses above 1785 IU/day consistently raised serum 25(OH)D concentrations beyond 75 nmol/L, whereas ≤1000 IU/day did not. Higher doses (≥2000-4000 IU/day) produced the largest improvements in serum 25(OH)D, with modest or inconsistent effects on PTH, BALP and CTX. PTH suppression was greatest at lower vitamin D3 doses of 800 IU/day for 52 and 156 weeks (range 1.9-3.2 pmol/L, p=0.002). BMD changes were small (<2%) although two trials reported smaller lumbar spine and hip BMD decline with 4000 IU/day. Minimal changes in bone turnover markers were reported.
Narrative synthesis studies indicated dose, formulation and duration effects. Multimodal exercise regimens significantly improved lumbosacral BMD in PLWH with low baseline BMD.
Conclusion
Vitamin D3 supplementation in PLWH reliably increases serum 25(OH)D and suppresses PTH, although BMD effects are modest and appear dependent on dose, duration and baseline vitamin D status. Exercise improves lumbar spine BMD and is a useful adjunct. Evidence is limited by heterogeneity, small sample sizes and lack of fracture-related outcomes. Well powered trials are required to define optimal vitamin D3 dosing and long-term fracture outcomes in PLWH.

P1687

IMPACT OF THERAPEUTIC ADHERENCE ON WORK-RELATED IMPAIRMENT IN CHRONIC INFLAMMATORY RHEUMATIC DISEASES

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Introduction
Poor therapeutic adherence is a major contributor to treatment failure in chronic inflammatory rheumatic diseases (CIRDs). This study aimed to evaluate patients' adherence levels and to identify factors influencing treatment compliance .
Patients and Methods
This was a cross-sectional study including consecutive patients followed for rheumatoid arthritis (RA), spondyloarthritis (SpA), and psoriatic arthritis at our Rheumatology Department. Therapeutic adherence was evaluated using the Compliance Questionnaire for Rheumatology (CQR). Work-related outcomes were assessed using the Work Productivity and Activity Impairment questionnaire (WPAI) and the Workplace Activity Limitations Scale (WALS). Scores were compared between RA, SpA, and psoriatic arthritis to identify which disease was associated with greater work and activity impairment.
Results
We included 55 patient in the study. The mean age was 48.4 ± 13.6 years. The sex ratio (M/F) was 0.08, with a marked female predominance (48 women and 7 men). Patients were followed for rheumatoid arthritis in 63.3% of cases, spondyloarthritis in 26.7%, and psoriatic arthritis in 10%.. The mean DAS28-CRP score was 3.7 ± 1.07, and the mean ASDAS-CRP score was 2.1 ± 0.89. The mean pain visual analogue scale (VAS) score was 40.5 ± 20.3. The mean CQR score was 11.7 ± 2.7 (range: 8–18), indicating suboptimal adherence to disease-modifying therapy.
Patients with rheumatoid arthritis showed significantly higher WPAI scores compared with SpA and psoriatic arthritis , with respectively an overall impairment of health-related activities of 54 % for RA , 43% for SpA and 38 % for psoriatic arthritis . Similarly, WALS scores were higher in RA patients, indicating more severe workplace limitations. The average WALS score in RA was 17 ± 2.7,compared to 14±1.9 in psoriatic arthritis and 13 ±2.1 in SpA .
In multivariate analysis,worse WPAI and WALS scores were associated with RA(p=0.03), higher disease activity(p =0.02), pain intensity (0.03) ,and poor therapeutic adherence (p=0.04).
Conclusion
These findings highlight the substantial occupational burden of RA and underscore the importance of optimizing disease control and improving therapeutic adherence to preserve work participation in patients with inflammatory arthritis.

P1688

FACTORS ASSOCIATED WITH DIFFICULT-TO-TREAT RHEUMATOID ARTHRITIS IN THE ERA OF TREAT-TO-TARGET

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Introduction Difficult-to-treat rheumatoid arthritis (D2T-RA) is defined as RA with failure of at least two biologic and/or targeted synthetic disease-modifying antirheumatic drugs (bDMARDs and/or tsDMARDs) with different mechanisms of action, following inadequate response to conventional synthetic DMARDs.
The objective of this study was to describe the clinical profile of patients with D2T-RA and to identify factors associated with this condition.
Patients and Methods This was a cross-sectional study including patients with RA fulfilling the 2010 ACR/EULAR classification criteria. Sociodemographic, clinical, biological, radiological, and therapeutic data were collected using a carefully designed questionnaire. Patients meeting the EULAR definition of difficult-to-treat RA were identified. Statistical analysis was performed using SPSS software.
Results A total of 118 patients with RA receiving biologic therapy were included, comprising 99 women (83.9%) and 19 men (16.1%), with a male-to-female ratio of 0.19. The mean age was 56.86 ± 11.61 years (range: 28–81). Among these patients, 26 met the EULAR definition of difficult-to-treat RA. In this subgroup, the male-to-female ratio was 0.13 (23 women and 3 men), with a mean age of 53.42 ± 11.49 years (range: 31–71). Twelve patients (46.15%) had comorbidities, mainly arterial hypertension (34.61%) and dyslipidemia (11.53%). The mean body mass index (BMI) was 27.8 ± 4.04 kg/m² (range: 19.13–34.7). The mean disease duration was 14.5 ± 5.1 years (range: 5–23). Anti-citrullinated protein antibodies (ACPA) and rheumatoid factor (RF) were positive in 61.5% and 65.4% of cases, respectively. The mean current DAS28-ESR score was 4.23, and the mean baseline Health Assessment Questionnaire (HAQ) score was 1.7 ± 0.72. Destructive and erosive disease was observed in 96.2% of patients. Five patients (19.23%) had hip involvement (coxitis). Extra-articular manifestations were present in 13 patients (50%), including osteoporosis in 12 cases. None of the patients were weaned off corticosteroids. The mean current corticosteroid dose was 8.95 ± 5.37 mg/day (prednisone equivalent). The mean number of conventional synthetic DMARDs used was 2.75 ± 0.9. All patients had received at least two biologic agents. Anti-TNF therapies were the most frequently prescribed (65.4%), including monoclonal antibodies in 12 patients and etanercept in 5 patients. Rituximab and tocilizumab were used in 19.2% and 15.4% of cases, respectively.
The presence of cardiovascular comorbidities, particularly arterial hypertension, was significantly associated with difficult-to-treat RA ($p = 0.05$). Significant associations were also found between difficult-to-treat RA and high baseline inflammatory burden, ACPA positivity, and the presence of structural damage assessed by the Sharp score, with p-values of 0.02, 0.03, and 0.05, respectively.
Conclusion These findings highlight the need for a better understanding of the mechanisms underlying therapeutic resistance in rheumatoid arthritis, in order to identify treatment barriers and guide the implementation of new and personalized therapeutic strategies.

P1689

FACTORS ASSOCIATED WITH STRUCTURAL DAMAGE PROGRESSION IN RHEUMATOID ARTHRITIS

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Background: Despite advances in imaging, conventional radiography remains the reference standard for assessing structural damage progression in rheumatoid arthritis (RA).
Objectives: To describe radiographic joint damage in RA using validated scoring systems and to evaluate its progression over time and associated factors.
Methods: We conducted a retrospective longitudinal study including 103 consecutive RA patients fulfilling the 2010 ACR/EULAR criteria, followed at a tertiary rheumatology center between January 2022 and December 2024. Radiographic damage was assessed using Larsen, Sharp, modified Sharp, SENS, and Steinbrocker scores. Clinical, biological, and therapeutic data were collected. Factors associated with radiographic progression were analyzed.
Results: Women represented 76% of patients, with a mean age of 53 ± 12.5 years and a mean disease duration of 9 years. Disease activity was moderate to severe in over 80% of cases. Extra-articular manifestations were present in 92.2%, mainly sicca syndrome and osteoporosis. Rheumatoid factor and anti-CCP antibodies were positive in 75% and 66% of patients, respectively. Almost all patients received methotrexate (99%), with a mean initiation delay of 34 months, and 28.2% were treated with biologic therapy. Thirty-five percent of patients had at least two radiographs. The mean interval between the first and second radiographs was 3.0 ± 2.4 years. Significant radiographic progression was observed, with the global Larsen score increasing from 33.9 to 45.9 and the Sharp score from 24.2 to 105.4. Moderate to rapid progression was observed in 53.1% of patients.
Factors associated with radiographic progression included the number of tender joints at diagnosis, disease duration, platelet count, and inflammatory activity assessed by DAS28-ESR and DAS28-CRP.
Conclusion:
Structural damage in RA remains severe and progresses significantly, particularly in the absence of early optimal treatment. Early diagnosis and rigorous radiographic monitoring are essential to optimize therapeutic strategies and improve long-term outcomes.

P1690

THE OCCUPATIONAL BURDEN OF CERVICOBRACHIAL NEURALGIA AMONG MEDICAL SECRETARIES

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Introduction Cervicobrachial neuralgia (CBN) is a frequent cause of functional impairment in the working population. Medical secretaries are particularly exposed to this musculoskeletal disorder due to prolonged static postures and intensive computer use. Identifying associated factors and assessing the functional impact in this population are essential to guide preventive and therapeutic strategies.
Objective The aim of this study was to assess the prevalence and clinical characteristics of cervicobrachial neuralgia among medical secretaries, as well as its impact on quality of life.
Materials and Methods A descriptive cross-sectional study was conducted in September 2025 among medical secretaries working at our hospital. A carefully designed anonymous self-administered questionnaire was used to collect sociodemographic data and ergonomic work habits. Functional disability and neuropathic pain were assessed using the Neck Disability Index (NDI) and the DN4 questionnaire (Douleur Neuropathique en 4 questions), respectively.
Results Twenty-three medical secretaries were included, all of whom were female. The mean age was 45.7 ± 7.1 years (range: 37–60). The most common comorbidities were diabetes mellitus and arterial hypertension, each present in 13% of cases. Most participants reported no prior medical history (73.9%). The mean body mass index (BMI) was 29.45 ± 3.25 kg/m². The mean professional seniority was 18.3 ± 9.1 years, and the average daily computer working time was 5.3 ± 1.1 hours. Eighty-seven percent of participants reported no regular physical activity. Ergonomic workstation adaptation was reported by 91% of participants. Clinically, 87% of participants presented with cervicobrachial neuralgia. Pain was bilateral in 56.5% of cases. The mean duration of symptoms was 7.5 ± 4.8 years. The most frequently involved nerve roots were C5 (56.5%), C6 (34.8%), C7 (8.7%), and C8 (4.3%). The mean pain intensity on the visual analogue scale (VAS) was 5.2 ± 1.7. Paresthesia was reported by 60.9% of participants, and motor deficit was observed in 26.1%. The main aggravating factors were prolonged work duration (43.5%) and constrained postures (34.7%). Regarding management, analgesics and nonsteroidal anti-inflammatory drugs (NSAIDs) were used by 82.6% and 52.1% of participants, respectively. More than half (60.9%) had consulted a healthcare professional at least once, whereas 39.1% had not sought medical advice. Functional rehabilitation was undertaken by 26.1% of participants. The mean DN4 score was 3.2 ± 2, suggesting a frequent neuropathic component. The mean Neck Disability Index score was 17 ± 9.2, indicating an overall moderate level of disability. Moderate disability was observed in 47% of participants, while 43% presented with mild disability.
Conclusion Cervicobrachial neuralgia appears to be a significant occupational health issue among medical secretaries, largely related to prolonged static postures and extended screen time. These findings emphasize the importance of ergonomic workplace adjustments, regular breaks, adapted physical activity, and improved access to rehabilitation in order to reduce the functional impact of this condition.

P1691

ADDRESSING CHRONIC PAIN IN RHEUMATOID ARTHRITIS: WHERE DO WE STAND?

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Introduction: Chronic pain is a common and disabling manifestation of rheumatoid arthritis (RA). It arises from a multifactorial interplay between inflammatory activity, neurophysiological alterations, and psychosocial factors, and may persist even when inflammatory disease activity is adequately controlled.
Objective: To evaluate chronic pain in patients with RA and to identify factors associated with pain severity.
Methods: This retrospective longitudinal study was conducted in the Department of Rheumatology at Fattouma Bourguiba University Hospital, Monastir, over a 3-year period (2022–2024). Patients fulfilling the 1987 ACR and/or 2010 ACR/EULAR classification criteria for RA were included. Pain intensity was assessed using the visual analogue scale (VAS). Clinical, biological, and therapeutic data were collected, and factors associated with pain severity were analyzed.
Results: A total of 103 patients were included, with a mean age of 53 ± 12.5 years and a marked female predominance. The mean disease duration was 9 years. Chronic pain was almost constant, with a mean VAS score of 5.35 ± 1.08, indicating moderate pain. Severe pain was reported in 34% of patients and was associated with higher DAS28-ESR scores, a greater number of tender joints, more frequent joint deformities, and more pronounced functional symptoms, including morning stiffness and nocturnal awakenings. Despite treatment with methotrexate in 99% of patients and biologic therapy in 28.2%, pain frequently persisted. Patients receiving biologic therapy showed a modest reduction in mean pain intensity compared with those on conventional therapy (VAS 4.9 vs. 5.5), without complete pain relief.
Conclusion: Chronic pain remains highly prevalent among patients with RA, including those treated with advanced therapies. These results underscore the importance of a comprehensive, multidimensional pain assessment that integrates inflammatory, mechanical, neuropathic, and psychosocial components in order to guide personalized pain management strategies.

P1692

IS ANTI–CITRULLINATED PROTEIN ANTIBODY POSITIVITY PREDICTIVE OF DIFFICULT-TO-TREAT RHEUMATOID ARTHRITIS?

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Introduction :
Difficult-to-treat rheumatoid arthritis (D2T-RA) remains a significant challenge in routine clinical practice. Early identification of patients at risk of developing D2T-RA may allow more timely and personalized therapeutic interventions. Anti–citrullinated protein antibodies (ACPA) are well established as markers of disease severity and structural damage in rheumatoid arthritis (RA); however, their potential role in predicting the development of D2T-RA is not well defined.
Objective :
We aim to assess the association between ACPA positivity and the occurrence of difficult-to-treat rheumatoid arthritis.
Methods :
We conducted a cross-sectional study including patients with RA fulfilling the 2010 ACR/EULAR classification criteria. D2T-RA was defined according to the 2021 EULAR definition. Sociodemographic, clinical, biological, radiological, and therapeutic data were collected using a carefully designed questionnaire. ACPA status was recorded at baseline. Statistical analysis was performed using SPSS software.
Results :
A total of 118 patients with rheumatoid arthritis treated with biologic agents were included. The cohort comprised 99 women (83.9%) and 19 men (16.1%), yielding a male-to-female ratio of 0.19. The mean age was 56.9 ± 11.6 years (range 28–81). Twenty-six patients fulfilled the EULAR definition of difficult-to-treat rheumatoid arthritis. In this subgroup, the male-to-female ratio was 0.13 (23 women and 3 men), with a mean age of 53.4 ± 11.5 years (range 31–71). IN patients with D2T-RA , Anti–citrullinated protein antibodies and rheumatoid factor were positive in 61.5% and 65.4% of patients, respectively.
In both univariate and multivariate analysis, ACPA positivity remained independently associated with D2T-RA (p=0.02).
Conclusion :
ACPA positivity is independently associated with difficult-to-treat rheumatoid arthritis. ACPA status may represent a useful biomarker to identify patients at higher risk of developing D2T-RA and could support early personalized therapeutic strategies.

P1693

EVALUATING PRIMARY CARE PHYSICIANS' AWARENESS OF PREGABALIN: PROPER USE AND MISUSE

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Introduction
Primary care physicians are often the first point of contact in the healthcare system and play a crucial role in guiding patients and coordinating their care. In recent years, medication misuse has increased, particularly for certain drug classes such as gabapentinoids, where new patterns of abuse have emerged.
Objective
The primary objective of this study was to evaluate the level of knowledge of primary care physicians about pregabalin, with a focus on its appropriate use and the risk of misuse.
Methods
This was a cross-sectional analytical study conducted over a two-month period, from February 1 to April 1, 2025, among primary care physicians practicing in different regions.
Results
A total of 40 participants were included in the study, of whom 28 (70%) were women. The mean age was 31 years (range: 26–41). Participants were distributed as follows: 24 family medicine residents (60%), 8 private practitioners (20%), and 8 public health physicians (20%). Thirty-three participants (82.5%) practiced in urban areas, while 7 (17.5%) practiced in rural settings. Regarding additional training, 4 participants (10%) had completed a university certificate (CEC) in pain management, 4 (10%) in addiction medicine, 1 (5%) in pharmacology, and 29 participants had completed other certificates. The mean global knowledge score of primary care physicians regarding pregabalin was 13.1 (range: 7.69–18.51), with a maximum possible score of 34. Among the participants, 67.5% had a total score below 17 (the mean score), while 32.5% achieved a score above 17.
In univariate analysis, female physicians were significantly more likely to have a score below 17 (77.8%, p = 0.045). Professional status (resident versus practicing physician), workplace setting (urban versus rural), and completion of a CEC in addiction medicine, psychiatry, pain management, or pharmacology were not significantly associated with the knowledge score.
Conclusion
The assessment of primary care physicians' knowledge of pregabalin revealed significant gaps and insufficient information. These findings highlight the need for targeted interventions. Continuous medical education on pregabalin is therefore essential to improve physicians' expertise and ensure safe, optimal, and individualized patient care.

P1694

ASSESSMENT OF MEDICATION ADHERENCE AND ASSOCIATED FACTORS IN PATIENTS WITH CHRONIC INFLAMMATORY RHEUMATIC DISEASES

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Introduction

Poor therapeutic adherence is a major contributor to treatment failure in chronic inflammatory rheumatic diseases (CIRDs). This study aimed to evaluate patients' adherence levels and to identify factors influencing treatment compliance .

Patients and Methods

This was a cross-sectional study including consecutive patients followed for rheumatoid arthritis (RA), spondyloarthritis (SpA), and psoriatic arthritis at the Rheumatology Department of Monastir. Therapeutic adherence was evaluated using the Compliance Questionnaire for Rheumatology (CQR).

Results

We included 55 patient in the study. The mean age was 48.4 ± 13.6 years. The sex ratio (M/F) was 0.08, with a marked female predominance (86 women and 7 men). Patients were followed for rheumatoid arthritis in 63.3% of cases, spondyloarthritis in 26.7%, and psoriatic arthritis in 10%. The most frequent comorbidities were diabetes mellitus and arterial hypertension, observed in 35.2% and 20.6% of patients, respectively. The mean disease duration was 13.53 ± 5.3 years (range: 1 month to 40 years). The mean DAS28-CRP score was 3.7 ± 1.07, and the mean ASDAS-CRP score was 2.1 ± 0.89. The mean pain visual analogue scale (VAS) score was 40.5 ± 20.3. The mean CQR score was 11.7 ± 2.7 (range: 8–18), indicating suboptimal adherence to disease-modifying therapy. The mean Pain Catastrophizing Scale (PCS) score was 24.25 (range: 12–44). A clinically significant level of catastrophizing (PCS > 30) was observed in 14 patients (25.4%).

Poor therapeutic adherence was significantly associated with higher disease activity and the presence of osteoporosis, with p-values of 0.03 and 0.04, respectively.

Conclusion

These results emphasize the need for a multidisciplinary and holistic approach to improve treatment efficacy and long-term outcomes in chronic inflammatory rheumatic diseases.

P1695

DOES SOCIAL SUPPORT PREDICT BETTER THERAPEUTIC ADHERENCE IN CHRONIC INFLAMMATORY RHEUMATIC DISEASES?

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Introduction:

Chronic inflammatory rheumatic diseases (CIRDs) are common conditions with a considerable impact on patients' quality of life. Optimal disease control relies on strict adherence to treatment. Identifying factors influencing therapeutic adherence, particularly psychosocial factors, represents a major challenge in rheumatology. This study aimed to evaluate the potential role of perceived social support on therapeutic adherence in patients with CIRDs.

Patients and Methods:

This was a cross-sectional study consecutively including patients followed for rheumatoid arthritis (RA), spondyloarthritis (SpA), and psoriatic arthritis at our Rheumatology Department. Perceived social support was assessed using the Multidimensional Scale of Perceived Social Support (MSPSS), and therapeutic adherence was evaluated using the Compliance Questionnaire for Rheumatology (CQR).

Results:

A total of 55 patients were included. The mean age was 48.4 ± 13.6 years. The sex ratio (M/F) was 0.08, with a marked female predominance (86 women and 7 men). Patients were followed for RA in 63.3% of cases, SpA in 26.7%, and psoriatic arthritis in 10%. The most common comorbidities were diabetes mellitus and arterial hypertension, present in 35.2% and 20.6% of patients, respectively.

The mean disease duration was 13.53 ± 5.3 years (range: 1 month to 40 years). The mean DAS28-CRP was 3.7 ± 1.07, and the mean ASDAS-CRP was 2.1 ± 0.89. The mean pain visual analogue scale (VAS) score was 40.5 ± 20.3.

The mean total MSPSS score was 50.25 [21–83], reflecting a moderate level of perceived overall social support. Social support was perceived as "low" in 9 patients (16.3%), "moderate" in 27 patients (49%), and "high" in 19 patients (34%). The mean scores for the MSPSS subscales were 19.14 ± 5.5 for perceived family support, 14.83 ± 7.5 for support from a significant other, and 16 ± 6.5 for support from friends. The mean CQR score was 11.7 ± 2.7 [8–18], indicating suboptimal adherence to disease-modifying therapy.

A significant association was observed between good therapeutic adherence and a high level of perceived family support ($p = 0.03$) as well as overall perceived social support ($p = 0.02$).

Conclusion:

Our study showed that perceived social support significantly impacts therapeutic adherence in patients with chronic inflammatory rheumatic diseases, highlighting the importance of integrating the psychosocial dimension into their comprehensive management

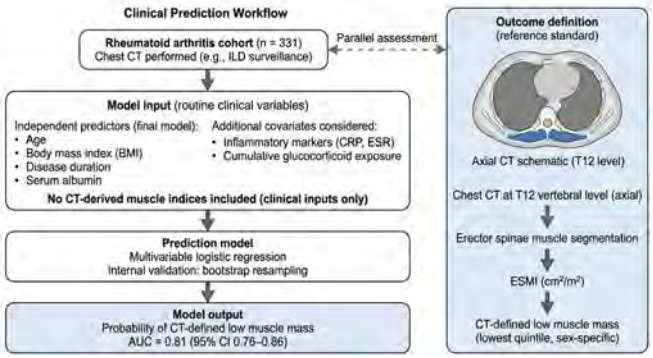
P1696

PREDICTION OF CHEST CT-DEFINED LOW MUSCLE MASS IN RHEUMATOID ARTHRITIS USING ROUTINE CLINICAL DATA

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Objective
Low muscle mass is a key component of sarcopenia and increasingly recognized as clinically important in rheumatoid arthritis (RA), contributing to functional impairment and poor outcomes. However, routine muscle mass assessment is seldom performed due to limited availability of body composition tools. We aimed to develop and internally validate a clinical prediction model for identifying RA patients at high risk of chest CT-defined low muscle mass using readily accessible clinical variables.
Methods
We conducted a retrospective study of RA patients who underwent chest CT at a tertiary referral center. The erector spinae muscle was manually segmented at the T12 vertebral level on axial CT images, and the cross-sectional area of the erector spinae muscle was normalized for height squared to derive the erector spinae muscle index (ESMI, cm^2/m^2). Low muscle mass was defined using sex-specific cut-offs corresponding to the lowest ESMI quintile. Clinical variables-age, body mass index (BMI), disease duration, inflammatory markers, serum albumin, and cumulative glucocorticoid exposure-were extracted from medical records. A multivariable logistic regression model was constructed to identify independent predictors of low muscle mass, and model performance was evaluated using the area under the receiver operating characteristic curve (AUC) with bootstrap resampling for internal validation.
Results
Of 331 RA patients included, 67 (20.2%) met criteria for CT-defined low muscle mass. Compared with those without low muscle mass, affected patients were older, had lower BMI and serum albumin levels, longer disease duration, and higher inflammatory burden. On multivariable analysis, older age, lower BMI, longer disease duration, and lower albumin levels emerged as independent predictors of low muscle mass. The model demonstrated excellent discrimination, with an AUC of 0.81 (95% CI, 0.76–0.86).
Conclusion
A straightforward clinical prediction model based exclusively on routinely collected clinical data can effectively identify RA patients at elevated risk of chest CT-defined low muscle mass. This approach may facilitate risk stratification in settings where CT imaging is not readily accessible and enable opportunistic sarcopenia screening without additional radiation exposure or cost in patients undergoing routine chest CT surveillance.



P1697

THE ROLE OF PHOSPHOLIPASE C-Γ1 IN SARCOPENIA VIA REGULATION OF MITOCHONDRIAL CALCIUM UPTAKE

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Objective:
Sarcopenia is an age-related systemic muscular disorder characterized by loss of muscle mass and function. Its pathogenesis remains incompletely understood, and there is currently no targeted treatment. Ca^{2+} signaling plays a crucial role in maintaining muscle function. This study aims to investigate the role and potential mechanism of phospholipase C-γ1 (PLC-γ1), a key enzyme regulating intracellular Ca^{2+} release, in sarcopenia.
Methods:
PLC-γ1 expression was examined in skeletal muscle tissues from elderly (>80 years) and young (<30 years) individuals to determine whether it declines with age. Skeletal muscle-specific PLC-γ1 knockout mice were generated to assess the impact of PLC-γ1 on muscle function. Both control and knockout mice were intraperitoneally injected with dexamethasone to establish a sarcopenia model. Muscle strength was evaluated using treadmill and grip strength tests. Muscle fiber number, cross-sectional area, fat accumulation, and fibrosis were observed via H&E staining, immunofluorescence, Sirius Red staining, and Oil Red O staining. Proteomic sequencing of skeletal muscle tissue was performed, revealing involvement of mitochondrial calcium uptake signaling. Mitochondrial calcium uptake was visualized by confocal microscopy. Mitochondrial morphology was examined using electron microscopy and MitoTracker staining. Reactive oxygen species (ROS) levels were detected with the DCFH-DA fluorescent probe, and mitochondrial membrane potential was measured using the JC-1 fluorescent probe.
Results:
PLC-γ1 expression was reduced in skeletal muscle of elderly individuals. Skeletal muscle-specific PLC-γ1 knockout mice exhibited decreased endurance and reduced muscle fiber cross-sectional area. In the sarcopenia model, knockout mice showed more severe muscle atrophy and altered mitochondrial morphology. In vitro knockdown of PLC-γ1 led to decreased mitochondrial calcium uptake, mitochondrial shrinkage and fragmentation, significantly increased intracellular ROS, and reduced mitochondrial membrane potential.
Conclusion:
PLC-γ1 maintains mitochondrial function by promoting mitochondrial calcium uptake, thereby mitigating muscle atrophy in sarcopenia.

P1698

DIAGNOSTIC AND TREATMENT PATTERNS IN OSTEOPOROSIS: A RETROSPECTIVE REAL-WORLD ANALYSIS FROM A TERTIARY PM&R CENTER

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Objectives
Osteoporosis is a major public health problem that reduces quality of life and imposes a significant economic burden, particularly in aging societies. This study aimed to retrospectively evaluate the demographic, biochemical, and clinical characteristics of patients diagnosed with osteoporosis who presented to the Physical Medicine and Rehabilitation outpatient clinics of our hospital, and to provide an overview of diagnostic and treatment patterns in clinical practice.
Methods
This retrospective study included patients diagnosed with osteoporosis who attended the Physical Medicine and Rehabilitation outpatient clinics at Göztepe Prof. Dr. Süleyman Yalçın City Hospital between December 1, 2024, and December 1, 2025. Evaluated variables included age, sex, presence of pathological fractures, serum 25-hydroxyvitamin D levels, lumbar spine and femoral neck BMD T-scores, and osteoporosis treatments.
Results
Among 2,823 screened patients, 1,556 patients with osteoporosis were included (91.6% female, mean age 68.9 years). Pathological fractures were present in 592 patients (38.0%). Based on BMD T-scores, 35.6% had T-scores between −2.5 and −3.0, and 24.0% ≤ −3.0. Notably, 40.4% of patients had T-scores > −2.5 (i.e., not osteoporotic by DXA criteria) but presented with pathological/fragility fractures. The most frequently prescribed treatments were denosumab (30.1%), alendronate (25.9%), zoledronic acid (19.9%), romosozumab (0.2%), and vitamin D (± calcium) supplementation alone (11.8%). Treatment distribution differed significantly according to fracture status ($p < 0.003$) and T-score severity ($p < 0.002$), with an increased use of denosumab and zoledronic acid—agents with proven efficacy in preventing new fractures—among patients with lower T-scores and higher fracture risk.
Conclusion
Osteoporosis treatment choices in clinical practice are closely associated with fracture presence and BMD severity. The low proportion of male patients highlights the need for improved awareness and screening. This study provides a comprehensive overview of osteoporosis management and emphasizes the importance of a holistic approach beyond bone health alone.

P1699

A REAL-WORLD STUDY ON THE EFFICACY AND ADVERSE EVENTS OF ROMOSOZUMAB IN CHINESE PATIENTS WITH OSTEOPOROSIS

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Purpose: To analyze the therapeutic and adverse effects of romosozumab among female osteoporosis patients at very high fracture risk in China.
Methods:A retrospective study initiated in October 2024 until December 2025, involving postmenopausal women with severe osteoporosis who are treated with romosozumab. Bone mineral density (BMD) at the lumbar spine (L1-L4), femoral neck, and total hip were measured by dual-energy X-ray absorptiometry at baseline, 6 months and 12 months. Serum bone turnover markers and calcium-phosphate metabolism parameters were also monitored.
Results: Among the 55 female patients, 56.3% were treatment-naive. The mean age ± standard deviation for treatment-naive patients and previously treated patients was 70.2 ± 9.3 years and 73.0 ± 8.6 years, respectively.The previous osteoporosis treatments were denosumab (36.8%), zoledronic acid (31.6%), and teriparatide (15.8%), with 15.8% of patients having received two or more types of medication. At 6 and 12 months of romosozumab treatment, the mean percentage increases in BMD from baseline were 7.4% and 16.6% at the lumbar spine, 2.8% and 5.9% at the total hip, and 3.0% and 7.5% at the femoral neck, respectively. All changes were statistically significant compared with baseline.When analyzed by prior treatment history, treatment-naive patients showed a 11.2% increase in lumbar spine BMD at 6 months, whereas previously treated patients showed a 2.8% increase. For the femoral neck, the increases were 3.1% and 3.3%, and for the total hip, 2.3% and 2.8%, respectively.No significant complications related to cardiac or other organ diseases were observed during treatment.
Conclusion: Significant improvements in lumbar spine, total hip, and femoral neck BMD were observed following 6 and 12 months of romosozumab treatment, according to real-world evidence.

