Intérêt de l'échographie en MPR

Présentation du 25/04/17

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Liège

CHU de Liège

FIFA MEDICAL CENTRE OF EXCELLENCE

Université de Liège

Plan

- Généralités
- Echographie diagnostique
  - Tendons
  - Muscles
  - Nerfs
  - Cartilage et os
- Echographie thérapeutique
  - Techniques d’injection
  - Infiltration de dérivés cortisonés
  - Infiltration d’acide hyaluronique
  - Injection de toxine botulinique
  - Injection de PRP
- Futur ?

Généralités

- Transducteur piézo-électrique
- Faisceau d'ondes US
- Fréquence variable
  - Profondeur
  - Résolution spatiale
- Réflexion – réfraction – absorption

Tableau 1 Profondeur explorée en fonction de la fréquence de la sonde.

Fréquence (MHz)	Profondeur explorée
3,5 MHz	4 - 8 cm
5 MHz	2,5 - 7 cm
7,5 MHz	1 - 4,5 cm
10 MHz	0,1 - 3,5 cm
20 MHz	0 - 2 cm

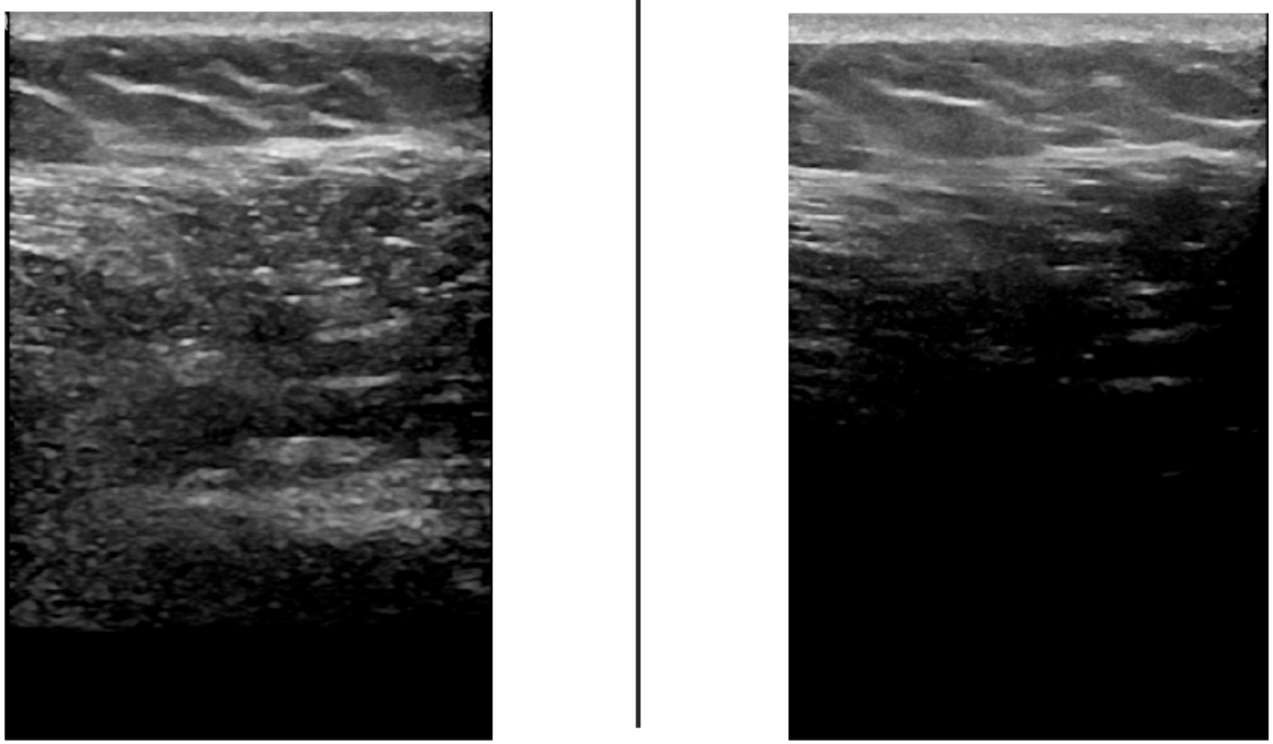
Tableau 2 Résolution spatiale en fonction de la fréquence.

Fréquence (MHz)	Résolution spatiale (mm)
2,5	0,616
3,5	0,440
5,0	0,308
7,5	0,205
10	0,154
13	0,118
15	0,102
20	0,090

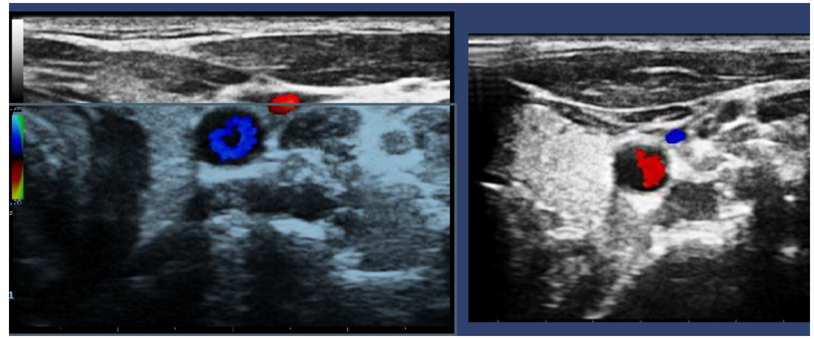
Ultrasound Frequency

8MHz

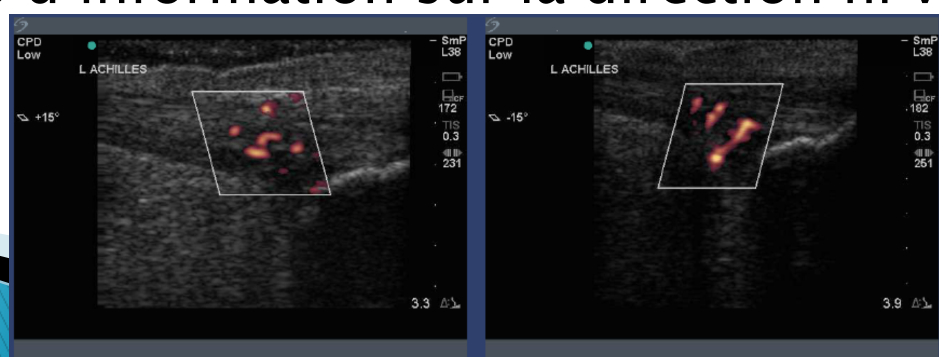
13MHz



Généralités

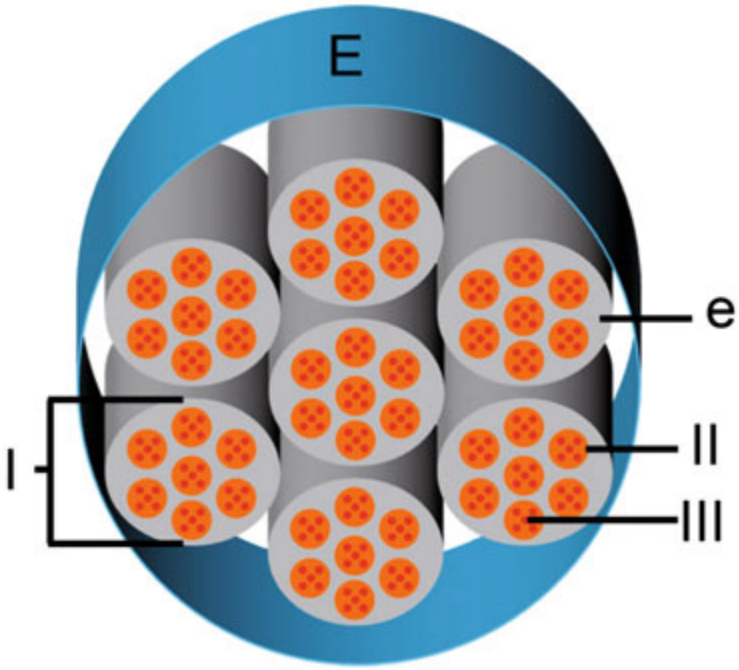


- Doppler
  - Couleur
    - Vitesse et direction des GR par rapport à la sonde
      - Rouge : vers la sonde
      - Bleu : s'éloigne de la sonde
  - Puissance
    - + : Sensible aux flux et vitesses faibles
    - – : Très sensible au mouvement
    - Pas d'information sur la direction ni vitesse du flux

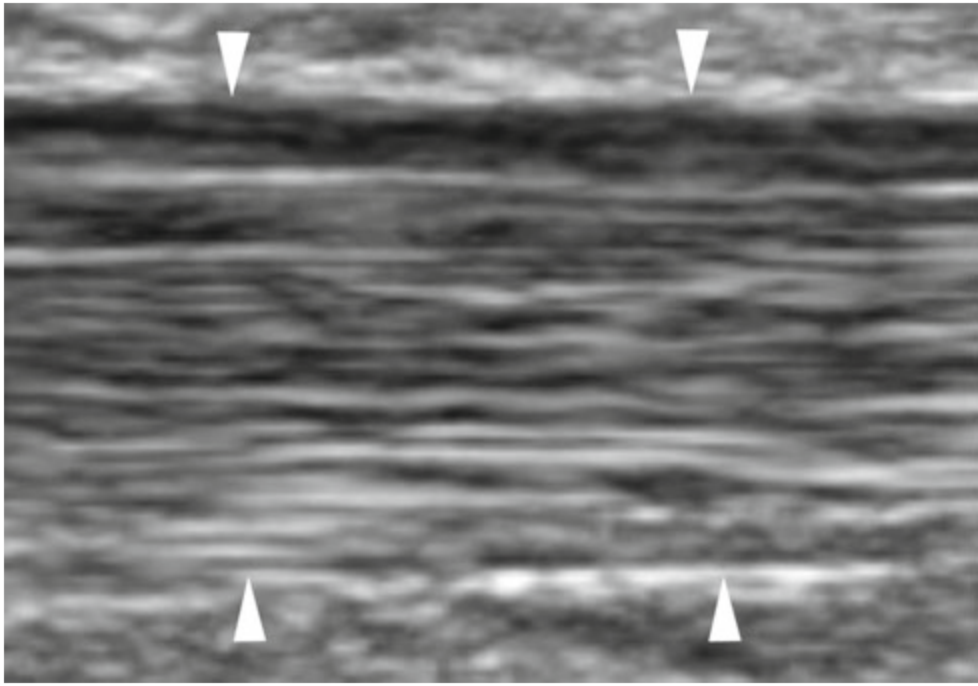


Echographie diagnostique

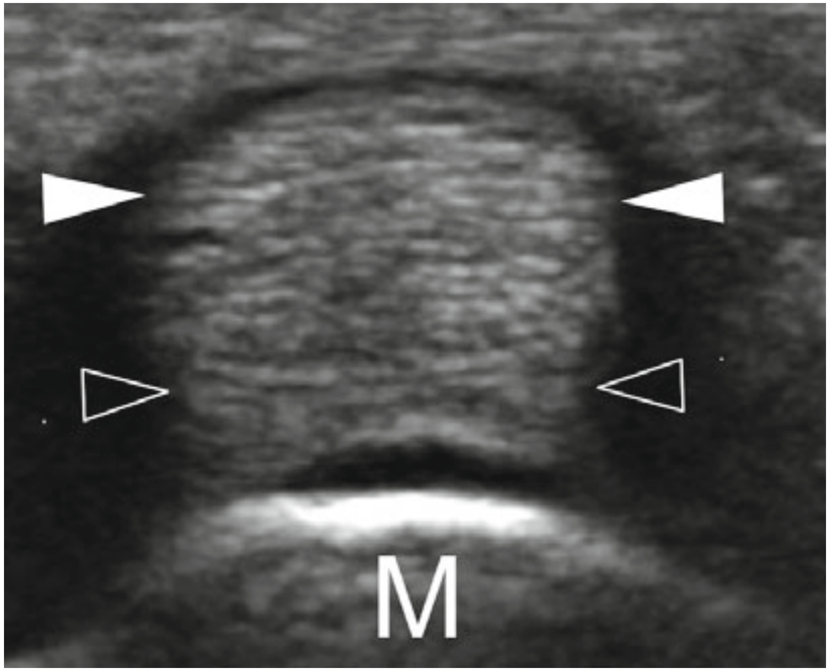
- Tendons



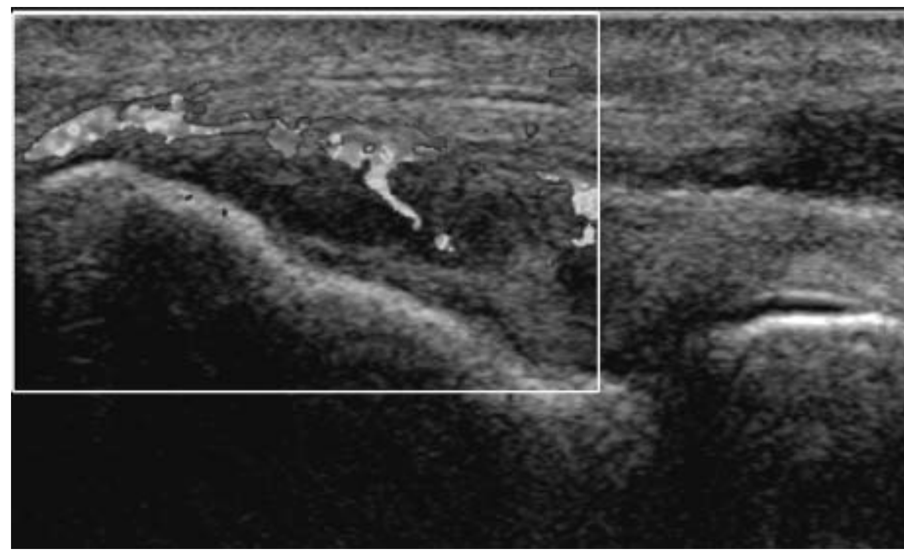
Fibrillaire

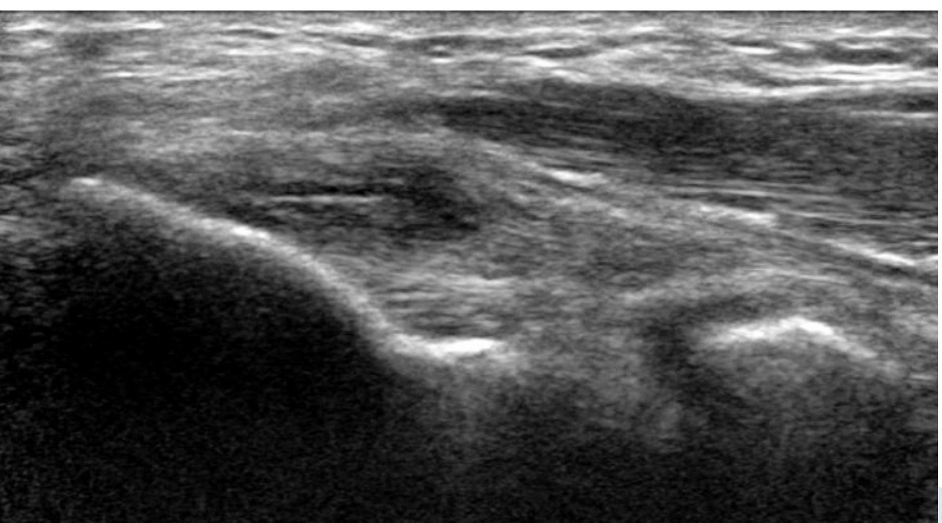


Piqueté



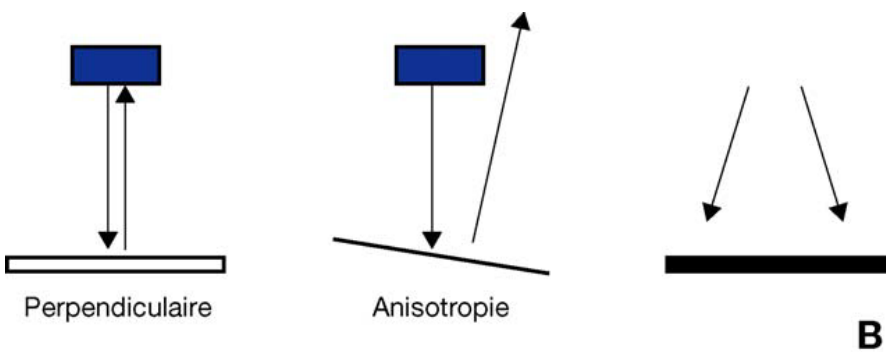
- Tendinopathies
  - Hétérogénéité
  - Hypo-iso-hyper écho
  - Signal doppler
  - Tuméfaction
  - Calcification
- Ruptures
  - Partielle
  - Complète





- Tendons

ANISOTROPIE !



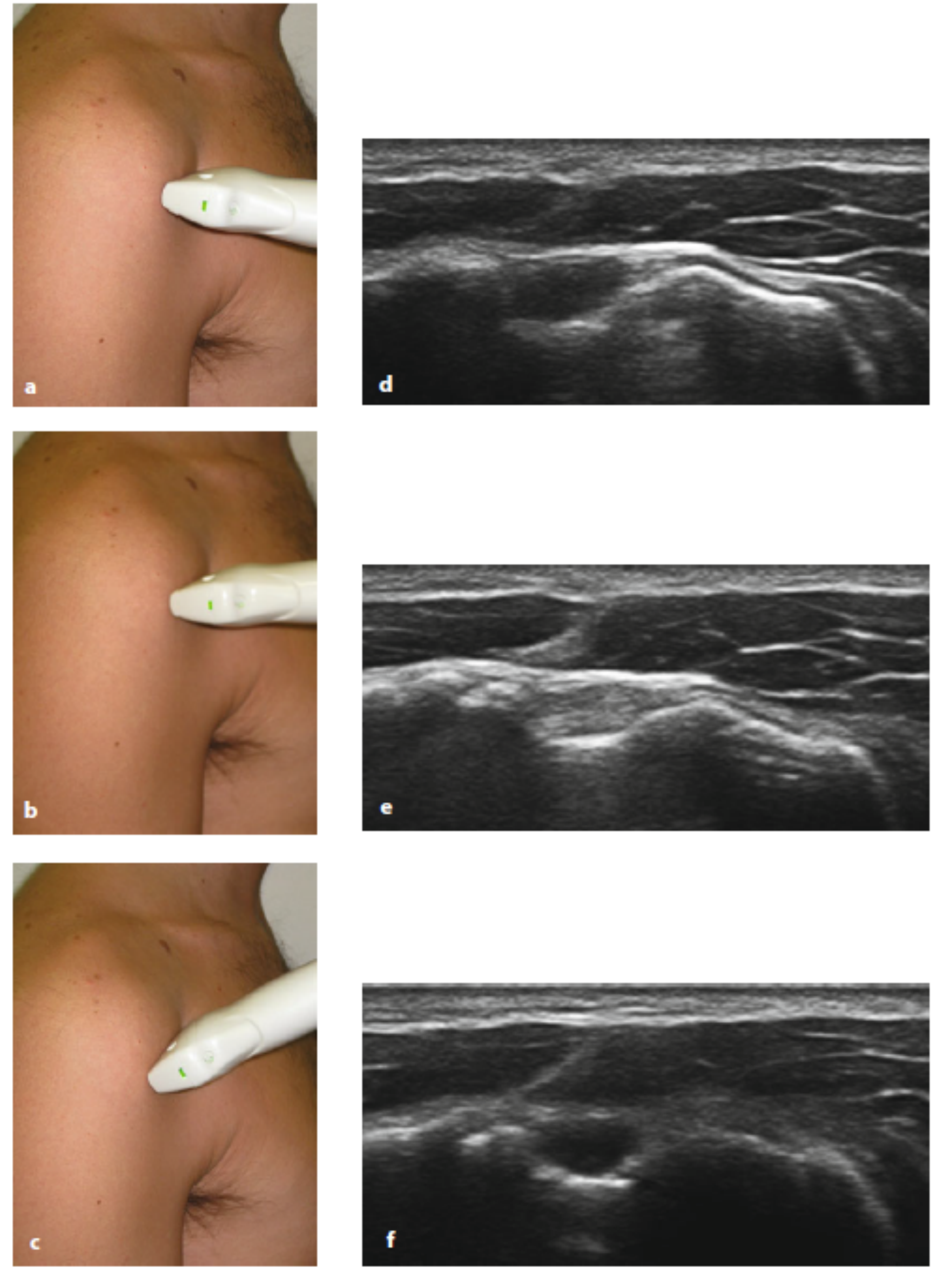


Fig. 2.4 Anisotropy artifacts affecting the long head of biceps tendon due to wrong probe positioning. In the wrong positions (a and c) the "empty bicipital groove" sign can be seen in the corresponding ultrasounds (d and f). This appearance is due to the prevalence of diffracted echos over reflected ones. When the US beam is perfectly perpendicular to the tendon, there is a prevalence of reflected echoes and the LHBBT tendon can be correctly evaluated (b and e).

