



衛生福利部雙和醫院
(委託臺北醫學大學興建經營)
Taipei Medical University · Shuang Ho Hospital,
Ministry of Health and Welfare



Musculoskeletal US in ER

骨骼肌肉軟組織急症之應用

急診進階超音波

陳國智醫師

雙和醫院急診醫學科

陳國智 醫師



急診超音波臨床評核醫師
醫用超音波學會指導醫師
WINFOCUS director / instructor

急診 / 重症 / 介入 / 急性疼痛

經歷

新光急診超音波訓練中心主任
西園醫院急診醫學科主任
急診醫學會超音波委員會主委
台灣疼痛醫學會大體模擬手術講師
急救加護醫學會重症超音波負責人

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}, Aning 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}

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Semin Musculoskelet Radiol 2020;24:167–174.



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

Seminars in

ROENTGENOLOGY

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

Michael V. Perone, MD, and Corrie M. Yablon, MD <https://doi.org/10.1053/j.ro.2020.09.004>

Limitations of US

In the hands of highly skilled practitioners, the performance of MSK US in the assessment of superficial soft tissue and tendon injury is equal to MRI. A barrier to the performance of MSK US in the ED is the high degree of training that is required of personnel, both to scan and to interpret the images. Sonographers must be able to recognize the artifacts inherent to MSK US and must be able to manipulate the various parameters in order to optimize image quality. It is vital to have a sophisticated understanding of MSK anatomy and the varied sonographic appearances of tissues such as skin, subcutaneous fat, muscle, tendon, ligament, and synovium, both when normal and abnormal. Without this high level of understanding, the resulting images can be confusing at best, and cause missed diagnoses at worst. <https://doi.org/10.1053/j.ro.2020.09.004>



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

**Steady hand
Window
Sono-anatomy**

T
0
1
2



Steady Hand



探頭

操作者的手

皮膚



A

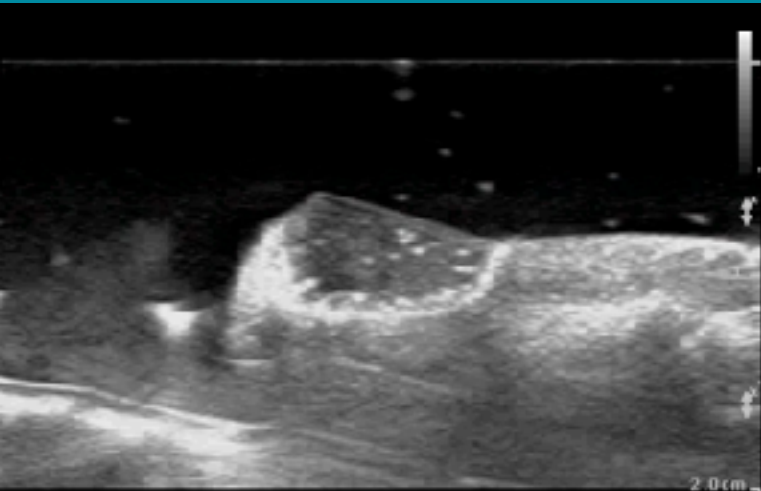


B

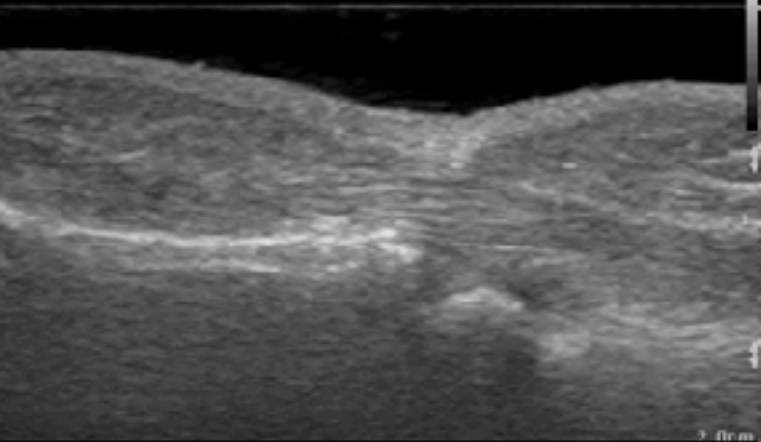
左手中指腫痛



Water bath method



G
D R
3.0 12.3

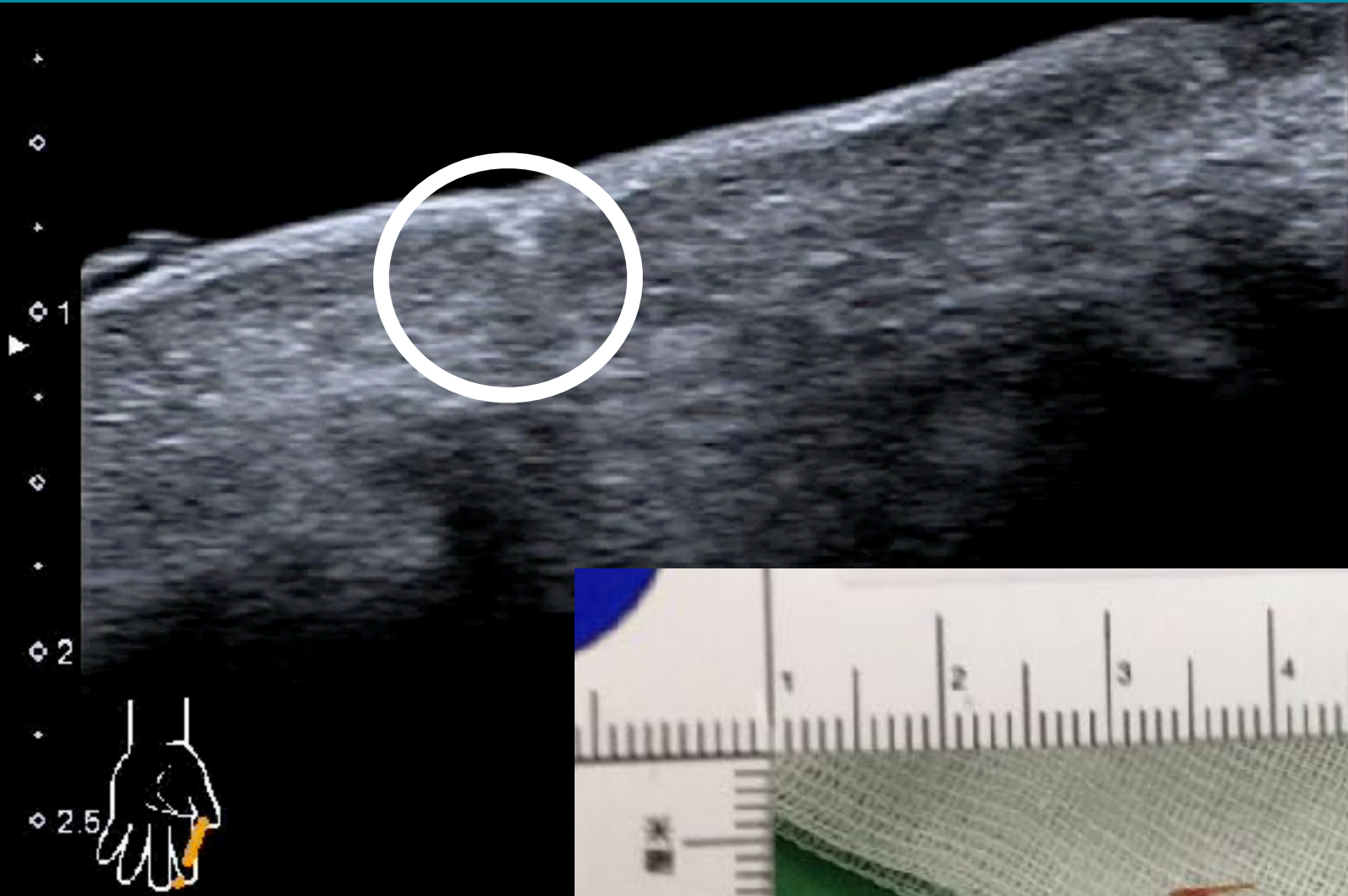


G
P R
2.0 12.0

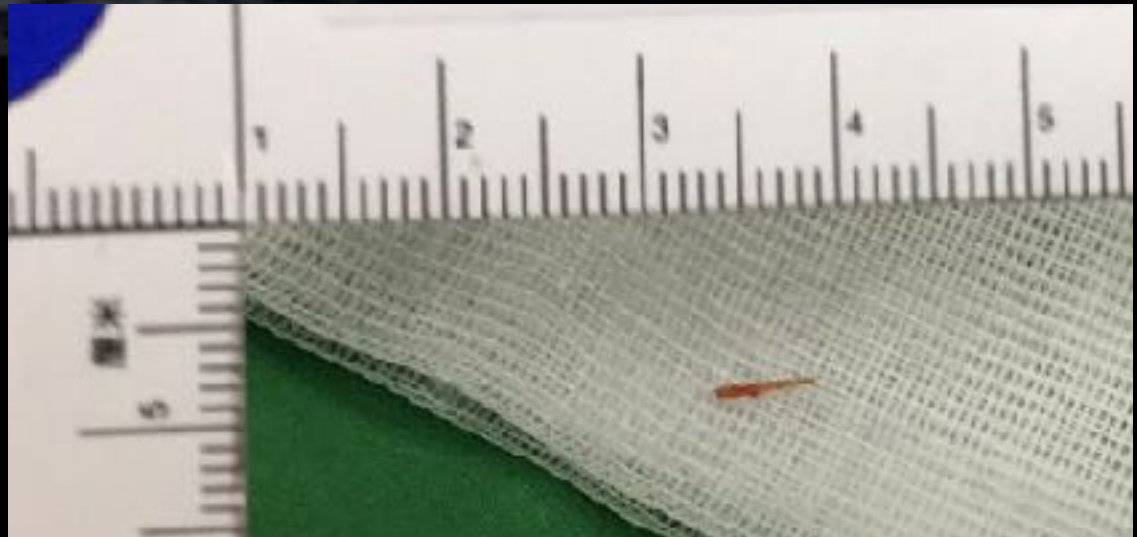


G
R
4 H.H

Create window



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



MSK掃描原則

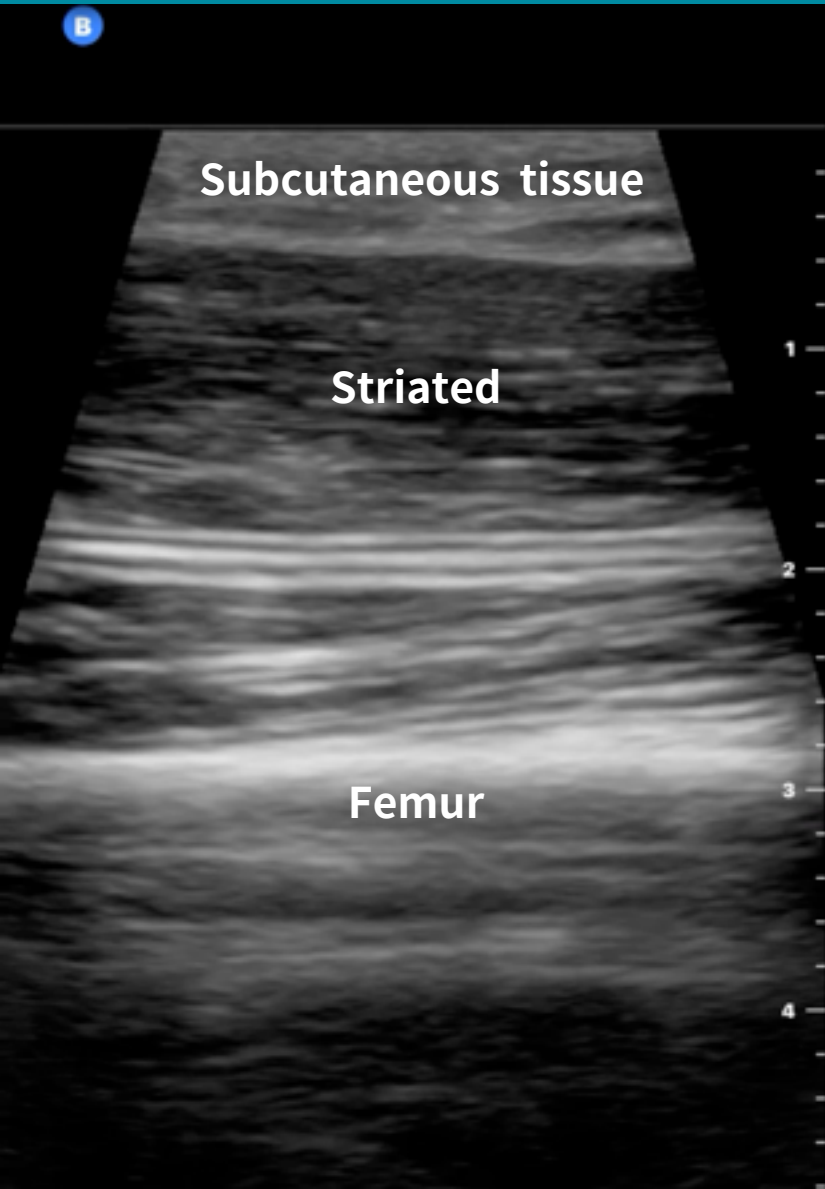


管狀構造橫掃優先

先找外在明顯定位

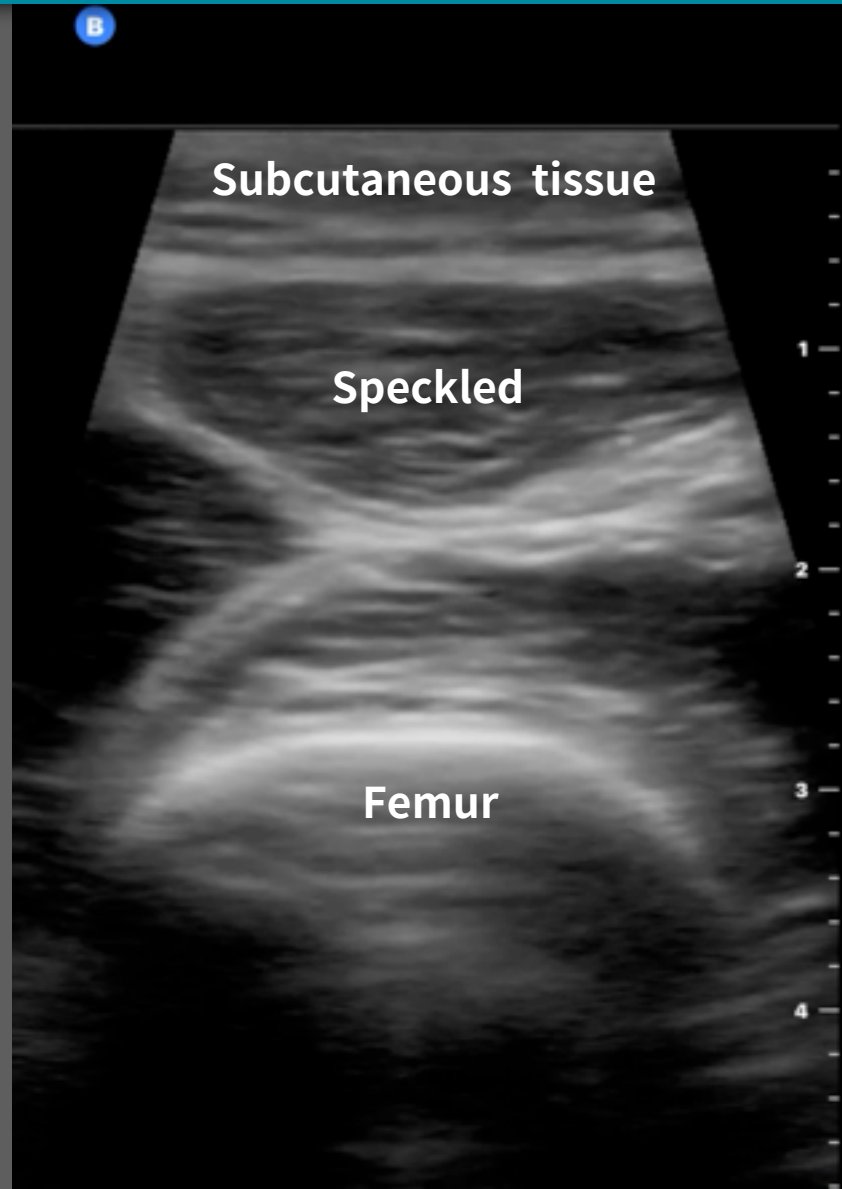
確認內在明顯標的

MSK的重要三界線(白線)



皮膚
筋膜

骨頭

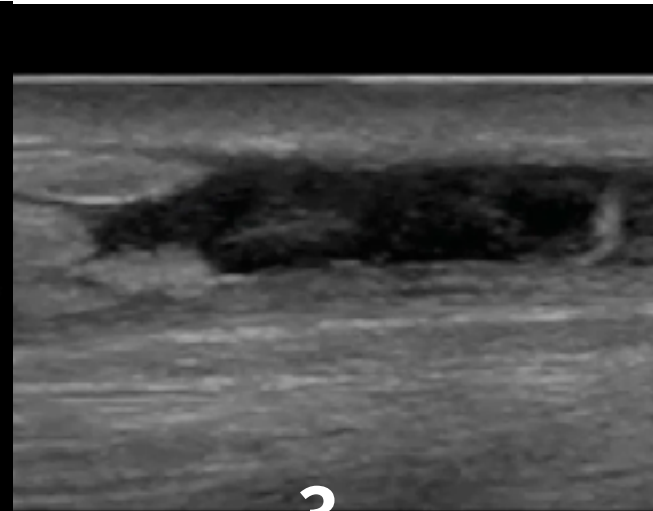


軟組織感染症

蜂窩性組織炎

膿瘍

壞死性筋膜炎



Cobblestone

Collection

Fascial fluid >4mm

軟組織感染症

蜂窩性組織炎

膿瘍

壞死性筋膜炎

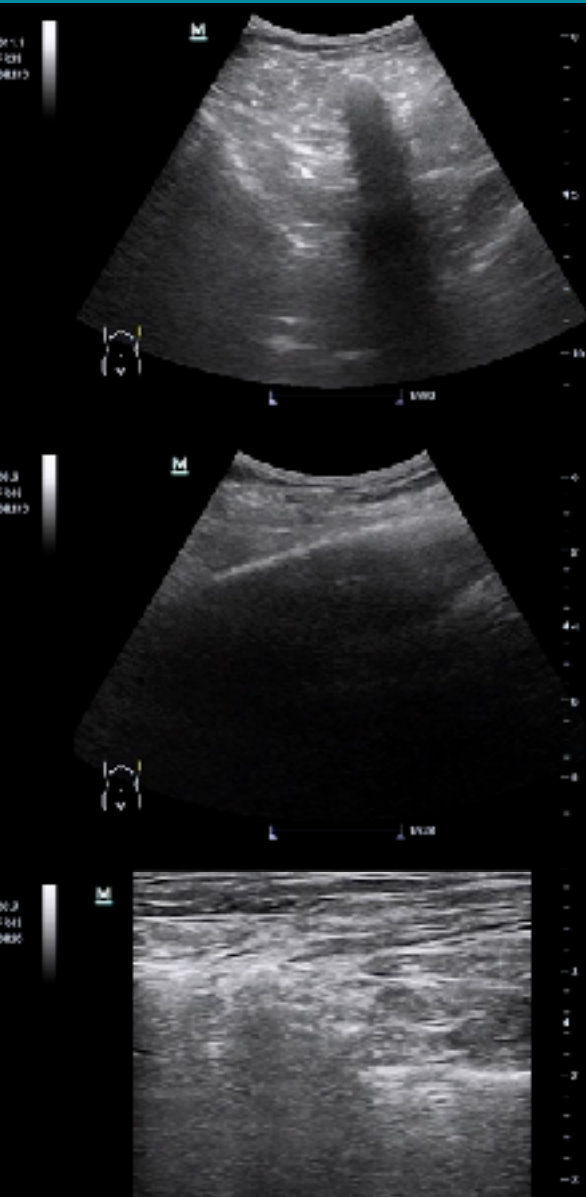


Cobblestone

Collection

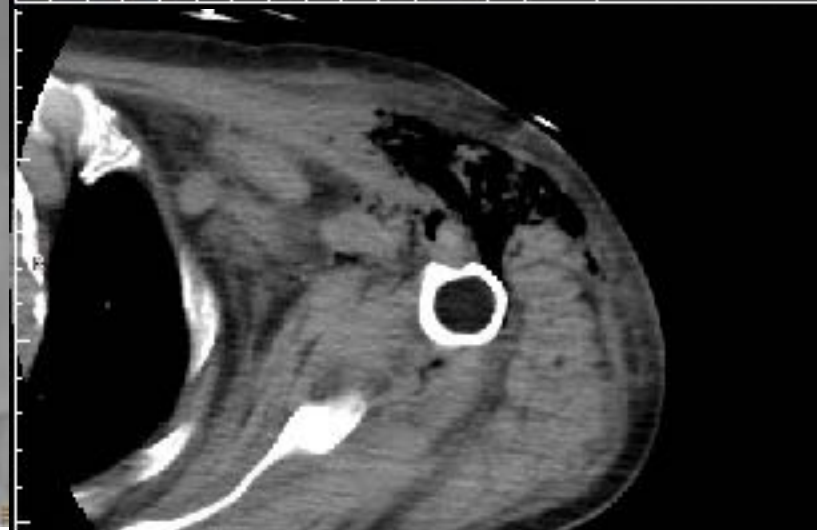
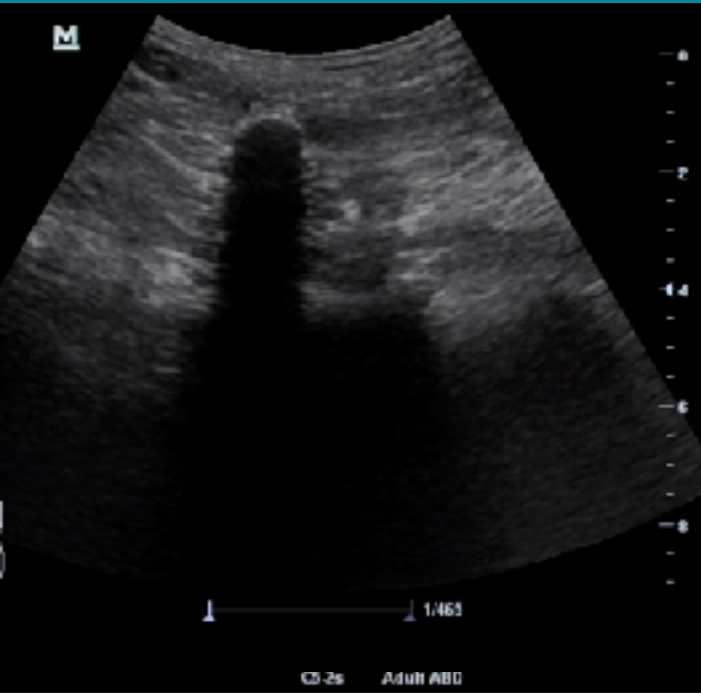
Subcutaneous
Thickening
Air
Fascial
Fluid