P1700

THE INTERNATIONAL CLASSIFICATION OF FUNCTIONING, DISABILITY AND HEALTH AS A FRAMEWORK FOR A COMPREHENSIVE REHABILITATION PROGRAM IN GERIATRIC OSTEOPOROSIS - A CASE REPORT

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Objective(s): To integrate a comprehensive rehabilitation program in a geriatric patient with osteoporosis using the International Classification of Functioning, Disability and Health (ICF).
Material and Methods: This case report refers to a 90-year-old female patient with osteoporosis and a left intertrochanteric fracture due to a fall. Assessment was performed using the icf-core-sets.org platform, incorporating categories from the Rehabilitation Set, the Comprehensive Osteoporosis Core Set, and the Comprehensive Geriatrics Core Set.
The patient was hospitalized for approximately two months. Upon admission, she was able to maintain a sitting position with minimal assistance. Clinical assessment revealed mild pain in the right shoulder and right knee. Muscle strength was preserved in assessed muscle groups except those which could not be examined due to surgery.
Regarding the domain of Body Functions, mental functions were largely preserved. Where impairments were present (e.g. Energy and drive functions – b130), they were mild and considered age-related. Moderate impairment was observed in Sensation of pain (b280), Blood pressure functions (b420), Defecation functions (b525) and Mobility of joint functions (b710). Notably, severe impairment was identified in Gait pattern functions (b770) and within the Body Structures domain in the Structure of lower extremity (s750), respectively.
Regarding Activities and Participation domain, the greatest limitation was in the category Moving around (d455). Environmental Factors were predominantly identified as facilitators, based on the patient's report.
Results: Based on the assessment findings, the patient was enrolled in an individualized inpatient rehabilitation program including medical treatment, physiotherapy, occupational therapy and psychological support.
Functional improvements were observed at discharge. She achieved independent sitting and standing with minimal assistance and was able to ambulate short distances with good balance using a walker, while a wheelchair was required for longer distances. The aforementioned outcomes were achieved while considering the patient's psychological status and her expectations from the rehabilitation program.
Conclusion(s): The use of icf-core-sets.org platform enabled a comprehensive rehabilitation program beyond a disease-centered approach, allowing consideration of the multidimensional impact of osteoporosis on the older individual's functional ability and independence in everyday life.

P1701

OSTEOPOROSIS DOCUMENTATION FOLLOWING HIP FRACTURE: A RETROSPECTIVE COHORT STUDY FROM A TERTIARY HOSPITAL

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Objective: Hip fractures are among the most common consequences of osteoporosis, yet adequate documentation of the diagnosis in medical records remains suboptimal. Evidence suggests that formal documentation increases the likelihood of treatment initiation. This study aimed to assess the rate of osteoporosis diagnosis following hip fractures in a tertiary hospital and to examine the association between diagnosis documentation and several outcomes.
Material and Methods: Population data extraction and exploration were done with the MDClone big data platform (ADAMS), and included patients aged ≥60 hospitalized with ICD-coded hip fractures between 2007-2024.
Results: The cohort comprised 6,933 patients, of whom 4,405 (63.5%) were women, with a mean age of 81.3 years. A total of 4,150 patients (59.8%) were discharged with a diagnosis of osteoporosis or osteoporotic fractures. A marked increase in documentation rates was observed after 2015, coinciding with nurse practitioner involvement. In a sub-analysis of patients who sustained fractures between 2016 and 2024, a lethal outcome was less likely among those with accurate documentation of osteoporosis, (adjusted HR 0.71; 95% CI, 0.64–0.78). No statistically significant differences were observed in subsequent osteoporotic fractures, rehospitalization, major infections and cerebrovascular ischemic events.
Conclusions: The rate of osteoporosis documentation following hip fractures was substantially higher than reported in the literature from centers without fracture liaison services. The inclusion of a dedicated nurse practitioner was associated with a significant increase in documentation of osteoporosis diagnosis. The observed association between accurate documentation and the lower mortality requires further exploration.

P1702

HOW COMMON IS IT? HIGH AND VERY HIGH-RISK FRACTURE RATES AMONG PATIENTS WITH A NON-OSTEOPOROTIC-RANGE BONE MINERAL DENSITY IN A DXA DATABASE FROM A TERTIARY MEDICAL CENTER

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Objective: Fracture risk assessment has become a mainstay of osteoporosis management. Treatment paradigms for patients with a high or, especially, very high fracture risk based on FRAX assessment prioritize first-line anabolic treatment, even when bone mineral density (BMD) is in the non-osteoporotic (NOP) range. However, data regarding the prevalence of high or very high fracture risk among patients with NOP-range BMD are scarce.

Material and Methods: We utilized computerized BMD data from a tertiary medical center between 2024 and 2025. BMD was measured by the Lunar Prodigy Advance densitometer, and country-specific FRAX calculation ± Trabecular Bone Score (TBS) adjustment was performed by the Encore v18 software. Risk factors were reported by a self-administered questionnaire. Patients were classified as osteoporotic according to T-score ≤-2.5 at either the femoral neck, total hip, or at least two lumbar spine vertebrae. High/very high fracture risk was defined as ≥3/4.5% for hip, or ≥20/30% for major osteoporotic fractures (MOF), respectively. Statistical analysis was performed using Python.

Results: Five thousand and fifteen patients aged 40 years or older (40.3% males, age 66.8 ± 8.9 years) performed BMD test during the study period and were included. Overall, 1523 (30.4%) were classified as osteoporotic and 3492 (69.6%) with a NOP BMD. Among those with a NOP BMD, 1054 (30.2%) had high hip fracture risk, while 639 (18.3%) had very high risk. In contrast, regarding MOF, only 199 (5.7%) had high risk, and 52 (1.5%) had very high risk. TBS adjustment did not significantly change these proportions (high/very high hip fracture risk: 28.9%, p=0.248/17.2% p=0.247, high/very high MOF risk 4.7%, p=0.067;/1.0%, p=0.051).

Patients with BMD-defined osteoporosis, compared to patients in the NOP high-risk group, were younger (67.9 vs. 73.8 years, p<0.001), more likely to be female (82.6% vs. 55.6%, p<0.001), and to have lower BMI (25.5 vs. 27.1 kg/m², p<0.001). Among those with NOP-range BMD, the mean lumbar spine1-4/femoral neck/total hip T-score was 0.10±1.58/-1.24±0.86/-0.56±1.07, respectively.

Conclusions: The proportion of patients with high or very high fracture risk categories despite NOP BMD is substantial and driven primarily by hip fracture risk. These data can inform reimbursement policy decisions regarding first-line anabolic treatment.

P1703

TRABECULAR BONE SCORE (TBS): A CRITICAL COMPLEMENTARY TOOL TO DXA FOR ENHANCED FRACTURE RISK STRATIFICATION IN CLINICAL PRACTICE

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Background

Osteoporosis diagnosis and fracture risk assessment traditionally rely heavily on Bone Mineral Density (BMD) measured by Dual-energy X-ray Absorptiometry (DXA). While BMD is a strong predictor of fracture risk, it accounts for only approximately 60% of fracture incidence, often classifying patients who still suffer fragility fractures as "non-osteoporotic. The Trabecular Bone Score (TBS) is a non-invasive texture parameter extracted from standard lumbar spine DXA images. TBS provides skeletal information regarding bone microarchitecture—specifically the quality and integrity of the trabecular network—that is *not* captured by the standard two-dimensional BMD measurement. TBS has been established as an independent risk factor for fracture, offering a crucial complementary assessment to enhance the precision of clinical fracture risk prediction.

Objective(s)

This study aims to evaluate the clinical utility of integrating the Trabecular Bone Score (TBS) with standard Bone Mineral Density (BMD) assessment via DXA to refine fracture risk prediction in a clinical cohort. Specifically, the study seeks to: 1) determine the prevalence of poor bone microarchitecture (low TBS) in patients classified as osteopenic or non-osteoporotic by BMD criteria; and 2) quantify the improvement in fracture risk stratification when TBS is incorporated into the assessment (e.g., used to adjust Fracture Risk Assessment Tool (FRAX) scores).

Methods

This was a retrospective/prospective (choose one) cohort study involving 167 postmenopausal men and women (age range 60-90 years old) undergoing routine osteoporosis screening. All participants underwent a standard DXA scan of the lumbar spine, hip, and femoral neck, providing T-scores and BMD values. TBS was subsequently calculated from the existing lumbar spine DXA files using ……..software. Patients were initially categorized based on WHO BMD criteria. The primary analysis involved reassessing fracture risk by incorporating the TBS value to adjust the 10-year probability of major osteoporotic fracture and hip fracture, typically using the TBS-adjusted FRAX score. Statistical analyses included logistic regression to compare the ability of BMD alone versus the combined BMD + TBS approach to correctly reclassify patients into high- and low-risk categories based on their clinical fracture history.

Results:

Analysis demonstrated that a low Trabecular Bone Score (TBS) was significantly and independently associated with both a history of fracture

and the incidence of new clinical fractures within the study cohort. Specifically, for every decrease of one standard deviation in TBS, the risk of a major osteoporotic fracture increased by [1.3 times (Odds Ratio: 1.3, P < 0.001], an effect that was shown to be largely independent of the standard Bone Mineral Density (BMD) measurement (Adjusted R^2 for the model increased by 8% after adding TBS).
The magnitude of the TBS effect was sufficient to significantly enhance fracture risk stratification when combined with BMD. The predictive ability of TBS was also independent of the Fracture Risk Assessment Tool (FRAX), as demonstrated by the consistent improvement in the Area Under the Curve (AUC) for fracture prediction (AUC improved from [0.76 for FRAX alone to 0.82 for FRAX adjusted by TBS].
The greatest clinical utility of incorporating TBS was observed in the osteopenic group (T-score between -1.0 and -2.5), where TBS values below the microarchitectural deterioration threshold (<1.2) led to the reclassification of 15% of patients into a higher-risk category warranting treatment, thereby refining clinical decision-making close to the intervention threshold.
Conclusion:
The robust, independent association between low Trabecular Bone Score (TBS) and fracture incidence, even after accounting for BMD and FRAX, confirms its significant clinical value. Integrating TBS into standard DXA reporting substantially enhances fracture risk stratification, particularly for patients classified as osteopenic, where treatment decisions are often ambiguous. Therefore, TBS is an essential, complementary diagnostic tool that refines personalized fracture risk assessment, leading to more accurate intervention targeting and improving the prevention of fragility fractures in clinical practice.

P1704

ASSESSING BONE MICROARCHITECTURE: ROMOSOZUMAB INDUCES FAVORABLE CHANGES IN TRABECULAR BONE SCORE COMPARED TO ANTI-RESORPTIVE THERAPY

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Background:
Osteoporosis is a systemic skeletal disease characterized by low bone mass and microarchitectural deterioration of bone tissue, leading to increased bone fragility and fracture risk. Current therapeutic strategies focus on reducing bone turnover through anti-resorptive agents (e.g., bisphosphonates) or stimulating bone formation through anabolic agents. The Trabecular Bone Score (TBS) is a readily available, non-invasive texture parameter that assesses bone microarchitecture independent of bone mineral density (BMD), providing crucial information on bone quality and fracture risk. Romosozumab, a novel bone-forming agent with a dual effect (increasing bone formation and decreasing resorption), has shown superiority in rapidly improving BMD compared to anti-resorptive treatments. However, data specifically demonstrating its impact on the critical measure of bone quality assessed by TBS, particularly when compared directly to standard anti-resorptive agents, remains limited.

Objective(s)
This study aimed to determine the comparative impact of Romosozumab versus anti-resorptive agents on the Trabecular Bone Score (TBS) in postmenopausal women with established osteoporosis. Specifically, the study sought to quantify the magnitude of change in TBS after treatment with Romosozumab compared to a control group receiving standard anti-resorptive therapy over a defined treatment period.
Methods:
This study was a retrospective, observational case-control analysis conducted to evaluate the comparative effect of Romosozumab on bone microarchitecture. The study included postmenopausal women with osteoporosis who were followed up for a 12-month period. Patients were categorized into two treatment groups: the Romosozumab group (N=21), who received 210mg subcutaneously monthly, and the Anti-resorptive group (N=28), who received oral bisphosphonates (Alendronate 70mg once weekly). Crucially, all participants in both groups received daily supplementation with calcium and vitamin D. The primary outcome measured was the percentage change in the Trabecular Bone Score (TBS) from baseline to the 12-month post-treatment assessment.
Results:
The primary outcome, the percentage change in the Trabecular Bone Score (TBS) from baseline to the 12-month post-treatment assessment, demonstrated a distinct difference between the two cohorts. The Romosozumab group experienced a mean increase in TBS of +2.88 + 3.05%, whereas the Anti-resorptive (bisphosphonate) group showed a minor mean decrease of -0.41 +3.02%. While the observed increase in TBS with Romosozumab was noticeable and favorable compared to the bisphosphonate group. However, the increase observed in the Romosozumab group did not meet the established Least Significant Change (LSC) threshold of 5% for TBS measurement.
Conclusion:
This study demonstrates that Romosozumab treatment is associated with a favorable increase in Trabecular Bone Score (TBS) in postmenopausal women with osteoporosis, contrasting with the minor decline observed in the anti-resorptive cohort. The numerical trend strongly suggests that the bone-forming action of Romosozumab positively impacts bone microarchitecture. These findings highlight that TBS may be a potentially useful, non-invasive tool for monitoring the anabolic effects of Romosozumab treatment, providing clinicians with a measure of bone quality improvement that complements traditional Bone Mineral Density (BMD) assessments.

P1705

THE ART OF STABILITY: INTEGRATING CREATIVE HEALTH INTERVENTIONS FOR BONE AND MUSCLE HEALTH OPTIMIZATION IN THE ELDERLY

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Objective

The objective of this protocol is to establish and implement a structured Creative Health Service tailored for older adults (aged 65 years and over) who are at increased risk of osteoporotic fractures and/or sarcopenia, and who face a high probability of falling. The service aims to improve dynamic balance, increase muscle and functional strength, and mitigate the psychological and social risk factors contributing to bone and muscle health deterioration. This will be achieved through the utilization of arts-based and creative activities as therapeutic interventions complementary to standard medical care.

Methods

The service will be delivered through intensive therapeutic cycles lasting a minimum of 12 weeks, with a frequency of twice weekly sessions. The program is built upon four core creative pillars: Specialized Dance/Movement (e.g., Tai Chi or ballet-based movements) to enhance balance and endurance; Rhythmic Movement and Group Drumming to improve upper body and grip strength; Music Therapy to enhance gait speed and consistency; and Expressive Arts for pain and stress management. Participants will be enrolled after obtaining medical clearance and undergoing a baseline assessment using standard tools including: the Timed Up and Go (TUG) test, Hand Grip Strength (Dynamometry), and pain/mood scales (GDS). Participants will be stratified into small groups based on their risk level and mobility status to ensure safety and personalization. Each intervention session (60-90 minutes) will focus on integrating weight-bearing and light resistance activities with relaxation techniques and social connection. Outcomes will be systematically evaluated pre- and post-intervention to measure changes in balance, strength, functional performance, and quality of life.

Outcomes: The service will employ a multi-faceted assessment and monitoring strategy, which will be stratified into 5 stages: Planning and Governance (Foundation), Program Structure and Modality Selection, Patient Intake and Risk Stratification, Implementation and Session Flow, and Monitoring and Evaluation (Outcomes)

Assessment (Intake and Stratification)

Before starting the 12-week program, every participant will undergo a comprehensive baseline assessment to ensure safety and personalize the intervention:

Medical Clearance: Essential confirmation will be obtained from a physician that the patient is safe to participate in low-impact, weight-bearing activities.

Functional Assessment: Standardized tools will be used to quantify baseline risk and function. This includes the Timed Up and Go (TUG) and the Berg Balance Scale/Tinetti Assessment to objectively measure fall risk and mobility. Muscle function and sarcopenia risk are quantified using SARC-F, Hand Grip Strength (Dynamometry) and the Chair Stand Test.

Psychosocial Baseline: Self-reported scales such as the Visual Analog Scale (VAS) will be used to gauge chronic pain levels, while tools such as the Geriatric Depression Scale (GDS) will be assess mood and quality of life.

Risk Stratification: Data from these assessments will be used immediately in the planning phase to assign participants to small, homogenous groups, ensuring the intensity of the creative activities is appropriate for their specific mobility level and fall risk.

Monitoring and Evaluation (Outcomes)

Monitoring will be formally conducted through a pre- and post-intervention evaluation design (Phase 5) to measure the service's efficacy:

Primary Clinical Outcomes: The core metrics for fall risk and strength (TUG Test, Hand Grip Strength, and Chair Stand Test) will be repeated after the 12-week cycle to quantify changes in balance, gait, and functional muscle endurance.

Secondary Outcomes: Measures of well-being will be repeated (VAS for pain, GDS for mood) to assess the psycho-social benefits of the intervention.

Adherence Monitoring: Session Attendance Rate will be continuously monitored (Phase 4 and 5) as a key indicator of patient engagement, adherence to the health behavior, and the overall enjoyment of the creative approach.

Conclusion:

The establishment of this Creative Health Service protocol marks a crucial step in modernizing preventative care for older adults facing high risks of falls and fragility fractures. Moving beyond traditional pharmacological and exercise-only models, our integrated approach leverages the intrinsic therapeutic mechanisms of creative arts—simultaneously improving physical balance through movement, increasing muscle recruitment through rhythm, and managing pain/stress through expression. The structured five-phase protocol, from rigorous baseline functional assessment (TUG, Dynamometry) to detailed outcome evaluation, ensures both patient safety and the generation of high-quality evidence. Successful implementation of this program is projected not only to yield statistically significant improvements in functional measures (e.g., increased grip strength and reduced TUG time) but also to validate Creative Health as a cost-effective, enjoyable, and essential complement to orthopedic and geriatric rehabilitation. This service offers a compelling pathway to empower older adults to actively participate in optimizing their musculoskeletal health and maintaining independence.

P1706

NUTRITIONAL RISK AS A PREDICTOR OF FUNCTIONAL IMPAIRMENT IN OLDER ADULTS CARE HOMES: IMPLICATIONS FOR INTEGRATED CARE

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Background: Older adults residing in long-term care homes represent a population highly vulnerable to both declining physical function (leading to falls, disability, and dependence) and malnutrition. Malnutrition in this setting is often multifactorial, stemming from factors like polypharmacy, poor dentition, and chronic disease, while poor physical function is exacerbated by sedentary behaviour and sarcopenia. The relationship between these two critical health domains is often synergistic: poor nutritional status accelerates the loss of muscle mass and physical capacity, and, conversely, reduced physical function can impair the ability to shop for or prepare food, contributing to inadequate intake. Despite this known interaction, the precise, independent association between specific measures of nutritional status and objective measures of physical function in the care home environment requires clear quantification to guide targeted, integrated interventions.

Objective(s)

This study aims to determine the strength and nature of the association between standardized measures of nutritional status and objective measures of physical function in a population of older adults residing in care homes. Specific objectives include: 1) to establish the prevalence of malnutrition and functional impairment within the cohort; and 2) to quantify the cross-sectional relationship between nutritional status scores and validated physical performance metrics, controlling for confounding factors such as age, sex, and comorbidity burden.

Methods:

This cross-sectional study included 209 older adults (mean age women 72.04±9.58 years, age range 50-106 years) residents in 10 care homes. The Nutritional status was assessed using Mini Nutritional Assessment (MNA) questionnaire, whereas physical functional was assessed using the Health Assessment questionnaire – Disability Index (HAQ-DI), with a score of ≤0.5 defined as functional remission. HAQ-DI score 0.5-1 was scored as mild disability, HAQ-DI score 2-3 was rated as moderate disability, whereas score >2 was rated as severe disability. Multivariable logistic regression analysis was conducted to examine the association between nutritional risk and functional remission, adjusting for relevant background factors including age, sex and comorbidities.

Results:

Among the 299 patients (65.2% female). Mean MNA score of 22.22 ± 3.84, and a mean HAQ score of 1.33 ± 0.84. Females were older than males (73.18 ± 10.02 vs 69.90 ± 8.35 years), had similar nutritional status (MNA 22.26 ± 3.82 vs 22.14 ± 3.89), but showed higher functional impairment (HAQ 1.44 ± 0.82 vs 1.12 ± 0.85). The cohort included 101 (48.3%) participants "at risk of malnutrition," 19 (9.09%) malnourished, and 89 (42.5%) with normal nutrition status, while HAQ categories revealed that 71 (33.97 %) mild–moderate difficulty, 68 (32.53%) moderate–severe disability, 31 (14.8%) normal/near-normal function, and 39 (18.7%) severe–very severe disability. MNA was significantly inversely associated with HAQ (Spearman's ρ = −0.213, p = 0.002; n = 209), indicating that better nutritional status was associated with lower functional impairment. Nutritional risk independently increases the odds of functional disability (OR: 1.86, 95% CI: 1.19–2.91).

Conclusion

This cross-sectional study in older adults residing in care homes establishes a significant, independent association between nutritional risk (assessed by MNA) and physical function disability (assessed by HAQ-DI). The finding that the prevalence of functional disability increases dramatically with the severity of nutritional risk, and that nutritional risk independently increases the odds of functional non-remission, underscores the crucial, synergistic relationship between these two domains. These results mandate that nutritional status assessment via tools like the MNA should be a standard and integrated component of functional assessment protocols in care home settings. Early identification and targeted nutritional interventions are essential, high-priority strategies for maintaining physical independence and preventing disability in this vulnerable population.

P1707

DYNAMIC ASSESSMENT OF INTRINSIC CAPACITY: A NOVEL APPROACH TO MONITORING MULTI-DOMAIN INTERVENTIONS THROUGH INTEGRATED INTERVENTION PROGRAM IN AGING POPULATIONS

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Background

The global aging population necessitates a transition from traditional disease-oriented models to proactive, functional assessments. The World Health Organization (WHO) defines **Intrinsic Capacity (IC)** as the composite of all physical and mental attributes an individual can draw upon. IC comprises five core domains: **locomotor, cognitive, psychological, sensory, and vitality**.

While multimodal interventions—incorporating physical activity, nutritional support, and psychological counselling—are recognized as the "gold standard" for preventing frailty, there is limited evidence on

how these domains respond dynamically to integrated programming. This study aims to evaluate the effectiveness of a targeted multimodal program in enhancing IC and to determine the feasibility of longitudinal IC monitoring as a clinical endpoint for older adults.

Methods

• **Study Design and Participants:** A prospective, longitudinal study was conducted involving community-dwelling older adults (>50-years) exhibiting signs of declining capacity or pre-frailty.

• **Multimodal Intervention:** Participants underwent a 24-week integrated program consisting of:

• **Physical:** Structured multicomponent exercise (aerobic, resistance, and balance training).

• **Nutritional:** Personalized counselling and protein-enriched dietary supplementation where indicated. Vitamin D supplementation when required following a blood check.

• **Psychological:** Psychotherapy, medical management when required.

Assessment of Intrinsic Capacity: IC was measured at baseline, and 24 weeks using the following validated tools:

• **Locomotor:** SARC-F, Chair stand test, time up and go, and gait speed.

• **Cognitive:** Mini Mental State Examination (MMSE).

• **Psychological:** General Health Questionnaire (GHQ-30).

• **Sensory:** Visual acuity (Snellen chart) and whispered voice test for hearing.

• **Vitality:** handgrip strength (dynamometry) and functional ability.

• **Nutrition:** Mini Nutritional Assessment (MNA)

Monitoring and Data Analysis: Changes in domain scores were analysed using linear mixed-effects models to account for individual variability over time. Feasibility was assessed through program adherence rates and participant-reported ease of monitoring. **Results**

A total of 209 participants (mean age women 72.04+9.58 years, age range 50-106, 65.2% female) completed the 24-week program. Significant improvements were observed across three primary IC domains:

• **Locomotor Capacity:** significant increase in the SARC-F score (p< 0.03) with a notable improvement in gait speed.

• **Vitality:** Handgrip strength improved by an average of 13.24 to15.76 **kg (p< 0.05)**, and functional ability improved from 1.33+0.6 to 1.18+0.08 (p< 0.01)

• Knowledge, Attitude, and Practice: significant improvement from 6.20+0.16 to 7.24+0.19 (p<0.01)

• MNA scores indicated a significant reduction in malnutrition risk.

• **Psychological:** There has been non-significant improvement of both GHQ-3- as well as Mini Mental State examination with reduction in depressive symptoms and improvement of the cognitive functions.

The integrated monitoring approach allowed for early detection of "micro-declines" in individual participants, prompting immediate clinical adjustments. Adherence to the multimodal program was high (87**%**), suggesting that the combined intervention is well-tolerated by community-dwelling older adults. **Conclusion** This study demonstrates that a structured physical, nutritional, and psychological program can effectively enhance or stabilize **Intrinsic Capacity** in older adults. The results emphasize that IC is not a static state but a dynamic one that responds to targeted, multi-domain interventions. Furthermore, the transition from traditional frailty screening to longitudinal IC monitoring provides a more holistic and person-cantered view of aging. These findings support the integration of IC assessment into routine geriatric care to prevent functional decline and promote "Healthy Aging" as envisioned by the WHO. Future research should focus on the long-term sustainability of these gains beyond the 24-week intervention period.

P1708

QUANTITATIVE BONE SPECT/CT PARAMETERS COULD PREDICT THE SUCCESS OF THE CONSERVATIVE TREATMENT FOR SYMPTOMATIC BASAL JOINT ARTHRITIS OF THE THUMB

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Purpose: The aim of this study was to evaluate the role of quantitatively assessed bone SPECT/CT parameters for predicting the success of conservative treatment for symptomatic basal joint arthritis of the thumb.
Materials and methods: Seventy-eight patients (128 hands) with symptomatic basal joint arthritis of the thumb who underwent bone SPECT/CT scans within 4 weeks after their initial visit and completed conservative treatment for more than 6 months between April 2019 and April 2023 were retrospectively enrolled. Patient-Rated Wrist/Hand Evaluation (PRWHE) were evaluated in all patients before and after the treatment. The maximum standardized uptake value (SUVmax) from bone SPECT/CT was measured in the four peritrapezial joints, and the highest uptake was used for analysis.
Results: On the basis of the minimal clinically important difference in PRWHE scores, 64 hands (50.0% of 128 hands) were classified as the treatment success group and 64 hands (50.0% of 128 hands) were failure group. In multivariate logistic regression analysis, only high SUVmax (OR 1.097; 95% CI, 1.027–1.172, p = 0.006) was a factor significantly associated with the success of conservative treatment. In receiver operating characteristics curve analysis, the area under the curve of SUVmax was 0.649 (95% CI 0.554–0.744, p = 0.002). As a prognostic parameter for the success of conservative treatment, SUVmax showed a sensitivity of 56.3% and specificity of 70.3% with a cut-off of 9.52.
Conclusions: High initial SUVmax on bone SPECT/CT was significantly associated with the success of conservative treatment for symptomatic basal joint arthritis of the thumb.

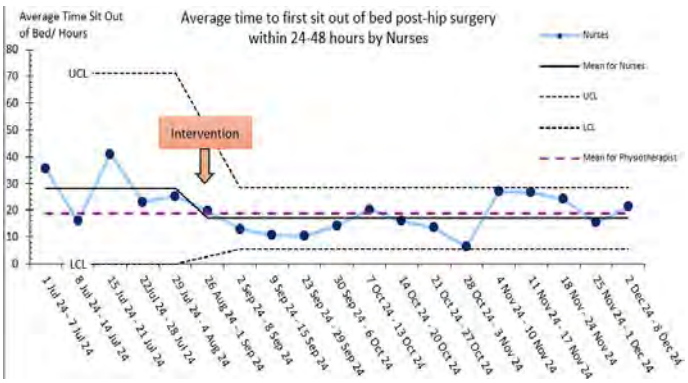
P1709

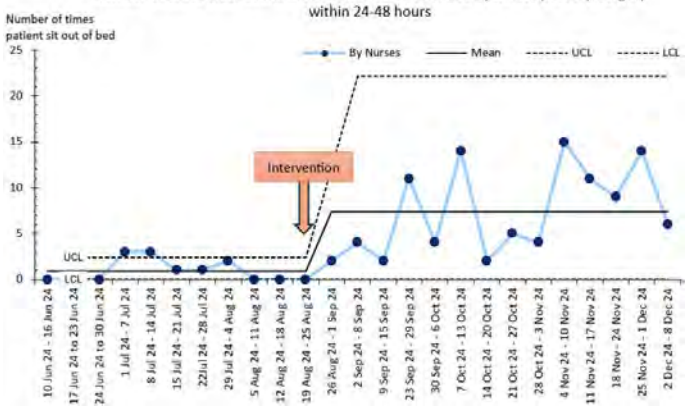
IMPLEMENTING NURSE-LED MOBILITY PROTOCOL FOR OLDER ADULTS POST-HIP SURGERY: A PILOT CLINICAL IMPLEMENTATION STUDY

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• Objective(s)
1.To conduct mandatory education sessions to increase nursing staff knowledge and confidence on the benefits and methods of post-hip surgery mobility.
2.To introduce a nurse-led mobility protocol and achieve a compliance rate of ≥ 70%.
3.To increase the rate of early postoperative mobilization (sitting out of bed within 48 hours) by 50% within three months for older adults who have undergone hip fracture surgery through nurse-led mobility measures.
Secondary outcome measures included the average length of stay (ALOS), and the incidence of postoperative complications from the postoperative day to the day of discharge.
• Material and Methods
Participants and sample size:
1. 40 nursing staff
2. Pre & Post intervention groups of patiets aged ≥60 post hip surgery admitted in GFU:
i) The pre-intervention group included 43 patients admitted between June - August'24
ii) The post-intervention group included 48 patients admitted between September – December'24.
A nurse-led early mobility protocol was developed based on evidence and expert consensus to guide safe mobilization. Staff completed an Investigator-designed survey via a secure platform before and after attending mandatory structured education sessions delivered by the orthopaedics Advanced Practice Nurse(APN), pain specialty nurse, and physiotherapist.
This study was submitted to the Centralized Insitutional Review Board (CRIB) and classified as exempt.
• Results
Nursing confidence in assisting patients to sit out of bed improved by 40% with statistically significant increases in total confidence scores (p = 0.011). Early mobilisation frequency increased from 0.9 to 7.4 times within 24-48 hours post-surgery. Protocol compliance was ranging from 86-100%. Secondary outcomes showed reductions in pressure injury and urinary tract infections (both 2.1%, p = 1.000), delirium (7.2%, p = 0.185), and mean length of stay (1.08 days, p = 0.283).





• Conclusion(s)
The nurse-led early mobility protocol empowered nurses to initiate timely, safe mobilisation and demonstrated improved patient outcomes. Non-significant results likely reflect small sample size and short follow-up period.