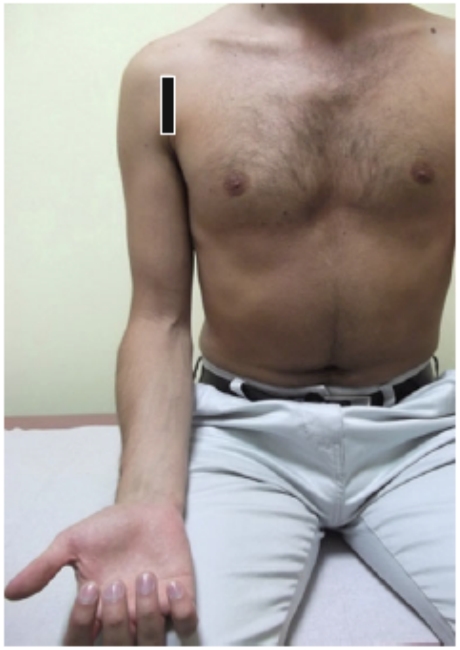


Fig. 2.6a Probe position to evaluate the LHBBT according to its longitudinal axis

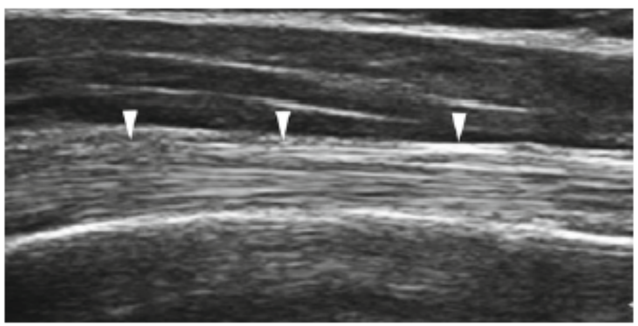


Fig. 2.6b Longitudinal scan of LHBBT (*arrowheads*) in bicipital groove

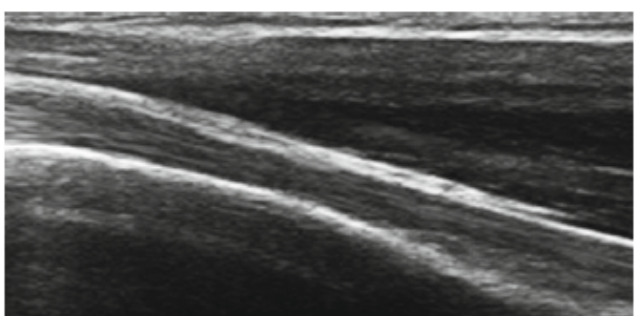
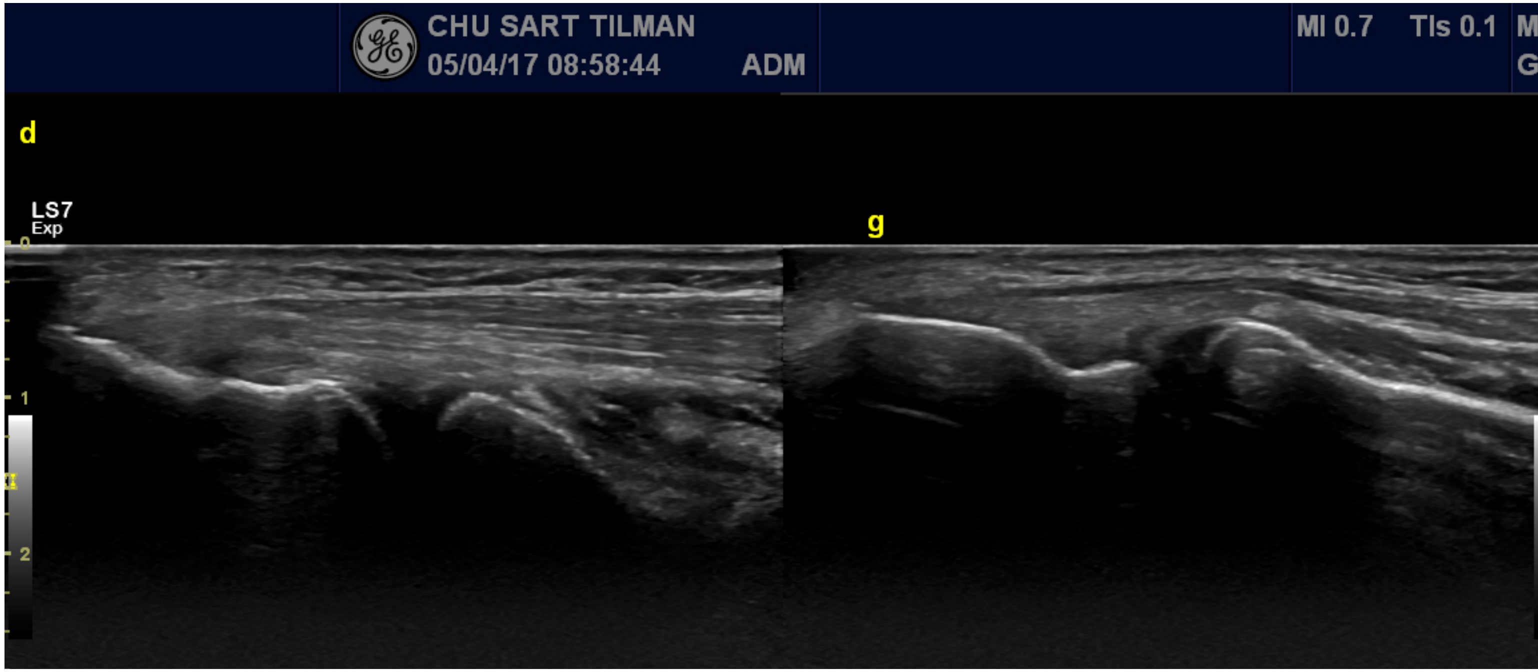
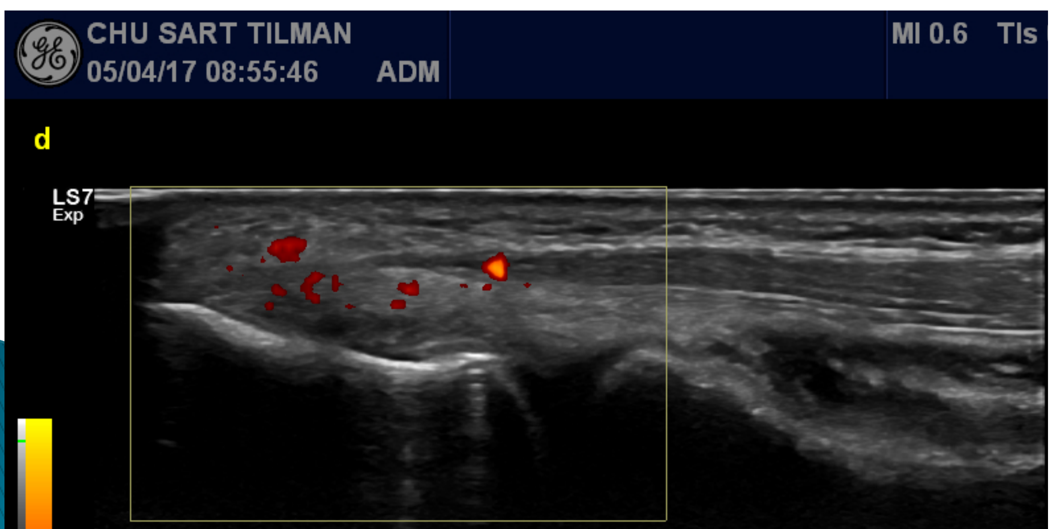


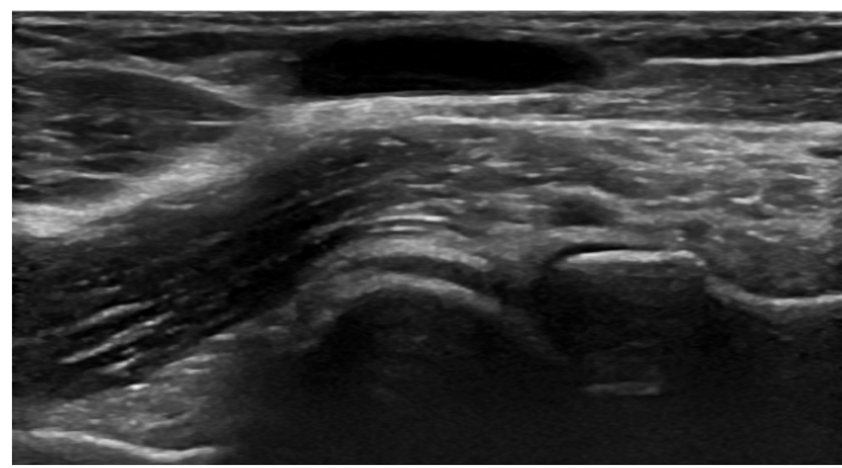
Fig. 2.6c Anisotropy artifact affecting the LHBBT on longitudinal scan, due to the wrong orientation of the US beam

« L'échogénicité de certaines structures dépendent de l'orientation du faisceau, elles sont alors dites anisotropiques. L'échogénicité est maximale lorsque le faisceau incident arrive perpendiculairement à la structure et elle diminue lorsque l'obliquité augmente »