83F，前天跌倒，左手痛，BP 69/43

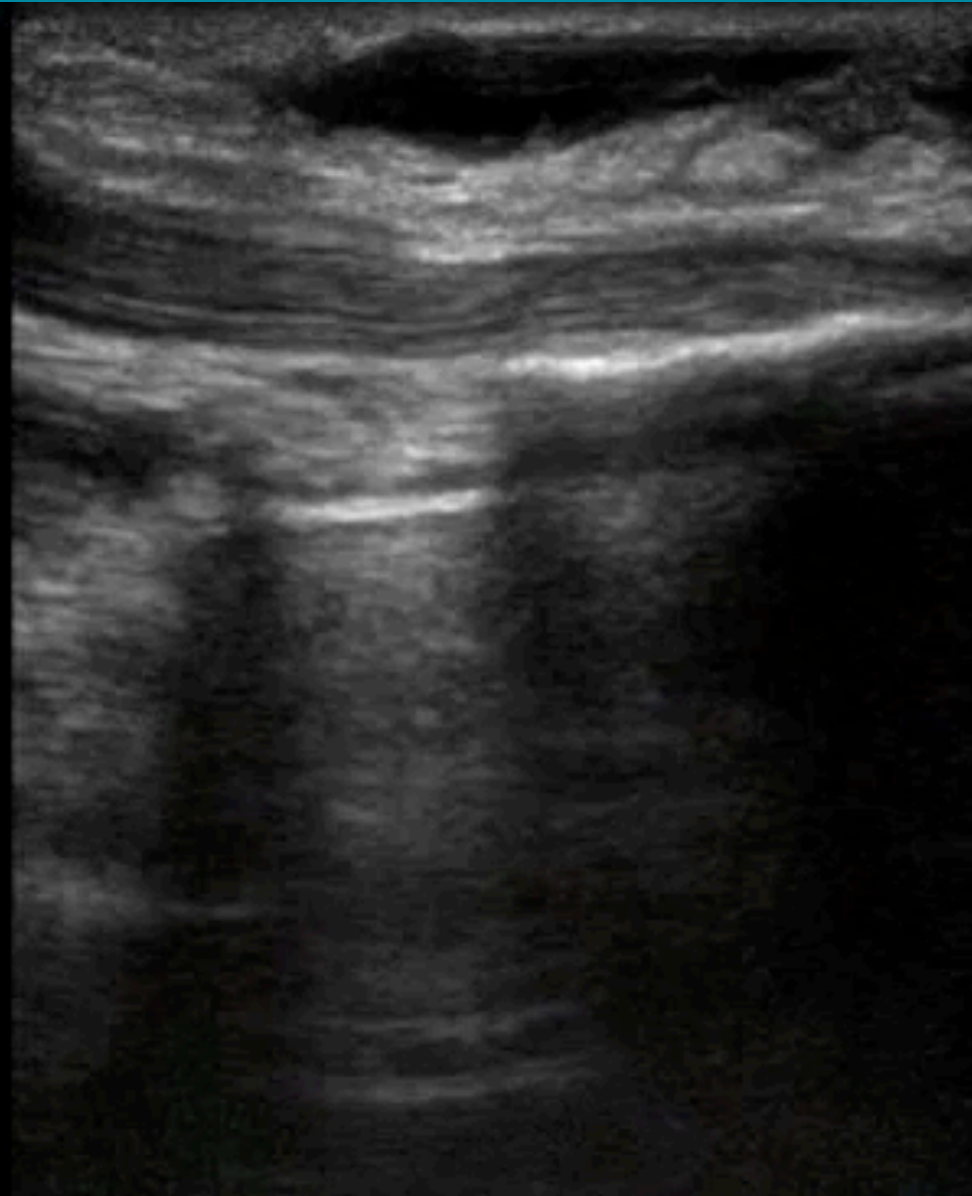




NF with shock



72F, left knee cellulitis



H
E
2
I
O
T
O

18

72F, left knee cellulitis

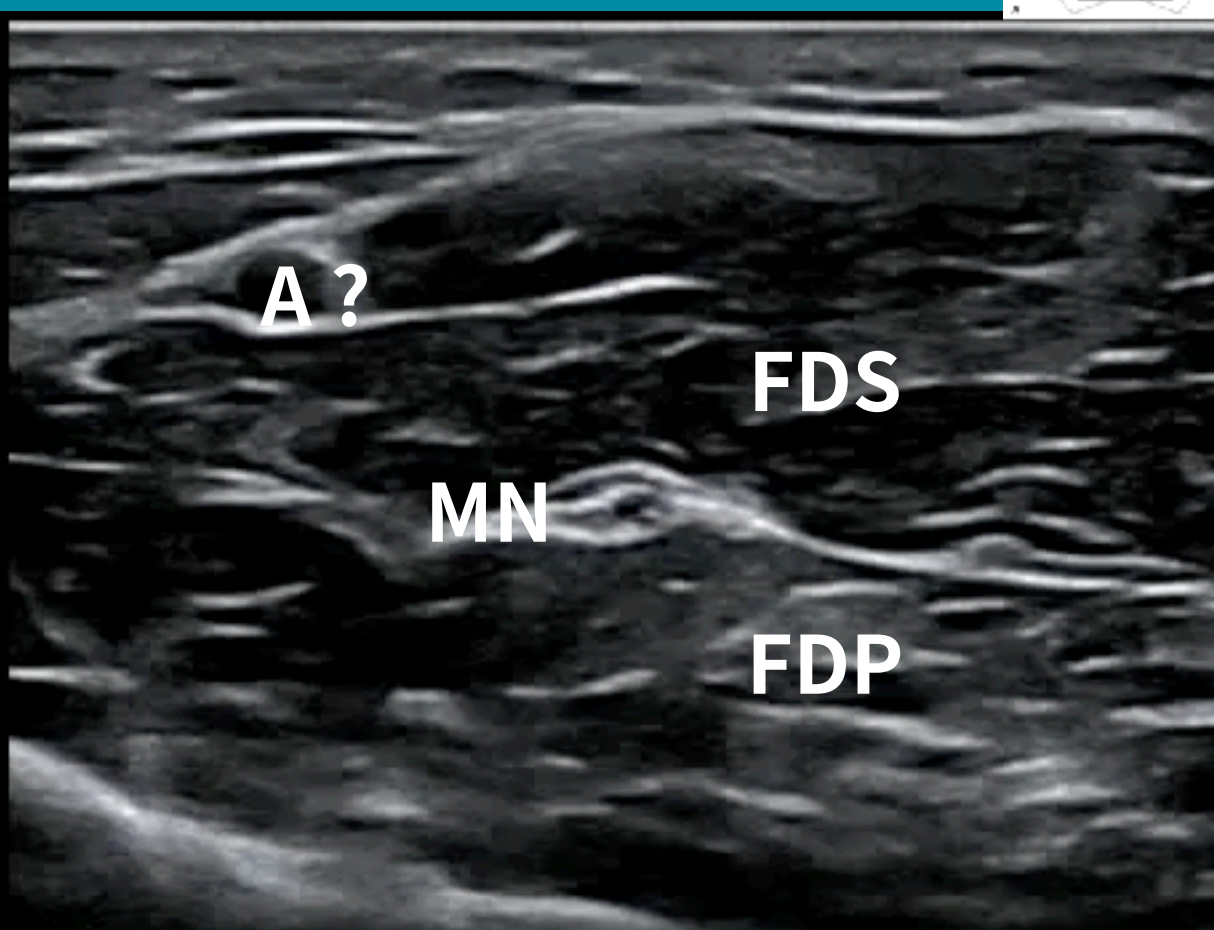
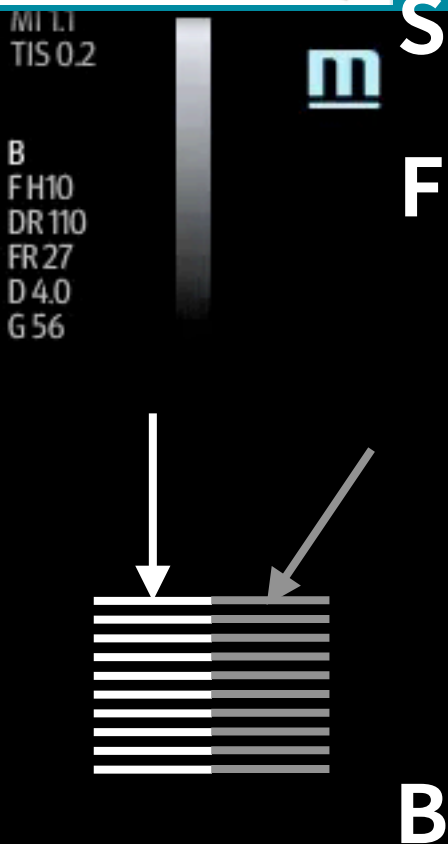
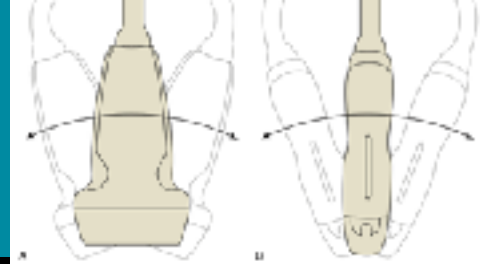
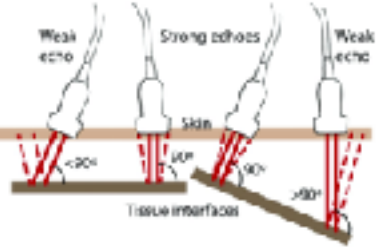


Vas
HFL
19%
MI
0.7
TIS
0.1



4.0

Anisotropy

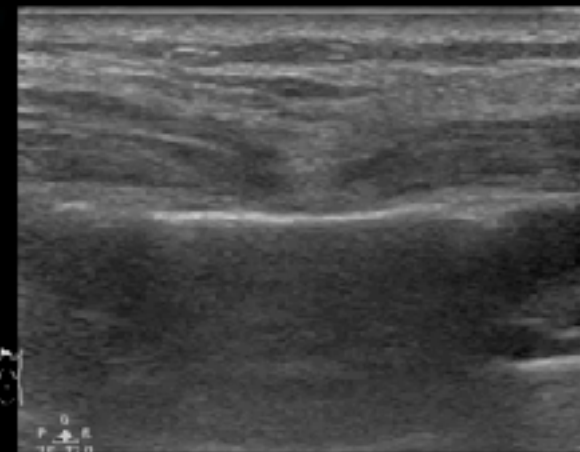
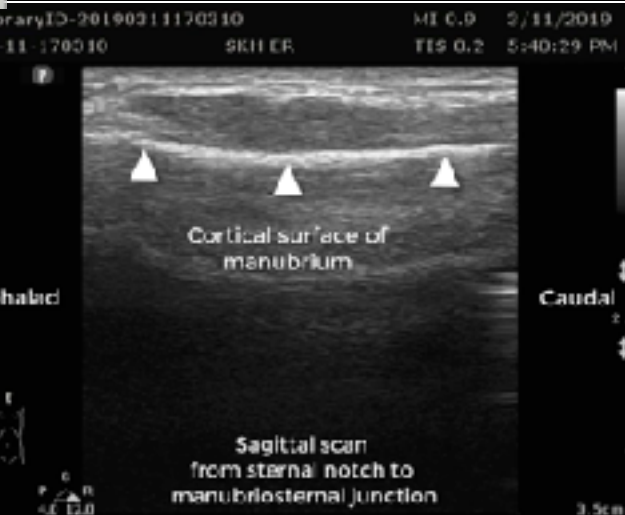
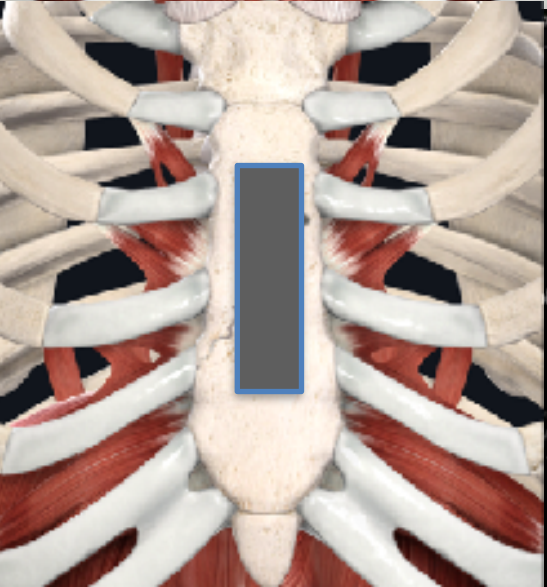
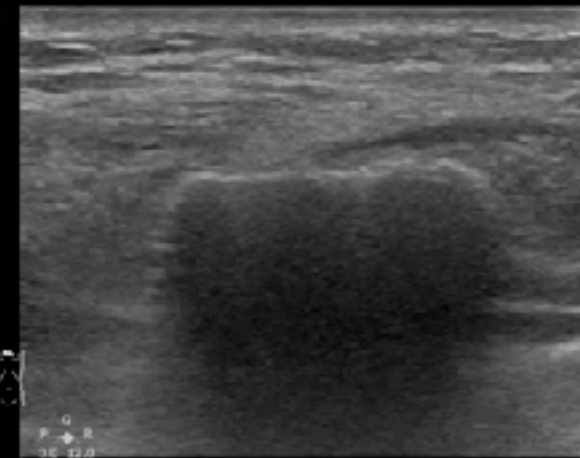
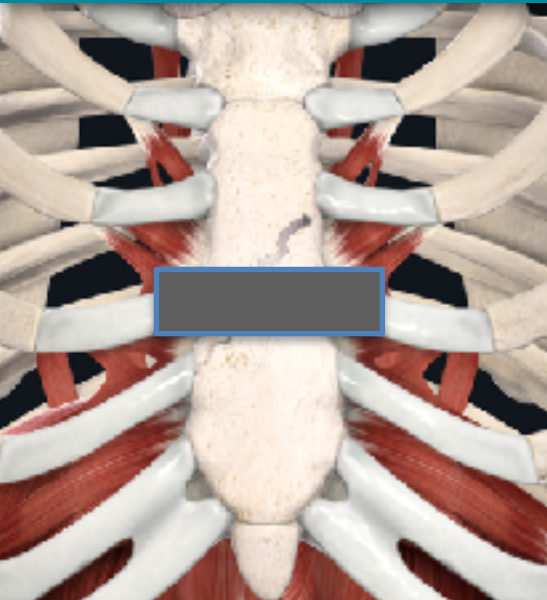


Tendon

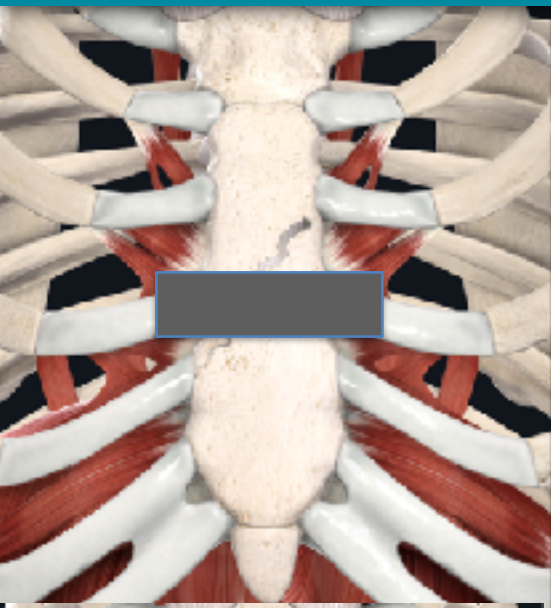
Nerve

Muscle

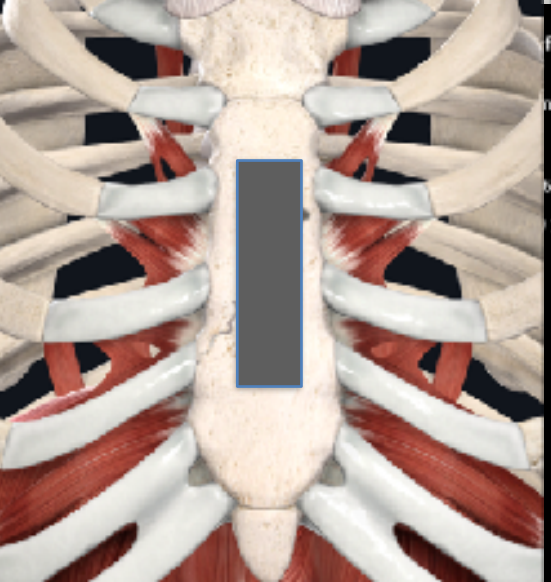
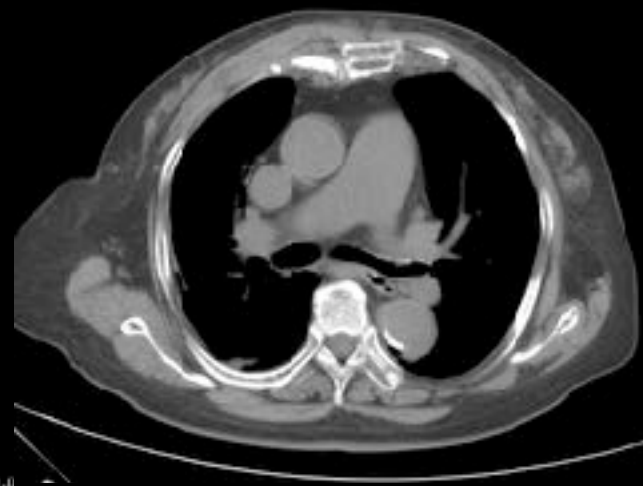
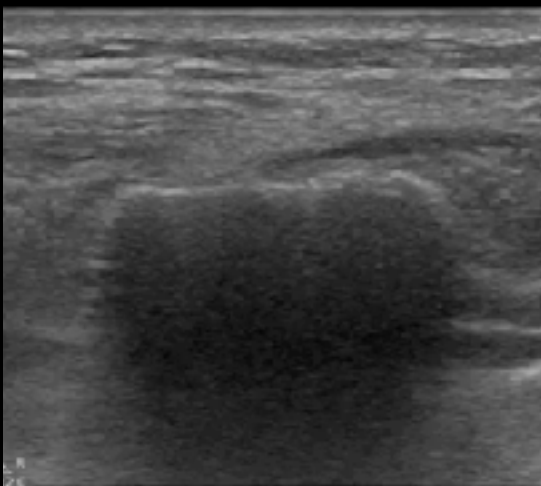
Sternal fracture