P1710

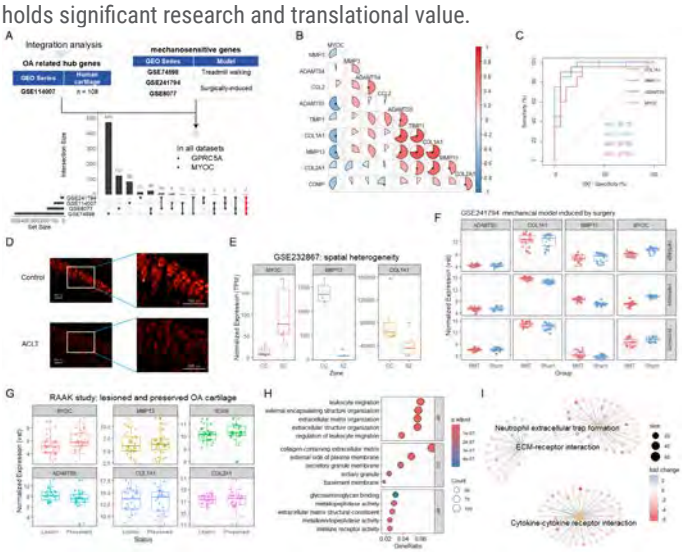
PROTECTIVE ROLE OF MYOC IN OSTEOARTHRITIS: A MECHANOSENSITIVE BIOMARKER FOR CARTILAGE EXTRACELLULAR MATRIX HOMEOSTASIS

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Multiple studies confirm that the secreted protein Myocilin, encoded by the gene MYOC, plays a key role in regulating processes such as cell adhesion and cytoskeleton functions. MYOC has been implicated in multiple diseases, including primary open-angle glaucoma, where it elevates pathological intraocular pressure by impairing trabecular meshwork cell function and disrupting aqueous humor outflow. To explore the role of MYOC in mechanically driven diseases like osteoarthritis (OA), we systematically analyzed its expression and function. Integrated omics data identified MYOC as the hub gene significantly associated with OA cartilage degeneration in a mechanical loading model. MYOC expression was significantly down-regulated in surgically induced mechanical instability animal models and human OA cartilage tissue, while the matrix marker MMP13 showed up-regulation. Physiological exercise promoted MYOC expression and inhibited MMP13, suggesting MYOC is mechanosensitive and may protect extracellular matrix (ECM)

homeostasis. ROC analysis revealed MYOC has high discriminatory efficacy for OA (AUC > 0.8), supporting its potential as a biomarker. MYOC expression correlated with cartilage damage severity and exhibited spatial heterogeneity, reinforcing its link to the mechanical microenvironment. Functional enrichment showed MYOC associated genes were enriched in ECM organization and immune regulation pathways. Human Protein Atlas data indicated MYOC is primarily expressed by fibroblasts and positively correlated with ECM remodeling markers. These results suggest MYOC regulates ECM homeostasis. In summary, MYOC may modulate ECM homeostasis across diseases, offering new insights into multi-scale mechanical mechanisms in disease pathogenesis. Identifying mechanically responsive biomarkers holds significant research and translational value.



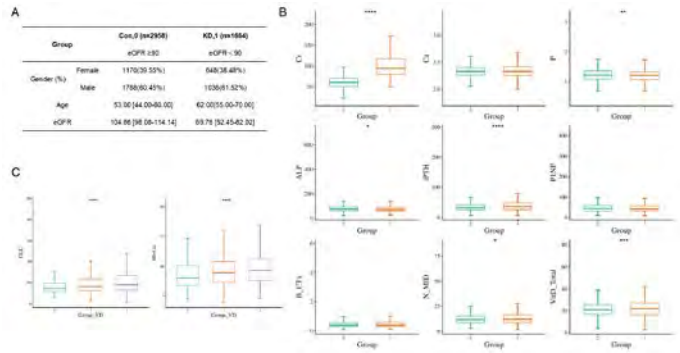
P1711

RENAL FUNCTION MODIFIES BONE TURNOVER MARKERS IN DIABETIC OSTEOPATHY: A RETROSPECTIVE STUDY IN CHINESE POPULATION

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To explore the effect of different renal function status on bone turnover markers in patients with type 2 diabetes mellitus (T2DM), and provide evidence for clinical management of diabetic osteopathy. A single-center retrospective study was conducted to analyze data of 4642 hospitalized T2DM patients in a Chinese general hospital from January 2019 to December 2024. Patients were divided into control group (Con, n=2958) and renal function decline group (KD, n=1684) based on estimated glomerular filtration rate (eGFR) ≥90 or not, excluding cases with severe renal insufficiency (eGFR<30). Mann-Whitney U test was used to compare 110 laboratory indicators between the two groups, focusing on differences in bone metabolism and related markers. Significant differences were observed in creatinine (Cr), phosphorus (P), alkaline phosphatase (ALP), intact parathyroid hormone (iPTH), osteocalcin (N-MID), and total vitamin D (VitD) between the two groups ($p<0.05$). The medians of Cr, iPTH, and VitD in KD group were higher than those in Con group, while P, ALP, and N-MID were lower. No differences were found in total calcium (Ca), procollagen type I N propeptide (PINP), and β isomerized C-terminal telopeptide of type I collagen (B-CTX). In addition, 87.12% of patients had VitD deficiency/insufficiency, and elevated blood glucose was positively correlated with the severity of VitD deficiency. Early renal function decline can alter bone turnover marker levels in Chinese T2DM patients. The high prevalence of VitD deficiency in Chinese population is associated with lifestyle factors such as insufficient sunlight exposure and dietary structure, suggesting that comprehensive management strategies for T2DM patients in China and other East Asia should be optimized based on renal function status and VitD nutritional status.



P1712

THE ANABOLIC PARADOX: INCREASED INCIDENCE OF THORACIC SPINE SURGERY IN OSTEOPOROTIC PATIENTS ESCALATED TO TERIPARATIDE THERAPY – A PROPENSITY-MATCHED GLOBAL DATABASE ANALYSIS

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Background: Teriparatide (Forteo) is a potent anabolic agent indicated for patients at high risk of fracture. In real-world clinical practice, it is often reserved for those with severe bone loss or those failing first-line anti-resorptives. This study utilizes a global federated database to evaluate the incidence of thoracic spine surgery (TSS) in patients escalated to teriparatide compared to those remaining on standard therapy, while strictly controlling for secondary bone pathologies and pre-operative prescription bias.

Methods: Using the TriNetX Global Health Research Network, we identified 1,376,971 patients with a diagnosis of osteoporosis. Two cohorts were established: **Cohort 1 (Meds + Forteo)** and **Cohort 2 (Meds, No Forteo)**.

- **Exclusion Criteria:** Patients with bone tumors, Paget's disease, and rickets or osteomalacia were excluded to isolate primary osteoporosis.
- **Matching:** Propensity score matching (1:1) was performed for age, sex, and race, resulting in **34,849 matched patients per group** (Mean Age: 74.9± m 11.5years; 85.2% Female).
- **Temporal Control:** To eliminate "pre-operative prescription bias," patients with surgical outcomes within the first 6 months of initiating teriparatide were excluded (N=1,741 in Cohort 1; N=447 in Cohort 2).

Results: Following the 6-month washout period, **33,108** patients in Cohort 1 and **34,402** in Cohort 2 were analyzed.

• **Surgical Incidence:** Cohort 1 demonstrated a significantly higher cumulative incidence of thoracic spine surgery (0.837%) compared to Cohort 2 (0.270%).

• **Risk Metrics:** The **Hazard Ratio (HR) was 3.006** (95% CI: 2.377, 3.802), and the **Odds Ratio was 3.113** (95% CI: 2.46, 3.939).

• **Risk Difference:** A significant risk difference of **0.566%** was observed (95% CI: 0.454%, 0.679%; z=9.964, p < 0.0001).

• **Survival Analysis:** Kaplan-Meier analysis confirmed a significantly lower survival probability (freedom from surgery) in the teriparatide group (97.6% vs 98.9%; Log-Rank X^2 = 93.225, p < 0.0001).

Conclusion: Despite accounting for pre-operative bias and secondary bone diseases, teriparatide escalation remains a strong statistical predictor for thoracic spine surgery. These results suggest a "Fragile Phenotype" paradox: in real-world settings, teriparatide is selectively prescribed to patients with the highest disease burden and impending spinal instability, necessitating surgical intervention regardless of potent anabolic medical management.This suggests that in real-world clinical practice, teriparatide serves as a marker for a "fragile phenotype"—patients with imminent structural failure that medical management alone may not prevent the outcomes of surgical interventions.

Table 1: Primary Outcome Analysis

Metric	Result	95% Confidence Interval
Hazard Ratio (HR)	**3.01**	(2.38, 3.80)
Risk Ratio (RR)	**3.10**	(2.45, 3.91)
Odds Ratio (OR)	**3.11**	(2.46, 3.94)

Table 2: Comparative Clinical Outcomes

Statistic	Value	95% Confidence Interval	p-value
Hazard Ratio	**3.006**	(2.377, 3.802)	< 0.0001
Risk Ratio	**3.095**	(2.448, 3.912)	< 0.0001
Odds Ratio	**3.113**	(2.460, 3.939)	< 0.0001
Risk Difference	**0.566%**	(0.454%, 0.679%)	< 0.0001

P1713

ENEBOPARATIDE: MECHANISM OF ACTION UNDERLYING THE SUSTAINED REGULATION OF CALCIUM IN HYPOPARATHYROIDISM

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Objectives: Here, we investigated the mechanism whereby eneboparatide provides prolonged calcium regulation *in vivo,* since in animal models and patients with chronic hypoparathyroidism (HypoPT), treatment with eneboparatide led to sustained regulation of urinary and serum calcium (sCa) despite its short circulating half-life.

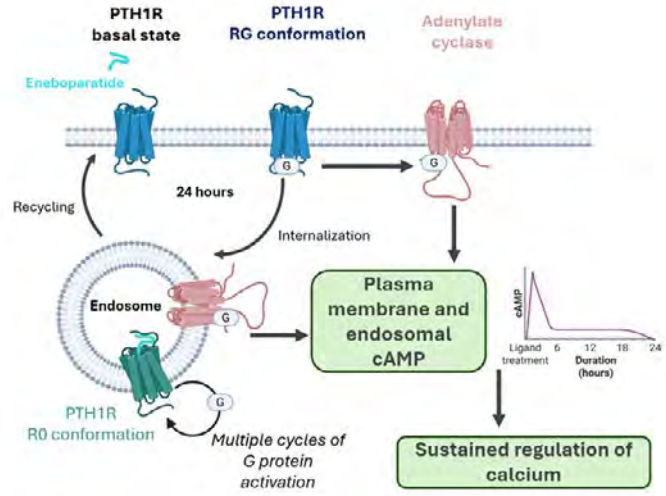
Materials and Methods: PTH 1 and 2 receptor (PTH1R and PTH2R) activation was evaluated using a cell-based cyclic adenosine monophosphate (cAMP) assay. Receptor binding affinity was assessed by radioligand competition assay. PTH1R activation kinetics were investigated by measuring cAMP production for 24 h after ligand washout in cells expressing PTH1R. Tissue distribution was examined by quantitative whole-body autoradiography in rats. Structure-function studies evaluated the effect of amino acid substitutions, additions, and truncations of eneboparatide on PTH1R activation kinetics.

Results: Eneboparatide activated PTH1R and PTH2R, establishing it as a broad-spectrum PTH receptor agonist. Eneboparatide had high affinity for PTH1R R0 conformation, leading to extended cAMP signaling up to 24 h, contrary to the transient effect of PTH(1-34). (**Figure**). Eneboparatide showed prolonged and enhanced receptor occupancy in PTH1R-expressing tissues vs PTH(1-34), particularly in the kidney, with structure-function studies identifying molecular features underlying sustained PTH1R activation.

Conclusions: These data revealed the unique properties of eneboparatide needed for sustained activation of PTH1R, resulting in extended regulation of sCa via retention, particularly in the kidney, despite rapid circulatory clearance.

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Disclosures: XG, YK, GR, CB, SA, and MA are employees of Alexion, AstraZeneca Rare Disease and hold stock/stock options. XG holds Adocia stock/stock options. Eneboparatide variants are included in European Patent Application No. 25306782.1.



P1714

REGENERATIVE APPROACHES TO THE TREATMENT OF OSTEOCHONDRAL DEFECTS: RESULTS BASED ON AN EXPERIMENTAL MODEL IN RABBIT

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Keywords: Osteochondral Defect, Cartilage, Bone Marrow-Derived Cell Transplantation, Platelet Rich Plasma, Experimental Study.

Objective

This experimental study aimed to assess the regenerative potential of Bone Marrow-Derived Cell Transplantation (BMDCT) and Platelet-Rich Plasma (PRP) for osteochondral defects treatment using morphological evaluation in a rabbit model.

Materials and Methods

The study involved 32 rabbits divided into four groups. Critical-size osteochondral defects (3 mm diameter, 5 mm depth) were created in the medial femoral condyle. Defects were left untreated, not filled (group 1), filled with a collagen-fibrin matrix (group 2), collagen-fibrin matrix combined with PRP (group 3), or BMDCT (group 4). Regenerative tissue was assessed for integration, structural organization, cellular composition, and extracellular matrix using a modified scoring system from the International Cartilage Regeneration & Joint Preservation Society (ICRS).

Results

Histological evaluation revealed hyaline cartilage formation only in groups 3 and 4, with minimal surface stratification. In group 3, the defect was filled with hyaline tissue containing chondroblasts, chondrocytes, and fibrochondrocytes densely occupying the lesion. In group 4, the regenerated tissue was well-developed hyaline cartilage with strong integration to surrounding tissue. Morphometric analysis demonstrated significant differences in all parameters between the PRP and BMDCT groups compared with controls. Between the experimental groups, BMDCT showed better tissue quality and cellular composition, with values approximately 1.4 times higher than PRP.

Conclusion

BMDCT demonstrated better regenerative efficacy compared to PRP in the treatment of osteochondral defects in this rabbit model, indicating its potential as an advanced therapeutic approach for cartilage repair.

P1715

IMPACT OF CYP2C19 GENOTYPES ON BONE MINERAL DENSITY CHANGES IN PROTON PUMP INHIBITOR USERS

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Objective

Proton pump inhibitors (PPIs) are associated with increased fracture risk, while CYP2C19 polymorphisms affect PPI pharmacokinetics. This study evaluated the impact of CYP2C19 genotypes on bone mineral density (BMD) in PPI users to clarify interindividual variability in bone health.

Material and Methods

Participants using PPIs with a medication possession ratio above >= 70% and previous BMD data were recalled for repeat dual-energy X-ray absorptiometry measurements and lifestyle questionnaires. Genotyping was performed using the TWBv2 array to define normal metabolizer (NM), intermediate metabolizer (IM), and poor metabolizer (PM) phenotypes based on loss-of-function variants rs4244285, rs4986893, and rs72552267. Due to non-normal distribution, non-parametric methods and robust regression were employed for analysis.

Results

Among 91 PPI users (NM: 41, IM: 38, PM: 12), median BMD fractional change showed no significant group difference (spine p=0.437, left femoral neck p=0.068, right femoral neck p=0.779), though the PM phenotype exhibited a numerical trend toward greater loss. In the robust regression analysis, associations between CYP2C19 phenotypes and BMD changes varied by site. For the lumbar spine, neither IM (beta=-0.01, p=0.387) nor PM (beta=-0.03, p=0.174) was significantly associated with BMD outcomes. For the left femoral neck, the IM phenotype was significantly associated with greater BMD loss (beta=-0.03, p=0.005), and the PM phenotype showed a potential negative trend (beta=-0.04, p=0.084). In the right femoral neck, no significant associations were found for IM (beta=0.00, p=0.989) or PM (beta=-0.02, p=0.434). Male gender (beta=0.04, p=0.006) and concurrent osteoporosis therapy (beta=0.04, p=0.002) were significant protective factors. Positive trends were observed for exercise and daily vitamin D >800 IU, whereas BMI showed no significant influence.

Conclusion

The CYP2C19 IM phenotype was independently associated with accelerated hip bone loss among PPI users, with a similar numerical potential in PM users. Concurrent osteoporosis therapy and healthy lifestyle factors like exercise appear to mitigate bone loss. These findings suggest a need for personalized bone health management in long-term PPI users based on genetic and lifestyle profiles.

P1716

DIFFICULT TO TREAT AXIAL SPONDYLOARTHRITIS: CLINICAL CHARACTERISTICS AND ASSOCIATED FACTORS

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Objectives:
Our study aimed to describe the clinical characteristics of patients with difficult to treat axial spondyloarthritis (D2T ax-SpA), to determine its frequency and to identify the associated factors.
Methods:
A retrospective study was conducted including patients with ax-SpA fulfilling the ASAS 2009 classification criteria and diagnosed between January 1, 2013, and December 31, 2018. Patients were divided into D2T ax-SpA and non D2T ax-SpA, according to the ASAS definition published in 2024.
Results:
A total of 129 patients were included. The frequency of D2T ax-SpA was 8.5%. Among them, five patients (45.5%) experienced failure of two anti-TNFα agents and six (54.5%) had contraindications. Sociodemographic characteristics and SpA phenotypes were comparable between groups. D2T patients more frequently presented with fibromyalgia (p=0.03), peripheral neuropathy (p=0.01), migraine (p=0.034), IgA glomerulonephritis (p<0.001), chronic kidney disease (p=0.01) and neoplasms (p<0.001). They also exhibited a longer diagnostic delay (p=0.05) and a longer disease duration (p=0.015). Initial CRP and ASDAS-CRP values were higher (p=0.04 and 0.003, respectively). Methotrexate doses were higher in D2T patients (p=0.043). Switching from the first biologic therapy in this group was mainly due to primary treatment failure (p=0.018).
In multivariate analysis, factors associated with D2T ax-SpA were IgA glomerulonephritis (OR=5.02 [1.6–17.3], p=0.016), fibromyalgia (OR=1.65 [1–13.4], p=0.049), migraine (OR=7.34 [2.7–19.4], p=0.001), neoplasms (OR=6.99 [2.3–16.1], p=0.013), elevated baseline CRP (OR=2.98 [1.1–8], p=0.01), elevated baseline ASDAS-CRP (OR=2.38 [1.1–9.3], p=0.013) and longer diagnostic delay (OR=5.02 [1.97–7.2], p=0.036).
Conclusion:
In our study, the frequency of D2T ax-SpA was 8.5%. This form was associated with IgA glomerulonephritis, fibromyalgia, migraine, neoplasms, elevated initial CRP and ASDAS-CRP levels, and a longer diagnostic delay.

P1718

FRAILTY AND OSTEOSARCOPENIA IN OLDER MEN: A HIDDEN VULNERABILITY

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Objective: This study aimed to investigate the association between frailty and osteosarcopenia (OSP), defined as the coexistence of osteoporosis (OP) and sarcopenia, in male patients aged 65–70 years.
Material and Methods: This cross-sectional study included 234 community-dwelling men aged 65–70 years who presented to a geriatrics outpatient clinic. OSP was defined by the presence of both low muscle strength and OP. Comprehensive geriatric assessments (CGA) and physical performance tests were performed. Clinical Frailty Scale (CFS) was used to assess frailty status. The Fracture Risk Assessment Tool (FRAX) and modified FRAX (mFrax) scores were used to measure the risk of 10-year probabilities (%) of major osteoporotic fracture (MOF) and hip fracture (HF).
Results: Our study included 234 male geriatric patients with a median age of 68 [66–69] years. Among them, 52 patients (22.3%) were diagnosed with OSP, while 182 (77.7%) were classified as non-OSP. OSP was independently associated with living with frailty (CFS ≥4) after adjusting for age, BMI, chronic renal disease (CRD), number of medications, malnutrition, arrhythmia, Katz Activities of Daily Living (ADL) scores, Lawton Instrumental ADL scores, and depression(OR = 3.34; 95% CI: 1.54–7.23; p = 0.002). Higher CFS scores were significantly associated with an increased likelihood of OSP in older men(OR: 1.66; 95% CI: 1.07–2.55; p=0.021). Patients with OSP had higher CFS and lower MNA scores (p<0.05). CRD and medication use were associated with increased OSP risk, while BMI >25 was associated with lower risk (p<0.05).
Conclusions: Frailty is significantly associated with OSP in older men and may contribute to its development. Screening men aged 65–70 for both conditions may support early detection and prevention. Further studies are needed to clarify causality and guide interventions.

Table 1: Sociodemographic features and clinical variables of study groups

	Normal n = 182 (77.7%)	Osteosarcopenic n = 52 (22.3%)	P-value
Age (median, IQR)	68 (66 - 69)	68 (66 - 69)	0.982
BMI, median (IQR)	27.8 (26.1 -29.7)	27.6 (23.9– 30.0)	0.566
BMI(>25), n (%)	148 (81.8)	35 (67.3)	**0.025**
Diabetes Mellitus, n (%)	87 (48.1)	23 (44.2)	0.625
Hypertension, n (%)	120 (66.3)	39 (75.0)	0.235
Hyperlipidemia, n (%)	85 (47.0)	25 (48.1)	0.887
Coronary arterial disease, n (%)	71 (39.2)	20 (38.5)	0.921
Arhytmia, n (%)	13 (7.2)	7 (13.5)	0.154
Heart Failure, n (%)	19 (10.5)	6 (11.5)	0.831
Chronic renal disease, n (%)	11 (6.1)	9 (17.3)	**0.011**
ADL score, median (IQR)	6 (6 - 6)	6 (6 - 6)	0.070
IADL score, median (IQR)	8 (8 - 8)	8 (8 - 8)	**0.05**
Living with Frailty (CFS≥ 4), n(%)	78 (43.1)	39 (75.0)	**<0.001**
CFS score, median (IQR)	3 (3 - 4)	4 (3,5 - 4)	**<0.001**
Low HGS, n (%)	40 (22.1)	40 (76.9)	**<0.001**
HGS, median (IQR)	31 (27.1 – 34.7)	25 (22.8 – 26.5)	**<0.001**
MNA-SF score, median (IQR)	14 (13 - 14)	14 (12 - 14)	**0.030**
Gait speed, median (IQR)	3,6 (3 – 4.305)	4.245 (3.4 – 5.35)	**<0.001**
TUG, median (IQR)	8.45 (7 – 10.1)	11 (8.975 – 13.05)	**<0.001**
Chair stand test, median (IQR)	12.3 (10.35 – 14.3)	15.9 (13.25 – 18.54)	**<0.001**
YGDS score, median (IQR)	1 (0 - 3)	1 (0 - 3)	0.173
SMMSE score, median (IQR)	28 (27 - 30)	28 (26 - 29)	**0.006**
Number of drugs, median (IQR)	5 (2 - 7)	6 (3 – 8.5)	**0.039**
Fallers, n(%)	30 (16.6)	8 (15.4)	0.838
FRAX MOP score, median (IQR)	4.5 (3.4 – 5.6)	6.45 (4.1 – 8.6)	**<0.001**
FRAX HF score, median (IQR)	1.2 (0.6 – 2.2)	2.4 (1 – 4.2)	**<0.001**
Mfrax MOP score, median (IQR)	4.7 (3.7 – 6.3)	7.01 (4.41 – 9.315)	**<0.001**
MFrax HF score, median (IQR)	1.5 (0.8 – 2.6)	2.65 (1.05 – 4.35)	**<0.001**
Number of fracture via TLR, median(IQR)	1 (0 - 2)	2 (1 - 3)	**0.003**

ADL: Activities of daily living; BMI: Body Mass Index; **CFS:** Clinical Frailty Scale; **HGS: Handgrip Strength;** MNA-SF: Mini-Nutritional Assessment Short-Form; SMMSE: Standardized Mini-Mental State Examination; TUG: Timed up and go; TLR: Thoracolumbar spine radiograph; YGDS:The Yesavage Geriatric Depression Scale

P1719

OSTEOBLASTIC 11B-HSD1-MEDIATED LOCAL GLUCOCORTICOID ACTIVATION DRIVES SUBCHONDRAL BONE SCLEROSIS TO PROMOTE CARTILAGE DEGENERATION IN OSTEOARTHRITIS

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Objective: In osteoarthritis (OA), subchondral bone sclerosis is a hallmark pathology that often accompanies with cartilage degeneration, yet its molecular regulation remains poorly understood. Although physiological glucocorticoid (GC) signaling is required for bone homeostasis, whether local GC activation contributes to pathological remodeling of subchondral bone in OA is unclear. While previous studies showed that blocking GC signaling via transgenic overexpression of 11β-hydroxysteroid dehydrogenase type (11β-HSD2, GC-inactivated enzyme) attenuates OA, 11β-HSD2 is not normally expressed in bone. 11β-HSD1the enzyme responsible for local GCs activation, is substantially expressed in bone, yet its role in the pathological OA microenvironment is unclear. Therefore, this study aimed to investigate whether osteoblastic 11β-HSD1-mediated local GC activation contributes to subchondral sclerosis and cartilage degeneration in OA.

Methods: We first analyzed GC pathway gene expression in load-bearing versus non-load-bearing subchondral bone regions using a public OA patients' subchondral bone dataset (GSE284357). To validate findings, we utilized the destabilization of the medial meniscus (DMM) mouse model, analyzing 11β-HSD1 expression patterns via immunofluorescence. To define cell-specific functions, osteoblast-specific 11β-HSD1 knockout mice (Bglap-cre; Hsd11b1$^{fl/fl}$, CKO) and WT mice underwent DMM surgery. Knee joints were harvested at 4 weeks to assess subchondral bone microarchitecture (micro-CT) and cartilage integrity.

Results: Bioinformatic analysis of OA patients' subchondral bone samples revealed a stress-dependent GC pathway activation: GC-responsive genes were specifically upregulated, while GC-downregulated genes were repressed in load-bearing subchondral bone regions compared to non-load-bearing sites (**Figure. 1A**). Consistent with this, 11β-HSD1 expression progressively increased in the subchondral bone of DMM mice (**Figure. 1B-D**). Co-staining identified osteocalcin-positive osteoblasts as the primary source of this pathological 11β-HSD1 upregulation (**Figure. 1E**). Importantly, osteoblast-specific deletion of 11β-HSD1 significantly reduced subchondral bone sclerosis (**Figure. 2A**) and attenuated OA progression (**Figure. 2B**) at 4 weeks post-surgery.

Conclusion: Our findings identify osteoblastic 11β-HSD1–mediated local GC activation as a key regulator of subchondral bone sclerosis in OA. Targeting osteoblastic 11β-HSD1 may represent a novel strategy to limit subchondral sclerosis and slow OA progression.

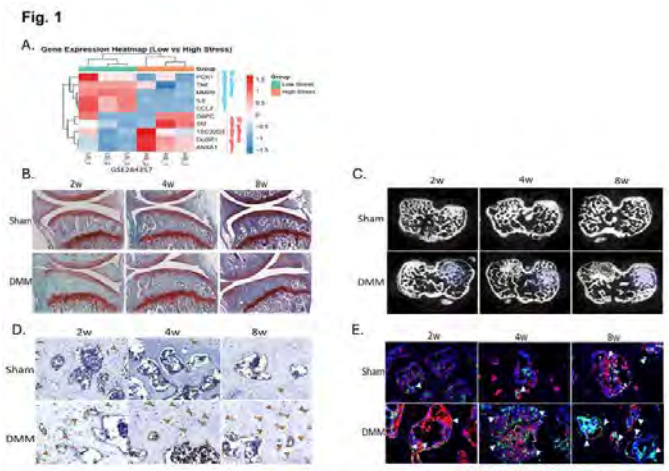


Fig. 1.osteoblastic 11β-HSD1 increased in DMM OA mice. (A) Heatmap of GC pathway gene expression in subchondral bone of low stress and high stress areas in OA patients(GSE284357).(B) Safranin O-Fast Green staining of OA mouse paraffin sections at different time points.(C) Representative micro-CT images of subchondral bone in OA mice at different time points.(D) IHC staining of paraffin sections of OA mice at different time points.(E) Immunofluorescence staining of paraffin sections of OA mice at different time points.

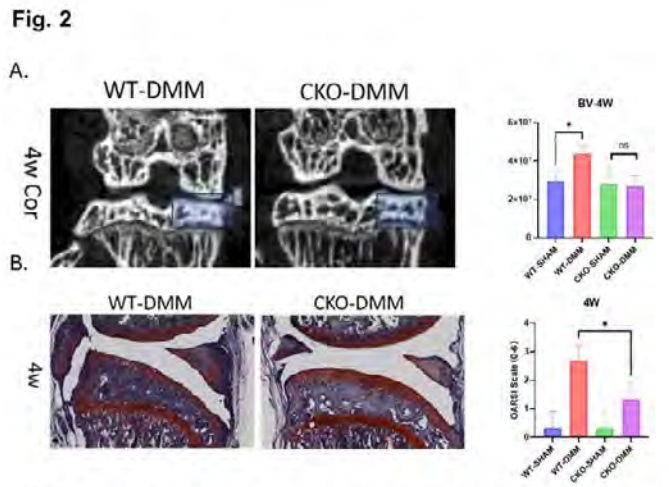


Fig. 2. Targeting osteoblastic 11β-HSD1 reduced subchondral bone sclerosis and attenuated cartilage degeneration. (A) Representative micro-CT images of subchondral bone in DMM CKO mice and DMM WT mice (B) Safranin O-Fast Green staining of in DMM CKO mice and DMM WT mice paraffin sections.

P1720

RELATIONSHIP BETWEEN NAMPT AND CLASSICAL INFLAMMATORY MARKERS IN PATIENTS WITH OSTEOPOROSIS ASSOCIATED WITH RHEUMATOID ARTHRITIS

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Objective: To study the relationship between serum nicotinamide phosphoribosyltransferase (Nampt) levels and laboratory markers of inflammation in patients with osteoporosis (OP) associated with rheumatoid arthritis (RA).
Methods: We determined serum Nampt levels in 140 RA patients (96 women and 44 men) using an indirect enzyme-linked immunosorbent assay (RaiBiotech, cat. no. EIA-VIS-1). All patients had RA diagnosed according to generally accepted clinical guidelines; dual-energy X-ray absorptiometry was used to measure bone mineral density. The control group consisted of 20 women and 10 men aged 22 to 55 years who had no complaints of joint pain throughout their life. The average disease duration was 5.94 ± 0.37 years.
Results. All RA patients were divided into two groups: one group (118 patients) with elevated serum Nampt levels (more than 3.9 ng/mL) and the second group (22 patients) with normal levels.
CRP and ESR levels were determined in each of the two groups.
Patients with elevated Nampt levels had the following laboratory parameters (M±m): ESR - 37.83 ± 1.57, CRP - 56.09 ± 3.73 (normal - less than 5.0 mg/L). In the second group, the following results were obtained: ESR 22.46 ± 0.56, CRP 21.65 ± 1.38. Thus, patients with elevated Nampt levels had significantly higher ESR and CRP concentrations ($p < 0.001$).
Conclusions. A relationship was found between serum Nampt levels in patients with RA-associated AP and laboratory markers of inflammation, such as CRP and ESR. These data indirectly support the hypothesis that elevated Nampt levels in RA patients are associated with disease activity.