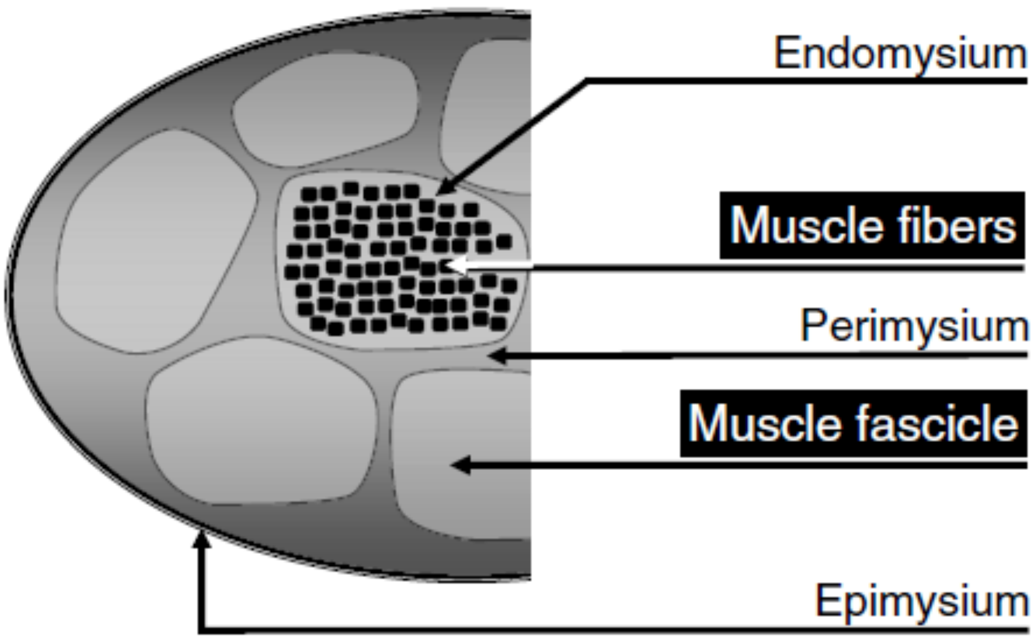
Histoire de chasse



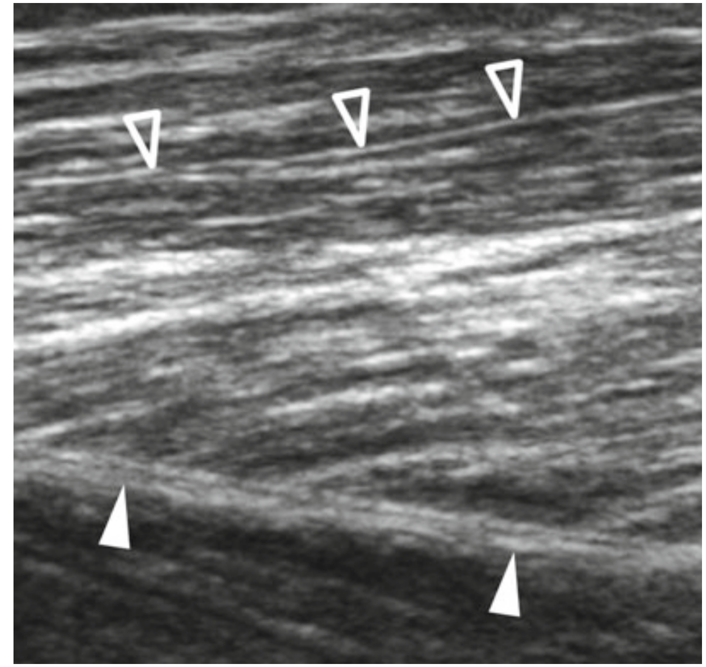




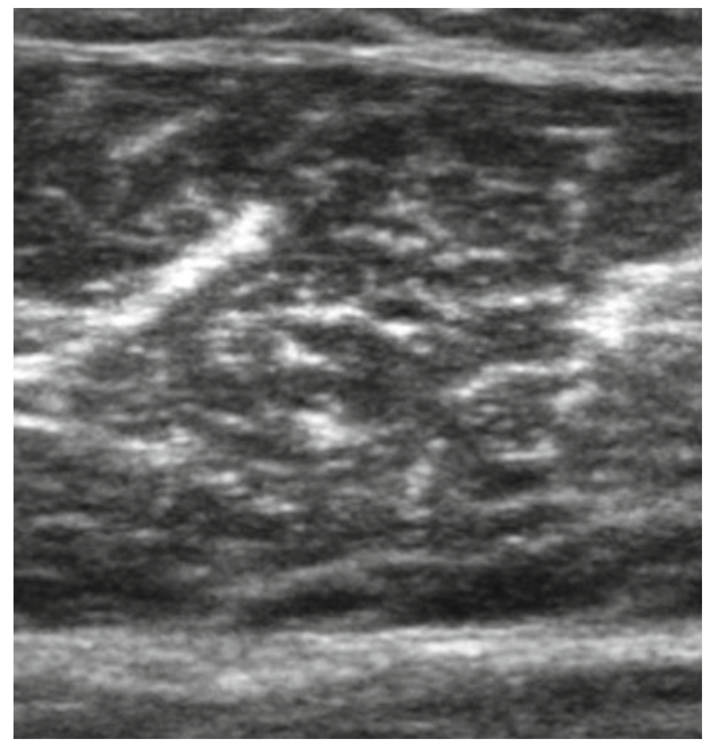
Muscles

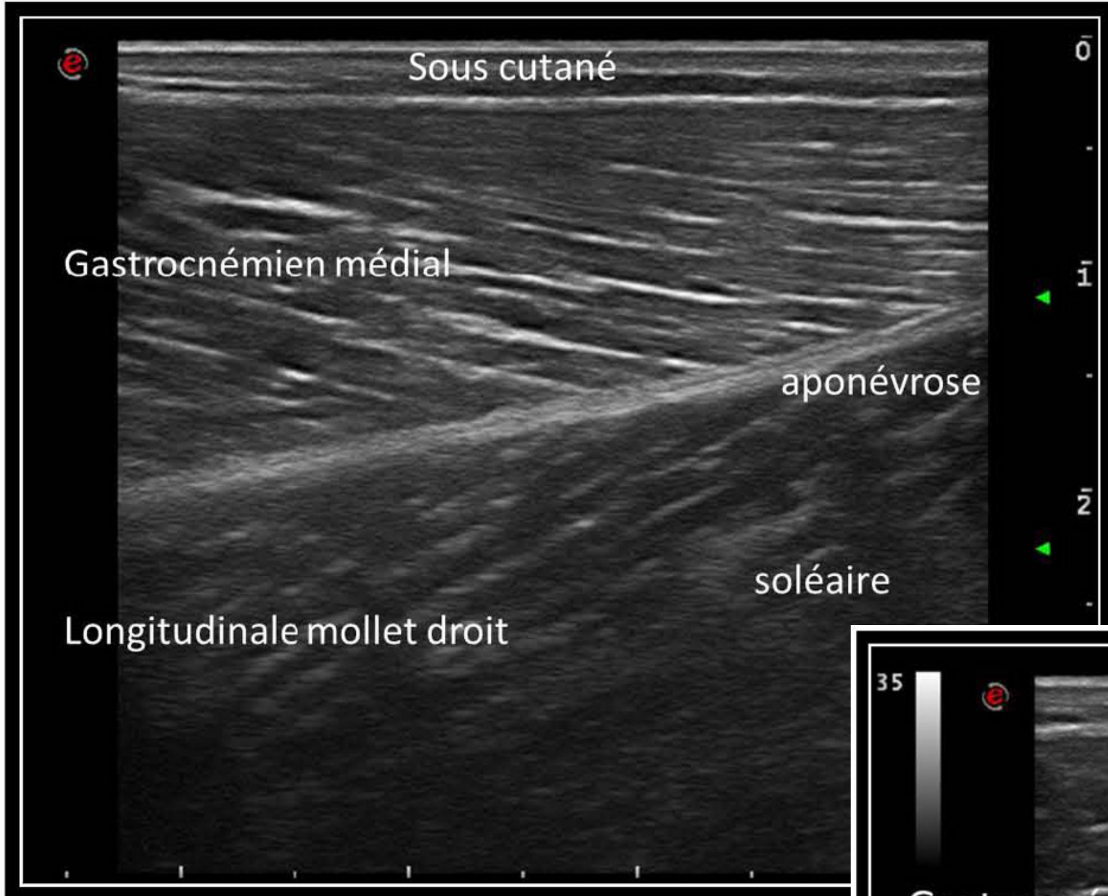


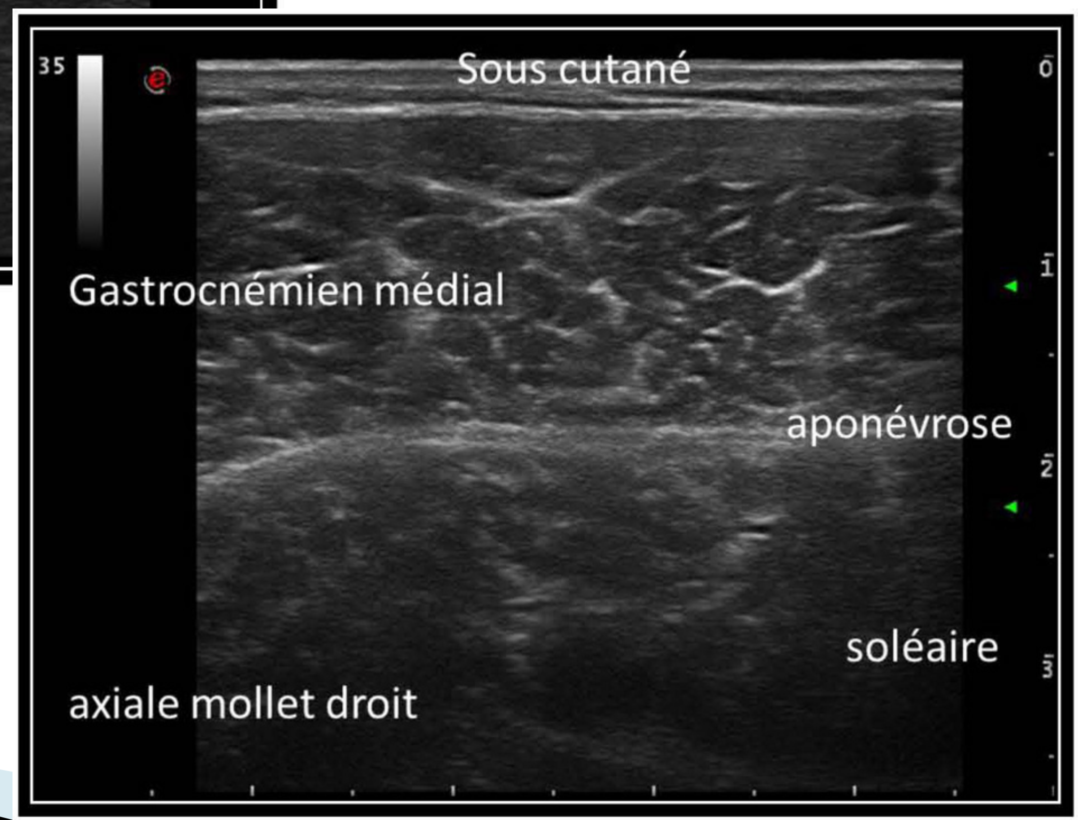
Fasciculaire
Penné



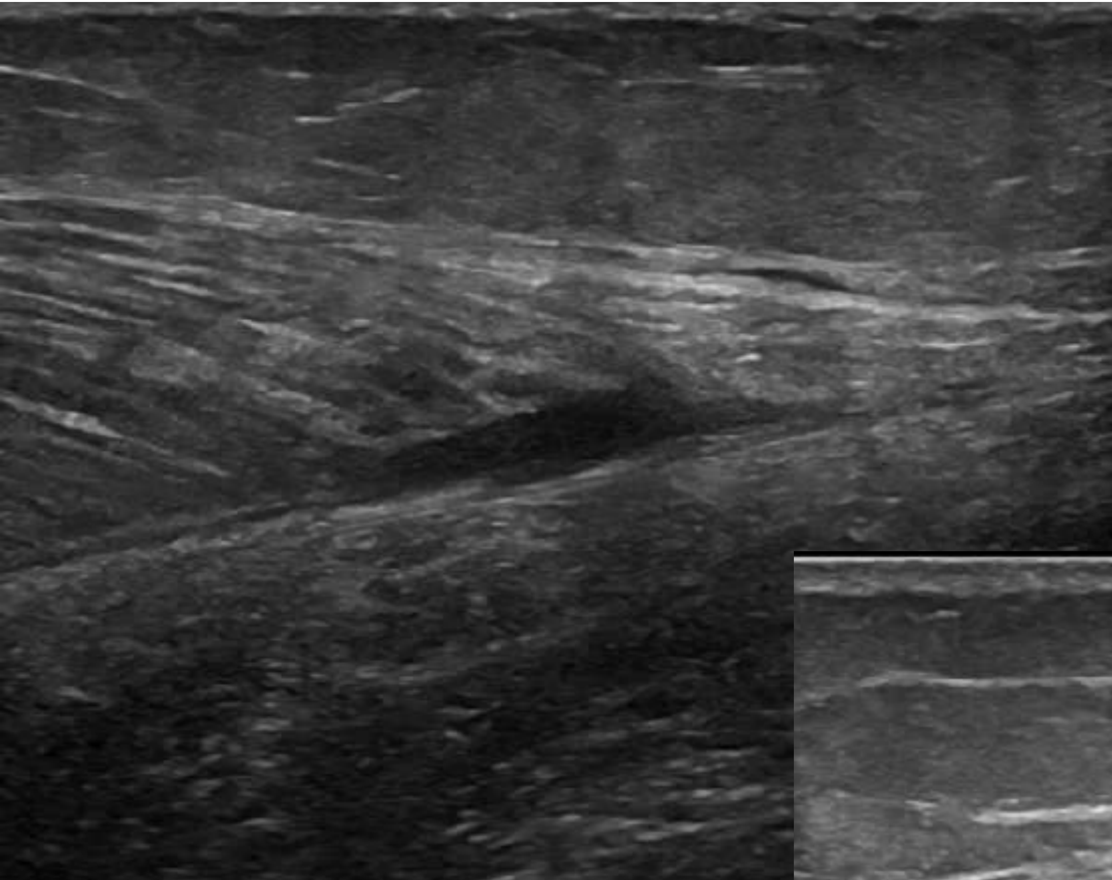
Ponctué
Piqueté

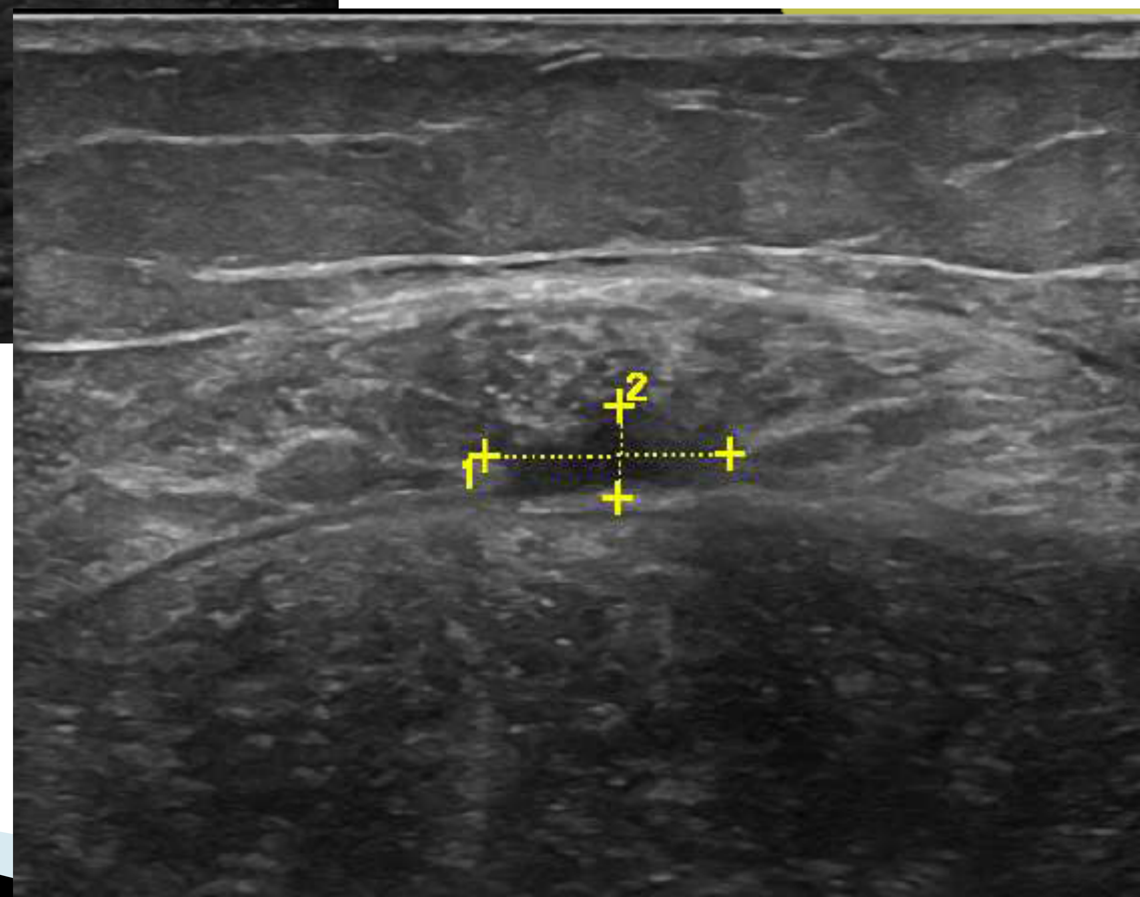



Sous cutané
Gastrocnémien médial
aponévrose
soléaire
Longitudinale mollet droit


Sous cutané
Gastrocnémien médial
aponévrose
soléaire
axiale mollet droit

Normal

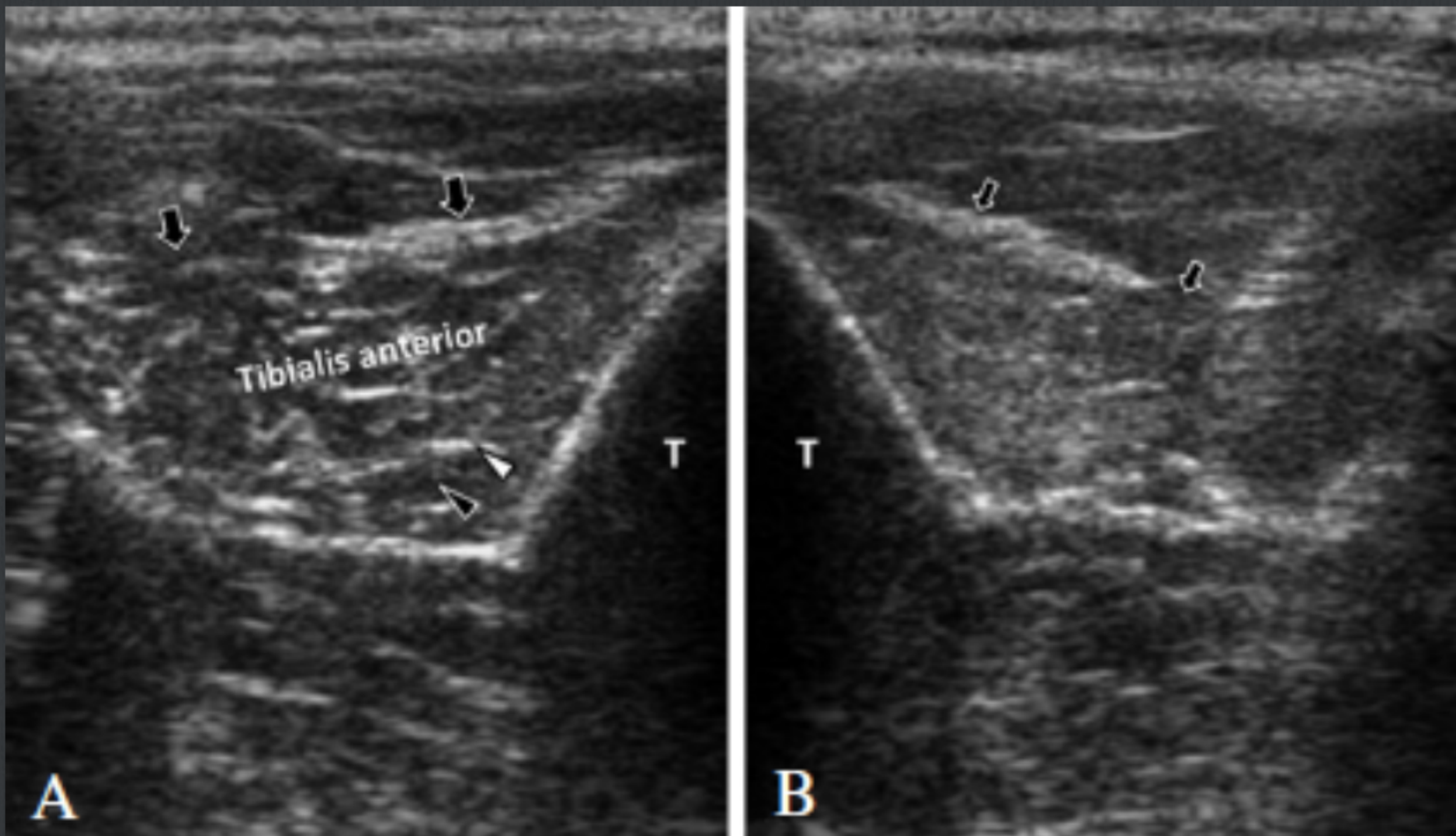




Désinsertion musculo-aponévrotique

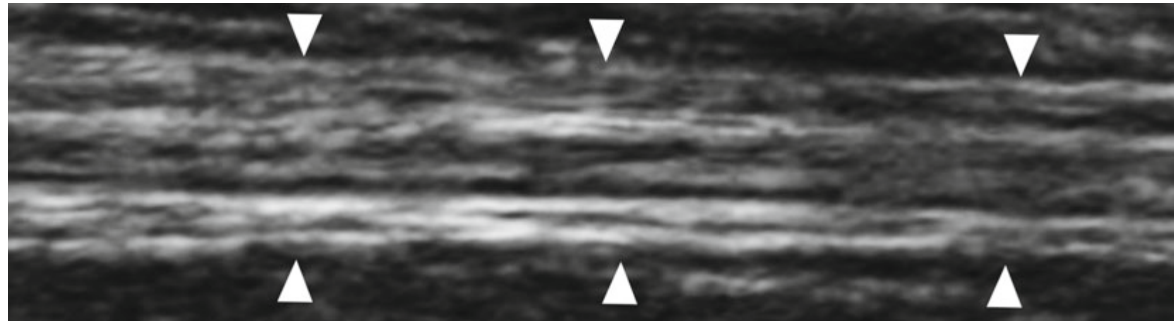
Dénervation musculaire

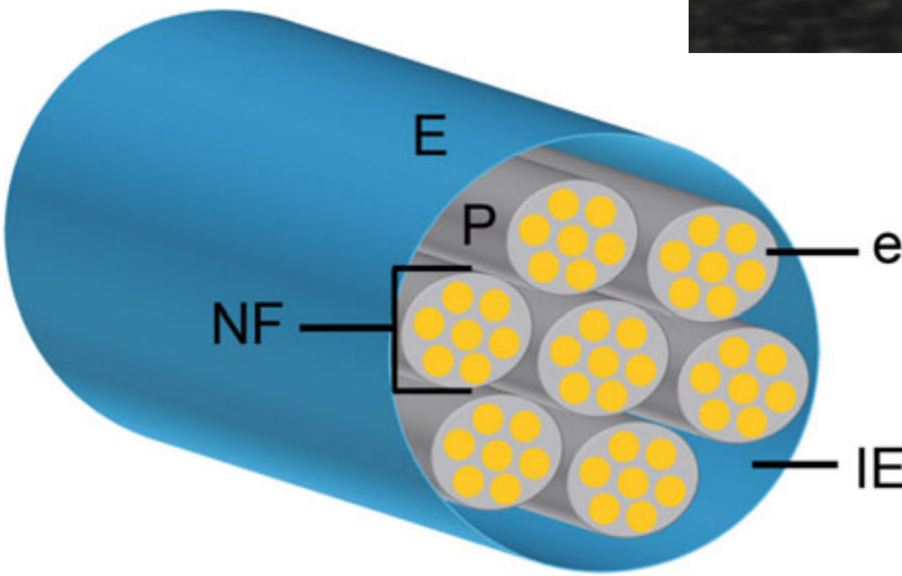
- En aigu : discrète hyperhémie Doppler
- Chronique :
  - atrophie
  - hyperéchogénicité (dégénérescence graisseuse)


Tibialis anterior
T
T
A
B

Nerfs

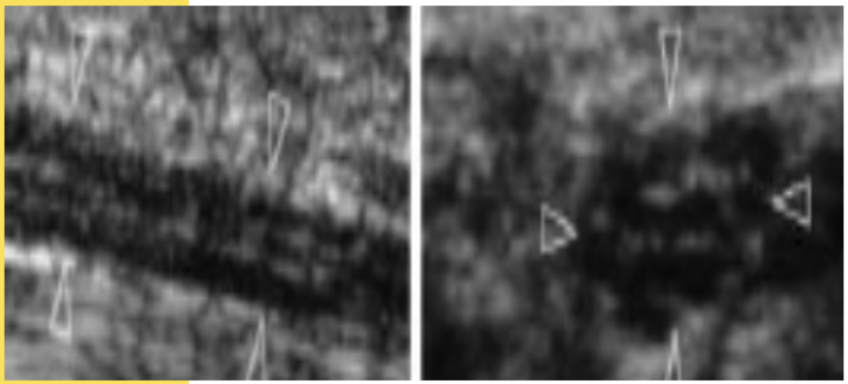
Fasciculaire

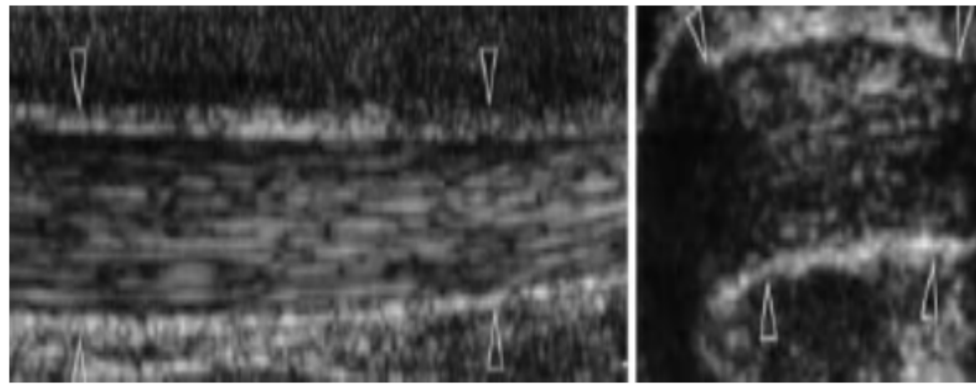




Nid d'abeille

Differentiation nerve - tendon





- Fascicels
- More hypoechoic
- Compressible
- Relation with vessels
- Less anisotropism
- Less mobile
- Oval- eccentric

- Fibrillae
- more hyperechoic
- Non compressible

- Anisotropism
- Mobile
- Often round

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US: THE future

V. cheap, non invasive, dynamic,
fast, simple, independent of body temperature

V. a lot of literature

V. a lot of applications

X. no replacement of ENMG, (MRI)

X. anatomical, technical, structural
limitations

X. dependent on sonographer

=> Already reached a lot, still a long way to go?!