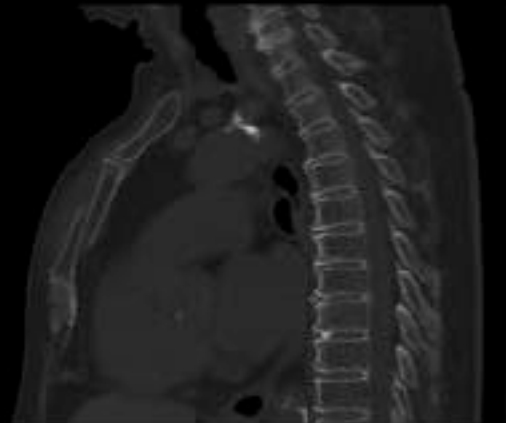
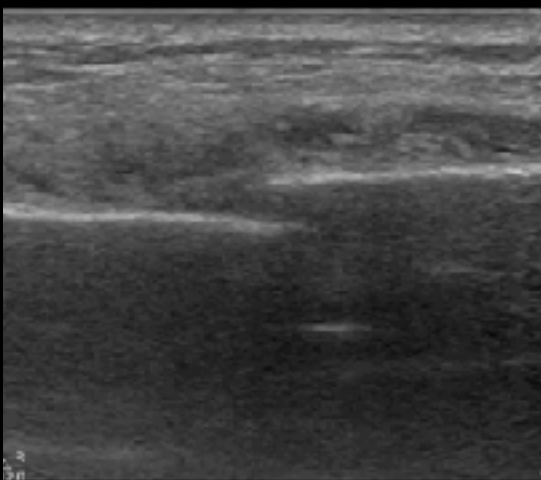
骨折判斷 - 適用長骨&平骨



高低落差

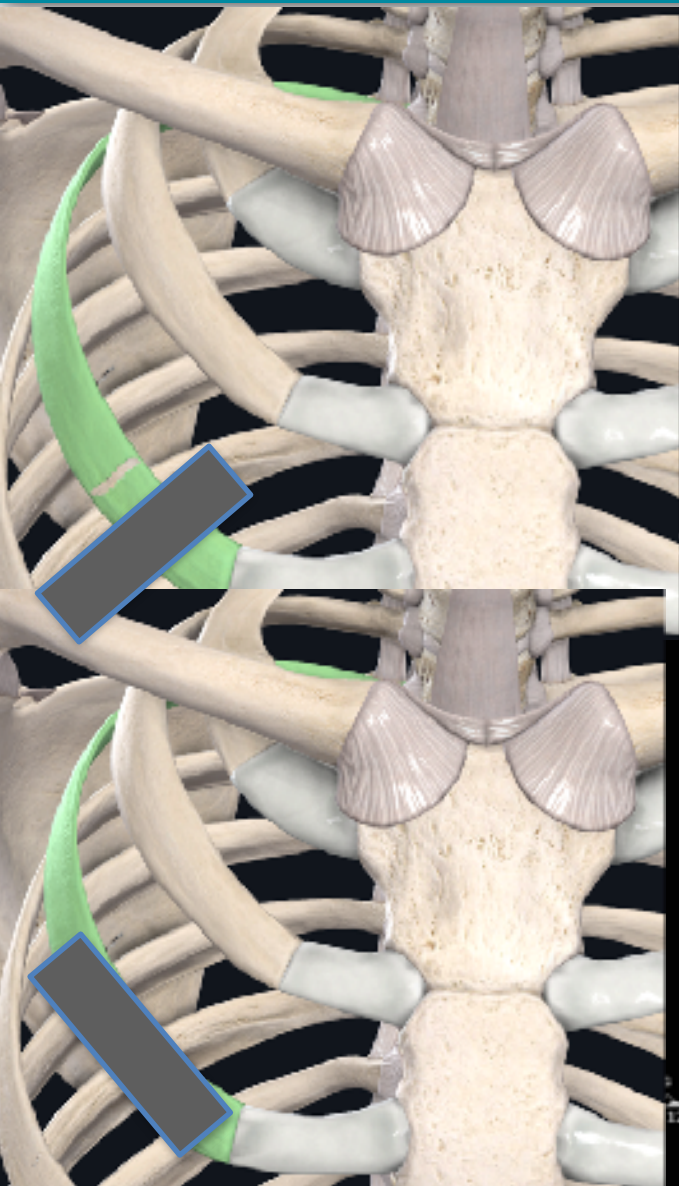


不連續



血腫

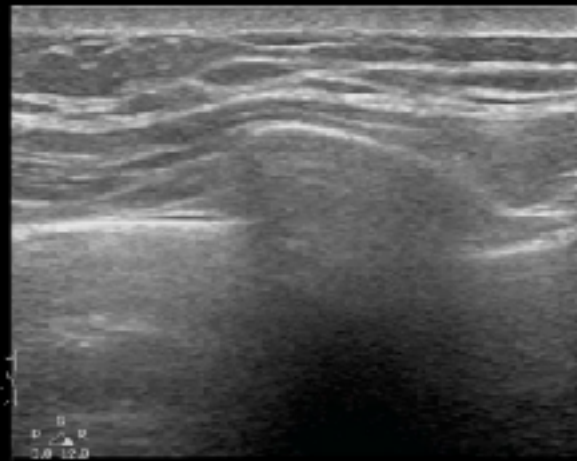
Rib fracture



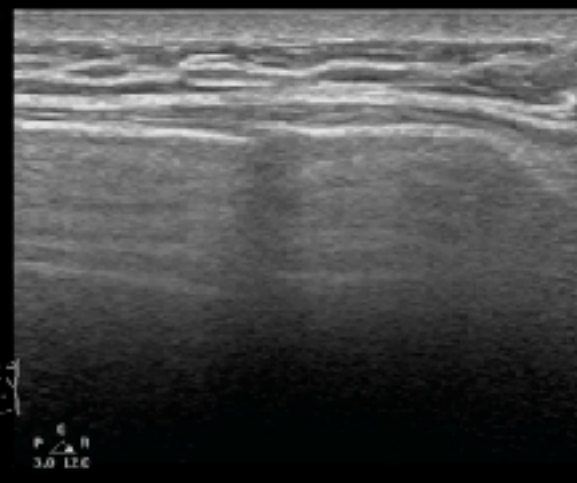
20190311170310 MI 0.9 3/11
SID SKH-ER TIS 0.2 5:40



Superficial
L12-3
46 Hz
3.0cm
2D
Res
Gn 96
C 56
3/2 / 1



Superficial
L12-3
46 Hz
3.0cm
2D
Res
Gn 96
C 56
3/2 / 1



23M，車禍，右膝腫痛

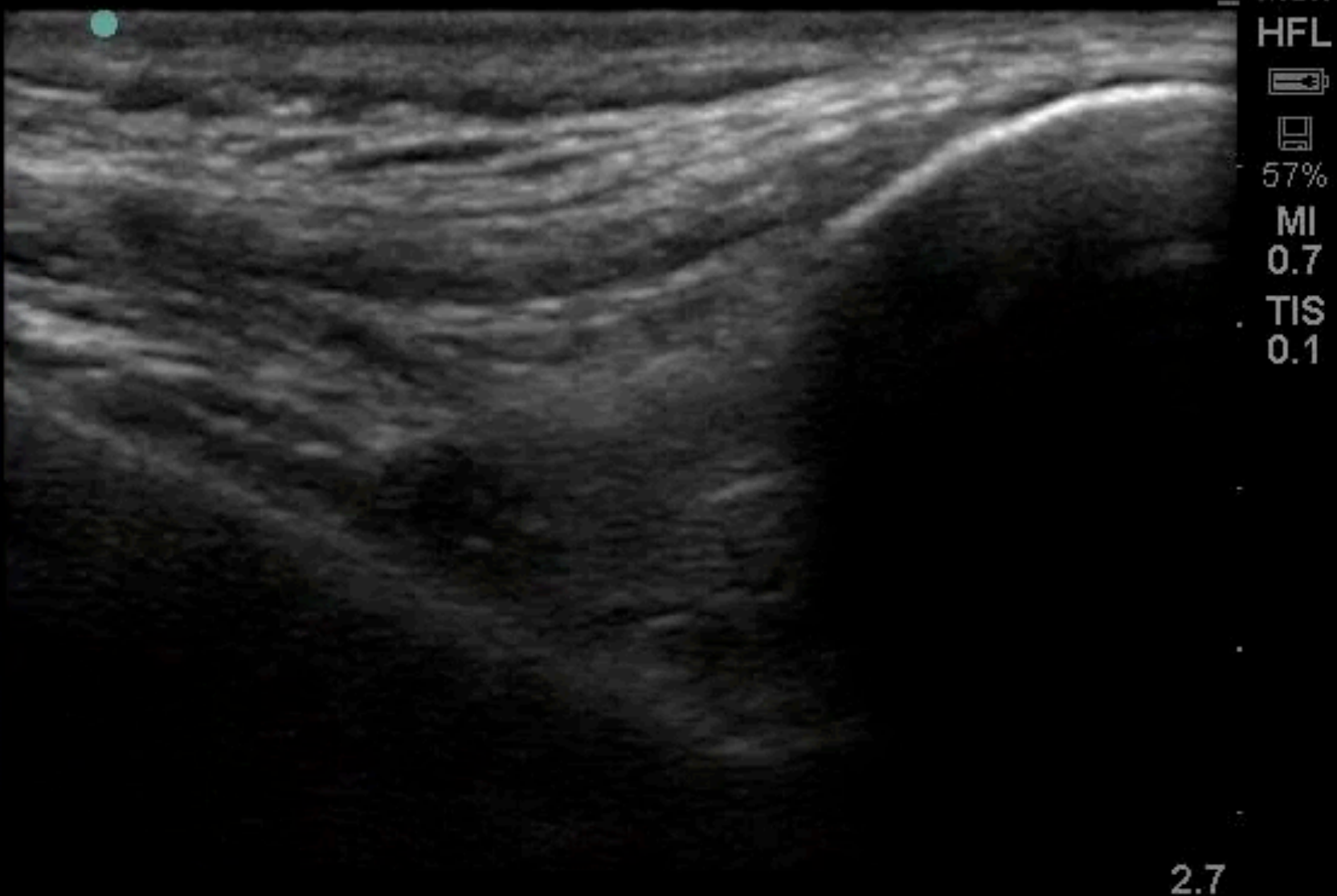
R



R



23M，車禍，右膝腫痛



HFL



57%

MI

0.7

TIS

0.1



Patient



Auto Gain



Res



Clip



Page 1/3

2.7

R



R



12/08/15
14:43:34
0.00000

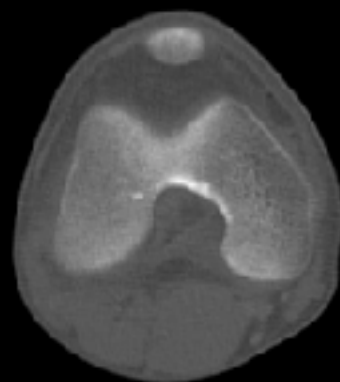
12/08/15
14:43:34
0.00000



Patient



Auto Gain



Lower extremity joints



1

Hip



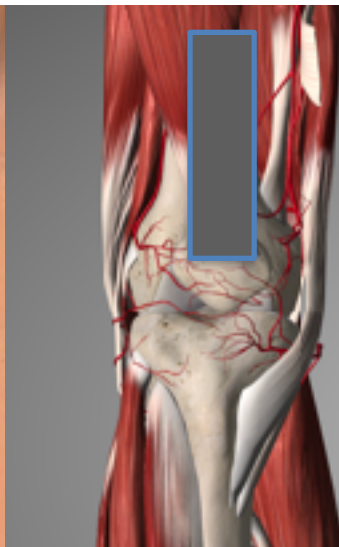
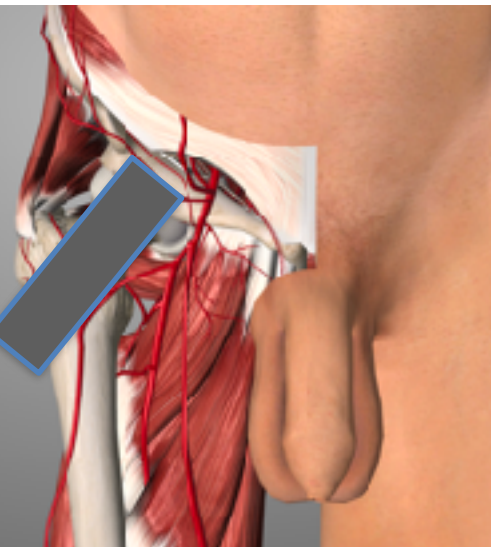
2