P1721

THE RELATIONSHIP BETWEEN THE LEVEL OF ANTI-RA-33 IN PATIENTS WITH OSTEOPOROSIS ASSOCIATED WITH RHEUMATOID ARTHRITIS AND LABORATORY PARAMETERS REFLECTING THE SEVERITY OF THE DISEASE

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Objective: To study the relationship between serum levels of antibodies to the RA-33 antigen and the characteristics of the course of rheumatoid arthritis.
Materials and methods. We observed 88 patients diagnosed with rheumatoid arthritis (RA) meeting the ACR/EULAR 2010 criteria; all patients had osteoporosis (OP) (according to dual-energy X-ray absorptiometry). The patients' age ranged from 22 to 81 years (M ± σ, 54.3 ± 12.1 years), with a predominance of older individuals (over 50 years). The duration of RA ranged from 0.5 to 30 years (M ± σ, 11.2 ± 8.6 years). Rheumatoid factor (RF) was detected in 64 patients (72.7%), and 59 (67%) study participants were anti-CCP positive. An indirect solid-phase ELISA was used to quantify anti-RA-33 in human serum. The study was conducted using the commercial IMTEC-RA33-Antibodies test system.
Statistical processing of the obtained results was performed using the STATISTICA 12.5 software package. To identify relationships between quantitative indicators, Spearman's rank correlation analysis was performed, calculating the correlation coefficient (r) and significance (p). Results were considered statistically significant at $p < 0.05$.
Results. The average level of anti-RA-33 in RA patients, calculated as M±σ, was 12.66±31.60 U/ml (from 0 U/ml to 44.26 U/ml). To identify the relationship between the level of anti-RA-33 and laboratory parameters reflecting the severity of the disease in RA patients, a correlation analysis was performed between the level of anti-RA-33 and the level of anti-CCP (correlation coefficient r=0.11, p=0.31), RF (correlation coefficient r=-0.20, p=0.22), ESR (correlation coefficient r=0.14, p=0.24), CRP (correlation coefficient r=0.33, p=0.002) and hemoglobin (correlation coefficient r=-0.07, p=0.55). The obtained data indicate the presence of a direct correlation of moderate strength between the levels of anti-RA-33 and CRP.
Conclusions. In the course of the study, a positive correlation was found between anti-RA-33 and CRP levels in patients with RA-associated OP.

P1722

THE RELATIONSHIP BETWEEN SERUM NESFATIN-1 LEVELS AND THE PRESENCE OF OSTEOPOROSIS, OSTEOPOROTIC FRACTURES AND BMD IN PATIENTS WITH RA

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Objective: To study the relationship between serum nesfatin-1 levels and the characteristics of the course of osteoporosis in patients with rheumatoid arthritis.
Materials and methods. We observed 170 people: 110 patients with RA and 60 conditionally healthy individuals, who formed the control group. Among the patients with RA, there were 105 (95.5%) women and 5 (4.5%) men, whose average age was 54.07±11.3 (51.9-56.2) years, BMI - 28.8±6.09 (27.6-29.9) kg/m2. All patients with RA were examined by DEXA. Osteoporosis (OP) was diagnosed in 52 patients with RA.
The control group consisted of 60 conditionally healthy individuals: 33 (55%) women and 27 (45%) men, whose average age was 49.3±11.1 (46.4-52.2) years, median BMI – 27.90 [23.56-31.84], with no history of joint pain. RA patients were comparable in age and BMI ($p>0.05$) with the group of conditionally healthy individuals.
Results. The mean serum nesfatin-1 (NF-1) level in healthy individuals was 31.6±3.17 (30.8-32.4) ng/ml. The reference values for NF-1, calculated using the M±2σ formula, were 25.27–37.95 ng/ml. We then examined the relationship between serum NF-1 levels and a history of OP and osteoporotic fractures. Patients with OP and osteoporotic fractures had statistically significantly higher NF-1 levels than patients without

them (Z=-2.06; p=0.040 and Z=-2.37; p=0.017, respectively).
To clarify the mechanism of this relationship, a correlation analysis was conducted between serum NF-1 levels and bone mineral density (BMD) in patients with RA. There was no association between serum NF-1 levels and lumbar spine BMD (r=0.01299, p=0.893), femoral neck BMD (ρ=-0.03, p=0.785) and proximal femur BMD (ρ=-0.02, p=0.825).
Conclusions. It can be concluded that the relationship between NF-1 levels and the presence of osteoporosis is not due to its dependence on BMD. While BMD is an important factor, it is not the only one considered when diagnosing osteoporosis. For example, with age, the number of artifacts associated with degenerative changes in the spine and joints also increases, which can lead to an overestimation of BMD levels in densitometric studies. Therefore, it can be concluded that the association of NF-1 with osteoporosis may be due to its association with osteoporotic fractures.

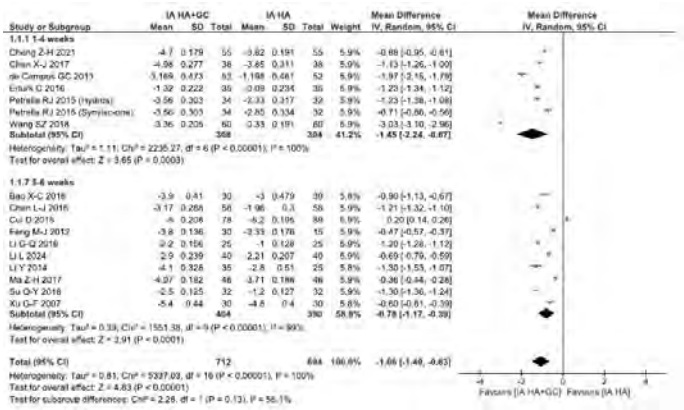
P1723

INTRA-ARTICULAR HYALURONIC ACID WITH OR WITHOUT GLUCOCORTICOIDS FOR KNEE OSTEOARTHRITIS: A META-ANALYSIS

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Objective(s): Adding intra-articular (IA) glucocorticoid (GC) to hyaluronic acid (HA) offered immediate pain relief and may enhance viscosupplementation in knee osteoarthritis (KOA). This study compared the effectiveness of IA HA with GC versus HA alone in patients with KOA for 12 weeks post-injection.
Material and Methods: We performed a meta-analysis (CRD420251031163), searching English and Chinese databases for literature published before April 2025. Randomized controlled trials (RCTs) and observational studies were included if they compared the effectiveness of IA HA with GC versus HA alone among patients with KOA. The primary outcomes were pain relief, measured by visual analog scale (VAS), and physical function, measured by Western Ontario and McMaster Universities Arthritis Index (WOMAC) at 1-4, 5-6, and 7-12 weeks post-injection. Treatment differences were estimated by the standard mean difference (SMD) and assessed against minimal clinically important differences (VAS: 0.9 cm).
Results: This meta-analysis included 20 studies (17 RCTs) on 1,847 patients. Compared with HA alone, HA with GC had significantly greater reductions in VAS (cm) at 1-4 (SMD: -1.43; 95%CI: -2.42, -0.44), 5-6 (SMD: -0.7; 95%CI: -1.02. -0.37), and 7-12 weeks (SMD: -0.41; 95%CI: -0.67, -0.15) post-injection. At 1-6 weeks, more VAS reductions were observed in patients receiving HA with GC (pooled SMD: -0.92; 95%CI: -1.34, -0.50), specifically, betamethasone (SMD: -1.08) or triamcinolone (SMD: -0.95). Results of function improvement measured by WOMAC total scores favored HA with GC at 1-6 (SMD: -7.45; 95%CI: -12.00, -2.90) and 7-12 weeks (SMD: -2.57; 95%CI: -4.72, -0.41). Adverse events were less frequent in patients receiving HA with GC across 12 weeks (OR: 0.61; 95% CI: 0.43, 0.87).
Conclusion(s): Intra-articular HA with GC was more effective than HA alone in pain relief and function improvement over 12 weeks post-injection. Treatment differences were more clinically relevant within 4 weeks. HA with GC experienced fewer adverse events.



P1724

RISK STRATIFICATION FOR FRAGILITY FRACTURES AND OSTEOPOROSIS UNDERDIAGNOSIS IN COMMUNITY-DWELLING WOMEN WITH MENOPAUSE: A POST-HOC ANALYSIS FROM A POPULATION-BASED, RANDOMIZED-SAMPLING, EPIDEMIOLOGICAL STUDY ON VERTEBRAL FRACTURES IN CHINA

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Objective(s): Treatment guidelines recommend risk stratification for fragility fractures (FFs) in postmenopausal women to optimize anti-osteoporosis (OP) therapy. We aimed to categorize FF risk and explore OP underdiagnosis in community-dwelling Chinese women with menopause.
Material and Methods: This study was a planned *post-hoc* analysis of a population-based, randomized, cross-sectional study on prevalent vertebral fractures (VFs) in 2,664 postmenopausal women from the community in China between 2017 and 2019 (ChiVOS). We stratified women into high- or very-high-risk groups for FFs, according to the guidelines of the Chinese Society of Bone and Mineral Research (CSOBMR 2022) and the American Association of Clinical Endocrinology (AACE 2020). We presented the risk category per CSOBMR (AACE) as percentages (prevalence) with 95% confidence intervals (CIs). Risk factors for underdiagnosis of OP were explored using multivariate logistic regression.
Results: In 2,655 subjects with eligible data, the prevalence of women with high risk and very high risk of FFs increased with age. In the age groups < 65 and ≥65 years, the prevalence of women with high risk of FFs was 17.7% (208/1173, 95%CI: 15.6%, 20.0%) and 29.8% (442/1482, 95%CI: 27.5%, 32.2%) (AACE: 18.2%, 30.3%); the prevalence of women with very high risk of FFs was 10.3% (121/1173, 95%CI: 8.6%, 12.2%) and 32.3% (478/1482, 95%CI: 29.9%, 34.7%) (AACE: 9.9%, 31.4%). In women of 55 – 59 and 60 – 64 years, 15.6% (64/410) and 23.2% (123/531) were with high risk (AACE: 15.6%, 24.3%); 7.6% (31/410) and 14.9% (79/531) were with very high risk (AACE: 7.6%, 14.1%). Rates of anti-OP therapy were low (<10.0%) across all age groups. Monotherapy with bone resorption inhibitors accounted for 2.2% (<65 years: 2.4%) and 1.7% (<65

years: 2.5%) in high- and very-high-risk groups for FFs. Undiagnosed OP was 72.6%. Household income <3000 RMB (OR: 1.99, 95%CI: 1.45, 2.74), age <65 years (OR: 1.67, 95%CI: 1.22, 2.29), and labour work (OR: 1.58, 95%CI: 1.15, 2.17) were factors associated with undiagnosed OP.
Conclusion(s): Community-dwelling Chinese women with menopause were at high and very high risks of FFs, even at a younger age. OP underdiagnosis was significant, with insufficient treatment. Study findings support the need for early screening in community-based postmenopausal women to prevent fragility fractures.

P1725

THE MAIN RISK-FACTORS OF LOW MUSCLE MASS IN POSTMENOPAUSAL WOMEN WITH SLE: A COMPARATIVE STUDY

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Background: It is a well-known that patients with SLE have an increased risk of early disability caused by complications associated with musculoskeletal system, especially with early development of muscle weakness. If the the muscle mass in general population is associated with age, nutrition, physical activity, hormonal status, etc., then in patients with SLE other factors may play a key role and are still need to be clarified.
Aim: To assess the freuquency of muscle mass loss in postmenopausal women with SLE compared with controls and to investigate its association with disease course.
Methods: 43 postmenopausal women with SLE (mean age 54.9±6.72 years, mean disease duration 18.4±6.05 years) and 37 age-matched healthy postmenopausal women (mean age 52.7±5.88 years) were included in this cross-sectional study. Muscular status was measured using dual-energy X-ray absorptiometry (DXA). The cut-off points for low muscle mass were appendicular skeletal muscle mass (ASMM) <15.0 kg and appendicular skeletal muscle index (ASMI) <5.5 kg/m2 according to the EWGSOP2 criteria (2019). The disease course was assessed by disease duration, laboratory activity indicators (CRP, ESR), SLEDAI-2K and SLICC scores. Statistical analysis was conducted with a t-test for mean difference and linear regression was used to adjust confounders.
Results: Patients with SLE showed significant lower measurements of muscle mass compared to the control group. Thus, the mean ASMM and ASMI were significantly lower in the SLE group than in controls (19605±1199.3g and 7.07±0.57 vs 25235±3568.3g and 9.23±0.73, p<0.001). The cut-off ASMM and ASMI points were recorded in 20.9% and 16.3% of SLE patients compared to 8.1% and 4.54% in controls. ASMM in SLE patients was associated with SLEDAI-2K, SLICC and CRP levels (p<0.005), while ASMI showed a close correlation with SLICC (p<0.001) and were not associated with ESR, age and disease duration.
Conclusions: SLE women in menopausal period have a significant disproportion in muscle mass compared to general population, which depends on the disease course, including activity and prevalence of the disease and does not depend on age, hormonal status and disease duration.

P1726

THE EFFECT OF SCHROTH METHOD EXERCISE ON PREOPERATIVE FLEXIBILITY IN AIS SURGICAL CANDIDATES, A RANDOMIZED CONTROLLED TRIAL

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Objectives: To compare the curve flexibility after Schroth method exercise and traditional exercise in AIS surgical candidates.
Study design: Randomized controlled trial
Background: Adolescent Idiopathic Scoliosis (AIS) surgical candidate is characterized by a spinal curvature of 30-40 degrees or more. Patients typically face wait times of 6 months to 2 years for surgery, during which maintaining spinal flexibility is crucial for better surgical outcomes. Physiotherapeutic Scoliosis Specific Exercise (PSSE), with the Schroth method being a well-researched technique, has shown effectiveness in improving spinal flexibility but limited research on the effects of these exercises for more severe curvatures.
Methods: A randomized controlled trial was conducted involving 21 AIS patients with Cobb angle of 40 degrees and greater. Patients were randomly allocated into two groups: Schroth method exercise group and control group. The Schroth method exercise group received supervised training and individualized home programs, with 2-3 in-hospital sessions per month and home exercises 3-5 days a week. The control group engaged in traditional exercise training, including stretching and core muscle training, with at least one in-hospital session in the first month and subsequent home exercises 3-5 days a week. Main curve flexibility index was assessed along with Cobb angle, ATR, and quality of life using Thai SRS-22 questionnaire at 3 and 6 months.
Results: 21 patients were included in the study (11 in Schroth method exercise group and 10 in control group). The Schroth method exercise group maintained a stable main curve flexibility index from the beginning of the study (51.60 ± 14.13) to 6 months post intervention (53.54 ± 18.46). On the contrary, the control group demonstrated a significant decline in main curve flexibility index from 43.87 ± 20.34 to 36.09 ±16.88 (p-value 0.032). The Schroth method exercise group also showed an improvement in quality of life based on the SRS-22 scores (from 3.757 ± 0.395 to 3.843 ± 0.393, p-value 0.023), while no significant change was observed for the control group (p-value 0.529). No significant change in Cobb angle and trunk rotation was observed throughout the study for both groups.
Conclusion: In this randomized controlled trial, the Schroth method exercise is superior to traditional exercise regimens in its ability to preserve spinal mobility in AIS surgical candidates and leads to statistically significant improvements in SRS-22 scores.
Keywords: Adolescent Idiopathic Scoliosis, AIS, Physiotherapeutic Scoliosis Specific Exercise, Schroth method exercise

P1727

THE EFFECT OF SYSADOA THERAPY ON GLYCEMIC LEVEL IN PRIMARY KNEE OSTEOARTHRITIS WITH TYPE 2 DIABETES MELLITUS

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Objective: Symptomatic slowing drug for Osteoarthritis (SYSADOA) is commonly prescribed for patients with knee osteoarthritis (KOA). Nevertheless, the effect of long-term use of SYSADOA, either Glucosamine or Diacerein on glycemic control in patients who coincide with Type 2 diabetes mellitus (T2DM) is still unclear. The aim of this study is to compare the mean difference in glycemic levels between patients with primary KOA and T2DM who received long-term SYSADOA and those with no SYSADOA (Reference group).

Methods: A retrospective cohort observational study included patients aged ≥40 years with KOA and T2DM. Exclusion criteria included patients who discontinued SYSADOA before 2 years, and had glycemic uncontrol requiring intensive stabilization. The primary outcome was fasting blood sugar (FBS) level and HbA1C which were sequentially assessed at least every 6 months over 2 years, following the initial administration of SYSADOA. Confounders, set a priori, including sex, age, and body mass index (BMI), alcohol, smoking, as well as the usage of NSAIDs, opioids, antidiabetic, lipid-lowering and antihypertensive drugs were adjusted in multilevel Gaussian regression to determine the mean differences of FBS (mg/dL) and HbA1C (%). The interaction terms between time and study groups were incorporated in the statistical models. The predictive margin was plotted to illustrate glycemic changes for each group.

Results: The study sample comprised of 64, 36, and 309 patients in the Glucosamine, Diacerein, and reference group, respectively. Predictive margins indicated an upward trend in FBS over two years in the Glucosamine group. Following confounder adjustment, the mean difference in FBS compared to the reference group was -6.8 (95%CI: -15.7, 2.1) mg/dL for the Glucosamine group and -3.7 (95%CI: -15.4, 7.9) mg/dL for the Diacerein group. Additionally, the mean difference for HbA1C relative to the reference group was 0.1 (95%CI: -0.3, 0.4) % for the Glucosamine group and 0.1 (95%CI: -0.3, 0.5) % for the Diacerein group, after confounder adjustment. The difference of FBS and HbA1C among groups were not statistically significant.

Conclusion: Glucosamine and Diacerein do not significantly affect glycemic levels, and thus additional glycemic monitoring is not required for T2DM patients receiving long-term SYSADOA.

P1728

FOOT PAIN AND FUNCTIONAL IMPAIRMENT IN RHEUMATOID ARTHRITIS: INSIGHTS FROM THE FOOT FUNCTION INDEX

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Introduction:
Rheumatoid arthritis (RA) is a chronic inflammatory disease that frequently affects the feet, leading to pain, deformities, and functional disability. Despite its high prevalence, foot involvement remains under-recognized in routine clinical practice.

Objective:
To evaluate the functional impact of foot involvement in patients with RA using the validated Foot Function Index (FFI).

Patients and methods:
We conducted a cross-sectional study including patients with RA fulfilling the 2010 ACR/EULAR classification criteria. Epidemiological data, clinical and podoscopic foot examinations, laboratory parameters, and radiological findings were collected. Foot pain was assessed using a visual analogue scale (VAS, 0–10). Functional impairment was evaluated using the validated French version of the FFI.

Results:
Thirty-five patients were included (29 women and 6 men; sex ratio 4.8), with a mean age of 54.0 ± 13.3 years and a mean disease duration of 13.8 ± 13.8 years. Foot involvement was observed in 82.9% of patients. The mean foot pain score was 4.65 ± 2.27. Forefoot, midfoot, and hindfoot involvement were present in 51.4%, 48.6%, and 51.4% of patients, respectively. Foot deformities were observed in 57%, podoscopic abnormalities in 60%, and radiological involvement in 74%.

The mean total FFI score was 38.5 ± 25.4, with subscale scores of 41.4 ± 27.9 for pain, 26.7 ± 27.7 for difficulty, and 44.4 ± 26.4 for activity limitation. Higher FFI scores were significantly associated with foot pain, pain on mobilization, positive squeeze test, abnormal podoscopic findings, hallux valgus, flat foot, and calcaneal valgus (all $p < 0.05$). The FFI correlated positively with disease activity (DAS28: $r = 0.677$), CRP levels ($r = 0.545$), and pain intensity (VAS: $r = 0.850$) (all $p \leq 0.001$). In multivariate analysis, pain intensity was the only independent predictor of functional impairment ($\beta = 0.65$, $p < 0.001$).

Conclusion:
Foot involvement is highly prevalent in RA and is associated with significant functional impairment, mainly driven by pain intensity. Systematic foot assessment should be integrated into routine RA management to optimize patient outcomes.

P1729

THERAPEUTIC PATIENT EDUCATION ENHANCES RESISTANCE TO STIGMA IN RHEUMATOID ARTHRITIS

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Introduction:
The Resistance to Stigma subscale of the Internalized Stigma of Mental Illness (ISMI) reflects patients' ability to oppose and cope with stigma, capturing elements of resilience and empowerment rather than internalized stigma itself. Interventions that strengthen resistance to stigma may therefore represent a meaningful therapeutic target in chronic diseases such as rheumatoid arthritis (RA).
Objective:
To evaluate the impact of therapeutic patient education (TPE) on the "Resistance to Stigma" subscale in patients with RA
Methods :
This prospective 11-month study included patients with RA followed in a rheumatology department. The Resistance to Stigma subscale was assessed at baseline and two months after completion of a structured TPE program. TPE sessions were delivered by two trained healthcare professionals in small groups of 6–7 patients, each lasting 90 minutes and combining interactive workshops, group reflection, discussion, and theoretical input. Associations between changes in Resistance to Stigma scores and sociodemographic, clinical, and biological variables were analyzed.
Results:
Eighty patients with RA were included (72 women, 8 men; female-to-male ratio 9:1), with a mean age of 61.1 ± 8.6 years. Most patients had a low educational level (78.8%), and nearly half had a medium socioeconomic status (49%). Obesity was present in 26.3% of patients. Regarding marital status, 68.8% were married, 18.8% single, 10% widowed, and 2.5% divorced. The number of children ranged from 0 to 7 (median 3 [2–5]).
The mean "Resistance to Stigma" score increased from 2.16 ± 0.63 at baseline to 3.22 ± 0.42 after TPE, with a mean change of 1.06 ± 0.56 ($p < 0.001$). The proportion of patients with high resistance to stigma increased markedly from 7.5% at baseline to 66.3% after TPE.
Among sociodemographic factors, marital status was significantly associated with score improvement ($p = 0.027$), and a positive correlation was observed between the number of children and change in resistance to stigma ($r = 0.280$, $p = 0.024$). No significant associations were found with age, sex, educational level, occupation, geographic origin, socioeconomic status, smoking, alcohol consumption, or body mass index.
Conclusion:
TPE substantially enhances resistance to stigma in patients with RA, supporting its role in fostering resilience and empowerment beyond symptom control.

P1730

DO RHEUMATOLOGISTS APPLY GLUCOCORTICOID-INDUCED OSTEOPOROSIS GUIDELINES ? KNOWLEDGE AND REAL-LIFE PRACTICES

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Introduction
Glucocorticoid-induced osteoporosis (GIOP) is a common complication of long-term glucocorticoid therapy that increases fracture risk. Awareness and implementation of clinical guidelines in rheumatology practice remain unclear.
Objective
To assess rheumatologists' knowledge of GIOP management and its application in real-life practice.
Materials and Methods
An anonymous online survey was conducted among rheumatologists to collect demographics, clinical experience, and knowledge and application of GIOP management, including risk assessment, preventive measures, and treatment strategies. Descriptive analyses summarized guideline awareness and adherence.
Results
Among 43 respondents (mean age 41 years, 86 % women), most were early-career (<5 years, 86 %) and practiced in university hospitals (79 %). Half managed 10–20 patients on chronic glucocorticoids per month. Most (86 %) were aware of GIOP guidelines, using SFR/GRIO 2014 (53 %), ACR 2022 (26 %), both (16 %), or ECTS 2023/2024 (5 %).
For risk assessment, 76 % considered bone loss clinically significant after ≥3 months of therapy, 60 % evaluated fracture risk at ≥7.5 mg/day prednisone, and only one-third assessed risk systematically. DXA was most used (48 %), while FRAX adjustment was applied by 26 % (40 % unsure).
Preventive measures were partially applied: DXA in patients with prior fractures (50 %) or all on prolonged glucocorticoids (29 %), calcium and vitamin D routinely prescribed (83 %), fall prevention addressed (64 %). Anti-osteoporotic treatment was mostly initiated after DXA (78 %), with oral bisphosphonates universally preferred. High-risk patients were managed with anti-resorptives alone by 44 %, and younger patients (<40 years) assessed case-by-case (74 %). Re-evaluation after glucocorticoid tapering occurred always/often in 73 %, DXA follow-up every 2–3 years in 71 %. Main barriers were lack of time (24 %), economic constraints (14 %), and low patient adherence (14 %). Only 19 % fully applied guidelines, while 77 % applied them partially.
Conclusion
Rheumatologists are aware of GIOP guidelines, but application remains partial, especially for risk assessment, DXA, and treatment initiation. Simplified recommendations, decision-support tools, and targeted training may improve adherence.

P1731

KNOWLEDGE OF PREGABALIN USE AND MISUSE AMONG PRIMARY CARE PHYSICIANS: A CROSS-SECTIONAL STUDY

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Background
The increasing prescription of pregabalin has raised growing concerns regarding misuse and dependence. In primary care, where most prescriptions are initiated, physicians' knowledge is crucial to ensure appropriate use and prevent medication-related harm.
Objective
To assess primary care physicians' knowledge regarding pregabalin use and misuse.
Methods
A cross-sectional analytical study was conducted among primary care physicians practicing in different regions. Data were collected using a structured questionnaire assessing demographic and professional characteristics, as well as knowledge related to pregabalin use and misuse. A global knowledge score was calculated (maximum score : 34).
Results
A total of 40 physicians were included; 28 (70%) were women. The mean age was 31 years (range: 26–41). Participants comprised 24 family medicine residents (60%), 8 private practitioners (20%), and 8 public health physicians (20%). Most participants practiced in urban settings (82.5%). Postgraduate certifications included pain management (10%), addictology (10%), and pharmacology (5%).
The mean global knowledge score was 13.1 (95% CI: 7.69–18.51). Overall, 67.5% of participants scored below the mean threshold of 17. Female physicians were more likely to have a score below 17 (77.8%, p = 0.045). Professional status, practice setting, and completion of postgraduate training in addictology, psychiatry, pain management, or pharmacology were not significantly associated with knowledge scores.
Conclusion
Significant gaps and inaccuracies were identified in primary care physicians' knowledge regarding pregabalin use and misuse. These findings highlight the need for targeted continuing medical education to improve prescribing practices and promote safe, effective, and individualized patient care.

P1732

WORK-RELATED IMPACT OF SPONDYLOARTHRITIS IN PATIENTS TREATED WITH BIOLOGIC THERAPY: A CROSS-SECTIONAL STUDY

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Background
Spondyloarthritis (SpA) is a chronic inflammatory disease affecting young adults during their most productive working years. Despite advances in biologic therapy, SpA continues to substantially impair work participation and productivity.
Objectives
To assess work-related impairment in patients with SpA treated with biologic therapy, distinguishing between job loss and work limitations among employed patients, and to identify associated factors.
Methods
We conducted a descriptive and analytical cross-sectional study at the Rheumatology Department of Fattouma Bourguiba University Hospital (Monastir) between January and July 2025. Patients fulfilling the ASAS 2010 criteria and receiving biologic therapy were included. Retired individuals and students were excluded. Work impairment was evaluated using the Work Productivity and Activity Impairment (WPAI) questionnaire. Disease activity (ASDAS-CRP, ASDAS-ESR, BASDAI), functional status (BASFI, BASMI, BAS-G), pain intensity (VAS), and quality of life (ASQoL) were assessed.
Results
Forty-eight patients were included (27 men, 21 women), with a mean age of 44 ± 11.5 years and a mean disease duration of 13.7 ± 6.7 years. Job loss attributable to SpA was reported in 14.6% of patients (n=7), while 85.4% (n=41) remained professionally active. Job loss was significantly associated with longer disease duration (p=0.036), lower socioeconomic status (p=0.035), higher NSAID use (p=0.004), elevated inflammatory markers (ESR p=0.020; CRP p=0.006), higher disease activity (ASDAS-CRP, ASDAS-ESR, BASDAI; all p<0.001), poorer functional status (BASFI p<0.001; BASMI p=0.001; BAS-G p<0.001), worse patient global assessment (p=0.006), and impaired quality of life (ASQoL p=0.001).
Mean WPAI scores were 15.7 ± 23.4% for absenteeism, 39.9 ± 27.1% for presenteeism, 43.8 ± 30.2% for overall work productivity loss, and 37.5 ± 25.8% for activity impairment. Among employed patients, higher work impairment across all WPAI domains was moderately to strongly associated with greater pain intensity, higher disease activity, worse functional status, and poorer quality of life (all p≤0.001).
Conclusions
Despite biologic therapy, spondyloarthritis remains associated with significant work impairment, highlighting the need for early targeted interventions.

P1733

EFFECT OF BELT ELECTRODE-SKELETAL MUSCLE ELECTRICAL STIMULATION ON FRACTURE HEALING AND BONE MICROARCHITECTURE IN A RAT FEMORAL FRACTURE MODEL

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Objective: Belt electrode–skeletal muscle electrical stimulation (B-SES) enhances bone remodeling, but its role in fracture healing remains unclear. This study evaluated the effects of B-SES in a rat femoral fracture model.

Methods: Twenty-one male Sprague–Dawley rats were used. Twelve with surgically induced femoral fractures were randomly assigned to a B-SES group or control group (n=6 each). Three additional rats were euthanized before fracture induction to obtain baseline periosteum and vastus medialis samples for reverse transcription polymerase chain reaction (RT-PCR). B-SES was initiated immediately after fracture induction. At 4 weeks, animals were sacrificed and the femur, tibia, periosteum, and vastus medialis were collected for radiography, micro-computed tomography (micro-CT), histology, biomechanical testing, and RT-PCR analysis.

Results: Radiography demonstrated improved cortical continuity and greater callus formation around fracture in the B-SES group. Micro-CT revealed significantly increased callus bone volume, trabecular thickness, and trabecular number in the fractured femur of B-SES group. Similar trends were observed in the intact tibia, with increased yield load and toughness. Histology confirmed a larger callus area in the B-SES group. RT-PCR showed that the expression of runt-related transcription factor 2 (Runx2), osteonectin, and receptor activator of nuclear factor κB ligand (RANKL) was upregulated in the periosteum around fracture, although these increases were not statistically significant, whereas sclerostin expression was significantly elevated. In the vastus medialis, myostatin expression was significantly reduced, whereas insulin-like growth factor-I (IGF-I) showed a non-significant upward trend.

Conclusion: B-SES significantly improved bone microarchitecture and mechanical strength, and further enhanced fracture healing by downregulating myostatin expression in a rat model. These findings highlight B-SES as a promising non-invasive therapeutic modality for promoting fracture repair and preserving musculoskeletal function.

P1734

SAFETY OF SEQUENTIAL ROMOSOZUMAB THERAPY AFTER DENOSUMAB DISCONTINUATION.

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Background

Denosumab discontinuation is associated with rapid loss of its antiresorptive effect, leading to increased bone turnover and a higher risk of vertebral fractures. Romosozumab, with combined anabolic and antiresorptive properties, may mitigate this rebound phenomenon; however, real-world evidence remains limited.

Objective

To assess the safety and effectiveness of romosozumab following denosumab discontinuation in routine clinical practice.

Methods

Prospective descriptive observational study including 11 patients with osteoporosis previously treated with denosumab and subsequently receiving romosozumab.

Collected variables included demographics, anthropometric data, fragility fracture risk factors, bone metabolism laboratory parameters, previous osteoporosis treatments, and bone mineral density (BMD).

Results

Baseline clinical, densitometric characteristics, and comorbidities are summarized in ***Table 1***.

In patients with available paired DXA data (N = 9), romosozumab treatment was associated with a trend toward increased BMD. The increase was statistically significant at the lumbar spine (p = 0.045). At the femoral neck, BMD also increased, although statistical significance was not reached (p = 0.0528).