©

Syndrome canal carpien

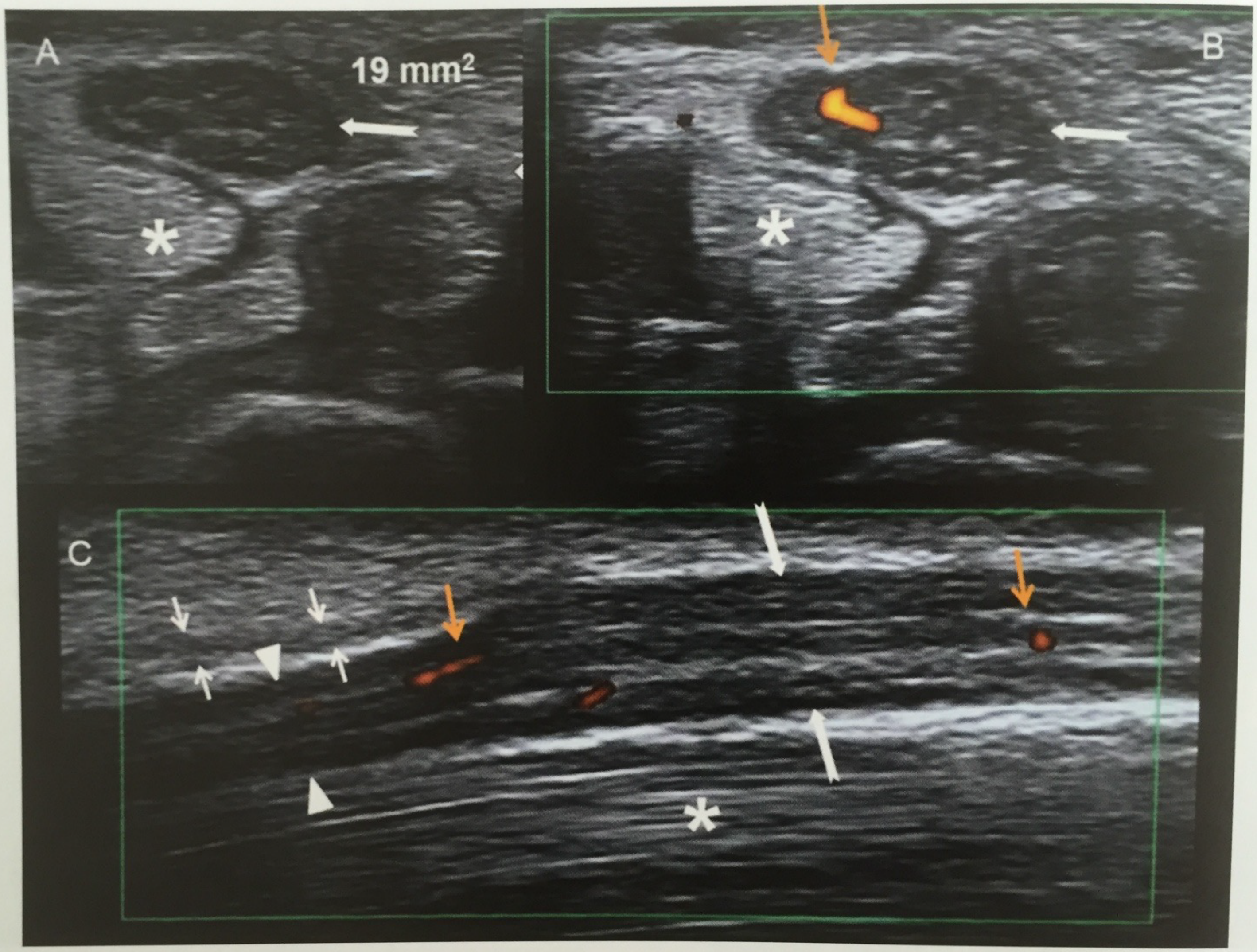
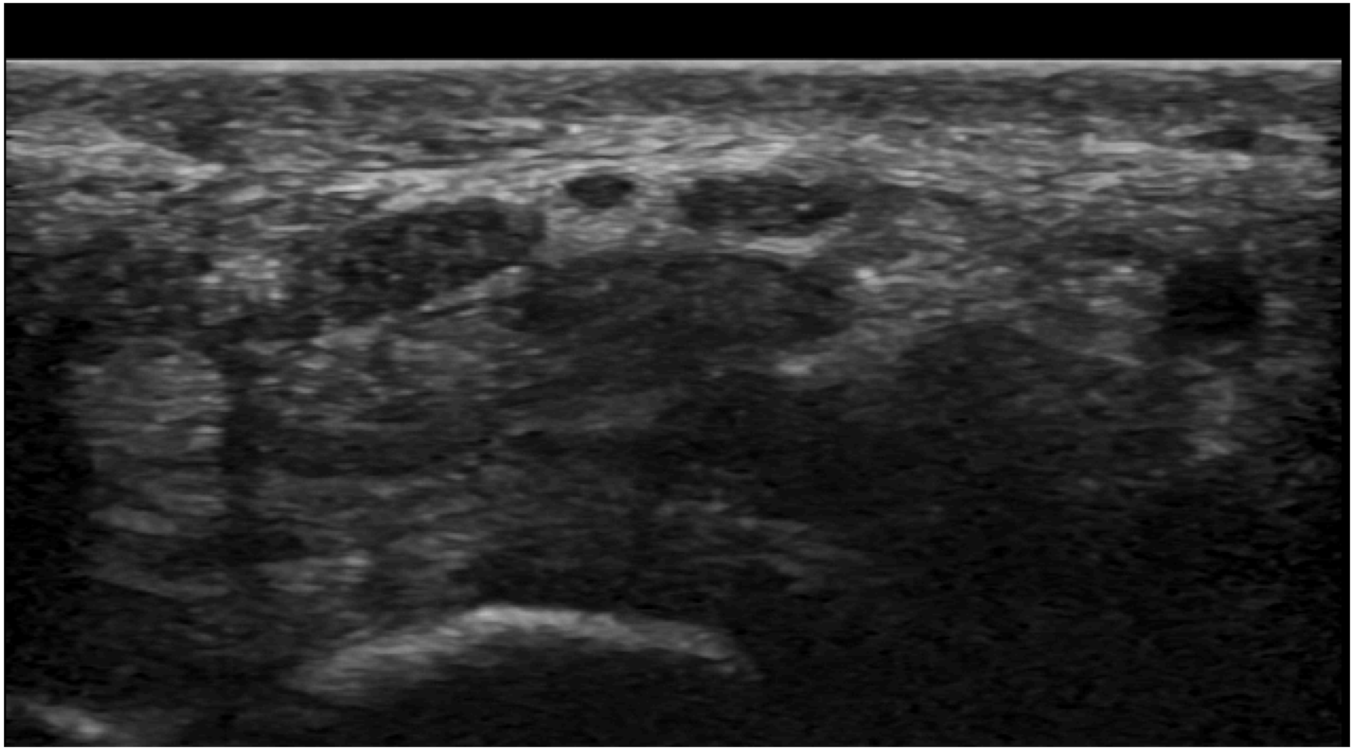
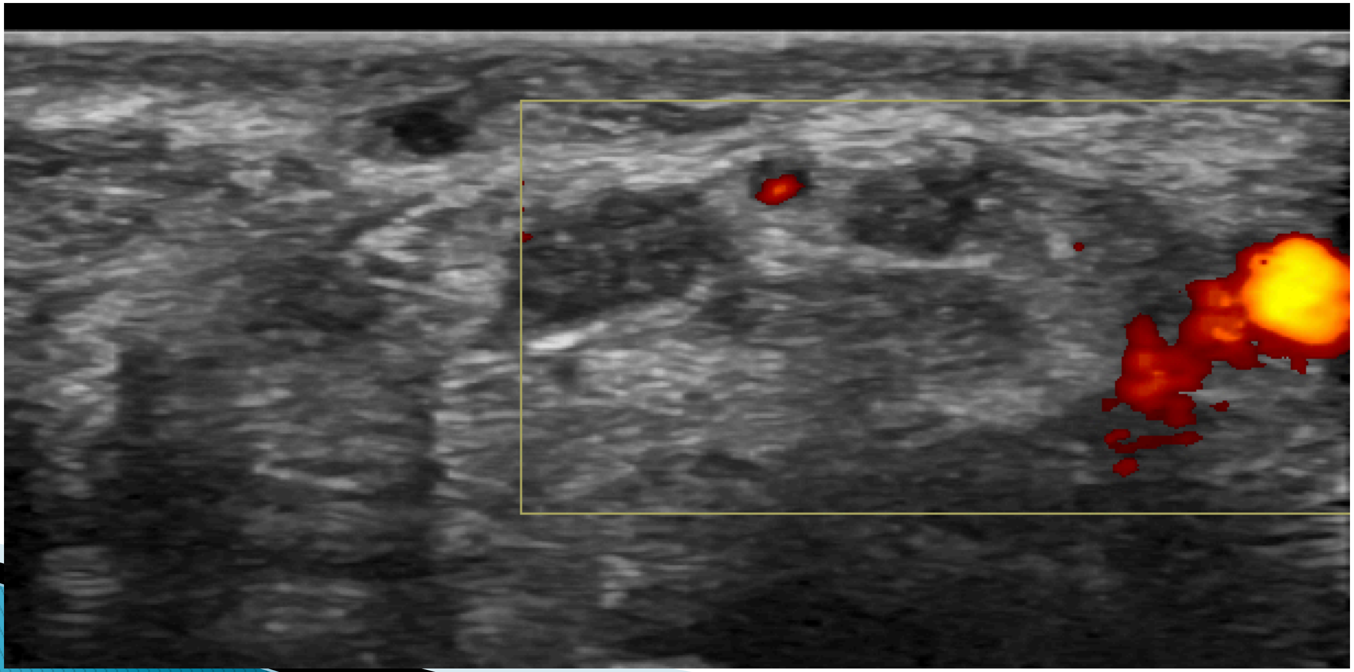


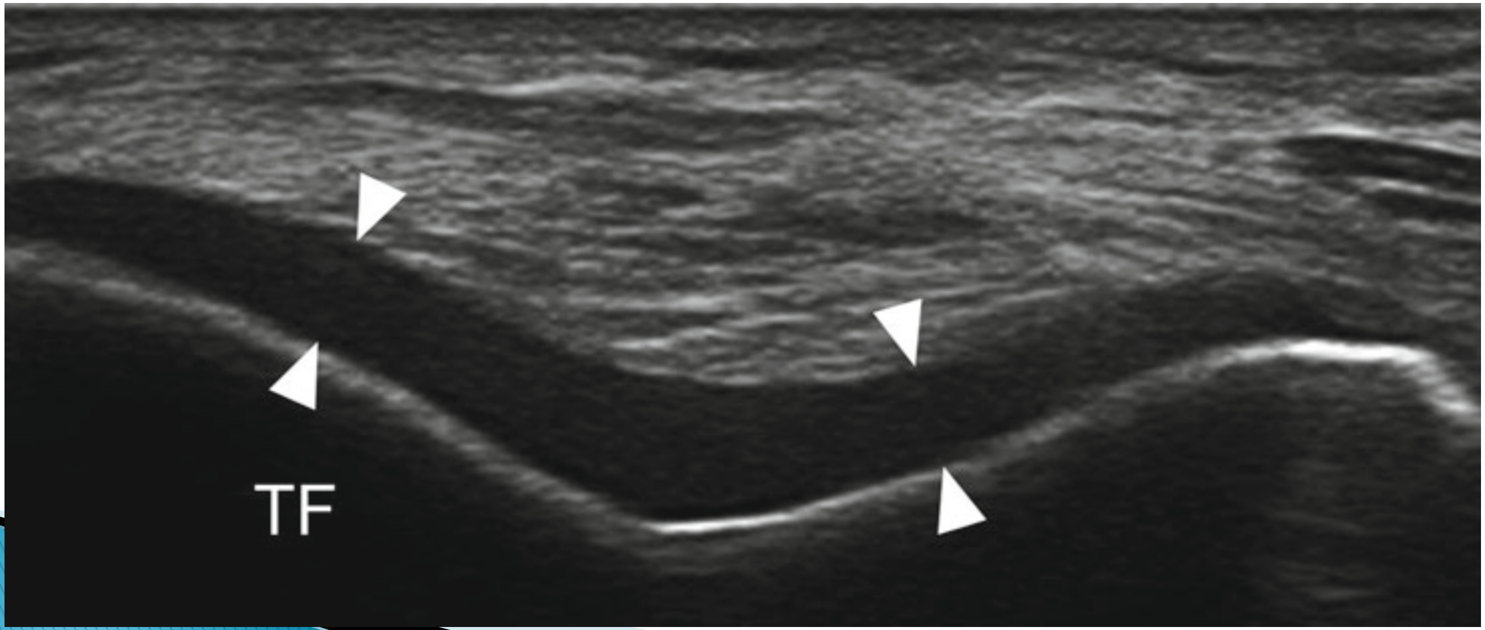
Fig. 31 : Disparité de calibre du nerf médian à l'entrée du canal carpien. Coupe échographique axiale (**A**, **B**) et sagittale (**C**). Hypertrophie du nerf médian (*flèches blanches*) mesurée à 19 mm² de surface de section en amont du rétinaculum des fléchisseurs (*petites flèches blanches*) avec diminution de calibre (*têtes de flèche blanches*) sous le ligament transverse du carpe. Le nerf est par ailleurs le siège d'une hyperhémie au Doppler énergie (*flèche orange*). Il n'y avait pas d'anomalie des tendons fléchisseurs sous-jacents (*).

Histoire de chasse





- Cartilage et os
  - Cartilage
    - Hypoéchogène
    - Surface hyperéchogène (interface)
  - Os
    - Hyperéchogène
    - Ombre acoustique postérieure (réflexion complète de l'onde US)



Arthrose

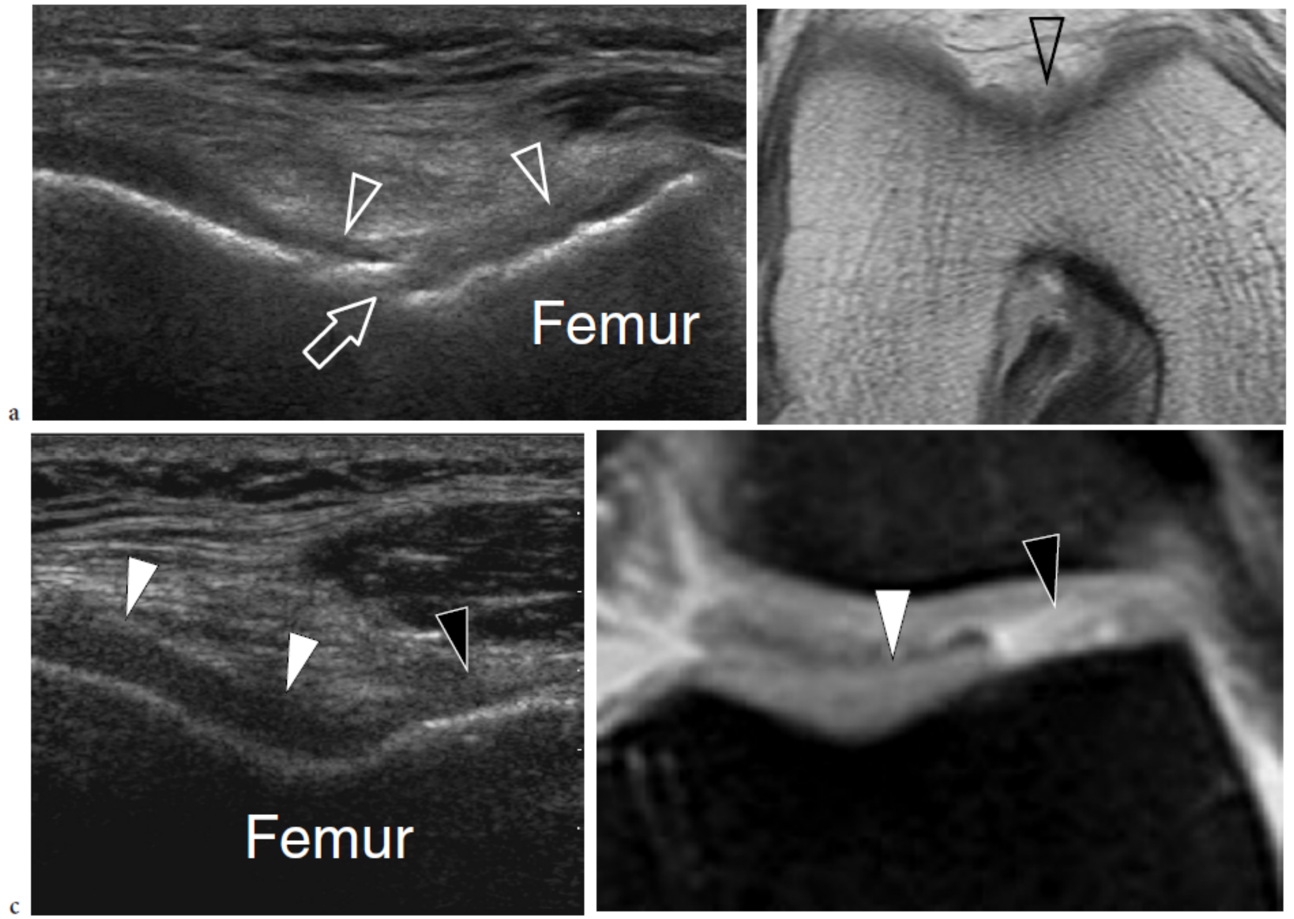
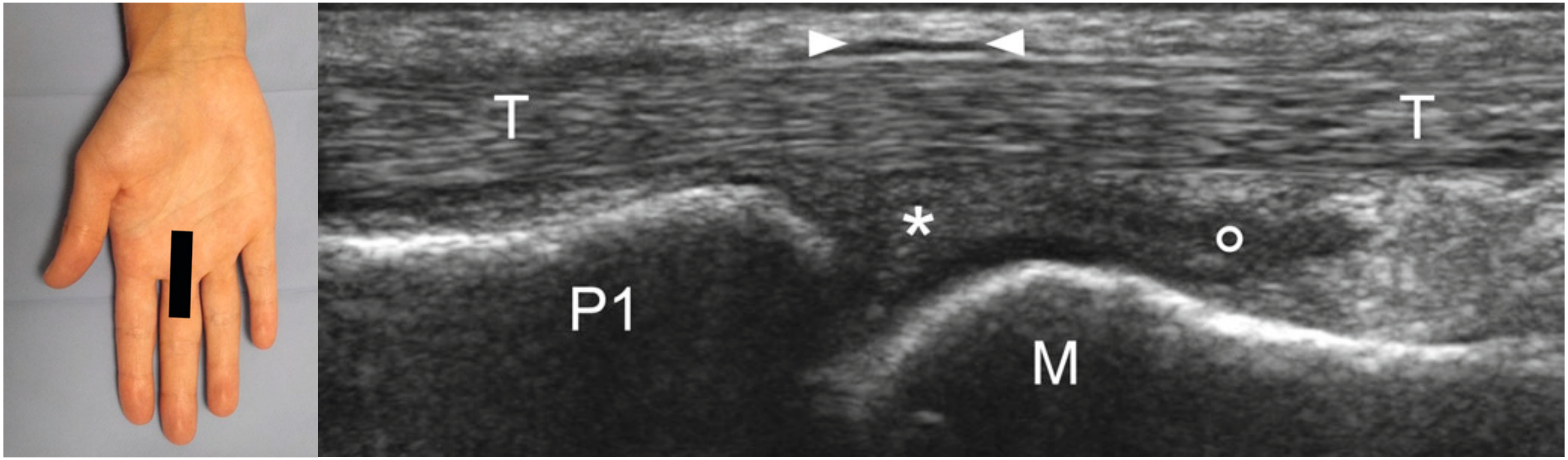
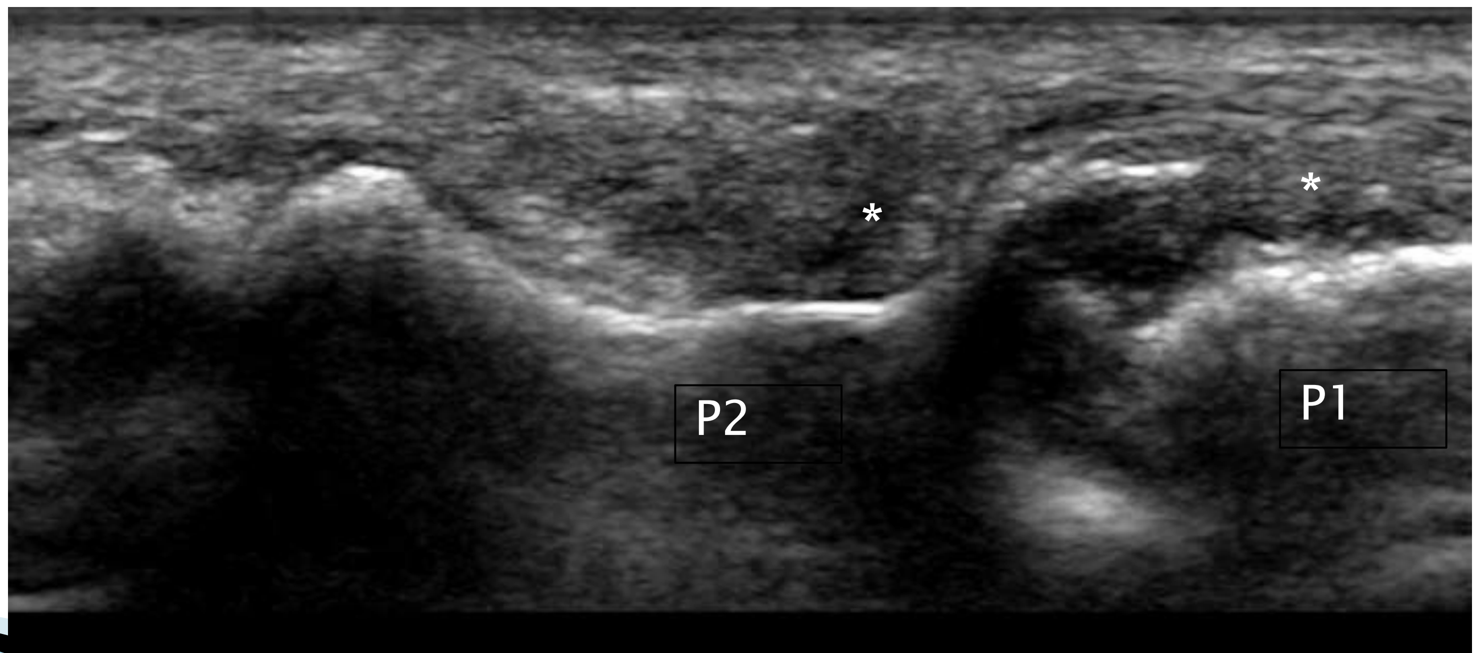


Fig. 5.32a–d. Degenerative osteoarthritis. Two different cases. **a** Transverse 12–5 MHz US image obtained over the trochlear cartilage with **b** proton density MR imaging correlation shows diffuse thinning (*arrowheads*) of the mid-third of the cartilage. Note the erosive changes (*arrow*) in the subchondral bone. **c,d** Loss of lateral compartment articular cartilage. **c** Transverse 12–5 MHz US image with **d** fat-suppressed proton-density MR imaging correlation shows a wide cartilage defect (*black arrowhead*) in the lateral facet of the trochlea. Note the normal-appearing cartilage of the medial trochlear compartment (*white arrowheads*)