Knee

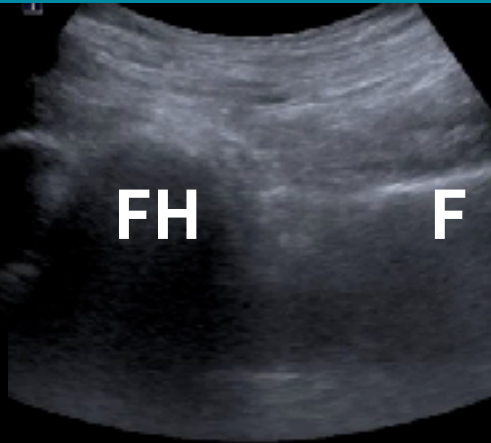


3

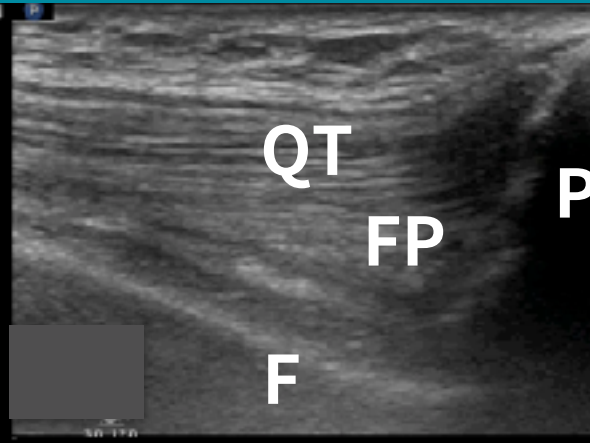
Ankle



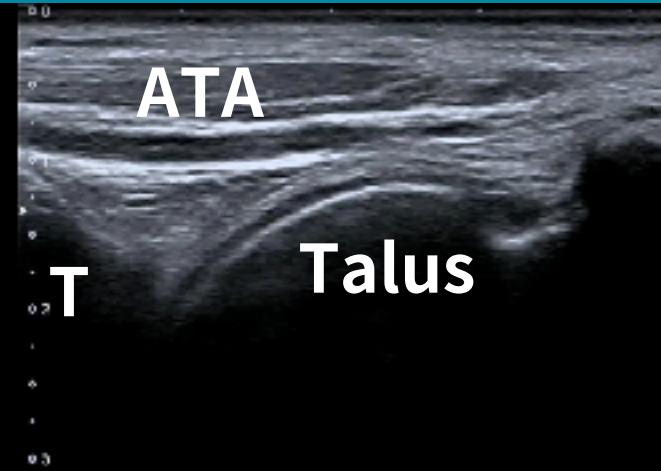
LE Joint effusion



Hip



Knee

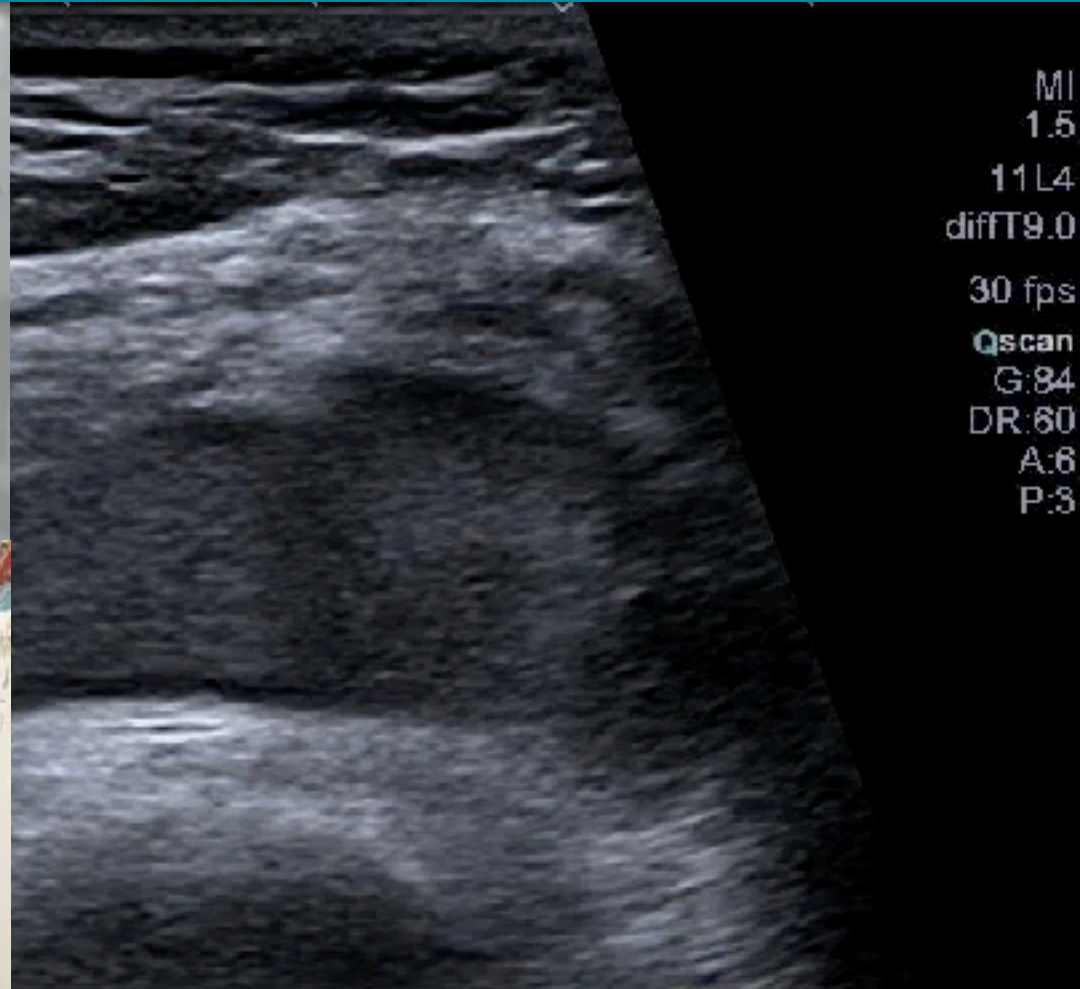


Ankle

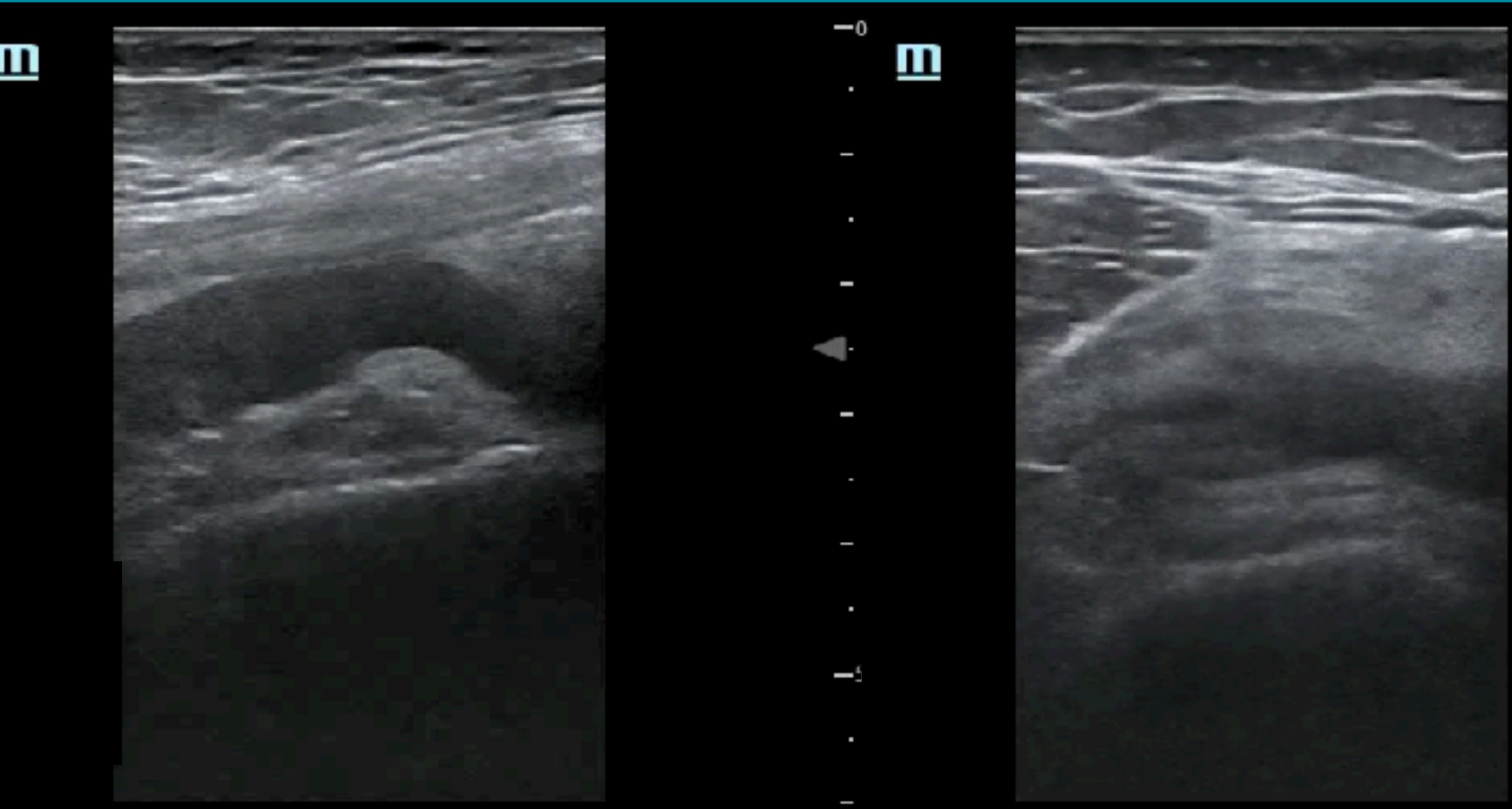
SKH-EUTC@ChenKC



Needling for hemarthrosis

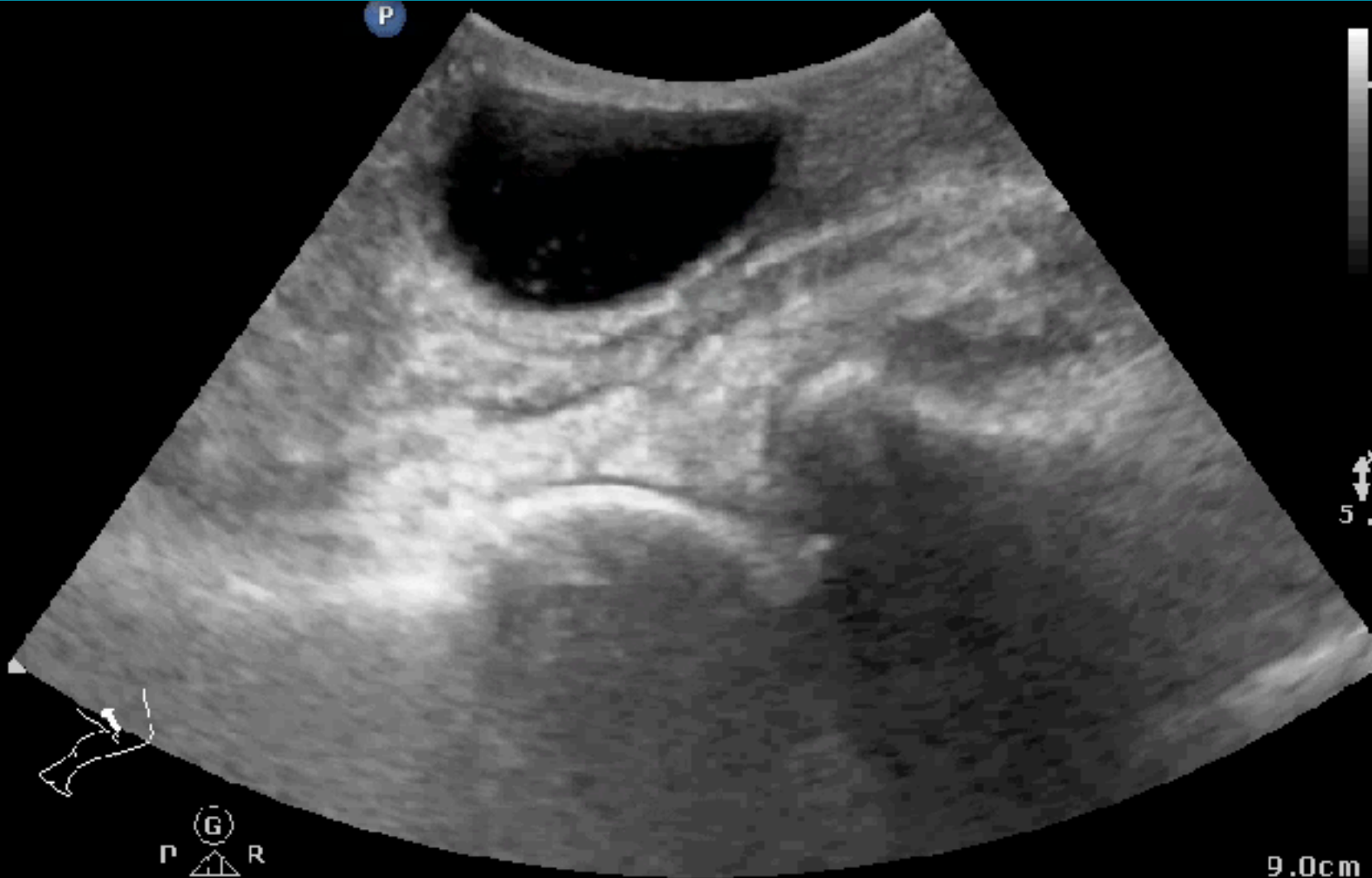


Lipohemarthrosis



Baker's cyst

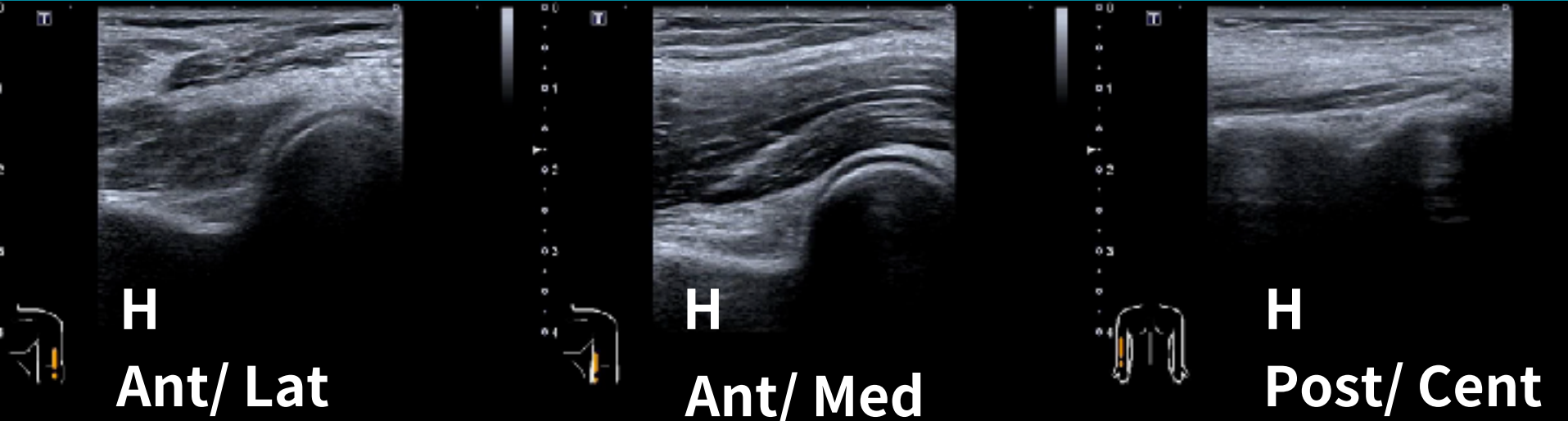
ADU Gen7
C5-1
47 Hz
9.0cm
2D
HGen
Gn 85
C 56
3 / 3 / 3



Ⓞ
P R
1.8 3.6

9.0cm

Elbow joint



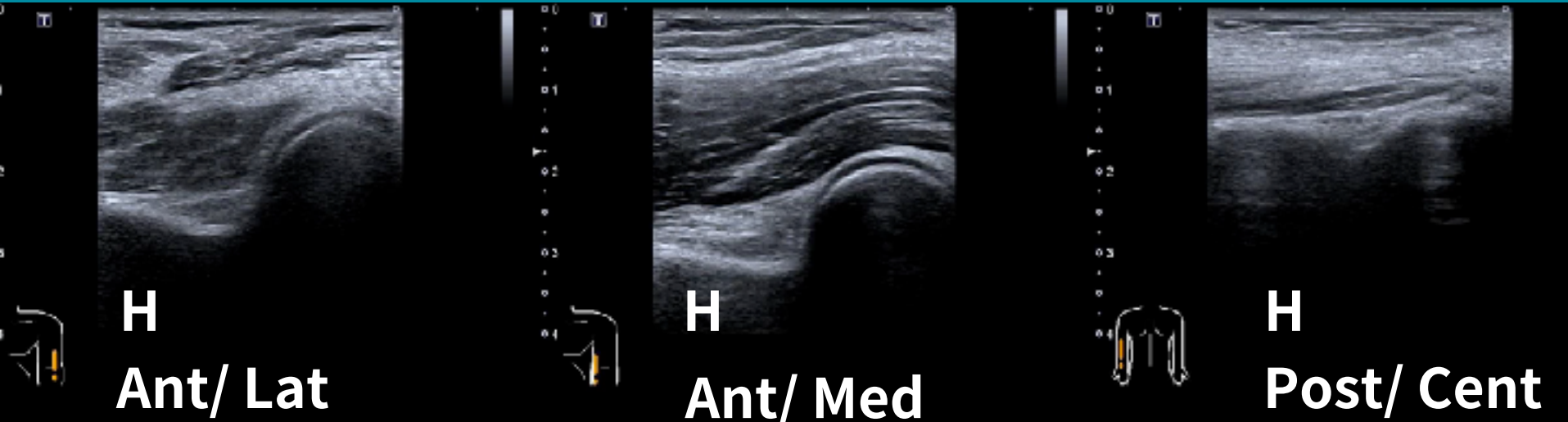
Radial fossa

Coronoid fossa

Olecranon fossa



Elbow effusion



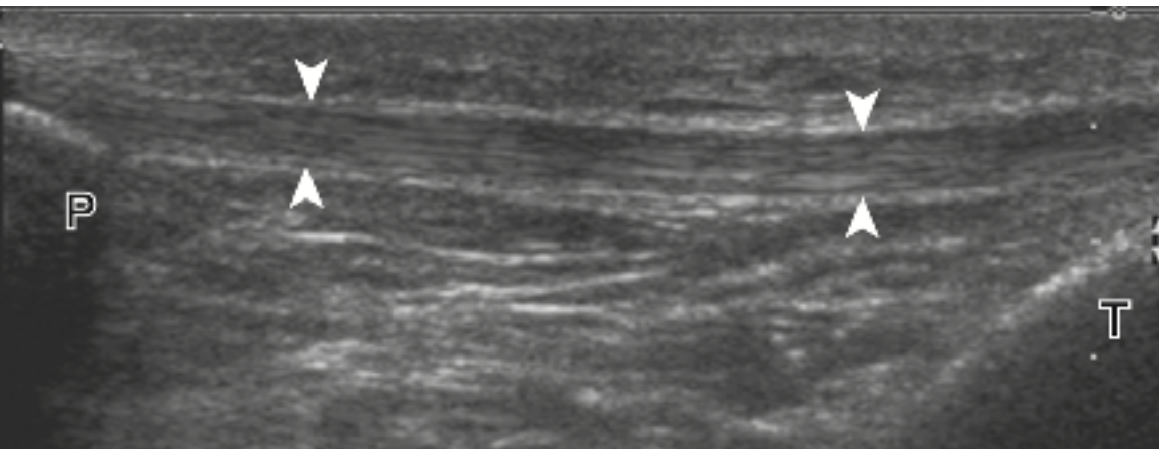
Radial fossa

Coronoid fossa

Olecranon fossa

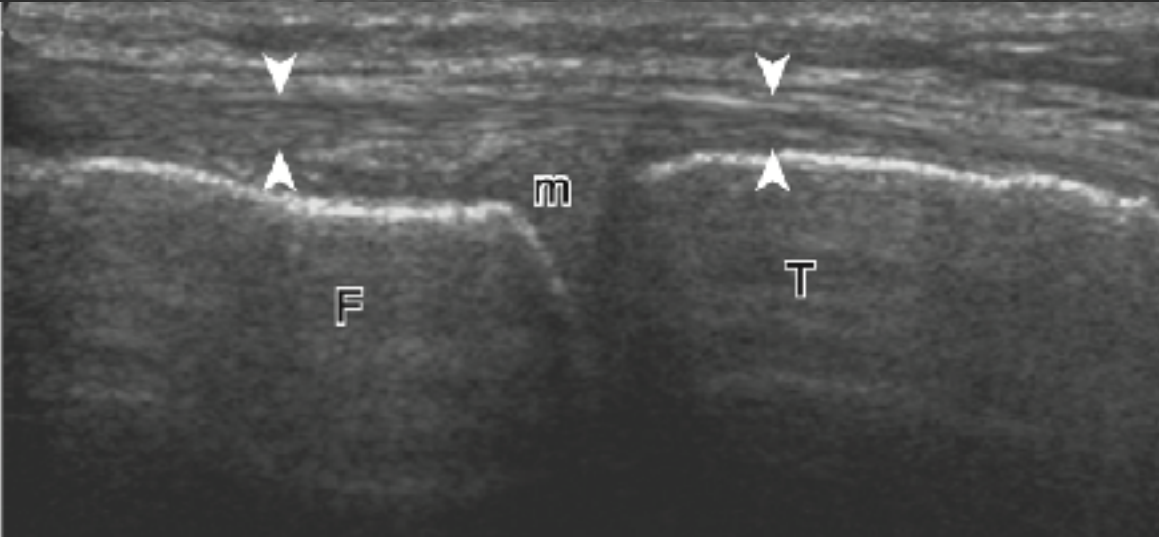


Tendon 韌帶



高回音

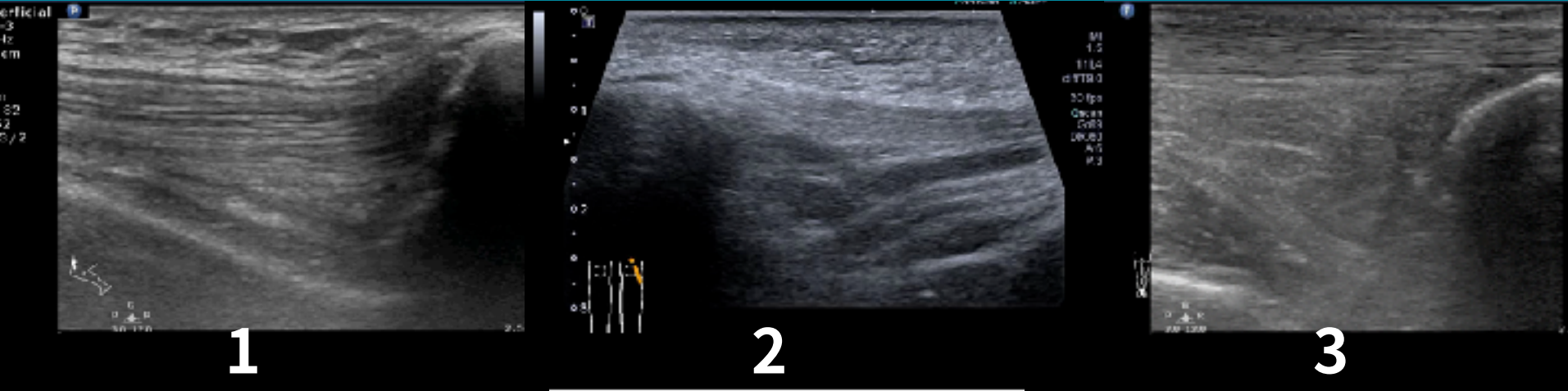
Fibrillar



Grade of Injury

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

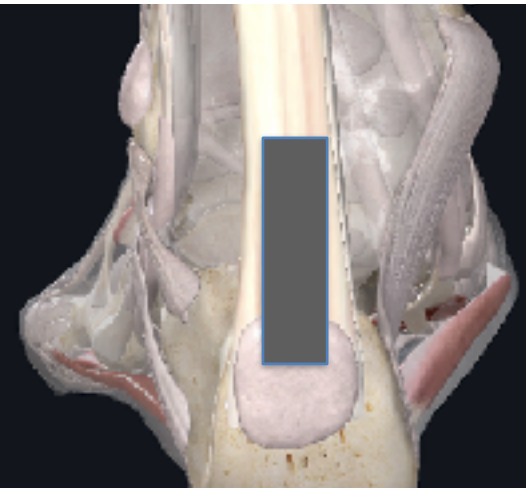
Tendon



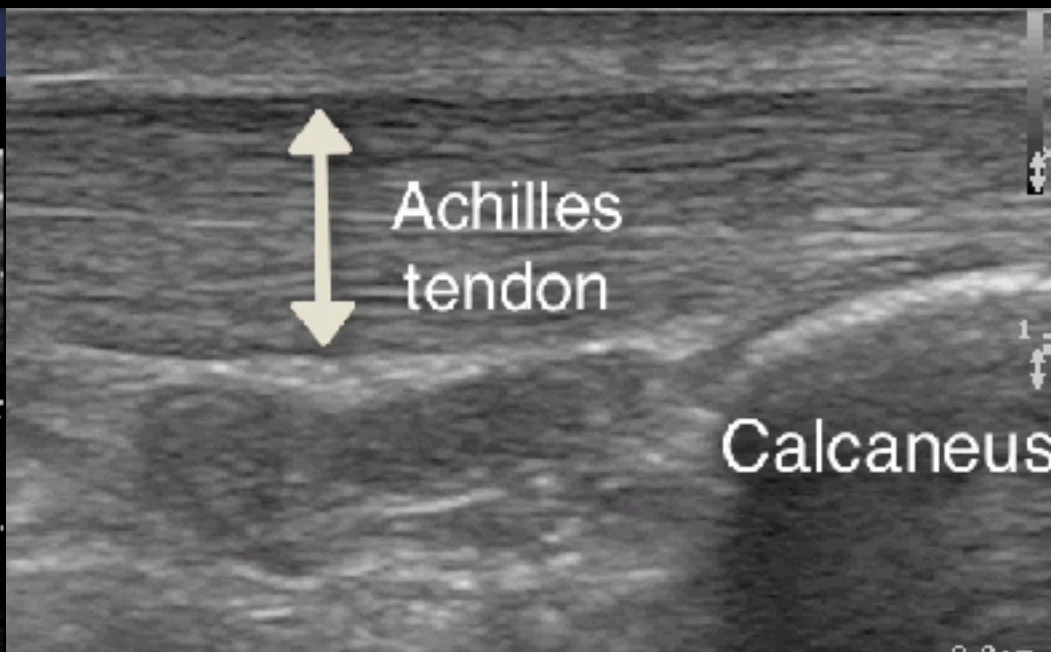
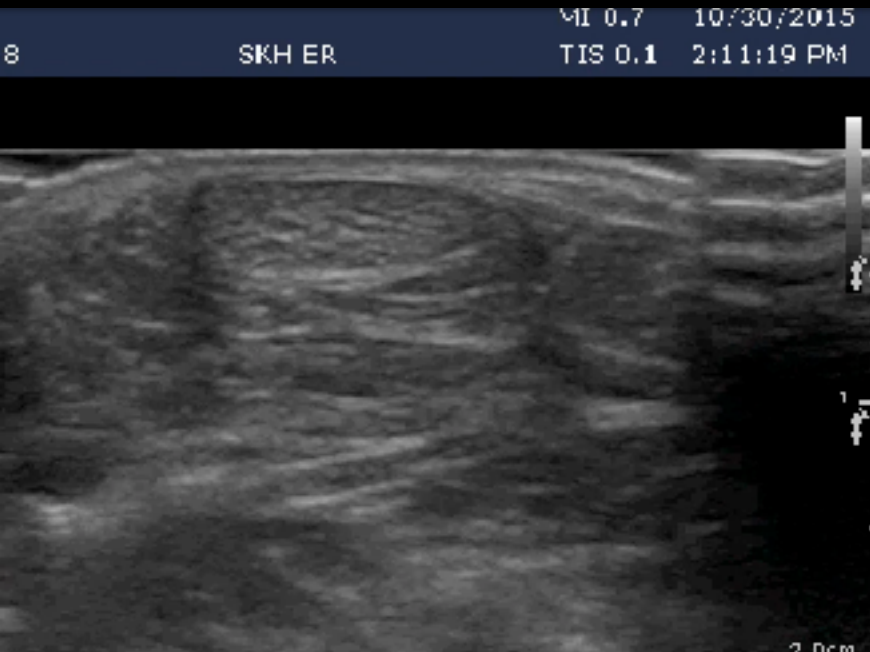
**Quadriceps
Tendon**