Age showed a borderline association with lumbar spine BMD gain (p = 0.05), with greater increases observed in older patients; however, no significant associations were confirmed in multivariate analysis. Duration of prior denosumab treatment and history of fragility fractures were not associated with BMD changes.

No fractures occurred during the transition period.

Conclusion

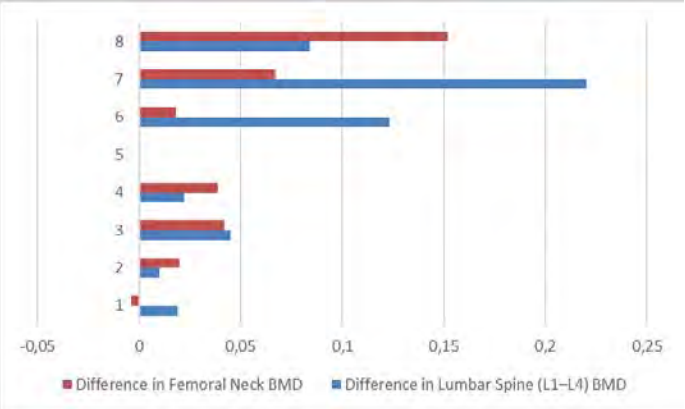
Sequential treatment with romosozumab after denosumab discontinuation was safe and showed a favorable effect on bone density, particularly at the lumbar spine. These real-world findings support romosozumab as a potential therapeutic option after denosumab withdrawal. Larger studies are warranted to confirm these results.

Table 1. Baseline clinical and densitometric characteristics

VARIABLE		N= 11
Female sex, n (%)		11(100)
Age, mean (SD), years		70.7 (7.38)
Cardiovascular risk factors, n (%)	Hypertension	5 (45.5)
	Dyslipidemia	3 (27.3)
	Diabetes mellitus	2 (18.2)

Previous fragility fracture, n (%)	Vertebral	8 (72.7)
	Hip	2 (18.2)
	Other	2 (18.2)
Parental hip fracture, n (%)		2 (18.2)
Smoking, n (%)		2 (18.2)
Alcohol		0
Glucocorticoid use, n (%)		2 (18.2)
Early menopause, n (%)		4 (36.4)
Duration of denosumab therapy, mean (SD), years		4.1 (3.43)
Time from last denosumab dose to romosozumab start, mean (SD), months		3.53 (3.13)
Fractures during transition		0
Lumbar spine BMD pre-romosozumab, mean (SD), g/cm²		0.734 (0.09)
Lumbar spine BMD post-romosozumab, mean (SD), g/cm²		0.784 (0.08)
Femoral neck BMD pre-romosozumab, mean (SD), g/cm²		0.591 (0.09)
Femoral neck BMD post-romosozumab, mean (SD), g/cm²		0.631 (0.08)

Figure 1. Changes in bone mineral density (BMD, g/cm²) before and after romosozumab treatment.



P1735

BONE HEALTH IN LUNG TRANSPLANT CANDIDATES: CLINICAL PROFILE, RISK FACTORS, AND MANAGEMENT

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Background/Objectives: Patients evaluated for lung transplantation are at high risk of osteoporosis and fragility fractures due to advanced age, chronic lung disease, long-term glucocorticoid use, reduced physical activity, systemic inflammation, and low BMI. Despite this, bone health remains underestimated during the pre-transplant evaluation. This study aimed to describe clinical characteristics, fracture risk factors, and anti-osteoporotic treatment patterns in lung transplant candidates

Methods: A descriptive study was conducted in 61 lung transplant candidates. Data collected included demographics, BMI, primary pulmonary diagnosis, fragility fracture risk factors, smoking status, glucocorticoid use, FRAX scores, prior bone mineral density (BMD) assessment, and anti-osteoporotic treatments before and after transplantation.

Results: The cohort comprised 21 women (34.4%) and 40 men (65.6%), with a mean age of 62.3 ± 7.33 years and mean BMI of 25.8 ± 3.86 kg/m². Interstitial lung disease was the most frequent diagnosis (55.7%), followed by COPD (42.6%) and other conditions (1.6%). Fragility fracture risk factors included prior fracture in 11 patients (18%), parental hip fracture in 3 (4.9%), premature menopause in 2 of 21 women (9.5%), and chronic glucocorticoid therapy in all patients (100%). Smoking history was present in 44 patients (72.2%), with 42 former smokers and 2 current smokers.

The mean FRAX-estimated risk was 7.37 ± 6.16% for major osteoporotic fracture and 3.06 ± 3.54% for hip fracture. BMD had been assessed in 34 patients (55.7%). Before transplantation, 36 patients (59%) were untreated for osteoporosis, 16 (26.2%) received oral bisphosphonates, 8 (13.1%) intravenous bisphosphonates, and 1 (1.6%) denosumab. After transplantation, untreated patients decreased to 27 (44.3%), with 15 (24.6%) on oral bisphosphonates, 12 (19.7%) on intravenous bisphosphonates, and 7 (11.5%) on denosumab.

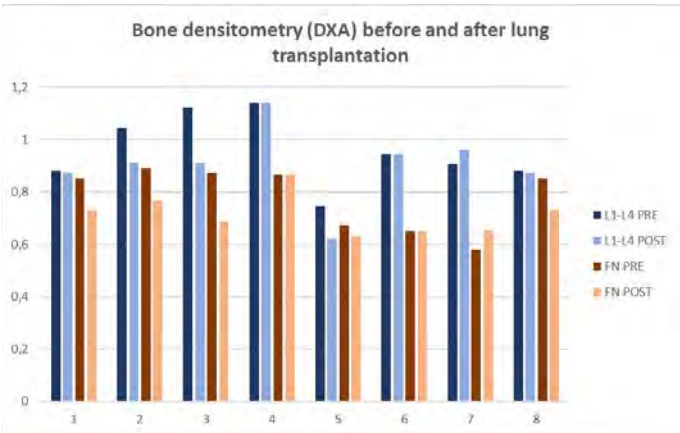
Eight patients had BMD measured before and after transplantation. Treatment was initiated post-transplant in five (62.5%): three with oral bisphosphonates and two with intravenous bisphosphonates; two switched from bisphosphonates to denosumab, and three continued prior therapy. No significant changes were observed in lumbar spine BMD (L1–L4; p = 0.071), whereas femoral neck BMD significantly decreased (p = 0.046), independent of previous treatment.

Conclusion: Lung transplant candidates exhibit a high burden of osteoporosis risk factors and fragility fracture risk. Despite this, many do not receive adequate bone health assessment or treatment, particularly pre-transplant. These findings highlight the need for systematic evaluation and early preventive and therapeutic strategies in this high-risk population.

Tabla 1. Clinical Characteristics and Osteoporosis Risk Factors in Lung Transplant Candidates

VARIABLE			N=61
Sex, n (%)	Female		21 (34,4)
	Male		40 (65,6)
Age, mean (SD)			62,3 (7,33)
BMI, mean (SD)			25,8 (3,86)
Diagnosis, n (%)	COPD		26 (42,6)
	ILD		34 (55,7)
	Other		1 (1,6)
Risk factors associated with fragility fractures, n (%)	Previous fragility fracture		11 (18)
	Parental history of hip fracture		3 (4,9)
	Smoking status, n (%)	Current smoker	2 (3,3)
		Former smoker	42 (68,9)
		Never smoker	17 (27.9)
	Chronic glucocorticoid therapy, n (%)		61 (100)
FRAX score, mean (SD)	Major osteoporotic fracture		7,37 (6,16)
	Hip fracture		3,06 (3,54)
Previous bone mineral density assessment, n (%)			34 (55,7)

Initiation of osteoporosis treatment prior to transplantation, n (%)	No treatment	36 (59)
	Oral bisphosphonate	16 (26,2)
	Intravenous bisphosphonate	8 (13,1)
	Denosumab	1 (1,6)
Osteoporosis treatment after transplantation, n (%)	No	27 (44,3)
	Oral bisphosphonate	15 (24,6)
	Intravenous bisphosphonate	12 (19,7)
	Denosumab	7 (11,5)



P1736

SCREENING STUDY FOR HIGH-RISK GROUPS OF OSTEOPOROSIS IN WOMEN OF SOUTHERN CHINA: A CROSS-SECTIONAL SURVEY OF 19,853 RESIDENTS

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Research Backgroun: Osteoporotic Prevention and Treatment Clinical Guidance Center of Ningbo, Ningbo,d: Osteoporosis has become a major public health issue threatening the health of middle-aged and elderly women. The prevalence of osteoporosis among women over 50 years old in China exceeds 30%, but large-scale screening data for women in the Ningbo area is lacking.In 2025, the Ningbo Women and Children Foundation launched the "Bone Mover" public welfare project, aiming to assess the distribution characteristics of osteoporosis risk in women over 40 years old through large-scale screening.

Methods:

Design: Cross-sectional survey (May 2025 - November 2025)

Sample: 19,853 women residents over 40 years old from 7 districts and counties (cities) in Ningbo

Screening: Positive IOF Osteoporosis Risk One-Minute Test; High-risk OSTA Score Scale; Ultrasound bone densitometer detecting T-value ≤ −1.0 at distal forearm or heel; High fall risk determination conditions: more than 2 falls in the past year / walking difficulties or balance problems / 6m walking speed < 1.0m/s

Sarcopenia determination condition: Calf circumference less than 33cm in women is considered positive.

Result: The overall high-risk rate reached 98.98%, with the positive rate of ultrasonic bone mineral density at 90.6% and that of IOF at 89.4%. The high-risk rate rose significantly with age.The risk of falls gradually increased among people aged over 60 (±23.5%), while the risk of sarcopenia went up among those aged over 40 (±24.4%).Elderly women are the key population for osteoporosis screening.

Figure 1. Distribution of Risk Factors by Age Group

Age Group	Cases	IOF Positive Cases	Percentage	OSTA Positive Cases	Percentage	Quantitative Ultrasound Bone Density Positive Cases	Percentage	High Fall Risk Cases	Percentage	Sarcopenia Risk Cases	Percentage
40-49Y	712	111	15.6%	0	0.0%	593	83.3%	31	4.4%	202	28.4%
50-59Y	1654	412	24.9%	1	0.1%	1428	86.3%	149	9.0%	476	28.8%
60-69Y	7891	7625	96.6%	169	2.1%	7124	90.3%	1373	17.4%	1851	23.5%
70-79Y	6985	6985	100.0%	1740	24.9%	6379	91.3%	1953	28.0%	1582	22.6%
80-89Y	2172	2172	100.0%	1762	81.1%	2038	93.8%	920	42.4%	585	26.9%
90+Y	439	439	100.0%	435	99.1%	415	94.5%	236	53.8%	141	32.1%

Conclusions: Screening reveals a negative correlation between aging and decreased bone mineral density. Meanwhile, it is found that the risk of sarcopenia emerges as early as the age of 40, indicating that muscle mass loss precedes bone mass loss. Sarcopenia and fall risk constitute key amplifiers in the "osteoporosis-fall-fracture" event chain. Comorbid chronic diseases further accelerate bone loss, becoming a major hidden danger for the elderly population. The bone health of women over 60 years old in Ningbo deserves close attention.

Keywords: Osteoporosis; Women; Screening; Risk Factors;Ningbo City, China

P1737

ABDOMINAL AORTIC CALCIFICATION SEVERITY IS INDEPENDENTLY ASSOCIATED WITH REDUCED FEMORAL BONE MINERAL DENSITY AND INCREASED RISK OF OSTEOPOROSIS KOREAN POSTMENOPAUSAL WOMEN

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Background
Vascular calcification has been implicated in skeletal fragility; however, the clinical impact of abdominal aortic calcification (ACC) severity on site-specific bone mineral density (BMD) and osteoporosis risk remains insufficiently characterized.
Methods
This cross-sectional study included Korean postmenopausal women(n=312) who were classified into three groups according to AC severity. Baseline characteristics were compared using ANOVA and chi-square tests. BMD T-scores at the lumbar spine and bilateral femoral sites

were analyzed across ACC groups using ANOVA with Tukey post-hoc tests. Multivariable linear and logistic regression models adjusted for age and diabetes mellitus assessed independent associations between AC and BMD as well as osteoporosis risk. Predictive performance was evaluated using receiver operating characteristic analysis with five-fold cross-validation.
Results
Age and diabetes prevalence increased with higher ACC severity ($p < 0.001$ and $p = 0.004$, respectively), while other baseline characteristics were comparable. BMD significantly decreased across increasing ACC severity at all skeletal sites, with the strongest differences observed at femoral neck and total femur (all $p < 0.001$). Post-hoc analyses demonstrated that major BMD reductions occurred between mild ACC and moderate-to-severe ACC groups. Continuous ACC measures were inversely associated with femoral BMD independent of age and diabetes ($p < 0.01$). Higher AC severity was associated with a markedly increased risk of osteoporosis (unadjusted OR up to 12.0), which remained significant after adjustment for confounders. Models incorporating AC parameters significantly improved osteoporosis prediction compared with clinical variables alone (cross-validated AUC up to 0.81).
Conclusions
Abdominal aortic calcification severity is independently associated with reduced bone mineral density, particularly at femoral sites, and substantially increases osteoporosis risk. Incorporation of AC measures enhances the predictive accuracy for osteoporosis beyond traditional clinical factors, highlighting vascular calcification as a clinically relevant marker of skeletal fragility.

P1738

EVALUATION OF OSTEOPOROSIS IN PATIENTS WITH DEMENTIA ATTENDING A GERIATRICS OUTPATIENT CLINIC: REAL-WORLD DATA

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Objectives
Osteoporosis and dementia frequently coexist in older adults and are associated with an increased risk of fractures, functional decline, and mortality. The aim of this study was to evaluate the clinical, geriatric, and bone mineral density–related factors associated with incident fractures and mortality in older adults with dementia receiving anti-osteoporotic treatment.
Material methods
This retrospective observational study was conducted in patients aged ≥65 years. Among 2,000 screened patients, among these, 988 patients were identified with osteoporosis and 577 with dementia, with 280 had concomitant osteoporosis and dementia. After excluding individuals who received fewer than two doses of anti-osteoporotic therapy or had a follow-up duration of ≤6 months, 89 patients who received denosumab or zoledronic acid as anti-osteoporotic treatment were included in the final analysis. Osteoporosis was diagnosed based on dual-energy X-ray absorptiometry (DXA), FRAX scores, or the presence of fragility fractures. Comprehensive geriatric assessment, laboratory parameters, bone mineral density measurements, fracture occurrence during treatment, and mortality were evaluated. Statistical analyses were performed using appropriate parametric and non-parametric tests.
Results
Eighty-nine patients with dementia and osteoporosis (mean age 84.3 ± 5.6 years; 77.5% female) were followed for a median of 35 months. Most were frail (68.5%) and classified as very high fracture risk (92.1%). Injectable therapies were used in all patients (denosumab 84.3%, zoledronic acid 15.7%). Adverse events were infrequent (6.7%;6.7%; five cases of hypocalcemia and one of myalgia), and fractures under treatment occurred in 7.9%.
Patients treated with denosumab and zoledronic acid showed comparable baseline demographic, clinical, functional, nutritional, and dementia-related characteristics (all $p > 0.05$). Rates of treatment-related adverse events, new fractures during therapy (8.0% vs 7.1%), and mortality were similarly low between groups.
Both denosumab and zoledronic acid were associated with significant within-group improvements in lumbar spine bone mineral density and T-scores. Denosumab additionally showed significant gains in total femur BMD, whereas zoledronic acid mainly improved lumbar spine parameters. However, percentage changes in BMD (ΔBMD%) did not differ significantly between treatment groups at any skeletal site, with only a non-significant trend toward greater femoral neck BMD increase in the zoledronic acid group.
Conclusion
Both denosumab and zoledronic acid resulted in significant improvements in lumbar spine bone mineral density in older patients with dementia. No significant differences in percentage BMD change were observed between treatments, supporting the use of either agent based on clinical considerations.

P1739

IMMATURE GRANULOCYTE PERCENTAGE IN POSTMENOPAUSAL SARCOPENIC INDIVIDUALS: A POTENTIAL NOVEL BIOMARKER?

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Background:
Sarcopenia is an age-related muscle disorder marked by loss of mass, strength, and function. Postmenopausal women face a greater risk because of alterations in hormones and metabolism. In addition, systemic inflammation has been proposed as a key contributor to this population. Although standard inflammatory markers, such as interleukin (IL)-6 and tumor necrosis factor (TNF)-α, are not readily available, the percentage of immature granulocyte (IGr%), easily obtained from routine blood tests, could be helpful as an indicator of inflammation.

Aim:
To investigate the association between IGr% and sarcopenia in postmenopausal women and identify related clinical and laboratory factors.

Methods:
This study was designed as a retrospective observational analysis. The study included postmenopausal women who attended the Geriatrics

and General Internal Medicine outpatient clinics between May and August 2024. The evaluation of sarcopenia involved SARC-F (Strength, Assistance with walking, Rising from a chair, Climbing stairs, and Falls) questionnaire, handgrip strength, bioelectrical impedance analysis, and a 4-meter gait speed test. Basic activities of daily living(ADL) were measured with the Katz ADL scale (22), while instrumental activities were assessed using the Lawton IADL scale (23) and Nutritional Risk Screening (NRS-2002). Laboratory parameters included IGr%, C-reactive protein (CRP), albumin, and white blood cell count (WBC).

Results:
Among 198 participants (mean age: 59 years), 43.9% had probable or confirmed sarcopenia. Sarcopenic women were older ($p < 0.001$), lower lumbar bone density ($p = 0.024$), had more comorbidities ($p = 0.001$), and greater functional dependency ($p = 0.001$). Sarcopenic individuals showed significantly higher IGr% in univariate analysis ($p = 0.046$), while no significant differences were observed in other inflammatory markers such as CRP, WBC, neutrophils, lymphocytes, the ratio of neutrophils to lymphocytes (NLR), and the ratio of platelets to lymphocytes (PLR) (all $p > 0.05$). Multivariate analysis revealed that older age (Odds Ratio (OR): 1.058, 95% Confidence Interval(CI): 1.022–1.096; $p = 0.002$) and albumin (OR: 0.891; 95% CI: 0.773–0.981; $p = 0.023$) were independent predictors of sarcopenia.

Conclusion:
Although IGr% was higher in sarcopenic individuals in univariate analysis, it did not remain an independent predictor after adjustment; however, as a readily available, cost-effective parameter from routine complete blood count, IGr% may serve as a potential early biomarker reflecting low-grade systemic inflammation in sarcopenia, warranting confirmation in larger, prospective, multicenter studies.

P1740

PLC-Γ1 PROMOTES SKELETAL MUSCLE REGENERATION THROUGH AUTOPHAGY ENHANCEMENT BY SUPPRESSING ROCK2

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Objectives
Skeletal muscle possesses a remarkable regenerative capacity, enabling rapid restoration of muscle mass and function following injury. However, the precise cellular and molecular mechanisms governing this regenerative process are not fully understood. Phospholipase Cγ1 (PLCγ1) is a key intracellular signaling enzyme known to elevate cytosolic calcium levels upon activation. While calcium signaling critically involved in various aspects of muscle biology, including contraction and repair, the specific contribution of PLCγ1 to the skeletal muscle regeneration program remains unclear.
Materials and Methods
Skeletal muscle myoblast-specific PLC-γ1 knockout mice were generated using the Cre-Lox system. Acute muscle injury was induced by injecting cardiotoxin or $BaCl_2$ into the tibialis anterior muscle. Regeneration markers were analyzed using RTqPCR and Western blot; ultrastructural changes and autophagy were assessed by transmission electron microscopy (TEM).
In vitro, PLCγ1 was knocked down in primary myocytes via adenoviral infection. Autophagy was evaluated following bafilomycin A1 treatment through Western blot, immunofluorescence, and TEM.
Proteomic sequencing of muscle tissue at day3 postinjury identified Rho-associated protein kinase 2 (ROCK2) as a key downstream candidate. For in vivo validation, adeno-associated virus (AAV) carrying ROCK2shRNA was administered to suppress ROCK2 expression in the skeletal muscle of both knockout and control mice. An acute injury model was then established to examine whether downregulation of ROCK2 could rescue autophagy levels and regeneration capacity in PLC-γ1 knockout mice.
Results
Compared with control mice, PLCγ1 knockout mice exhibited significantly impaired skeletal muscle regeneration, evidenced by a decreased number of regenerated myofibers and reduced proliferative capacity. Autophagyrelated markers were also markedly downregulated. Knockdown of ROCK2 in primary myoblasts enhanced autophagic activity. In vivo, suppression of ROCK2 in PLCγ1 knockout mice restored autophagy levels and rescued skeletal muscle regenerative capacity.
Conclusions
PLCγ1 is essential for skeletal muscle regeneration, where it functions by promoting autophagy through the suppression of ROCK2 expression.

P1741

PREGNANCY AND LACTATION-ASSOCIATED OSTEOPOROSIS WITH MULTIPLE VERTEBRAL FRACTURES: A CASE REPORT

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Background: Pregnancy and lactation-associated osteoporosis (PLO) is a rare but potentially debilitating condition that typically presents in the third trimester or early postpartum period with severe back pain due to vertebral compression fractures. It is often underdiagnosed or misdiagnosed as more common causes of back pain, such as lumbar disc herniation.
Case Presentation: We report the case of a 28-year-old primiparous woman who presented with severe back pain one month postpartum. She was initially misdiagnosed with lumbar disc herniation at an external center. Physical examination revealed severe paravertebral muscle spasms and tenderness at T11-T12 spinous processes with a Visual Analog Scale (VAS) score of 10/10. Radiographic imaging demonstrated height loss at T10, T11, T12, and L1 vertebrae. Dual-energy X-ray absorptiometry (DXA) revealed osteoporosis with a lumbar spine T-score of -2.6 (BMD 0.873 g/cm²) and femoral T-score of -1.7 (BMD 0.814 g/cm²). The patient was treated with lactation cessation, calcium and vitamin D supplementation, analgesics, rigid thoracolumbar brace, and intravenous zoledronic acid 5 mg. At two-week follow-up, her VAS score improved to 2/10, and she subsequently returned to work with continued brace use.
Conclusion: This case emphasizes the importance of maintaining high

clinical suspicion for PLO in young postpartum women presenting with severe back pain. Early recognition and comprehensive management are crucial to prevent diagnostic delays and optimize patient outcomes.

Keywords: Pregnancy-associated osteoporosis, lactation, vertebral fracture, postpartum back pain, bone mineral density

P1742

CLOSING THE DIAGNOSTIC GAP: A SUPERIOR PARADIGM FOR OSTEOPOROSIS SCREENING VIA AI-BASED OPPORTUNISTIC ANALYSIS OF CHEST RADIOGRAPHS

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Background and Objectives

Osteoporosis remains a major public health challenge in aging societies, yet diagnostic rates remain critically low. While Dual-energy X-ray Absorptiometry (DXA) is the gold standard for diagnosis, its clinical accessibility is often limited. This study aimed to evaluate the performance of a deep learning-based chest radiograph (CXR) analysis tool (VeriOsteo™ OP) in predicting bone mineral density (BMD) abnormalities and to conduct a comprehensive comparison with conventional quantitative ultrasound (QUS) and multiple clinical risk assessment tools, including **OSTAi (TW,** Taiwan/Asian versions**)**, **OSTAi & MOSTAi (TW)**, **FRAX**, and **OSTA (Asian)**.

Methods

In this single-center, prospective study, 305 participants aged 50 years or older were enrolled. All participants completed DXA, CXR, and QUS examinations within a one-year window. Osteoporosis was defined as a DXA T-score ≤ -2.5 at any measured site (lumbar spine or femoral neck). The diagnostic efficacy, including the Area Under the Curve (AUC), sensitivity, and specificity, was compared between the VeriOsteo™ OP, QUS, **OSTAi (TW,** Taiwan/Asian versions**)**, **OSTAi & MOSTAi (TW)**, **FRAX**, and **OSTA (Asian)**. Pearson correlation coefficients were also calculated to assess the relationship between AI-predicted values and DXA-measured BMD.

Results

The study cohort had a mean age of **73.13 ± 8.43** years and an osteoporosis prevalence of 58.36%. VeriOsteo™ OP demonstrated superior diagnostic performance compared to all other screening modalities, achieving a high AUC of 0.866, which significantly outperformed QUS (AUC: 0.694), OSTAi (AUC: 0.722), FRAX (AUC: 0.695), and OSTA (AUC: 0.722). Furthermore, AI-predicted BMD values showed a strong positive correlation with DXA-measured values (r = 0.757). Subgroup analyses further revealed that the AI tool maintained exceptional robustness across female and high-BMI populations, effectively overcoming the physical interferences and anatomical inconsistencies that limited the efficacy of conventional QUS.

Conclusions

Deep learning-based analysis of standard chest radiographs provides superior accuracy and robustness in osteoporosis screening compared to currently used non-invasive tools. By enabling opportunistic screening through existing imaging data without additional radiation exposure or medical costs, this technology offers a transformative solution to improve identification and early intervention for high-risk individuals.

P1743

ASSOCIATION BETWEEN POSTOPERATIVE DENOSUMAB USE AND THE RISK OF REVISION SURGERY AFTER TOTAL KNEE REPLACEMENT: A NATIONWIDE POPULATION-BASED COHORT STUDY

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Objective(s)

To investigate the association between denosumab use after total knee replacement (TKR) and the risk of all-cause revision and revision surgery due to aseptic loosening.

Material and Methods

This nationwide, population-based, retrospective cohort study used the Taiwan National Health Insurance Research Database (2012–2020). From an initial population of 186,472 primary TKR patients, we identified 20,506 who subsequently sustained hip or vertebral fractures with a diagnosis of osteoporosis. Exclusion criteria included death within one year post-fracture, tumor-related TKR, any anti-osteoporosis medication use prior to TKR, and duplicate TKR records. The final cohort comprised 15,615 patients (194 denosumab users; 15,421 non-users). A 1:4 propensity score matching was performed to balance baseline characteristics. Event-free survival was estimated using the Kaplan-Meier method. Associations between denosumab use and study outcomes were primarily estimated using Cox proportional hazards models, reporting hazard ratios (HRs) with 95% confidence intervals.

Results

Adjusted multivariable analysis revealed that denosumab use was associated with a significantly lower risk of all-cause revision (Adjusted HR 0.83; 95% CI, 0.69–1.00; p = 0.048). Furthermore, a reduction in revision risk secondary to aseptic loosening was observed, showing a protective trend (Adjusted HR 0.65; 95% CI, 0.42–1.00; p = 0.052).

Conclusion(s)

Postoperative denosumab use is associated with a lower risk of revision surgery in high-risk osteoporotic patients following TKR. Although the sample size of denosumab users was limited, the observed reduction in revision rates suggests that pharmacological bone preservation may help extend implant longevity.

References

None.

Acknowledgments

None.

Disclosures

The authors declare no conflicts of interest.

P1744

THE THIRD-YEAR RESULTS OF DENOSUMAB SEQUENTIAL THERAPY TRIAL: AN EXTENSION OF A RANDOMIZED CLINICAL TRIAL

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Objective(s)

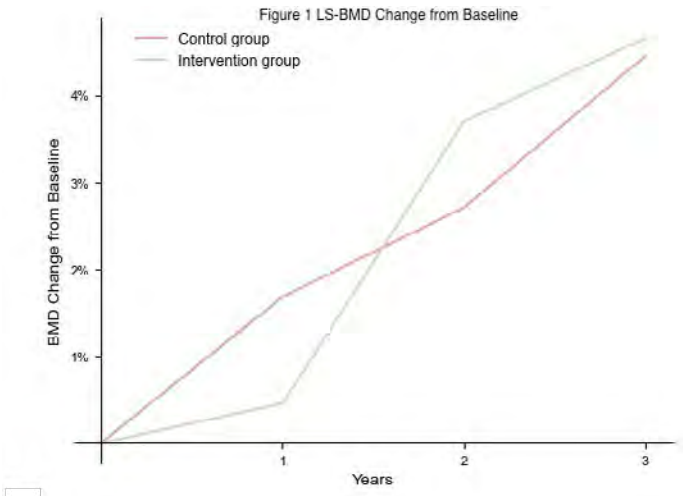
To investigate the long-term efficacy and sustainability of an alternating regimen of denosumab and zoledronate on bone mineral density (BMD) and bone turnover markers (BTMs) over a three-year period.

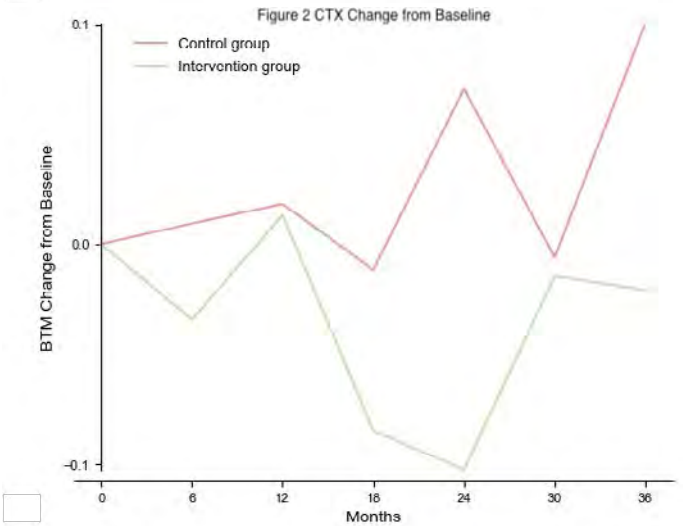
Material and Methods

This prospective observational study is a one-year extension of the Denosumab Sequential Therapy 1 (DST1) trial, a multicenter, open-label, two-year randomized controlled trial (NCT03868033) (Lee et al., 2024). We included 26 participants (intervention vs. control; n=12, 14). Participants were postmenopausal women and men aged ≥ 50 who had received biannual Denosumab for at least 2 years prior to enrollment. The control group continued receiving denosumab. The intervention group received zoledronate in the first year, followed by a switch back to denosumab in the second and third years. The primary outcome was the percent change in lumbar spine BMD (LS-BMD) from baseline at 36 months. Secondary outcomes included BMD changes in the total hip (TH-BMD), femoral neck (FN-BMD), and BTMs: C-terminal telopeptide (CTX).

Results

At 36 months, BMD gains were similar in both groups across all regions. LS-BMD increased by 4.66% vs. 4.46% in the intervention vs. control group (95% CI, 1.45-7.87 vs. 2.05-6.86; p=0.91) (Figure 1). TH-BMD (2.19% vs. 2.35%) and FN-BMD (3.14% vs. 2.01%) also showed no significant differences. However, the intervention group exhibited significantly lower BTMs. CTX levels decreased by -0.02 vs. 0.10 µg/L (95% CI, -0.08 to 0.04 vs. 0.02-0.18; p=0.02) in the intervention vs. control group (Figure 2).