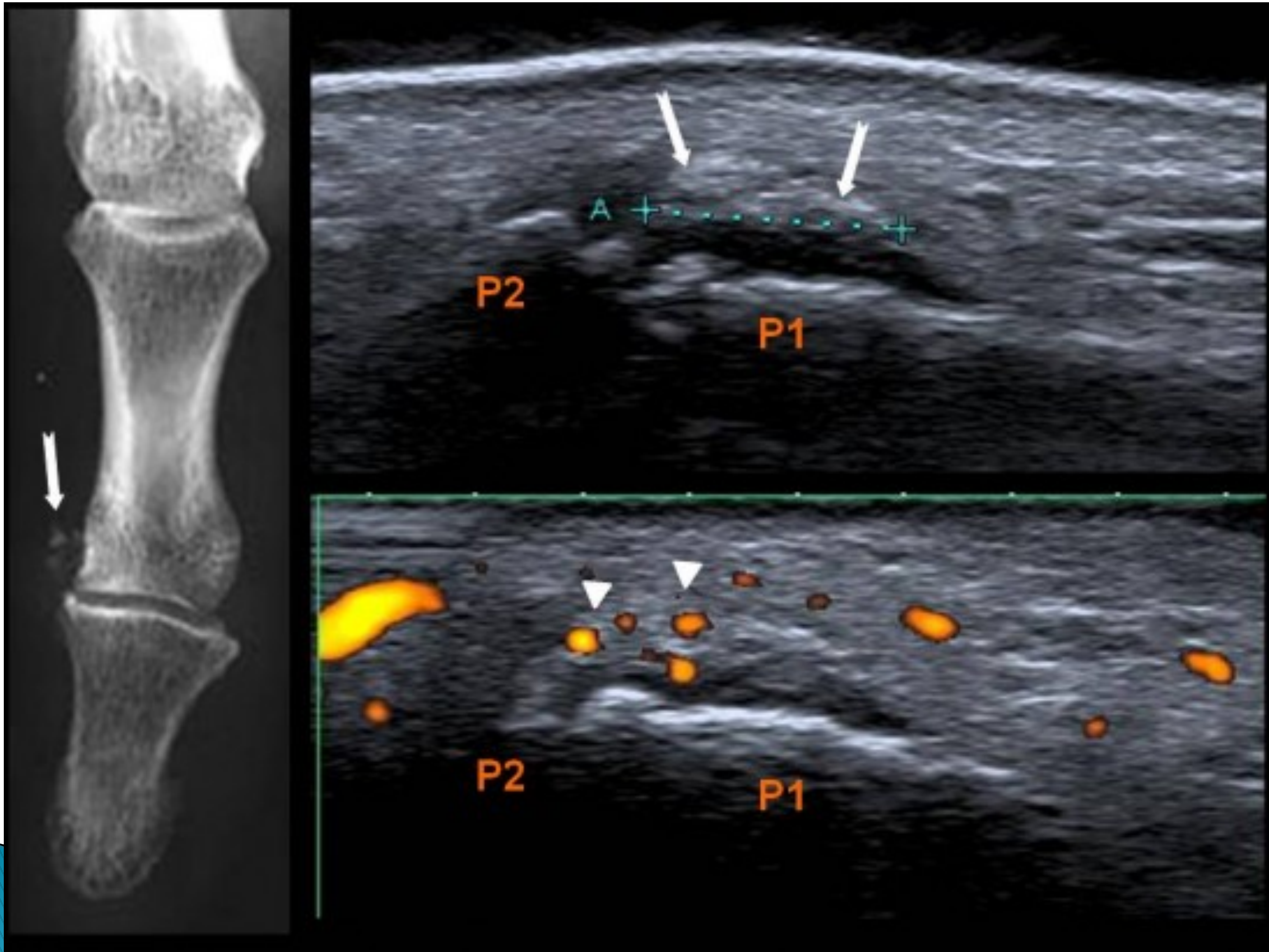


Normal



Arthrite psoariasique IPP

Arthrite goutteuse



Chondrocalcinose

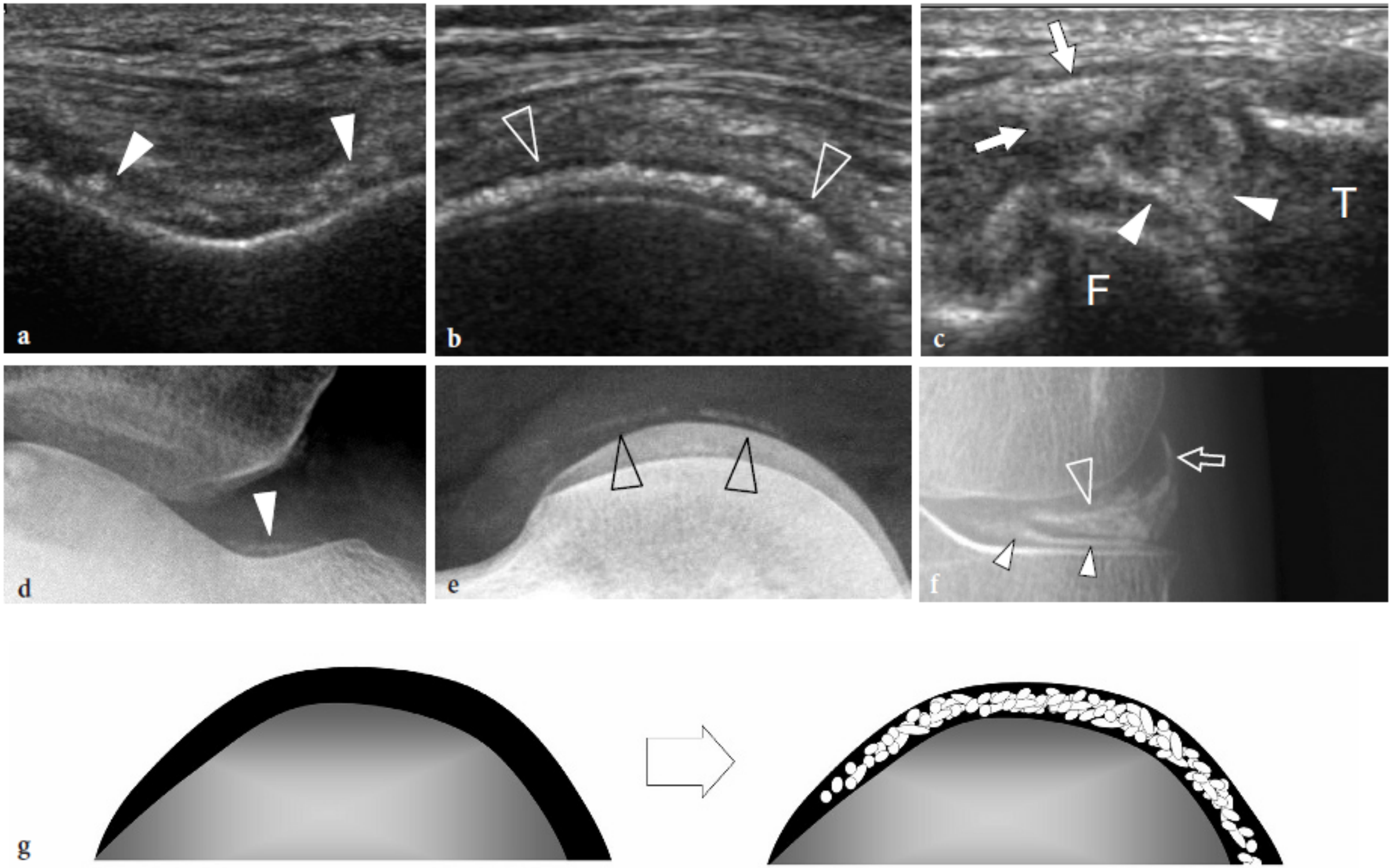


Fig. 5.34a–g. Calcium pyrophosphate deposition disease. a–c Transverse 12–5 MHz US images obtained over a the femoral trochlea, b the posterior aspect of the medial condyle and c the lateral meniscus in a patient with bilateral degenerative osteoarthritis of the knee reveal scattered hyperechoic foci (*arrowheads*) due to crystal deposition within the hyaline cartilage, the medial meniscus and the joint capsule (*arrows*). F, femur; T, tibia . Note that crystals tend to be deposited in the middle layer of the cartilage, parallel to the subchondral bone. d–f Radiographic correlation. g Schematic drawing illustrates the typical deposition pattern of pyrophosphate crystals within the cartilage

Fracture

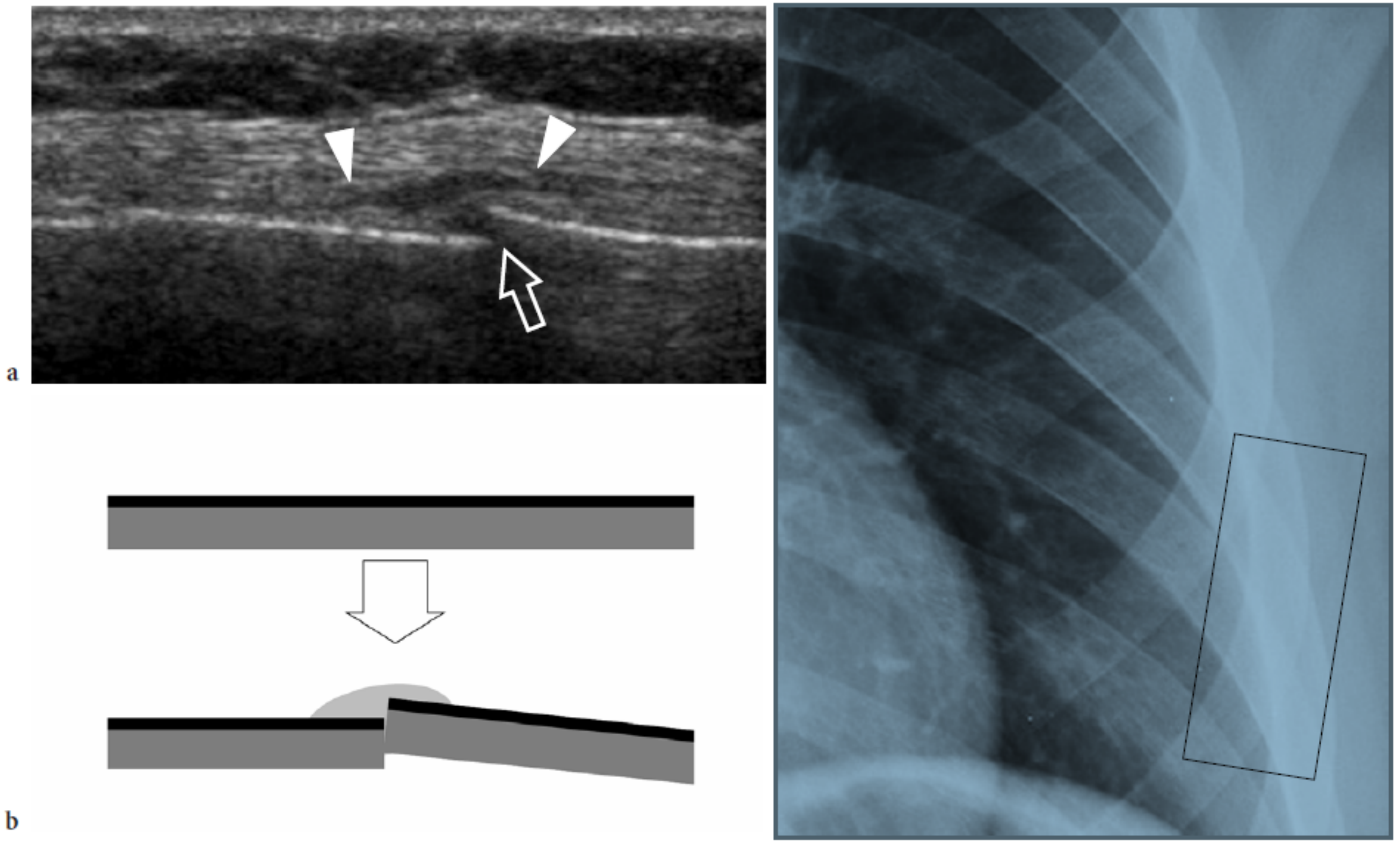
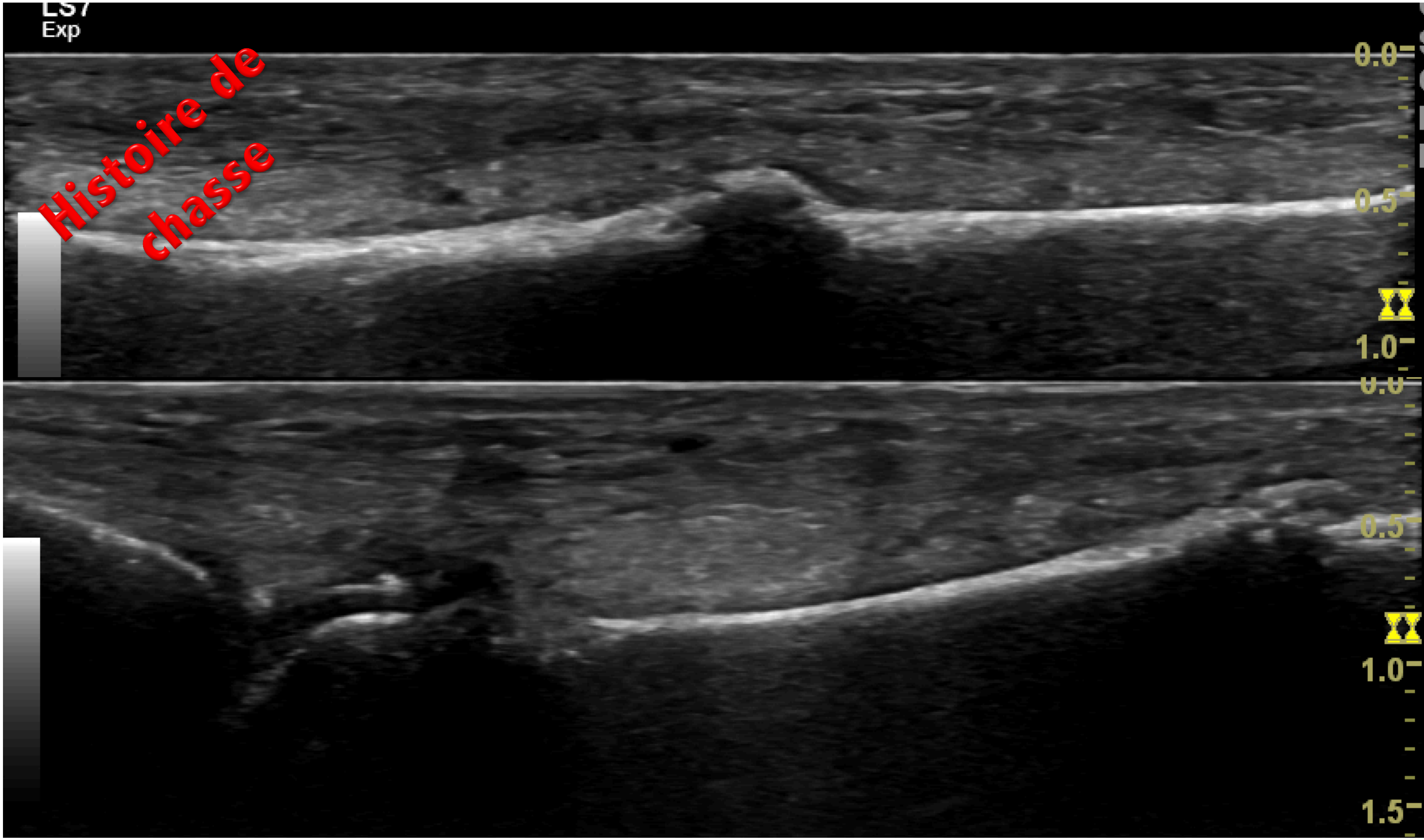
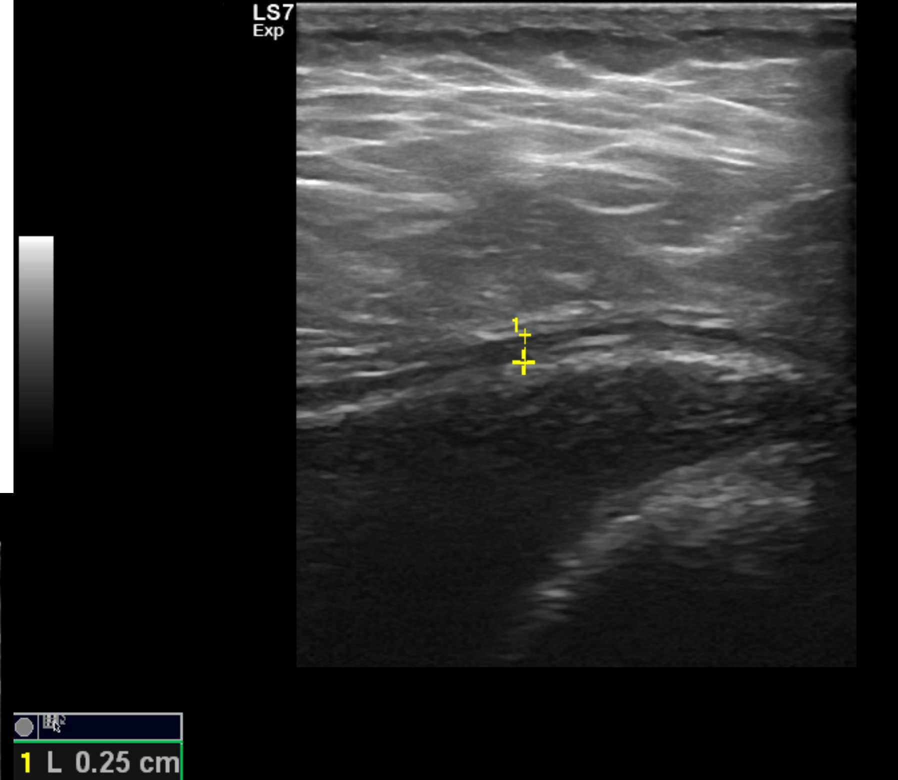


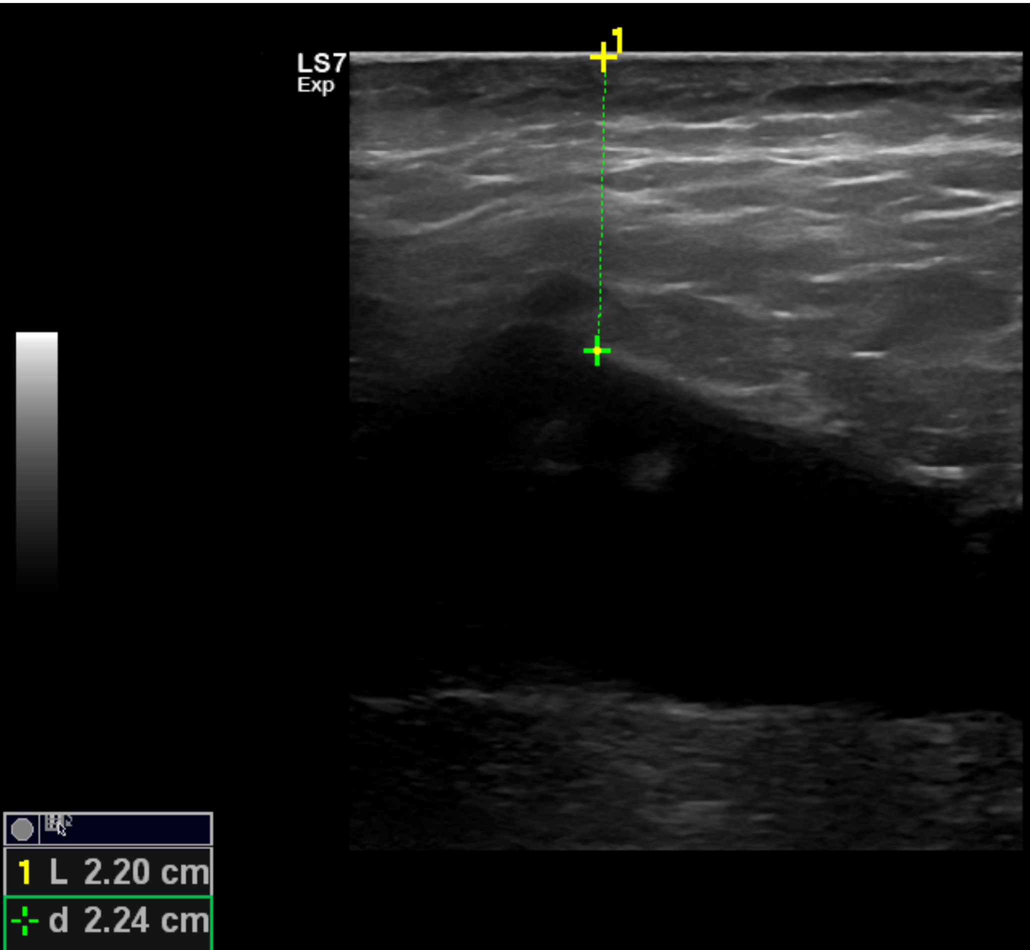
Fig. 5.9a–c. Occult fracture. a Long-axis 12 MHz US image over the left sixth rib with b schematic drawing correlation in a patient complaining of persistent local pain after a fall demonstrates a step-off discontinuity (*arrow*) of the rib surface with overlying soft-tissue edema (*arrowheads*) due to a fracture. The fracture site was extremely painful when applying pressure with the probe over it. c Chest radiograph obtained 1 week earlier did not demonstrate any bone abnormality. The *black rectangle* indicates US probe positioning

