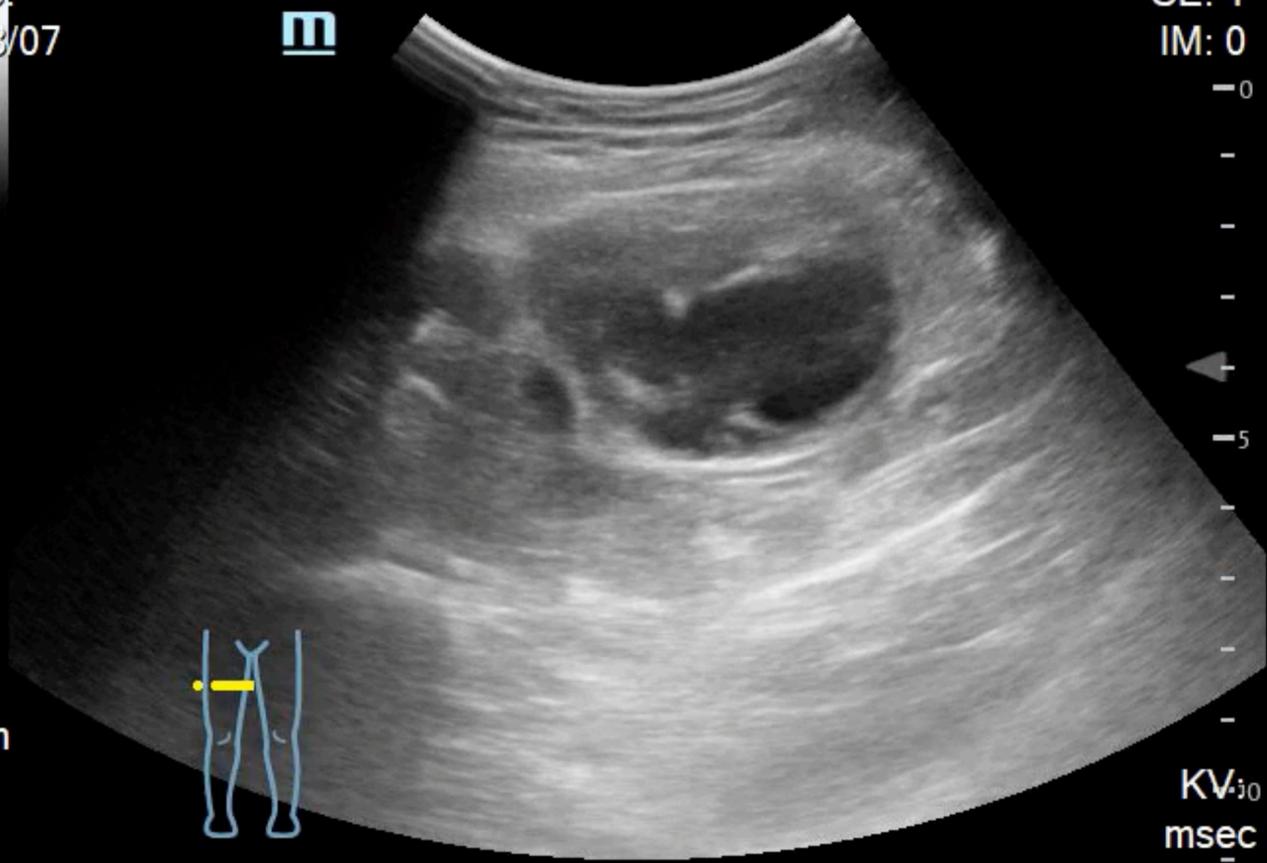


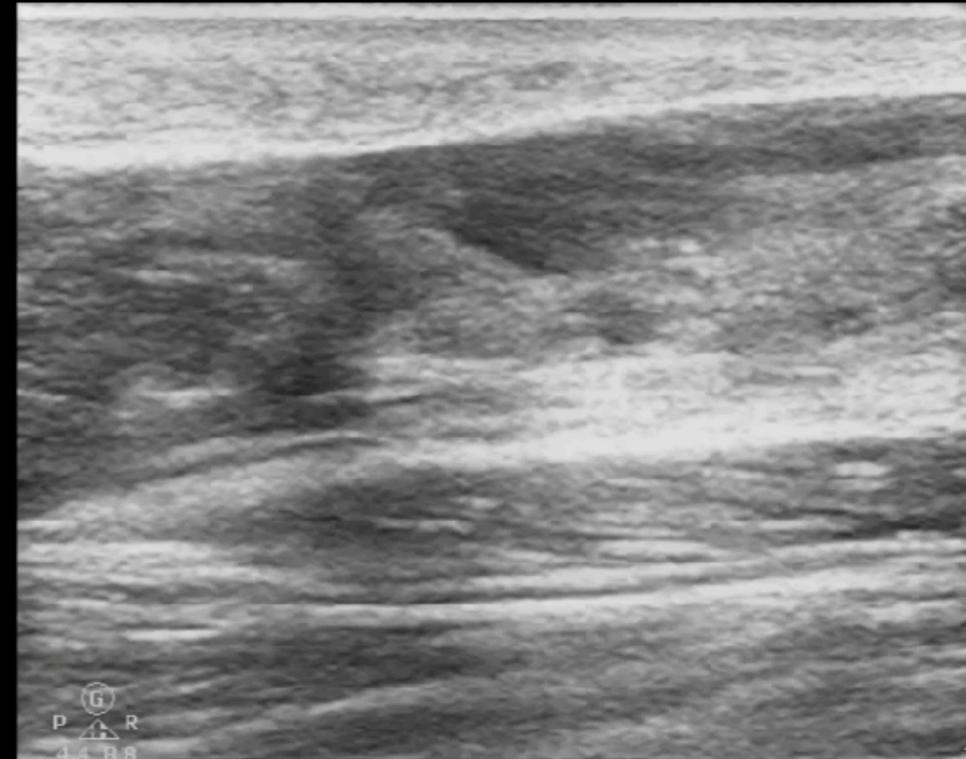


ACCESS:
FH5.0
2024/03/07
FR 19
D 11.0
G 50



iNeedle
iTouch
thk: mm
DFOV:

SE: 1
IM: 0
-0
-5
KV:30
msec
ALG:



MSK-lower extremity

陳國智醫師 雙和醫院急診醫學科

juice119@gmail.com / POCUSacademy.com

先進與革新急症技術中心 / Advanced & Revolutionary Technology center



Core Applications (2023 ACEP Emergency Ultrasound Guidelines)
15項急診超音波核心應用

陳國智醫師

Aorta

DVT

Trauma

Thoracic/Airway

Cardia/HD assessment

Procedural Guidance

US-guided NB

Testicular

Ocular

Skin & Soft tissue

Hepatobiliary

Urinary tract

Pregnancy

Bowel

MSK

REVIEW

Open Access



An overview of point-of-care ultrasound for soft tissue and musculoskeletal applications in the emergency department

Kuo-Chih Chen^{1,2}, Aming Chor-Ming Lin^{1,2*}, Chee-Fah Chong^{1,2} and Tzong-Luen Wang^{1,2}

Musculoskeletal Ultrasound in the Emergency Department

Vito Chianca, MD¹ Francesco Di Pietto, MD, PhD² Marcello Zappia, MD, PhD³
Domenico Albano, MD^{1,4} Carmelo Messina, MD^{1,5} Luca Maria Sconfienza, MD, PhD^{1,5}

¹IRCCS Istituto Ortopedico Galeazzi, Milano, Italy

²Dipartimento di Diagnostica per Immagini, Pineta Grande Hospital, Castel Volturno (CE), Italy

³Department of Medicine and Health Sciences, Università del Molise, Campobasso, Italy

⁴Section of Radiological Sciences, Department of Biomedicine, Neurosciences and Advanced Diagnostics, University of Palermo, Palermo, Italy

⁵Dipartimento di Scienze Biomediche per la Salute, Università degli Studi di Milano, Milano, Italy

Address for correspondence Vito Chianca, MD, IRCCS Istituto Ortopedico Galeazzi, Via Riccardo Galeazzi 4, 20161 Milano, Italy (e-mail: vitochianca@gmail.com).

Semin Musculoskelet Radiol 2020;24:167–174.



Musculoskeletal Ultrasound in the Emergency Department: Is There a Role?

Michael V. Perone, MD, and Corrie M. Yablon, MD <https://doi.org/10.1053/>

Soft tissue infection
Joint effusion
Foreign body
Long bone fracture
Muscle & Tendon injury
Vascular occlusion
Procedures



Skin, Soft Tissue, and Musculoskeletal Ultrasound



Amy Marks, MD^{a,*}, Evelyn Schraft, MD^a, Michael Gottlieb, MD^a

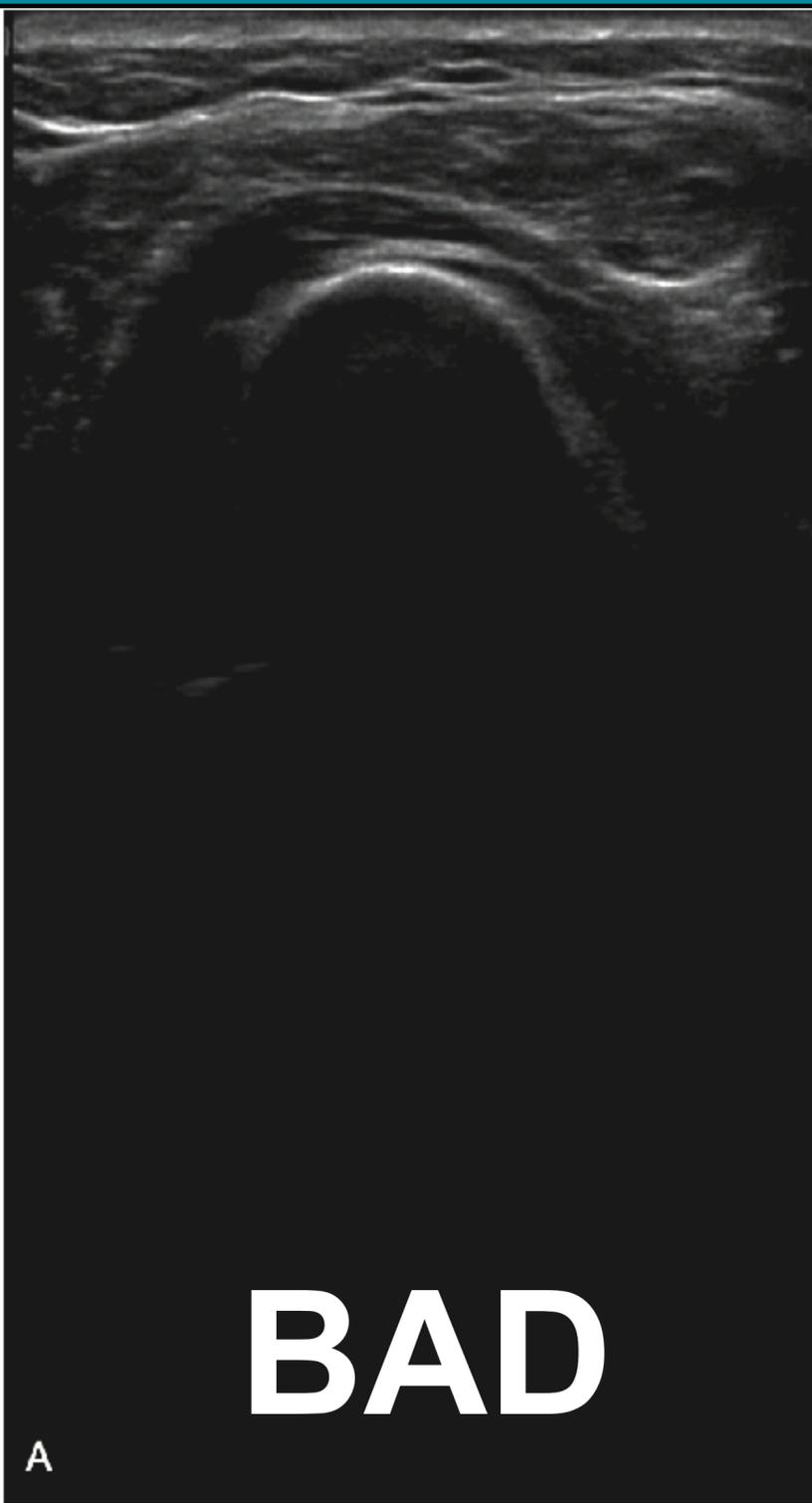
KEYWORDS

- Ultrasound • Skin • Soft tissue • Cellulitis • Abscess • Musculoskeletal • Arthrocentesis

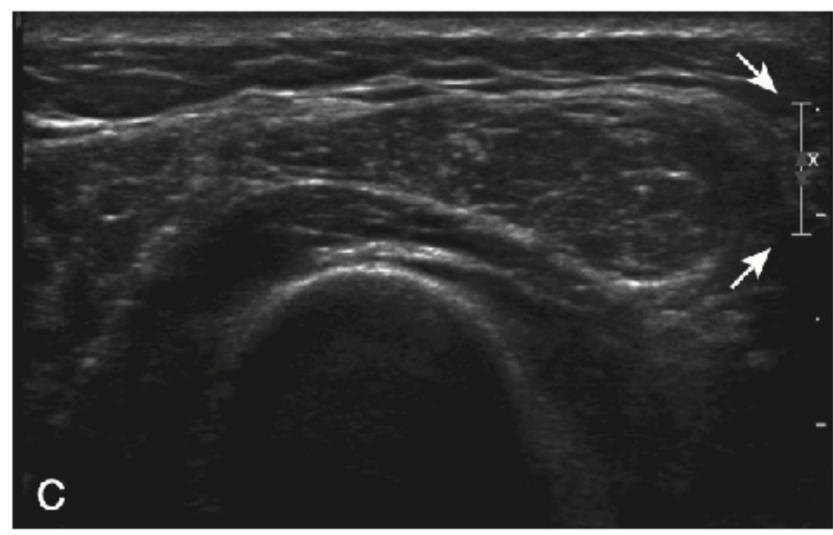
KEY POINTS

- Point-of-care ultrasound (POCUS) is an efficient and easy tool to assist in the diagnosis of skin, soft tissue, and musculoskeletal conditions at the bedside.
- POCUS may be used for the evaluation of cellulitis, abscess, necrotizing fasciitis, foreign bodies, and hematomas.
- POCUS may also be used to assist in procedures, such as foreign body removal, hematoma blocks, and arthrocentesis as well as in the evaluation of musculoskeletal complaints including fractures, dislocations, and tendon ruptures.

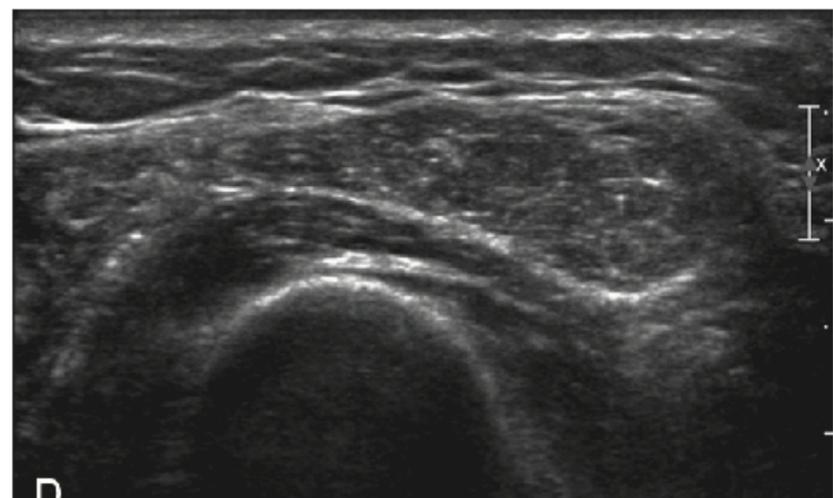
優化影像三大手法



深度/Depth



焦點/Focus



亮度/Gain

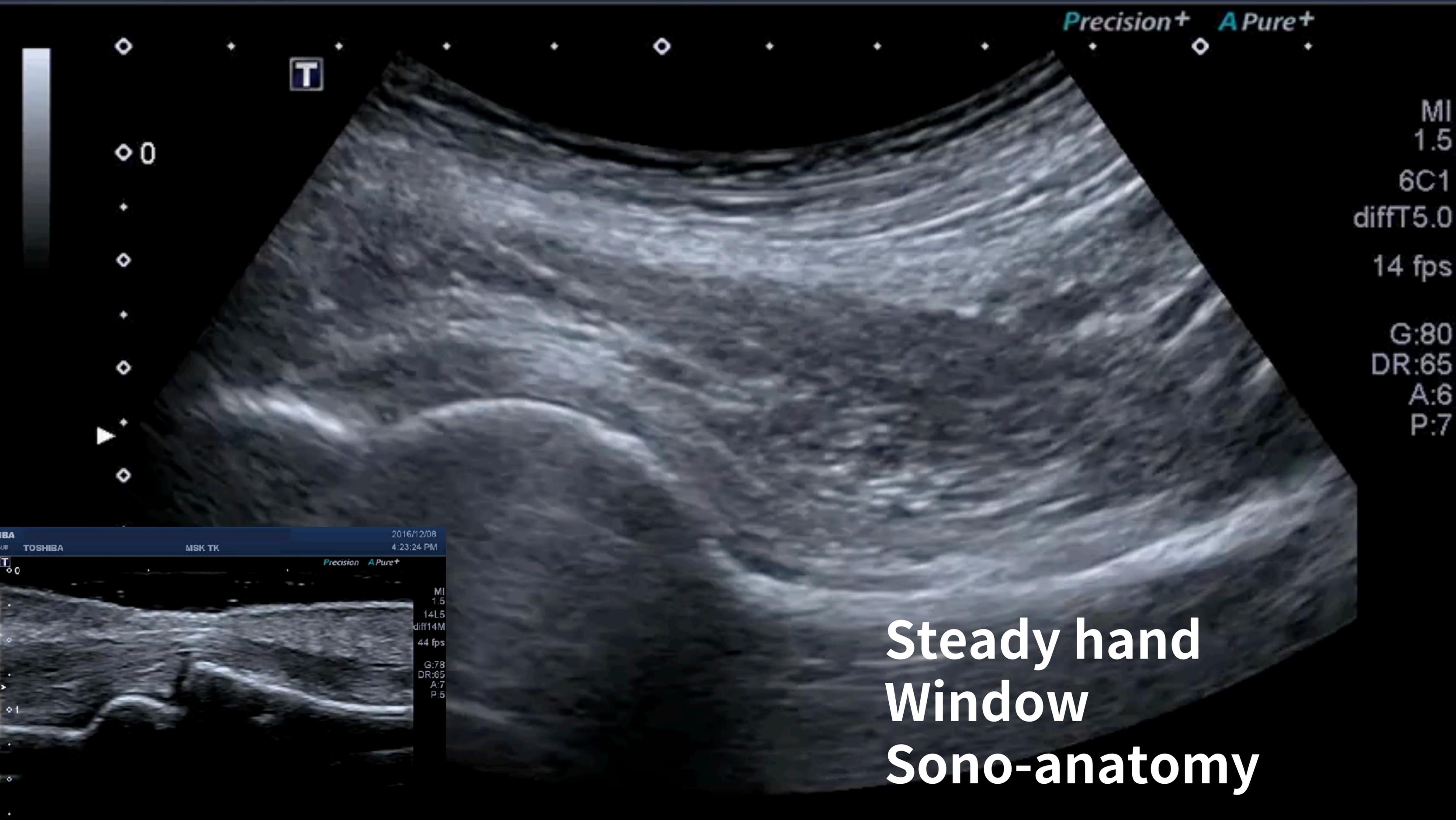
骨骼肌肉超音波 第三版 MUSCULOSKELETAL ULTRASOUND



超音波：醫師的第二個聽診器

主編 王亭貴 / 陳文翔

執行編輯 吳爵宏



Precision+ APure+

MI
1.5
6C1
diffT5.0
14 fps
G:80
DR:65
A:6
P:7

TOSHIBA 2016/12/08 4:23:24 PM MSK TK

Precision+ APure+

MI
1.5
14L5
diff14M
44 fps
G:78
DR:65
A:7
P:5

**Steady hand
Window
Sono-anatomy**



Steady Hand



探頭

操作者的手

皮膚



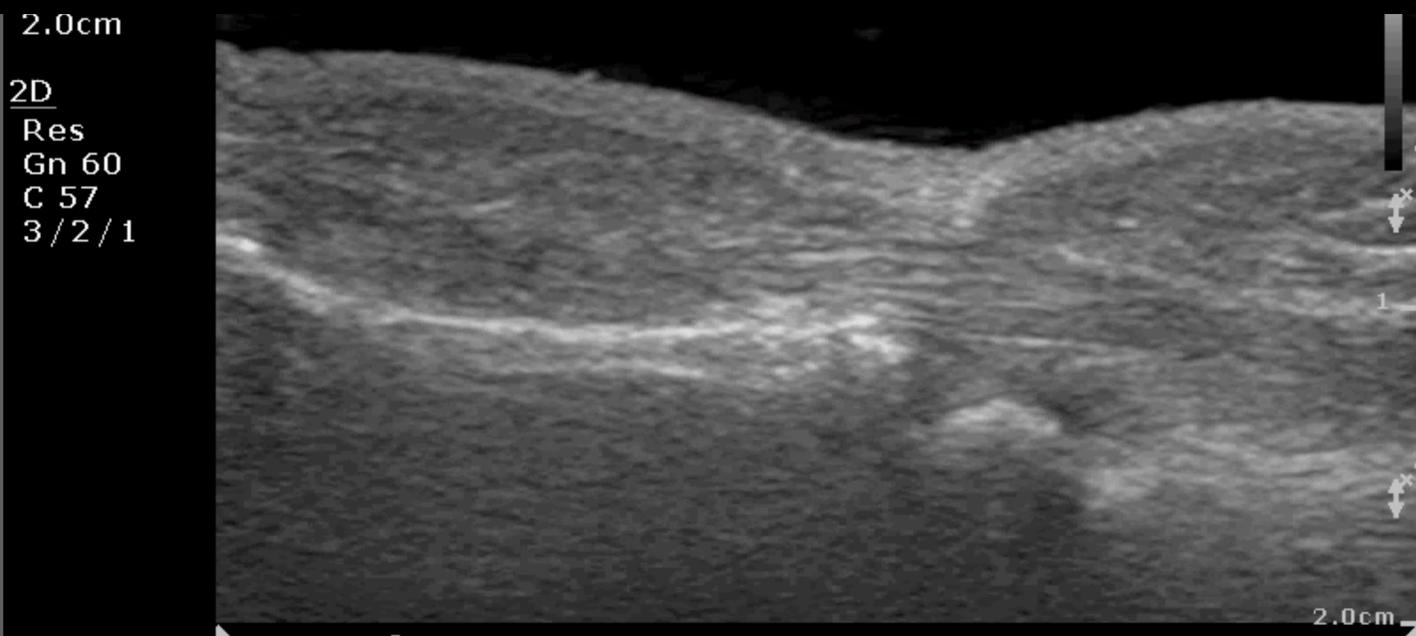
左手中指腫痛



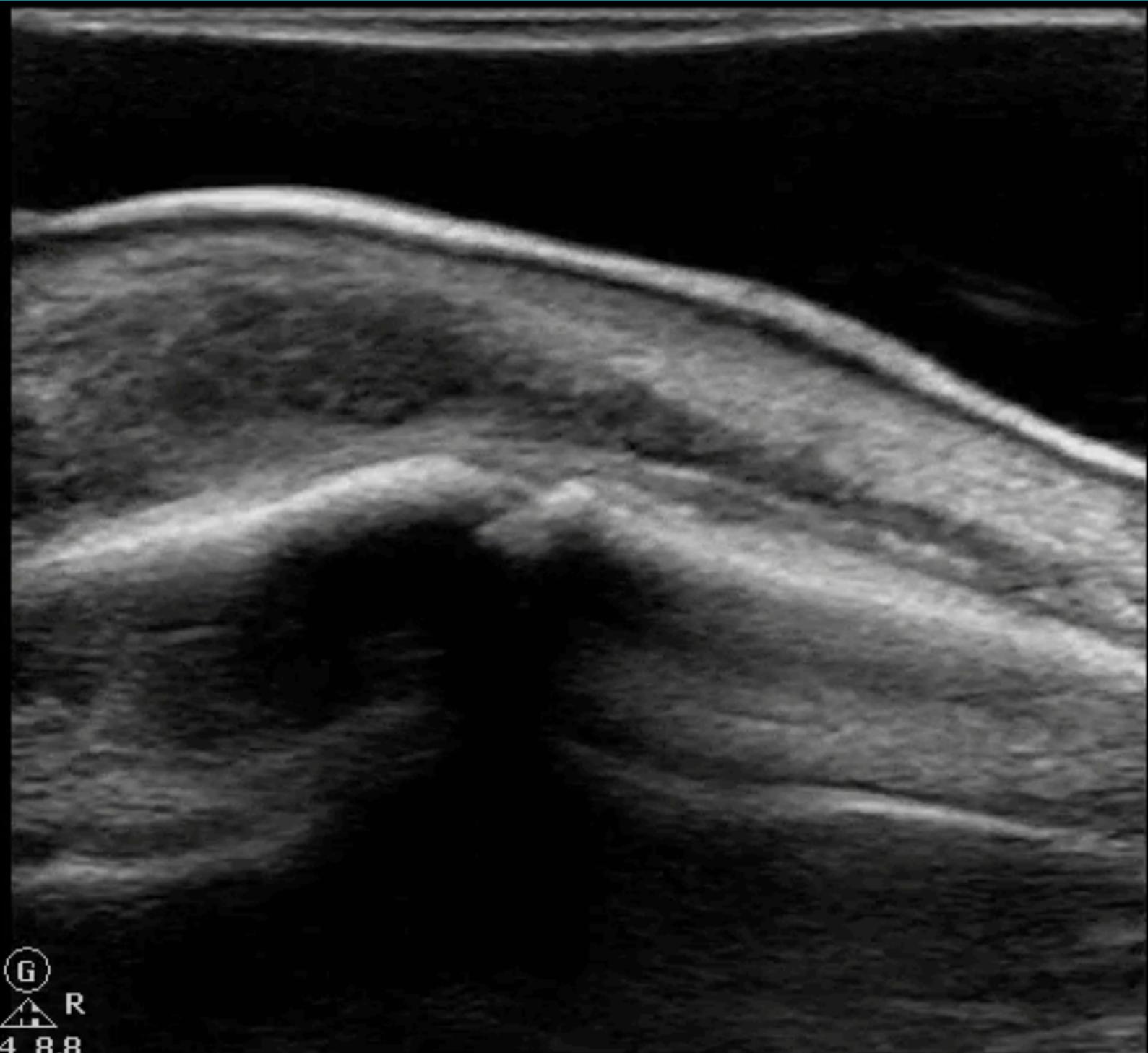
Water bath method



G
P R
3.0 12.0



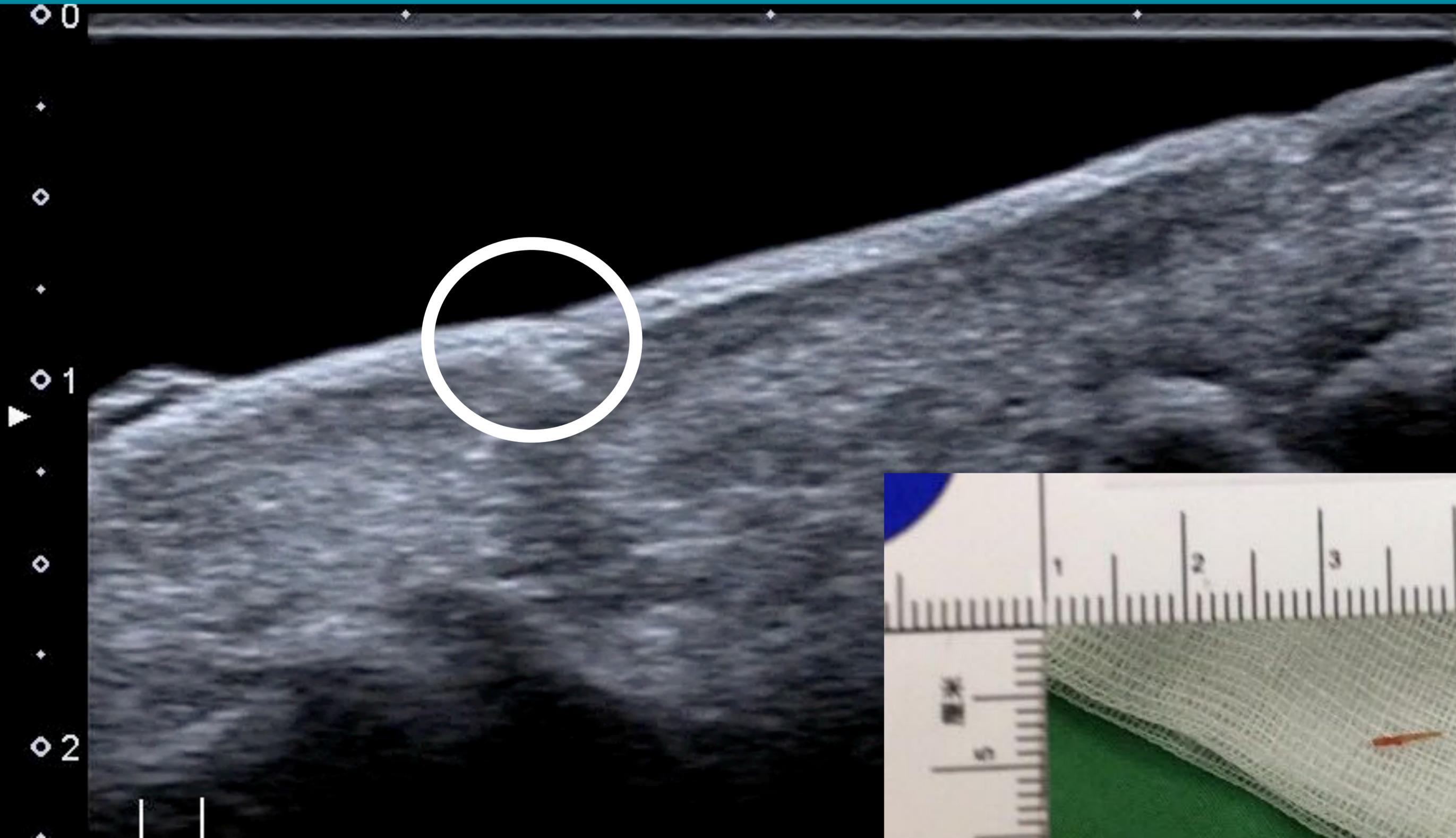
G
P R
4.4 8.8



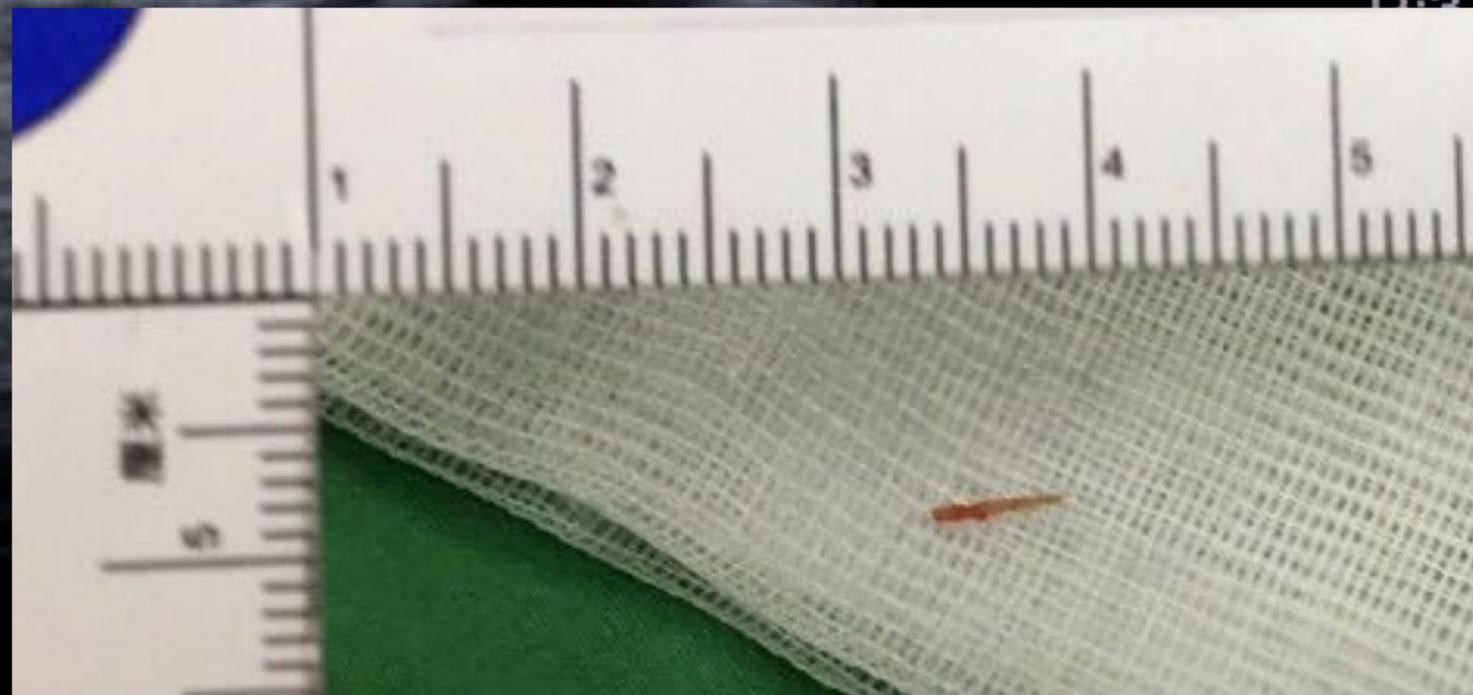
2
↕

3.5cm

Create window



MI
1.5
11L4
diffT9.0
30 fps
G:86
DR:60
A:6
D:3



MSK掃描原則



管狀構造橫掃優先

先找外在明顯定位

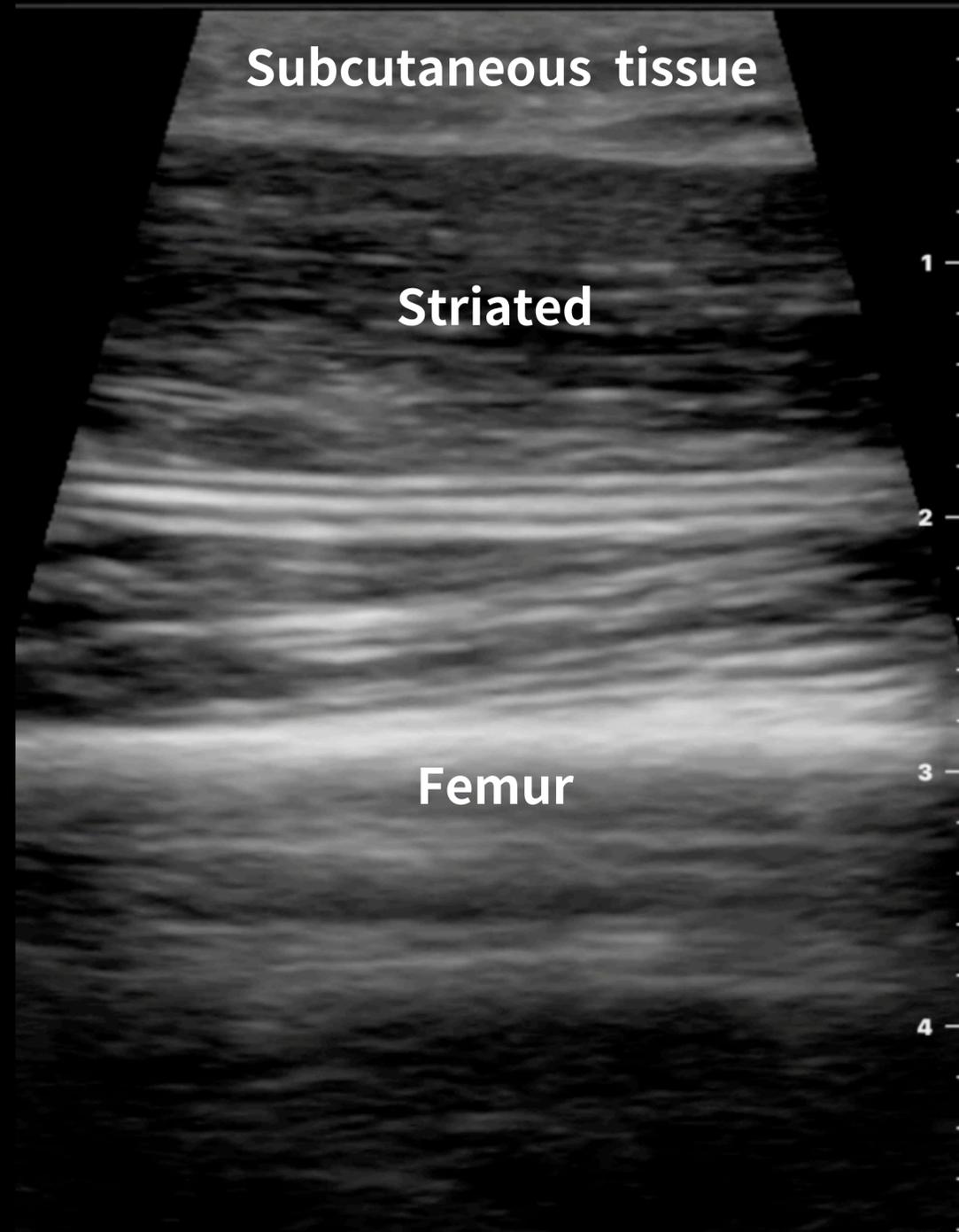
確認內在明顯標的

MSK的重要三界線(白線)