Conclusion(s)

An alternating regimen of denosumab and zoledronate is a viable strategy for managing osteoporosis, maintaining BMD gains while significantly reducing bone resorption activity compared to continuous denosumab. This approach may mitigate the rebound effect associated with denosumab discontinuation, highlighting the need for further prospective trials to evaluate its long-term safety and efficacy.

References

Lee et al. JAMA Netw Open. 2024;7:e2443899

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Disclosures

The authors declare no conflicts of interest.

P1745

CARTILAGE REGENERATION AND FUNCTIONAL RECOVERY IN KNEE OSTEOARTHRITIS VIA ADIPOSE-DERIVED STEM CELL THERAPY: A SINGLE-CENTER EXPERIENCE IN TAIWAN

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Objective:
Knee osteoarthritis affects 15% of Taiwan's population (3.5 million people). Since 2018, Regulation Governing the Application of Specific Medical Examination Technique and Medical Device start to performed autologous adipose-derived stem cells (ADSCs), which was used for grade 1–3 osteoarthritis and cartilage defects. This study analyzed nine cases, showing significant improvement in joint range of motion, quality of life, and a positive trend in cartilage regeneration.

Material and Methods:
Nine cases of knee osteoarthritis treated with knee joint injection with autologous ADSCs. Clinical assessment was done, in pre-injection and post-injection 1th, 3rd, 6th, and 12th month. The evaluation instruments including Knee injury and Osteoarthritis Outcome Score (KOOS), Pain Visual Analogue Scale (VAS), and Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC). Additionally, imaging study were performed at time of pre-treatment and one-year follow-up.

Results:
In nine cases, KOOS score improved from 53 to 74 after one year treatment. WOMAC score 16 decreased to 4 after treatment. Pain VAS score from 8 to 0 after treatment.(Figure1) Magnetic resonance imaging (MRI) demonstrated cartilage regeneration, cartilage thickness with an average increase of 0.66 mm in the right knee and 0.88 mm in the left knee.(Figure2.3)

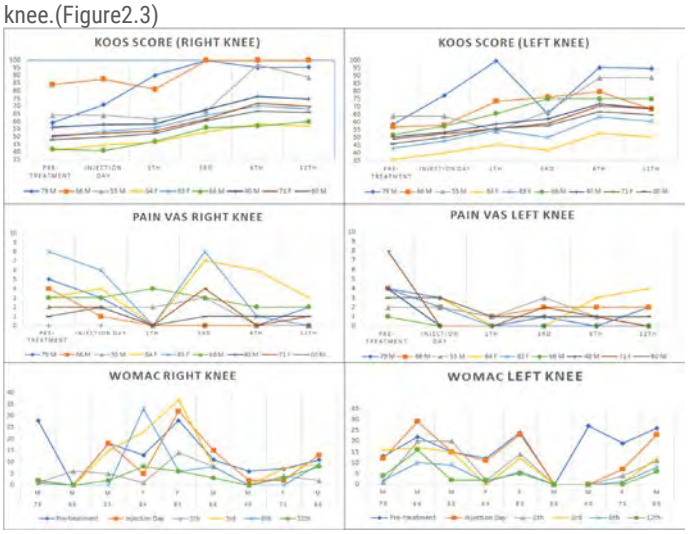


Fig.1. shows pre-and post-treatment improvements in KOOS, Pain VAS, and WOMAC scores.

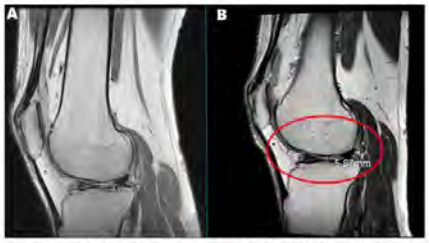


Fig.2. MRI right knee image before(A) and after(B) 12 th stem cells injection treatment.



Fig.3. MRI left knee image before(A) and after(B) 12 th stem cells injection treatment.

Conclusion:
ADSC treatment significantly improved in KOOS, Pain VAS, and WOMAC scores, reflecting reduced pain, less stiffness, and enhanced daily function. These clinical gains were accompanied by higher quality of life. One year MRI confirmed cartilage regeneration, proving that ADSCs effectively promote tissue repair and long-term functional recover.

P1746

BENEFICIAL INTERVENTION OF ARTIFICIAL TIGER BONE POWDER ON AGE-RELATED SARCOPENIA BY REGULATING MITOCHONDRIAL QUALITY AND INHIBITING THE CGAS-STING SIGNALING PATHWAY

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Objective: This study aims to investigate the therapeutic effects and the underlying mechanisms of artificial tiger bone powder (ATBP) on age-related sarcopenia.
Material and Methods: The grip strength, weight-loaded swimming time, muscle mass (quadriceps femoris, gastrocnemius, tibialis anterior and soleus muscles), and muscle fiber cross-sectional area (CSA) were measured in mice with age-related sarcopenia. The transcriptomic sequencing, RT-PCR, Western blot, immunofluorescence, and immunohistochemistry were employed to explore and validate the potential molecular mechanisms of ATBP. Additionally, the mice were administered with ATBP via oral gavage for 3 months, followed by a 3-month withdrawal period to observe the long-term effects of ATBP.
Results: The treatment with ATBP significantly improved muscle grip strength, muscle endurance, muscle mass, and elevated CSA of myofibers and expressions of muscular regulatory factors, as well as down-regulated expressions of MuRF-1 and Atrogin-1 in the ubiquitin-proteasome system. The ATBP administration of 12-month-old mice for 3 months significantly reduced the expression levels of senescence-associated secretory phenotypes and of age-related

markers (β-gal, P53, and P16). ATBP enhanced mitochondrial quality by promoting mitochondrial biogenesis through increased expression of peroxisome proliferator-activated receptor-γ coactivator-1α (PGC-1α) and mitochondrial transcription factor A (TFAM), restored mitochondrial dynamics via regulation of mitofusin-1 (MFN-1) and fission 1 (FIS-1), and activated PINK1/Parkin-mediated mitochondrial autophagy. The ATBP-induced maintenance in mitochondrial homeostasis led to the reduction in the leakage of mitochondrial DNA (mtDNA) into the cytosolic, thereby attenuating the activation of cGAS-STING signaling pathway and lowering NF-κB-evoked chronic low-grade inflammation in skeletal muscle, ultimately ameliorating age-related sarcopenia. After drug withdrawal for 3 months, the mice in ATBP-treated groups still displayed better muscle function and improvement in muscle aging.

Conclusion: ATBP benefits for alleviating aging conditions of skeletal muscle by maintaining mitochondrial homeostasis *via* regulating mitochondrial biogenesis, mitochondrial dynamics, and mitophagy. ATBP could effectively ameliorate age-related sarcopenia by inhibiting the cGAS-STING signaling pathway.

Acknowledgments

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P1747

SMART LIAISON CARE PROGRAM FOR OSTEOPOROSIS AND SARCOPENIA: EVIDENCE FROM CHIAYI COUNTY, TAIWAN

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Objectives

In April 2023, the Chiayi County Public Health Bureau launched the "Smart Liaison Care Program for Osteoporosis and Sarcopenia." The program aims to implement community-based screening to enable early identification of high-risk individuals, followed by risk stratification with referral to medical care or linkage to community-based exercise and nutrition interventions. This integrated approach seeks to operationalize preventive medicine and advance the vision of a "Healthy Chiayi."

Methods

Mobile healthcare units equipped with dual-energy X-ray absorptiometry (DXA) and other screening devices were deployed to deliver services directly to community settings. Individuals identified as being at risk were managed through the establishment of an "Osteoporosis and Sarcopenia Integrated Care Platform," which enables standardized data management, streamlined referral pathways, and consistent follow-up.

Beginning in 2024, a "High-Risk Osteoporosis and Sarcopenia Exercise and Nutrition Program" was introduced, consisting of 36 sessions (72 hours) integrating structured exercise training and nutrition education. The exercise components included high-load resistance training, combined walking programs, Baduanjin (Eight-Section Brocade), and supervised self-practice. Post-exercise high-protein supplementation was provided, forming a comprehensive "screening–diagnosis–intervention" continuum of care.

Results

By the end of December 2025, a total of 37,227 screening examinations had been completed, identifying 14,992 individuals at high risk. Among them, 585 participants were referred to hospitals for further medical treatment, while more than 14,000 individuals were continuously managed by local health centers through follow-up, exercise guidance, and nutritional counseling. In addition, 749 participants enrolled in the exercise and nutrition program organized by the Public Health Bureau.

Among participants who completed the exercise and nutrition program, the mean DXA T-score improved from −2.76 before the intervention to −2.74 after the intervention. Paired t-test analysis demonstrated a statistically significant improvement ($p < 0.01$), indicating the effectiveness of integrated exercise and nutrition interventions in improving osteoporosis- and sarcopenia-related outcomes.

Conclusions

The Smart Liaison Care Program for Osteoporosis and Sarcopenia demonstrates that an integrated care model combining mobile healthcare services with a digital management platform can effectively enhance community screening accessibility, optimize referral pathways, and establish a continuum of care. By enabling systematic risk management and linkage to community-based exercise and nutrition interventions, this program provides an evidence-based public health strategy for local governments to address population aging and the prevention and management of osteoporosis and sarcopenia.

P1748

EFFECTIVENESS OF A COMMUNITY-BASED INTEGRATED EXERCISE AND NUTRITION INTERVENTION FOR INDIVIDUALS AT HIGH RISK OF OSTEOPOROSIS AND SARCOPENIA

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[1]Chiayi County Public Health Bureau, Chiayi County, Taiwan; [2]Dalin Tzu Chi Hospital, Buddhist Tzu Chi Medical Foundation, Chiayi County, Taiwan; [3]Nanhua University, Chiayi County, Taiwan

Objectives

The Chiayi County Public Health Bureau pioneered Taiwan's first community-based "Exercise and Nutrition Program for Individuals at High Risk of Osteoporosis and Sarcopenia." Following identification through mobile healthcare screening, high-risk individuals were referred for hospital-based treatment when indicated. In addition, a subgroup of relatively younger high-risk adults aged 50–65 years was specifically targeted to receive an integrated exercise and nutrition intervention aimed at enhancing muscle strength and bone health, thereby implementing preventive medicine strategies and delaying functional decline.

Methods

Since 2024, the "High-Risk Osteoporosis and Sarcopenia Exercise and Nutrition Program" has been implemented as a structured community intervention consisting of 36 sessions (72 hours in total). The exercise component included high-intensity resistance training, combined walking programs, Baduanjin (Eight-Section Brocade), and supervised home-based practice.

The nutrition intervention comprised post-exercise high-protein supplementation, along with on-site dietary counseling delivered by registered dietitians, focusing on high-calcium diets and nutrition education to enhance participants' self-management and health literacy.

Results

Based on pre- and post-intervention analyses of the 2025 program, a total of 345 participants with complete data were included. After the intervention, total skeletal muscle mass (SMM) increased by 73.2 kg, total fat mass decreased by 92.7 kg, and the skeletal muscle index (SMI)

increased by 10.47, all reaching statistically significant improvements ($p < 0.05$).

In 2025, 413 individuals participated in the program; 96 participants attended all 36 sessions, and 242 attended more than 30 sessions, representing an attendance rate of 58%, indicating high engagement, increased awareness of personal health issues, and improved health literacy.

Compared with one-on-one personal training programs, which would require approximately €1,560 per participant (total €644,280), the total program cost was €102,870 (NTD 3,800,000), achieving a 6.26-fold reduction in expenditure. Overall participant satisfaction reached 96%.

Conclusions

For individuals at high risk of osteoporosis and sarcopenia, an integrated intervention combining high-load resistance training, combined walking, Baduanjin exercise, and structured self-practice, together with high-protein and high-calcium nutritional support, effectively improves key indicators related to bone and muscle health. This community-based model also fosters proactive health management behaviors and strengthens awareness of preventive medicine, demonstrating a cost-effective and scalable approach for population-level prevention of age-related musculoskeletal decline.

P1749

EFFECTIVENESS OF OSTEOPOROSIS AND SARCOPENIA SCREENING USING MOBILE HEALTHCARE INTEGRATED WITH ARTIFICIAL INTELLIGENCE: A CASE STUDY OF CHIAYI COUNTY, TAIWAN

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Objectives

As of December 2025, Chiayi County had a total population of 473,181, of whom 114,069 (24.1%) were aged 65 years or older, classifying the county as a super-aged society. This demographic shift poses substantial public health challenges, particularly in the prevention and management of age-related conditions such as osteoporosis and sarcopenia.

This study aimed to evaluate the effectiveness of integrating mobile healthcare services with artificial intelligence (AI) technologies to deliver osteoporosis and sarcopenia screening to remote and community-based settings, enabling rapid identification of high-risk individuals and improving healthcare accessibility and preventive outcomes.

Methods

To expand population-based screening for osteoporosis and sarcopenia, Chiayi County launched a mobile healthcare screening program in 2023. The mobile units were equipped with dual-energy X-ray absorptiometry (DXA), an AI-assisted bone mineral density (BMD) image interpretation system, a multifunctional body composition analyzer (Q-check), and the FRAX fracture risk assessment tool, enabling a one-stop screening workflow.

The AI-based BMD interpretation system provides lumbar spine T-score assessments within 10 seconds. Individuals identified as high risk for osteoporosis or sarcopenia (T-score ≤ −2.5) were selectively referred for confirmatory DXA examinations, allowing for precise risk stratification and resource allocation.

To further enhance accuracy and efficiency while reducing radiation exposure, hip X-ray AI-based BMD interpretation was introduced in 2023, followed by an upgrade to chest X-ray AI-based BMD interpretation in 2025.

Results

By the end of December 2025, a total of 37,227 screening examinations had been completed, identifying 14,992 individuals at high risk. Through county government funding, approximately €1,007,770 (NTD 37,227,000) in screening costs were subsidized, substantially reducing the financial burden on residents.

For individuals meeting the criteria for early pharmacological intervention following screening, the average monthly medication cost ranged from €27.07 to €40.61 (NTD 1,000–1,500), which is markedly lower than the costs associated with hip fracture surgery (€4,061–5,414; NTD 150,000–200,000) and subsequent long-term care.

Based on evidence indicating that DXA-based screening can reduce hip fracture incidence by approximately 20%, it is estimated that nearly 3,000 individuals may avoid hip fracture risk, resulting in significant reductions in healthcare and long-term care expenditures.

Conclusions

The integration of AI-assisted BMD interpretation into mobile healthcare screening effectively serves as a frontline risk stratification tool, improving screening efficiency and optimizing the use of medical resources. This model enables advanced screening services to reach rural and community settings, facilitating early detection and preventive intervention at the population level. Ultimately, this approach contributes to narrowing urban–rural health disparities and enhancing equity and effectiveness in public health prevention and healthcare delivery.

P1750

OBESITY AND ITS RELATIONSHIP WITH METABOLIC RISK IN SYSTEMIC LUPUS ERYTHEMATOSUS

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Introduction. Cardiometabolic complications are the leading cause of late mortality in systemic lupus erythematosus (SLE). Along with chronic inflammation and glucocorticoid therapy, obesity is considered a potentially significant modifiable risk factor. However, data on the predominant obesity phenotype (abdominal or gynoid) and its direct relationship with SLE activity markers are contradictory.

Objective. To study the characteristics of obesity, cardiometabolic risk, and their relationship with clinical and laboratory indicators of SLE activity.

Materials and Methods. Data from 10 patients with SLE without comorbidities (9 women, 1 man, mean age 39.7 ± 12.7 years) were analyzed. Anthropometric parameters (body mass index (BMI), waist circumference (WC), hip circumference (HC), and WC/HC), the FINDRISK score, SLE activity markers (ESR, CRP, complement levels, anti-dsDNA), complete blood count parameters, and renal function (creatinine, eGFR, proteinuria) were assessed.

Results. Obesity (BMI≥30 kg/m²) was detected in 40% of patients, and abdominal obesity according to the WC criterion was detected in 70%. Android-type fat distribution according to the WC/HC criteria (≥0.85) was

observed in 80% of patients. A statistically significant strong positive correlation was established between cardiometabolic risk according to the FINDRISK score and anthropometric parameters: with BMI (r=+0.93; p<0.01) and with WC (r=+0.92; p<0.01). However, no significant direct relationship was found between BMI and laboratory markers of inflammatory activity (ESR, CRP), which may indicate an independent comorbidity of obesity, requiring special attention when treating patients with SLE and reducing metabolic risk.
Conclusions. Patients with SLE are characterized by a high prevalence of android obesity, which is a key factor in increased cardiometabolic risk. These findings highlight the need to assess not only BMI but also WC and WC/HC in patients with SLE for cardiometabolic risk stratification.

P1751

MYOKINES FOR THE ASSESSMENT OF SARCOPENIA-RELATED PARAMETERS IN PATIENTS WITH TYPE 1 DIABETES MELLITUS

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Patients with type 1 diabetes mellitus (T1DM) are prone to earlier and progressive development of sarcopenia due to combination of pathogenetic factors including insulin deficiency, hyperglycemia, oxidative stress and mitochondrial dysfunction.
Objective.
To study the myokines levels along with other laboratory parameters in sarcopenia assessment in in patients with type 1 diabetes mellitus (DM) compared with a healthy control group (CG).
Materials and Methods.
A single-center, cross-sectional comparative study of a cohort of postmenopausal women with type 1 DM (n=40) and a CG (n=40) aged 50 to 75 years. The study included a SARC questionnaire, myokines (myostatin ELISA Kit (Immundiagnostik AG), follistatin immunoassay (R&D Systems)), cystatin C ELISA Kit (AssayPro), lipocalin 2 NGAL Immunoassay/Quantikine ELISA (R&D Systems), along with Insulin-like growth factor (IGF-1), assessment of muscle mass (MM) using Total Body (GE, iDXA), muscle strength (MS) assessed by dynamometry (grip strength), and muscle function assessed by Brief Exercise Battery tests.
Results.
The median age of the included patients was 62 y.o. [57;65]. The median HbA1c level in patients with T1DM was 8% [7,6; 9,3], with an average diabetes duration of 26 years [13;42]. The frequency of falls, the number of fractures and the level of physical activity didn't differ significantly between the groups. No differences in MM were found between the groups. MS according to hand dynamometry and 4-meter walking speed were higher in the CG. Myostatin levels was higher in patients with T1DM 52,73 [46,45; 58,26] mg/ml (p < 0,0001) and directly correlated with the level of HbA1c (p < 0,0001, r = 0,54), but no correlations were found between the parameters of MS and MM. HbA1c negatively correlates with the results of the five times chair rising test. IGF-1 levels were lower among patients with DM (92,7 ng/mL vs. 114,1 ng/mL, p = 0,014) and positively correlated with MS. Severe sarcopenia according to EWGSOP 2 criteria was diagnosed in only one patient with DM, whose myostatin level did not differ from the interquartile range for patients without sarcopenia.
Conclusion.
Patients with T1DM have reduced functional capacity, which is directly associated with HbA1c levels. Myostatin, among other biomarkers, is the most specific for patients with T1DM as it is influenced by glycemic control. However myostatin levels do not seem to directly affect physical performance or muscle mass in T1DM.

P1752

ROLE OF VITAMIN D METABOLITE MEASUREMENTS IN MONITORING DISEASE CONTROL IN HYPOPHOSPHATEMIC RICKETS WITH HYPERCALCIURIA

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Purpose: To assess vitamin D metabolites in patients with hereditary hypophosphatemic rickets with hypercalciuria (HHRH) and estimate whether phosphate treatment leads to vitamin D metabolite normalization and disease control.
Methods: a detailed biochemical, genetic, and clinical analysis was performed on three adult patients (aged two cases 19 and 25 years) with genetically confirmed HHRH. Genetic testing identified different *SLC34A3* gene variants: a compound heterozygous state (c.1394C>T and c.-40G>A; c.1304del and c.-846G>A) in two patients and a homozygous mutation (c.1058G>T) in one case. Simultaneous quantification of $25(OH)D_3$, $1,25(OH)_2D_3$, $24,25(OH)_2D_3$ was done using LC-MS/MS. We also calculated the $25(OH)D_3/24,25(OH)_2D_3$ ratio, which indicates the activity of relevant metabolic pathways. Biochemistry and clinical assessments were performed using routine tests.
Results: In Patient 1, who received long-term phosphate replacement therapy (Reducto Special 6-8 tablets per day), normal $1,25(OH)_2D_3$ (28.00 pg/mL) was accompanied by an elevated $25(OH)D_3/24,25(OH)_2D_3$ ratio (23.4) along with normal PTH (16.6 pg/mL), phosphate, serum and urine calcium. This profile was associated with persistent high bone turnover (osteocalcin 50.0 ng/mL, CTX 1.28 ng/mL), the absence of Looser's zones, or kidney stones. In contrast, Patients 2 and 3 who were not receiving phosphate at the time of admission exhibited a different pattern: elevation of $1,25(OH)_2D_3$ (85.00 and 176 pg/mL) with profound PTH suppression (6.5 and 8.6 pg/mL) and similarly elevated $25(OH)D_3/24,25(OH)_2D_3$ ratios (24.8 and 251.4), which was associated with hypercalciuria and hypophosphatemia.
Conclusion: Vitamin D metabolite measurements in serum are useful for assessment of metabolic disease control in adult patients with HHRH as well as for diagnostic evaluation in untreated individuals or those potentially misclassified as having other hypophosphatemic disorders. Further research is needed to determine the sensitivity of vitamin D metabolite measurements in relation to phosphate replacement dosing.
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P1753

AN EXPLORATORY APPLICATION OF THE OSTEOGENIC INDEX ON LOW-INTENSITY, UPPER-BODY SUPPORTED EXERCISE IN ADULTS: A PILOT STUDY

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Objective: To quantify peak and cumulative loading of functional exercises and low-intensity plyometric exercises with upper body support.
Materials and Methods: All research was approved by the Marquette University (MU) Institutional Review Board (#5103). Participants were a convenience sample from the MU community. Women over 18 years of age were eligible to participate in the study. A total of 5 exercises chosen for the potential to increase bone loading were assessed including several from the Build Better Bones website. All exercises were performed on dual AMTI force plates (1000Hz) and participants used a ballet bar for balance support (at kitchen counter height). The Osteogenic Index (OI) was computed according to the Turner & Robling calculation using STATA software. During exercise, a peak threshold of 3.6xBW, reported to be osteogenic in humans, was used as a reference for peak loading. An OI value of 7 was used as a reference threshold suggesting osteogenic potential for cumulative loading.
Results: 15 women participated in this pilot study. Participants were 39 ± 17 years old (range: 23-68), 1.7m ± 0.8m tall, and 70 ± 12kg. Only the Step Down and the Pogo jump had average peaks over the 3.6xBW threshold. Only the Pogo and Bunny Hop met the OI threshold of 7. However, when all exercises were standardized to 20 reps (2 sets x 10 reps) every exercise surpassed the OI threshold of 7.
Conclusion: Current osteoporosis exercise guidelines lack quantitative thresholds for safe, home-based mechanical loading that can be scaled across large populations. Evidence from animal models suggests that cumulative exposure to low-intensity impacts may result in an osteogenic potential comparable to higher-magnitude loading. When cumulative loading is considered, each low-intensity exercise that was assessed appeared capable of achieving loading values that are theoretically consistent with osteogenic signaling, despite some having peak forces below osteogenic thresholds. These preliminary findings support further investigation of low-impact, accessible strategies for populations unable to participate in high-impact exercise. Longitudinal studies on bone-specific outcomes are needed to determine whether these loading profiles translate to meaningful adaptations.

P1754

ASYMMETRICAL STRENGTH AND LANDING IMPACT FORCES IN INDIVIDUALS AT RISK FOR KNEE OSTEOARTHRITIS

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Objective: To quantify side-to-side differences in isometric knee flexor and extensor strength, and peak vertical ground reaction forces (pGRFs) during unilateral step-downs for individuals at elevated risk for knee osteoarthritis (KOA).
Materials and Methods: All research was approved by the Marquette University Institutional Review Board (#5103). Individuals with current knee pain (>3 months) and/or prior traumatic knee injury (i.e. ACL, MCL), established as risk factors for KOA, were recruited through convenience sampling. The "involved" side was defined as the injured, painful, or more painful limb (for those with bilateral symptoms); the opposite side was classified as "non-involved." Participants completed two warm-up trials followed by three maximal voluntary isometric contractions of the knee extensors and flexors using a Tindeq strain gauge. Torque (Nm) was calculated as force (N) × tibial length (m) and normalized to body mass (kg) to allow comparison across participants. Participants performed five trials, per side, of a unilateral step-down task from an 8-inch box onto a force plate (AMTI, 1000 Hz) to capture pGRFs, which were normalized to units of bodyweight. Paired t-tests compared the side-to-side differences in measures.
Results: 42 individuals participated in the study (23 females, age: 37 ± 16 y/o, height: 1.71 ± 0.08m tall, weight: 81.0 ± 15.2kg). Participants had significantly weaker ($p < 0.01$) knee extensor strength on the involved limb (2.06 ± 0.75 Nm/kg) compared with the non-involved limb (2.23 ± 0.72 Nm/kg). Knee flexor strength was not statistically significantly different ($p = 0.08$). Participants had significantly higher pGRFs ($p < 0.05$) when landing on the non-involved side (1.50 ± 0.26 xBW) than the involved side (1.44 ± 0.23 xBW).
Conclusion: The observed asymmetries in this population highlight the need for early screening of KOA-related risk patterns. Elevated pGRFs on the non-involved side are consistent with compensatory unloading strategies that may limit pain on the involved side. This supports consideration of unilateral symptoms as a bilateral condition given the increased exposure to higher impact forces on the uninvolved side. Repetitive asymmetric loading has implications for cartilage health, subchondral bone adaptation, and long-term joint degeneration.

P1756

PATHOGENETIC RATIONALE FOR THE APPLICATION OF COMBINED THERAPY FOR PERIODONTAL TISSUE DISEASES IN CHILDREN WITH DIABETES MELLITUS

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Introduction. Issues of prevention and treatment of inflammatory periodontal diseases in children remain relevant challenges in dentistry. Children with type 1 diabetes mellitus (DM) constitute a particular risk group, as periodontal pathology develops at an earlier age and is characterized by rapid progression. In patients with DM, pathological changes in the periodontium develop against the background of metabolic disorders, angiopathies, and decreased tissue resistance to infectious agents. This contributes to reduced local immunity, microcirculatory disturbances, and altered bone tissue metabolism. With this concomitant pathology, traditional treatment methods do not always provide therapeutic efficacy.

Aim of the study. To evaluate the efficacy of a complex containing herbal preparations in the prevention and treatment of periodontal tissue diseases in children with diabetes mellitus.

Materials and methods. A clinical and laboratory examination was conducted on 25 children aged 8-12 years with chronic catarrhal gingivitis (CCG) with underlying type 1 DM. The control group consisted of 20 children with clinically healthy periodontal tissues without background pathology. Children with DM underwent oral cavity sanitation and professional hygiene. Treatment measures consisted of gingival applications of a combination of phytopreparations containing eucalyptus, pine, mint, and fennel oils (1:1:1:1) based on bentonite clay (10:1). The proposed composition possesses regenerative, antioxidant, anti-inflammatory, and capillarystrengthening properties, and improves cellular metabolism of periodontal tissues. Gingival applications were performed for 20 minutes daily, №10. The oral hygiene status was determined using the Stallard index. The Papillary Marginal Alveolar (PMA) index (modified by C. Parma), and the Papillary Bleeding Index (PBI) by Saxer and Muhlemann were used to assess periodontal tissue status. Local immunity status was evaluated based on sIgA and lysozyme content in oral fluid. Control examinations were performed before and after treatment.

Results. The treatment of CCG in children with DM contributed to the elimination of the main signs of inflammation in gingival tissues, as well as pronounced positive dynamics of clinical indices. Following treatment of CCG according to the proposed protocol, the Stallard index decreased 3,8-fold ($p<0.01$), and the PMA index decreased 3,5-fold ($p<0.01$). The bleeding index decreased 2,8-fold. The sIgA level increased significantly (2,2-fold, $p<0.01$), as did lysozyme activity (1,6-fold, $p<0.01$). Their values approached those of the control group.

Conclusion. A comprehensive approach to the treatment of periodontal diseases in children with DM, targeting all pathogenetic mechanisms, contributes to the elimination of clinical signs of gingivitis, improvement of local immunity parameters, and prevention of the development of more severe forms of periodontal diseases.

1758

UNUSUAL CORNEAL INVOLVEMENT ASSOCIATED WITH CERTOLIZUMAB PEGOL: A CASE REPORT

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Introduction:
Anti-TNFα agents, such as certolizumab pegol, are widely used in the treatment of chronic inflammatory diseases. Although generally well tolerated, these therapies can occasionally cause rare adverse effects, including ocular complications. We report here a case of keratitis occurring under certolizumab pegol in a patient with rheumatoid arthritis (RA)—a complication that is scarcely documented in the literature.

Case Report:
Mrs. S., a 73-year-old woman with a history of hypertension, had been followed since 2012 for rheumatoid arthritis associated with secondary Sjögren's syndrome. She was initially treated with oral methotrexate (20 mg/week), achieving a good clinical and biological response.

In 2022, she developed methotrexate toxicity, manifested by erosive gingivostomatitis and pancytopenia. The treatment was then modified to sulfasalazine (2 g/day), hydroxychloroquine (400 mg/day), and oral prednisone (10 mg/day), allowing partial disease control (DAS28-ESR between 4.22 and 4.84).

In 2024, certolizumab pegol therapy was initiated, resulting in excellent joint improvement. However, three days after the first injection, the patient developed recurrent corneal ulcerations after each administration, eventually leading to corneal perforation. The biologic therapy was discontinued, and treatment with cyclosporine eye drops, local and systemic corticosteroids (10 mg/day), and an amniotic membrane graft was initiated. The clinical course was marked by progressive healing of the corneal ulcers.

Pharmacovigilance assessment concluded a probable causal relationship between certolizumab pegol and the corneal involvement. A switch in biologic therapy was recommended, with rituximab (Mabthera®) selected as an alternative.

Discussion:
The occurrence of corneal ulcers in this patient could have been favored by the presence of ocular dryness due to secondary Sjögren's syndrome, although this alone cannot fully explain the presentation. However, the temporal relationship between certolizumab pegol administration and the onset of symptoms, as well as their recurrence after each injection, strongly suggests a drug-induced adverse reaction.

While biologic therapies are commonly used to treat ocular inflammatory disorders, they may paradoxically induce corneal involvement, although this remains extremely rare. A few cases have been reported with adalimumab or tocilizumab, but none have been published to date with certolizumab pegol. This agent may, albeit infrequently, alter tear secretion, leading to dry eye syndrome and corneal ulceration. It is plausible that the ulceration observed in this case resulted from a paradoxical autoimmune reaction triggered by the immunogenicity of certolizumab.

Conclusion:
Ocular adverse effects associated with anti-TNFα agents are uncommon; however, our observation highlights that certolizumab pegol may, in rare instances, cause corneal ulcers. This underscores the importance of regular ophthalmologic monitoring and systematic pharmacovigilance reporting to enhance the understanding of the safety profile of these biologic therapies.