**Patellar
Tendon**

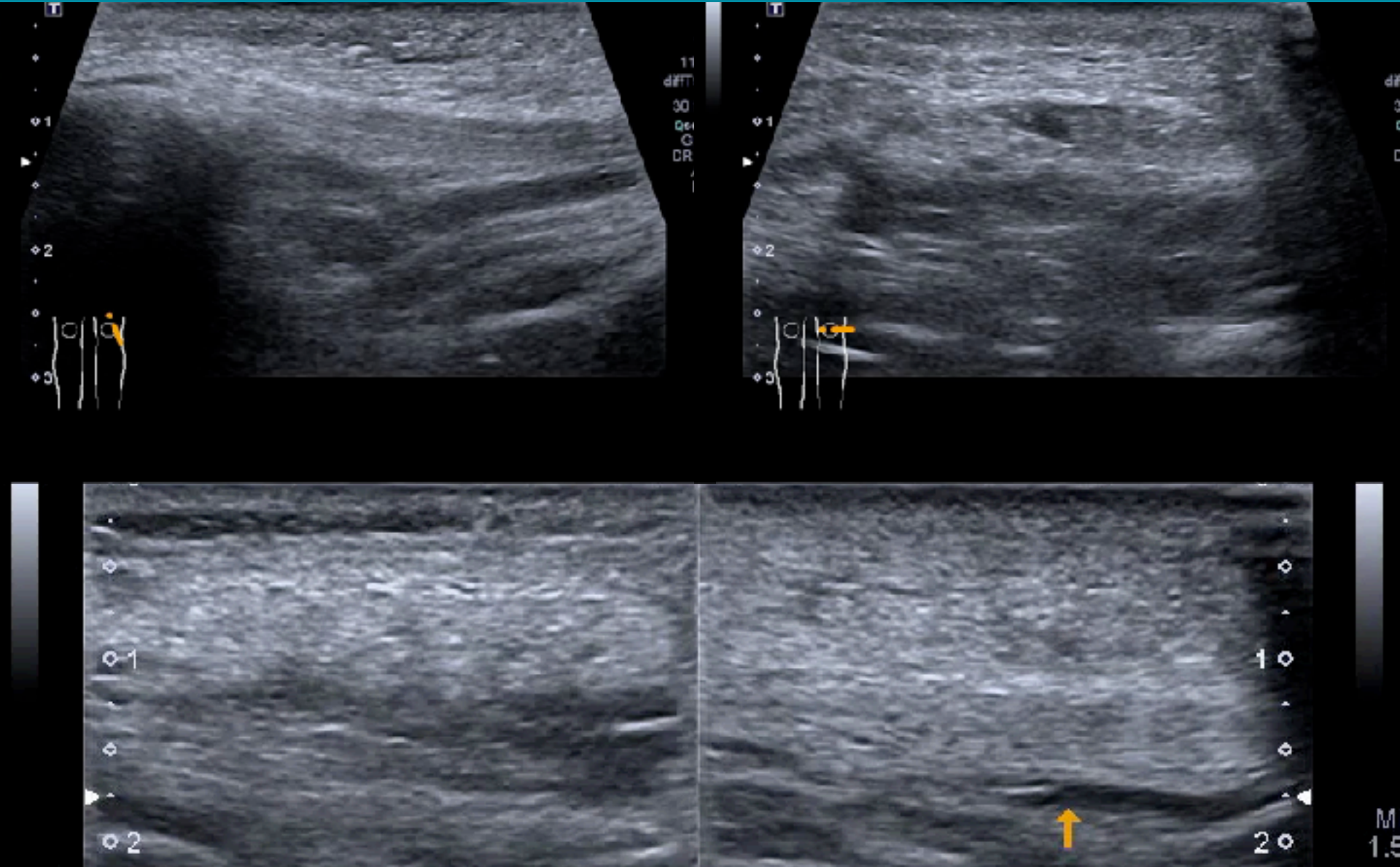
**Achilles
Tendon**



Achilles tendon rupture



Patellar tendon injury



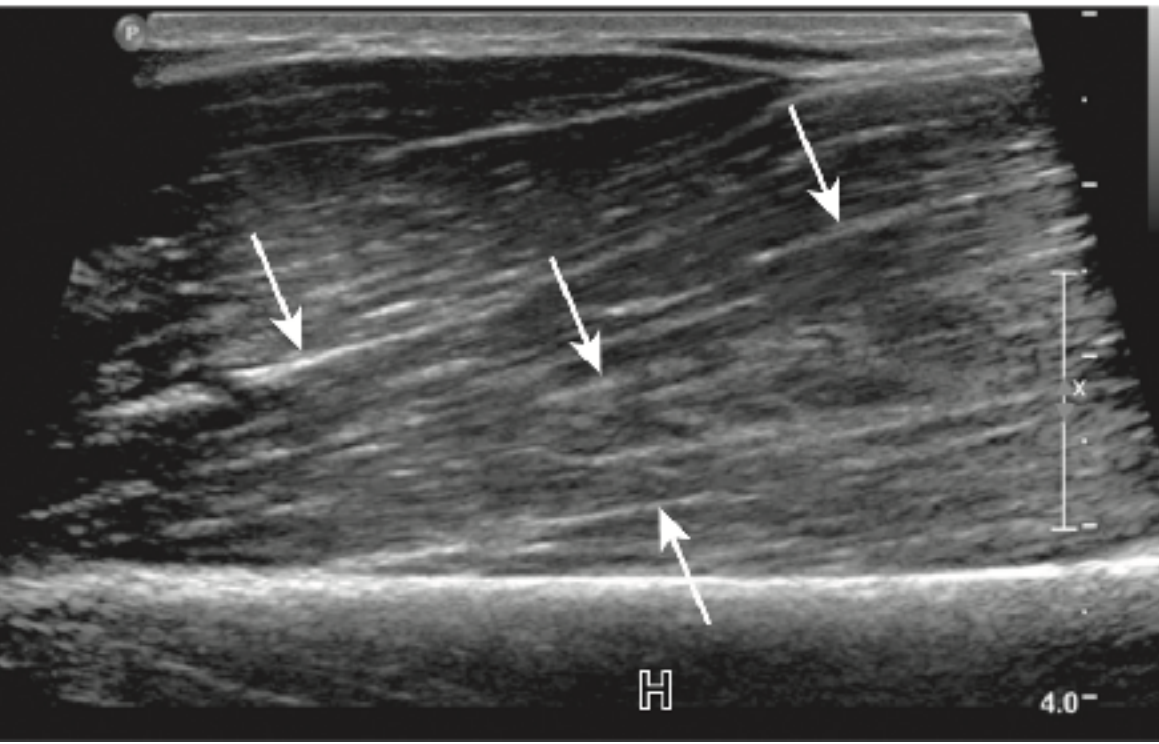
Muscle 肌肉

Grade of Injury

I : no fiber disruption

II : partial fiber disruption

III: complete fiber disruption



Bristal brush

Hypoechoic
mucle

Hyperechoic
fibroadipose tissue

58M, right leg pain while running

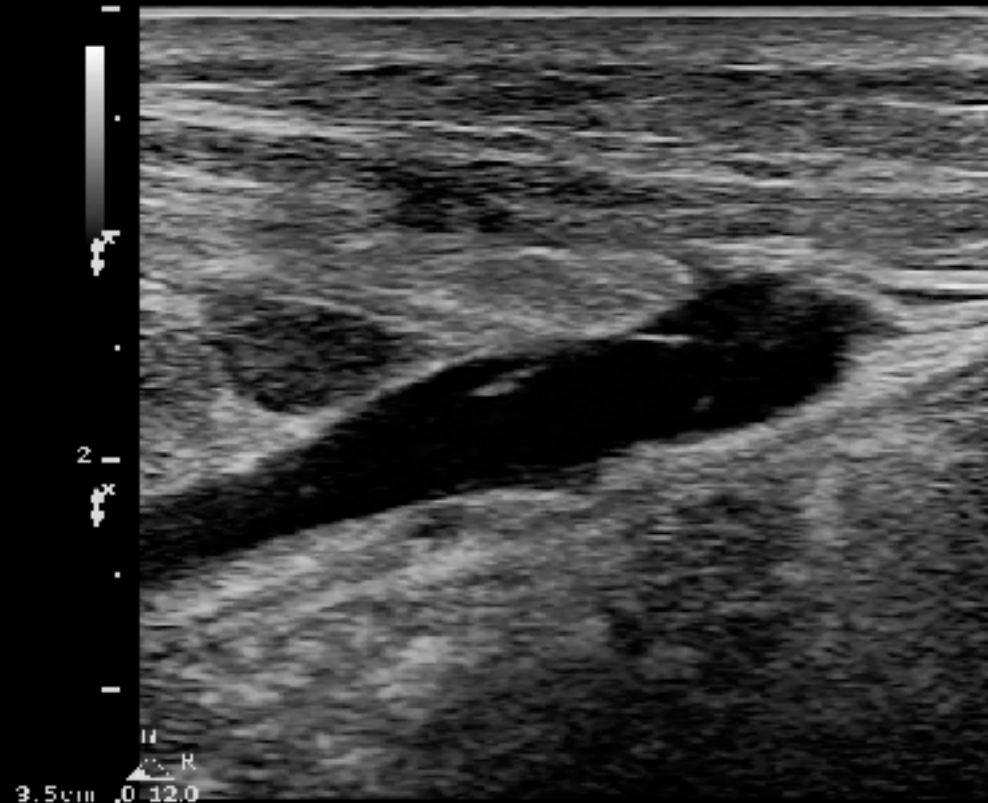


Calf muscle tear

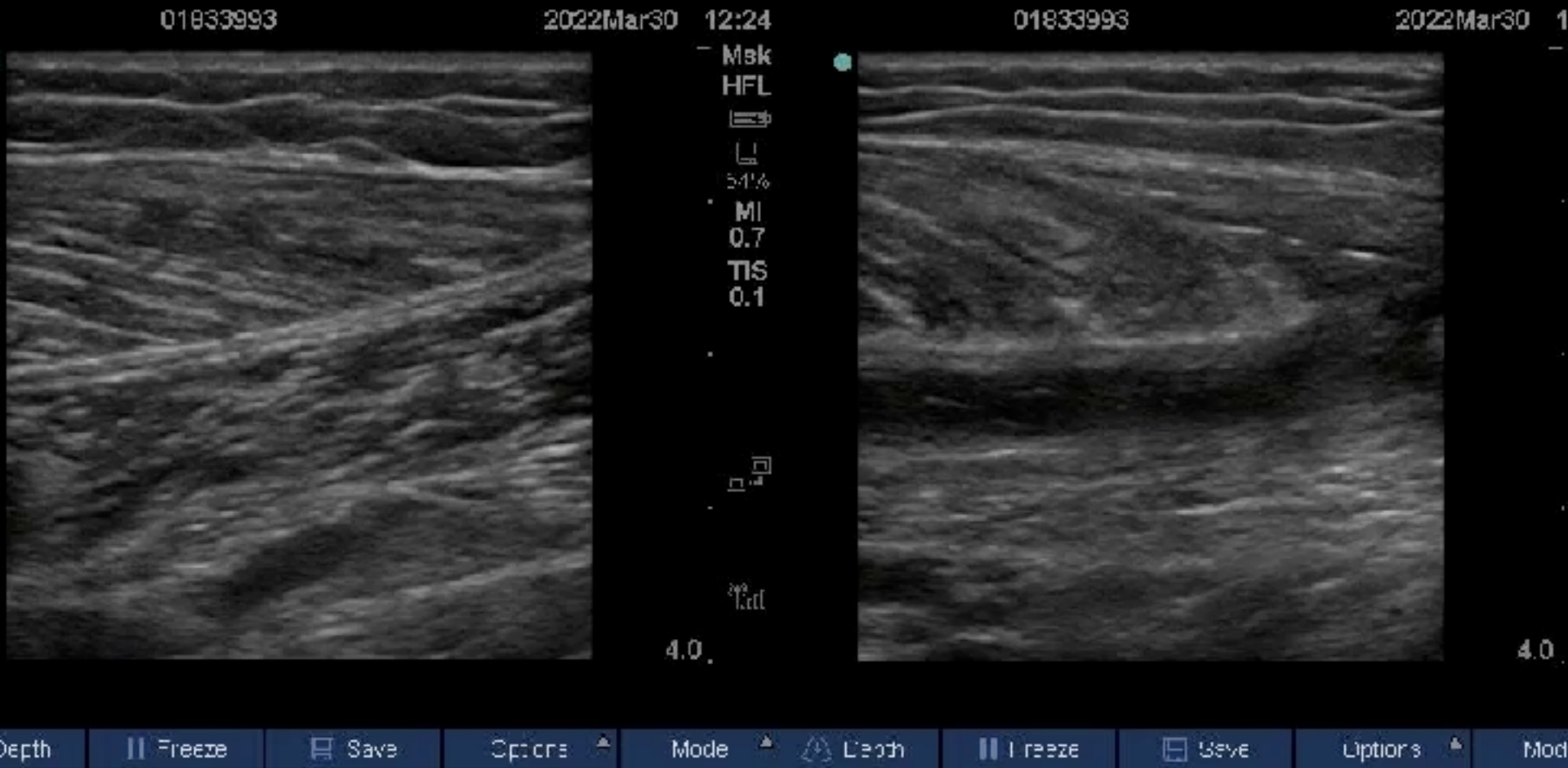
Left calf



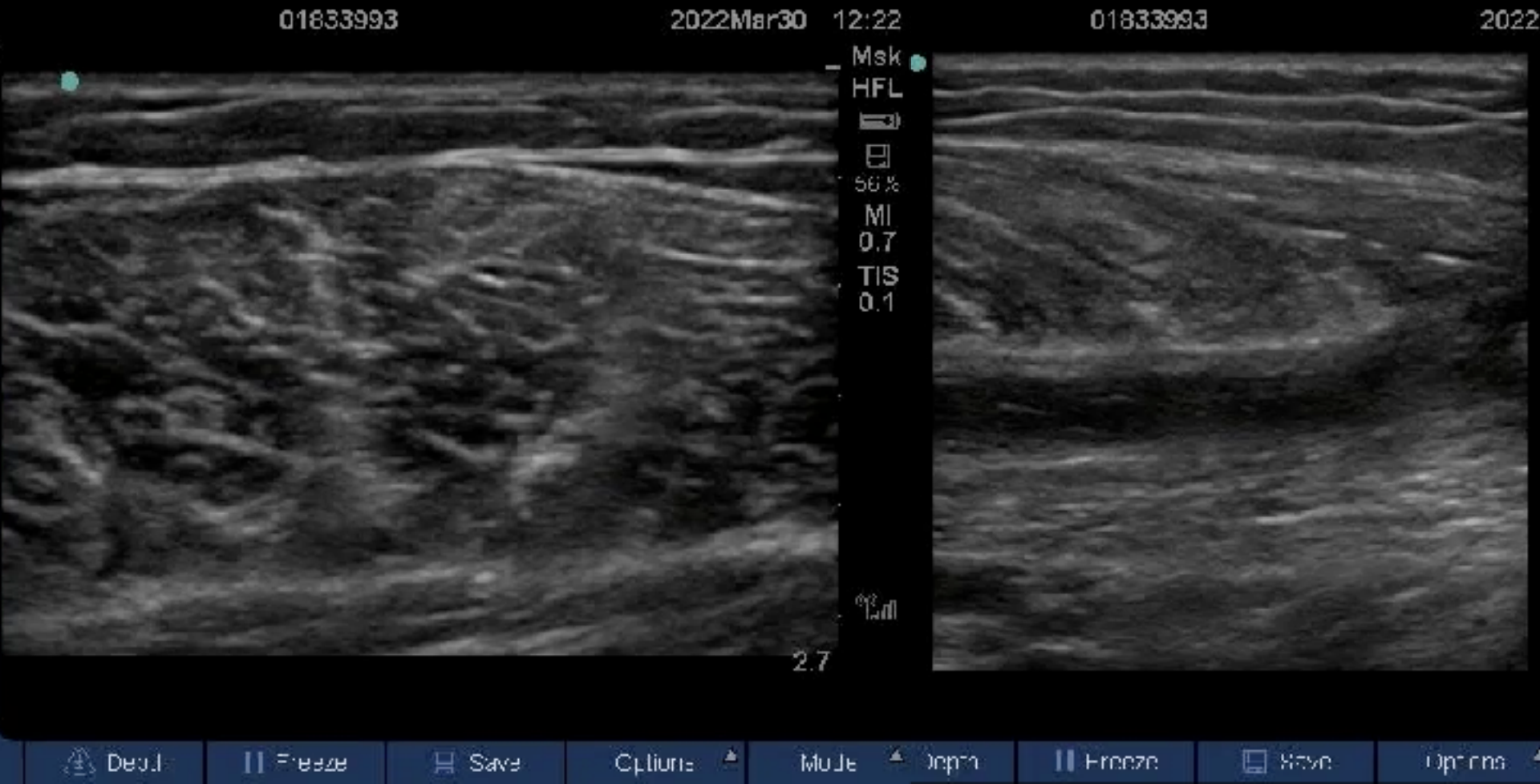
Right calf



Calf muscle tear



Calf muscle tear





226 游: 3.8Km - 騎180Km - 跑42km

秀姑巒溪

新白陽

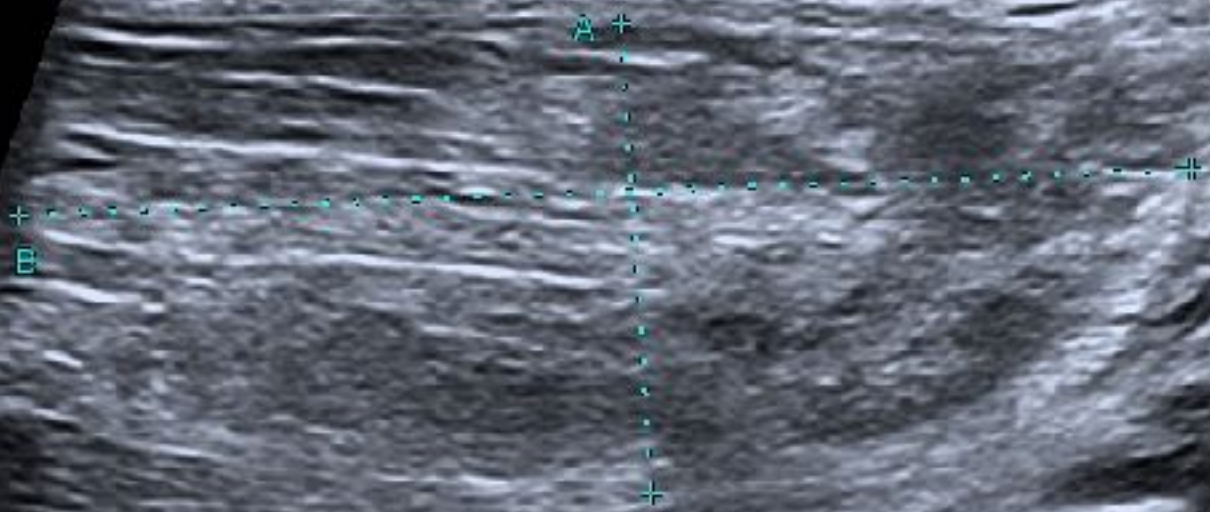
武嶺

4天前
左腳不小心
撞到石頭。
致血腫疼痛



T

0
1
2



diffT
30
Q
C
D

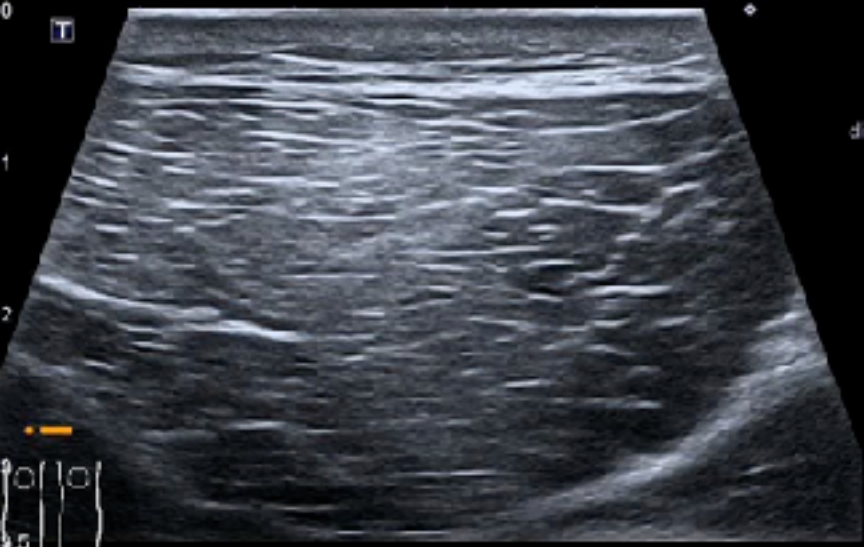
2021/12/01 OSHIBA 2021/12/01
 West Garden Hospital MSK 3 3155 11:20:25 AM 1100.78 West Garden Hospital MSK 3 3155 11:21:37 A