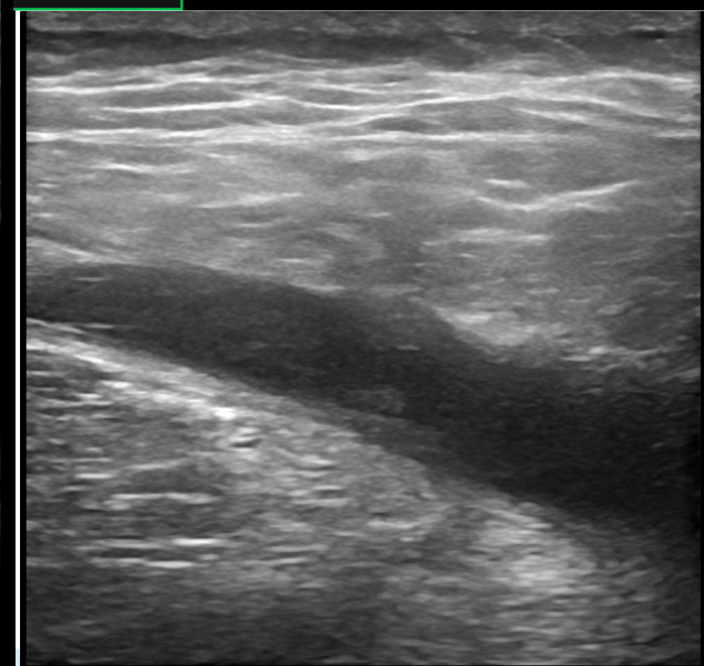


Fracture M2R2 pied gauche (3-4 sem)

Histoire de chasse



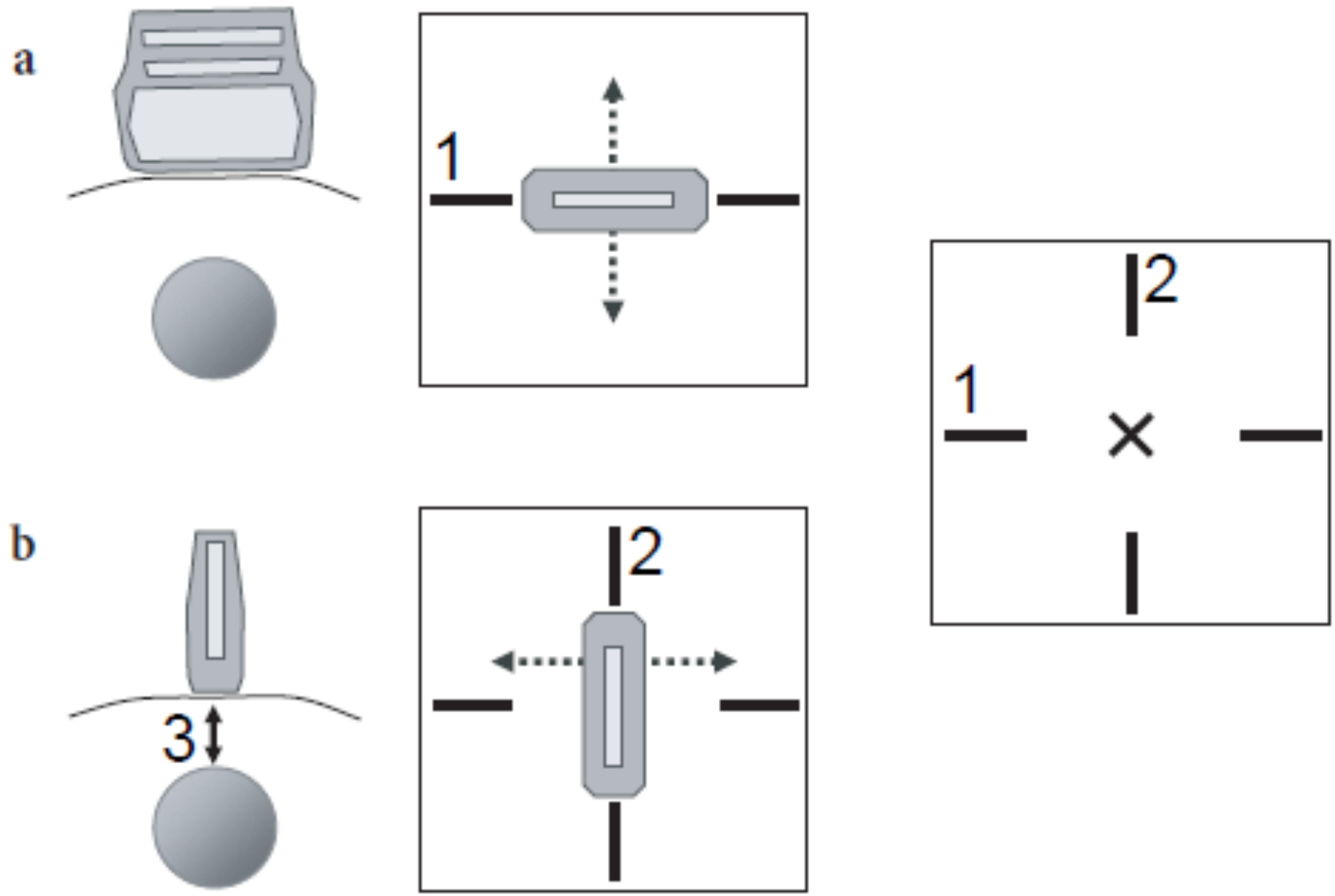




Echographie thérapeutique

Techniques d'injection

INDIRECTE



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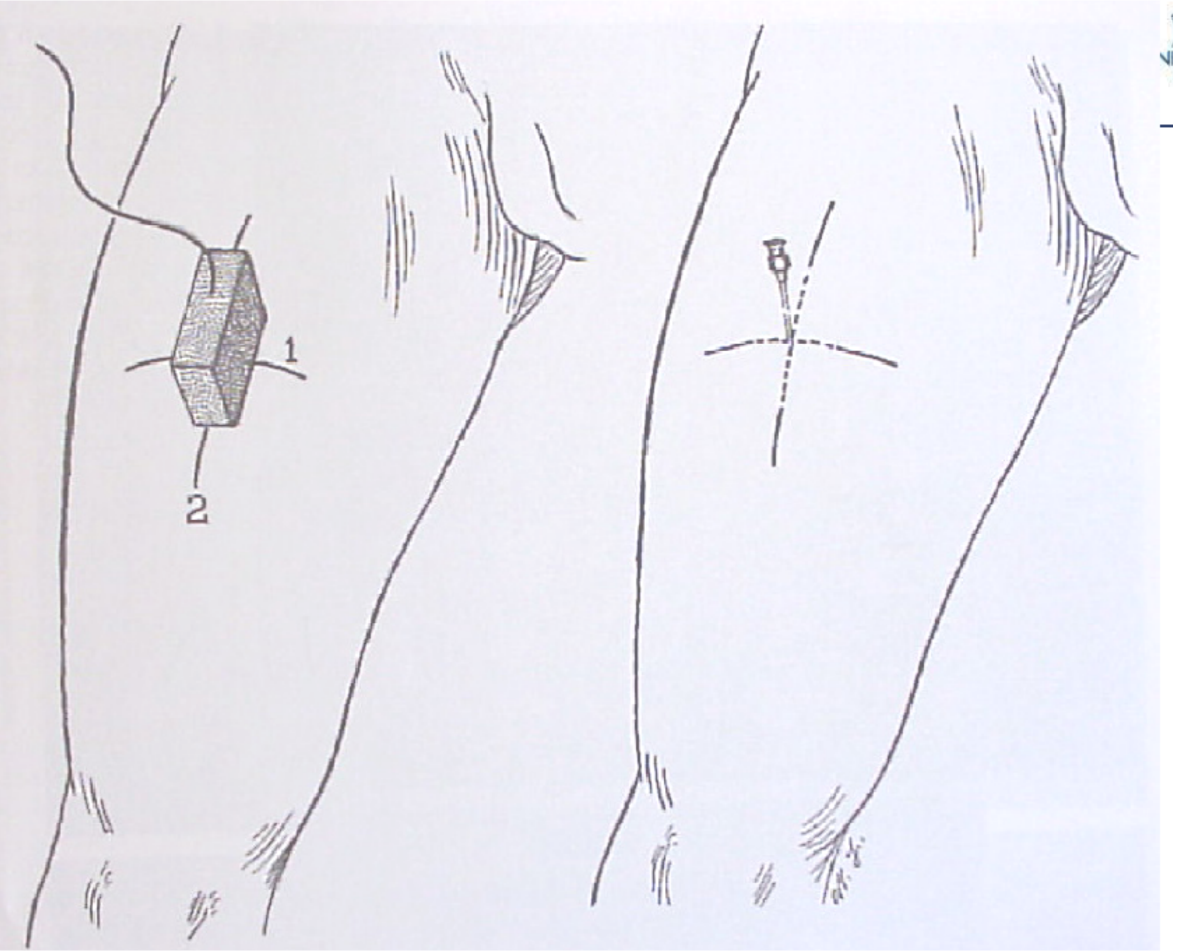
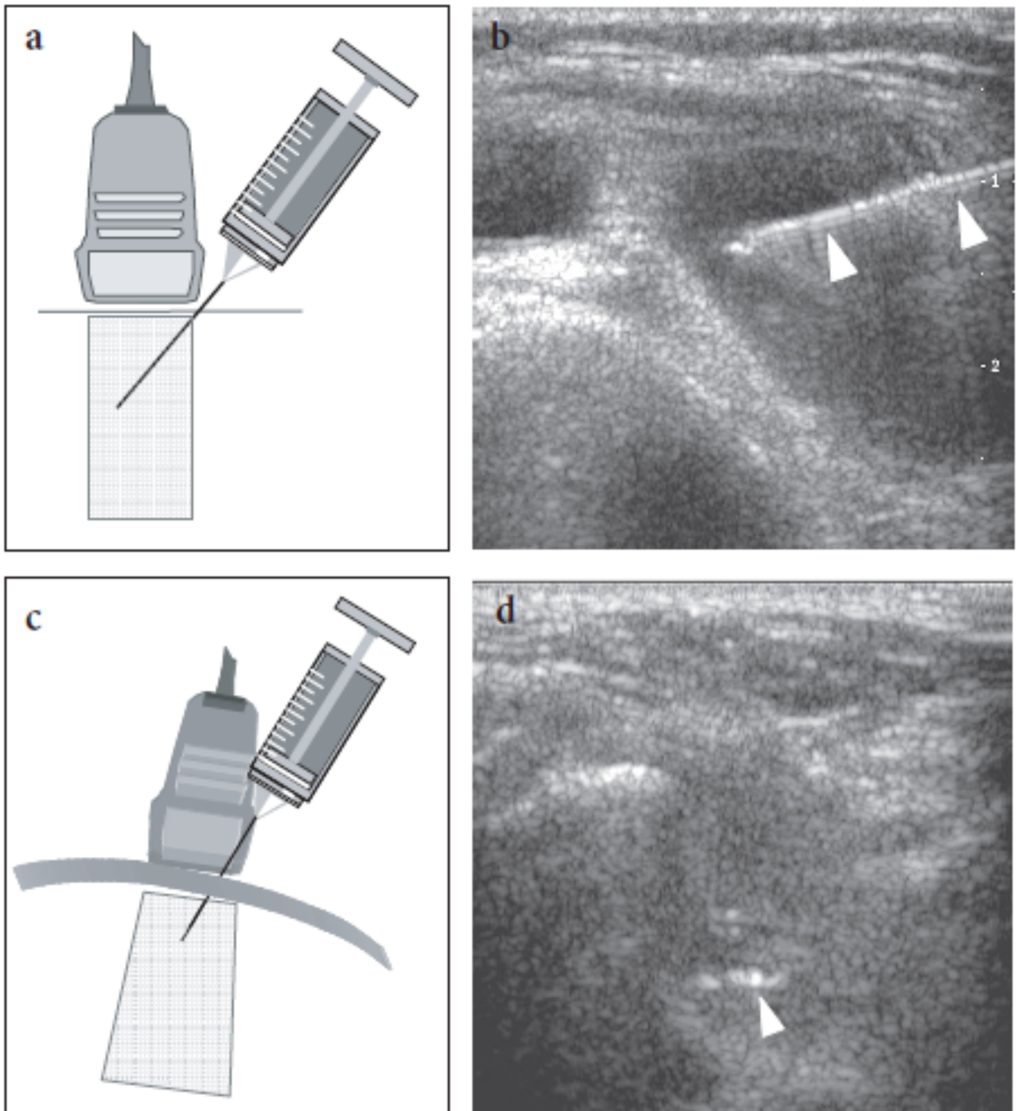
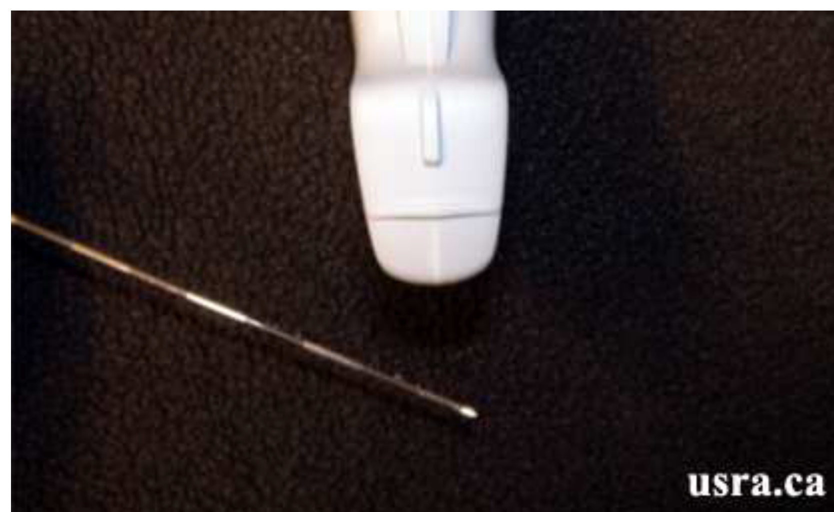


Techniques d'injection

DIRECTE





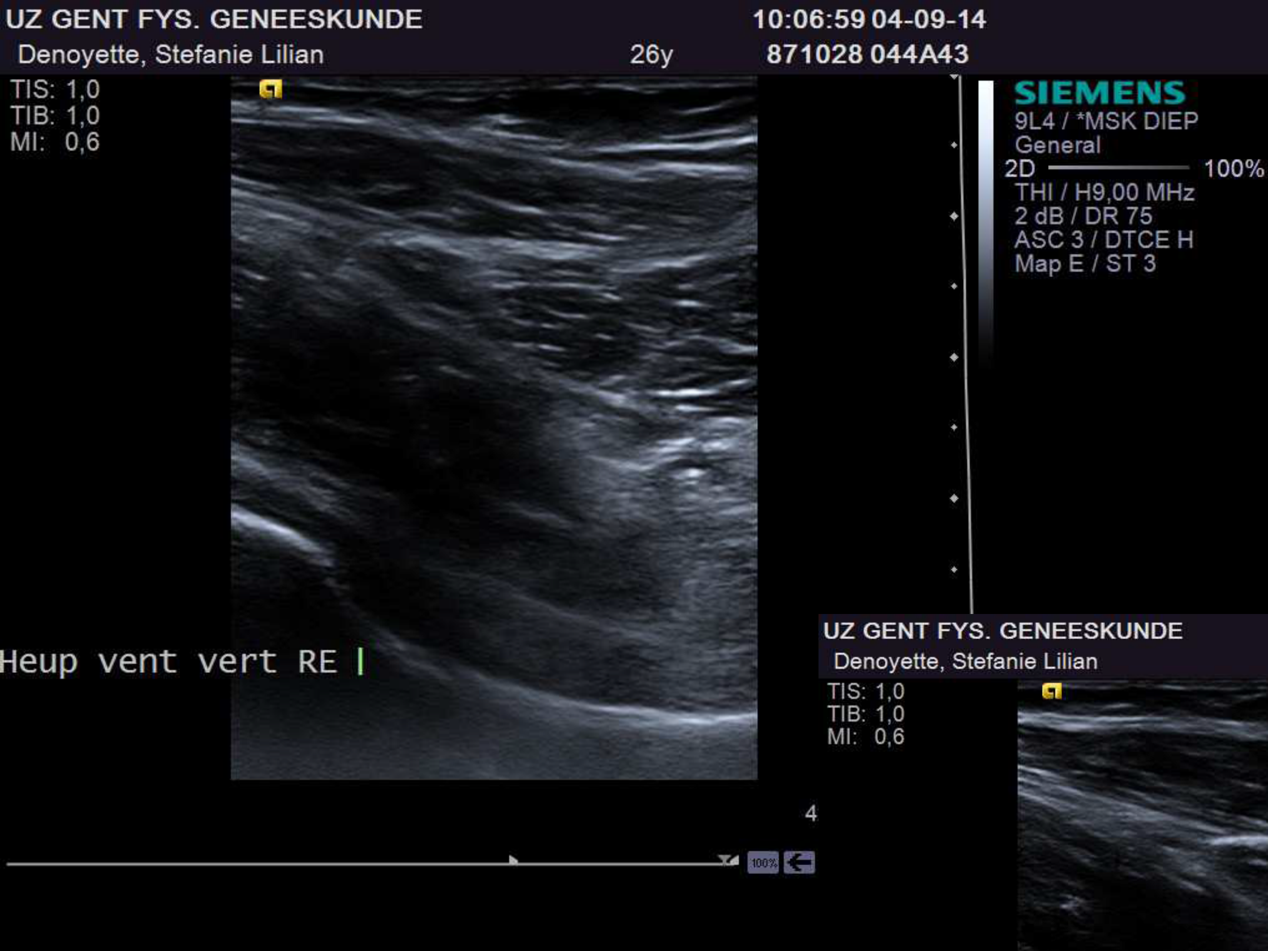
Directe VS Indirecte

- Les 2 : pas de Rx
- Directe :
  - Avoir la preuve qu'on injecte dans la structure voulue « en live »
  - « Une 3e main serait la bienvenue »
  - Requiert + d'entraînement et d'expérience
  - Stérilité? -> Désinfection – No touch
    - Gel stérile – solution hydroalcoolique – chlorhexidine
    - Tegaderm

- Indirecte :
  - Localiser les structures nobles
  - Repérer le site d'insertion + profondeur
  - Stérilité + facile
  - Infiltration réalisée tout de même en aveugle – pas de preuve qu'on est strictement au bon endroit

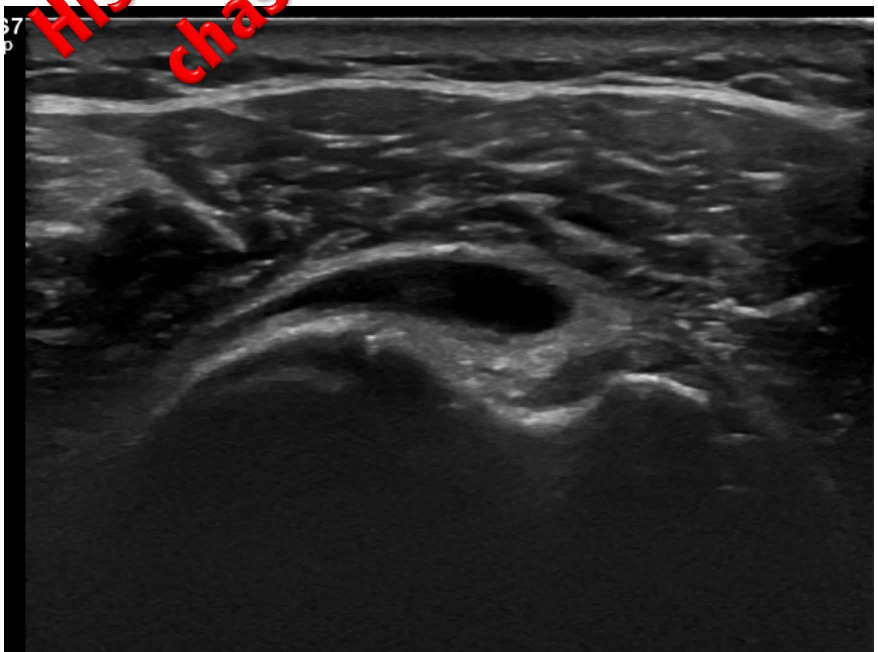
Technique directe

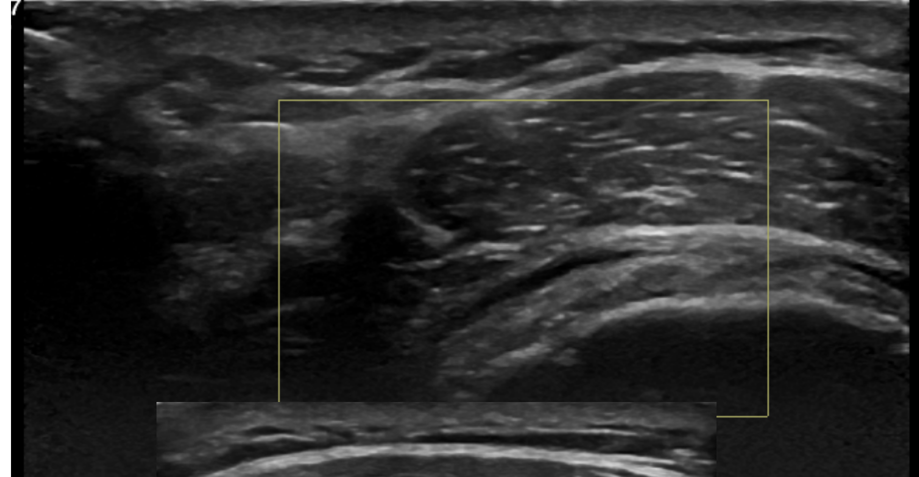
- Longitudinale
  - Technique préférée
  - Toute la longueur de l'aiguille est visualisée
  - Éviter de léser des structures nobles
  - Sur le plan pratique parfois difficile (si profond)
- Transversale
  - On ne visualise pas l'entièreté de l'aiguille
    - Difficulté de localiser l'aiguille
    - Risque de léser des structures nobles
  - Parfois plus facile pour certaines régions + superficielles
- Pour maximiser l'échogénicité de l'aiguille :
  - Sonde // à l'aiguille -> ondes US perpendiculaires à l'aiguille

