

For outcomes reported by less than 3 studies, we synthesized the results narratively. In other cases, a meta-analysis was performed, giving an overall r coefficient and its 95%CI.

Results: Fifteen papers were included. In connection with the evolution of BMD, 10 studies concerned the parallel evolution of muscle mass, 4 were about grip strength, and 1 was about physical performance. Children were the population of interest for 5 studies, while the aging population was the focus of the other studies. The correlation between hip BMD and muscle mass was significant, with an overall coefficient $r=0.37$ (95%CI 0.23–0.49). High heterogeneity was observed between studies but the length of follow-up, sex and study quality did not seem to significantly influence results. The systematic review allowed some other highlights: a significant link between changes in BMD and changes in muscle strength was observed (p -value <0.05 in the 4 studies), in addition to changes in performance (1 study, $r=0.21$, p -value=0.004).

Conclusion: Despite the heterogeneity between studies, we highlighted a significant association between the evolution of BMD and the evolution of various muscle parameters, thus proposing the use of preventive and therapeutic strategies that are based on a single entity: the 'muscle-bone unit'.

OC25

BIRTHWEIGHT, LIMB MUSCLE MASS AND GRIP STRENGTH IN MIDDLE AGE: FINDINGS FROM THE UK BIOBANK IMAGING ENHANCEMENT

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Objective: Low birthweight has been associated with poorer musculoskeletal health in later life. We investigated relationships between birthweight, and grip strength or MRI measures of muscle volume in UK Biobank.

Methods: UK Biobank is a large prospective cohort of men and women aged 40–69 y, including a detailed baseline assessment in which birthweight was collected by self-report. A subset underwent MRI examination with the dual-echo Dixon Vibe protocol, from neck to knees. Automated analysis was performed using the AMRA Profiler™ system, to segment and quantify total thigh muscle volume. Grip strength was assessed using a Jamar hydraulic hand dynamometer. Associations between birthweight, and thigh muscle volume or grip

strength (expressed as Fisher-Yates z -scores) were investigated using multivariate linear regression analysis. This study was conducted under generic ethics approval (NRES:11/NW/0382).

Results: 3699 participants [1513 men, mean (SD) age 61.0 (7.6) y and 2186 women, age 60.1 (7.4) y] were able to recall their birthweight and had their grip strength assessed or underwent MRI body composition analysis. In both men and women, higher birthweight was associated with greater thigh muscle volume (adjusted for age and BMI): men, β (95%CI): 0.229(0.156,0.301) SD/kg, $p<0.001$; women, β (95%CI): 0.284(0.221,0.346) SD/kg, $p<0.001$. Higher birthweight was also associated with higher grip strength (adjusted for age and height); men, β (95%CI): 0.123(0.051,0.195) SD/kg, $p=0.001$; women, β (95%CI): 0.070(0.007,0.134) SD/kg, $p=0.031$. Apart from the association with grip strength in women, these associations persisted after additional adjustment for current smoking and physical activity.

Conclusions: These findings provide novel evidence of associations between birthweight and volumetric measures of muscle size and grip strength, and support the developmental programming hypothesis. Interventions to improve obstetric health and optimise birthweight may help to prevent sarcopenia and reduce the risk of falls in future generations.

OC26

INTRINSIC CAPACITY AND ITS ASSOCIATION WITH MORTALITY OVER THREE YEARS IN NURSING HOMES: RESULTS OF THE SENIOR COHORT

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Objective: Recently, in order to evaluate functional ability of older people, the WHO proposed a model containing 5 domains of intrinsic capacity (i.e., cognition, locomotion, sensory, vitality and psychosocial), divided in 13 subdomains. The predictive value of these subdomains on mortality has not yet been investigated in nursing home setting. The aim of this study was to evaluate the predictive value of the 13 proposed subdomains of intrinsic capacity on the 3-year mortality of nursing home residents.