B

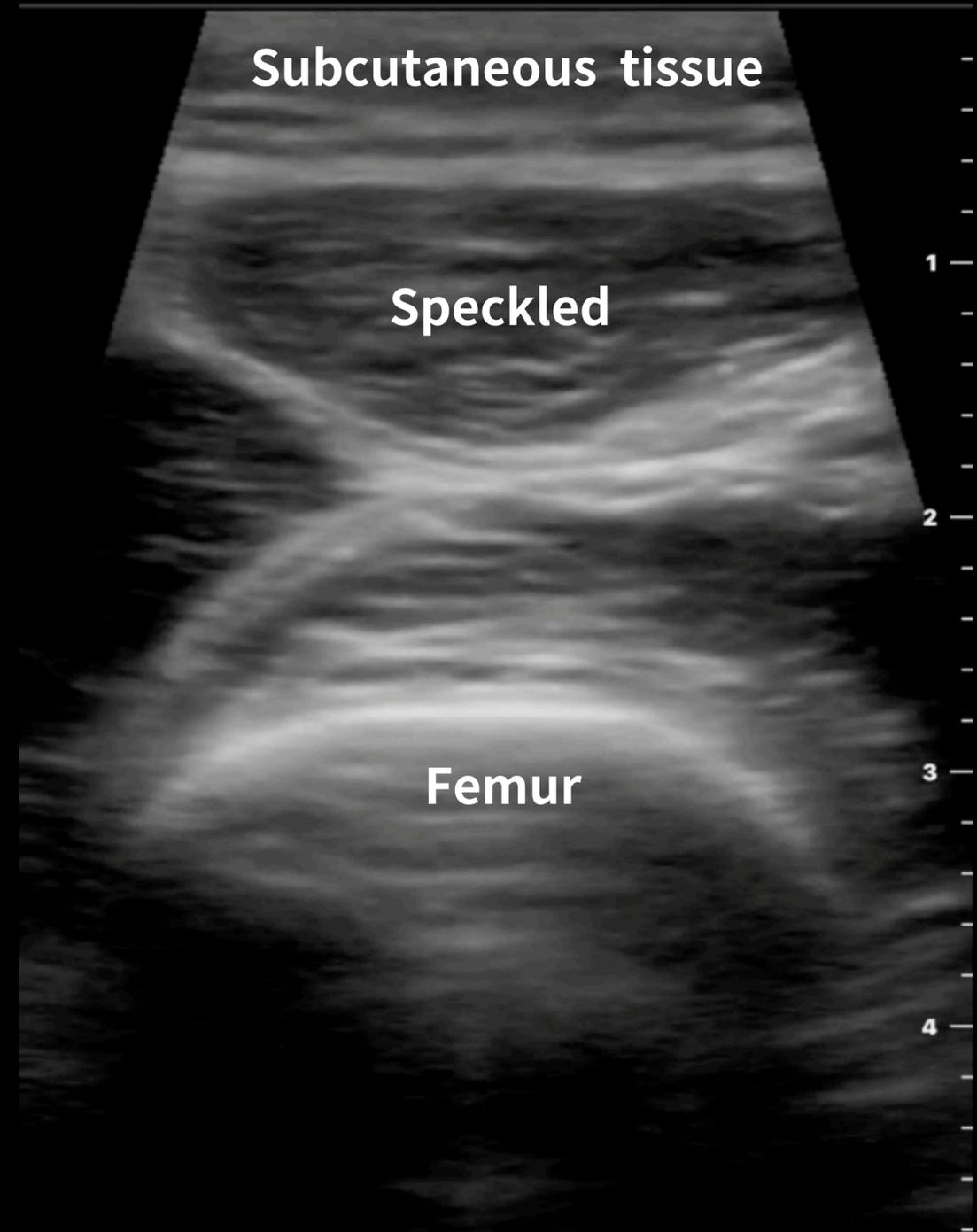
皮膚

B

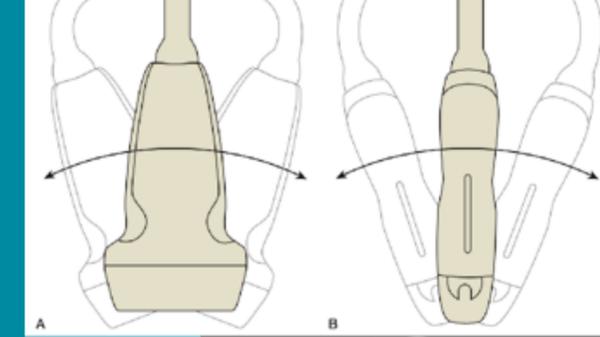
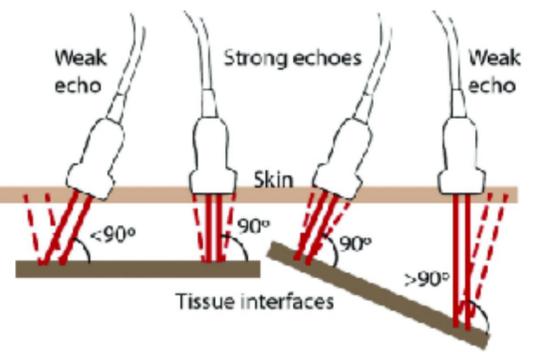


筋膜

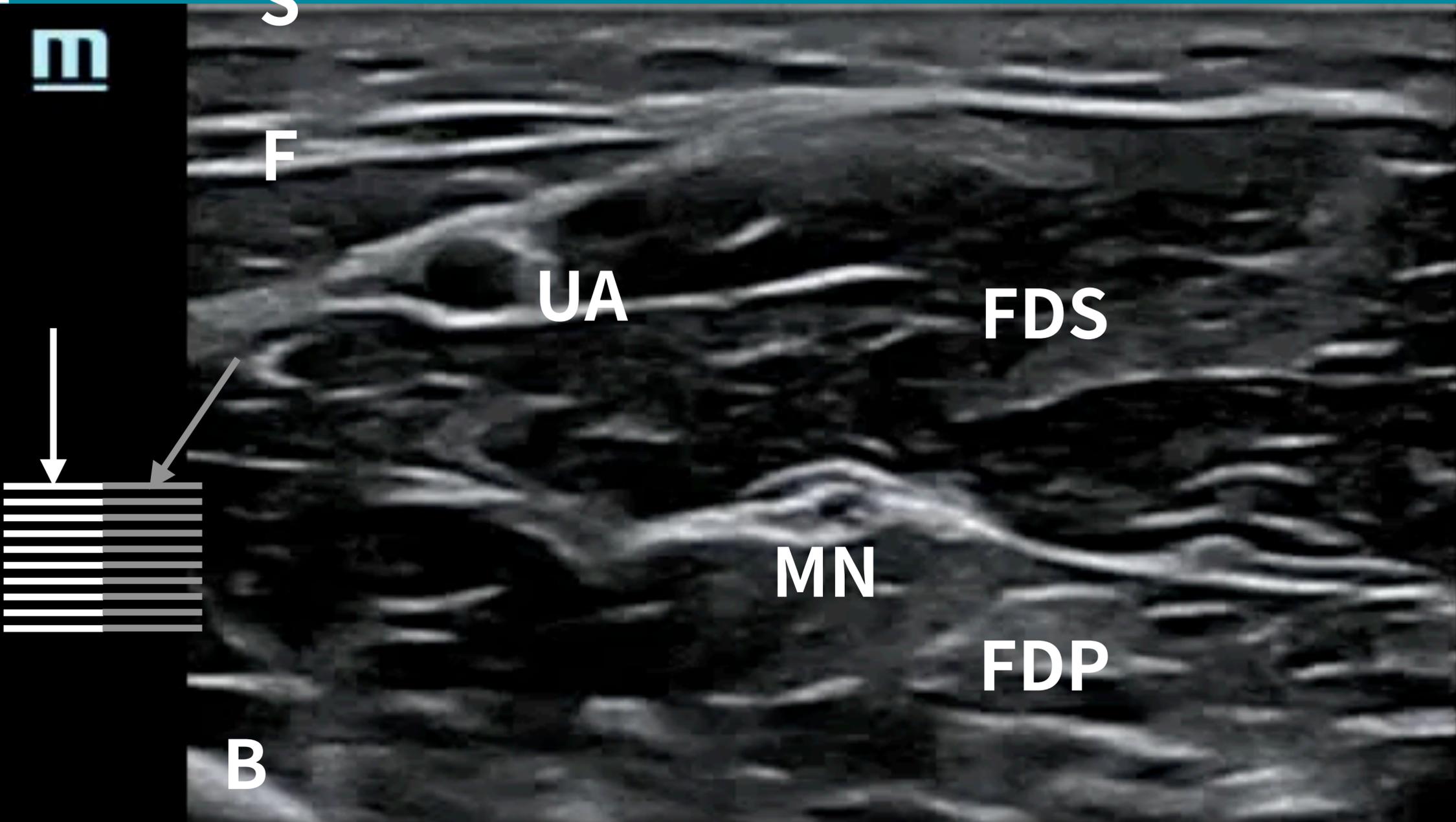
骨頭



Anisotropy



TIS 0.2
B
FH10
DR 110
FR 27
D 4.0
G 56



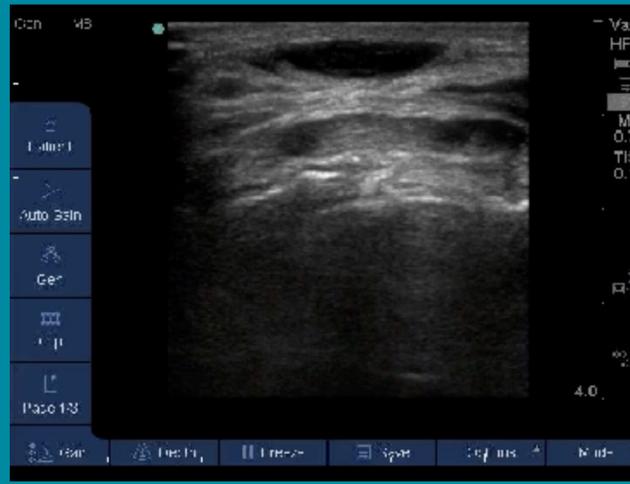
Tendon

Nerve

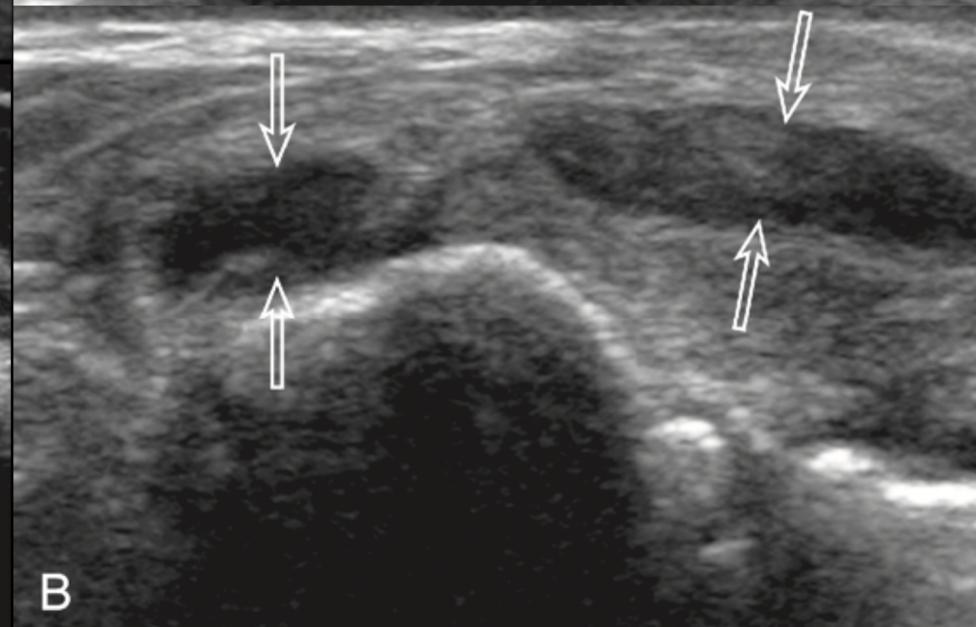
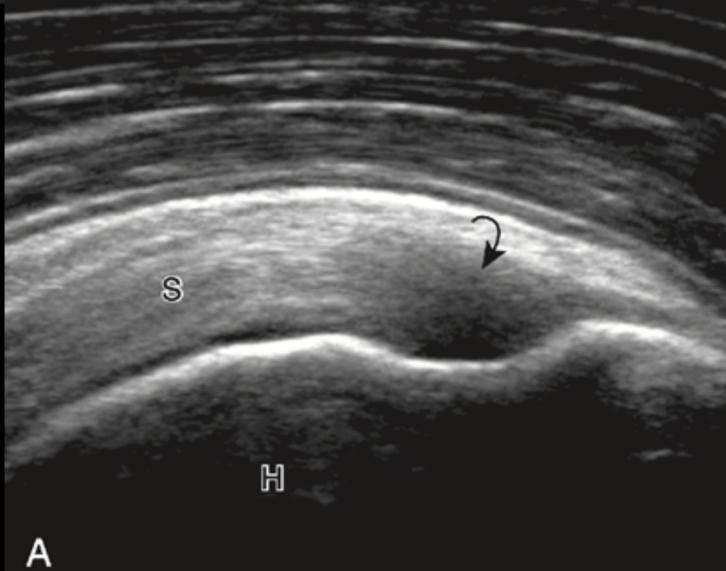
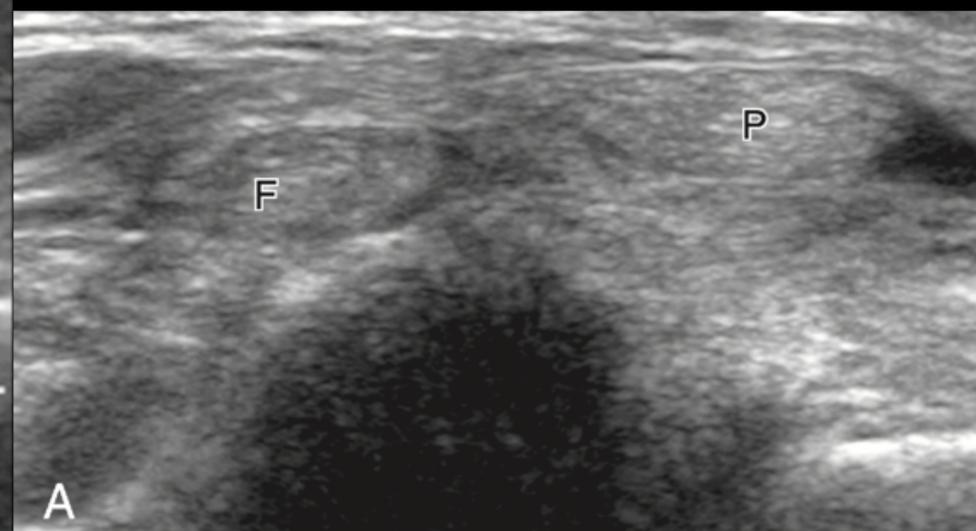
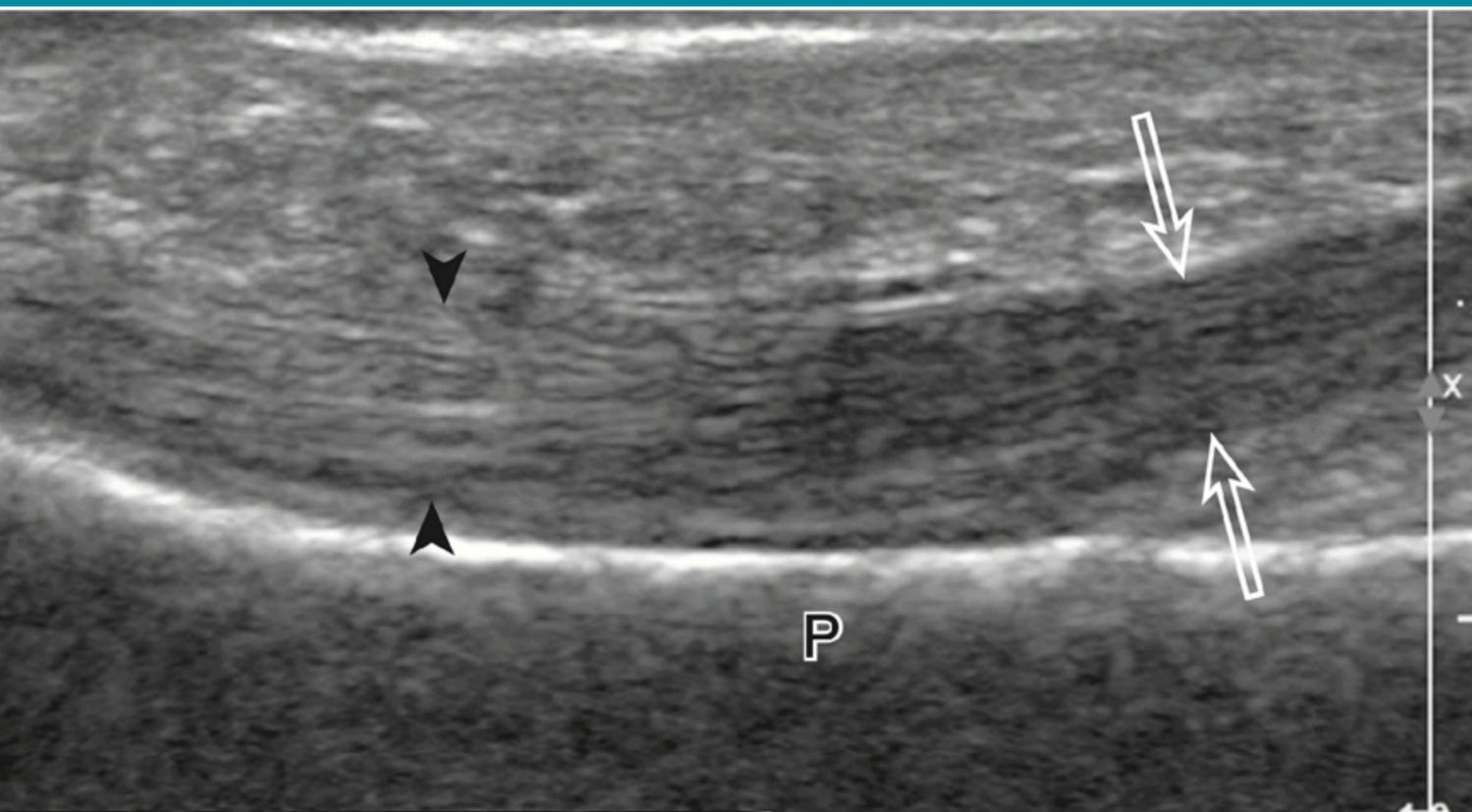
Muscle

Anisotropy

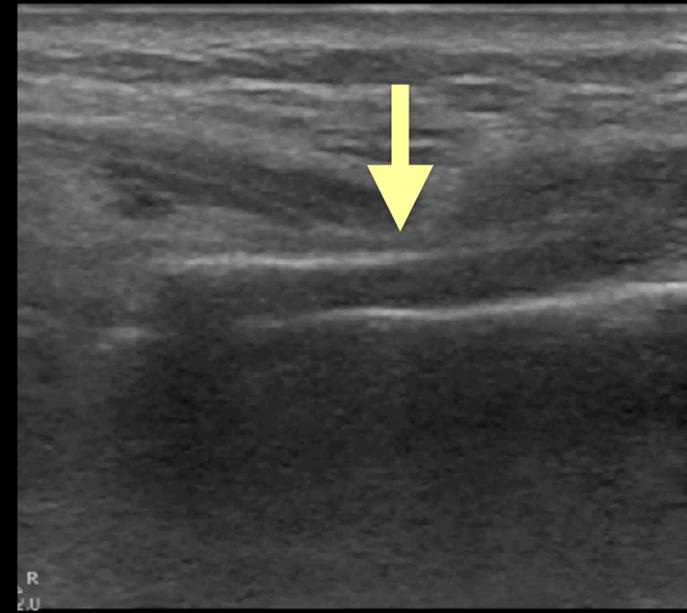
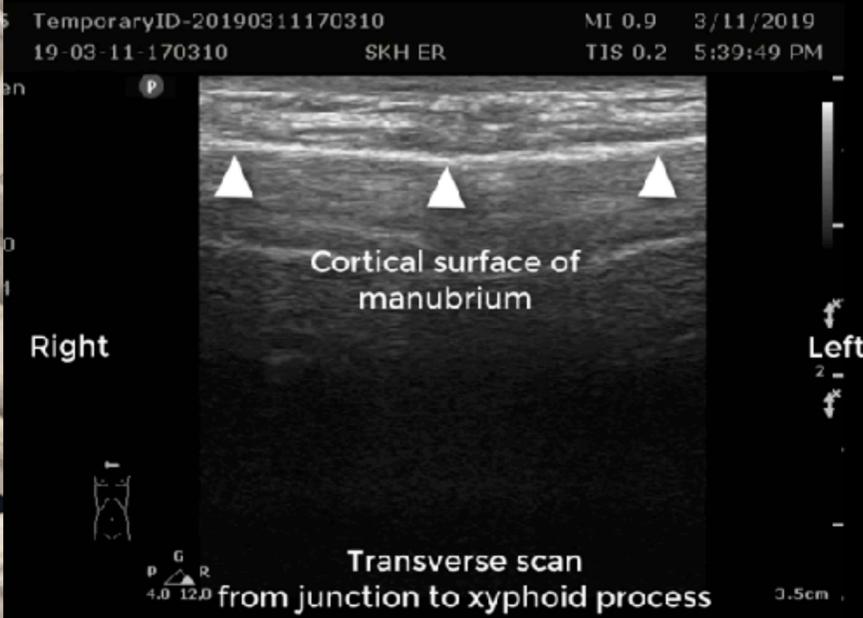
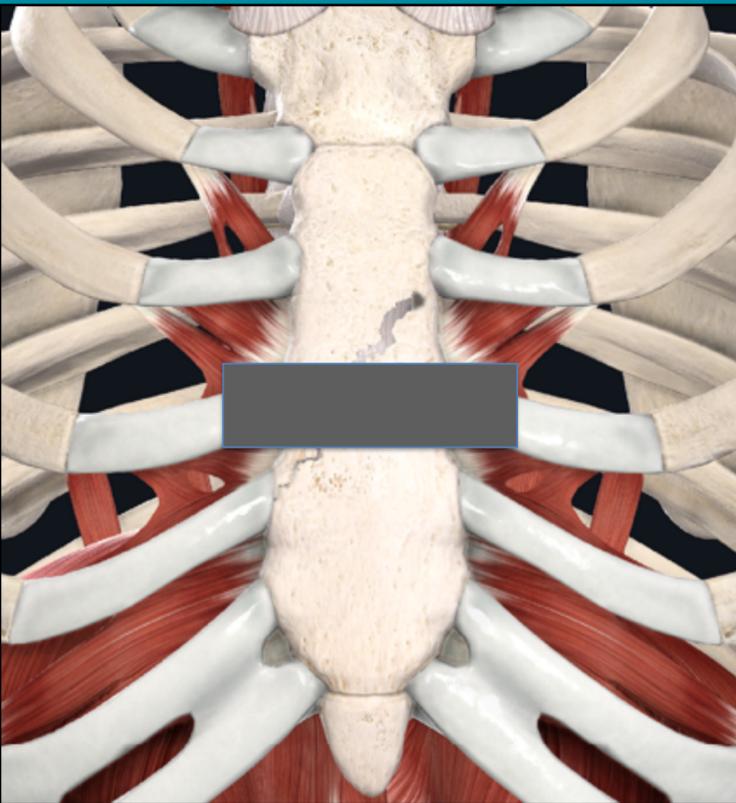
隨掃描角度調整回音改變



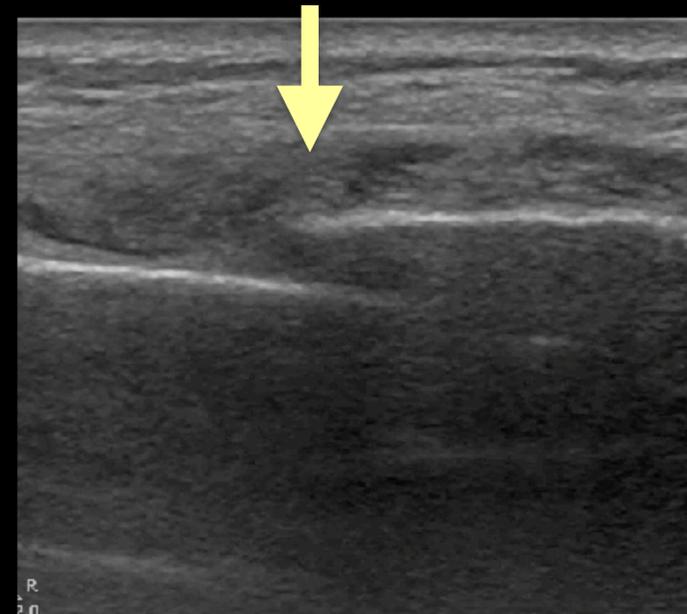
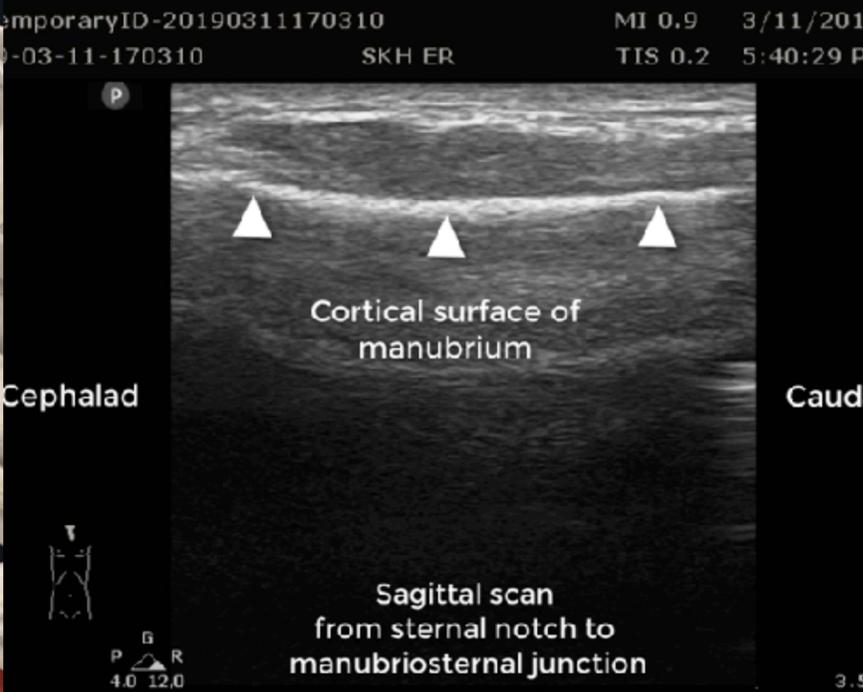
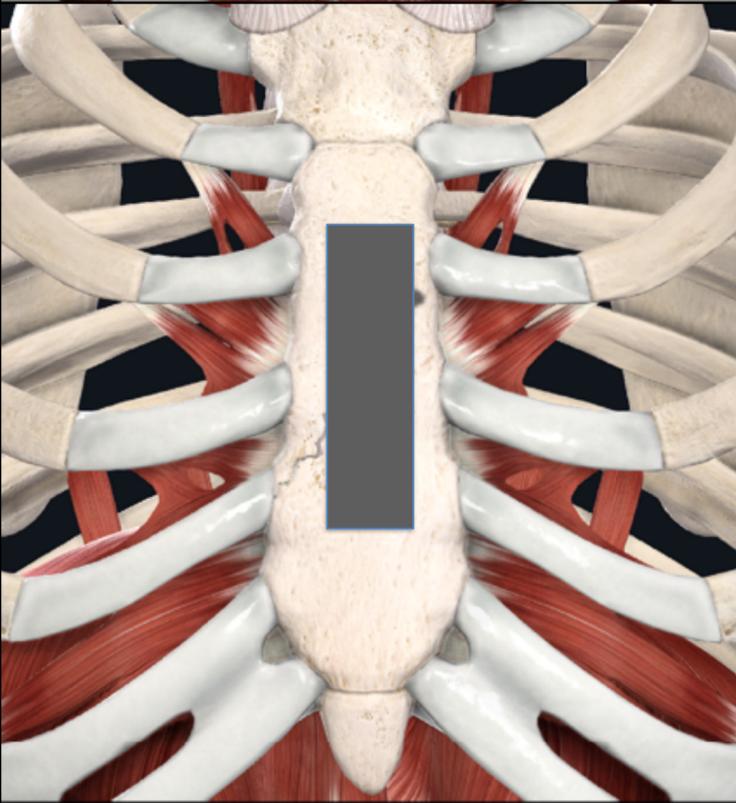
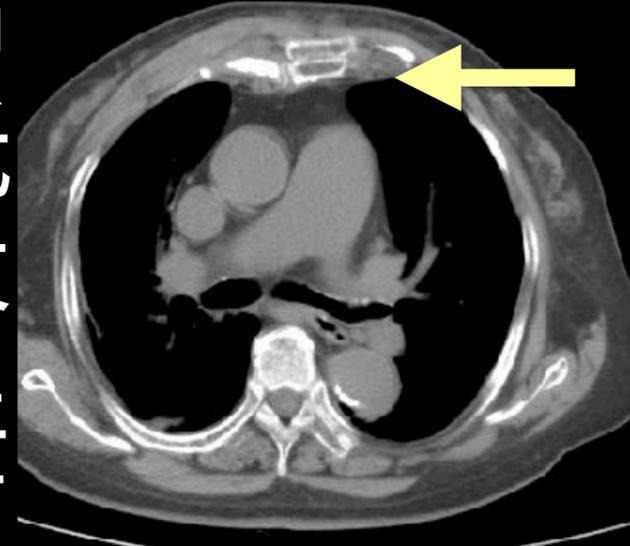
角度/垂直