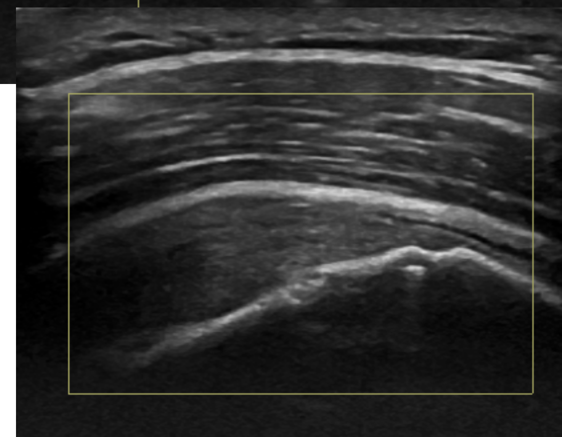

UZ GENT FYS. GENEESKUNDE
10:06:59 04-09-14
Denoyette, Stefanie Lilian
26y
871028 044A43
TIS: 1,0
TIB: 1,0
MI: 0,6
SIEMENS
9L4 / *MSK DIEP
General
2D 100%
THI / H9,00 MHz
2 dB / DR 75
ASC 3 / DTCE H
Map E / ST 3
Heup vent vert RE

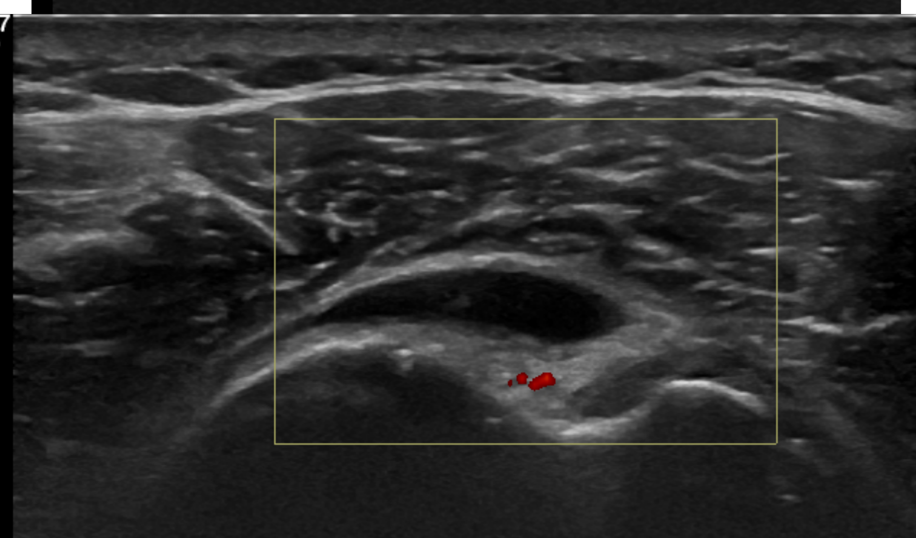

UZ GENT FYS. GENEESKUNDE
10:21:17 04-09-14
Denoyette, Stefanie Lilian
26y
871028 044A43
TIS: 1,0
TIB: 1,0
MI: 0,6
SIEMENS
9L4 / *MSK DIEP
General
2D 100%
THI / H9,00 MHz
2 dB / DR 75
ASC 3 / DTCE H
Map E / ST 3
42fps
5cm
Fr507

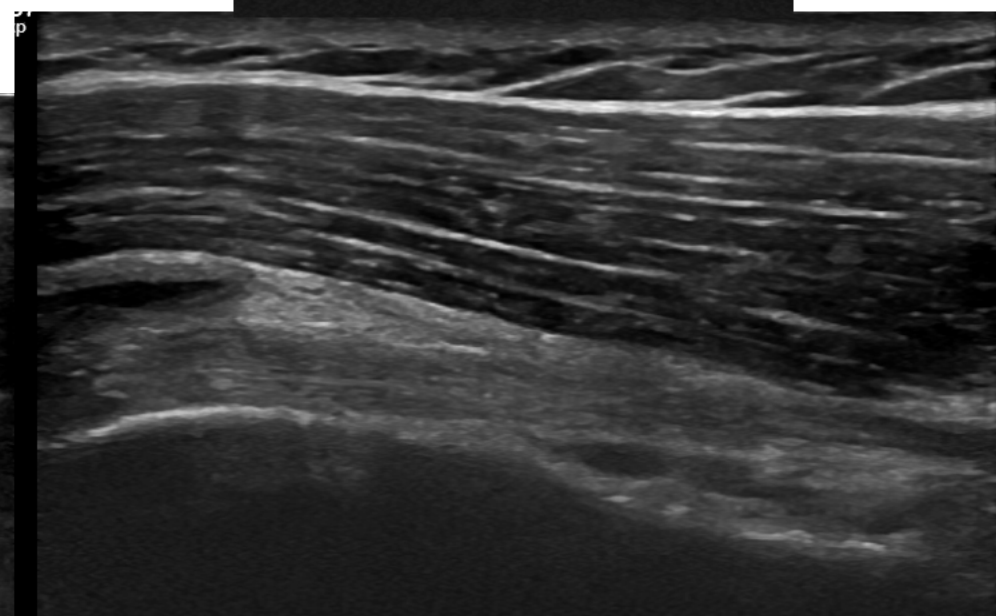
Histoire de chasse



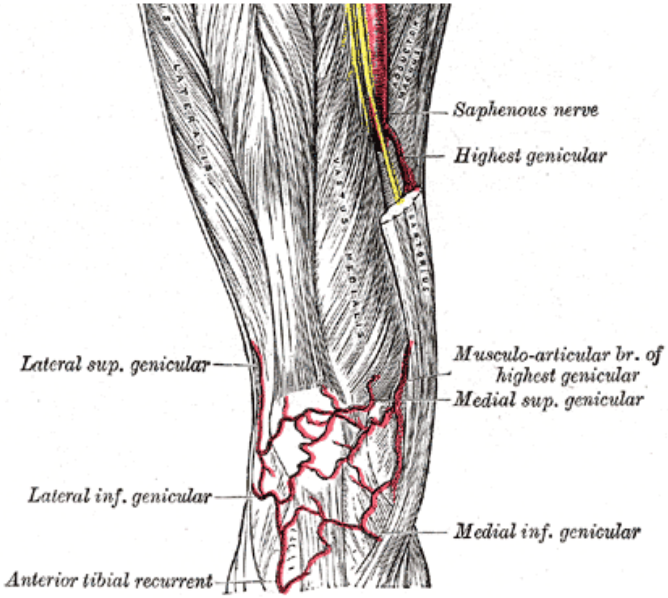


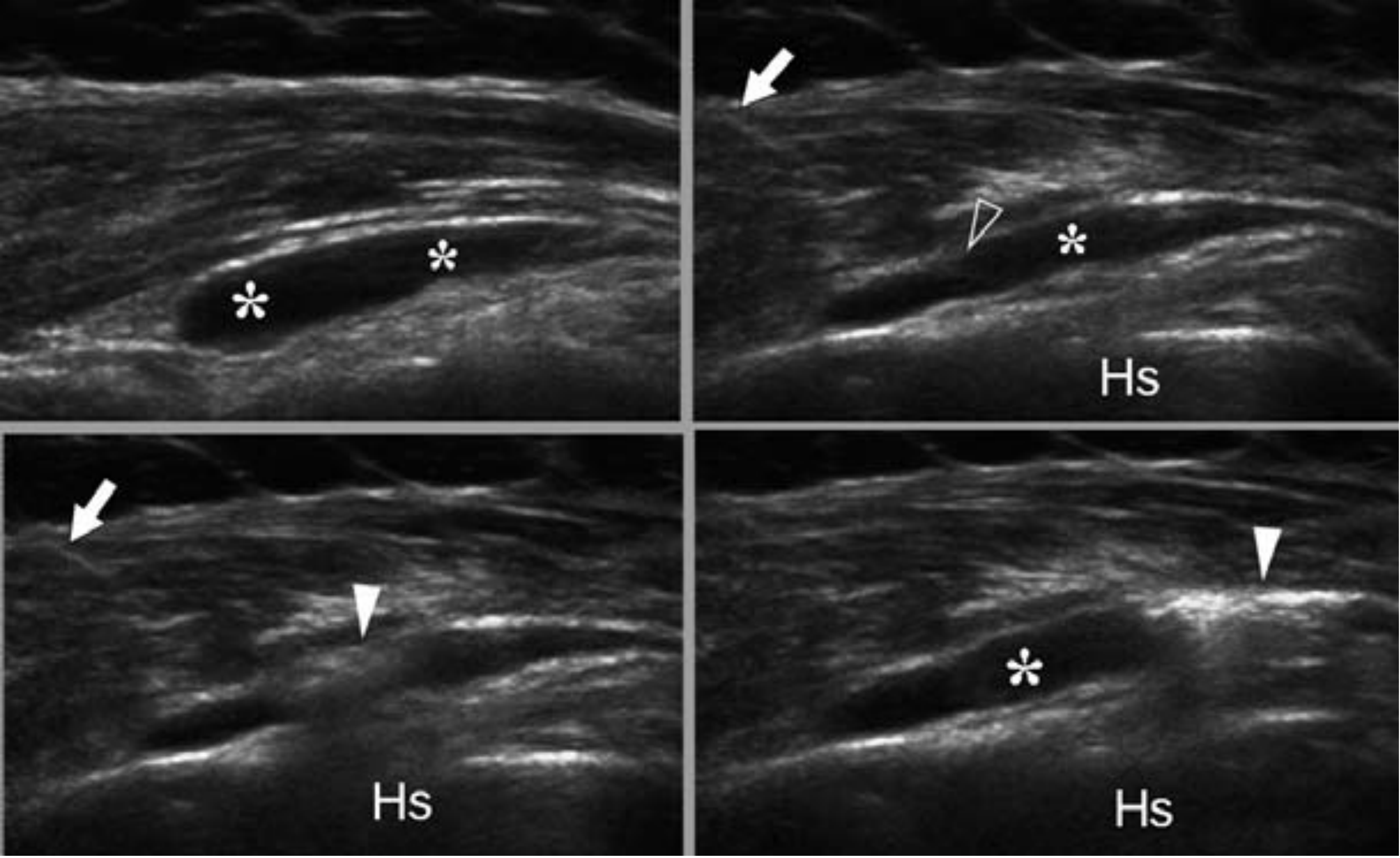






- Injection intra articulaire
  - Intérêt :
    - s’assurer qu’on est bien dans la cavité articulaire (ex : visco dans la synoviale -> réaction inflammatoire +++)
    - Éviter structure noble (ex : artère géniculée inféro-interne pour bursopathie de la patte d’oie)





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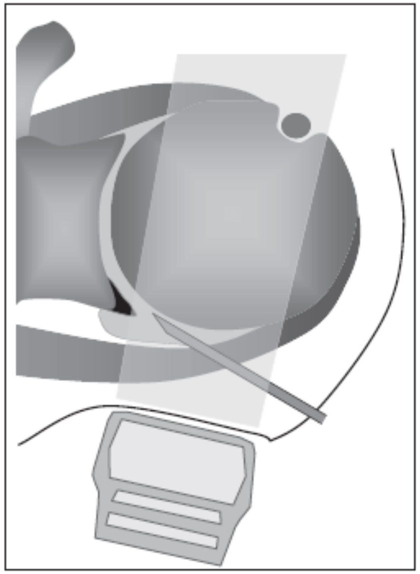

Fig. 18.9. Schematic drawing of a transverse view through the shoulder illustrates the technique for US-guided arth sis using a posterior approach. The needle is advanc lateral to medial to reach the posterior recess of th humeral joint. This path facilitates gliding of the nee the humeral head and below the posterior labrum

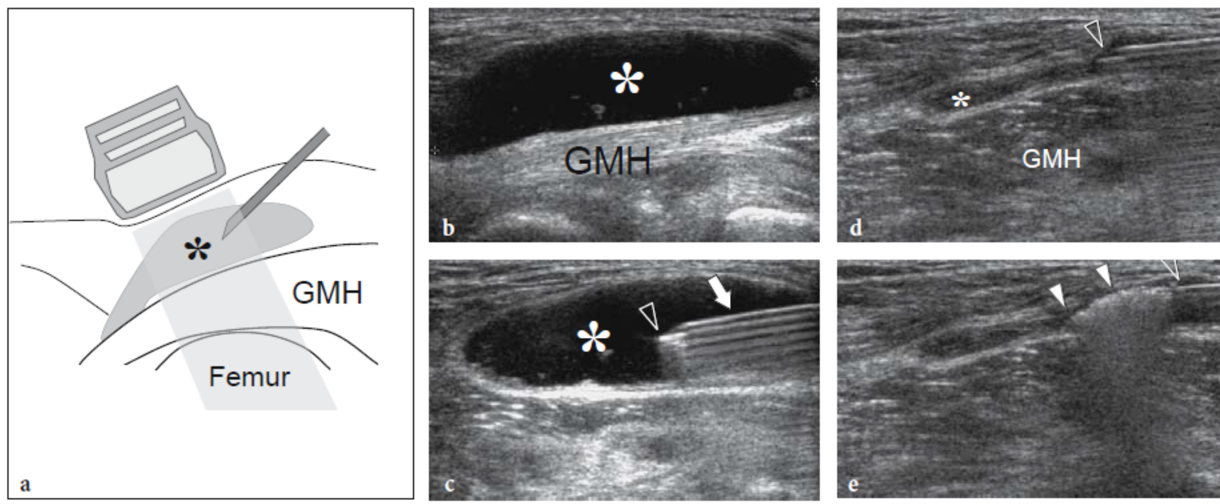

Fig. 18.19a–e. US-guided percutaneous treatment of symptomatic Baker cyst. **a** Schematic drawing of a sagittal view through the posteromedial knee shows the landmarks for real-time intracystic needle placement. The relationship of the superficial part of the Baker cyst (*asterisk*) with the medial head of the gastrocnemius (*GMH*) is depicted. **b** Sagittal 12–5 MHz US image obtained at the medial aspect of the popliteal space shows the Baker cyst (*asterisk*) demonstrated in its long axis. **c** Under real-time US guidance, the needle (*arrow*) is introduced within the cyst and advanced until its tip (*arrowhead*) reaches the cystic center. **d** After aspiration of approximately 10 ml of clear synovial fluid, there is complete collapse of the superficial part of the cyst. **e** Steroid injection (*white arrowheads*) inside the lumen of the cyst is checked in real time

EBM?

Seminars in Arthritis and Rheumatism 45 (2015) 374–378

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ELSEVIER

Ultrasound-guided versus blind subacromial–subdeltoid bursa injection in adults with shoulder pain: A systematic review and meta-analysis

CrossMark

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A R T I C L E I N F O

Keywords:
Ultrasound
Injection
Shoulder

A B S T R A C T

Objective: This systematic review and meta-analysis aimed to assess the effectiveness of ultrasound-guided (USG) versus blind (landmark-guided, LMG) corticosteroid subacromial–subdeltoid bursa injection in adults with shoulder pain.
Methods: The searches were performed on PubMed, Ovid MEDLINE, Ovid EMBASE, Ovid CochraneCENTRAL, Web of Science, Google Scholar, and Scopus from database inception through March 27, 2015. Studies were included trials comparing USG versus LSG injections for the treatment of adults with subacromial–subdeltoid bursitis. Two reviewers independently performed data extraction and appraisal of the studies. The outcome measures collected were the decreased VAS and SDQ scores, the increased shoulder function scores and shoulder abduction motion range, and the effective rate at 6 weeks after injection.
Results: Seven papers including 445 patients were reviewed; 224 received LMG injections and 221 received USG injections. There was a statistically significant difference in favor of USG for pain score [MD = 1.19, 95% CI (0.39, 1.98), $P = 0.003$] and SDQ score [MD = 5.01, 95% CI (1.82, 8.19), $P = 0.02$] at 6 weeks after injection. Also there was a statistically significant difference between the groups, with greater improvement reported of shoulder function scores [SMD = 0.89, 95% CI (0.56, 1.23), $P < 0.001$] and shoulder abduction motion range [MD 32.69, 95% CI (14.82, 50.56), $P < 0.001$] in the USG group. More effective rate was also reported with USG group and the difference was statistically significant [risk ratio = 1.6, 95% CI (1.02, 2.50), $P = 0.04$].
Conclusions: Ultrasound-guided corticosteroid injections potentially offer a significantly greater clinical improvement over blind SASD bursitis injections in adults with shoulder pain.

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Ultrasound-guided versus landmark in knee arthrocentesis: A systematic review

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ARTICLE INFO

Keywords:
Knee
Arthrocentesis
Ultrasound
Accuracy

ABSTRACT

Objectives: The objective was to assess the efficacy of ultrasound-guided (USG) versus landmark (LM) knee arthrocentesis in adults with knee pain or effusion.
Methods: A systematic review of the literature was performed until August 2015. All controlled trials reporting the accuracy or clinical efficacy between USG and LM knee joint arthrocentesis were selected. Pooled weighted mean difference (WMD) using the D–L fixed models for continuous outcomes and the risk ratio (RR) for dichotomous outcomes were assessed by meta-analysis. Heterogeneity between studies was estimated by I^2 statistic.
Results: Nine studies including 715 adult patients (725 knee joints) were eligible for this review versus LM group; there was a statistically significant difference in favor of USG for knee arthrocentesis accuracy rate (risk ratio = 1.21; 95% CI: 1.13–1.29; $P < 0.001$; $I^2 = 37\%$), lower procedural pain scores (WMD = −2.24; 95% CI: −2.92 to −1.56; $P < 0.001$; $I^2 = 4\%$), more aspiration volume (WMD = 17.06; 95% CI: 5.98–28.13; $P = 0.003$; $I^2 = 57\%$), and decreased pain score 2 weeks after injection (WMD = 0.84; 95% CI: 0.42–1.27; $P < 0.001$; $I^2 = 0$). There was no statistically significant difference in procedural duration between two groups (WMD = −0.8; 95% CI: −2.24 to 0.74; $P = 0.31$; $I^2 = 0$).
Conclusions: Ultrasound-guided knee joint arthrocentesis offer a significantly greater accuracy and clinical improvement over landmark technique in adults with knee pain or joint effusion.

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Hoeber S, et al. Br J Sports Med 2016;50:392–396. doi:10.1136/bjsports-2014-094570

Downloaded from http://bjsm.bmj.com/ on March 26, 2017 - Published by group.bmj.com

Ultrasound-guided hip joint injections are more accurate than landmark-guided injections: a systematic review and meta-analysis

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ABSTRACT

Aim To compare the accuracy of ultrasound (US)-guided versus landmark-guided hip joint injections.

Methods PubMed, Medline and Cochrane libraries were searched up to 31 July 2014. Two independent authors selected studies assessing accuracy of intra-articular hip injections based on predetermined inclusion and exclusion criteria. Selected papers were then evaluated for quality and a meta-analysis of accuracy was performed using random effects models.