P1759
IVORY VERTEBRA : A RARE IDIOPATHIC CASE

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Introduction : The ivory vertebra (IV) is defined as a homogeneous and diffuse sclerosis of the vertebral body. Although uncommon, its etiologies are diverse, mainly osteoblastic metastases, bone lymphoma and Paget's disease. Idiopathic forms are exceptional. We report a rare case of idiopathic IV after an extensive and negative etiological workup.
Case Report : A 40-year-old woman, with no medical history, presented with severe mechanical low back pain evolving for 3 months and resistant to analgesics. She reported repeated domestic and occupational microtrauma. Physical examination was normal except for localized L4 tenderness. Laboratory tests including inflammatory markers, Complete blood count, renal function, calcium, alkaline phosphatase, and serum protein electrophoresis were normal. Standard radiographs showed no abnormalities. CT revealed homogeneous sclerosis of the L4 vertebral body, consistent with IV **(Fig. 1)**. Spine MRI confirmed hypoT1 and isoT2–STIR signal without gadolinium enhancement **(Fig. 2)**. Bone scintigraphy showed increased uptake at L. Tumoral, infectious, metabolic, hematologic, and inflammatory causes were ruled out through normal imaging, negative tumor markers, and absence of biological abnormalities. A CT-guided vertebral biopsy excluded malignancy, granulomatous disease, and mast cell or lympho-plasmacytic infiltration. Two-month MRI follow-up showed stability of the lesion without progression. Clinically, the patient reported improvement of pain under conservative management.
Discussion : In the literature, very rare cases of idiopathic IV have been reported. Most described lesions occur in the lumbar spine, as in our patient. Suggested pathogenic mechanisms include total or segmental vertebral body sclerosis, reactive to disco-vertebral disruption caused by trauma or degenerative changes [1,2].
Conclusion : The causes of IV are varied and require an exhaustive etiological evaluation, often including bone biopsy, to identify the underlying pathology. The idiopathic form remains extremely rare. Repeated microtrauma appears to have played a triggering role, leading to localized reactive bone sclerosis without any identifiable systemic disease.
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Figure 1 :

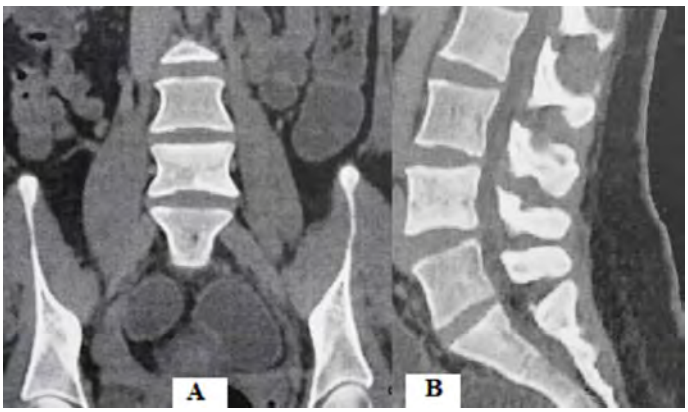
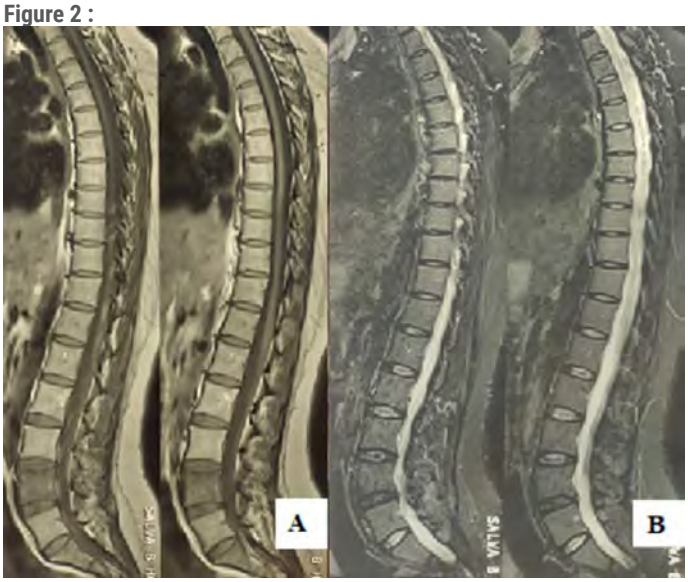


Figure 2 :



P1760
UNUSUAL CORNEAL INVOLVEMENT RELATED TO CERTOLIZUMAB PEGOL : A CASE REPORT

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Introduction : Anti-TNFα agents, such as certolizumab pegol, are widely used in the treatment of chronic inflammatory diseases, but can rarely cause ocular adverse effects. We report here a case of keratitis under certolizumab pegol in a patient with rheumatoid arthritis (RA), a rarely documented complication.
Case presentation : Mrs. S., 73 years old, with a history of hypertension, has been followed since 2012 for RA and secondary Sjögren's syndrome. She was initially treated with oral methotrexate (20 mg/week) with good clinical and biological response. In 2022, she developed methotrexate toxicity characterized by erosive gingivostomatitis and pancytopenia. The treatment was then changed to sulfasalazine (2g/day), hydroxychloroquine (Plaquenil®: 400 mg/day), and systemic corticosteroids (prednisone 10 mg/day), which allowed partial disease control with a DAS28-ESR score ranging from 4.22 to 4.84. In 2024, certolizumab pegol therapy was initiated, resulting in excellent articular response. However, 3 days after the first injection, recurrent corneal ulcerations appeared with each injection, leading to corneal perforation.

Biotherapy was stopped, and the patient was treated with cyclosporine eye drops, local corticosteroids, and an amniotic membrane graft. The evolution was favorable with progressive healing of the corneal ulcers. Pharmacovigilance suggested probable imputability of certolizumab pegol. The biological treatment was switched to Rituximab.

Discussion : Dry eye syndrome may have contributed to corneal ulcers in this patient but the timing and the recurrence after each certolizumab pegol injection strongly suggest a drug adverse effect. While biotherapies are usually used to treat corneal inflammation [1], they can, paradoxically and rarely, cause corneal lesions. Few cases have been reported with Adalimumab or Tocilizumab [2], but no previous cases exist with certolizumab pegol. Impaired tear secretion and possible paradoxical autoimmune reactions may explain the corneal ulcers [2].

Conclusion : Ocular adverse effects related to anti-TNFα agents are rare, but our observation illustrates that certolizumab pegol can exceptionally cause corneal ulcers. Regular ophthalmological monitoring and systematic pharmacovigilance reporting are recommended.

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P1761

PREDICTIVE FACTORS OF A GOOD RESPONSE TO ANTI-TNFA THERAPY IN SPONDYLOARTHRITIS

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Introduction : Spondyloarthritis (SpA) comprises a group of chronic inflammatory rheumatic diseases primarily affecting the axial skeleton, as well as entheses and peripheral joints. The aims of this study were to identify sociodemographic, clinical, and paraclinical factors associated with a good response to anti-TNFα therapy in patients with SpA.

Patients and Methods : We conducted a retrospective, descriptive, and analytical study including SpA patients, regardless of clinico-radiological phenotype, who has been treated with anti-TNFα agents for more than six months. Sociodemographic, clinical, biological, and radiological data were collected. Therapeutic response was assessed using ASDAS-ESR at baseline, 6 months, and 12 months. A *p*-value < 0.05 was considered statistically significant.

Results : Fifty-five patients were included (mean age 48.3 ± 10.8 years; M/F = 1.39). The mean age at symptom onset, diagnosis, and biologic initiation was 32 ± 10, 36 ± 10, and 44 ± 10 years, respectively, with a median disease duration of 17 years [2–49]. Four patients (7.2%) reported a family history of SpA. Axial radiographic ankylosing spondylitis was observed in 74.5% (n=41), psoriatic arthritis 12.7% (n=7), and Inflammatory Bowel Disease associated SpA in 12.7% (n=7). Hip involvement occurred in 38.2% and uveitis in 14.5%. HLA-B27 was positive in 65.5%. Biologics used included infliximab (47.3%), adalimumab (20%), certolizumab (18.2%), etanercept (10.9%), and golimumab (3.6%). Mean ASDAS-ESR scores at baseline, 6, and 12 months were 3.2 ± 0.7, 2.4 ± 0.6, and 2.3 ± 0.8, respectively. No significant association was found between ASDAS improvement and age, sex, smoking, disease duration, SpA phenotype, HLA-B27, or Antinuclear antibodies status. Higher body mass index (BMI) was significantly correlated with persistently higher ASDAS-ESR at 6 and 12 months (*p = 0.015; p = 0.02*), while elevated baseline CRP and ESR predicted a better response at 6 and 12 months (*p = 0.003; p = 0.004*).

Conclusion : Our study demonstrated that, among patients with spondyloarthritis, elevated baseline CRP and ESR levels may predict a better therapeutic response to anti-TNFα agents, whereas higher BMI appears to negatively affect treatment efficacy and disease activity over time.

P1762

PREDICTIVE FACTORS FOR A FAVORABLE RESPONSE TO ANTI-TNF ALPHA THERAPY IN SPONDYLOARTHRITIS

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Introduction : Spondyloarthritis (SpA) comprises a group of chronic inflammatory rheumatic diseases primarily affecting the axial skeleton, as well as entheses and peripheral joints. The aims of this study were to identify sociodemographic, clinical, and paraclinical factors associated with a good response to anti-TNFα therapy in patients with SpA.

Materials and Methods : We conducted a retrospective, descriptive, and analytical study including SpA patients, regardless of clinico-radiological phenotype, who has been treated with anti-TNFα agents for more than six months. Sociodemographic, clinical, biological, and radiological data were collected. Therapeutic response was assessed using ASDAS-ESR at baseline, 6 months, and 12 months. A *p*-value < 0.05 was considered statistically significant.

Results : Fifty-five patients were included (mean age 48.3 ± 10.8 years; M/F = 1.39). The mean age at symptom onset, diagnosis, and biologic initiation was 32 ± 10, 36 ± 10, and 44 ± 10 years, respectively, with a median disease duration of 17 years [2–49]. Four patients (7.2%) reported a family history of SpA. Axial radiographic ankylosing spondylitis was observed in 74.5% (n=41), psoriatic arthritis 12.7% (n=7), and Inflammatory Bowel Disease associated SpA in 12.7% (n=7). Hip involvement occurred in 38.2% and uveitis in 14.5%. HLA-B27 was positive in 65.5%. Biologics used included infliximab (47.3%), adalimumab (20%), certolizumab (18.2%), etanercept (10.9%), and golimumab (3.6%). Mean ASDAS-ESR scores at baseline, 6, and 12 months were 3.2 ± 0.7, 2.4 ± 0.6, and 2.3 ± 0.8, respectively. No significant association was found between ASDAS improvement and age, sex, smoking, disease duration, SpA phenotype, HLA-B27, or Antinuclear antibodies status. Higher body mass index (BMI) was significantly correlated with persistently higher ASDAS-ESR at 6 and 12 months (*p = 0.015; p = 0.02*), while elevated baseline CRP and ESR predicted a better response at 6 and 12 months (*p = 0.003; p = 0.004*).

Conclusion : Our study demonstrated that, among patients with spondyloarthritis, elevated baseline CRP and ESR levels may predict a better therapeutic response to anti-TNFα agents, whereas higher BMI appears to negatively affect treatment efficacy and disease activity over time.

P1763

HEPATIC INVOLVEMENT IN CHRONIC INFLAMMATORY RHEUMATIC DISEASES : FREQUENCY AND CLINICAL IMPLICATIONS

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Introduction : Chronic inflammatory rheuamtic diseases such as rheumatoid arthritis (RA) and spondyloarthritis (SpA), are associated with various extra-articular manifestations, among which hepatic involvement has gained increasing interest. This study aimed to evaluate the frequency, clinical features, and etiological profile of hepatic involvement in this population.

Patients and Methods : We conducted a retrospective study including 150 patients followed for RA or SpA over a 5-year period (2020–2024). Sociodemographic, clinical, biological, ultrasonographic, and histopathological data of patients presenting hepatic abnormalities were analyzed.

Results : The mean age was 47±12 years and the female-to-male ratio was 3. 100 patients were followed for RA and 50 for SpA (40 ankylosing spondylitis and 10 psoriatic arthritis). The mean disease duration was 10±3.8 years. In RA, 90% of cases were erosive and seropositive, with a mean DAS-28 score of 3± 1.1. In SpA, the mean ASDAS score was 3.2± 1.5. Almost all patients received paracetamol (98%), 90% received NSAIDs (90%) 60% systemic corticosteroids (mean dose: 9.8±1.2 mg/day), 72% methotrexate, and 18% biologic therapy (anti-TNF agents). Hepatic involvement occured in 24.6% (n=37). Among them, abdominal pain was reported in 13.5% and hepatomegaly was noted in 16.2%. Regarding biological abnormalities, hepatic cytolysis was noted in 54% and cholestasis in 29.7% (n=11). Abdominal ultrasound performed in these patients (n=37) revealed hepatomegaly in 24.3% (n=9) and a hepatic tumor in 5.4% (n=2). Liver biopsy was performed in 2 patients (5.4%), showing non-suppurative destructive cholangitis with peri-biliary infiltrate in one case and granulomatous hepatitis in the other. Etiologies were mainly drug-induced (64.8%) most frequent paracetamol (33%), NSAIDs (13.5%) and methotrexate (10.8%). The case of granulomatous hepatitis was linked to prolonged high-dose indomethacin. Two cases were related to anti-TNF agents (rituximab and etanercept). Other etiologies included viral hepatitis (16.2%), autoimmune hepatitis (5.4%), primary biliary cirrhosis (5.4%), benign hepatic tumors (5.4%), and hyperthyroidism (2.7%).

Conclusion : Hepatic involvement in chronic rheumatic diseases is frequent in our series. Often asymptomatic, it requires regular and systematic monitoring. The etiologies are diverse, predominantly drug-induced.

P1764

DO OBESE INDIVIDUALS HAVE MORE SEVERE DEGENERATIVE DISC DISEASE ? A COMPARATIVE MRI STUDY

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Introduction : Common low back pain due to degenerative disc disease (DDD) is a frequent condition and currently represents a public health issue. It involves mechanical, biochemical, genetic, and environmental factors. Among the identified risk factors, overweight and obesity play a determining role in the onset and progression of disc degeneration (DD). The objective was to assess the severity of DD on MRI in obese individuals, as well as pain levels and functional disability in this population compared with non-obese subjects.

Patients and Methods : We conducted a cross-sectional, case–control, analytical study including patients suffering from chronic common low back pain (>3 months) related to MRI-confirmed DD. Subjects were divided into two groups : G1: Overweight or obese subjects (BMI ≥25 kg/m²) / G2: Normal-weight subjects (BMI <25 kg/m²). Pain intensity was assessed using the Visual Analog Scale (VAS), functional disability using the Oswestry Disability Index, and the severity of DD on MRI using the Pfirrmann classification. According to this classification, three levels are distinguished: mild (grades 1 and 2), moderate (grade 3), and severe (grades 4 and 5).

Results : A total of 150 patients were included and distributed as follows : G1 : n=87 (58%) and G2 : n=63 (42%). Mean age was similar in both groups : 48.2 ± 11.3 years vs. 47.9 ± 10.85 years (p=0.77), as was the sex ratio : 0.38 vs. 0.39 (p=0.87). Pain level was significantly higher in G1 : a VAS ≥7 was found in 45.3% of G1 compared with 29% of G2 (p<0.01). Functional disability was also greater in overweight/obese subjects: an Oswestry score ≥40 (severe disability) was observed in 40.7% of G1 versus 27.3% of G2 (p<0.05).

Finally, overweight and obesity were significantly associated with severe DD according to the Pfirrmann classification (grades 4 and 5): 65.3% in G1 vs. 34.7% in G2 (p=0.01).

Discussion : Excess body weight is an important risk factor in the occurrence of low back pain and DD. Indeed, overweight exerts increased mechanical pressure on spinal structures, particularly the paravertebral muscles, thereby disrupting lumbar balance [1,2]. In addition, metabolic factors associated with obesity (such as diabetes and hyperlipidemia) promote local inflammatory mechanisms through pro-inflammatory adipokines, which contribute to and worsen disc degradation [3].

Conclusion : Our study highlights higher levels of pain and functional disability, as well as more severe DD, in overweight/obese subjects compared with those of normal weight. These findings reinforce the idea that excess body weight plays a key role in the progression and worsening of lumbar degenerative disc disease.

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P1765

MANAGING FRAIL MULTIPLE MYELOMA PATIENTS WITH MELPHALAN : OUTCOMES FROM A 15-YEAR RHEUMATOLOGY EXPERIENCE

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Introduction

Multiple myeloma (MM) primarly affects older adults, a population frequently characterized by increased frailty. Melphalan-based protocols, such as MPT (melphalan, prednisone, thalidomide) and MP (melphalan, prednisone), remain an important therapeutic option for patients ineligible for intensive treatment.

This study aims to evaluate the efficacy and safety of these regimens in frail MM patients managed in a rheumatology department.

Patients and Methods

We conducted a retrospective and descriptive study including symptomatic MM patients treated with MPT or MP over a 15-year period (January 2014–December 2024). Diagnosis was based on the 2014 International Myeloma Working Group (IMWG) criteria. MPT and MP were prescribed to patients considered ineligible for intensive therapy, with intermediate to high frailty assessed by the Revised Myeloma Comorbidity Index (R-MCI). Hematological response was evaluated at the end of treatment according to the 2016 IMWG response criteria.

Results

Among 40 MM patients, 27 (67.5%) received MPT (n=22, 55%) or MP (n=5, 12.5%). MP was used in 5 patients due to thalidomide contraindications, including pre-existing neuropathy, (n=3) or a thromboembolic history (n=2). The mean age at diagnosis was 69.3 years [65,92], with a male-to-female ratio of 1.7. All patients had at least one CRAB criterion : hypercalcemia (37.1%, n=10), renal insufficiency (26%, n=7), anemia (51.8%, n=14), and bone lesions (93%, n=25). Immunological subtypes were dominated by IgG kappa (37%, n=10), IgG lambda (29.6%, n=8), and light chain myeloma (22.2%, n=6). For MPT patients, frailty risk was intermediate in 63.6% (n= 14) and high in 36.4% (n= 8), while all MP patients (n=5) were highly frail.

Regarding the MPT protocol, melphalan was administered at a dose of 0.2 mg/kg in 19 patients and 0.25 mg/kg in 3 patients. Prednisone was administered at 2 mg/kg in all 22 patients. Thalidomide was given at 100 mg/day in 19 patients and 50 mg/day in 3 patients. The mean number of cycles was 10.89 ± 3.43 [5–12]. Twelve cycles every six weeks were received by 63.4% (n=14), while earlier treatment discontinuation occurred in 36.4% (n=8).

The MP protocol (n=5) was administered with a melphalan dose of 0.2 mg/kg and prednisone dose of 2 mg/kg in 2 patients, and with a melphalan dose of 0.15 mg/kg and prednisone dose of 15 mg/kg in 3 patients. The mean number of cycles was 6.8 ± 1.92 [4–9].

Among patients on MPT, the therapeutic response at the end of treatment was : good (≥ partial response) in 14 patients (63.6%), stable disease in 3 patients (13.6%), and progression in 5 patients (22.7%). The mean overall survival was 76 ± 15.2 months. Three patients died (13.6%), all due to disease relapse.

For patients on MP, the therapeutic response was insufficient for all, with stable disease in 2 patients and disease progression in 3 patients. All 5 patients died, with a mean overall survival of 14 ± 7.5 months.

Good hematologic treatment tolerance was observed in 22.7% of cases (n=5), while adverse effects occurred in 77.3% (n=17), including infections (n=13, 60%), hematologic toxicity (n=7, 25.9%), thromboembolic events (n=2, 10%), and neurologic complications (n=2, 10%).

Conclusion

Melphalan-based protocols, particularly MPT, can achieve meaningful responses and acceptable survival in frail MM patients, though toxicity remains significant. These findings reinforce the importance of individualized therapy for frail patients in a rheumatology context.

P1766

THERMAL ABLATION VERSUS PARATHYROIDECTOMY FOR PRIMARY HYPERPARATHYROIDISM: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Background: Parathyroidectomy (PTX) is the standard treatment for primary hyperparathyroidism (pHPT). Thermal ablation has emerged as a less invasive alternative.

Objective: To compare the effectiveness and safety of thermal ablation versus PTX in adults with pHPT, assessing parathyroid hormone (PTH), calcium and phosphorus levels, cure rates, and adverse effects.

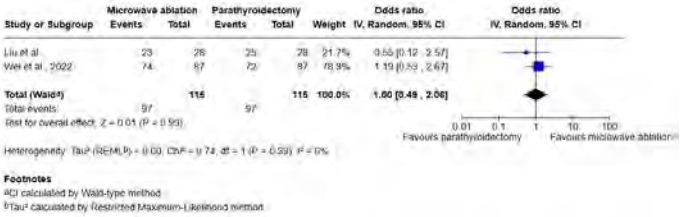
Methods: We conducted a comprehensive literature search of MEDLINE, EMBASE, and Web of Science from inception to March 2025, following a PROSPERO-registered protocol CRD420251009401. We included comparative studies reporting outcomes for adults with pHPT treated with thermal ablation and PTX. Two reviewers screened, extracted data, and assessed risk of bias using ROBINS-I, independently and in duplicate. We performed random-effects meta-analysis when ≥2 studies with comparable interventions and outcome definitions were available; otherwise, results were synthesized narratively.

Results: We screened 3,765 records at title/abstract level, assessed 11 full texts, and included 3 comparative retrospective cohort studies conducted in China. Mean age ranged from 53.5 to 57.7 years, and the proportion of females ranged from 65% to 79%. Preoperative serum calcium ranged from 2.69 to 2.80 mmol/L and reported adenoma size ranged from 1.4 to 2.13 cm. Meta-analysis was performed for microwave ablation (MWA) vs PTX (2 studies; MWA n=115, PTX n=115). Cure rate defined as normalization of serum calcium and PTH at 6 months follow-up was similar between MWA and PTX (odds ratio [OR] 1.00, 95% CI 0.49–2.06, I^2=0%) Figure 1. Post-treatment calcium (mean difference [MD] −0.00 mmol/L, 95% CI −0.20 to 0.19, I^2=93%) and phosphorus (MD 0.00 mmol/L, 95% CI −0.05 to 0.05, I^2=0%) were similar. Hypocalcemia was less frequent after MWA (OR 0.33, 95% CI 0.12–0.92, I^2=24%). Hoarseness showed a non-significant trend toward being more common with MWA (OR 3.54, 95% CI 0.84–14.94, I^2=0%). PTH could not be pooled because one study did not report SD. The two studies were judged at serious risk of bias.

Conclusion: In adults with pHPT, limited comparative evidence suggests

MWA achieves similar cure rates to PTX and may reduce hypocalcemia, but conclusions are constrained by small study numbers and serious risk of bias. Larger prospective comparative studies are needed, including direct comparisons across ablation modalities.

Figure 1. Cure rate MWA vs PTX



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P1767

DON´T BREAK – BE THE BONE ALL YOUR LIFE

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Objectives: Osteoporosis is a metabolic bone disease with increasing prevalence worldwide. Puberty represents a critical period for bone mass development, and insufficient intake of calcium, vitamin D, other essential nutrients, and inadequate physical activity during this time may negatively affect bone health. The aim of the pilot project Healthy Bones in Secondary Schools was to raise awareness of osteoporosis among secondary school students, with an emphasis on prevention, healthy lifestyle promotion, and proper nutrition.

Material and methods: The pilot project was implemented in two secondary schools in the Košice district (Slovakia) and involved 364 first- and second-year students. A questionnaire with 26-item was developed, containing open and closed questions to assess students' personal medical history, their knowledge of osteoporosis, and selected risk factors such as smoking, physical activity, calcium and vitamin D intake, sun exposure, corticosteroid use, and fracture history. After an initial assessment of their knowledge, the students participated in an educational activity consisting of a lecture and discussion on osteoporosis, its causes, symptoms, and prevention. In addition, specific exercises aimed at promoting bone health were recommended during six weeks of physical education. A follow-up questionnaire assessed changes in students' knowledge, attitudes, and perceptions of the project.

Results: Only 35.71% of students were informed about osteoporosis. Smoking was reported by 6.90% of girls and 4.85% of boys. Frequent consumption of Coca-Cola or energy drinks (four or more times a week) was reported by 13.41% of girls and 22.32% of boys. Daily consumption of dairy products was reported by 49.81% of girls and 60.19% of boys. Approximately half of the respondents reported taking vitamin D supplements (49.81% of girls, 55.34% of boys). Insufficient physical activity (<30 minutes/day) was reported by 14.56% of girls and 7.7% of boys. Students spent an average of 4.64 hours per day using electronic devices. The effectiveness of the educational activities was confirmed by a control questionnaire.

Conclusion: After the educational activity, knowledge about osteoporosis increased by 24.29%. More than two-thirds of students felt informed about maintaining bone health throughout their lives, and approximately 38% reported that this information would have a positive impact on their eating habits and lifestyle.

Keywords: osteoporosis, healthy lifestyle, educational activities

P1768

COMPUTABLE QUALITY INDICATORS FOR OUTPATIENT KNEE OSTEOARTHRITIS CARE USING STRUCTURED AND FREE-TEXT ELECTRONIC MEDICAL RECORDS

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Objective

To develop and evaluate computable, guideline-aligned quality indicators (QIs) for outpatient knee osteoarthritis (OA) care using real-world electronic medical record (EMR) data, and to assess their feasibility for large-scale quality measurement.

Methods

We conducted a retrospective observational study using seven years (2018–2024) of outpatient EMR data from a tertiary hospital in China. Knee OA encounters were identified through a computable phenotype integrating structured diagnostic codes and free-text documentation. Five process-based QIs reflecting international guideline recommendations for conservative OA management were operationalized using transparent, rule-based logic applied to structured fields and curated text lexicons. Indicator extractability, score distributions, temporal trends, and correlations were examined at the encounter level.

Results

A total of 11,833 outpatient knee OA encounters were included. All five QIs were computable across all encounters. The mean total quality score was 51.3 (SD 17.2) on a 0–100 scale. Indicators derived primarily from structured data showed higher and more stable performance, whereas text-dependent indicators, particularly documentation of exercise or rehabilitation advice, demonstrated extremely low extractability (mean 0.27/10), with over 95% of encounters scoring zero. Correlations between indicators were low, suggesting that each captured a distinct domain of care. Quality scores showed modest variation over time with stable algorithm performance.

Conclusion

Computable, guideline-aligned quality indicators can be derived from routine EMR data to enable scalable assessment of outpatient knee OA care. The findings reveal substantial and persistent gaps in the documentation and visibility of recommended non-pharmacologic management, particularly exercise-based care. These results highlight structural limitations in current EMR systems and underscore the need for improved documentation and system-level support to facilitate high-quality, guideline-concordant OA management.

P1769

OSTEOPOROSIS IN OLDER ADULTS IS MORE THAN BONE LOSS: THE ROLE OF GERIATRIC SYNDROME BURDEN

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Background/Aim:

Osteoporosis is a major health problem in older adults, not only due to increased fracture risk but also because it frequently coexists with multiple geriatric syndromes. This study aimed to examine the prevalence and co-occurrence of geriatric syndromes among older adults diagnosed with osteoporosis and to examine whether geriatric syndrome burden is associated with osteoporosis.

Participants and Methods:

We retrospectively evaluated patients aged ≥65 years attending a tertiary geriatric outpatient clinic. Demographic characteristics, clinical parameters—including age, sex, body mass index (BMI), handgrip strength (HGS), body composition parameters, comprehensive geriatric assessment (CGA) parameters like history of falls, fear of falling, urinary incontinence, frailty, nutritional status, sarcopenia (defined according to EWGSOP2 criteria, based on low HGS and low skeletal muscle mass measured by bioelectrical impedance analysis and adjusted for BMI), and comorbidities (depression and dementia)—were recorded. Patients were categorized by osteoporosis diagnosis. A geriatric syndrome burden score (GSBS, 0–6) was calculated by summing impaired IADL (IADL<8), fear of falling, chronic pain, malnutrition/risk (MNA-SF≤11), depression (physician diagnosis/antidepressant use and/or GDS-15≥5 or GDS-30≥10), and slow gait speed (<0.8 m/s). Multivariable logistic regression models were adjusted for age, sex, and BMI.

Results:

Among 1,254 patients (median age 76 years; 68.7% female), osteoporosis was present in 24.6% (n=308).

In multivariable logistic regression analysis, female sex (OR 5.02, 95% CI 3.41–7.37; p<0.001), older age (OR 1.05 per year, 95% CI 1.02–1.07; p<0.001), chronic pain (OR 1.47, 95% CI 1.09–1.98; p=0.011), and sarcopenia (OR 1.50, 95% CI 1.09–2.07; p=0.012) were associated with higher odds of osteoporosis, whereas higher BMI was protective (OR 0.94 per kg/m², 95% CI 0.92–0.97; p<0.001). Frailty was not associated with osteoporosis after adjustment (OR 1.17, 95% CI 0.84–1.64; p=0.354). Also, GSBS was independently associated with osteoporosis after adjustment (OR 1.10 per 1-point increase, 95% CI 1.01–1.21; p=0.038).

Conclusion:

Our findings suggest that older adults with osteoporosis commonly present with multiple coexisting geriatric syndromes, including sarcopenia and chronic pain. Furthermore, increasing geriatric syndrome burden was independently associated with higher odds of osteoporosis. These findings underscore the importance of comprehensive geriatric assessment, with particular emphasis on muscle strength evaluation, in the holistic management of older adults with osteoporosis.

Table 1: Multivariable logistic regression analysis of factors associated with osteoporosis (n = 1254)

Variable	Model 1 OR (95% CI)	P value	Model 2 OR (95% CI)	P value
Sex (female)	5.02 (3.41 – 7.37)	<0.001	5.00 (3.37 – 7.40)	<0.001
Age	1.05 (1.02 – 1.07)	<0.001	1.05 (1.03 – 1.07)	<0.001
BMI	0.94 (0.91 – 0.97)	<0.001	0.94 (0.91 – 0.97)	<0.001
Chronic Pain	1.47 (1.09 – 1.98)	0.011	-	
Sarcopenia	1.50 (1.09 – 2.07)	0.012	-	
Frailty	1.17 (0.84 – 1.64)	0.354	-	
GSBS			1.101 (1.005 – 1.206)	0.038

OR: odds ratio; CI: confidence interval; BMI: body mass index; GSBS: geriatric syndrome burden score.

Model 1 included age, sex, BMI, chronic pain, sarcopenia, and frailty.

Model 2 included age, sex, BMI, and GSBS instead of individual geriatric syndromes to avoid multicollinearity.

P1770

REAL-WORLD TREATMENT STRATEGIES FOR OSTEOPOROSIS IN OLDER ADULTS WITH CKD-MBD: IMPACT OF GERIATRIC SYNDROMES AND TREATMENT COMPLIANCE

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Aim: Osteoporosis (OP) management in chronic kidney disease (CKD) is complicated by altered bone turnover, mineral metabolism, renal drug clearance, and coexisting geriatric syndromes. Frailty and high fall risk may justify treatment even without low T-scores. This study presents a real-world, multidisciplinary, and individualized approach to managing older adults with OP and CKD–mineral bone disease (MBD), focusing on geriatric syndromes and treatment compliance (access, duration, adverse effects).