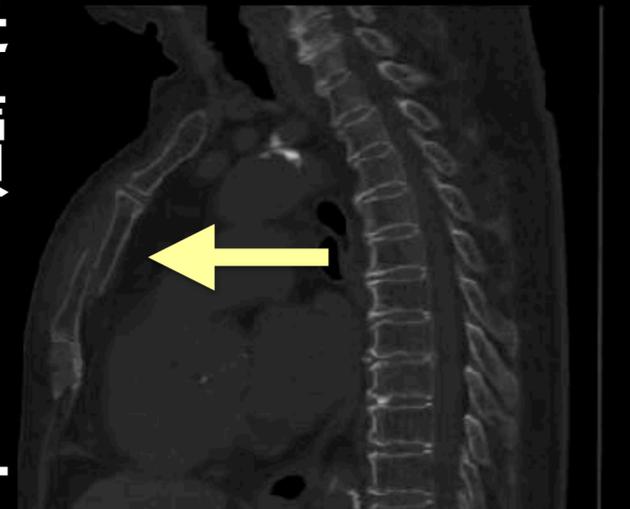
POCUS for fracture: long & flat bone



高低落差

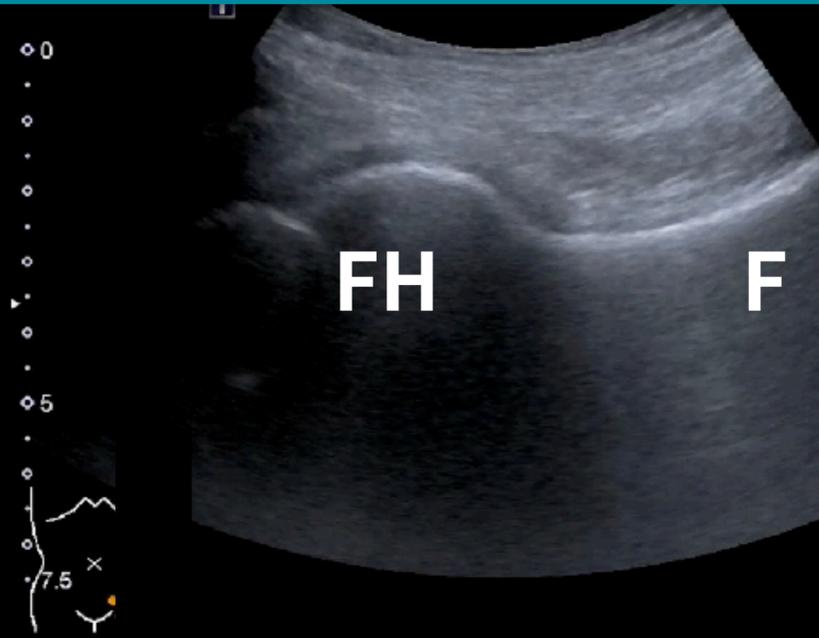


不連續

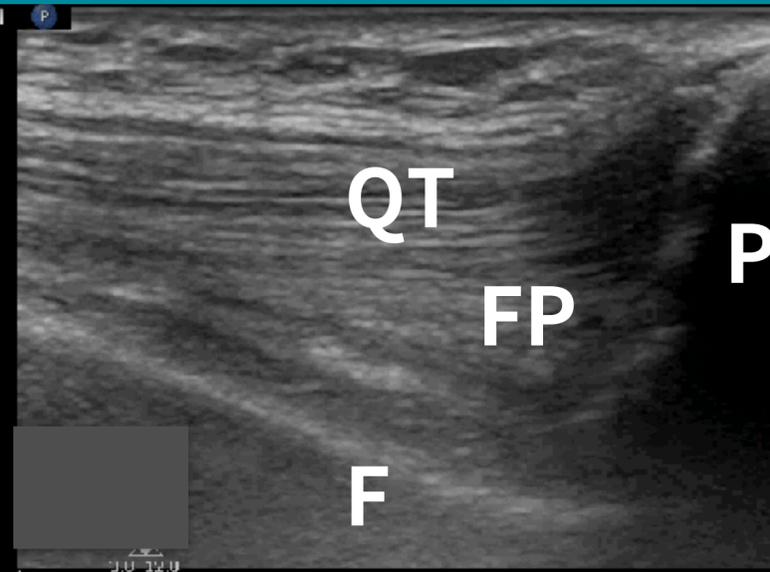


血腫

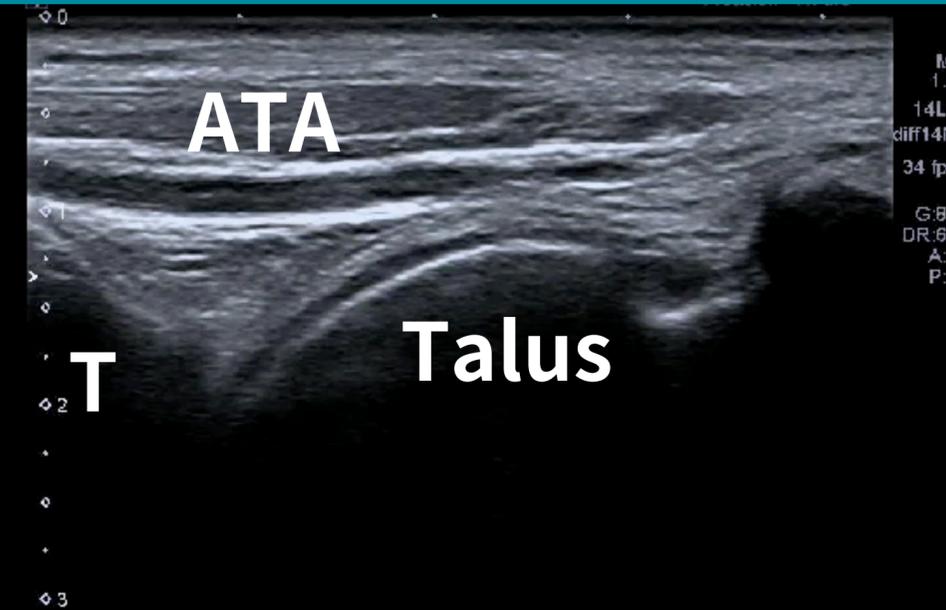
LE Joint effusion



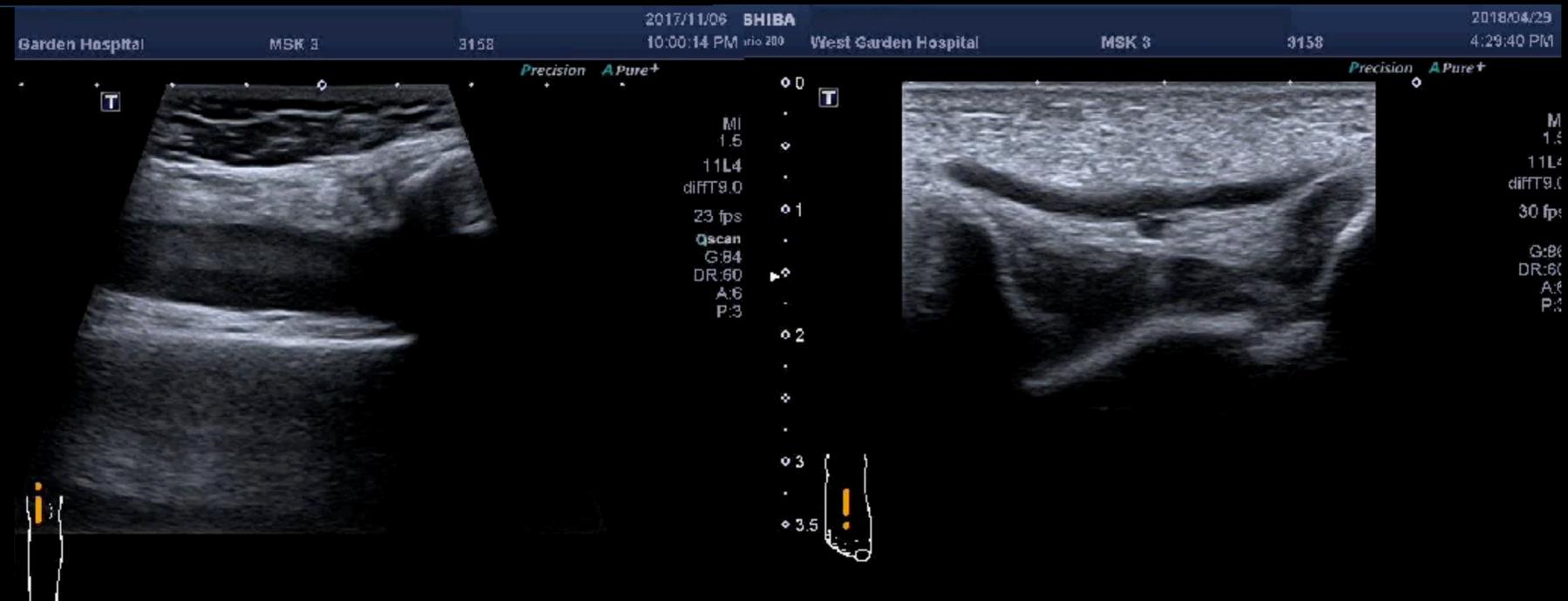
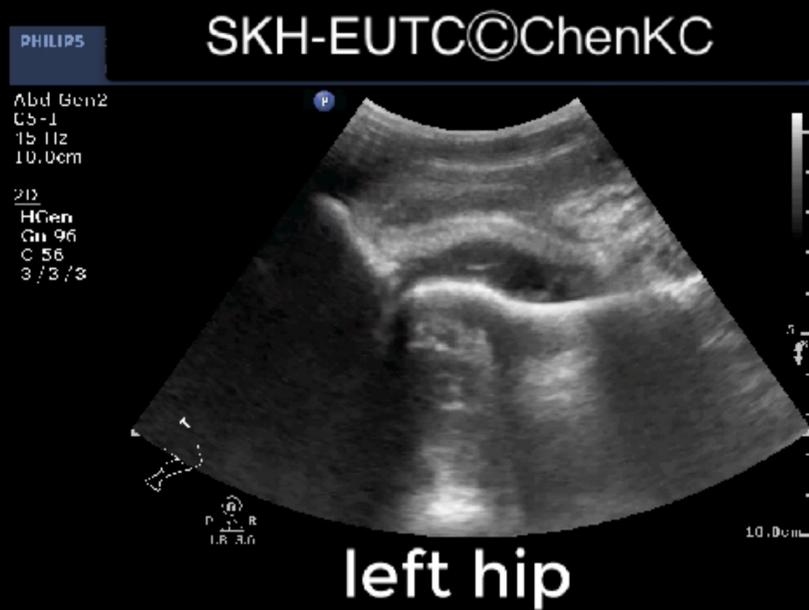
Hip



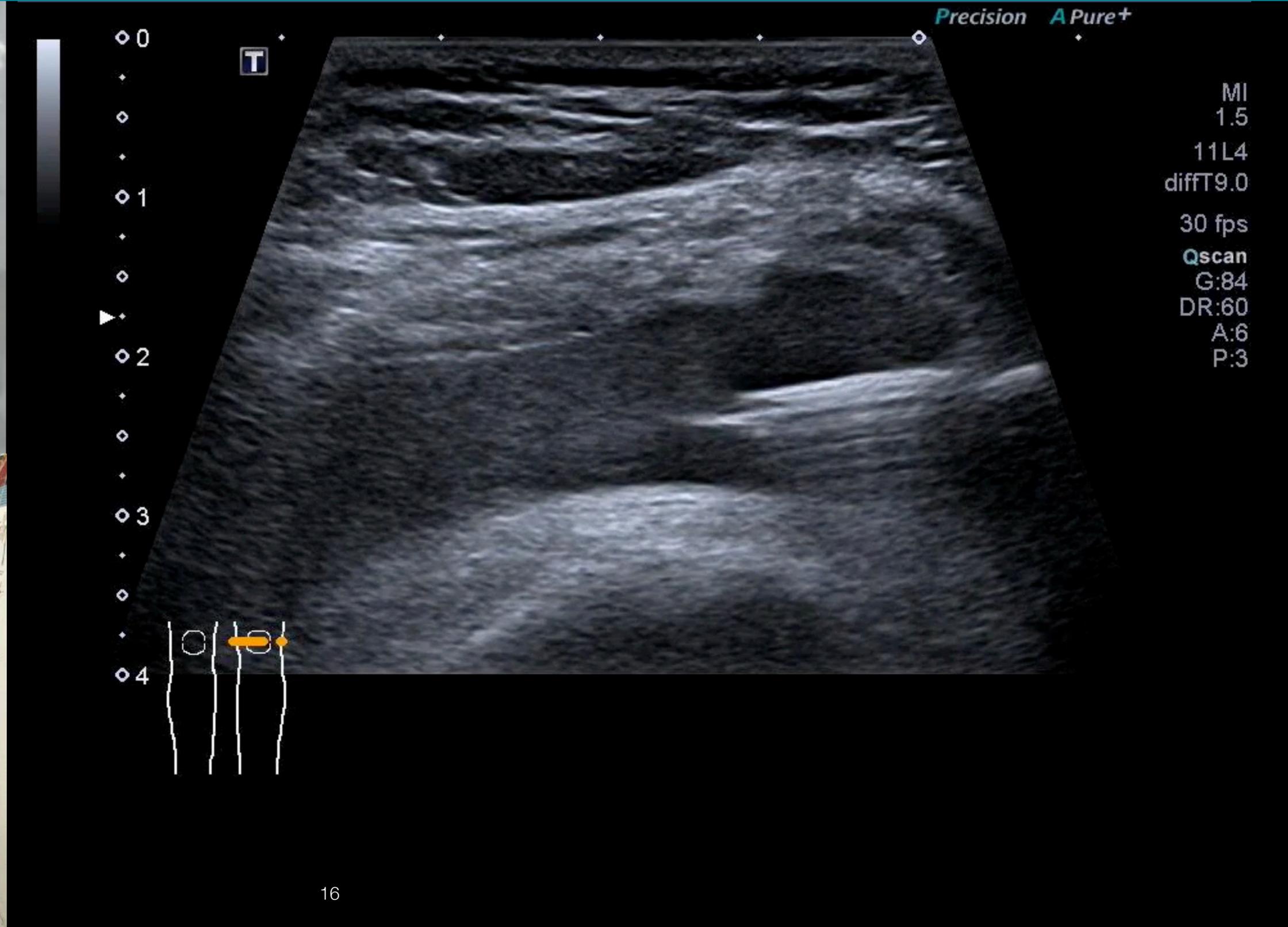
Knee



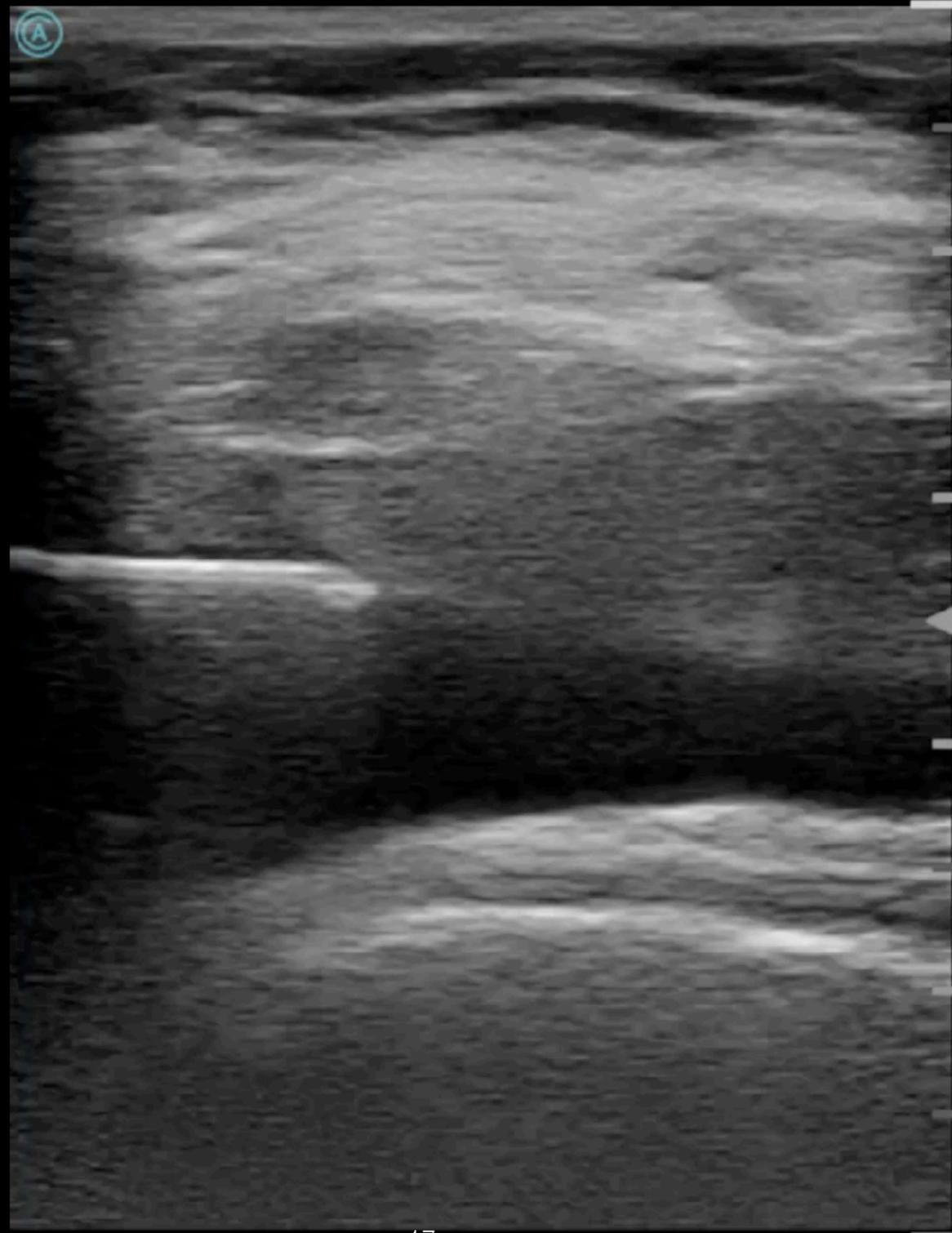
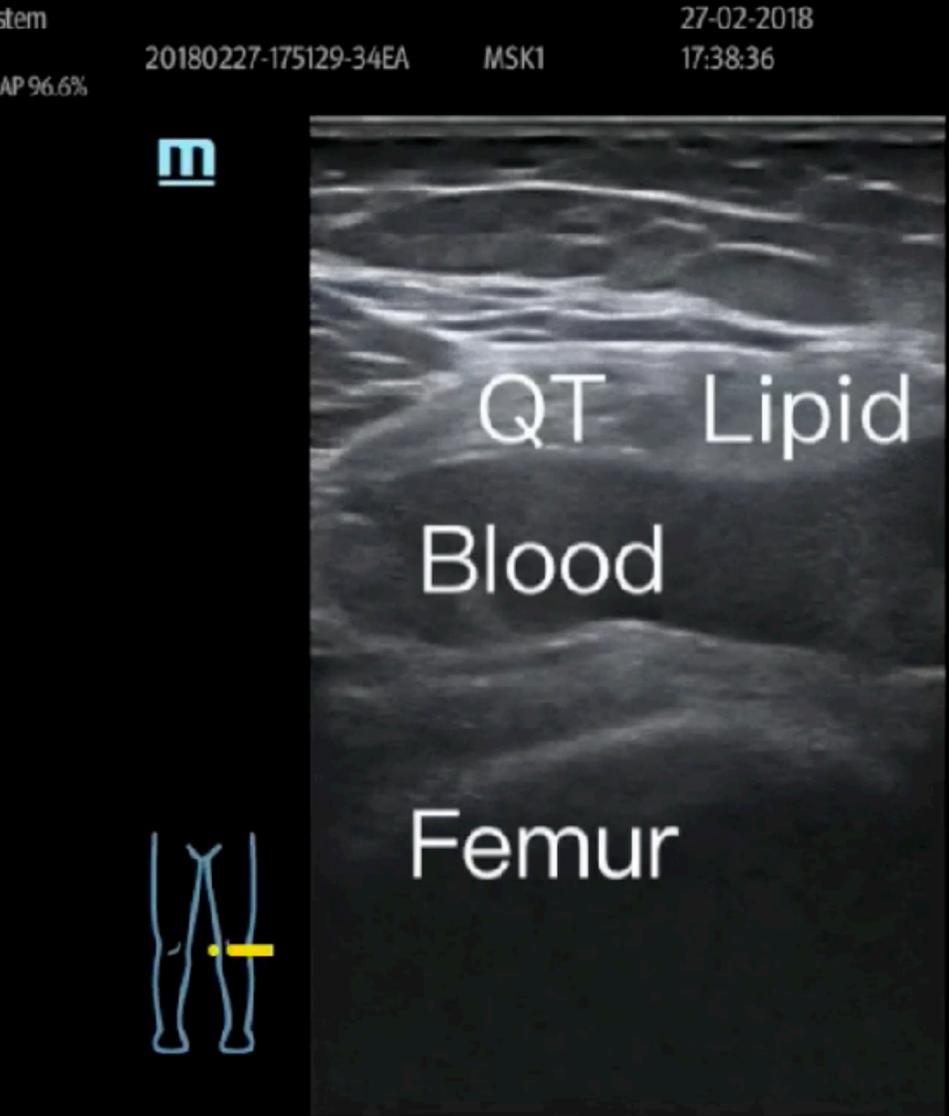
Ankle



Needling for hemarthrosis



Lipohemarthrosis

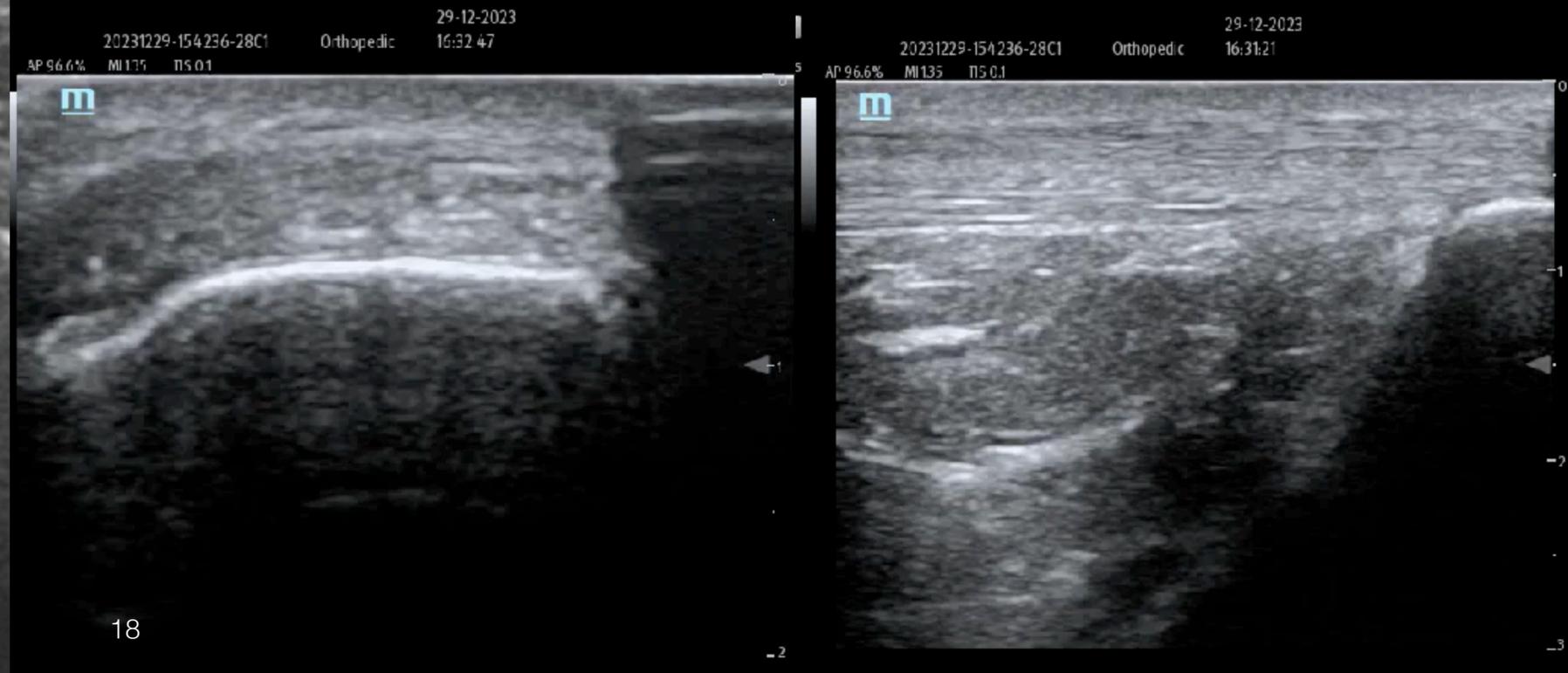
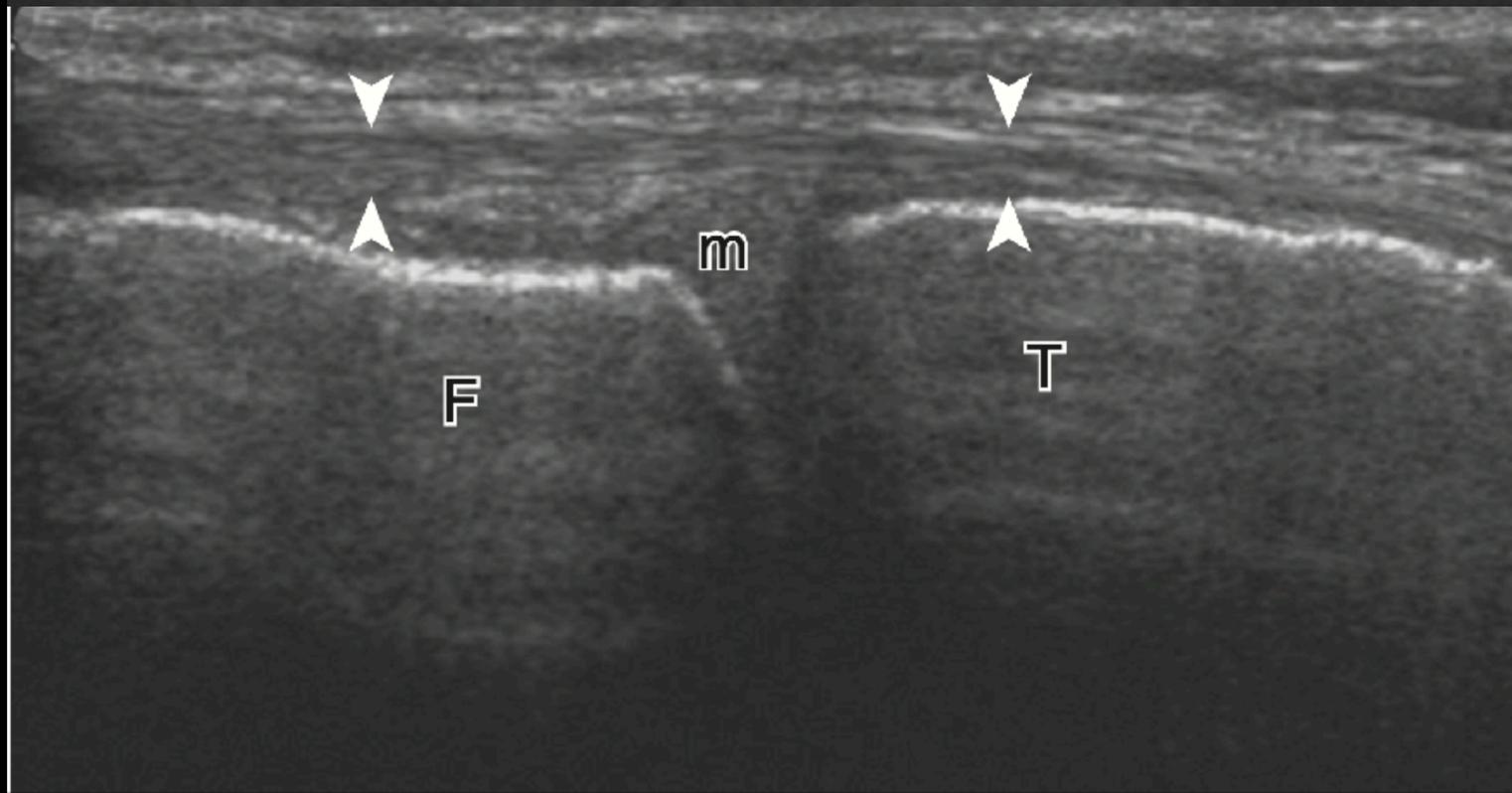
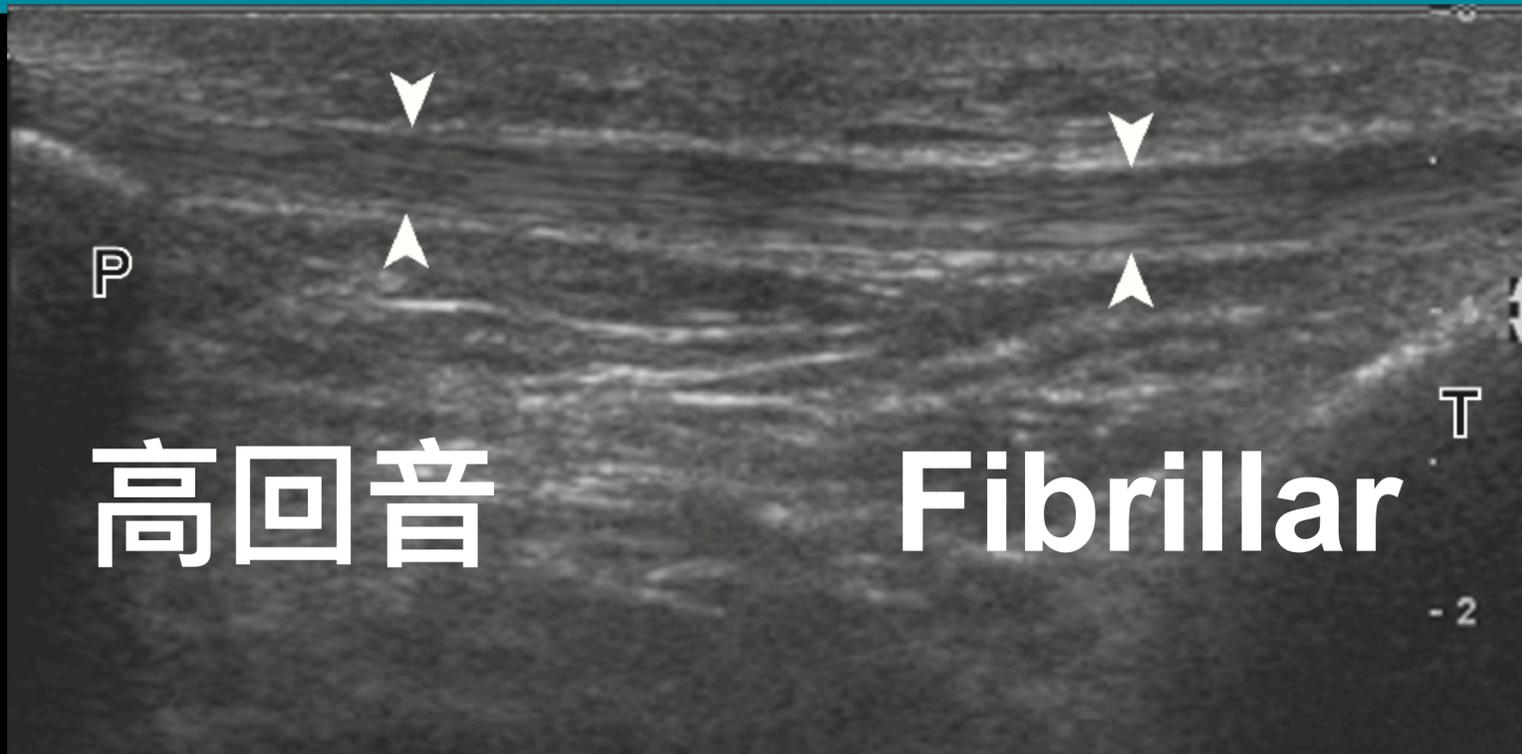


膝關節橫向掃描

Tendon 韌帶

Grade of Injury

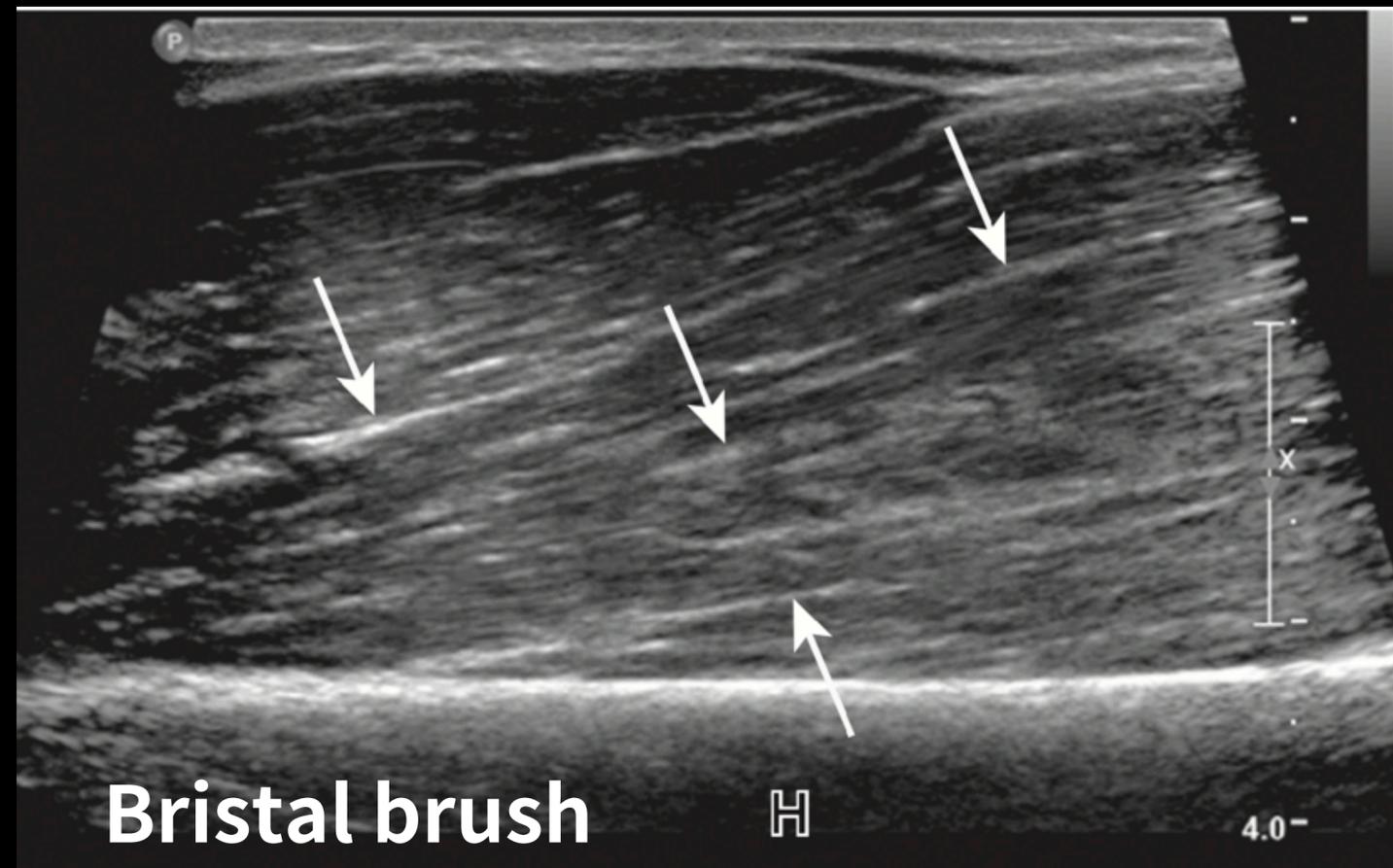
- I : no fiber disruption
- II : partial fiber disruption
- III: complete fiber disruption



Muscle 肌肉

Grade of Injury

- I : no fiber disruption
- II : partial fiber disruption
- III: complete fiber disruption



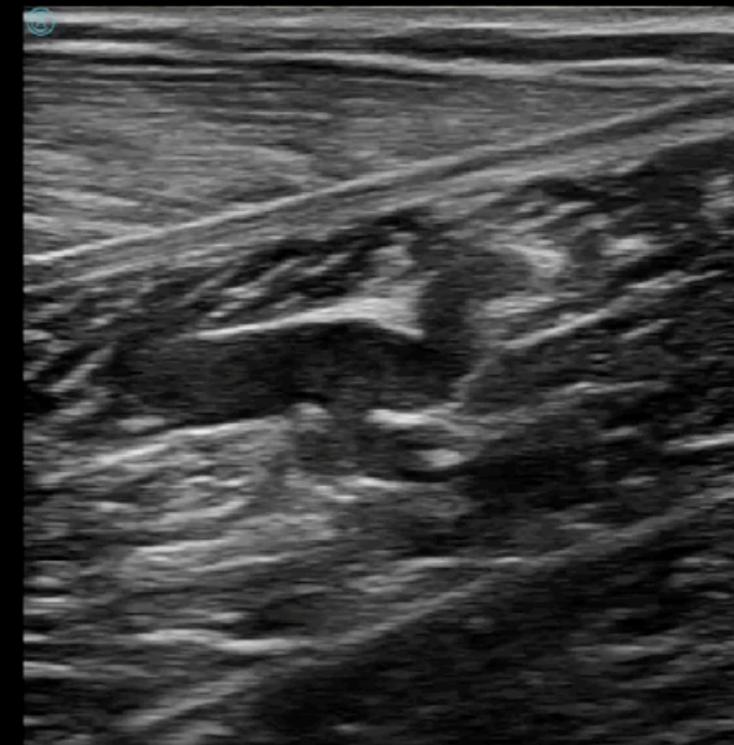
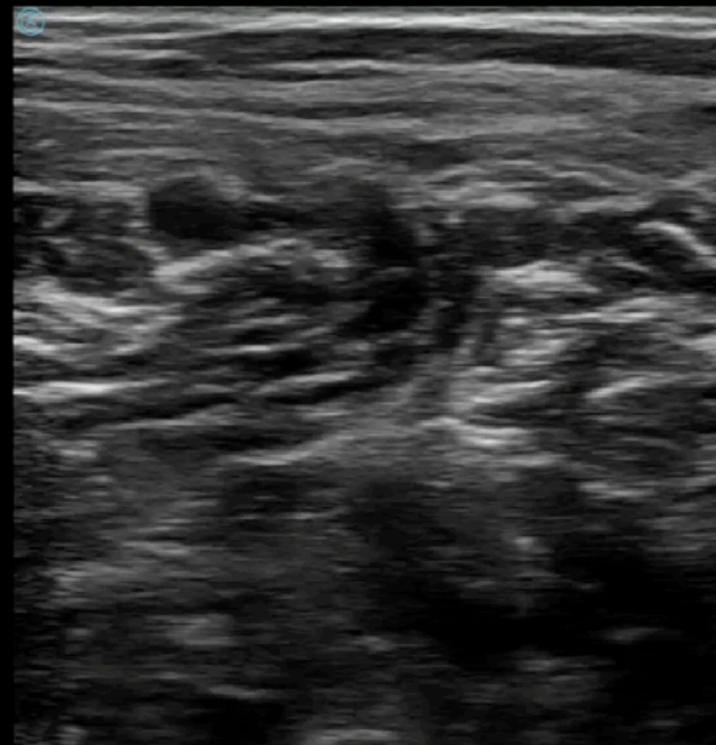
Bristal brush