Methods: At baseline, clinical data (i.e. age, sex, comorbidities, medication and education) from an initial cohort of 662

subjects living in 28 Belgian nursing homes, were collected. For the Cognition subdomains, time orientation and memory were assessed using the Mini-Mental State Examination. For Locomotion, balance, gait speed and chair stand performance were evaluated with the Short Physical Performance Battery (SPPB). Sensory was measured using the self-reported Strawbridge questionnaire for audition and vision. For Vitality, abdominal circumference, BMI, nutritional status (by Mini Nutritional Assessment [MNA]) and handgrip strength (by a hand-dynamometer) were assessed. For the Psychosocial subdomains, depression was evaluated by the EuroQol-5D and fatigue by the CES-D scale. Multiple imputations were applied to handle missing data. Cox proportional hazard models were performed to evaluate the association between subdomains of intrinsic capacity and the occurrence of death during the 3-year follow-up.

Results: Out of the initial 662 subjects, 604 (aged 82.9±9 y, 72.5% of women) were included in this study. Indeed, 2 nursing homes with 58 residents dropped out. After 3 y, 38.2% of the study population deceased and the mean survival was 2.6 y. The residents who died were significantly older compared to the alive subjects ($p=0.01$), but no other clinical characteristics were significantly different. In the multivariate model adjusted for age, sex and the 10 intrinsic capacity subdomains associated with mortality in univariate analyses, a one-unit increase in balance performance of the SPPB and in the nutrition score of the MNA decreased the probability of death within 3 y by 12% (hazard ratio (HR) 0.88; 95%CI 0.78-0.99) and 4% (HR 0.96; 95%CI 0.93-0.99), respectively.

Conclusion: Balance capacity and nutrition, belonging respectively to the general domains of locomotion and vitality proposed by the WHO, are independently associated with the 3-y mortality among nursing home residents.

OC27

DEVELOPMENT AND EXTERNAL VALIDATION OF A PATIENT-LEVEL PREDICTION MODEL FOR 60-DAY MORTALITY FOLLOWING TOTAL KNEE ARTHROPLASTY: A MULTINATIONAL COHORT STUDY

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Objective: Total knee replacement (TKR) is the most effective intervention available for the treatment of severe knee osteoarthritis. A small proportion of patients undergoing TKR are at risk of postoperative complications. We aimed to develop and externally validate algorithms for the prediction of post-operative mortality.

Methods: We conducted a multinational, multidatabase cohort analysis using claims data from the USA (Optum® de-identified Clinformatics® Datamart, Extended - Date of Death (Optum)) and The Health Improvement Network (THIN) UK primary care database. Both data sources were mapped to the Observational Medical Outcomes Partnership (OMOP) common data model, and processed using the same analytical platform developed by the Observational Health Data Sciences and Informatics (OHDSI) initiative. All subjects undergoing a primary TKR, aged 40 years or older and registered in any of the contributing data sources for at least one year before surgery were included. Study outcome was postoperative (60-d) all-cause mortality. Lasso logistic regression models were fitted with predictors with prevalence 0.1% using Optum, assessing discrimination and calibration and externally validated in THIN. Model performance was assessed using area under curve, AUC and calibration plot.

Results: A total of 152,665 US and 40,950 UK participants were included, with 353 (0.23%) and 81 (0.20%) deaths identified in the 60 days post-TKR respectively. A total of 121/89,031 potential variables were included in the final model. 102 predictors covering morbidity, process of care, and prescription medicine codes were included in the final model. Discrimination performance of the model developed on the OPTUM database was AUC 0.78 in the internal, and 0.69 in the external validation. Calibration was acceptable based on visual assessment.

Conclusions: TKR is a common procedure with low (1/500) mortality in the 60 d following surgery. We have developed and externally validated a prediction tool for the identification of subjects at high risk of postoperative mortality. More research is needed to understand the impact of its use in clinical practice.

Acknowledgements: This activity under the European Health Data & Evidence Network (EHDEN) has received funding from the Innovative Medicines Initiative 2 Joint Undertaking under grant agreement No 806968. This Joint Undertaking receives support from the European Union's