Precision A Pure+

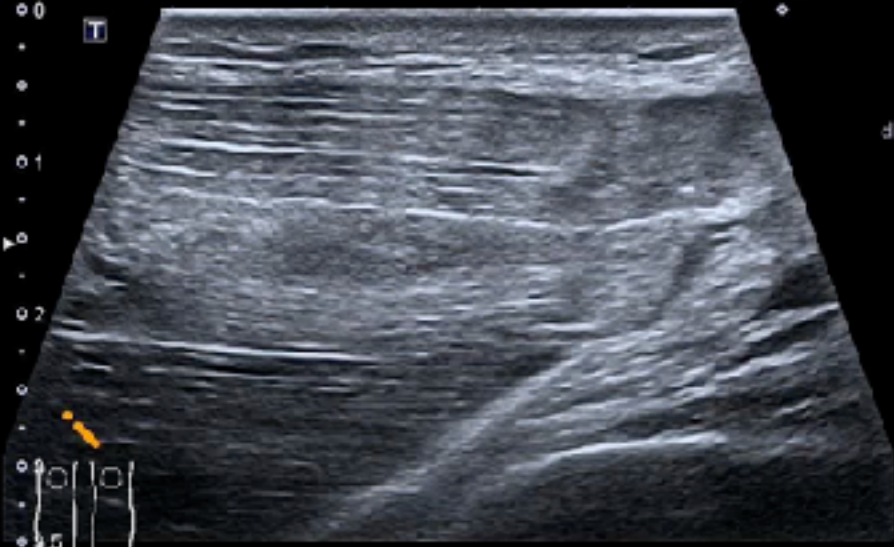
Precision A Pure+

T

T

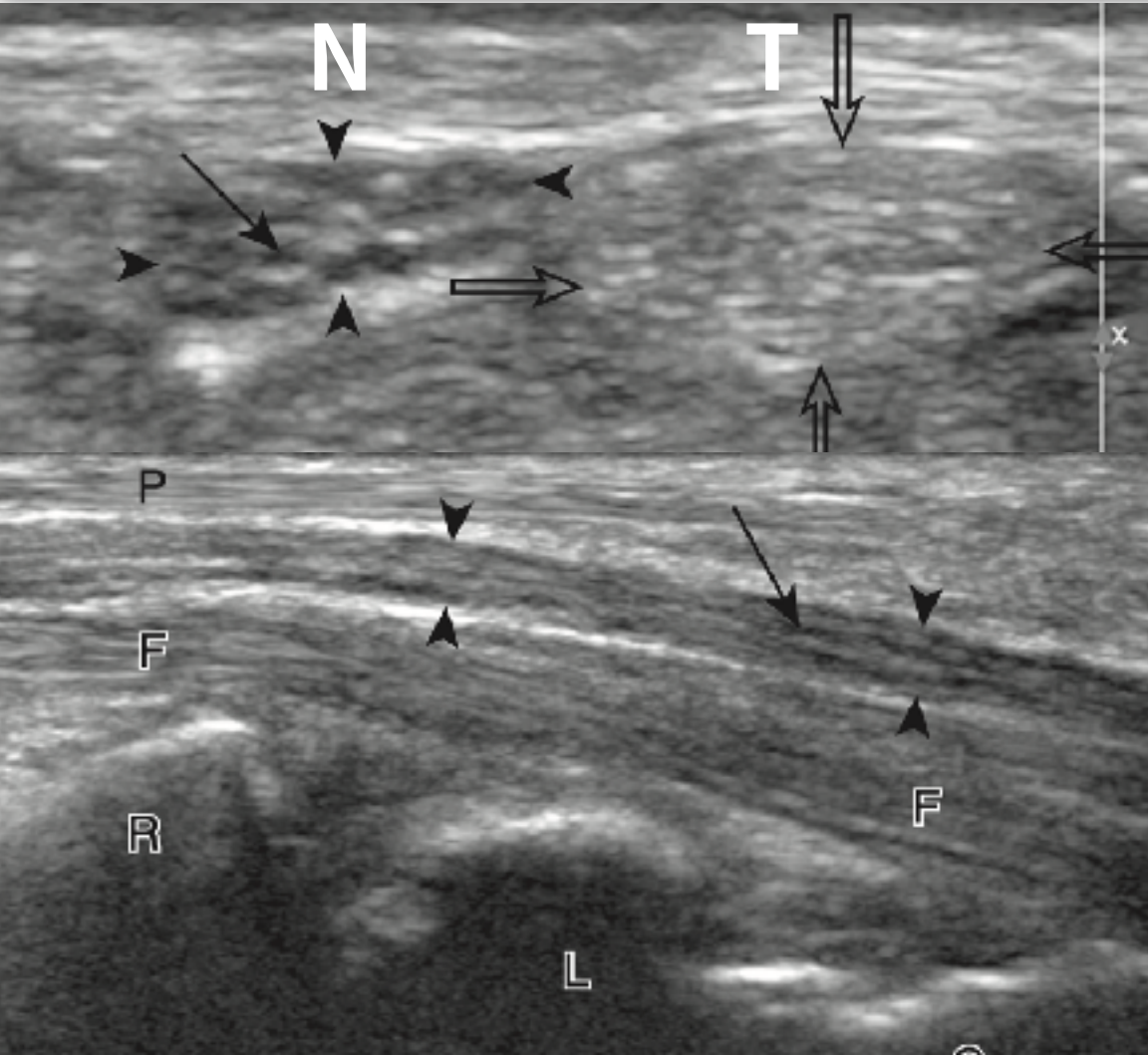


M
1.2
18L7
diffT14.0
30 fps
scan
G 80
DR 80
A 6
P 3



18
diffT14
30 f
sc
G 8
DR 8
A 6
P 3

Nerve



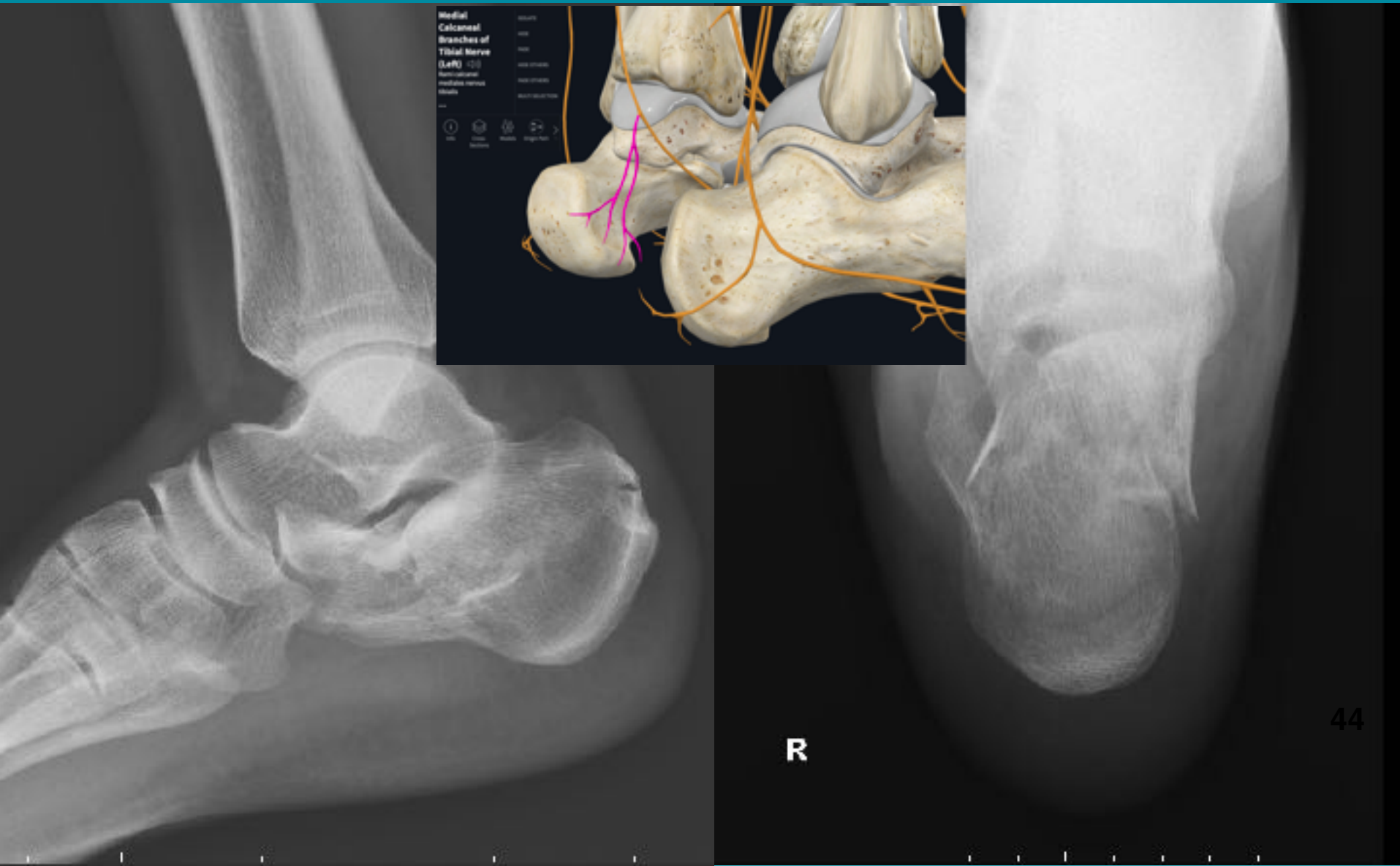
Hypoechoic

Hyperechoic

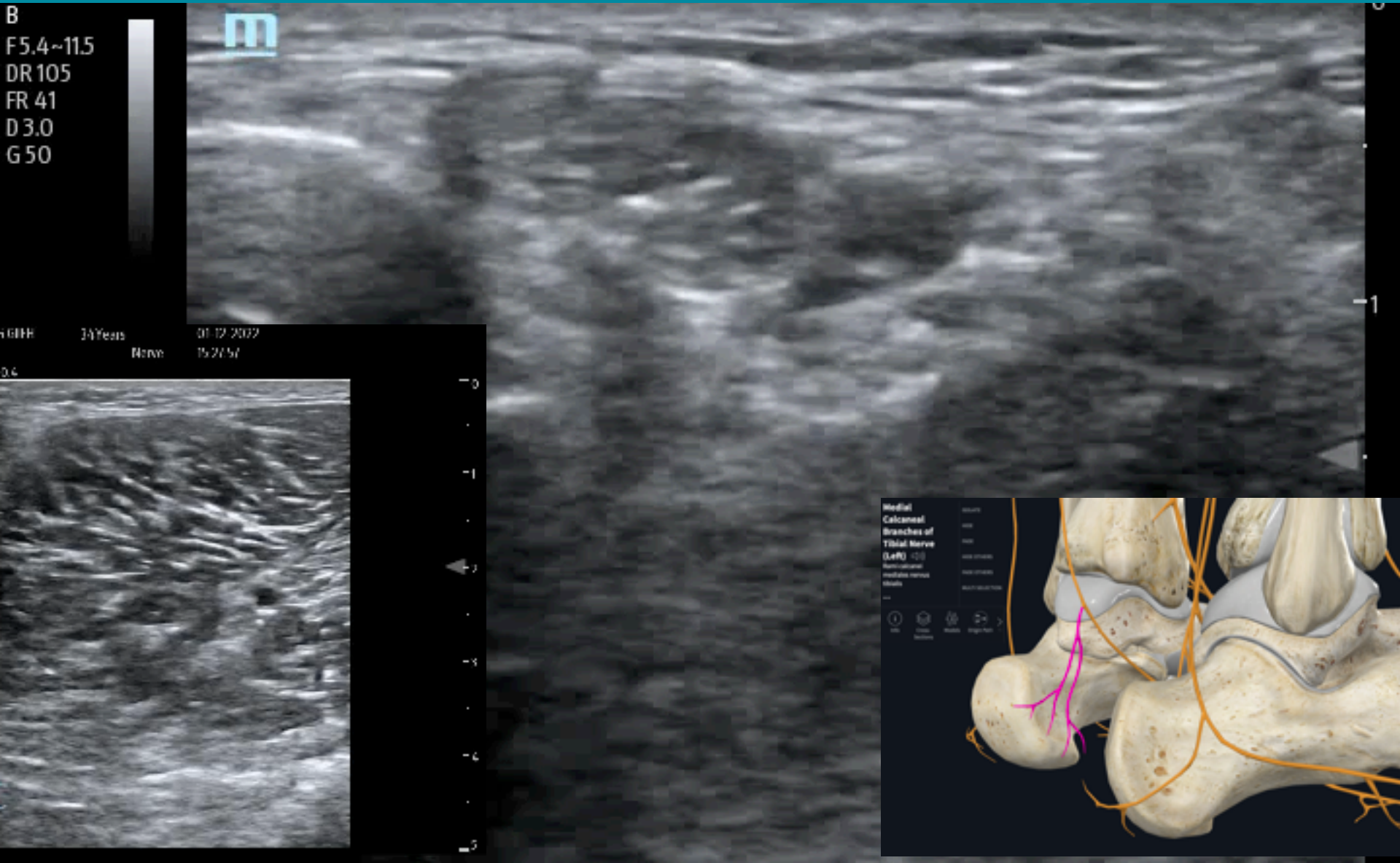
Honeycomb

Fibrillar

34M，貨車車斗跌下，足踝腫痛



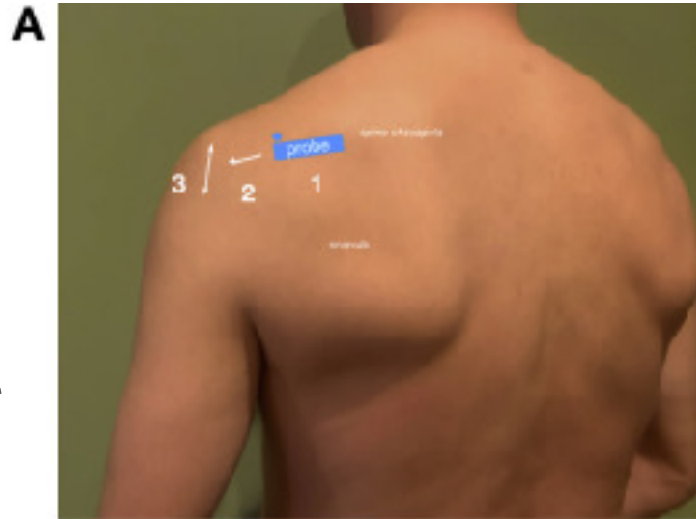
Tibial nerve block



Musculoskeletal Ultrasonography to Diagnose Dislocated Shoulders: A Prospective Cohort

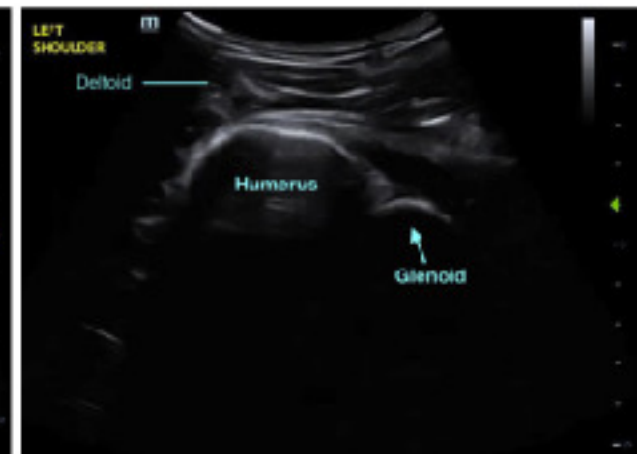
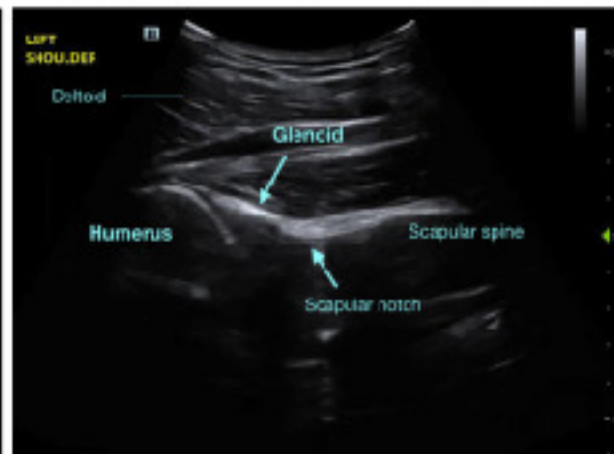
Michael A. Secko, MD, RDMS*; Lindsay Reardon, MD; Michael Gottlieb, MD; Eric J. Morley, MD; Mathew R. Lohse, MD
Henry C. Thode, Jr, PhD; Adam J. Singer, MD

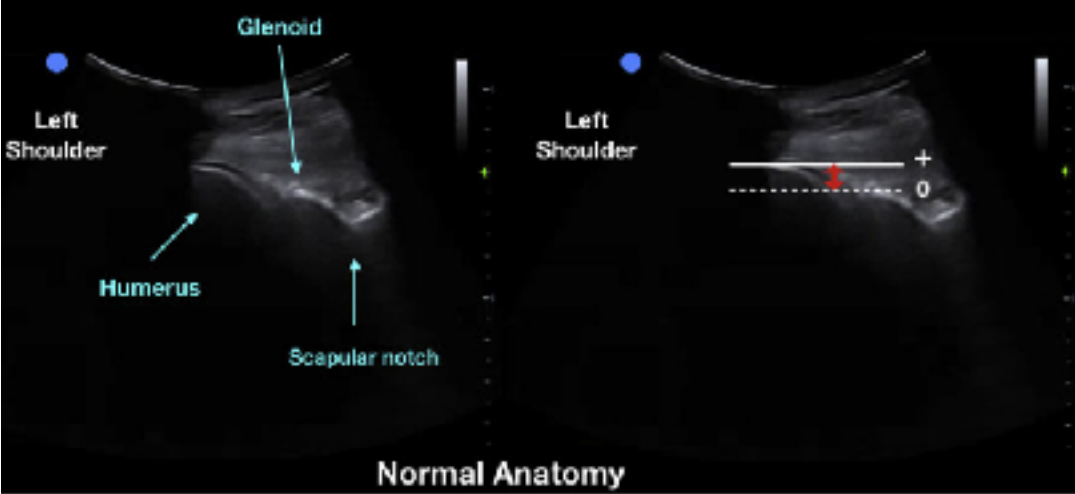
Multicenter
Prospective
Observational



65 patients

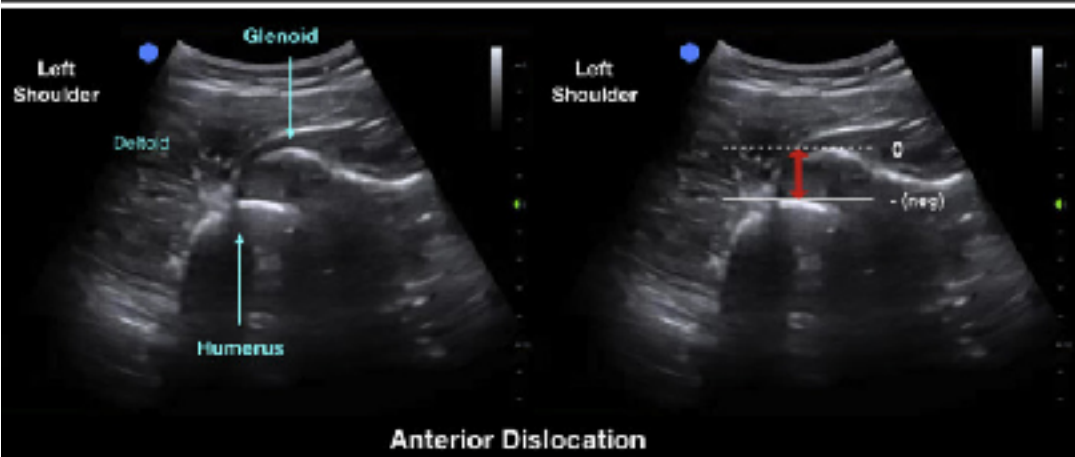
B





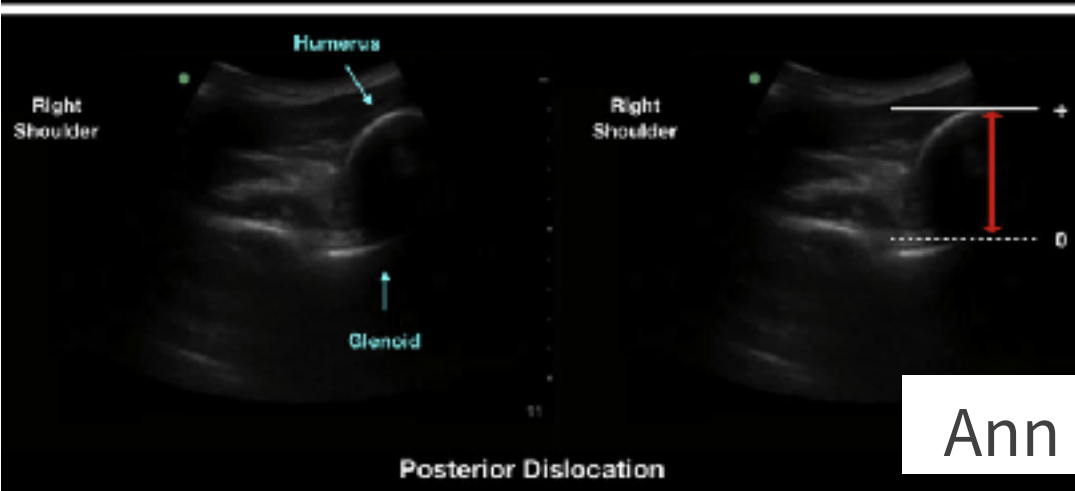
Sensitivity 100%

Specificity 100%



Sens (Fx) 92%

Spes (Fx) 100%



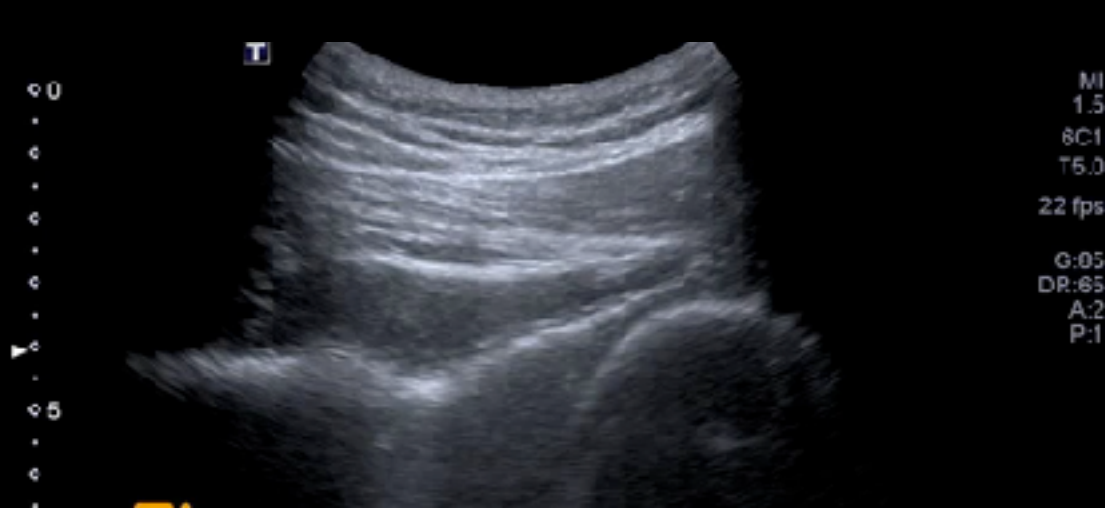
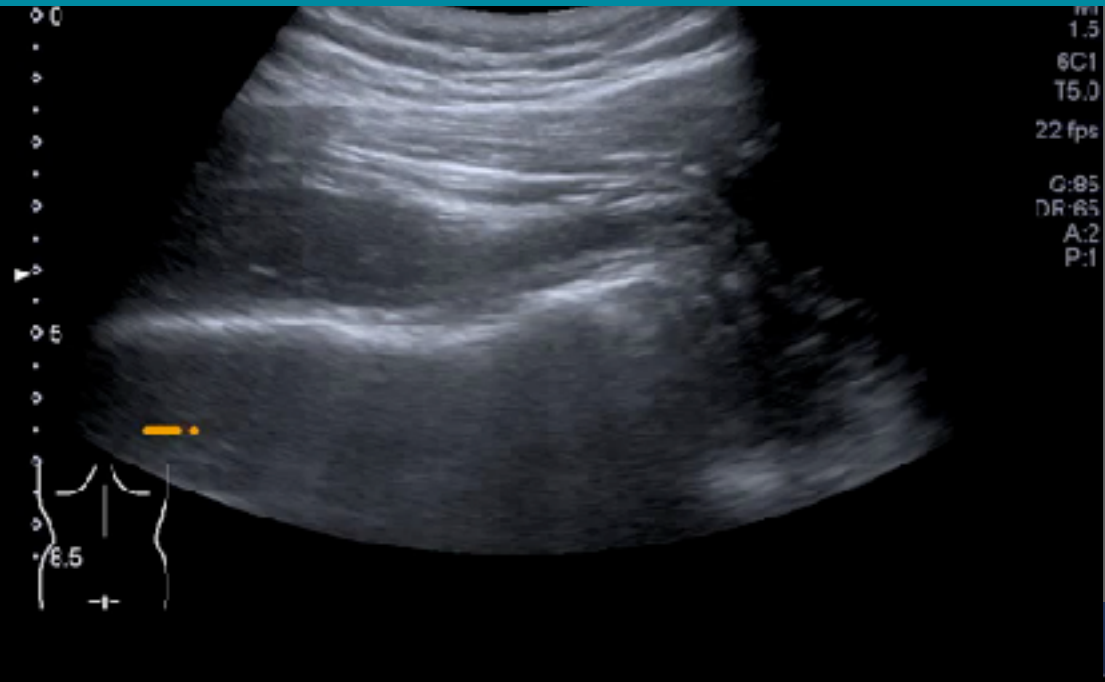
Median 19s