H

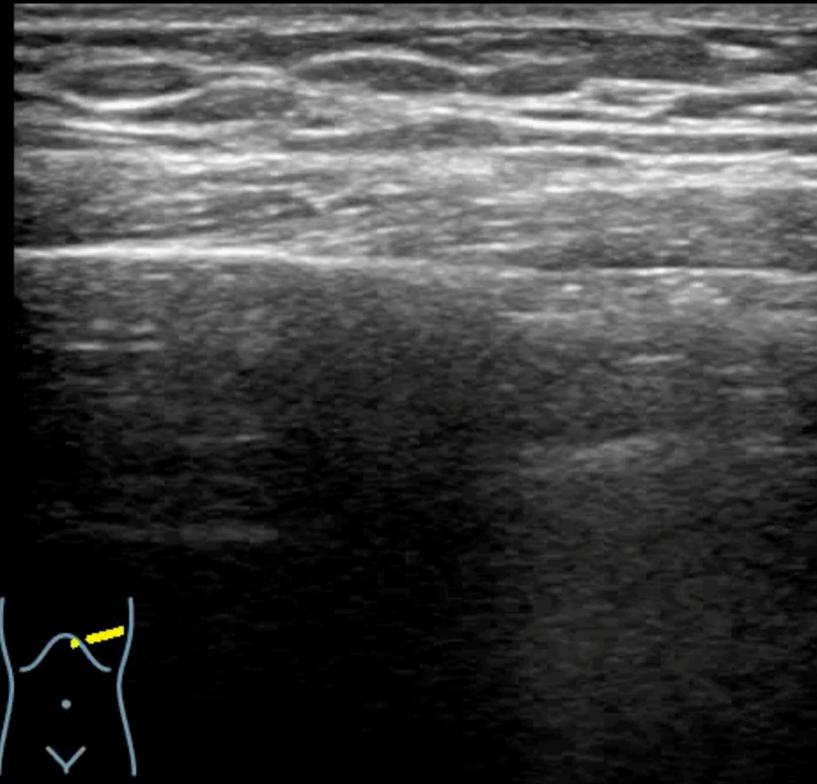
4.0

Hypoechoic
mucle

Hyperechoic
fibroadipose tissue



Subcutaneous tissue



Subcutaneous Emphysema

Subcutaneous Hemorrhage

Subcutaneous Hematoma

軟組織感染症

蜂窩性組織炎



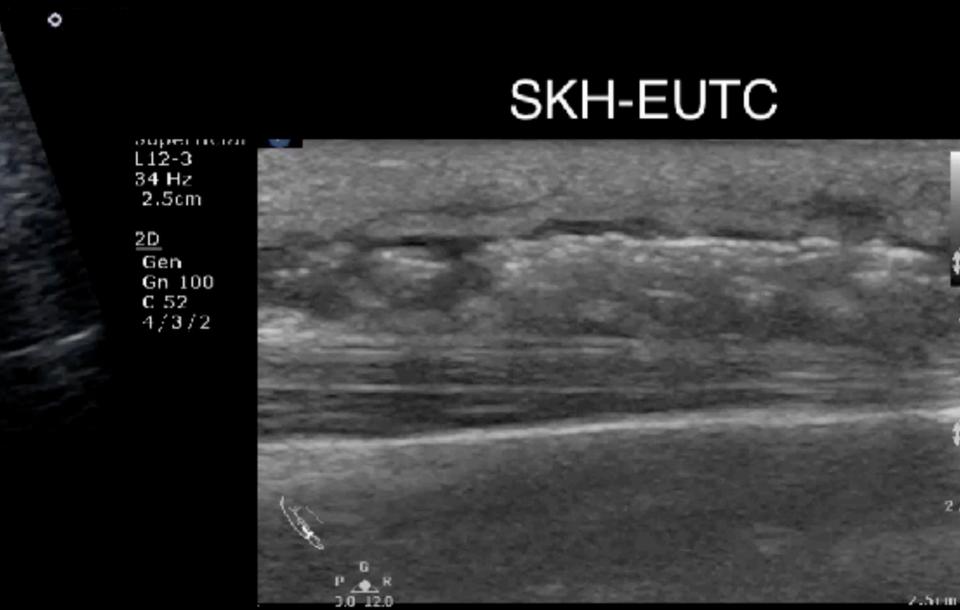
Cobblestone

膿瘍



Collection

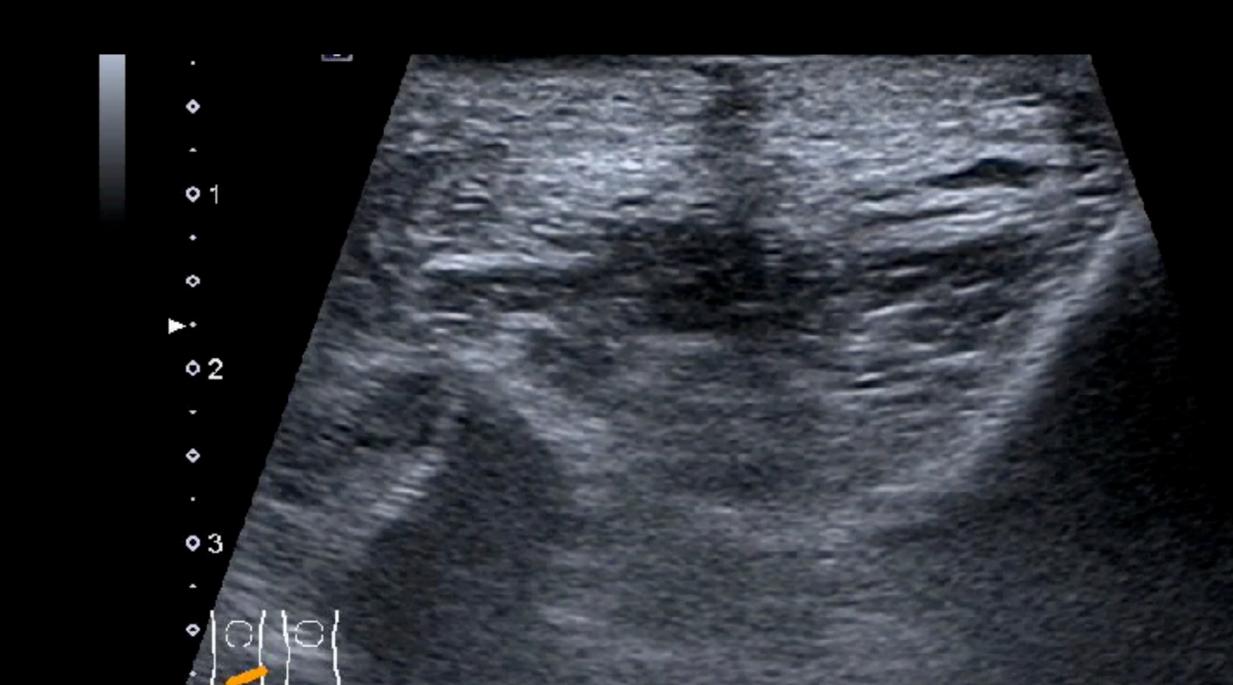
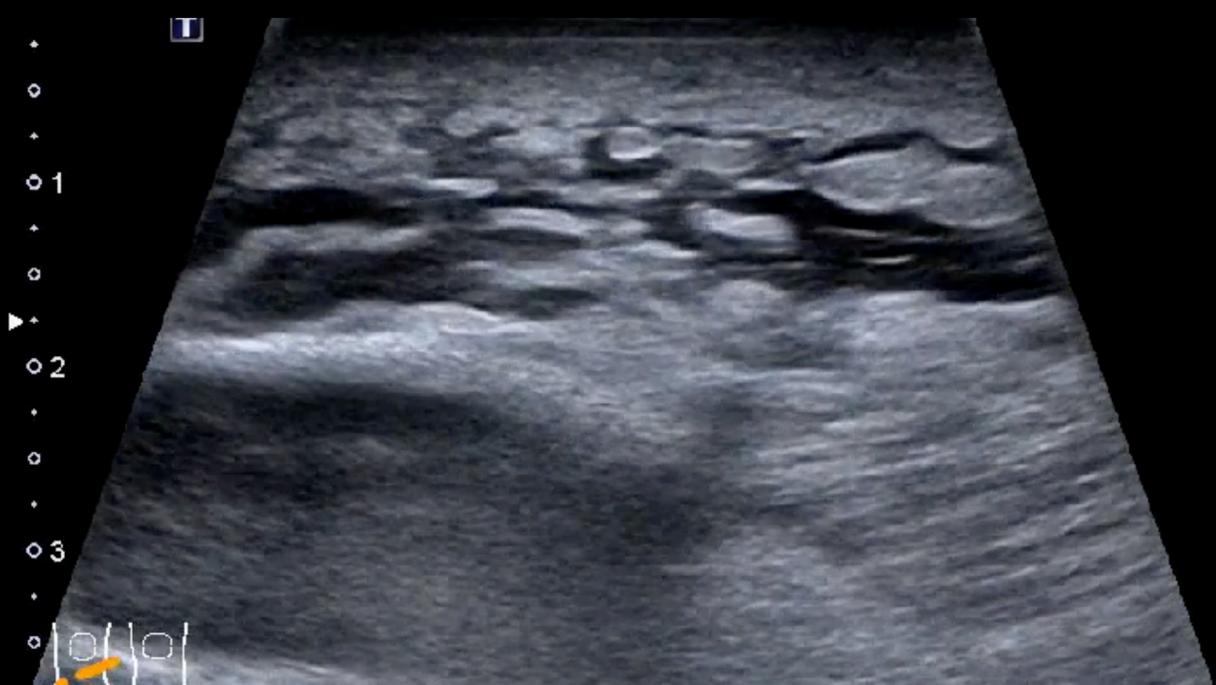
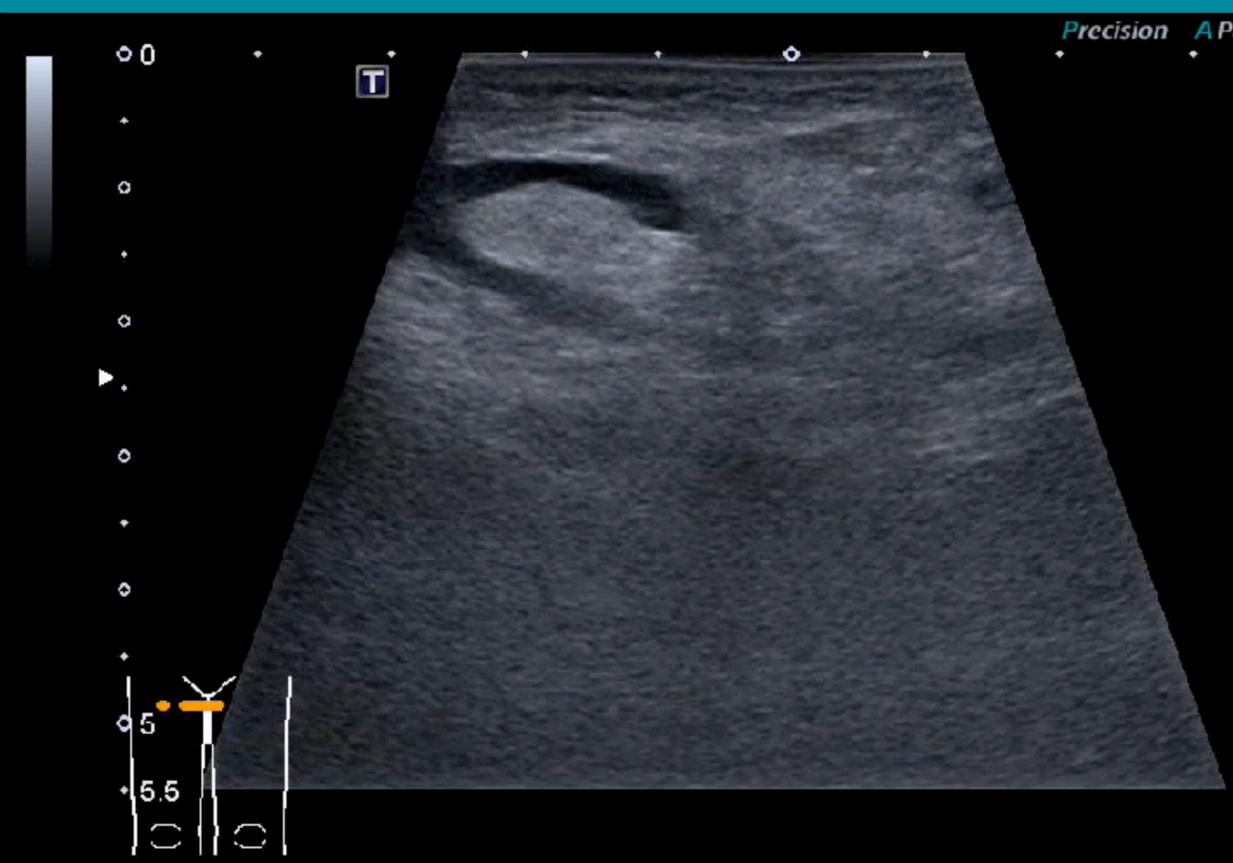
壞死性筋膜炎



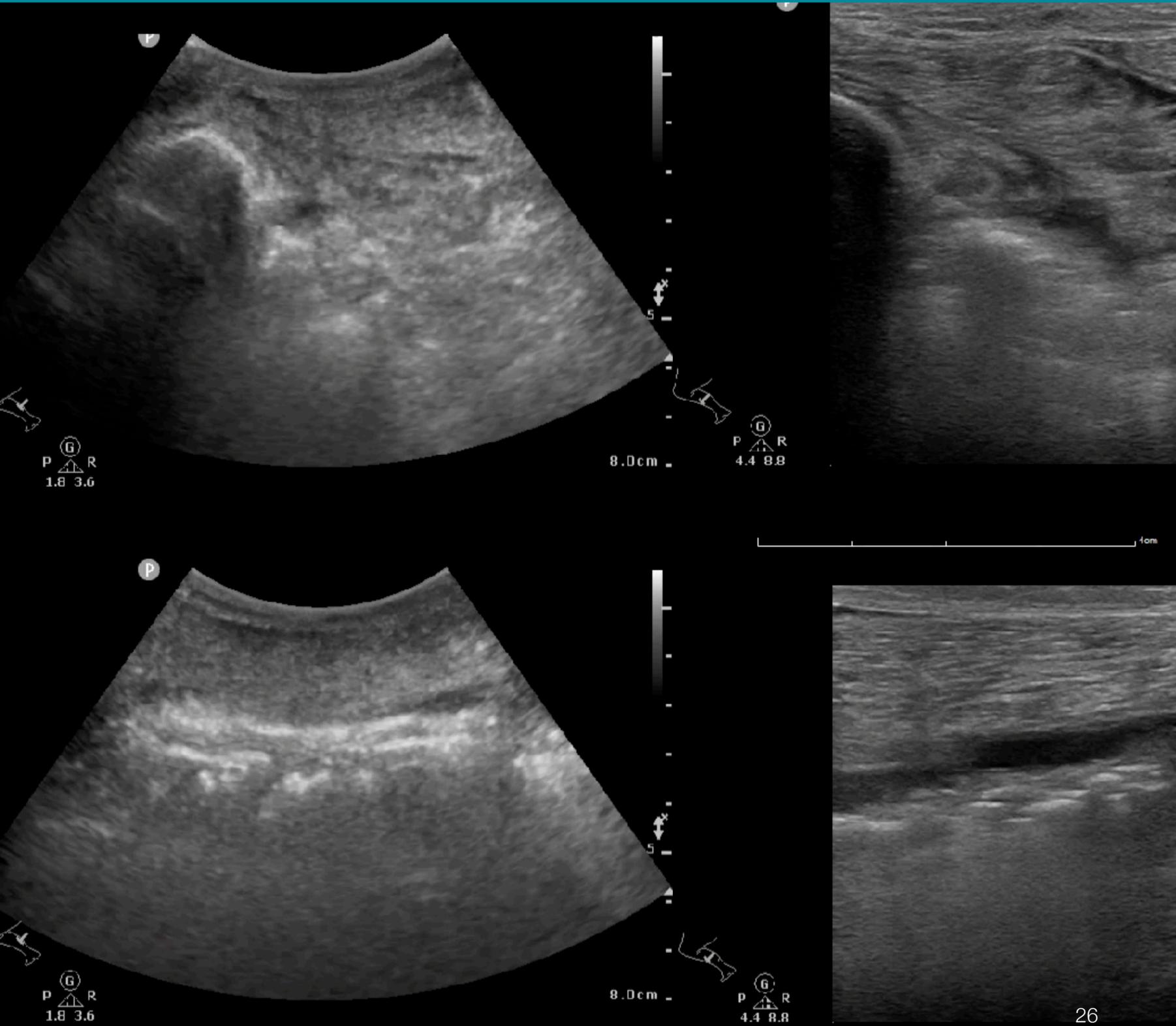
Air >> hyperechoic + dirty shadow

Subcutaneous
Thickening
Air
Fascial
Fluid

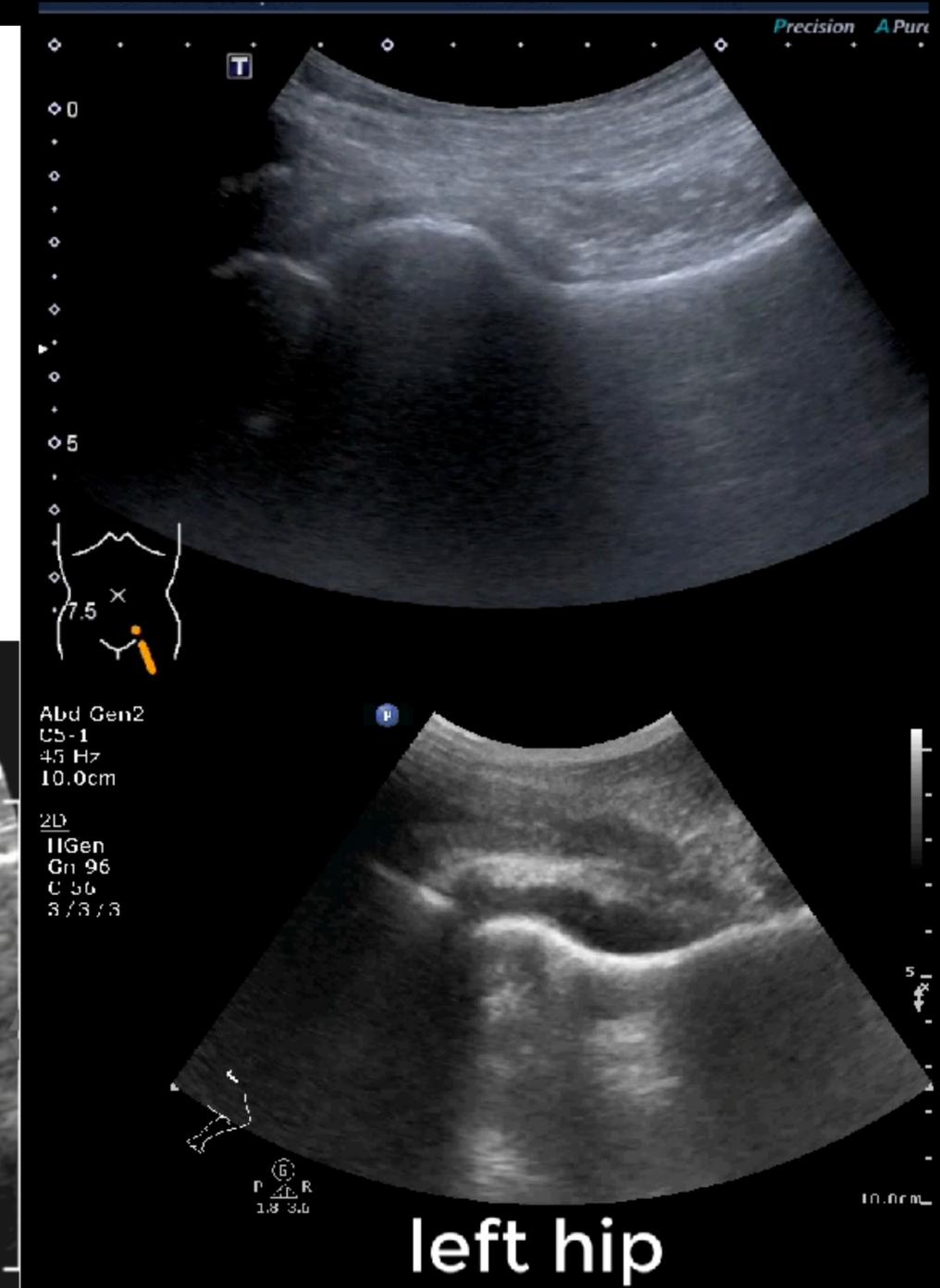
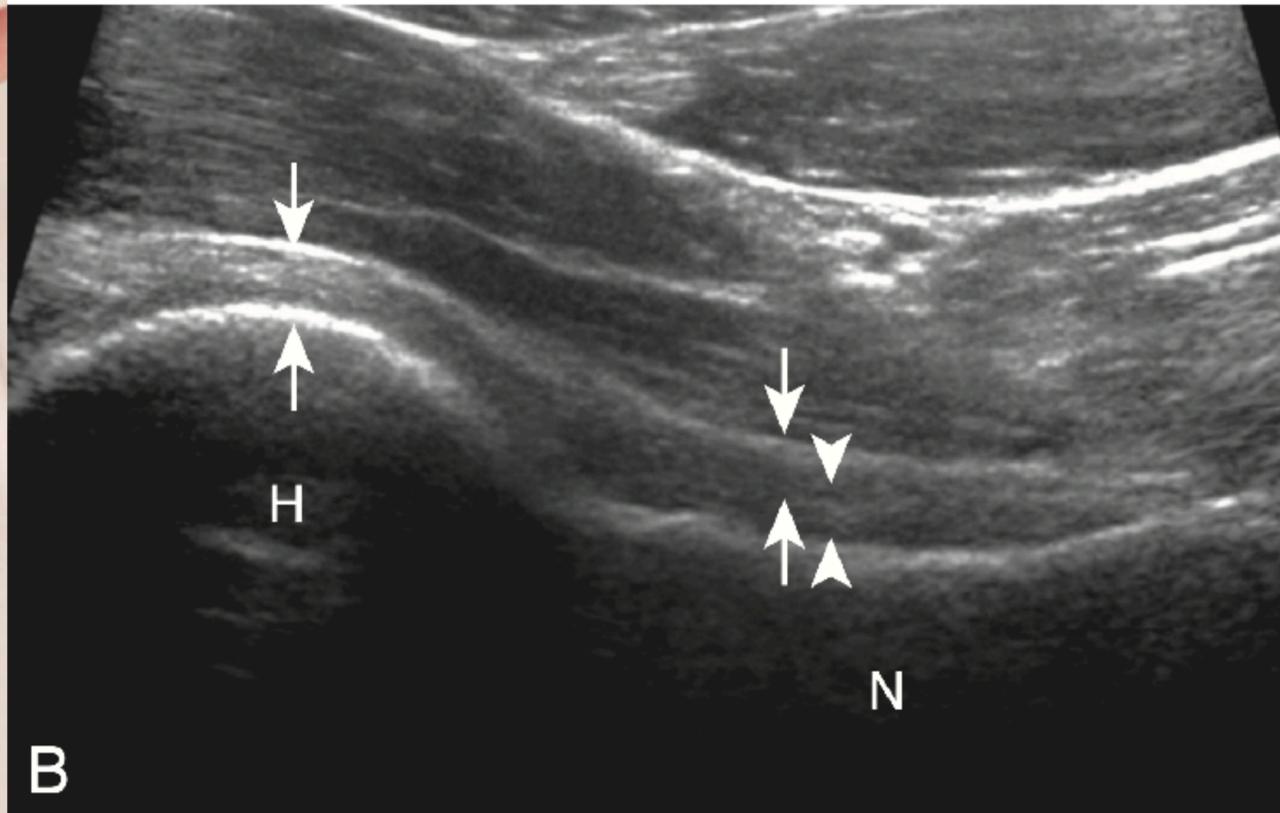
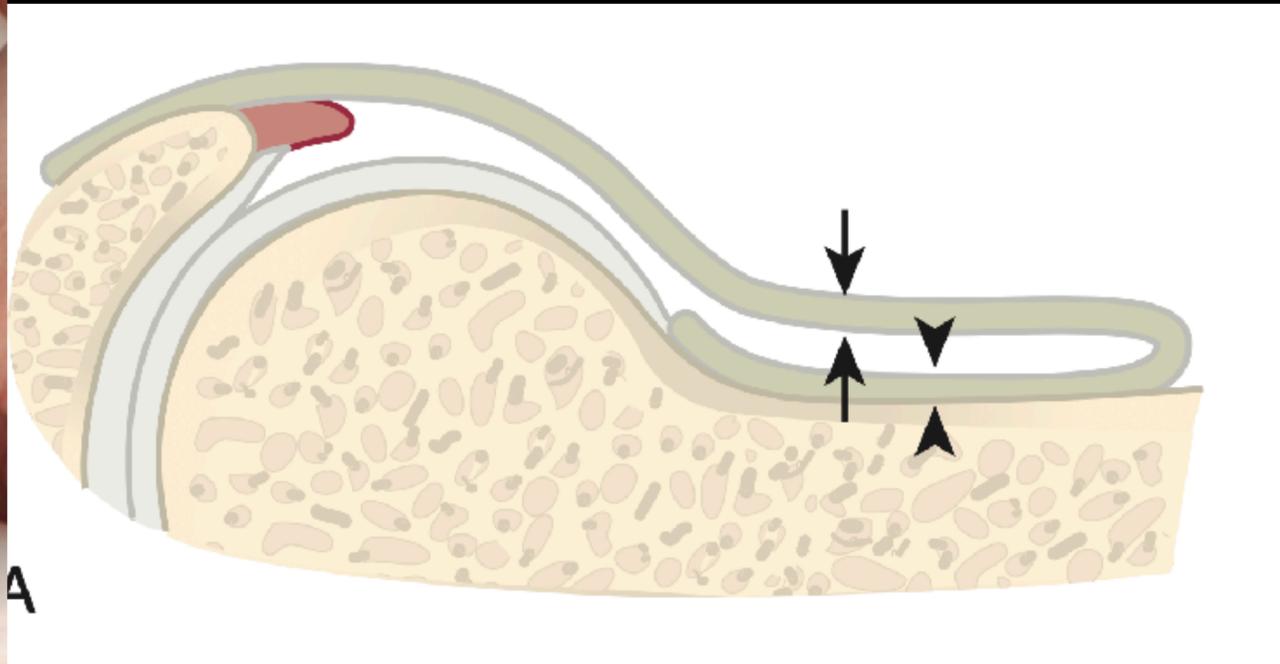
86F, right leg swelling, BT 39, CRP 15



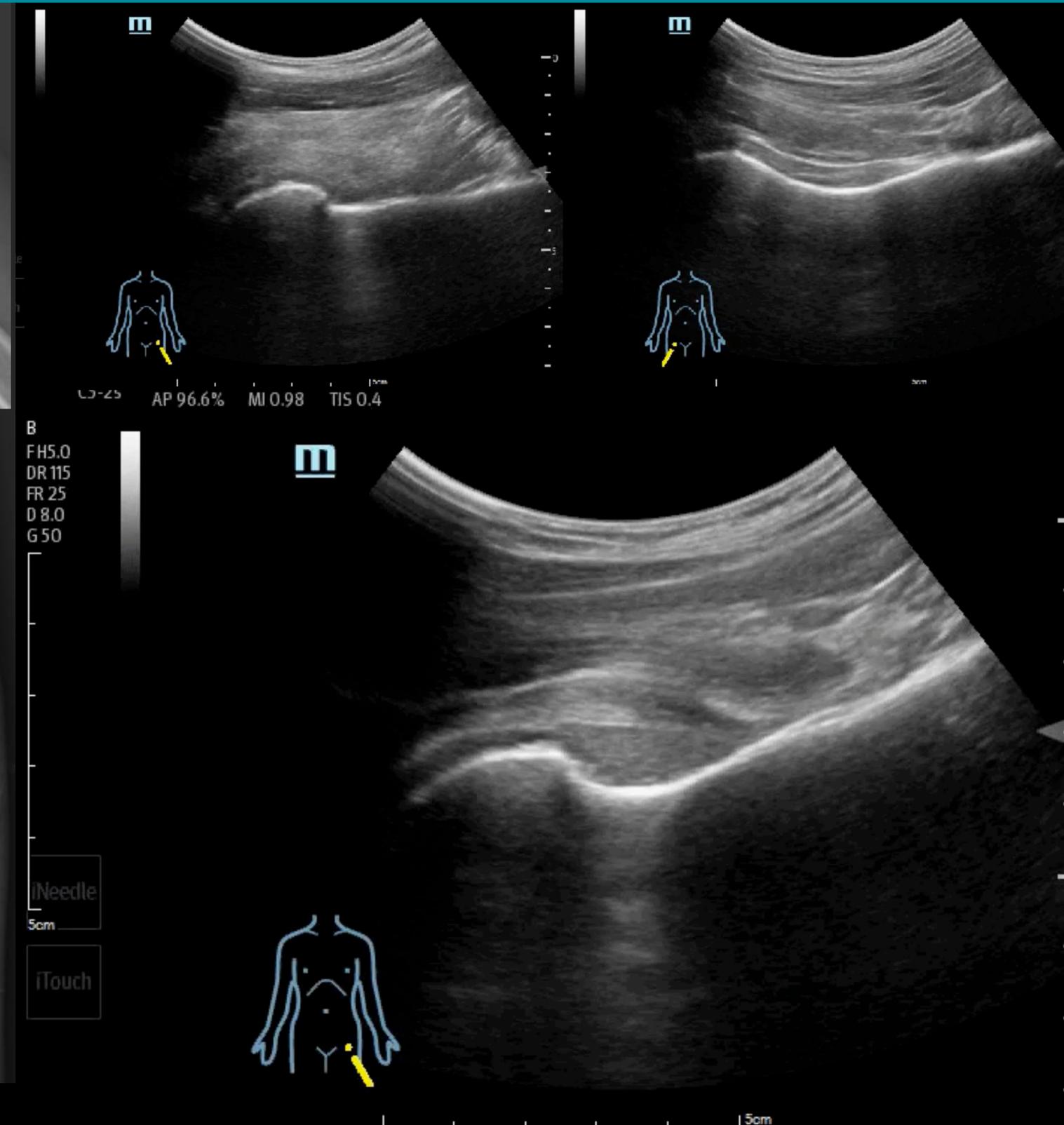
69M, back pain & right leg pain for 2 wks



Anterior hip joint recess



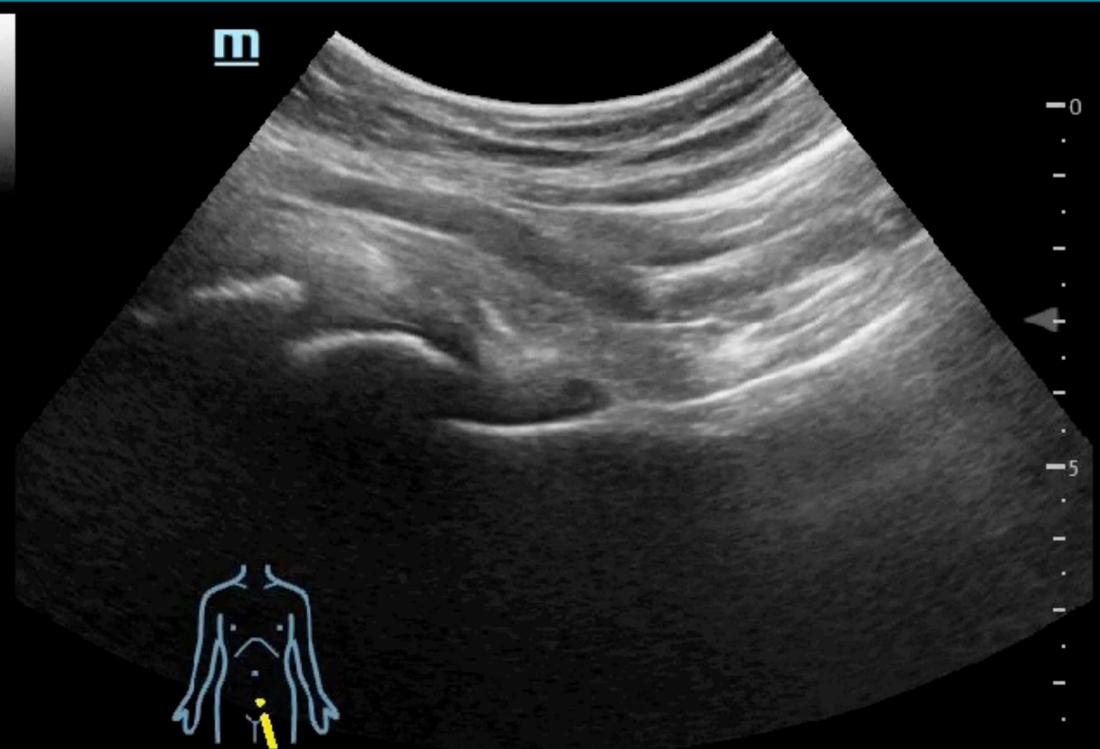
76M, left hip pain due to falling injury