Results 4 US-guided (136 hip injections) and 5 landmark-guided (295 hip injections) studies were reviewed. The weighted means for US-guided and landmark-guided hip injection accuracies were 100% (95% CI 98% to 100%) and 72% (95% CI 56% to 85%), respectively. US-guided hip injection accuracy was significantly higher than landmark-guided accuracy ($p<0.0001$).

Summary This is the first systematic review and meta-analysis of the accuracy of US-guided versus landmark-guided hip joint injections that has revealed that US-guided injections are significantly more accurate than those that are landmark guided. Future studies should compare US with fluoroscopic-guided hip joint injections for accuracy, efficacy, safety profile, cost-effectiveness and patient satisfaction.

current studies have directly compared landmark to US guidance, the aim of this study was to identify studies that assessed accuracy of either technique using an accepted gold-standard (fluoroscopic contrast, CT contrast, MRI arthrogram, or direct visualisation of injectate during surgery). We systematically compared studies of the accuracy of landmark-guided and US-guided intra-articular hip injections, and performed a meta-analysis of the available data.

MATERIAL AND METHODS

Search strategy

The search strategy and the systematic review protocol were performed in compliance with the PRISMA statement.[7] The electronic databases of PubMed, Medline and Cochrane were searched up to 31 July 2014. The MeSH terms used were: hip AND injection. Identified systematic review bibliographies were also searched for relevant articles.[2 8]

Study selection and critical appraisal

Two authors independently assessed the titles and abstracts from the combined electronic search database for eligibility (box 1). Disagreements between the two authors were resolved through a discussion

Best Practice & Research Clinical Rheumatology 30 (2016) 736–750

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10

Musculoskeletal interventional procedures: With or without imaging guidance?

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Keywords:
Intra-articular injection
Ultrasound guided
Musculoskeletal
Procedural
Efficacy

ABSTRACT

Aspiration and injection of joints and soft tissues is an indispensable skill used in everyday practice by the clinical rheumatologist. Most rheumatologists recognise that performing these procedures using anatomical landmarks is not always successful, particularly in the case of small or infrequently injected joints, bursae or tendon sheaths. Musculoskeletal ultrasound confirms the local pathological-anatomical diagnosis and is the most applicable and feasible imaging method that can be applied in clinical practice in guiding musculoskeletal interventional procedures. From 1993, there has been substantial examination of the accuracy of landmark- and imaging-guided procedures. We have searched the literature and ascertained whether imaging techniques improve the accuracy of musculoskeletal procedures and whether the accuracy of needle placement can be translated into improved clinical outcome (efficacy).

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modalities in guiding injection. We have examined the literature on landmark-guided and US-guided procedures in musculoskeletal diseases of the upper and lower limbs and of the SIJ. According to the clinical and cadaveric studies, the US-guided technique is more accurate than the landmark-guided technique in the glenohumeral, acromioclavicular, wrist, hand, hip, knee and foot joints, and in the tendons of the biceps, wrist, hand hip, knee and ankle. Synovial biopsies are more accurate using an US-guided method. In terms of accuracy, both methods work equally and the data are insufficient to conclude for superiority of US-guided techniques in subacromial bursa, sternoclavicular, elbow, ankle and SIJ injections. The superiority of the efficacy of USGI has been shown in a minority of the joint regions including the subacromial bursa, wrist and hand (tendon sheath injections included), and knee joint injections. Plantar fascia injection is equally efficacious using both methods. The data for other anatomical area are presently insufficient to make any further conclusions. There is a trend towards an expanded number of advanced applications of interventional musculoskeletal US that can also be performed by a rheumatologist.

Practice points:

- There is clear evidence that the accuracy of LMGIs is sub-optimal, and USGIs are more accurate in most anatomical areas
- Much less is known about the efficacy of the USGIs.

Research agenda:

- More studies are required to assess how US alters the pathological anatomical diagnosis and the accuracy and efficacy of USGIs in different anatomical areas.
- Which US-guided technique (direct or semi-guided) is the most appropriate in different anatomical areas and clinical settings requires further research.

- Toxine botulinique :

EXPERT REVIEWS

Ultrasound-guided botulinum toxin injections in neurology: technique, indications and future perspectives

Expert Rev. Neurother. 14(8), 923–936 (2014)

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[2]*Department of Neurology, Movement Disorders Section, Hannover Medical School, Hannover, Germany*
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Botulinum toxin (BT) therapy is used in neurology to treat muscle hyperactivity disorders including dystonia, spasticity, cerebral palsy, hemifacial spasms and re-innervation synkinesias as well as exocrine gland hyperactivity disorders. To increase its therapeutic effect and to decrease adverse effects in adjacent tissues, exact BT placement is important. Ultrasonography (US) allows non-invasive, real-time imaging of muscular and glandular tissues and their surrounding structures. It can visualize, guide, and standardize the entire procedure of BT application. Small randomized studies suggest that US-guidance can improve therapeutic efficacy and reduce adverse effects of BT therapy when compared to conventional placement. US-guidance should be used in forearm muscles when functionality is important, and in selected leg muscles. It may be used for targeting distinct neck muscles in cervical dystonia. It is helpful for targeting the salivary glands. Here we review the technique, indications and future developments of US-guidance for BT injection in neurological disorders.

KEYWORDS: botulinum toxin • cerebral palsy • dystonia • hypersalivation • needle navigation • placement • spasticity • task-related dystonia • ultrasonography • ultrasound-guidance

needle. For this, an injection needle is isolated except for its tip, which is electrically connected to an EMG machine. However, passive EMG guidance requires selective activation of the target muscle, which is difficult to perform for patients with higher degree paresis. In patients with dystonia and sometimes also in patients with spasticity, the co-activation of adjacent muscles may superimpose the target muscle activity [10]. EMG guidance may be improved by electric stimulation via the injection electrode (active EMG guidance) [12]. The disadvantages of EMG guidance include increased discomfort due to larger size of EMG needles and the lack of identification of critical structures such as nerves and vessels and lack of control of the applied BT. Obviously, EMG cannot be used for BT placement in glandular tissue.

EMG combined with fluoroscopy

For special target muscles such as the piriformis muscle in piriformis syndrome, the anterior and middle scalene muscles in neurogenic thoracic outlet syndrome and the longus colli mus-

Botulinum Toxin Type A Injection Into the Gastrocnemius Muscle for Spastic Equinus in Adults With Stroke

A Randomized Controlled Trial Comparing Manual Needle Placement, Electrical Stimulation and Ultrasonography-Guided Injection Techniques

ABSTRACT

Picelli A, Tamburin S, Bonetti P, Fontana C, Barausse M, Dambruoso F, Gajofatto F, Santilli V, Smania N: Botulinum toxin type a injection into the gastrocnemius muscle for spastic equinus in adults with stroke:a randomized controlled trial comparing manual needle placement, electrical stimulation and ultrasonography-guided injection techniques. Am J Phys Med Rehabil 2012;91:957–964.

Objective: The aim of this study was to compare the clinical outcomes of manual needle placement, electrical stimulation, and ultrasonography-guided techniques for botulinum toxin injection into the gastrocnemius of adults with spastic equinus after stroke.

leg. The manual needle placement group ($n = 15$) underwent injections using anatomic landmarks and palpation; the electrical stimulation group ($n = 15$) received injections with electrical stimulation guidance; and the ultrasonography group ($n = 17$) was injected under sonographic guidance. The modified Ashworth scale, the Tardieu scale, and the ankle passive range of motion were measured at baseline and 1 mo after injection. Nonparametric statistical analysis was used.

Results: One month after injection, the modified Ashworth scale improved better in the ultrasonography group than in the manual needle placement group ($P = 0.008$). The ankle passive range of motion improved better in the ultrasonography group than in the electrical stimulation ($P = 0.004$) and manual needle placement ($P < 0.001$) groups. No difference was found between groups for the Tardieu scale.

Conclusions: Ultrasonography-guided injection technique could improve the clinical outcome of botulinum toxin injections into the gastrocnemius of adults with spastic equinus.

Key Words: Rehabilitation, Spasticity, Calf Muscles, Injection Guidance

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Archives of Physical Medicine and Rehabilitation

journal homepage: www.archives-pmr.org

Archives of Physical Medicine and Rehabilitation 2015;96:2067-78

REVIEW ARTICLE

Impact of Injection-Guiding Techniques on the Effectiveness of Botulinum Toxin for the Treatment of Focal Spasticity and Dystonia: A Systematic Review

CrossMark

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From the [a]University Hospital of Brest, Rehabilitation Department, Brest; [b]LUNAM, University of Angers, University Hospital of Angers, Rehabilitation Department, Angers; [c]LUNAM, University of Angers, Angers Laboratory for Research in Engineering Systems (LARIS)—UPRES EA, Angers; [d]Western Brittany University, Brest; and [e]National Institute of Health and Medical Research (INSERM) UMR 1101, Medical Data Treatment (LaTIM), Brest, France.

Treatment (LaTIM), Brest, France.

Conclusions: These results strongly recommend instrumented guidance of BoNT-A injection for the treatment of spasticity in adults and children (ES or US), and of focal dystonia such as spasmodic torticollis (EMG). No specific recommendations can be made regarding the choice of instrumented guiding technique, except that US appears to be more effective than ES for spastic equinus in adults with stroke.

Archives of Physical Medicine and Rehabilitation 2015;96:2067-78

- Toxine botulinique :
  - Anatomique ET dynamique mais pas fonctionnelle
  - Visualisation en temps réel
  - Éviter structures nobles
  - Structures musculaires plus en profondeur (psoas…) ou plus petites (avant-bras…)
  - Autre indication : équin spastique
  - Parfois à combiner avec ENMG ?

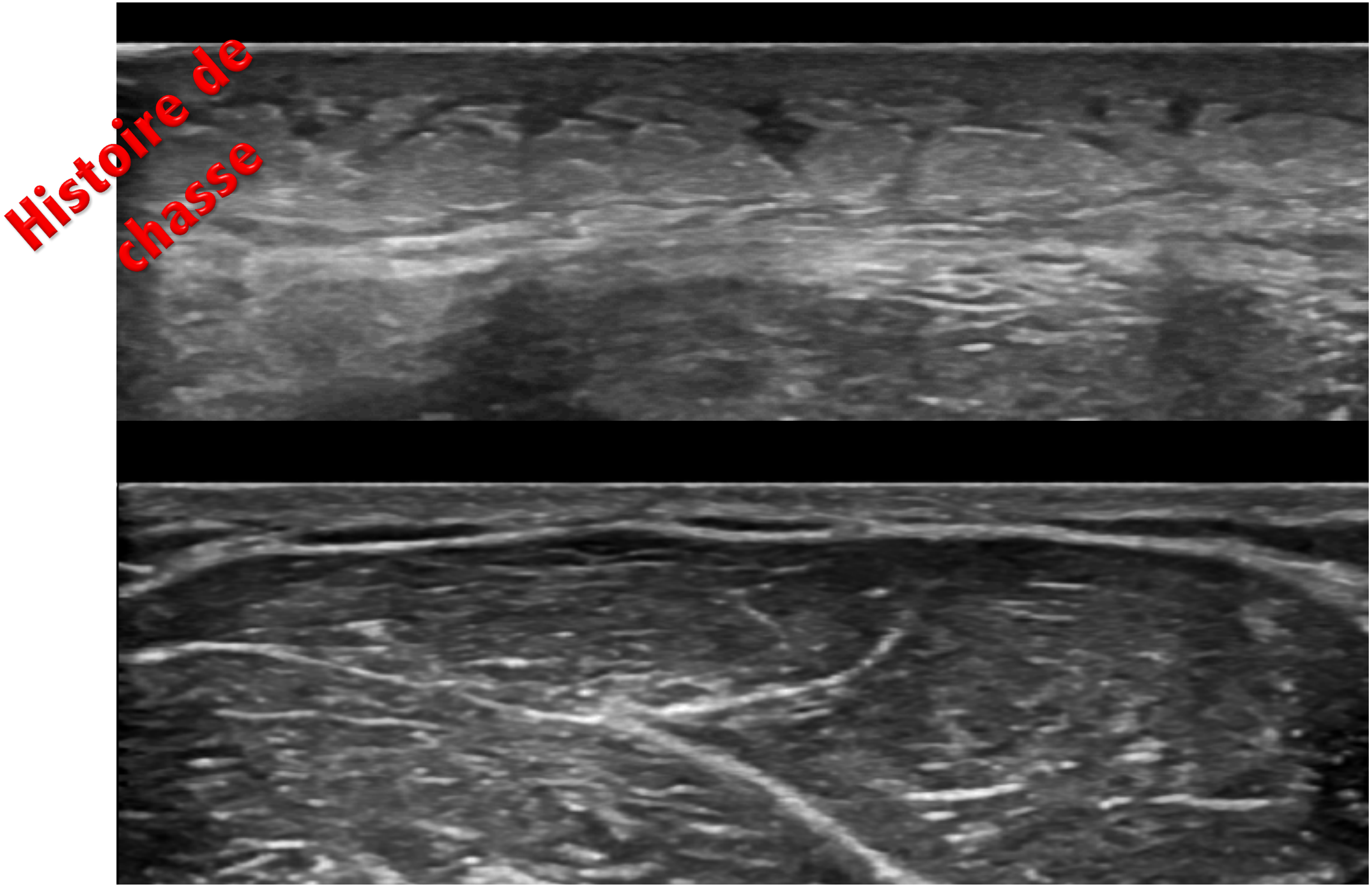
- PRP

Use of platelet-rich plasma in the care of sports injuries: our experience with ultrasound-guided injection

Gino Bernuzzi[1], Federica Petraglia[2], Martina Francesca Pedrini[2], Massimo De Filippo[3], Francesco Pogliacomi[4], Michele Arcangelo Verdano[4], Cosimo Costantino[2]

[1]*Immunohaematology and Transfusion Centre, Department of Laboratory Medicine and Pathology;* [2]*Department of Clinical and Experimental Medicine, Unit of Sport and Functional Rehabilitation;* [3]*Department of Clinical Sciences, Section of Radiological Sciences;* [4]*Department of Surgical Sciences, Orthopaedic Department, University Hospital of Parma, Parma, Italy*

by either palpating the site of tenderness or using a peppering technique to distribute the gel uniformly. The use of ultrasound (US)-guided injection has led to a more precise and direct visualisation of the exact site of the pathology and of the injected blood products in the region of lesion. Furthermore, sonography allows the position of the needle position to be adjusted in real time[10-13]. Considering these properties, local US-guided injection of PRP may improve the repair of tendons, muscles, ligaments, cartilage and bone injuries[3]. The aim of this study was to demonstrate the efficacy of US-guided injections of PRP in muscle strains and their absence of side effects.



Cellulite infectieuse avant-bras après prélèvement sanguin (J7)

Case series of ultrasound-guided platelet-rich plasma injections for sacroiliac joint dysfunction

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[b] *Faculty of Medicine, University of Ottawa, ON, Canada*
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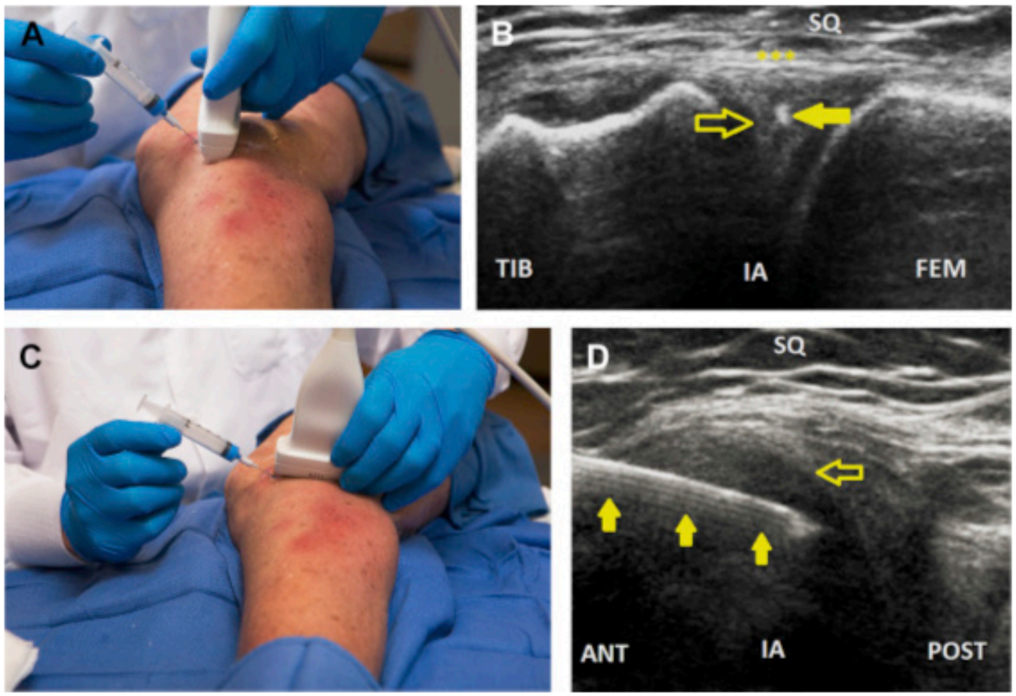
[d] *Canadian Centre for Integrative Medicine, ON, Canada*

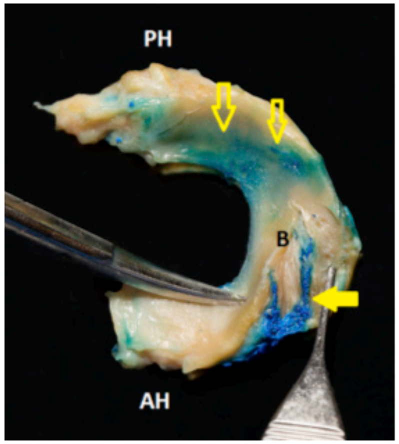
Abstract.
BACKGROUND: Two-thirds of adults worldwide will experience low back pain at some point in their life. In the following case series, we present four patients with sacroiliac (SI) joint instability and severe chronic low back pain, which was refractory to other treatment modalities.
OBJECTIVE: We investigated the efficacy of platelet-rich plasma (PRP) injections, a novel orthobiologic therapy, for reducing SI joint pain, improving quality of life, and maintaining a clinical effect.
METHODS: Short-form McGill Pain Questionnaire (SFM), Numeric Rating Scale (NRS), and Oswestry Low Back Pain and Disability Index were used for evaluation of treatment at pretreatment, 12-months and 48-months after treatment.
RESULTS: At follow-up 12-months post-treatment, pooled data from all patients reported a marked improvement in joint stability, a statistically significant reduction in pain, and improvement in quality of life. The clinical benefits of PRP were still significant at 4-years post-treatment.
CONCLUSIONS: Platelet-rich plasma therapy exhibits clinical usefulness in both pain reduction and for functional improvement in patients with chronic SI joint pain. The improvement in joint stability and low back pain was maintained at 1- and 4-years post-treatment.

- PRP
  - Nécessité d'être en intra-tendineux et intra-lésionnel
  - Parfois découverte de fissuration sous estimée à l'écho sans injection

Futur ?

- Injection intraméniscale





Sonographically Guided Knee Meniscus Injections: Feasibility, Techniques, and Validation.
Michael R Baria ; Jacob L Sellon ; Dan Lueders ; Jay Smith
PM & R : the journal of injury, function, and rehabilitation. , 2017

Futur ?

- Injection de cellules souches

Orthobiologic Interventions Using Ultrasound Guidance

Gerard Malanga, MD[a,b,*], Dena Abdelshahed, MD[a],
Prathap Jayaram, MD[c]

KEYWORDS

• Platelet-rich plasma • Stem cell therapy • Orthobiologics • Biologic agents
• Regenerative medicine • Tendon • Ligament • Muscle

KEY POINTS

- Regenerative medicine techniques, including platelet-rich plasma (PRP) and mesenchymal stem cell (MSC) therapy, are becoming increasingly popular for the treatment of surgical and nonsurgical musculoskeletal injuries.
- PRP and MSCs, collectively referred to as orthobiologics, work by augmenting natural healing processes and have been found effective at increasing tissue regeneration.
- Orthobiologics are becoming increasingly preferred over conventional treatments, including anti-inflammatory medications and corticosteroid injections, which have been shown to have adverse effects.
- Ultrasound guidance can assist in the performance of the various procedures used in regenerative medicine, ranging from venipuncture to bone marrow and adipose aspiration.
- Further high-quality research on PRP and MSCs will serve to further define the most appropriate and effective applications for these treatments.

Futur ?

- Mini US

Conclusion

- Complémentaire à l'examen clinique
- On ne remplace pas le radiologue
  - Si doute : ne pas hésiter à référer
- Nécessité de formation + expérience
- Rapidité de diagnostic -> prise en charge et suivi
- Sécurité + garantie du geste infiltratif
- Coût faible
- Dans le futur : partie intégrante du cursus MPR ?

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