GH(d-A) -1.83cm

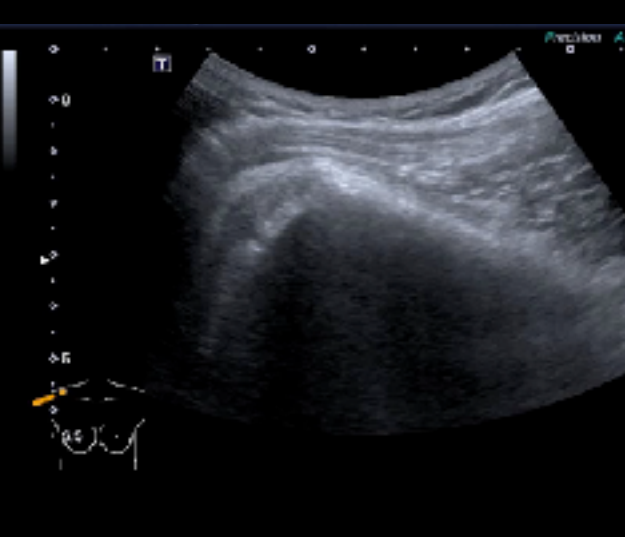
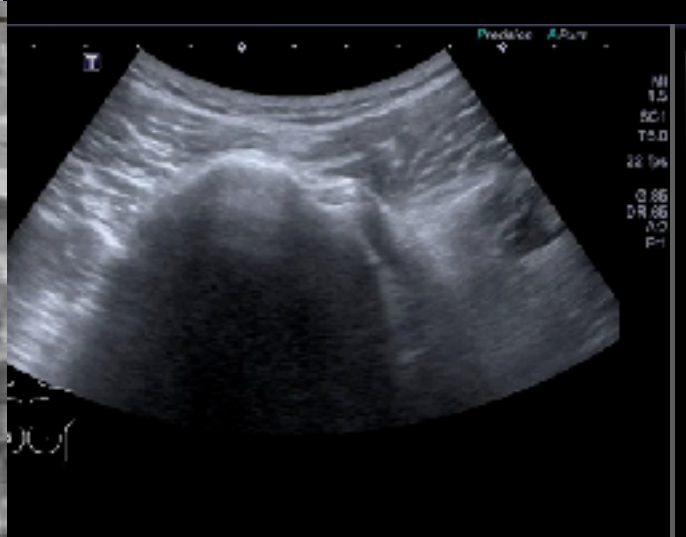
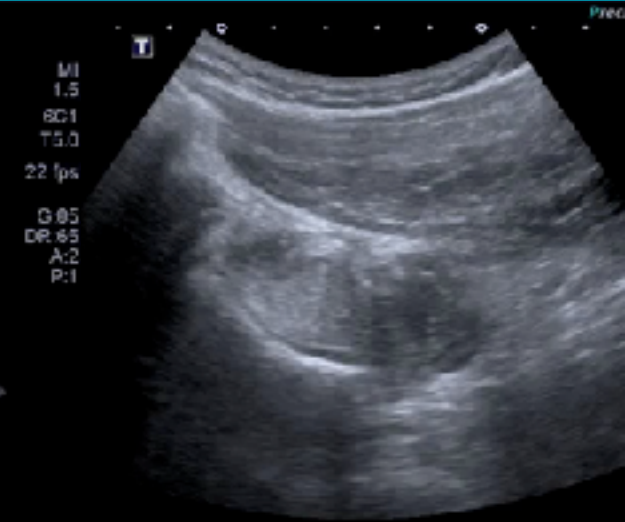
GH(d-N) 0.22cm

GH(d-P) 3.3cm

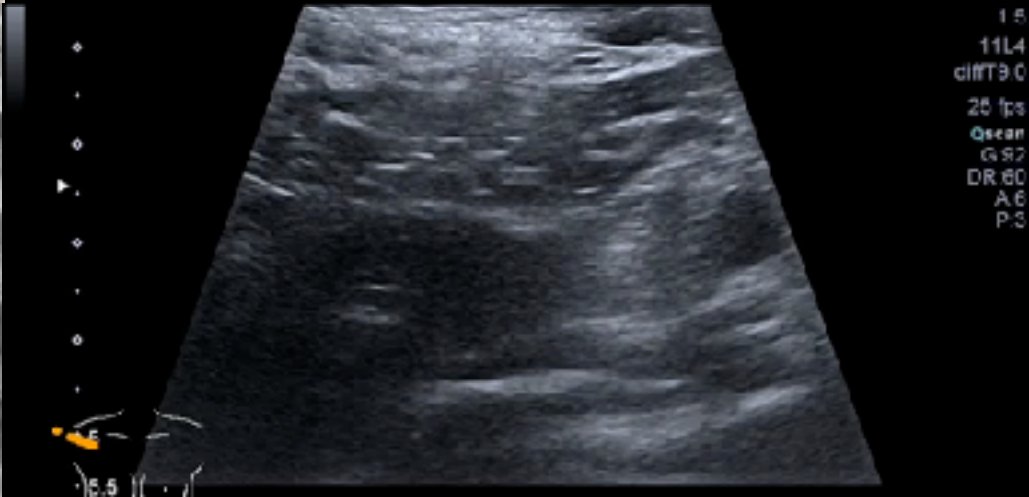
M/20, 工作時從階梯滑下用手去抓致右肩脫位



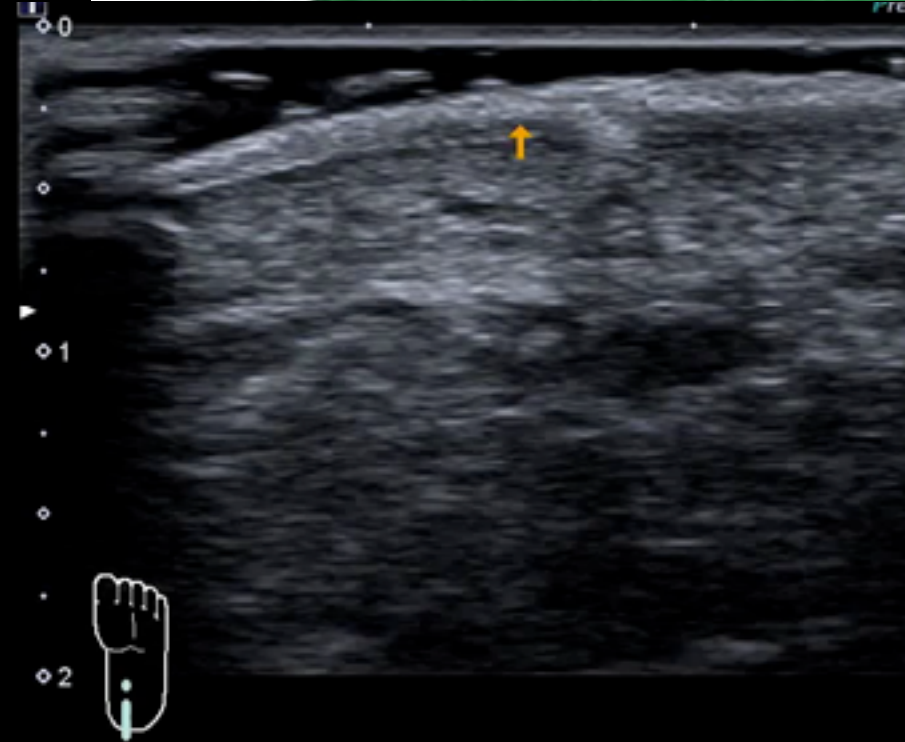
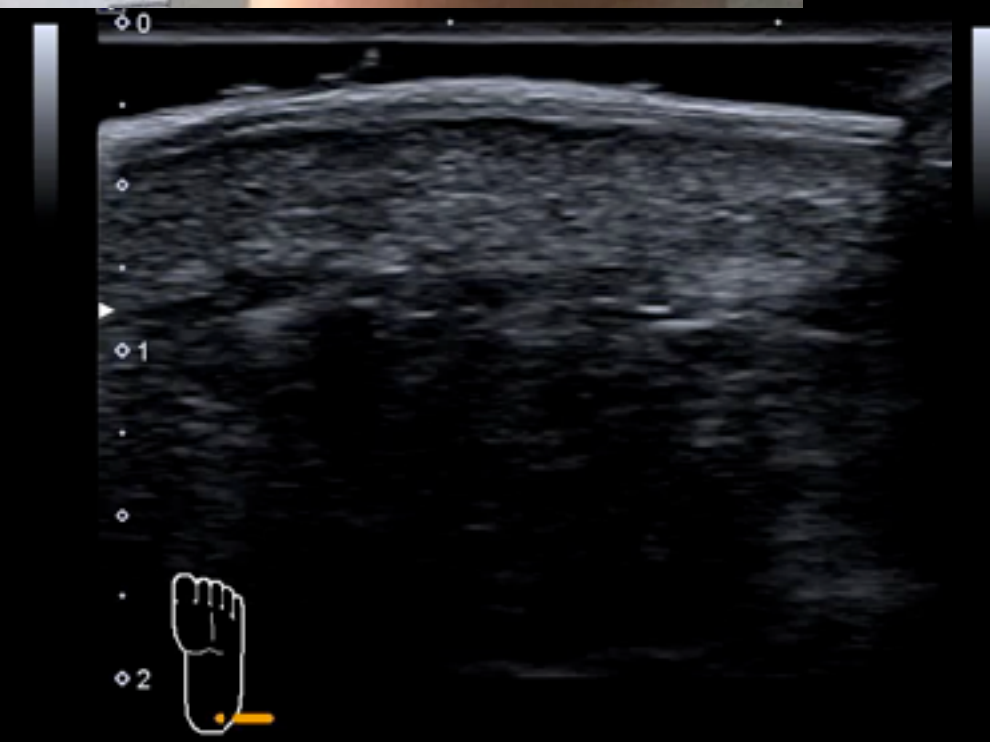
Anterior approach for diagnosis, block & reduction

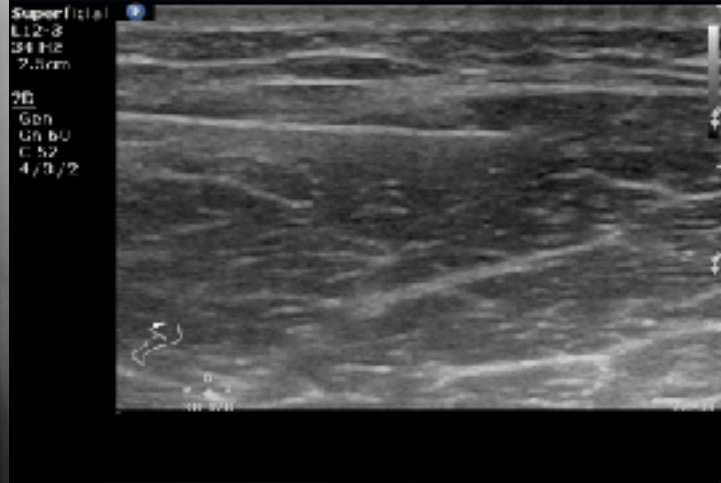
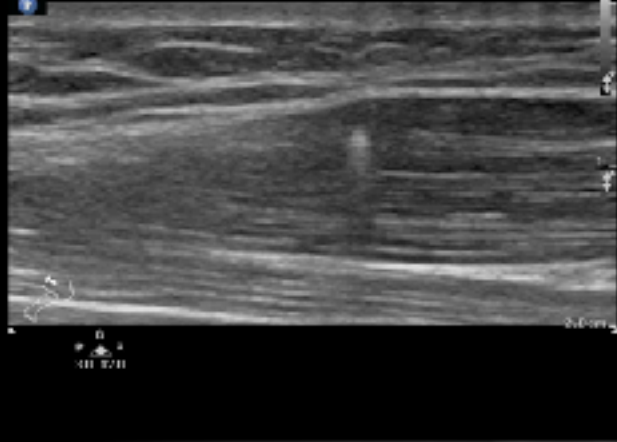


Supraclavicular brachial plexus block



踩到碎玻璃，覺得有異物



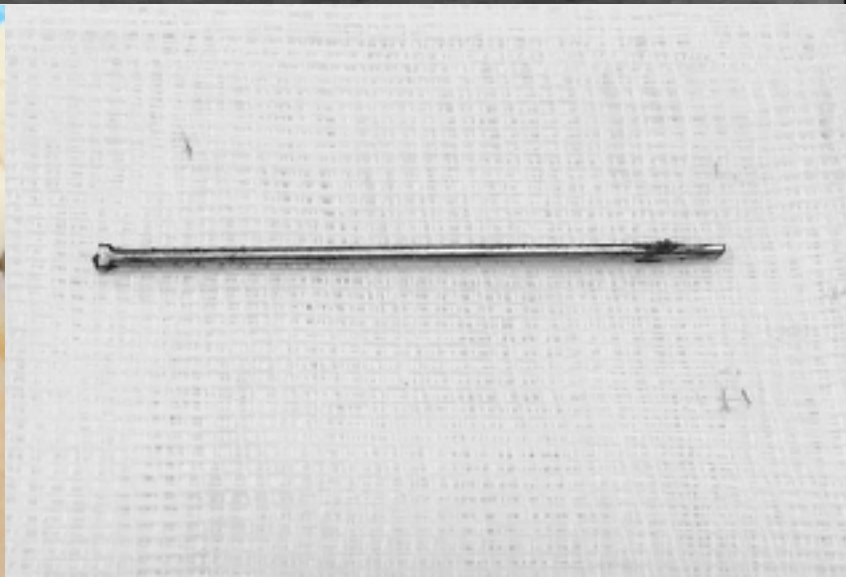
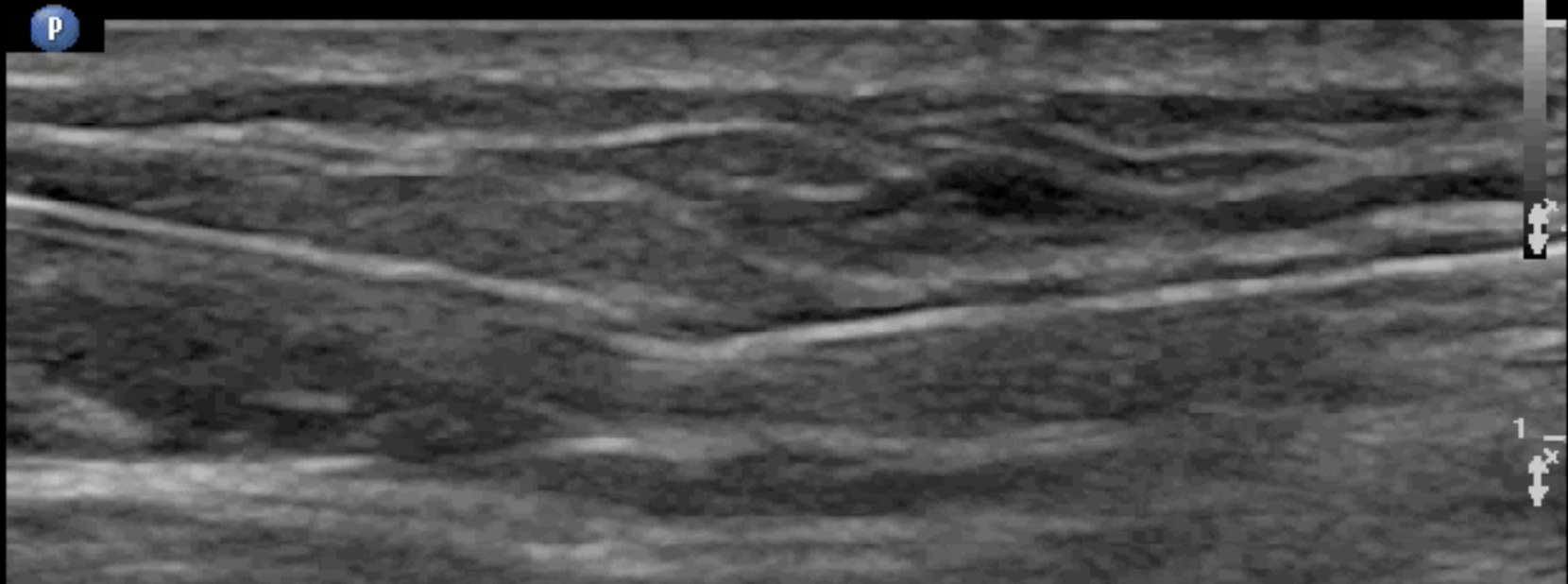