86F, 廁所出來跌倒，左髖疼痛

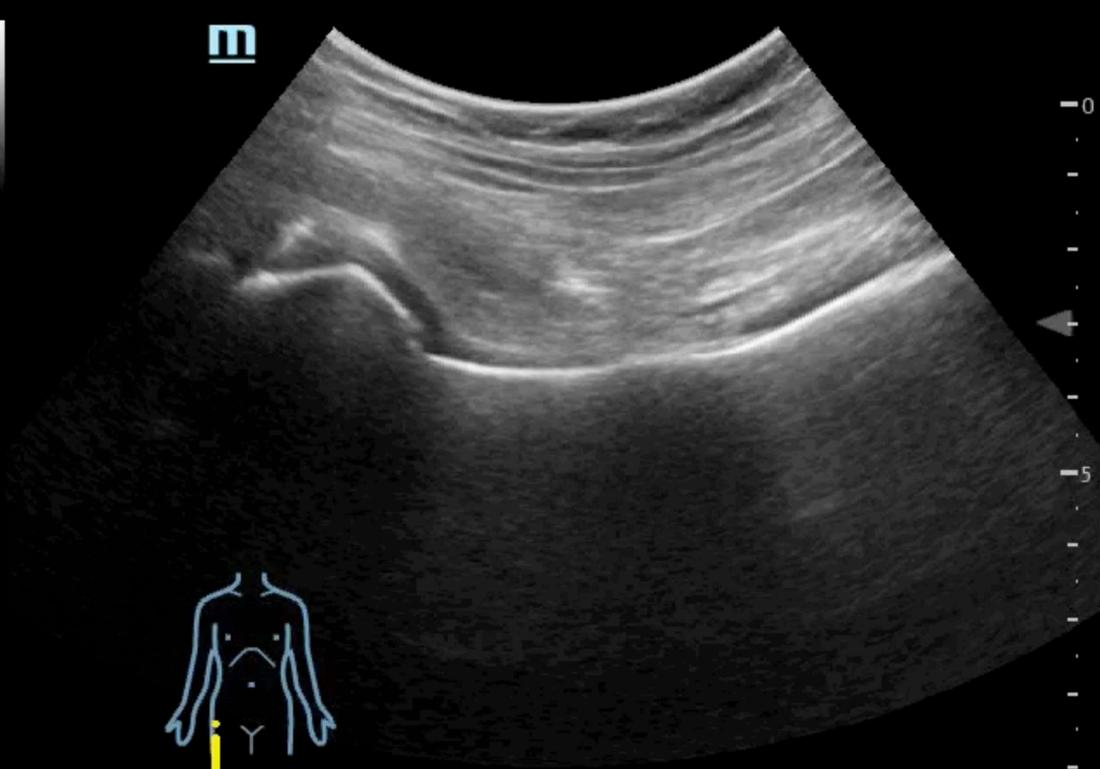


B
FH5.0
DR115
FR23
D9.0
G58



iNeedle
iTouch

E
FH5.0
DR115
FR23
D9.0
G58

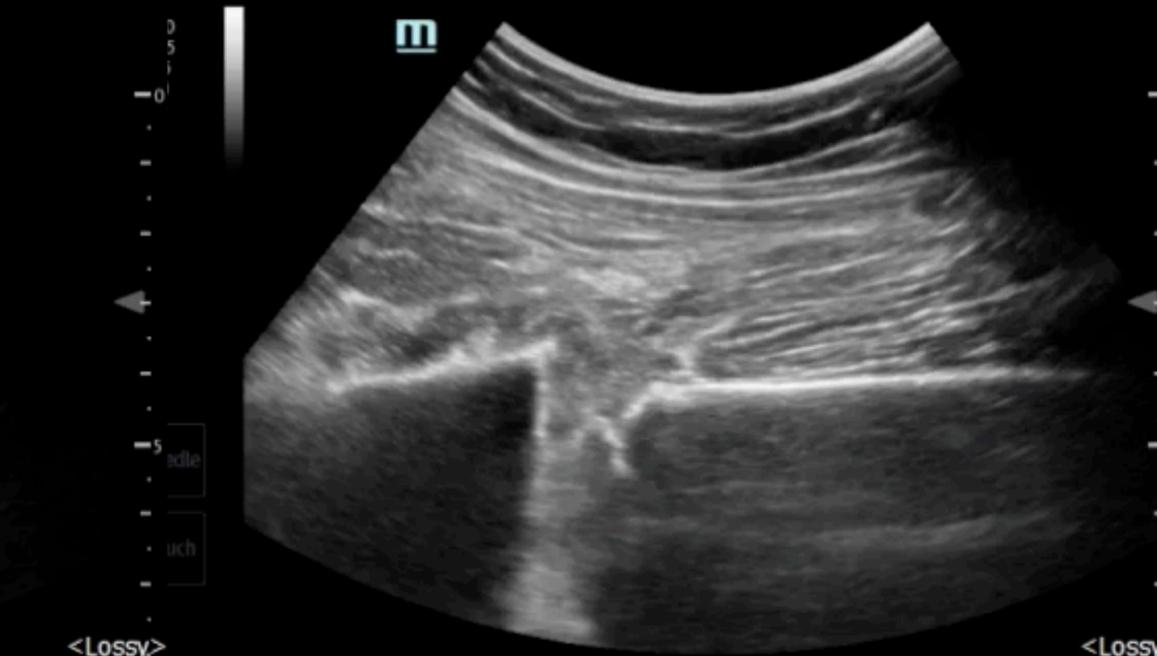
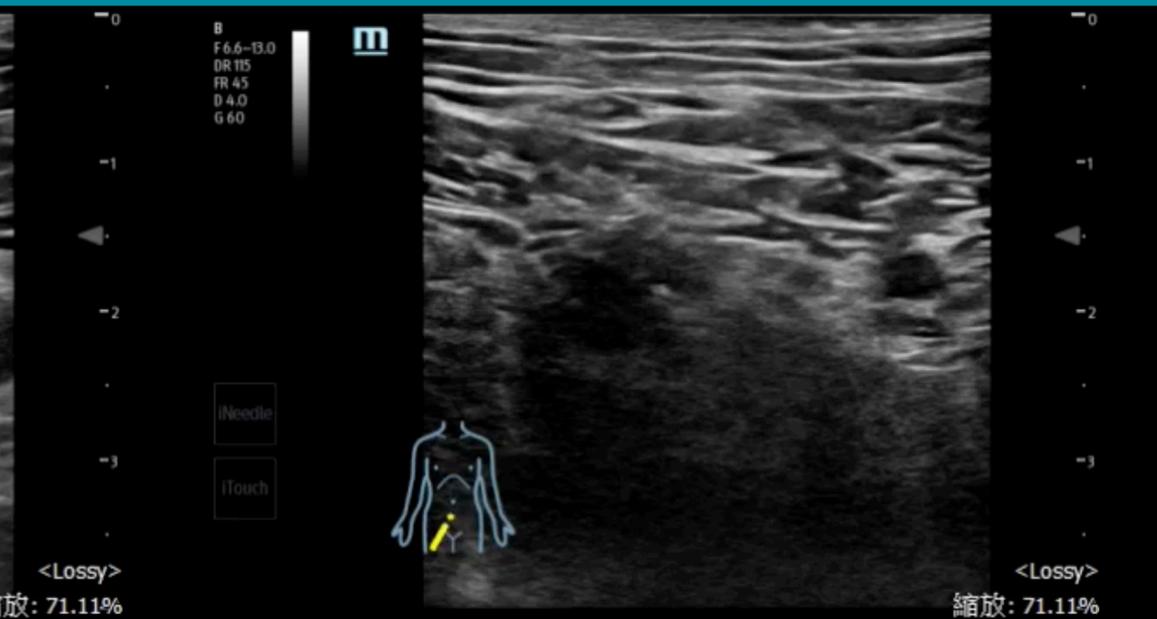
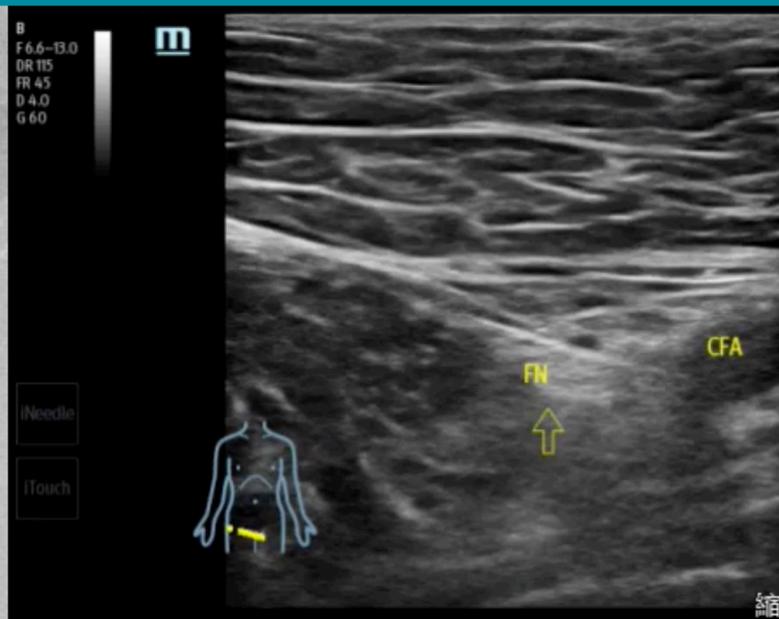
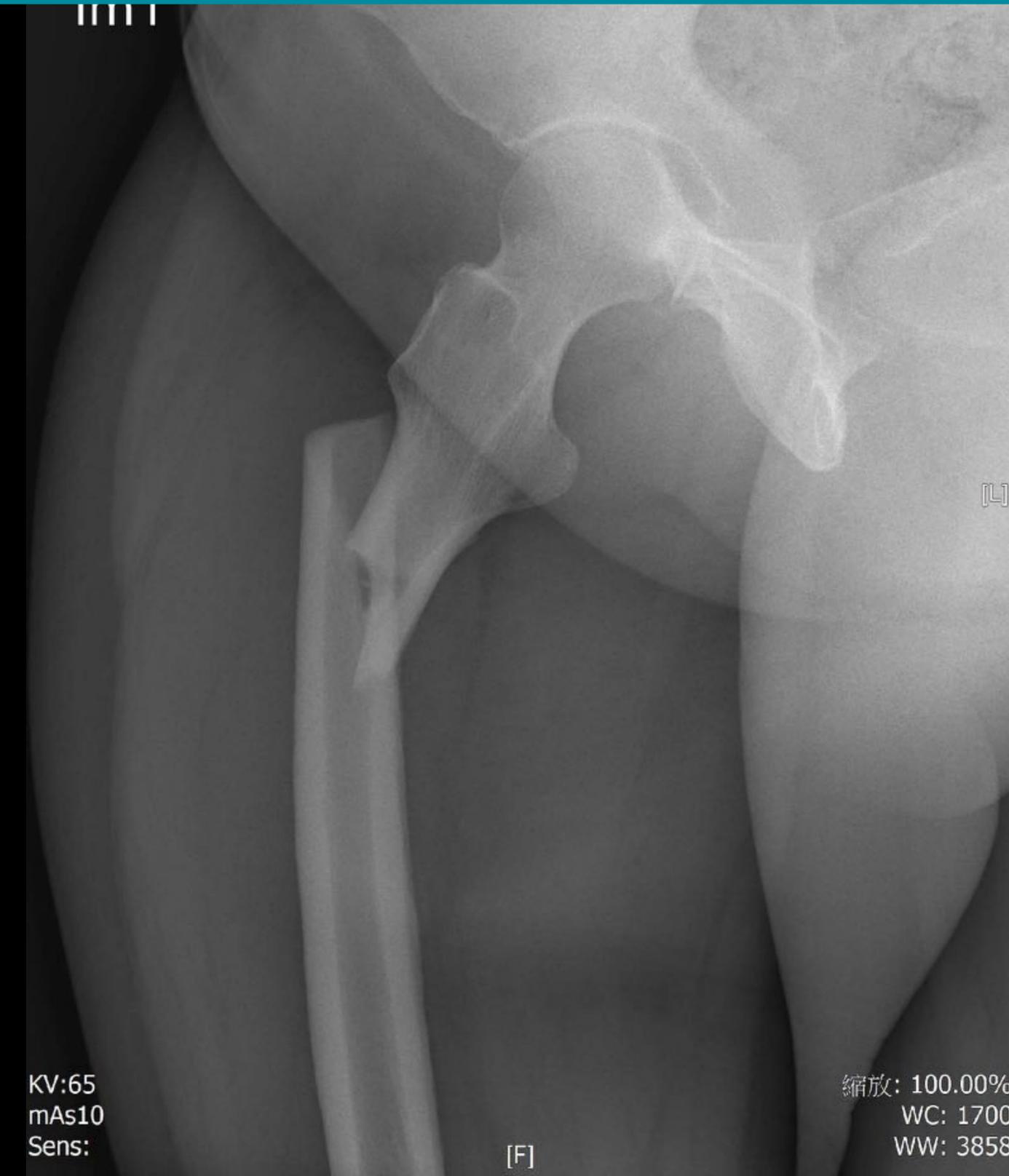


iNeedle
iTouch



01.43.56
401

64F, TA with right thigh painful swelling



61F, left knee injury

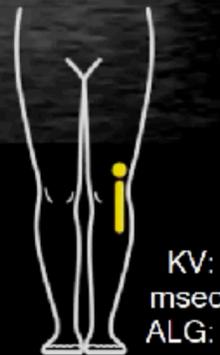


061Y F
ACCES:
2025/07/03

SE: 0
IM: 5

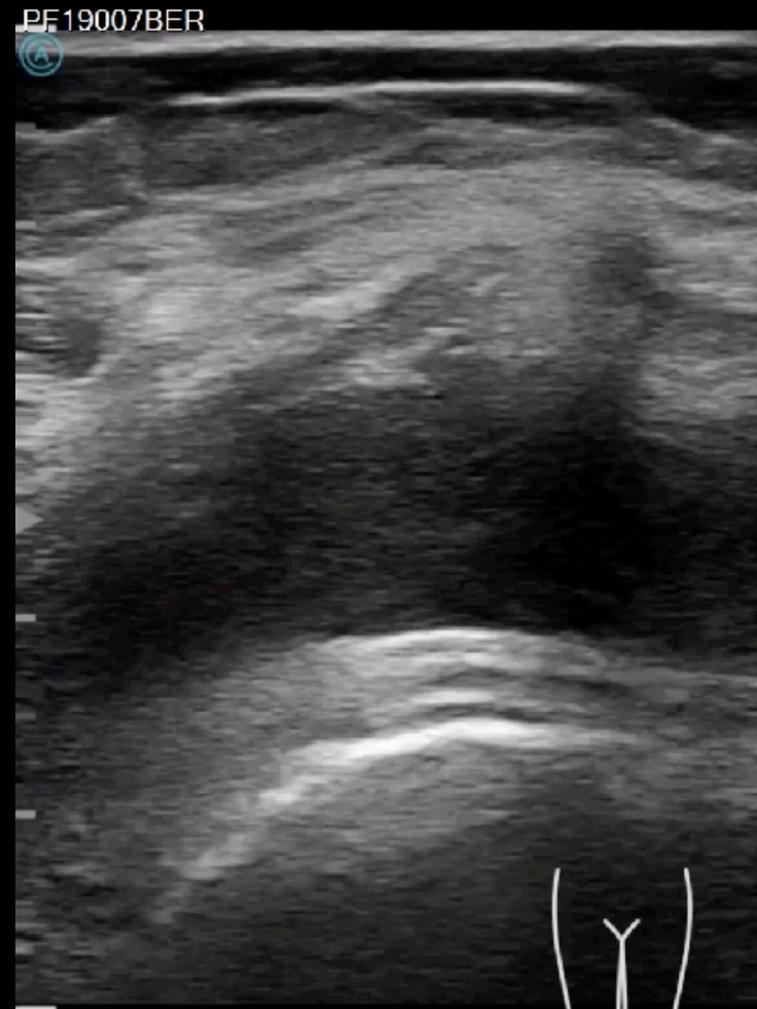


thk: mm
PF19007BER
DFOV:

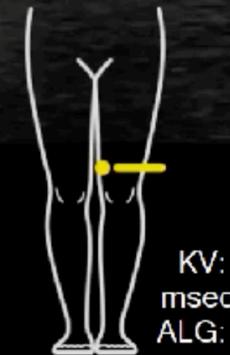


061Y F
ACCES:
2025/07/03

SE: 0
IM: 7



thk: mm
PF19007BER
DFOV:



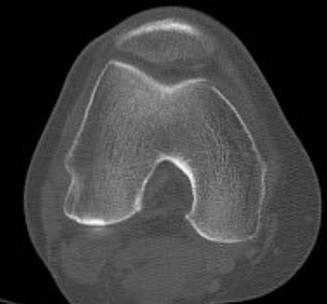
061Y F
ACCES:
2025/07/03

SE: 0
IM: 0



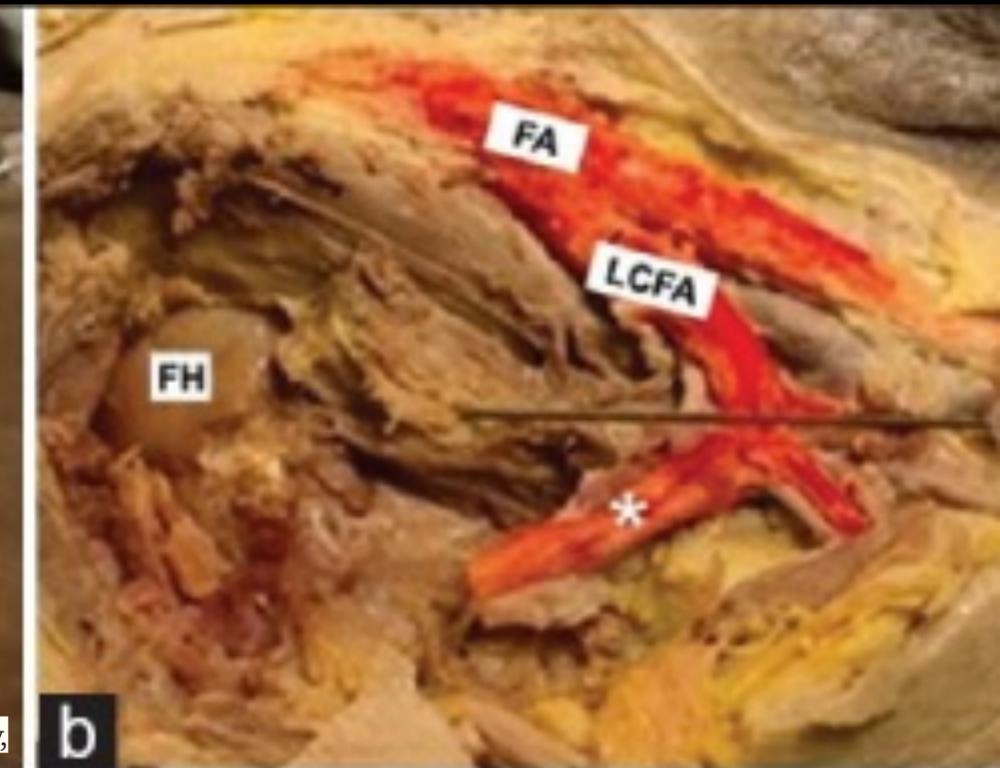
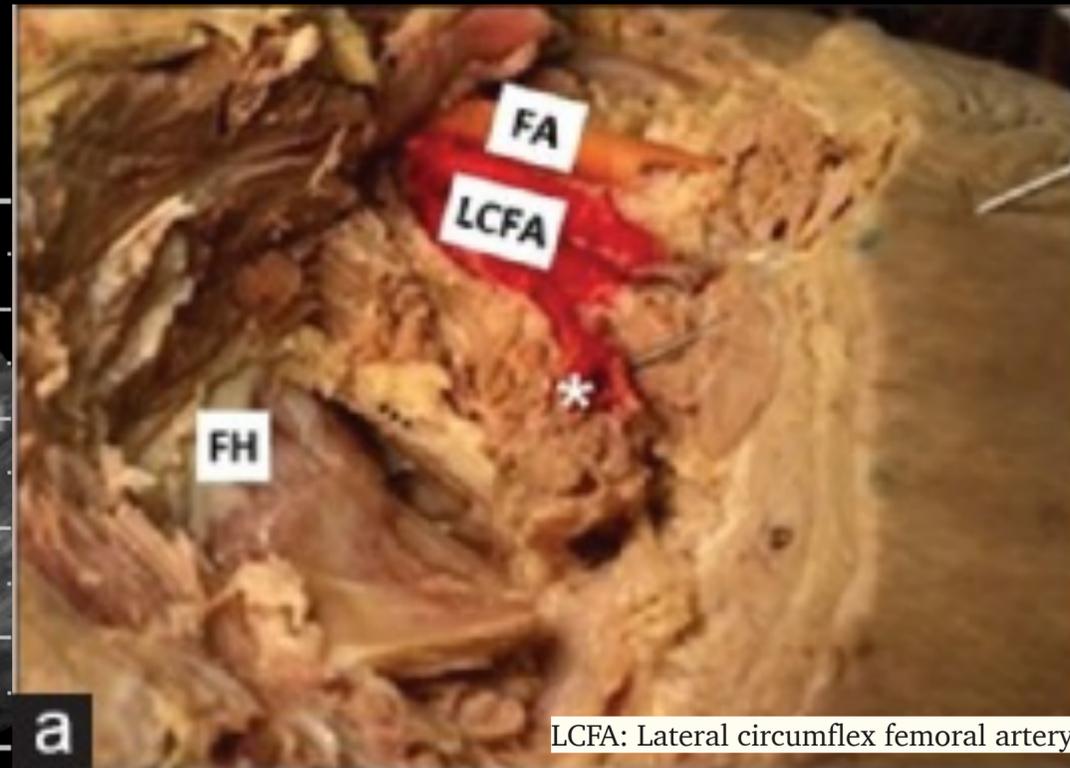
061Y F
ACCES:
2025/07/03
17:08:09
2.5mm Bone

R

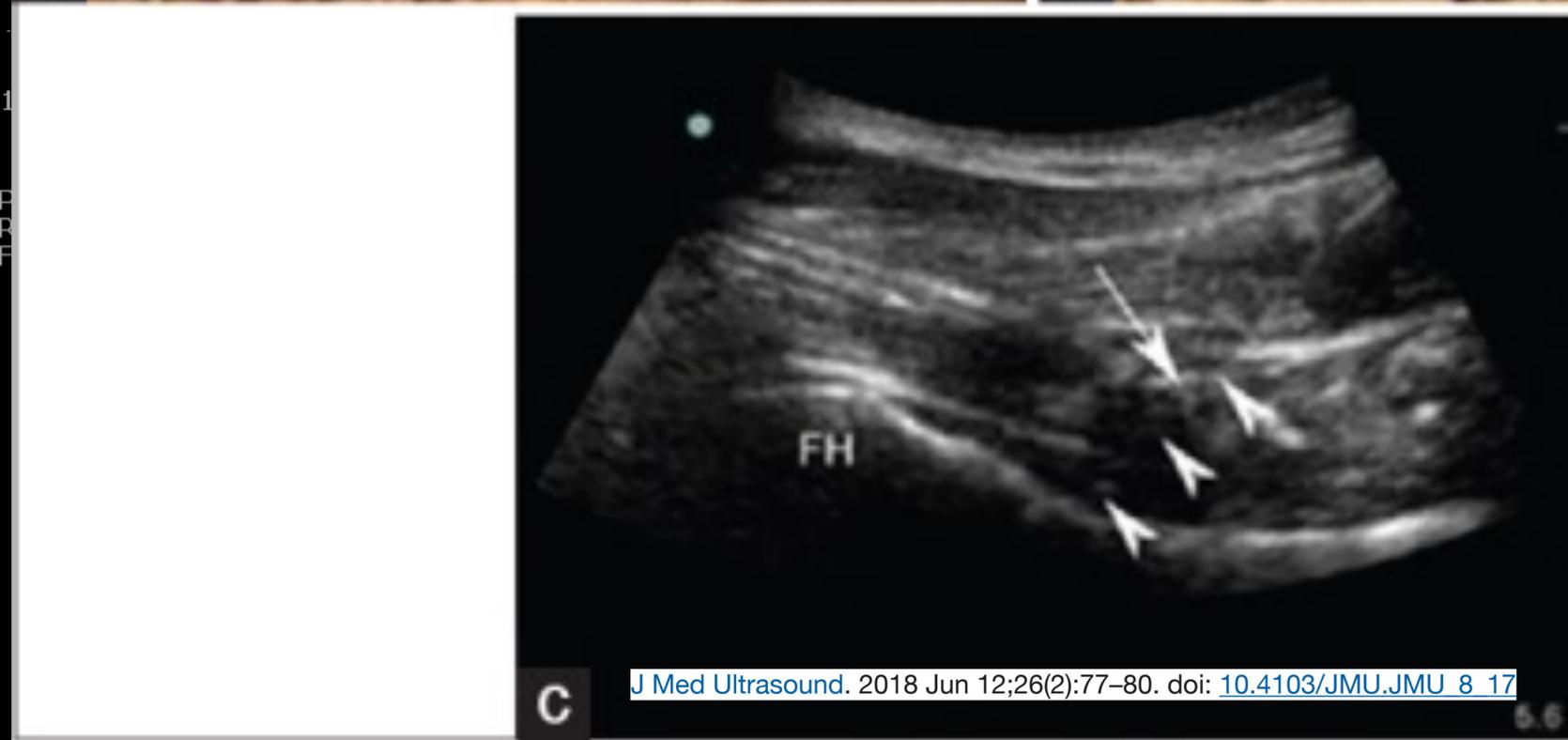
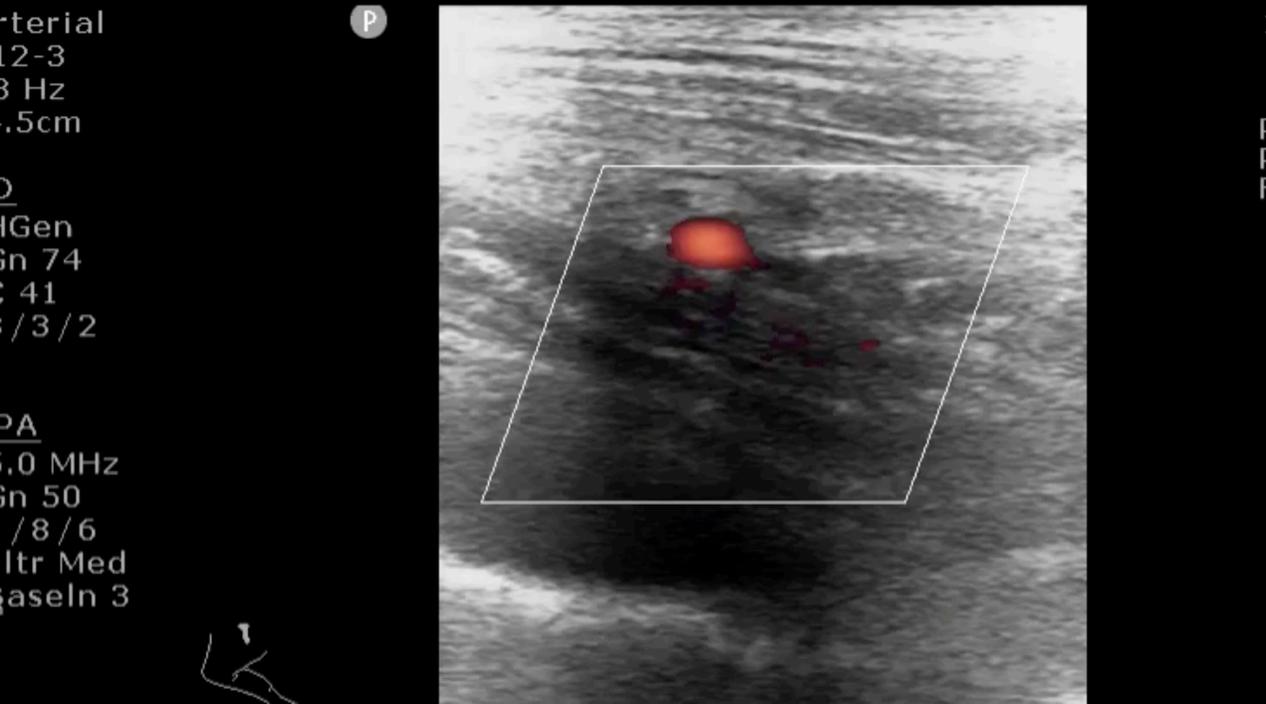


Shuang Ho Hos
3
SE
IM

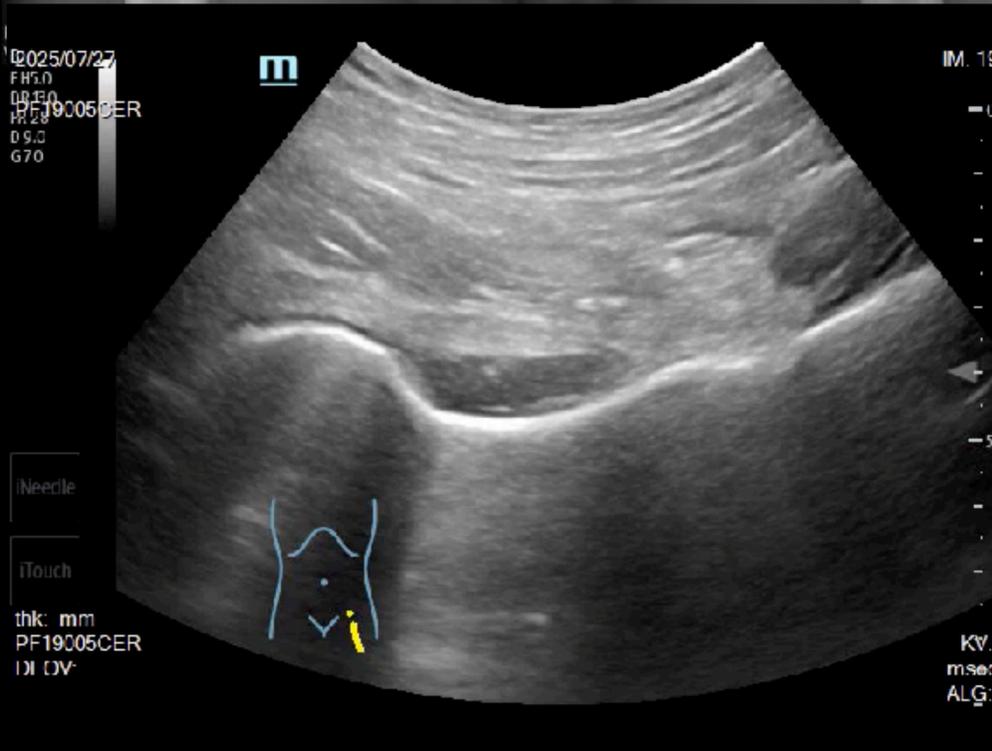
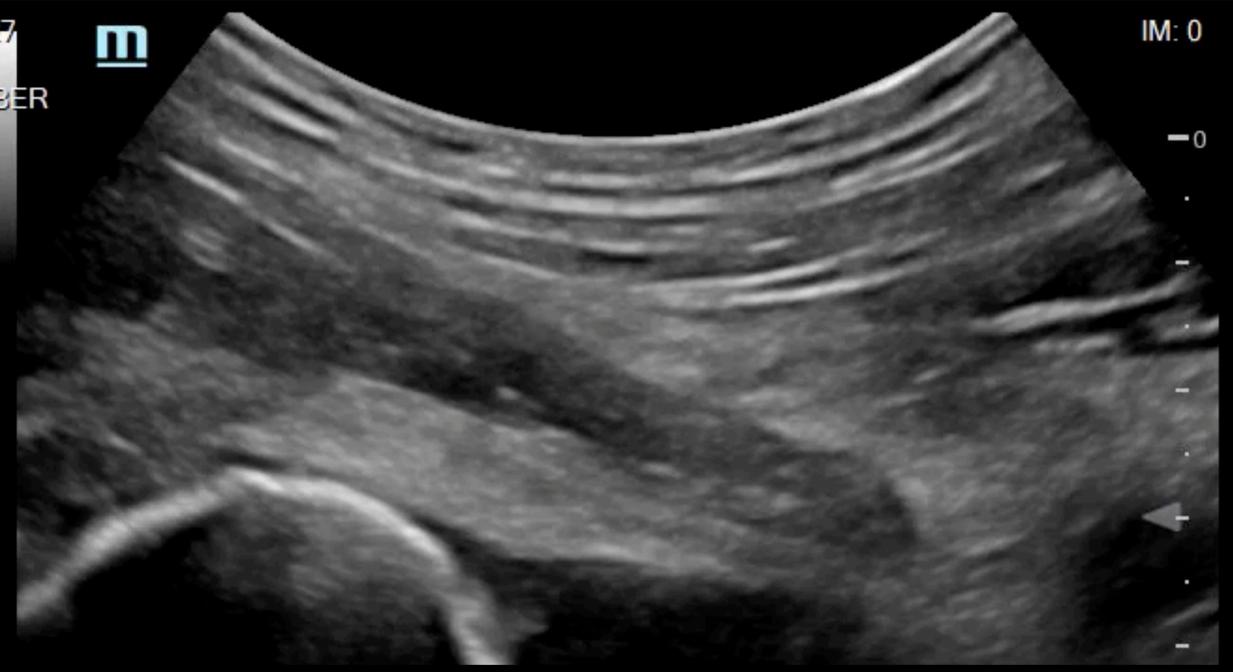
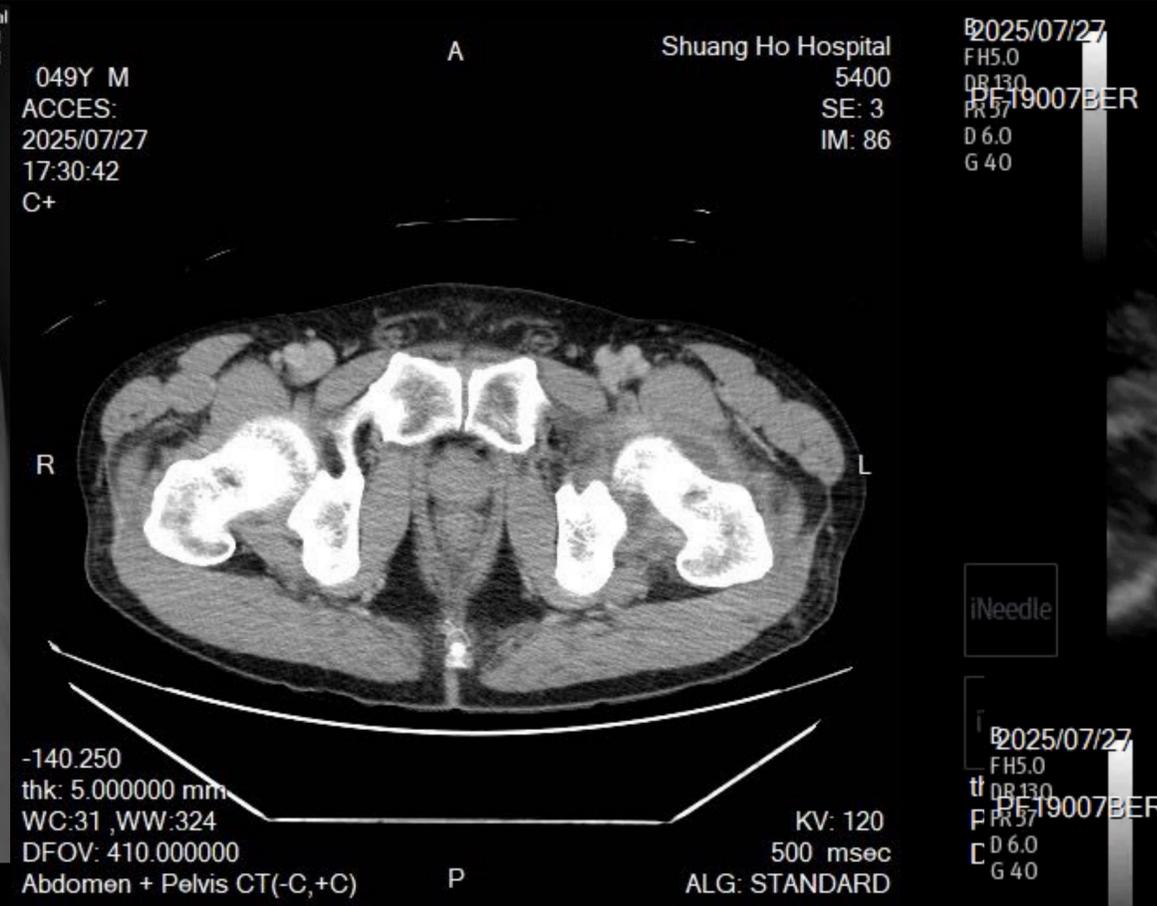
Hip joint aspiration / Aware of LCFA