Participants and Methods: Twenty older adults with OP and stage 3a–5 CKD were evaluated by a multidisciplinary team. Baseline data (December 2023) included clinical, DXA, biochemical, and comprehensive geriatric assessment(CGA) findings; fracture and treatment history; inappropriate medication use(IMU); and fall-risk-increasing drugs (FRIDs). Patients were categorized as OP-only, OP + adynamic bone disease(ABD), or OP + osteomalacia(OM). Treatment was individualized based on bone turnover, renal function, prior therapy, and CGA. Compliance was reassessed at two years (December 2025).

Results: Median age was 78 years; 45% were male. Frailty was present in 50%, orthostatic hypotension in 50%, falls in 35%, and polypharmacy in 95% (median 9 drugs). IMU was identified in 12(60%) of patients, with 1–3 inappropriate drugs deprescribed per patient, and FRIDs were used by 75%. Malnutrition was present in 25%. Prior fragility fractures were common (65%), yet only two patients were on OP treatment at baseline.

Diagnosis, treatment decisions, and compliance are summarized in Table 1. At two years, 50% patients were fully compliant, 30% required treatment modification (reimbursement issues, comorbidities, or switching/interruptions), 10% were lost to follow-up, and 10% were managed conservatively. No severe hypocalcemia, new fragility fractures, or adverse-effect–related discontinuations occurred.

Conclusions: Managing osteoporosis in older adults with CKD requires a nuanced, patient-specific strategy supported by multidisciplinary collaboration, considering bone turnover, renal impairment, and complex geriatric syndromes. Treatment compliance remains crucial; in our cohort, reimbursement delays and comorbidities were the main barriers. Overall, denosumab—combined with structured calcium supplementation and monitoring—appeared to be the most feasible therapeutic option.

Table-4: Diagnosis, Treatment Decisions, Duration and Compliance Outcomes of the Study Patient

Patient Number	Diagnosis	Decision	Treatment Compliance	Treatment Duration (months)
1	CKD-MBD (ABD) + OP	Teriparatide	Lost to follow-up	-
2	CKD-MBD (ABD) + OP	Teriparatide after discontinuation of vit D and calcium	Could not start teriparatide (reimbursement issues); switched to denosumab	18
3	OP-only	Oral bisphosphonate therapy continued	Compliant, no complications	28
4	OP-only	Zoledronate	Compliant, no complications	21
5	CKD-MBD (ABD) + OP	Teriparatide after discontinuation of active vitamin D and phosphate binders	Compliant, no complications	18
6	CKD-MBD (ABD) + OP	Follow-up without treatment (Due to no indication) Cessation of active vitamin D and calcium	Follow-up without treatment	-
7	OP-only	Romosozumab	Compliant, no complications	12 mo romosozumab, followed by denosumab
8	OP-only	Romosozumab	Irregular romosozumab use, later switched to denosumab	10 months irregular romosozumab, then switched to denosumab
9	OP-only	Denosumab + Testosterone replacement	Compliant, no complications	17
10	OP-only	Teriparatide	Could not initiate teriparatide due to recurrent hospitalizations (GI bleeding, ileus); later switched to denosumab	7
11	OP-only	Denosumab	Compliant, no complications	18
12	OP-only	Denosumab	Lost to follow-up	-
13	CKD-MBD (ABD) + OP	Teriparatide	Compliant, no complications	24 months teriparatide, followed by denosumab
14	CKD-MBD (ABD) + OP	Teriparatide	Compliant, no complications	10
15	CKD-MBD (ABD) + OP	Denosumab, after discontinuation of calcium and no evidence of ABD	Compliant, no complications	10
16	CKD-MBD (OM) + OP	Denosumab after calcium and vitamin D supplementation	Interrupted after 2nd denosumab dose (1-year gap), later resumed therapy	19 months (with interruption)
17	OP-only	Follow-up without treatment (Due to low life expectancy and being bedridden)	Follow-up without treatment	-
18	CKD-MBD (OM) + OP	Teriparatide after vitamin D supplementation	Could not start teriparatide (recurrent UTIs/ urosepsis) then refused further treatment	-
19	CKD-MBD (OM) + OP	Denosumab after vitamin D supplementation	Delayed denosumab initiation due to cardiac problems; sustained fracture during delay, denosumab later started	3
20	OP-only	Denosumab	Compliant, no complications	3

ABD: Adynamic Bone Disease, CKD-MBD: Chronic Kidney Disease – Mineral and Bone Disorder, OM: Osteomalacia, OP: Osteoporosis, UTI: Urinary Tract Infection, GI: Gastrointestinal

P1771

THE IMPORTANCE OF CONE BEAM COMPUTED TOMOGRAPHY FOR THE DIAGNOSIS OF BONE MINERAL DISORDERS IN DENTAL PRACTICE

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The importance of cone beam computed tomography for the diagnosis of bone mineral disorders in dental practice

The widespread occurrence and significant socio-economic consequences of mineral and bone disorders in dental patients necessitate the introduction of high-tech diagnostic techniques into clinical practice. One of the promising innovations is cone beam computed tomography (CBCT). The similarity of the symptoms of the pathology and the lack of clear diagnostic criteria for various forms of bone lesions

force us to look for certain clinical, laboratory or instrumental signs that allow us to assume its further development in the early stages of the disease, which allows for a more favorable treatment outcome and social prognosis in patients. At the first stage of diagnosis of bone mineral disorders, dentists use an orthopantomogram. Unfortunately, it does not always allow for a detailed assessment of changes in bone structure. However, until now, radiation diagnostics, especially assessment of the severity of damage to the maxillary system, is often carried out only by this method in everyday clinical practice. According to some authors, multisection computed tomography (MSCT) is considered the most informative method for detecting characteristic radiological changes, but its use in clinical practice is limited by many factors, including relatively high radiation exposure. Currently, it has become possible to use high-tech cone beam computed tomography (CBCT) techniques for such studies. The aim of the study was to evaluate the possibilities of using CBCT in the dental practice of patients with mineral and bone disorders in somatic pathology that led to chronic kidney disease. Materials and methods As part of the work, 420 middle-aged patients (postmenopausal women, men over 50 years old) were examined at the University Dental Clinic, who underwent dental implantation and preimplantation correction using reconstructive and reconstructive surgery to ensure satisfactory conditions for implantation. The examined patients had somatic pathology: kidney diseases (urolithiasis, pyelonephritis, glomerulonephritis, polycystic fibrosis) in 151 cases, of which 70 were men, diseases of the cardiovascular system (hypertensive nephropathy, ischemic kidney disease) in 76 cases, of which 35 were men, rheumatological diseases (gout, undifferentiated collagenosis, Sharpe syndrome, systemic lupus erythematosus, rheumatoid arthritis): 42 cases, 18 of them men. A combination of cardiovascular and kidney diseases occurred in 105 cases, including 47 males, and a combination of cardiovascular and rheumatological diseases in 46 cases, including 24 males).

Renal osteodystrophy was determined by the level of the hormonal regulator of calcium and phosphorus metabolism, intact parathyroid hormone (i-PTH). Prior to the dental implantation operation, the examined patients underwent cone beam computed tomography (CBCT) on a KaBo 3D eXam dental tomograph (KaBo Dental GmbH, Germany) with the i CATVision CT data visualization program (i CAT, Gendex CB-500). During postprocessing of the CT scans of the jaws, the shape, contours of the bone, and signs of bone damage were reliably visualized: areas of osteolysis; cyst-like cavities; bone structure restructuring and erosion; enthesophytes; narrowing of articular crevices, subluxations and dislocations, bone ankylosis of the temporomandibular joints; bone deformities. In addition, CBCT allowed us to evaluate not only the bone structure, but also dense soft-tissue anatomical formations in cases where diffuse periarticular thickening and compaction of soft tissues occurred. In terms of optical density (in Hounsfield units - units). HU) in the area of missing teeth, at the site of the proposed implant surgery, osteoporosis can be confirmed or rejected. Conclusions: Taking into account the low radiation load on the patient, compared with MSCT, the possibility of detecting foci of structural changes, as well as relatively low direct research costs, CBCT can be recommended as a first-stage technique for diagnosing bone forms of pathology in somatic pathology that led to chronic kidney disease in dental patients. In addition, this technique can be used to monitor the effectiveness of the treatment, gradually replacing radiography.

P1772

ON THE INTERPRETATION OF DENSITOMETRY DATA IN THE EXAMINATION OF DENTAL PATIENTS IN THE LATE STAGES OF CHRONIC KIDNEY DISEASE

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On the interpretation of densitometry data in the examination of dental patients in the late stages of chronic kidney disease.

Dentistry is a field of medicine that allows for the earliest diagnosis of bone mineral disorders in chronic kidney disease (CKD). Osteoporosis (OP) is common in such patients. Dentists, having enlisted the support of endocrinologists, increasingly use the results of densitometry in their work to diagnose OP. The interpretation of the obtained results causes certain difficulties. Thus, in the study of middle-aged patients who applied for dental implantation surgery, they often have a history of OP. After referral to an endocrinologist, medical records confirm this diagnosis. Some of them even had instructions about antiresorption therapy. From the moment of treatment to the present treatment, more than 5 years of remission have passed. When performing densitometry at the time of treatment, the T-criterion is <1.0. Other examples are patients at the G4–G5g stage of CKD, who have no data on osteoporosis, and according to densitometry, the T-criterion is < -2.5. And the same patients who have a history of OP diagnosis confirmed by low-traumatic compression fractures of the spine, while at the time of treatment, the T-test score is >-2.5. How to assess such conditions? Obviously, in the first case, OP should not be present in the main diagnosis. It should be mentioned in concomitant diseases. As for the second case, we are talking about mineral and bone disorders of chronic kidney disease (MCD-CKD) and OP in these patients. We regarded the third cases as MNK-CKD-OP. Obviously, in the first case, consultation with an endocrinologist is not required, while the rest require a multidisciplinary approach to diagnosis and treatment. The limited diagnostic methods of OP in outpatient dental practice make the method of densitometry the most preferable, although imperfect.

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SY1

FROM RISK STRATIFICATION TO INNOVATION: ADVANCING CARE FOR VERY HIGH FRACTURE RISK PATIENTS

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Objective:

Experts faculty to discuss how advances in risk stratification can be translated into timely, system-based interventions that improve outcomes for patients at Very High Fracture Risk. By bridging clinical risk identification with structured care models - particularly Fracture Liaison Services (FLS) - and exploring the role of innovation and technology, the session aims to demonstrate how healthcare systems can move from reactive fracture management to proactive, coordinated prevention.

Chair's introduction[1]

Osteoporosis management has evolved from a simple reliance on BMD T-score to use of absolute fracture probability to direct treatment decisions. In recent years, the greater and faster impact of bone building anabolic than antiresorptive therapies has led to the development of novel treatment stratification approaches to target specific medications according to baseline fracture risk. Those at sufficiently high fracture risk should be targeted with bone anabolic medications to rapidly reduce their risk before maintenance with antiresorptive therapies. A recent fracture has an immediate marked impact on future fracture risk and is an indication for urgent risk assessment and treatment. This symposium will address new approaches to risk stratification in osteoporosis management, and place these within the specific context of barriers and facilitators to optimal fracture liaison service provision.

Very High-Risk Fracture: Why Stratification Must Drive Action[2]

Selecting patients optimally treated by anabolic drugs requires their assessment as having a very high fracture risk. The recency, severity and number of fragility fractures together with the degree of bone loss all drive this increase in fracture risk. The presence of a fragility fracture within the past 2 years and a bone mineral density T-score of <-2.5, or the presence of a severe vertebral fracture or multiple fractures indicate very high fracture risk. International guidelines have also proposed absolute fracture risk thresholds, measured by FRAX®, of ≥30% for major osteoporotic fracture or ≥4.5% for hip fracture as being indicative of very high fracture risk[4]. Fractures or bone loss on antiresorptive therapy also indicate a very high fracture risk, but this group may have reduced gains in BMD with anabolic therapy, particularly following denosumab therapy. A goal-directed approach helps ensure that the most appropriate treatment is selected for each patient at each stage of life. Although the goal of treatment is freedom from fragility fractures, a validated surrogate endpoint is achieving a total hip BMD T-score >-2.5, or >-2.0 in the presence of a fragility fracture. The choice of initial therapy will depend on the baseline bone mineral density and the probability of achieving the treatment target after three years of treatment. In patients with the lowest bone density, anabolic therapy is preferred. It is critical to note that anabolic drugs work best if used as first-line, rather than as second-line drugs when increases in BMD on anabolic therapy will be attenuated. On completion of a course of anabolic therapy, timely initiation of antiresorptive drug therapy is required to maintain bone mineral density. The choice of antiresorptive drug will depend on the proximity of the bone mineral density to the treatment target and whether another course of anabolic therapy is planned. Denosumab would be preferred if the bone mineral density is still well below the treatment target, however, an oral or intravenous bisphosphonate would be preferred if a further future course of anabolic therapy is being contemplated. In conclusion, stratification by the identification of patients at very high fracture risk and the highest probability of achieving a target with treatment must drive action.

From First Fracture to Re-fracture: Why Systems Fail and the importance of FLS[3]

Fractures are the consequence of osteoporosis. Fractures are associated with increased morbidity and mortality. The risk of a subsequent fracture remains elevated compared to the risk of a first fracture for years after a fracture, but is especially high during the first 2 years, leaving the patients at imminent and sometimes high imminent risk of a subsequent fracture.

Therefore, patients with a recent fragility fracture should have the attention of the healthcare systems and be offered diagnosis, initiation or change of osteoporosis treatment if indicated. It has been demonstrated that Fracture Liaison Service (FLS), which is a systematic approach to identification, characterization and management of patients with fragility fractures, is the most effective service to accomplish this goal. In addition, it has been demonstrated to be cost-effective. Despite these advantages, it has proven challenging to implement FLS in many hospitals. Examples of FLS implementation and the challenges associated with implementation and running of FLS's will be presented and discussed.

References:

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SY2

OPPORTUNITIES AND CONTROVERSIES IN OSTEOPOROSIS MANAGEMENT USING SEQUENTIAL THERAPIES

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Advances in osteoporosis therapeutics have underscored the importance of treatment sequencing, particularly in patients at high and very high fracture risk. Chaired by Serge Ferrari and Enrique Casado, the symposium will address current opportunities and controversies in the use of sequential osteoporosis therapies.

Serge Ferrari will review international and European guideline recommendations supporting an anabolic-first approach in patients at very high fracture risk. He will highlight the substantial variability in how "very high risk" is defined across guidelines and discuss how real-world implementation is constrained by reimbursement criteria and specific contraindications, which may limit the use of osteoanabolic agents as first-line therapy.

David Kendler will focus on the clinical challenge of fractures during treatment, often perceived by patients and clinicians as treatment failure. As osteoporosis therapies reduce fracture risk by 20–80%, fractures may still occur in successfully treated patients. The presentation will review the International Osteoporosis Foundation position on treatment failure, which requires either at least two fractures after a minimum of one year of therapy, or one fracture in the presence of declining bone mineral density or an insufficient bone turnover marker response exceeding the least significant change.

The importance of excluding secondary causes of bone loss will be emphasised, as nonadherence or noncompliance represents the most common reason for apparent treatment failure. In this context, long-interval parenteral antiresorptive regimens may offer advantages for selected patients. Therapeutic options following fracture on treatment will be discussed and tailored to individual patient needs, including switching from oral to parenteral antiresorptive therapy or to bone anabolic agents. Considerations regarding treatment sequencing, including the potential blunting of bone mineral density response when switching from bisphosphonates to anabolic therapies, will also be addressed.

The symposium will integrate guideline perspectives with practical clinical considerations to support clinicians in determining treatment failure appropriately and selecting optimal therapeutic sequences for patients at high and very high fracture risk.

This satellite symposium is funded and organised by Gedeon Richter Plc. and is intended for Healthcare Professionals only.

SY3

PROTECTING HER FUTURE WITH ROMOSOZUMAB FIRST

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Following a fracture, immediate and rapid intervention to reduce fracture risk is vital, as approximately half of subsequent fractures occur within the first 2 years.[1-3]

In this interactive, case-based symposium, leading experts will share insights into the management of patients with postmenopausal osteoporosis (PMO) at very high fracture risk (VHFR). They will explore how romosozumab, through its rapid bone-building ability, stands out as an optimal approach to rapidly reduce fracture risk and, when followed with an antiresorptive, provides long-term protection from future fractures.[1,4,5]

Case 1: The Urgent Imperative

Professor Ralf Schmidmaier will discuss guideline-recommended strategies to address elevated fracture risk in patients who have recently suffered a fragility fracture. Through exploration of both clinical and real-world efficacy data, he will share insights into romosozumab's rapid bone-forming action and anti-fracture efficacy in PMO patients at VHFR.[1,4,5]

Case 2: Breaking the Cycle

Despite being a recommended first-line therapy for PMO patients at VHFR, [3,6] many patients receive alternative therapy prior to romosozumab.[7] Professor Nicola Napoli will illustrate how romosozumab remains an optimal strategy to prevent fractures in the VHFR population, irrespective of prior antiresorptive exposure, showcasing its superior bone mineral density gains compared with a parathyroid hormone (PTH) analogue in pre-treated patients.[8,9]

Case 3: Rebuilding Foundations in VHFR

Professor Bente Langdahl will share valuable insights into optimised treatment sequences, [9] showcasing both short- and long-term outcomes seen with romosozumab when used first-line followed by antiresorptive therapy.[5] Furthermore, Professor Langdahl will explore the latest evidence regarding romosozumab's benefit-risk profile and how this is incorporated into her clinical decision-making.

The Time Is Now

Closing the symposium, symposium chair Professor Javaid will share critical insights into how robust post-fracture management pathways can prioritise early identification of patients at VHFR, supporting timely intervention and first-line initiation of romosozumab to maximise potential benefits for eligible patients.[1,4,5]

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In the EU, romosozumab is indicated in treatment of severe osteoporosis in postmenopausal women at high risk of fracture.[1]

Romosozumab PI is available at booths 19-20. Licenses may vary by country, please always refer to the Prescribing Information (PI) in your country before prescribing any drug. Adverse events should be reported to your local regulatory authority and UCB. Reporting forms and information can be obtained from your local regulatory authority.

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SY4

THE OA TREATMENT JOURNEY: FROM EARLY INTERVENTION TO LONG-TERM MANAGEMENT

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Osteoarthritis is a progressive condition characterized by structural joint changes, pain, functional limitation, and increasing disability over time. Early stages of OA represent a critical window of opportunity in which timely intervention may modify symptom burden and potentially alter the disease trajectory.

In this presentation, Dr. Nicholas Fuggle will explore the osteoarthritis treatment journey from early diagnosis through long-term disease management. The session will review key clinical features of early OA, the importance of accurate assessment, and the role of guideline-supported therapeutic strategies across different stages of disease severity.

Particular attention will be given to evidence-based early interventions, including lifestyle measures and pharmacological options, and how these strategies can be adapted over time as OA progresses. The presentation will also discuss the long-term management of OA, highlighting the need for sustained symptom control, functional preservation, and individualized treatment planning in routine clinical practice.

SY5

HOLISTIC OA MANAGEMENT: HOW DISEASE SEVERITY CAN GUIDE NSAID CHOICES

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The management of osteoarthritis-related pain often requires a tailored approach that considers disease severity, patient characteristics, and the balance between efficacy and safety. Non-steroidal anti-inflammatory drugs (NSAIDs) remain a cornerstone of pharmacological treatment for OA, particularly in patients with moderate to severe symptoms.

In this lecture, Prof. Olivier Bruyère will discuss a holistic framework for OA management, focusing on how disease severity, symptom profile, and patient risk factors can inform NSAID selection. The presentation will review current international guidelines and clinical evidence supporting the rational use of NSAIDs within a comprehensive OA treatment strategy.

The session will emphasize the importance of individualized decision-making, integrating clinical evidence with patient-specific considerations, to optimize pain control while minimizing potential risks. This approach supports a broader, patient-centered model of OA care, aligned with contemporary recommendations for long-term disease management.

SY6

REMS TECHNOLOGY IN CLINICAL PRACTICE: APPLICATIONS THAT ENHANCE OSTEOPOROSIS DIAGNOSIS

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Objective: Osteoporosis often remains clinically silent until a fragility fracture occurs, particularly in patients with secondary osteoporosis or multiple comorbidities, where fracture risk is frequently underestimated. Radiofrequency Echographic Multi Spectrometry (REMS) is a non-ionizing technology that improves early diagnosis and fracture risk assessment, overcoming limitations of conventional densitometry. This review summarizes clinical evidence of REMS across different patient populations.

Materials and Methods: A review of REMS applications in several clinical settings was conducted. REMS measurements were compared with DXA for agreement, diagnostic performance, reproducibility, and ease of use.

Results: Clinical evidence confirms REMS applicability across multiple medical specialties. In endocrinology, REMS improves detection of bone fragility in conditions such as type 2 diabetes, obesity, eating disorders, and during hormone-based therapies, where DXA may underestimate fracture risk. In nephrology, REMS enables accurate bone evaluation in chronic kidney disease, peritoneal dialysis, and kidney transplantation by

overcoming artefacts related to vascular calcifications. In rheumatology, REMS overcomes BMD overestimation often observed with DXA in the presence of osteoarthritis, spondyloarthritis and other inflammatory conditions. In geriatric and orthopedic settings, REMS supports fracture prevention and secondary fracture management through bedside assessments and accurate evaluation in the presence of vertebral deformities or prosthetic implants. In gynecology, REMS allows safe bone health monitoring across pregnancy, lactation, and menopause. In oncology, REMS facilitates early identification of therapy-induced bone loss and fracture risk stratification. Across specialties, REMS demonstrates high reproducibility, portability and diagnostic accuracy.

Conclusions: REMS expands access to osteoporosis diagnosis and fracture risk assessment, offering a safe, accurate, and portable alternative to conventional densitometry, including for previously underserved populations. Its broad applicability supports early diagnosis, personalized management, and continuity of care.

SY7

FROM INNOVATION TO CLINIC: REMS AS A BREAKTHROUGH TOOL IN OSTEOPOROSIS MANAGEMENT

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Objective: To illustrate the clinical value of REMS as an innovative tool in osteoporosis management, with practical insights into interpreting REMS-derived BMD.

Materials and Methods: Targeted literature review on REMS as an innovation transitioning into routine osteoporosis management. Evidence was synthesised from key methodological descriptions and clinical studies, with practical examples addressing the role of age/BMI in the REMS pathway and the ability to monitor BMD over time.

Results: REMS yields a BMD result derived from patient-specific ultrasound information. Anthropometric and demographic parameters are taken into account to place the measurement within an appropriate reference framework. Importantly, the measurement retains strong individual specificity, such that patients with the same age and BMI can display a broad spread of BMD values. In addition, REMS processing can identify and automatically exclude signals consistent with common artefacts (e.g., osteophytes, calcifications, prosthetic material), keeping the provided BMD representative of bone-related information. Across follow-up studies, REMS has demonstrated the ability to detect significant BMD changes over time, including decline during pregnancy (around −2% in reported series), early postpartum recovery (about +0.02 g/cm² at 1 month in one cohort), and measurable variations over 12-month monitoring in metabolic/therapeutic settings (e.g., adults with type 2 diabetes starting GLP-1 receptor agonist therapy; breast cancer patients undergoing aromatase inhibitor based therapy, with and without denosumab administration).

Conclusions: REMS represents a breakthrough tool for osteoporosis care, translating patient-specific bone information into BMD values that can support diagnosis and monitoring in several different clinical settings. REMS leverages spectral-model matching of raw backscatter signals against reference profiles (stratified by patient characteristics and skeletal site), which is a key technical enabler of its patient-specific BMD output in real-world pathways. Age and BMI are embedded in the workflow, but they are not the determinants of the final value, enabling substantial BMD variability to be captured among individuals with similar anthropometrics and supporting longitudinal assessment.

SY8

IDENTIFYING FRAGILITY BEFORE FRACTURES OCCUR: THE ADDED VALUE OF REMS IN OSTEOPOROSIS CARE

N. Fuggle[1]

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Fragility fractures frequently represent the first clinical manifestation of osteoporosis, underscoring persistent challenges in the early identification of skeletal fragility. Radiofrequency Echographic Multi Spectrometry (REMS) has emerged as a non-ionising, ultrasound-based technique proposed as a complementary approach to bone assessment.

An expanding body of evidence suggests that REMS-derived BMD correlates well with that derived from Dual-Energy X-ray Absorptiometry (DXA). The REMS Fragility Score, may provide additional information on skeletal microarchitecture that is independent of BMD. By automatically integrating T-Score and Fragility Score values, REMS identifies short-term fracture risk, enabling stratification into seven risk categories aligned with five-year fracture probability. Observational and comparative studies have reported associations between REMS parameters and fracture risk in selected clinical settings, including conditions known to affect bone quality such as diabetes mellitus and chronic kidney disease. REMS has also been evaluated in populations for whom conventional imaging may be less suitable or practical, including pregnant women, frail inpatients, paediatric cases and individuals with severe disability, reflecting its portability and important absence of ionising radiation.

Overall, REMS represents a potentially useful adjunct or alternative for osteoporosis assessment by integrating quantitative evaluation of bone density and bone quality with short-term fracture risk assessment. Its especial clinical value also lies in scenarios where conventional tools provide incomplete risk characterisation.

SY9

LOW PHOSPHATE AND THE BONE DOCTOR

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Chronic hypophosphatemia is an under-recognized yet clinically significant contributor to metabolic bone disease, leading to impaired mineralization, bone fragility, pain, and functional limitation. Despite its clinical relevance, low phosphate often remains overlooked in routine bone assessments, resulting in delayed or missed diagnoses with prolonged patient morbidity. Hypophosphatemic disorders may be congenital (such as X-linked hypophosphatemia) or acquired (such as tumor-induced osteomalacia), exhibiting different primary causes and onset patterns, but overlapping pathophysiology and clinical manifestations.

Advances in the understanding of phosphate dysregulation have

highlighted the central roles of fibroblast growth factor 23 (FGF23), renal phosphate transport, measured through tubular maximum reabsorption of phosphate (TmP/GFR), and vitamin D in the development of chronic hypophosphatemia. However variability in clinical manifestations, gaps in the routine use of specific biomarkers, and complexities in the interpretation of laboratory findings, including the need for age- and sex-specific reference ranges, continue to pose diagnostic challenges.

Recognizing the signs of hypophosphatemic disorders, including bone abnormalities, skeletal deformities, occurrence of fractures/pseudofractures and pain, can help raise earlier suspicion, and aid timely and accurate diagnosis. Diagnostic confirmation from clinical, biochemical, and imaging assessments, along with genetic testing in congenital forms, is mandatory for the optimal management of rare metabolic bone disorders.

This lecture will synthesize current knowledge on hypophosphatemic disorders in clinical practice, highlight gaps in recognition and assessment, and illustrate practical, guideline-informed approaches to suspicion and diagnosis using real-world cases, with the aim of supporting earlier identification and improved patient outcomes.

SY10

BIOSIMILARS IN BONE HEALTH: TRANSLATING CLINICAL EVIDENCE INTO SUSTAINABLE OUTCOMES

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Biosimilars have emerged as an important advancement in bone health management, offering the potential to expand patient access to biologic therapies while supporting healthcare systems' sustainability. However, their successful integration into clinical practice and acceptance among clinicians and patients depend on a clear understanding of the scientific principles underpinning biosimilar development. This symposium will provide an integrated overview of biosimilar fundamentals, with a particular focus on Canadian real-world experience with biosimilar denosumab, and strategies to support sustained patient outcomes.

The session will open with an overview of biosimilars' development, regulatory approval, and evidence requirements. Key focus will be on addressing knowledge gaps related to biosimilars, including concerns about switching and perceived differences in effectiveness, safety, and immunogenicity compared with their reference medicines. The potential impact of these concerns on the nocebo effect in patients will also be evaluated.

The panel discussion will then explore Canadian real-world experience with treatment adherence and clinical outcomes following initiation and transition to biosimilar denosumab. The faculty will discuss emerging system- and practice-level considerations, including evolving clinical guidance, provincial formulary access, patient switching approaches, and healthcare professional engagement. In addition, they will highlight findings from a Sandoz-sponsored Canadian patient-reported satisfaction survey (N=435) following transition from reference to biosimilar denosumab, to provide insights into patient experience, communication around treatment transitions, innovative approaches to long-term antiresorptive therapy, and factors influencing confidence in biosimilar therapy.

Finally, denosumab in the long-term management of osteoporosis will be explored, recognising its strength as a potent antiresorptive treatment option. The evidence underlying treatment sequencing, strategies to minimise rebound bone loss, safety considerations, including osteonecrosis of the jaw and atypical femoral fractures, will be discussed, taking into consideration the balance between clinical value, access and cost in real-world practice.

Disclosures:

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SY11

ADVANCES IN THE DIAGNOSIS AND MANAGEMENT OF PATIENTS WITH HYPOPHOSPHATASIA (HPP) ACROSS THE DISEASE CONTINUUM

Alexion[1]

[1]AstraZeneca Rare Disease

HPP is a rare disease caused by deficient activity of alkaline phosphatase (ALP).[1,2] In this session, leading experts will explore how to recognize and diagnose HPP across the lifespan of a patient, discuss how to effectively manage HPP, and provide a practical overview of assessments that can be performed in the clinical setting.

HPP Presentation and Diagnosis Across the Disease Continuum
Prof. Maria Luisa Brandi (FIRMO Foundation, Italy)

Prof. Maria Luisa Brandi will review HPP diagnosis in children and adults, including practical considerations for differential diagnosis. She will explore key patient archetypes and review new mechanistic data on muscular symptoms of HPP.

HPP Disease Impact and Management Throughout the Patient Lifespan

Prof. Florian Barvencik (University Medical Center Hamburg-Eppendorf, Germany)

Prof. Florian Barvenick will review the disease impact of HPP, covering structural (skeletal) and functional manifestations. He will review effective management strategies in appropriate patients.

Future Directions in HPP

Dr Eric T. Rush (Children's Mercy Hospital, Kansas City, MO, United States; University of Missouri–Kansas City, Kansas City, MO, United States)

Dr Eric T. Rush will provide an overview of the key clinical assessments

to evaluate disease burden and management in patients with HPP. He will review practical considerations across both structural and functional assessments, including mobility, physical function, pain, fatigue, and quality of life.

References

1. Khan AA, et al. *Adv Ther*. 2025;42(9):4270–99.

2. Kishnani PS, et al. *Orphanet J Rare Dis*. 2025;20(1):626.

Alexion medicines in the context of HPP management will be discussed at this meeting. Some content may be deemed promotional in your territory. This lunch symposium is fully funded and organized by Alexion, AstraZeneca Rare Disease, and is intended for healthcare professionals only.

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