Localization

2 needle

Removal

12-5
34 Hz
2.0cm
D
Gen
Gn 60
C. 57
4/3/2

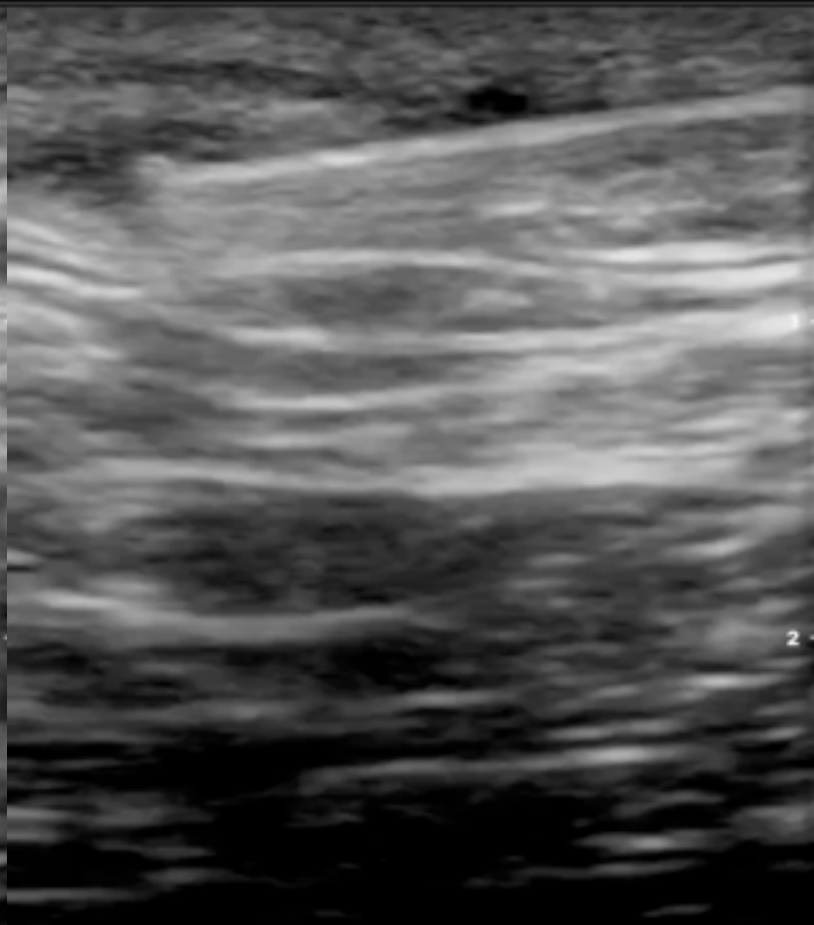
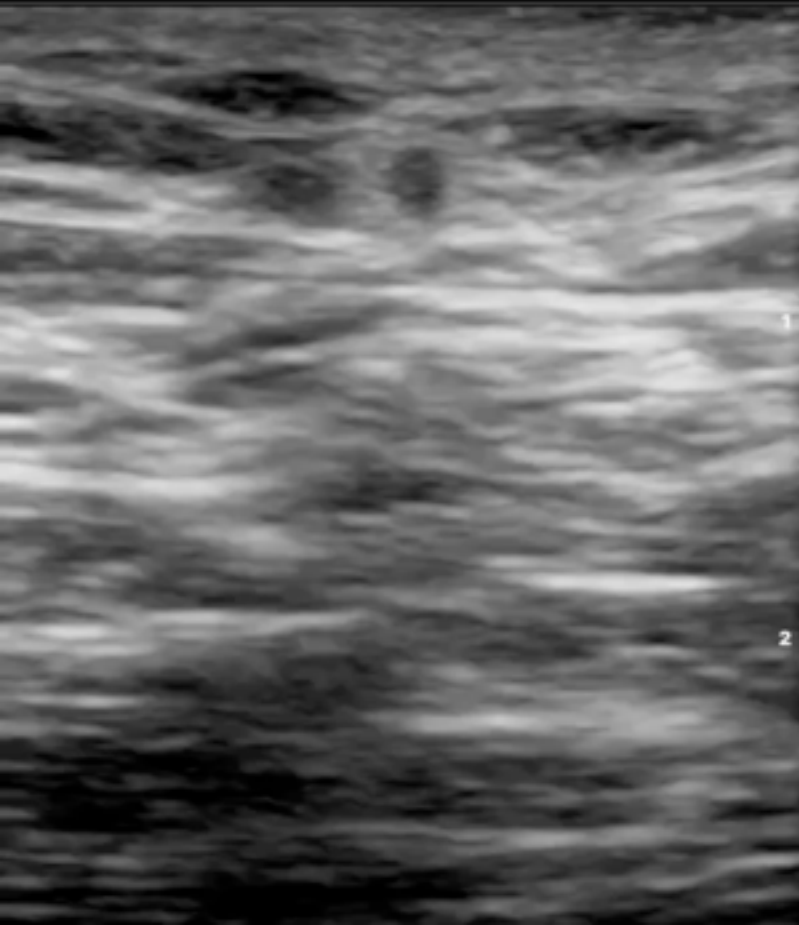


大腿痛和異物感

TIS: 0.01, MI: 0.26, Small Organ

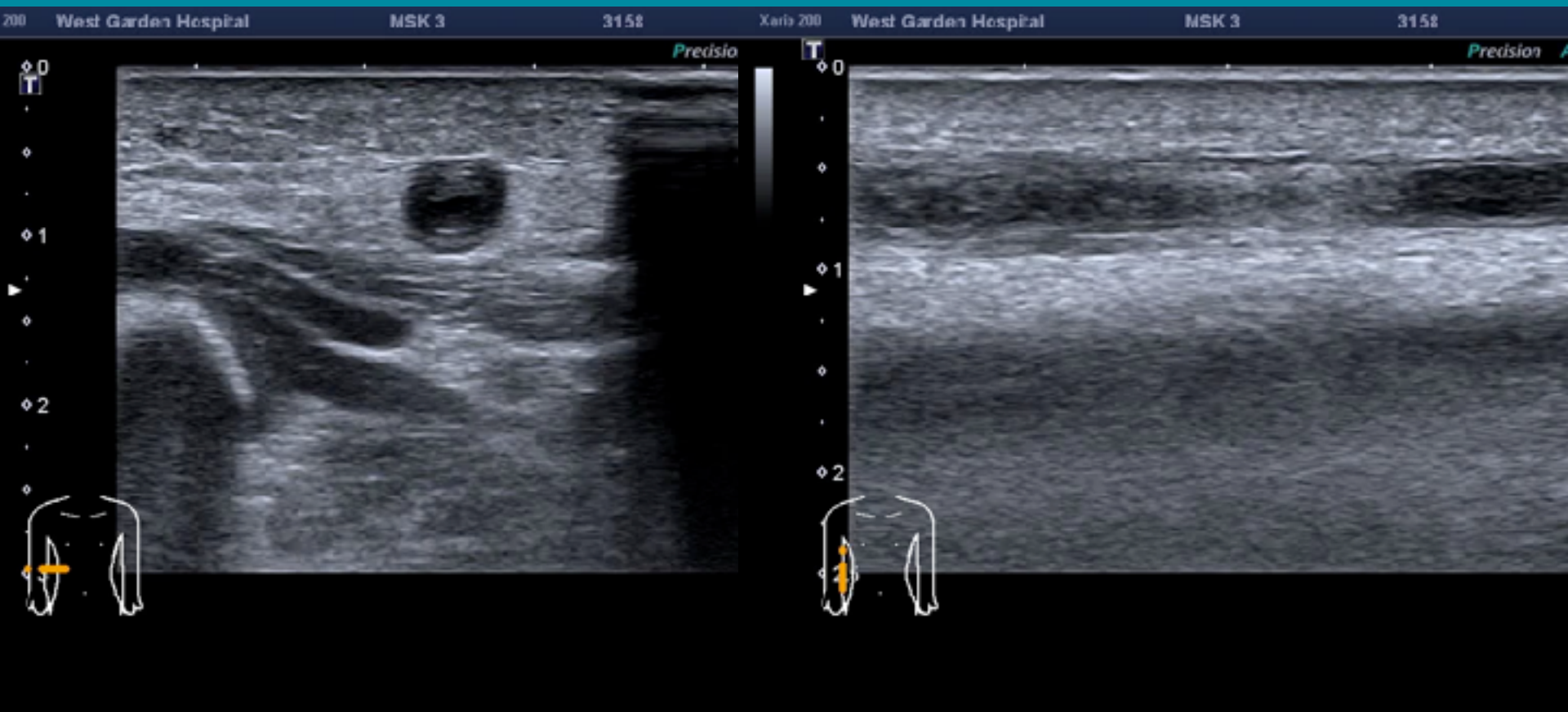
TIS: 0.01, MI: 0.26, Small Organ

Halo sign



54歲男，注射處腫痛

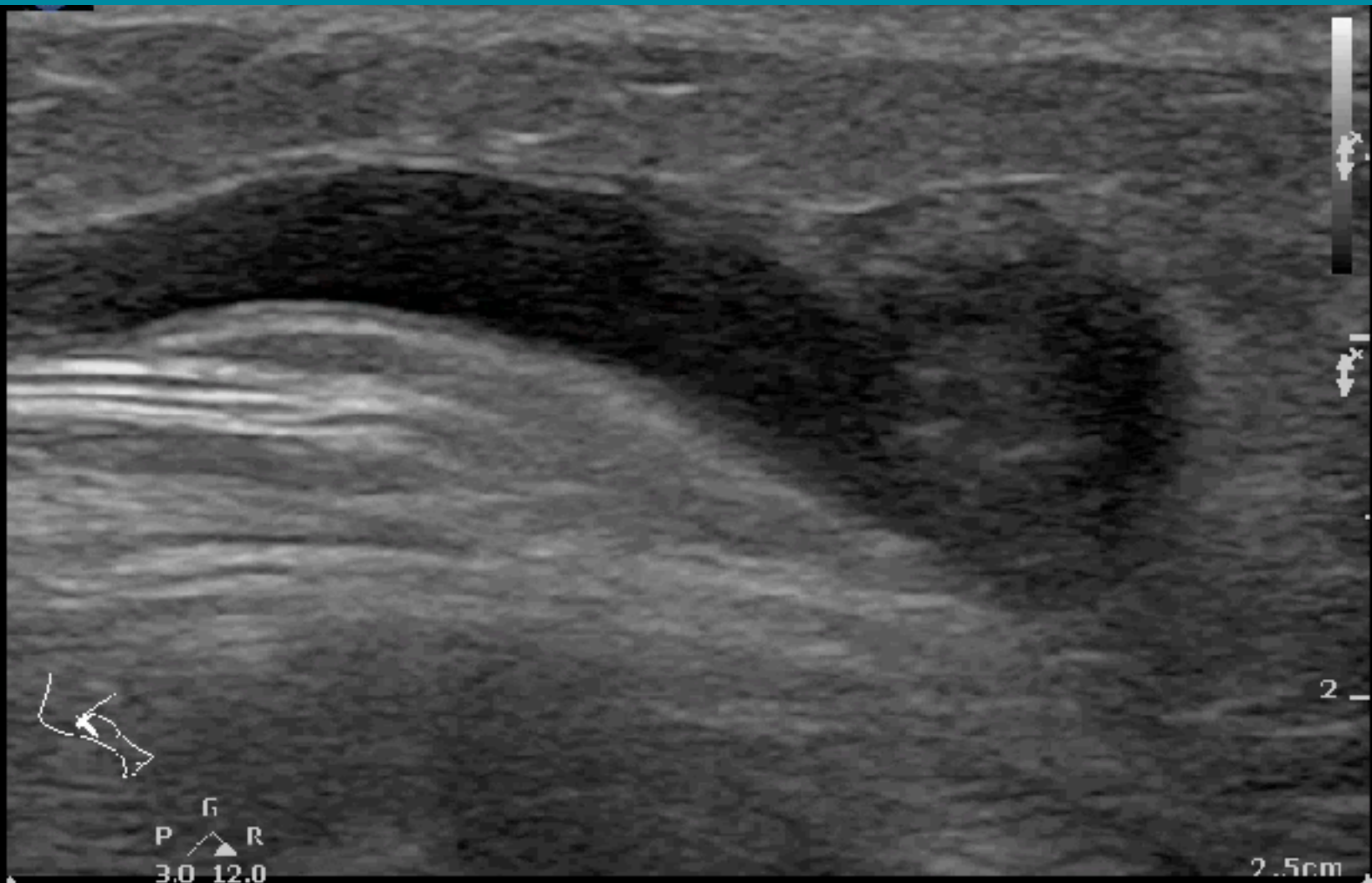
Superficial thrombophlebitis



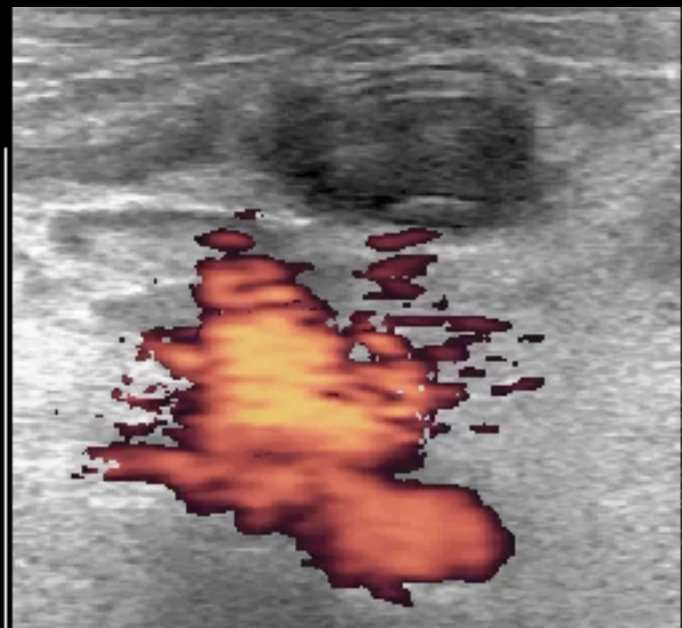
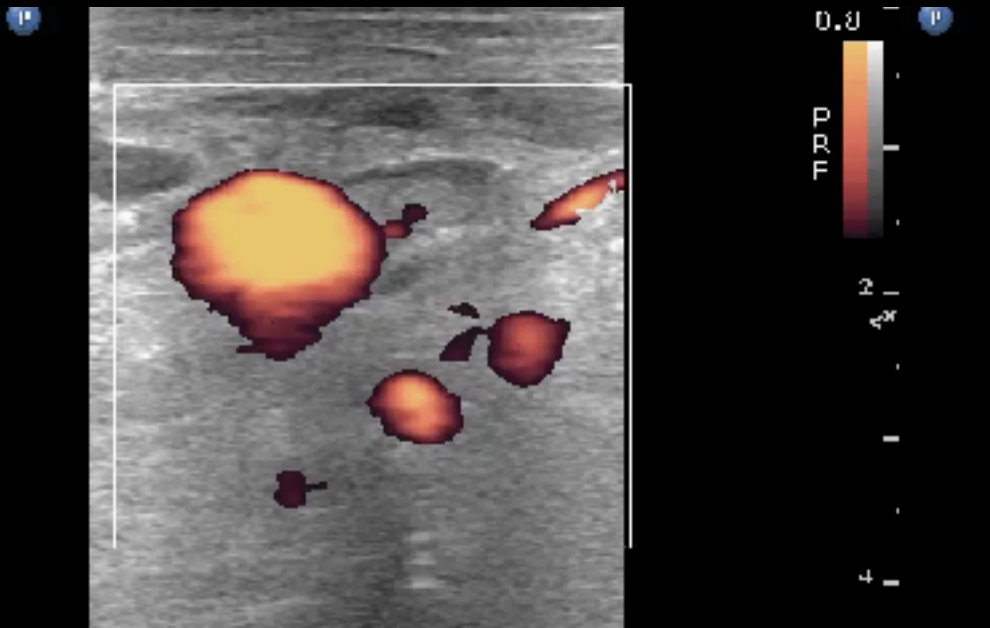
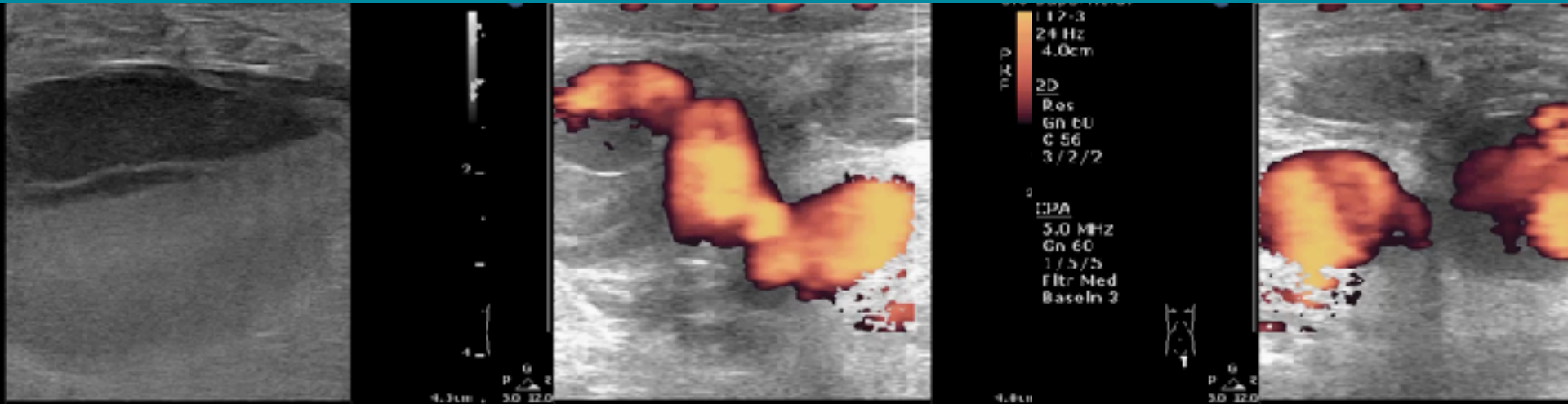
76F，小腿痛

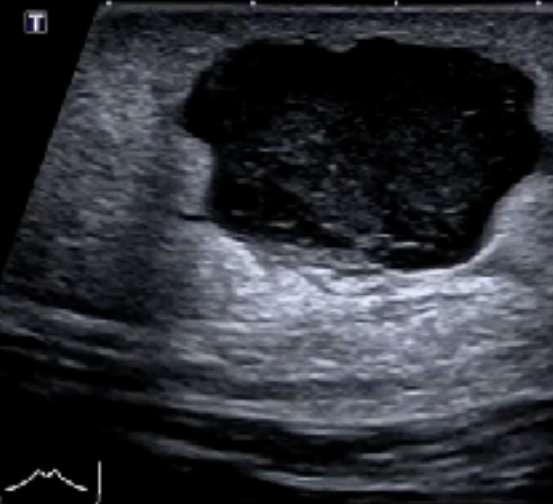
L12-3
50 Hz
2.5cm

2D
Res
Gn //
C. 56
3 / 2 / 1

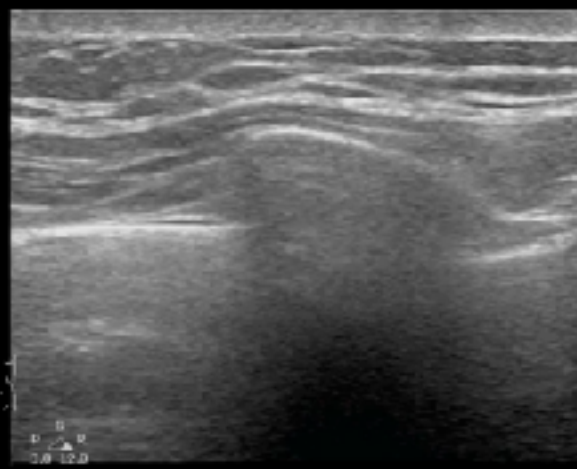


Left femoral painful swelling

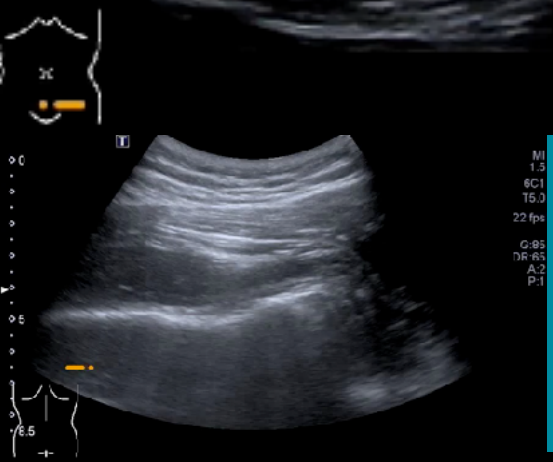




Superficial
L12-3
46 Hz
3.0cm
70
Res
Gn 96
C 56
3/2/1



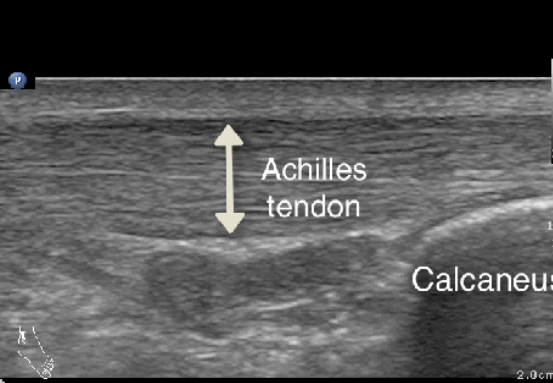
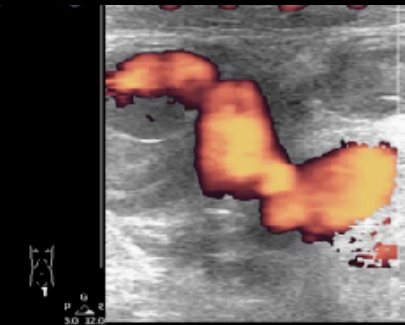
3.0cm
m
i



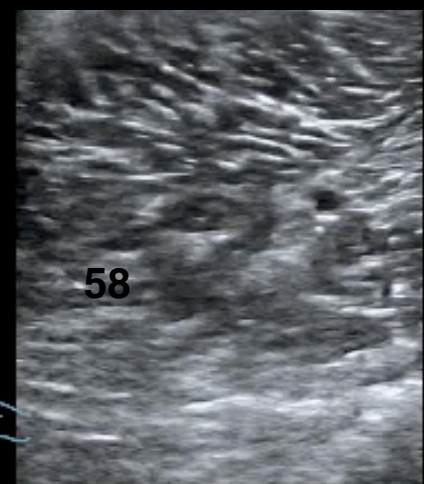
MI 1.5
6C1
T5.0
22 fps
G:89
DR:65
A:2
P:1

MSK US in ER

L12-3
24 Hz
4.0cm
2D
Res
Gn 6U
C 56
3/2/2
EPA
5.0 MHz
Gn 60
1/5/5
Filt: Med
Baseline 2



MI 1.5
11L4
diffT9.0
30 fps
G:92
DR:60
A:6
P:3



58

U
P R
3.0 12.0