LCFA: Lateral circumflex femoral artery,



49M, severe left hip pain



Major findings:

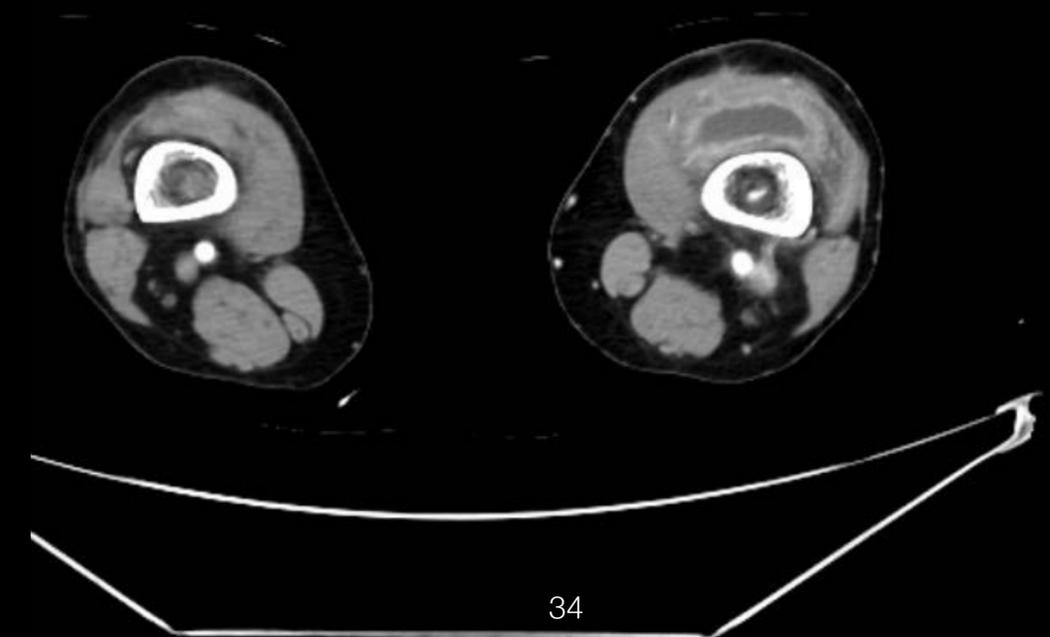
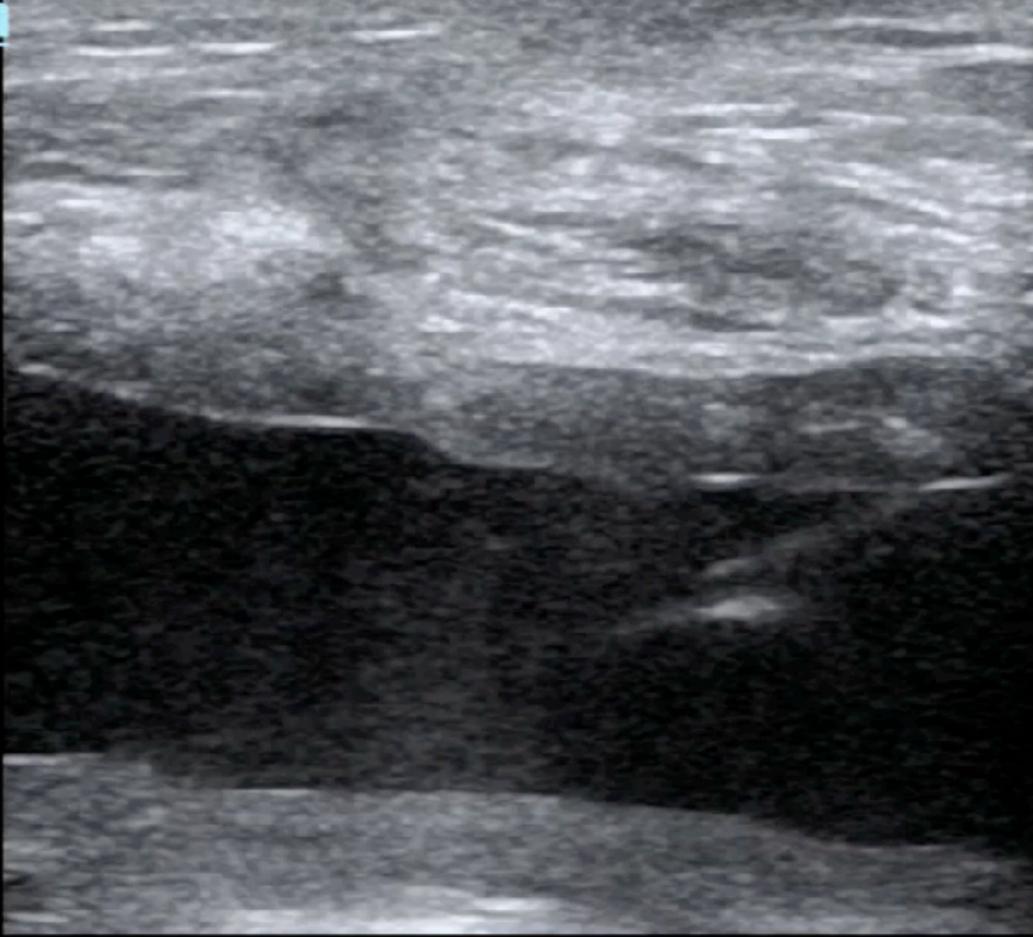
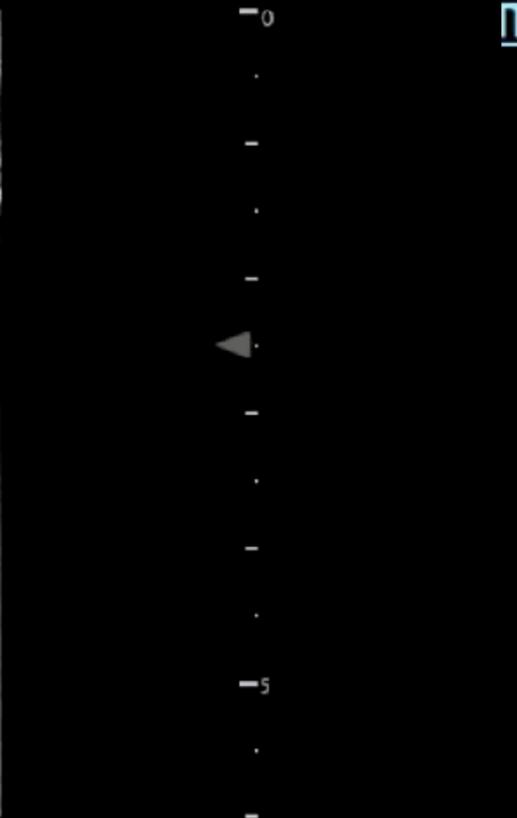
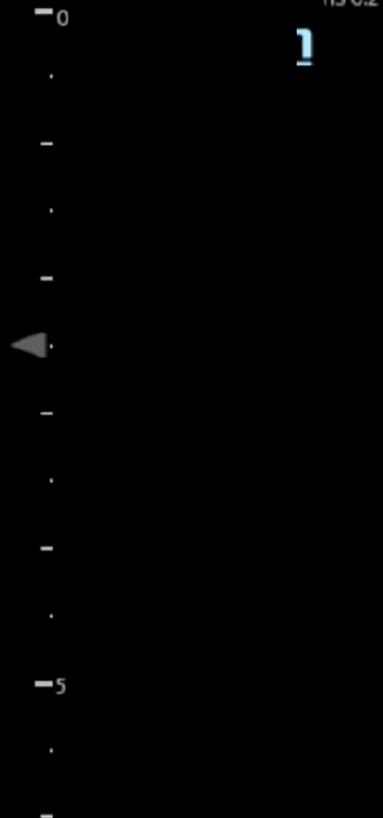
1. fatty liver with a few liver cysts.
2. Normal size and appearance of appendix. no obvious radi

Other findings:

1. No abnormal lesion in the bil. basal lungs. The scanned pl
2. The spleen, pancreas, both kidneys and adrenal glands are
3. No gallstone, nor dilatation of the IHDs.
4. Normal appearance of the urinary bladder, bil. seminal ves
5. The stomach, duodenum, small intestine and the colon are
6. There are no enlargement of the paraaortic, pelvic and ing
7. Degenerative change of lumbar spine with spurs formation
8. No ascites, nor extraluminal free air. Clear mesentery and
9. Patent SMA. Atherosclerosis of the aorto-iliac arteries.

IMP: fatty liver with a few liver cysts.

70F, left knee pain



**Streptococcus
Dysgalactiae**

75M, F3D

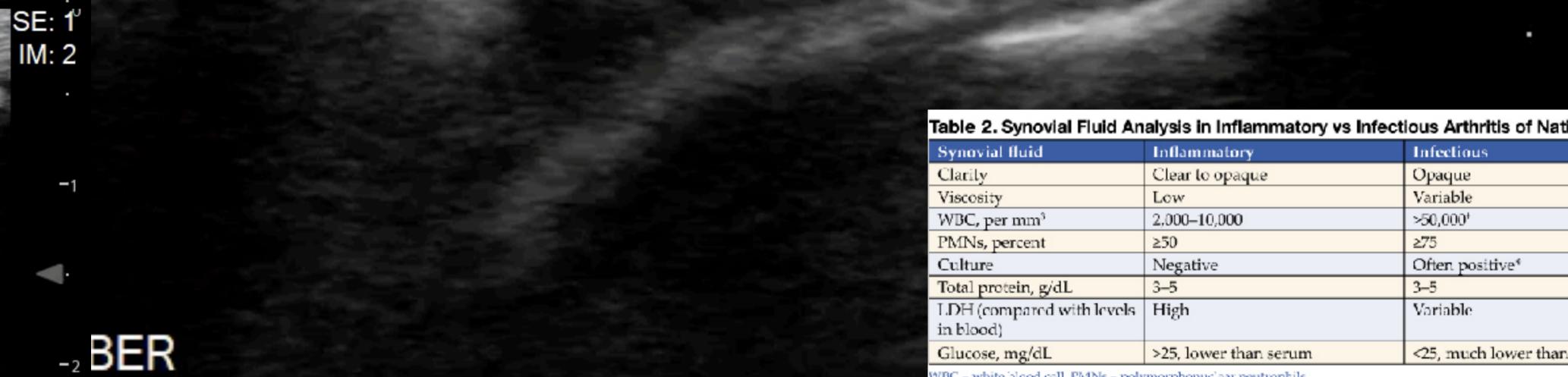
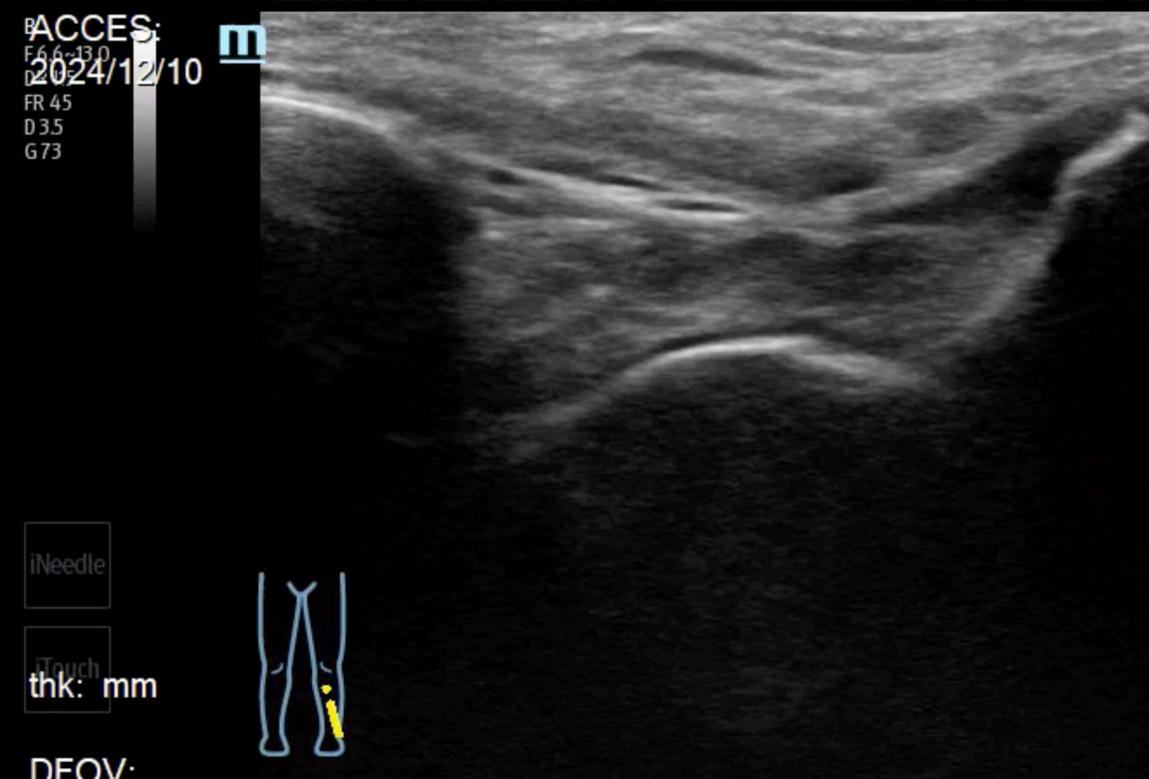
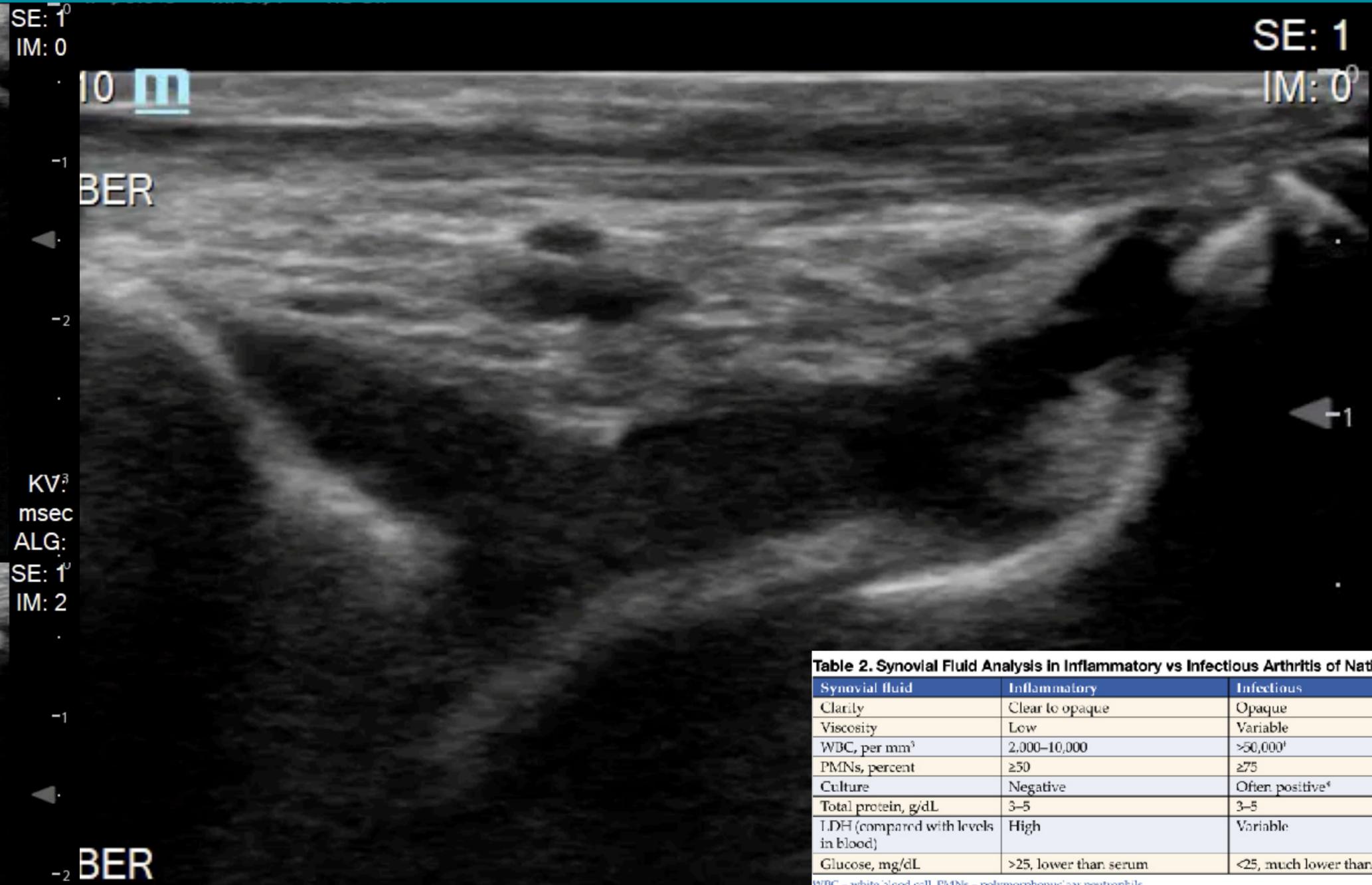
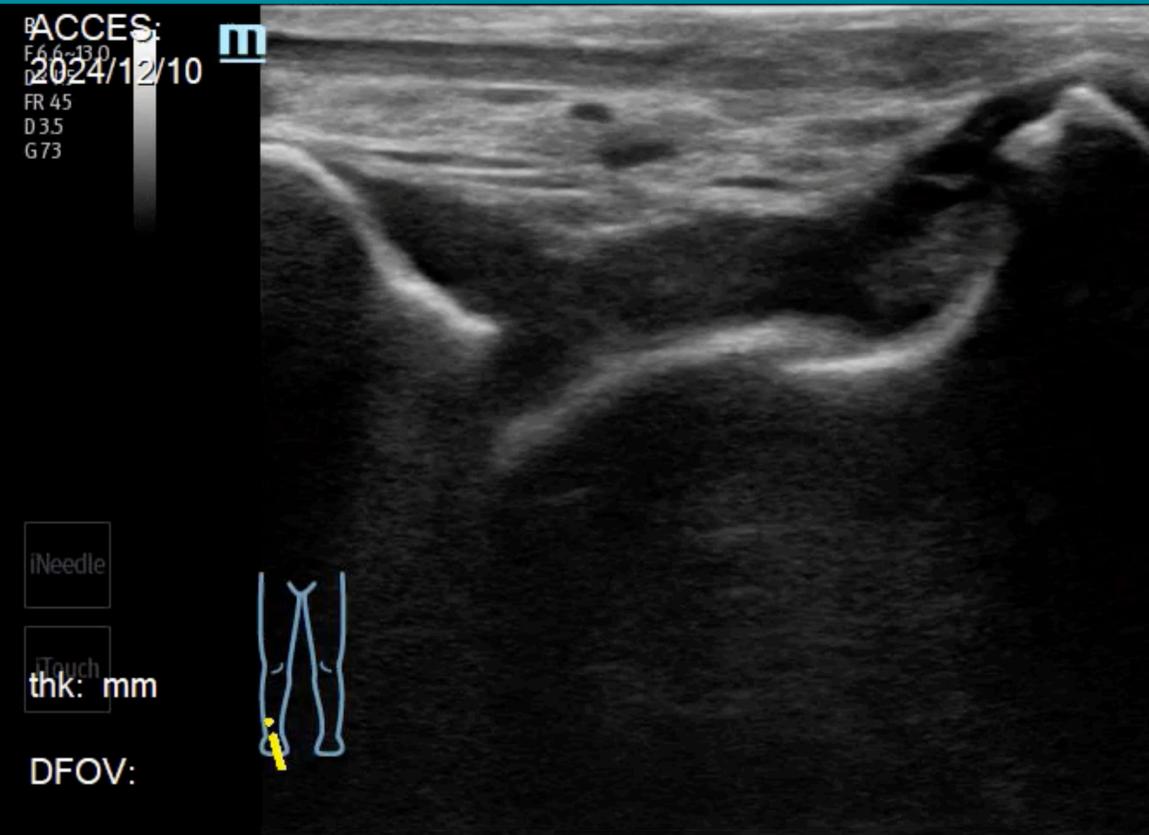


Table 2. Synovial Fluid Analysis in Inflammatory vs Infectious Arthritis of Native Joints.

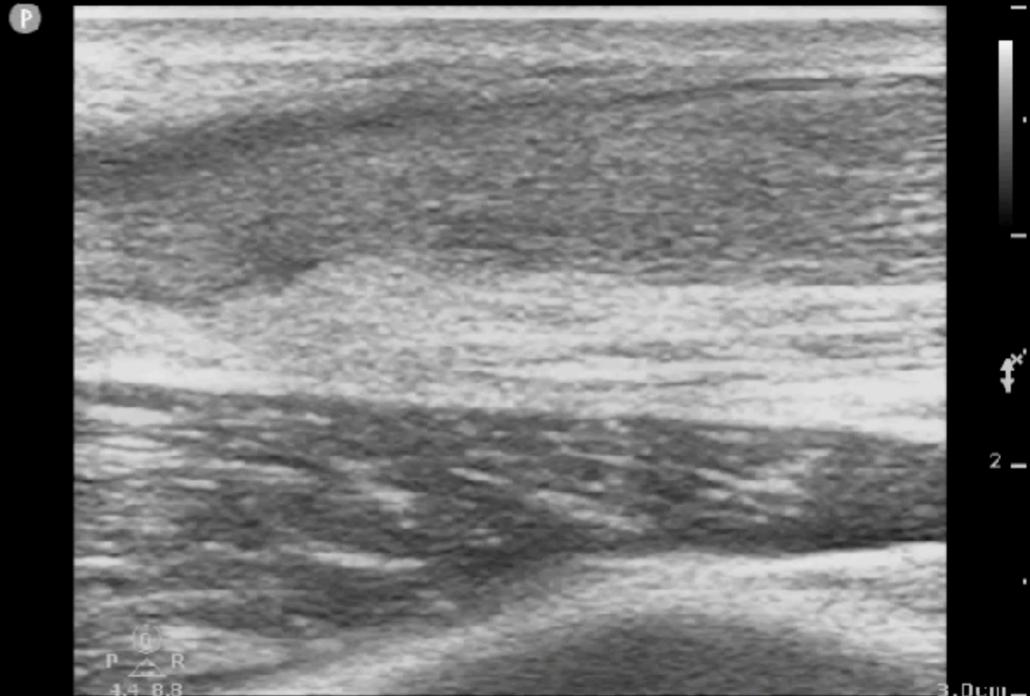
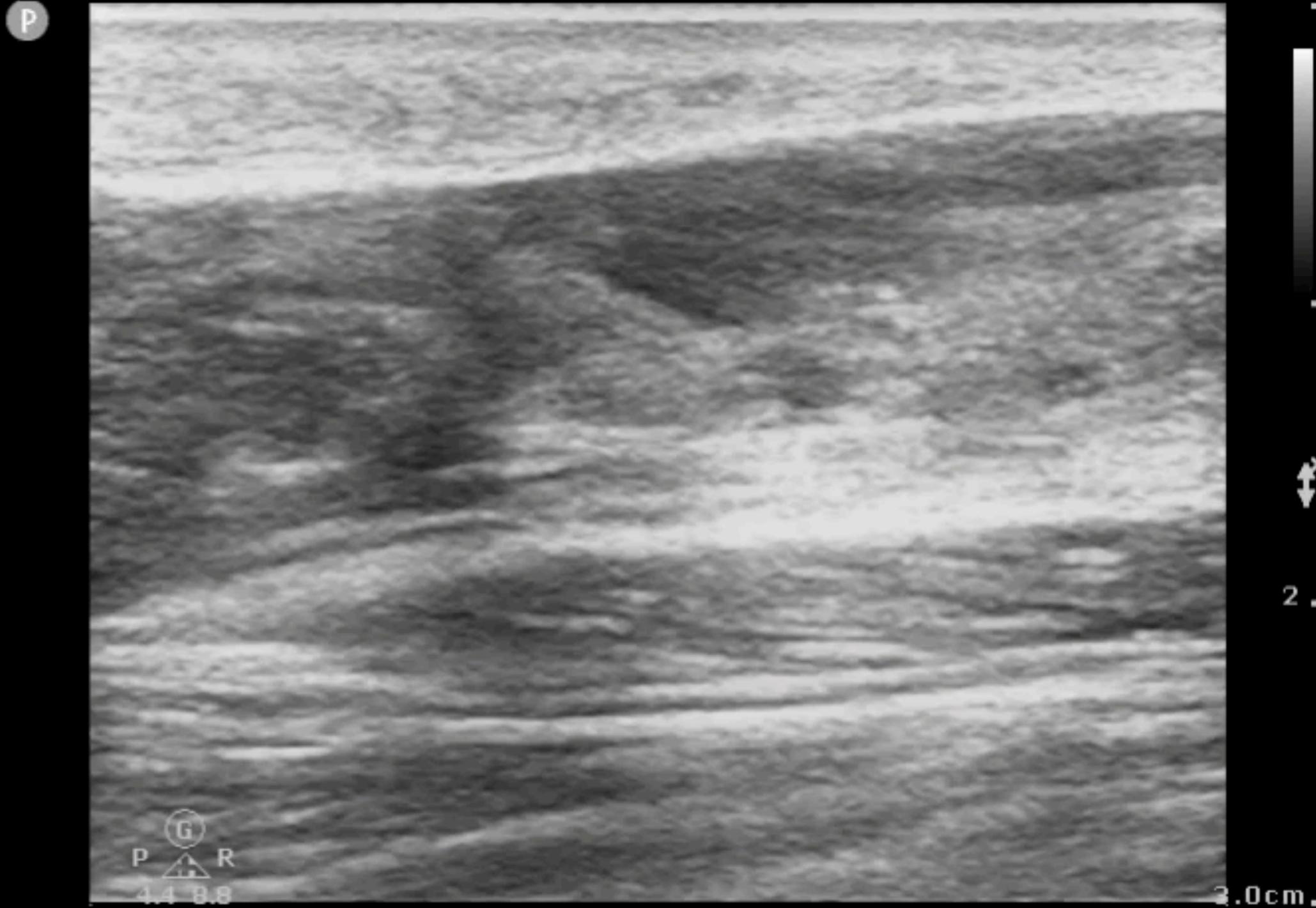
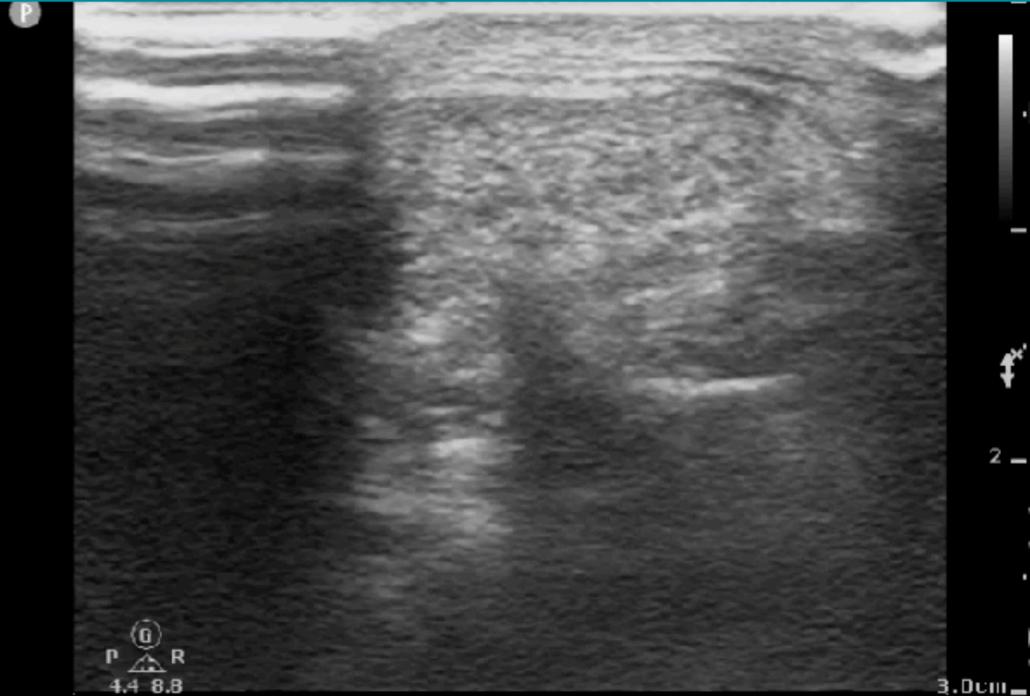
Synovial fluid	Inflammatory	Infectious
Clarity	Clear to opaque	Opaque
Viscosity	Low	Variable
WBC, per mm ³	2,000–10,000	>50,000 [†]
PMNs, percent	≥50	≥75
Culture	Negative	Often positive [*]
Total protein, g/dL	3–5	3–5
T.DH (compared with levels in blood)	High	Variable
Glucose, mg/dL	>25, lower than serum	<25, much lower than serum

WBC – white blood cell, PMNs – polymorphonuclear neutrophils
[†]Lower with infections caused by low virulence organisms or after partial treatment
^{*}Synovial fluid and blood culture sensitivity declines after antimicrobial therapy has been initiated.

[Synovial]

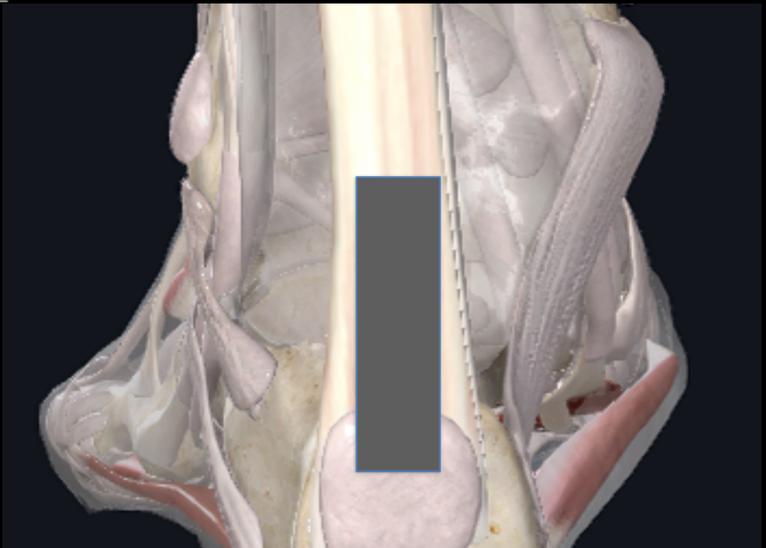
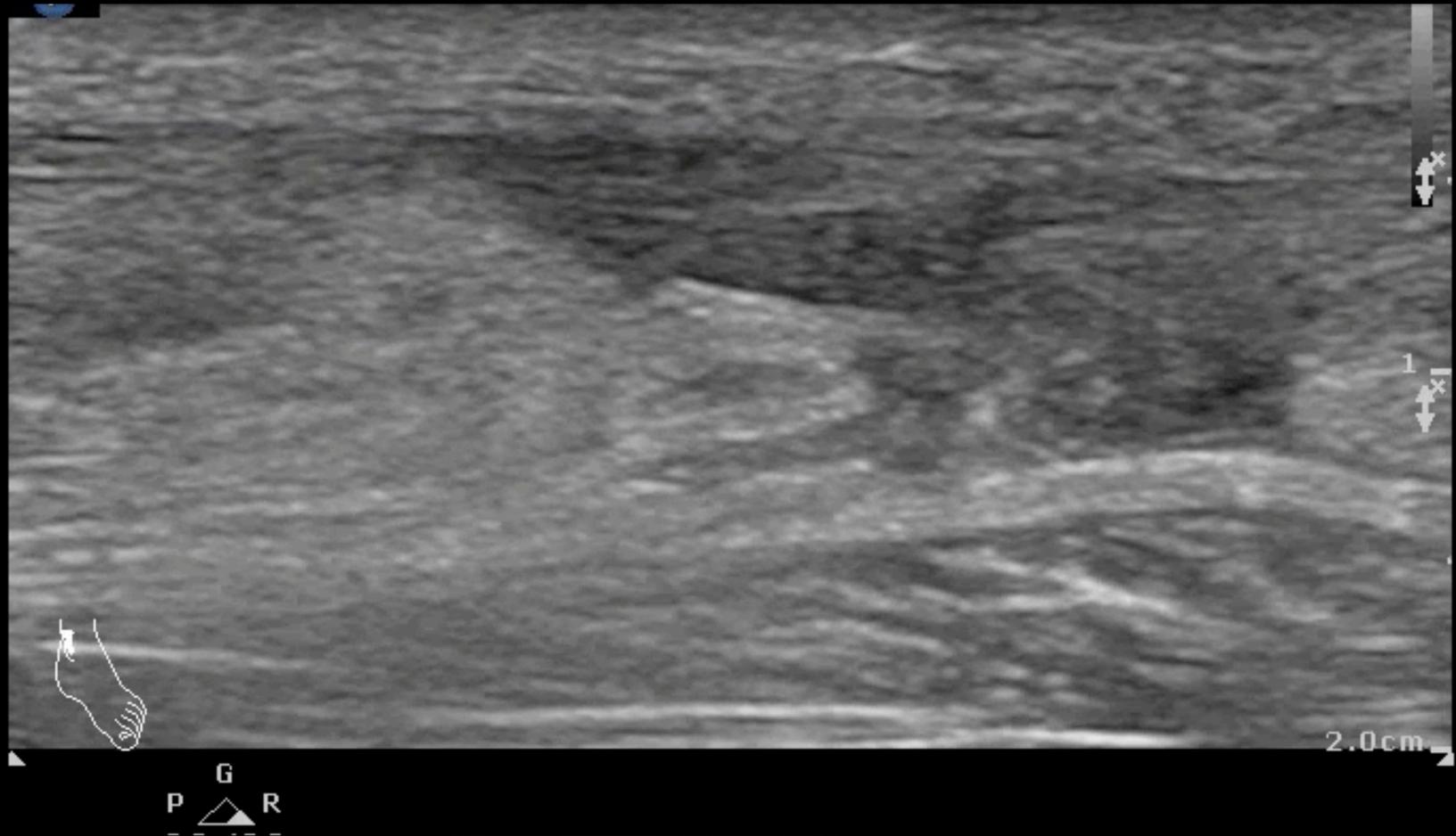
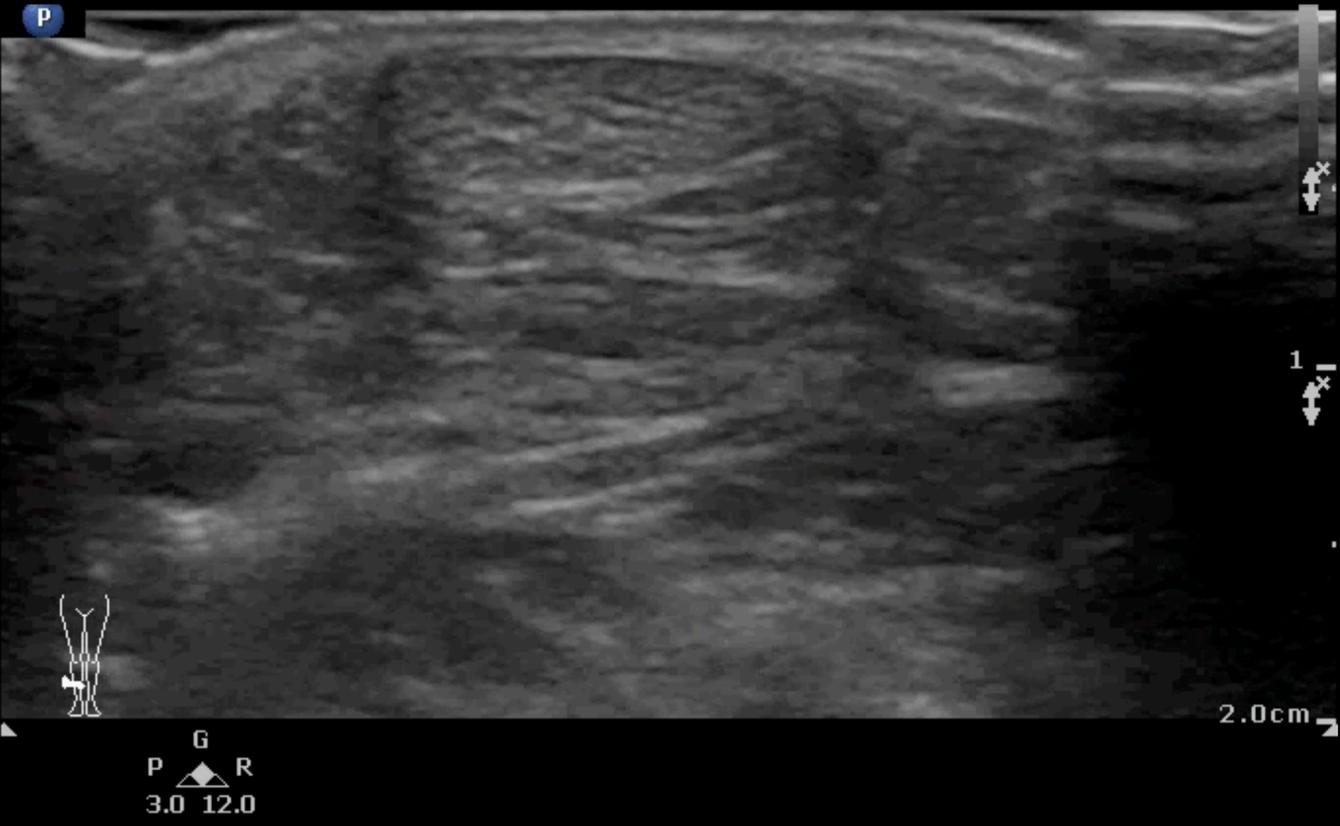
(12/10) RBC 980 WBC 1257 Neutrophil 0 Lymphocyte 25 Eosinophil 0 Mesothelial cell+
 Histocyte+Monocyte 75 Synovial fluid Appearance Yellow * Viscosity Normal * Mucin clot test Good
 * Crystal Not found * Turbid 3+ * Crystal exam(Synovial fluid) Not found *

35M, slip down with right leg severe pain

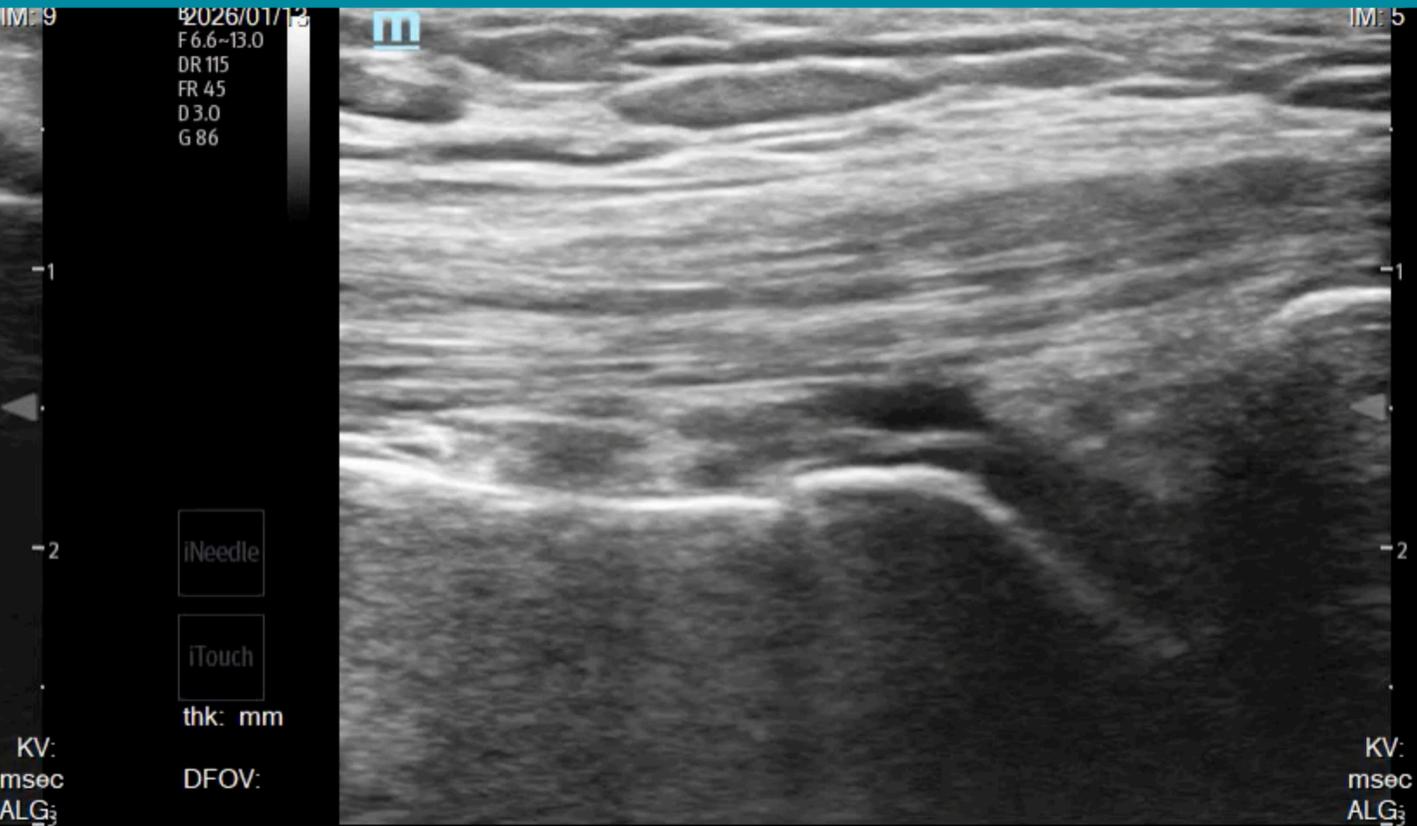
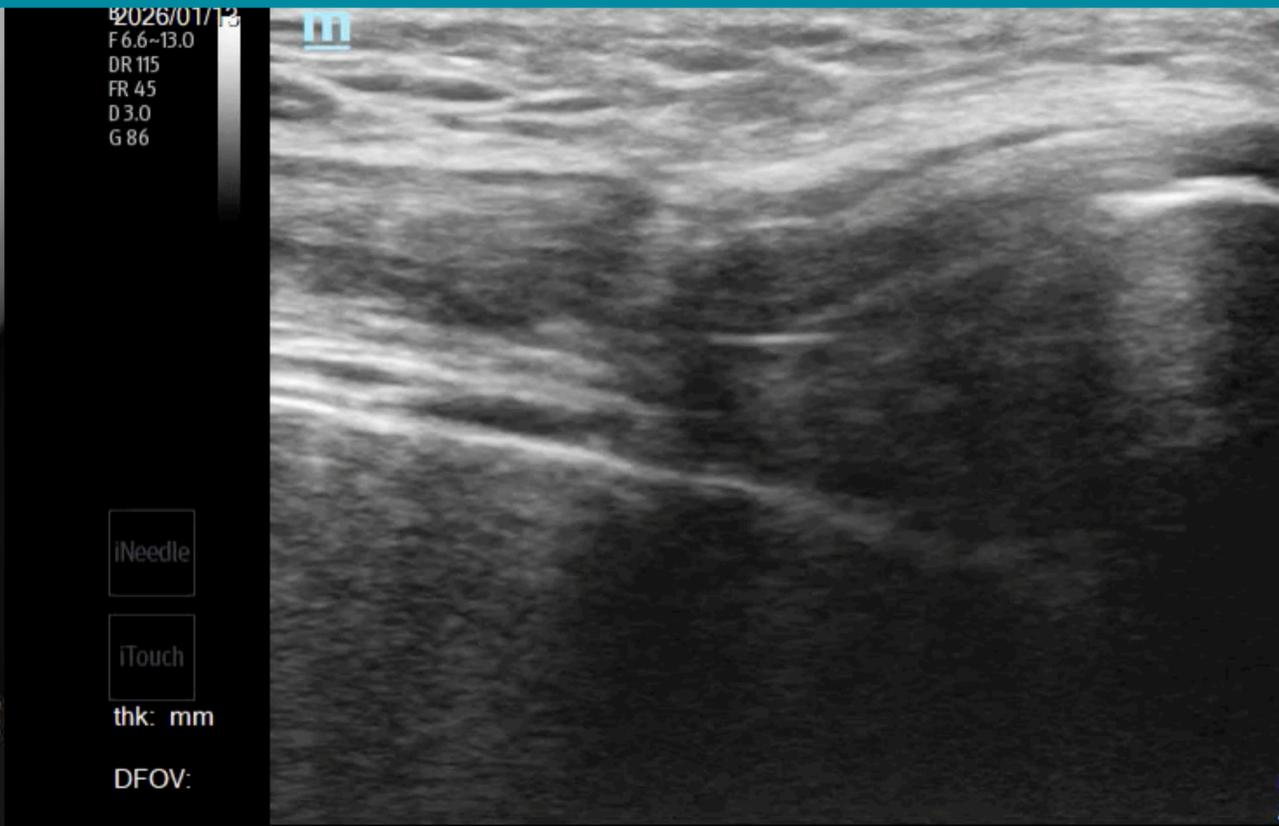
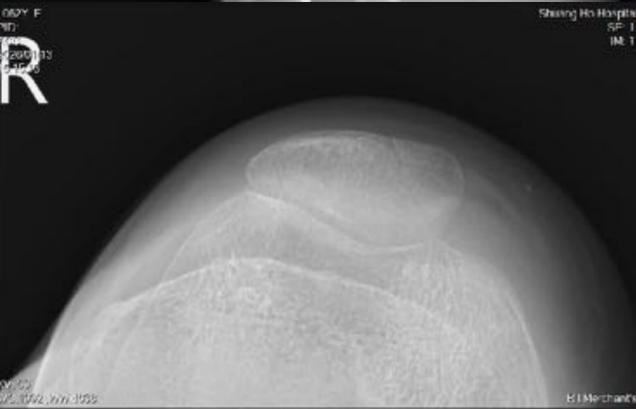


Achilles tendon rupture

34 Hz
2.0cm
2D
Gen
Gn 94
C 52
4/3/2



62F, falling injury at airport on right knee

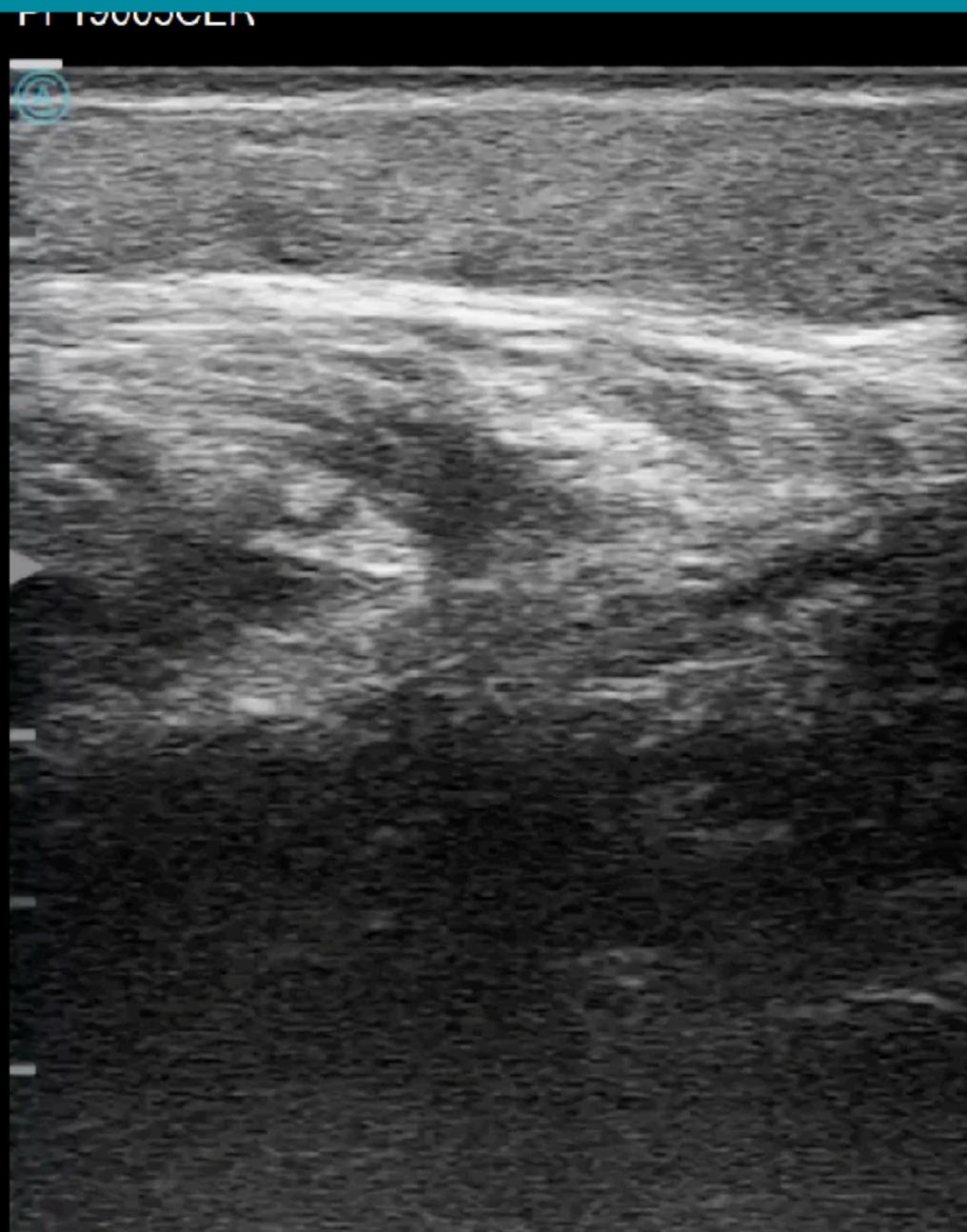


59F, right leg pain while climbing stairs



thk: mm
PF19005CER
DFOV:

KV:
msec
ALG:



thk: mm
PF19005CER
DFOV:

KV:
msec
ALG:



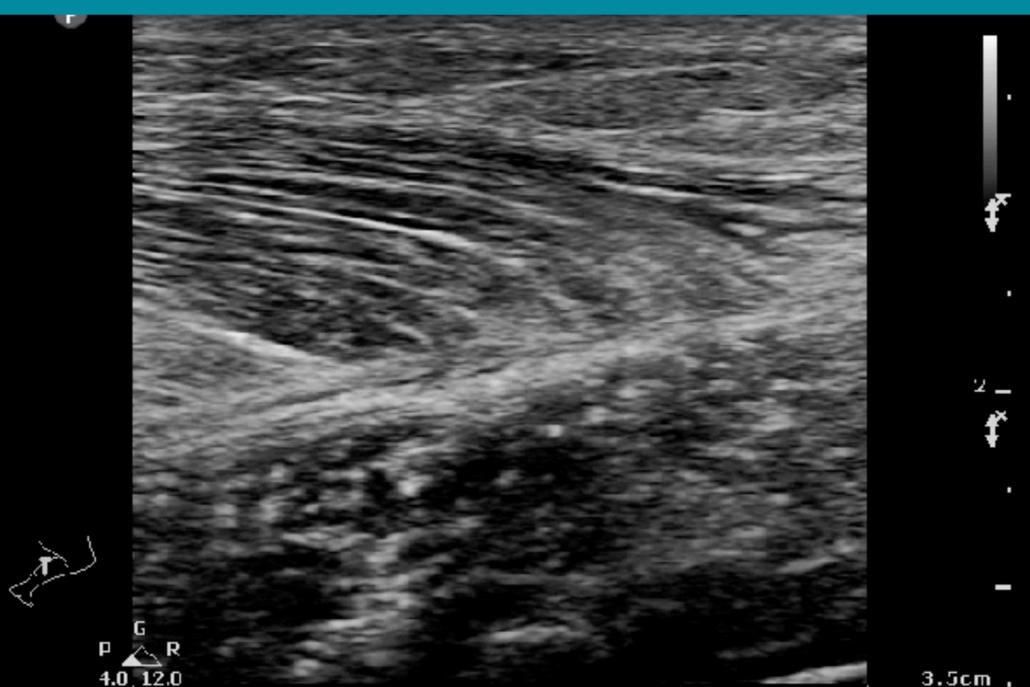
thk: mm
PF19005CER
DFOV:

KV:
msec
ALG:

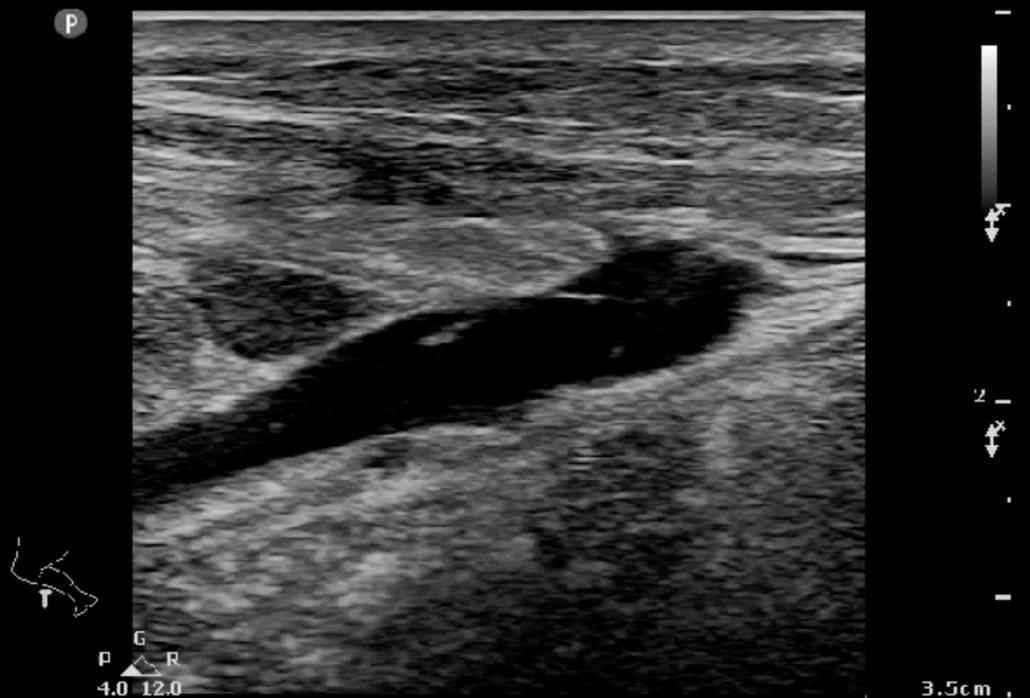
58M, right leg pain while running



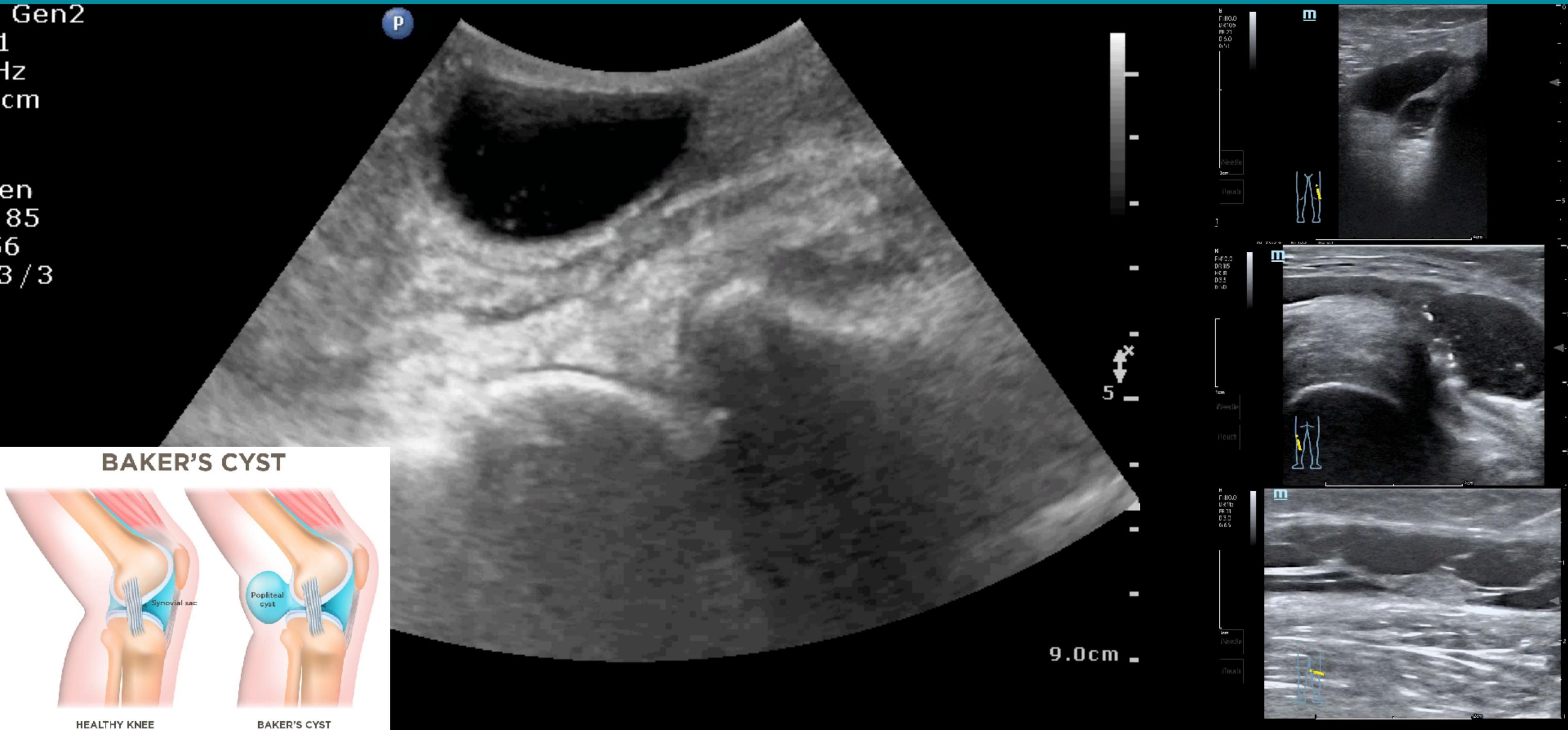
Venous1
L12-1
39Hz
3.5cm
2D
Pen
Gn 69
50
1/2/2



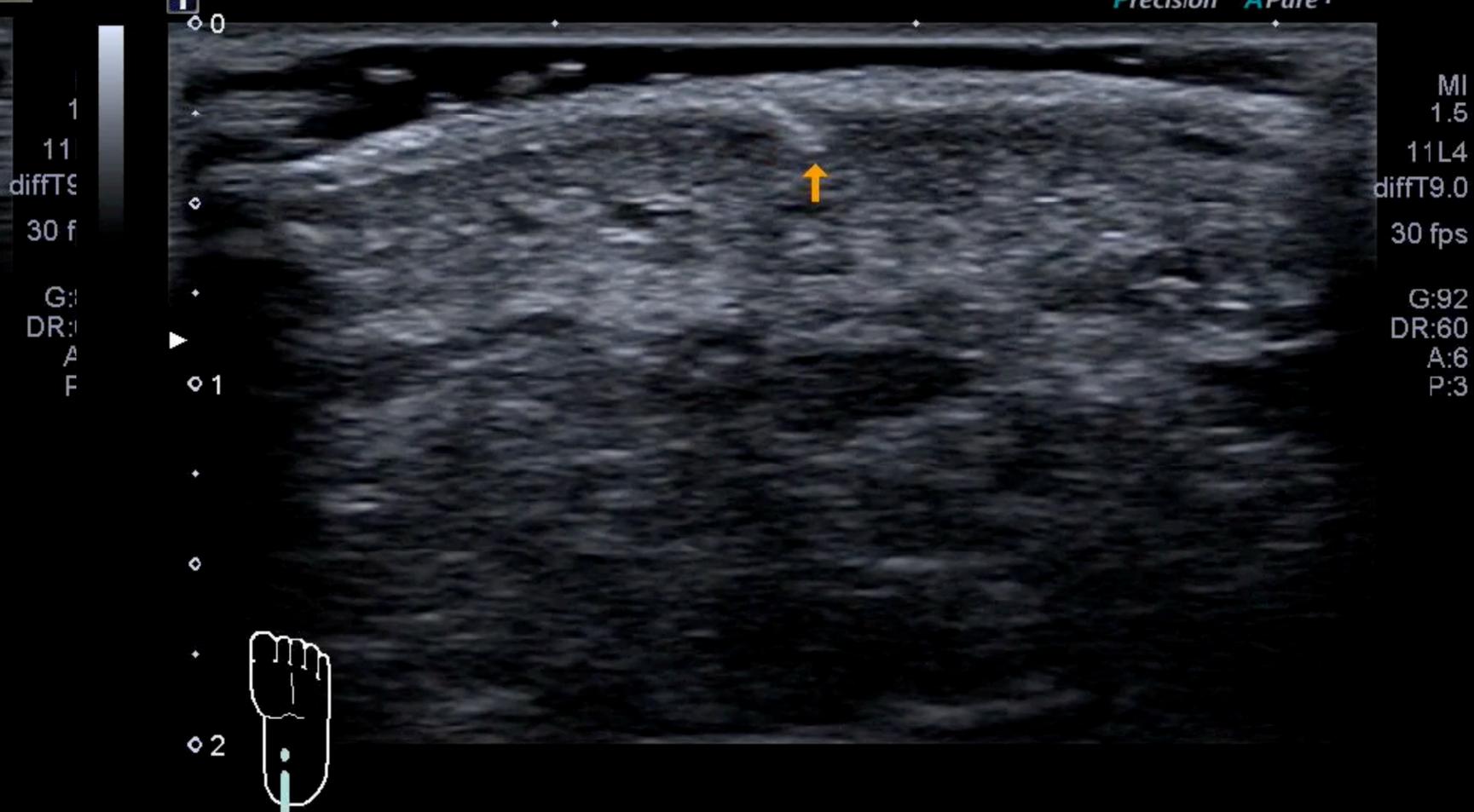
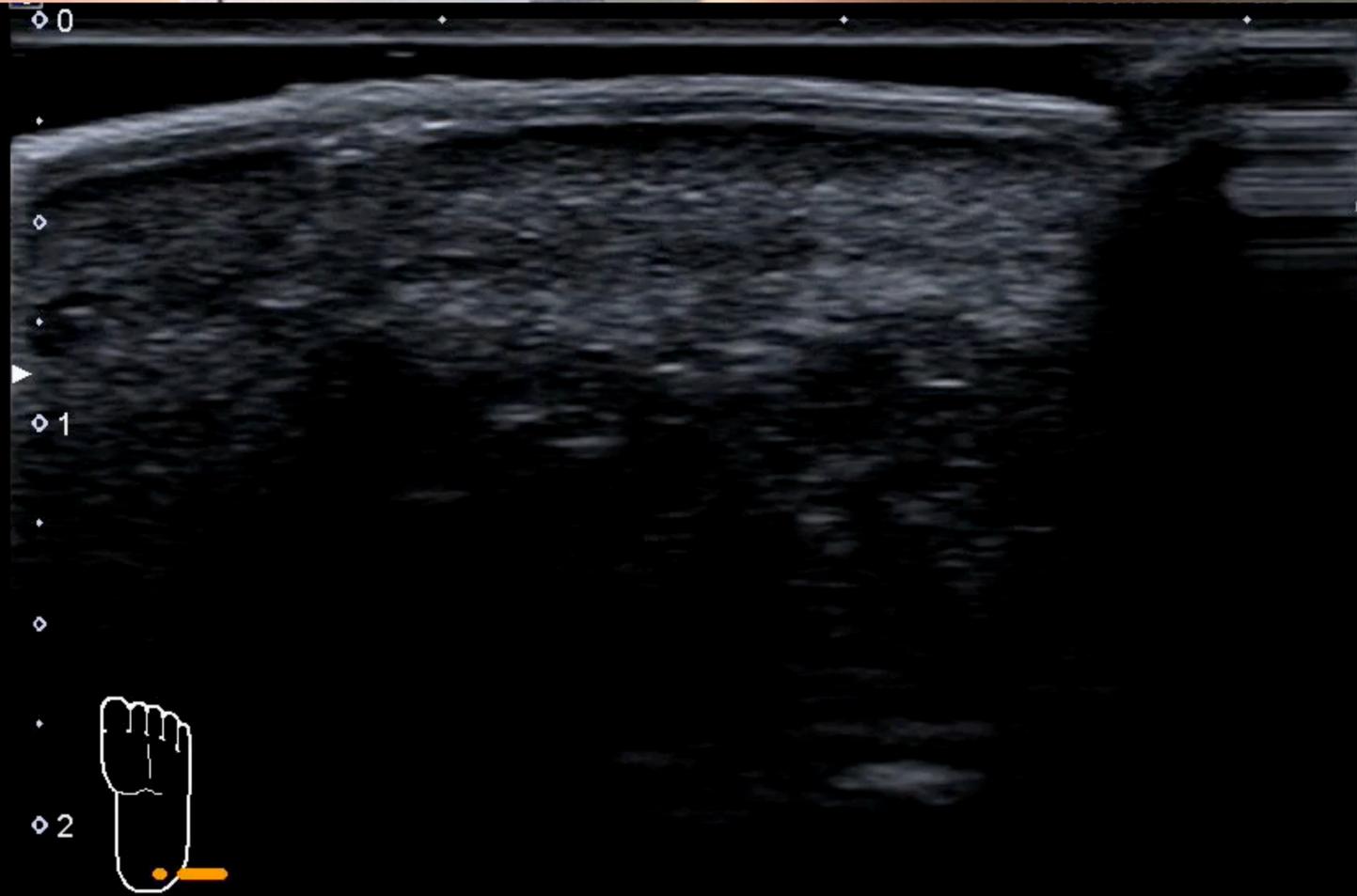
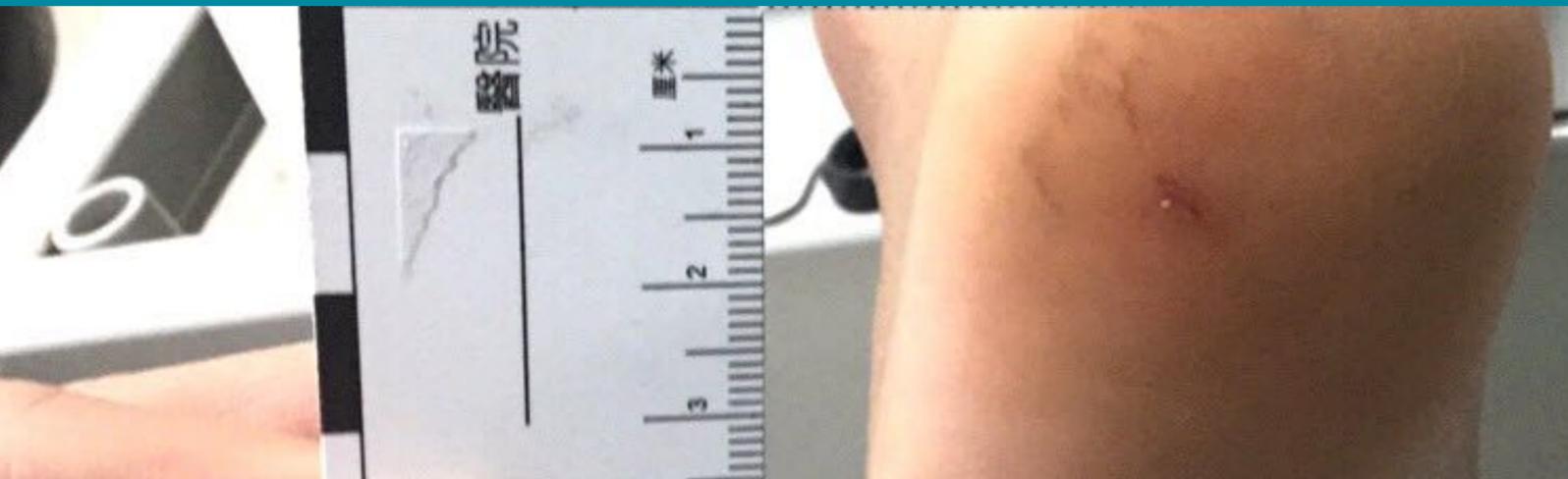
Venous1
L12-1
39Hz
3.5cm
2D
Pen
Gn 69
50
1/2/2



Baker's cyst



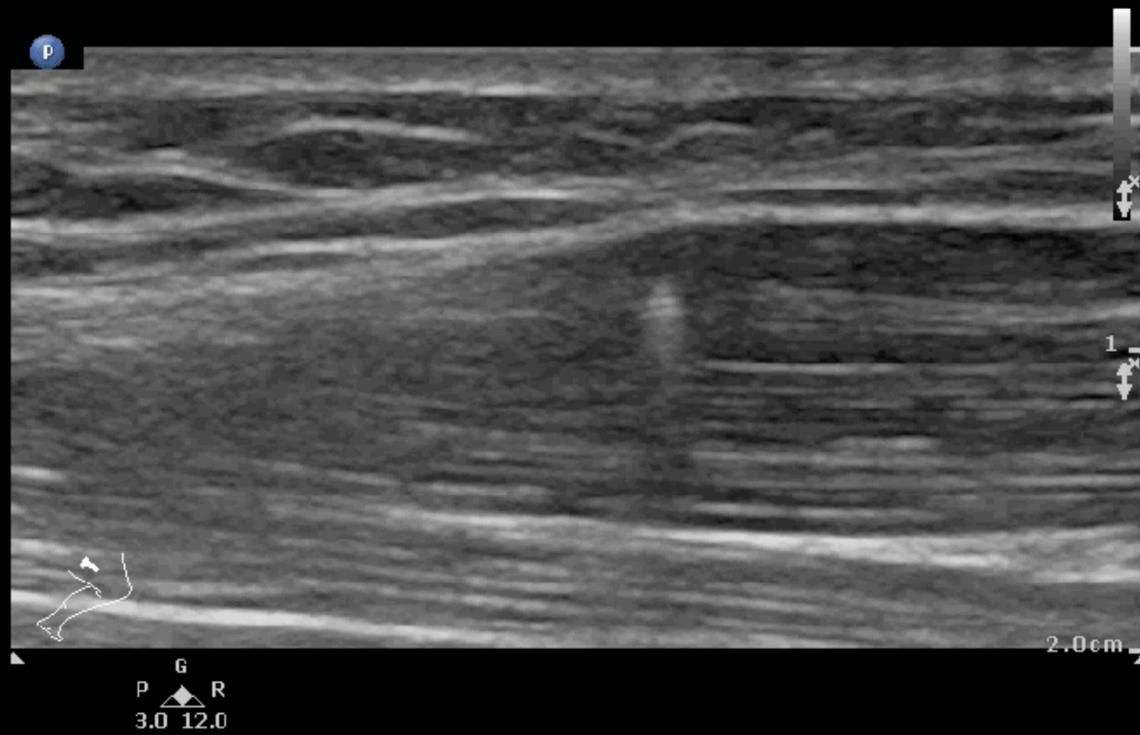
踩到碎玻璃，覺得有異物





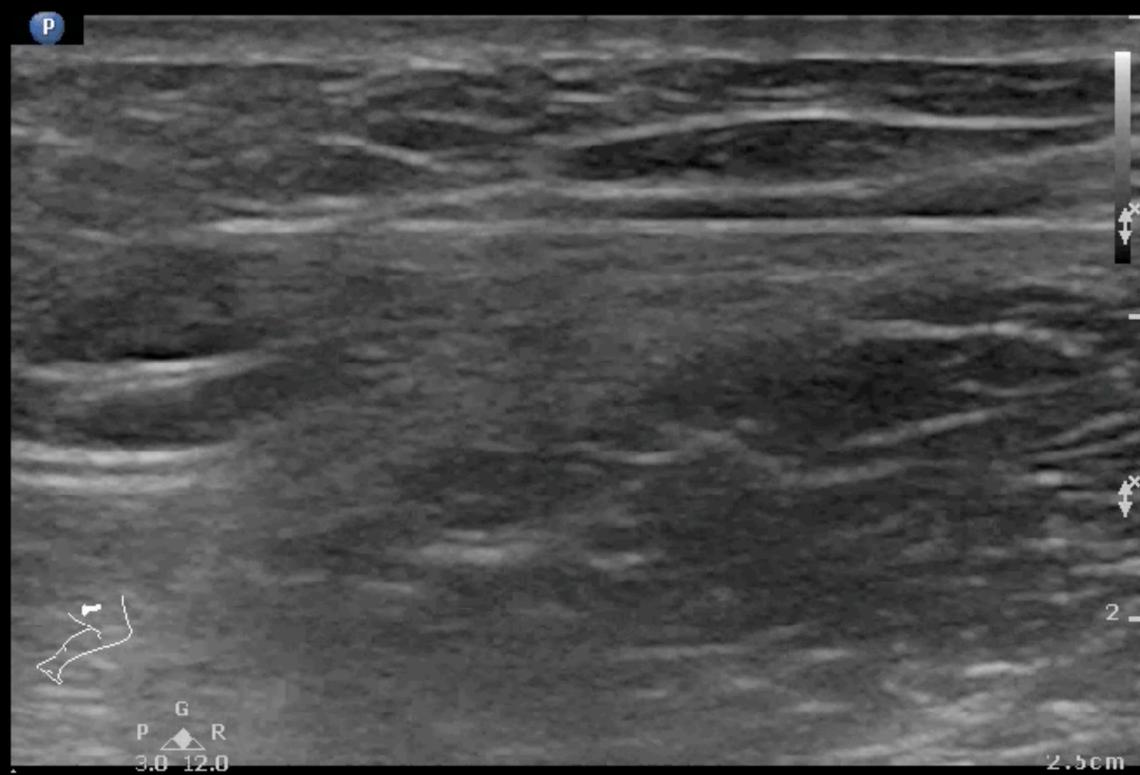
Superficial
L12-3
34 Hz
2.0cm

2D
Gen
Gn 60
C 52
4/3/2



Superficial
L12-3
34 Hz
2.5cm

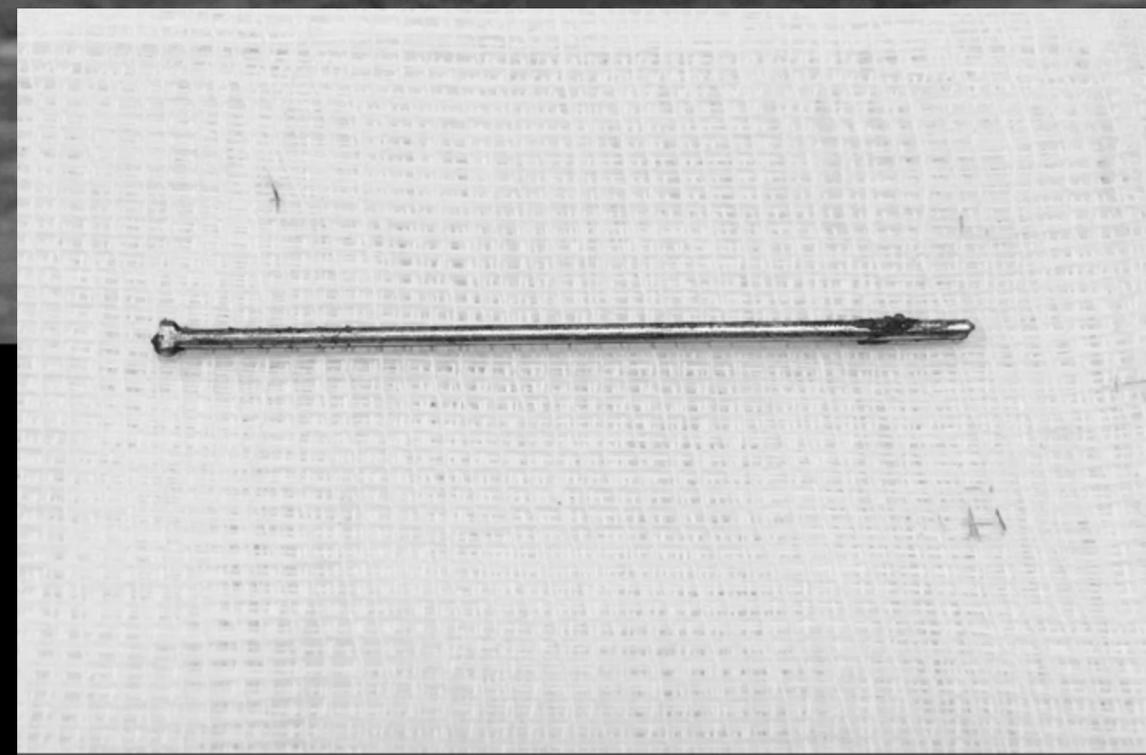
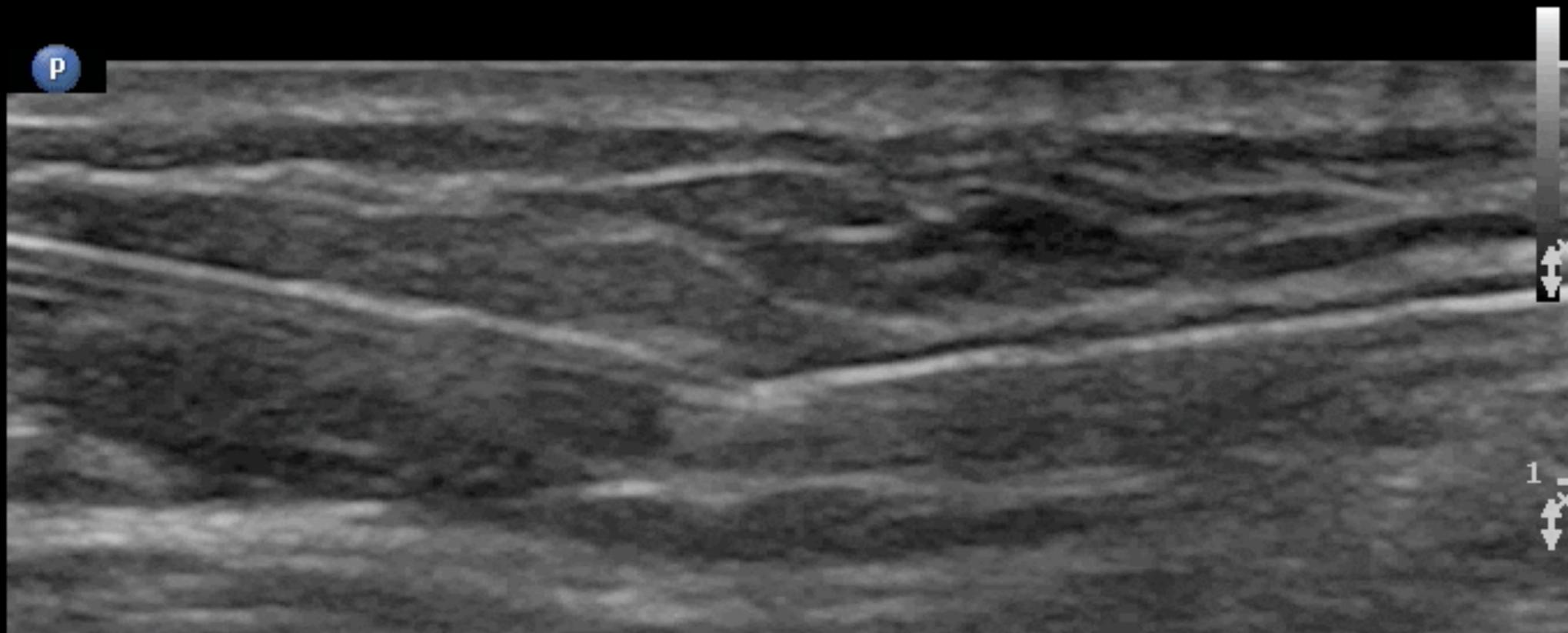
2D
Gen
Gn 60
C 52
4/3/2



Localization

L12-3
34 Hz
2.0cm

2D
Gen
Gn 60
C 52
4/3/2



2 needle

Removal

037Y M
PIR #
ACC:
2025/12/02
15:16:13

Shuang Ho Hospital
SE: 2
IM: 1

KV: 73
WC:2037 ,WW:4910

R't Femur AP

45

2025/12/02
F6.6-13.0
DB 115
PF19007BER
PR 49
D 3.5
G 69

iNeedle
iTouch
thk: mm
PF19007BER
DFOV:

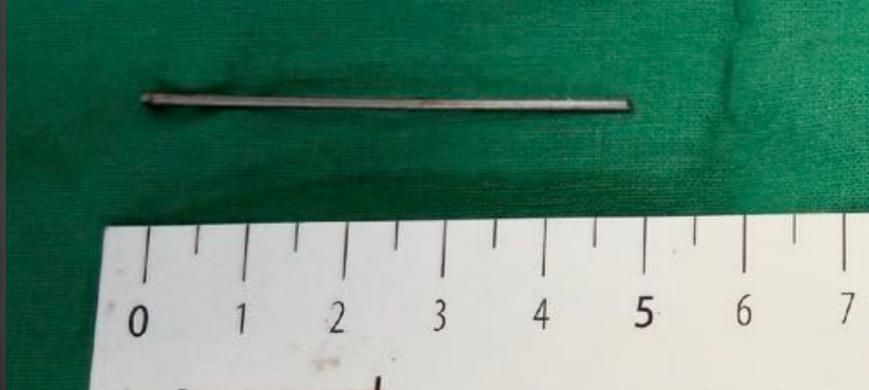
2025/12/02
F6.6-13.0
DB 115
PF19007BER
PR 49
D 3.5
G 69

iNeedle
iTouch
thk: mm
PF19007BER
DFOV:

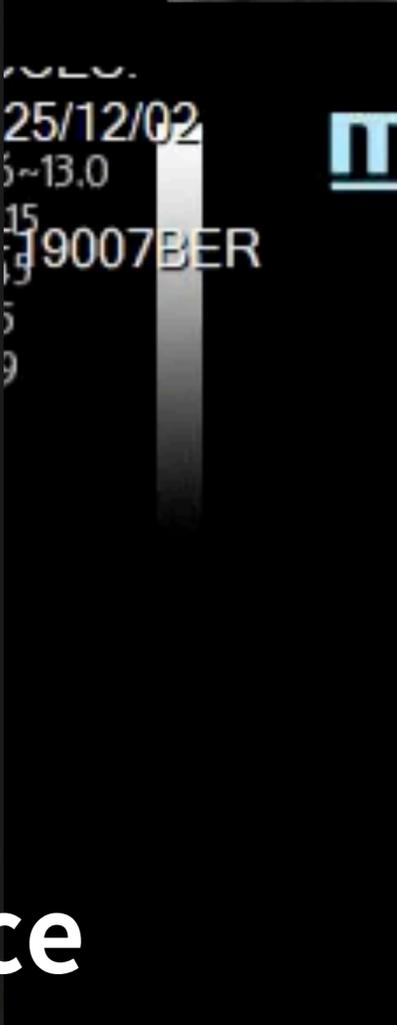
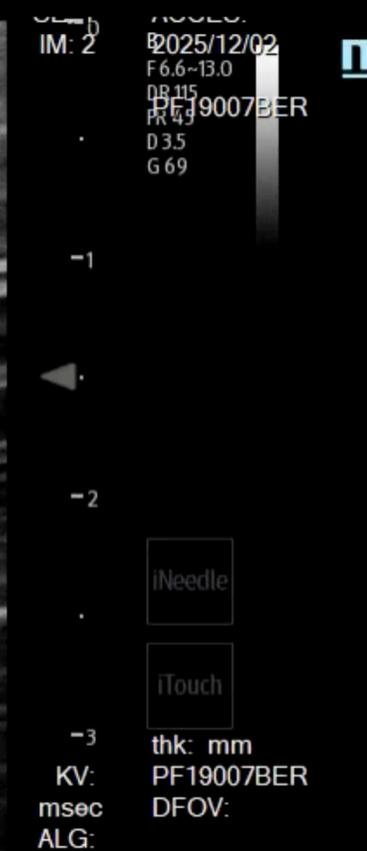


IM: 0
-1
-2
-3
KV:
msec
ALG:

IM: 1
-1
-2
-3
KV:
msec
ALG:



FB localization
Needle targeting
Removal guidance



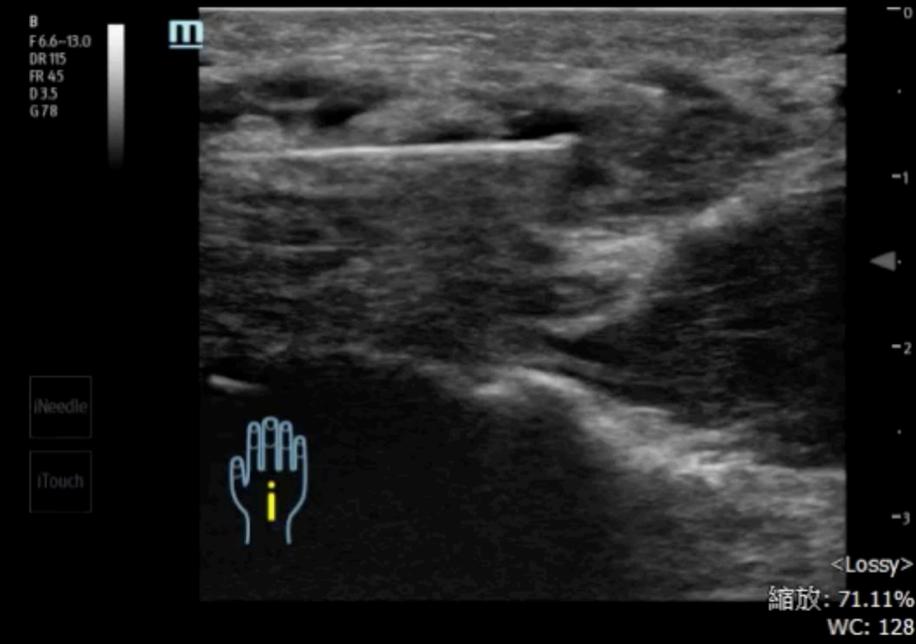
72M, left hand injury



Localization

NB

Removal



大腿痛和異物感

TIS: 0.01, MI: 0.26, Small Organ

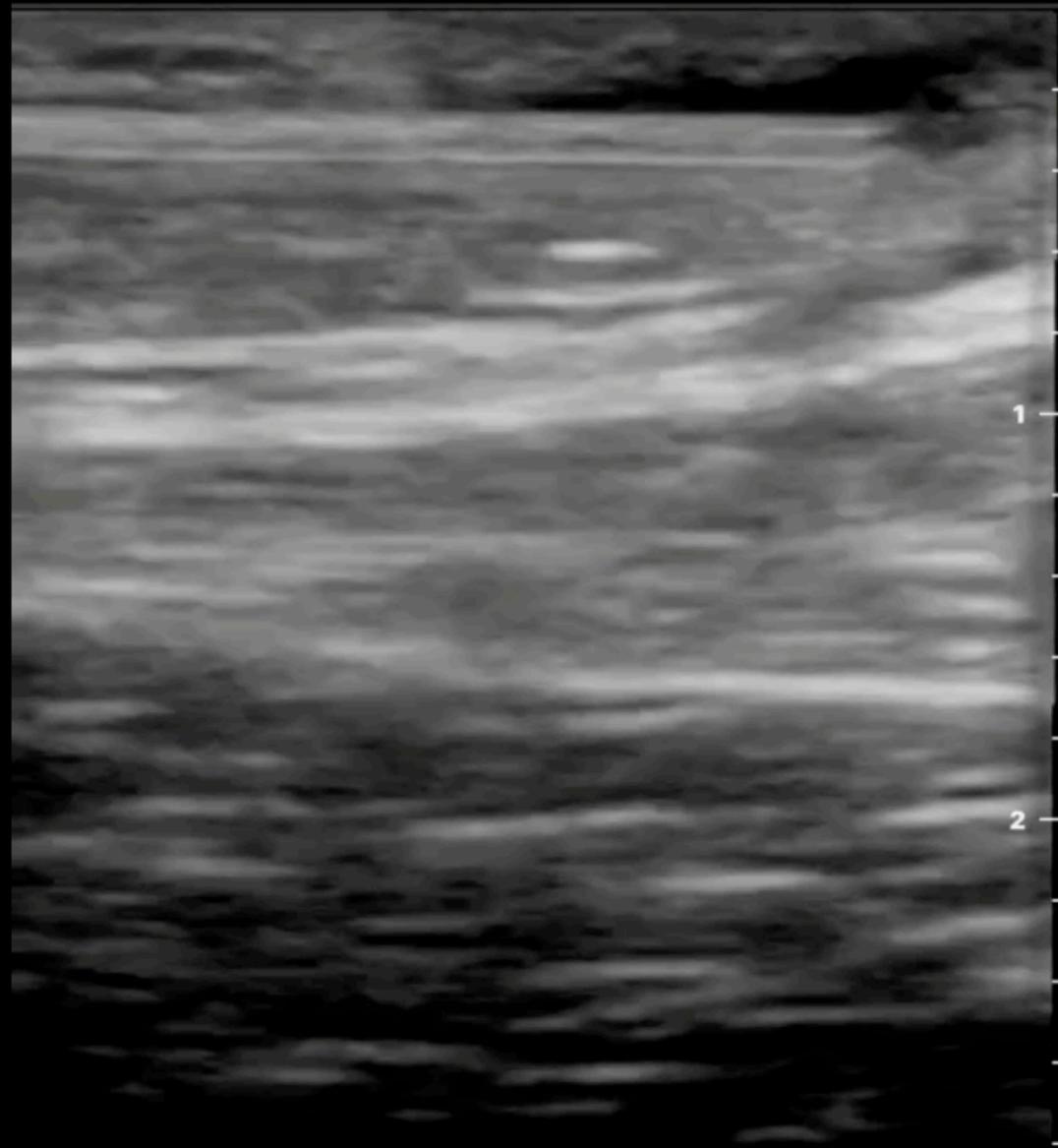
B

Halo sign

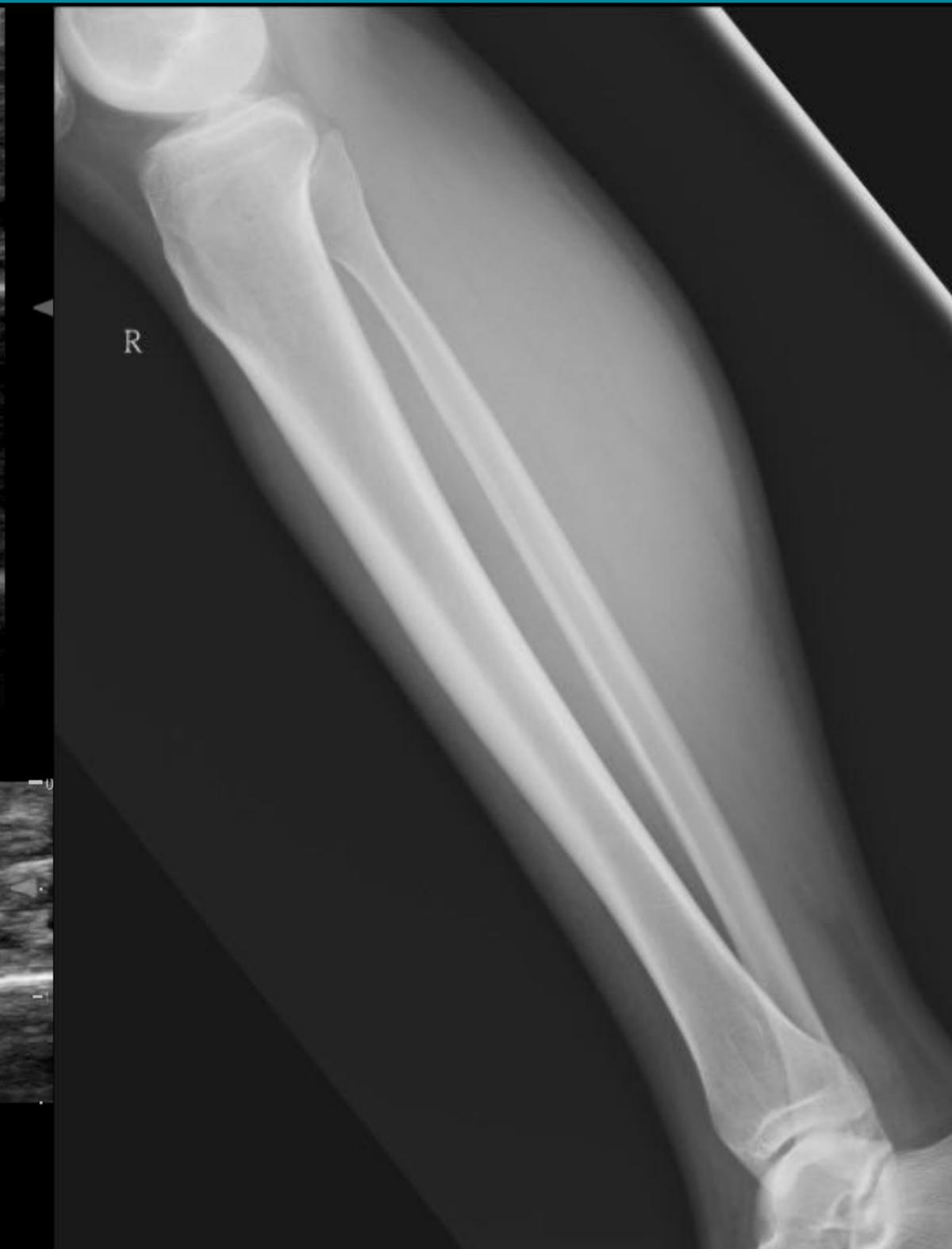
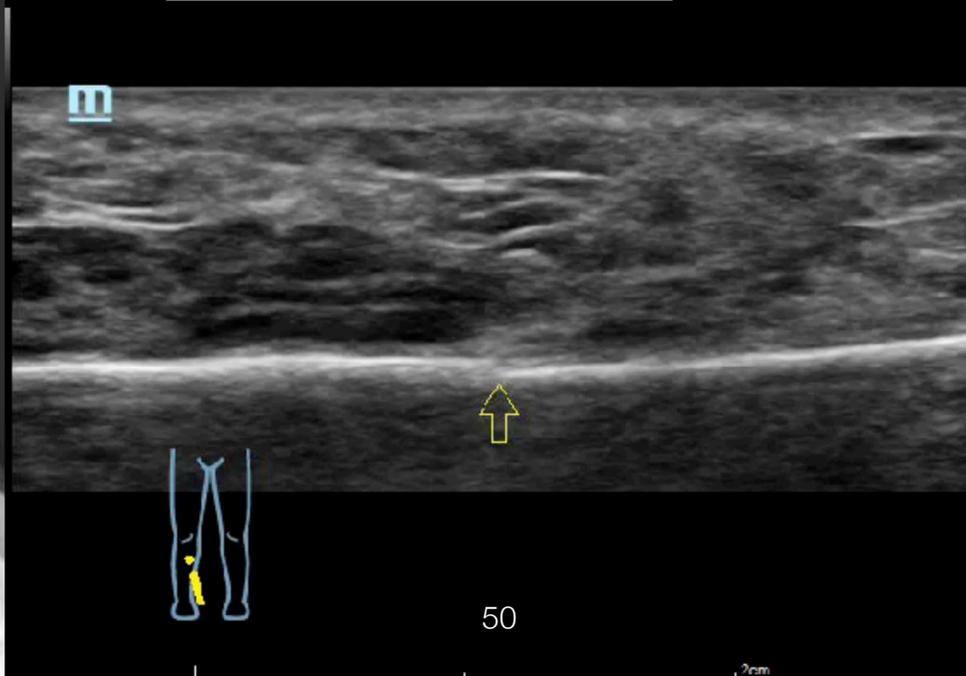
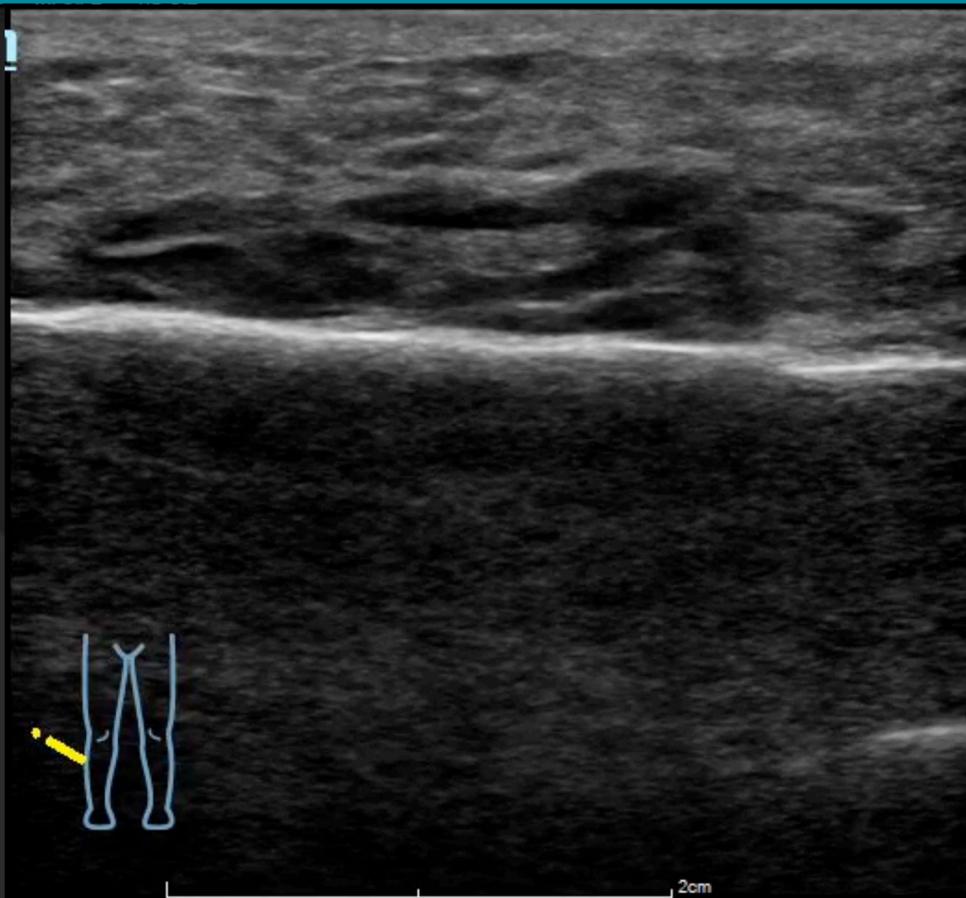


TIS: 0.01, MI: 0.26, Small Organ

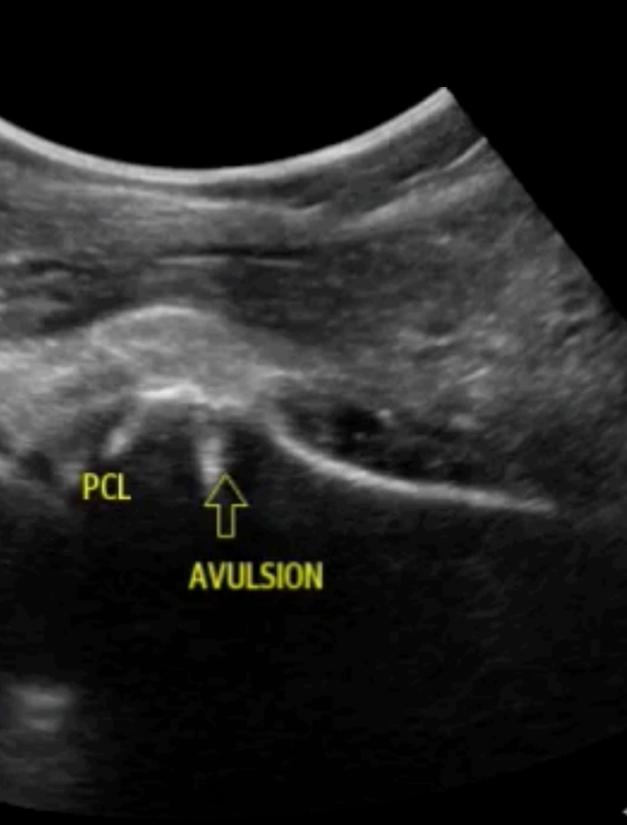
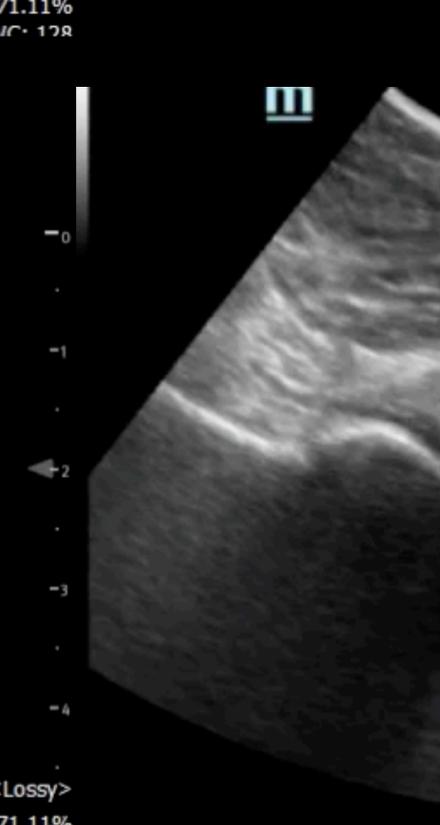
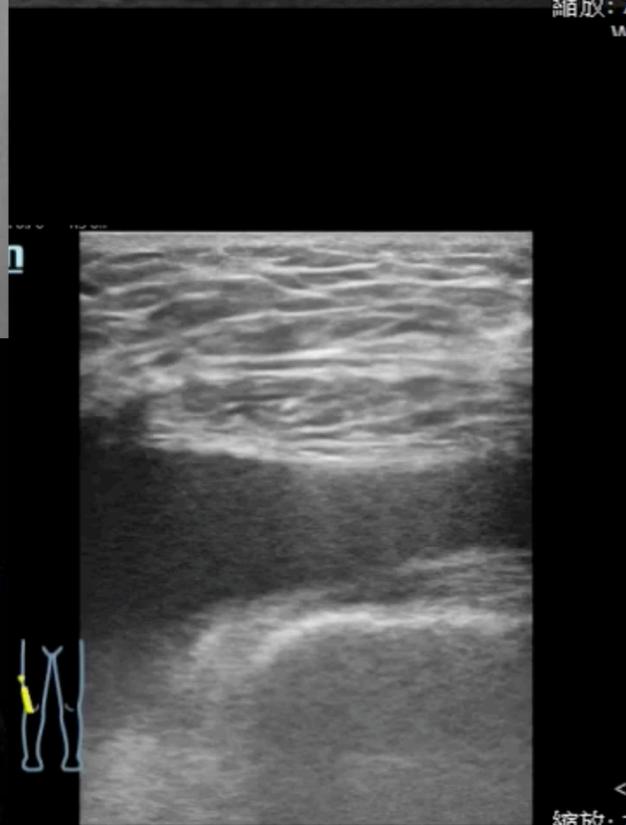
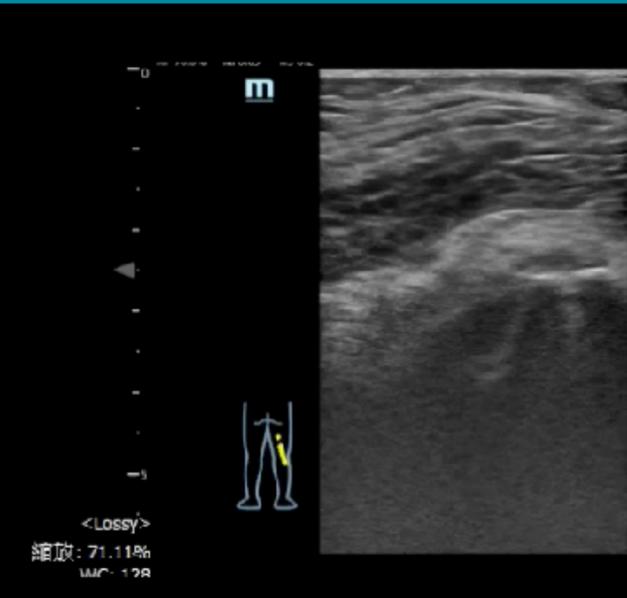
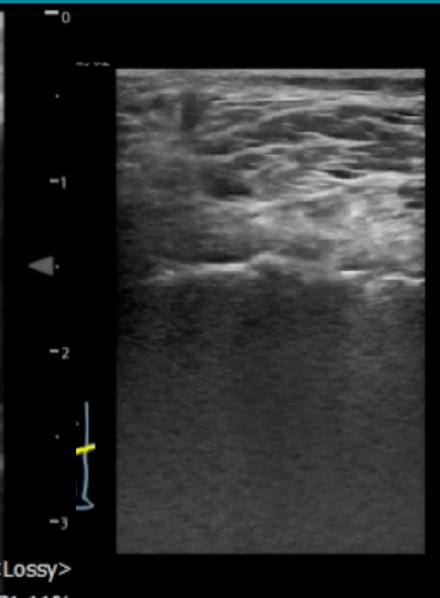
B



39M，3天前走路滑倒，小腿瘀青腫痛



64F, RK injury, worsening swelling & pain



縮放: 100.00%
WC: 350
WW: 2000
51

<Lossy>
縮放: 71.11%
WC: 178

ATFL injury

