

# Advanced imaging

The ankle and foot example



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<http://radiology-crete.com>

No conflict to declare

# Basic views, foot

painful ankle and foot

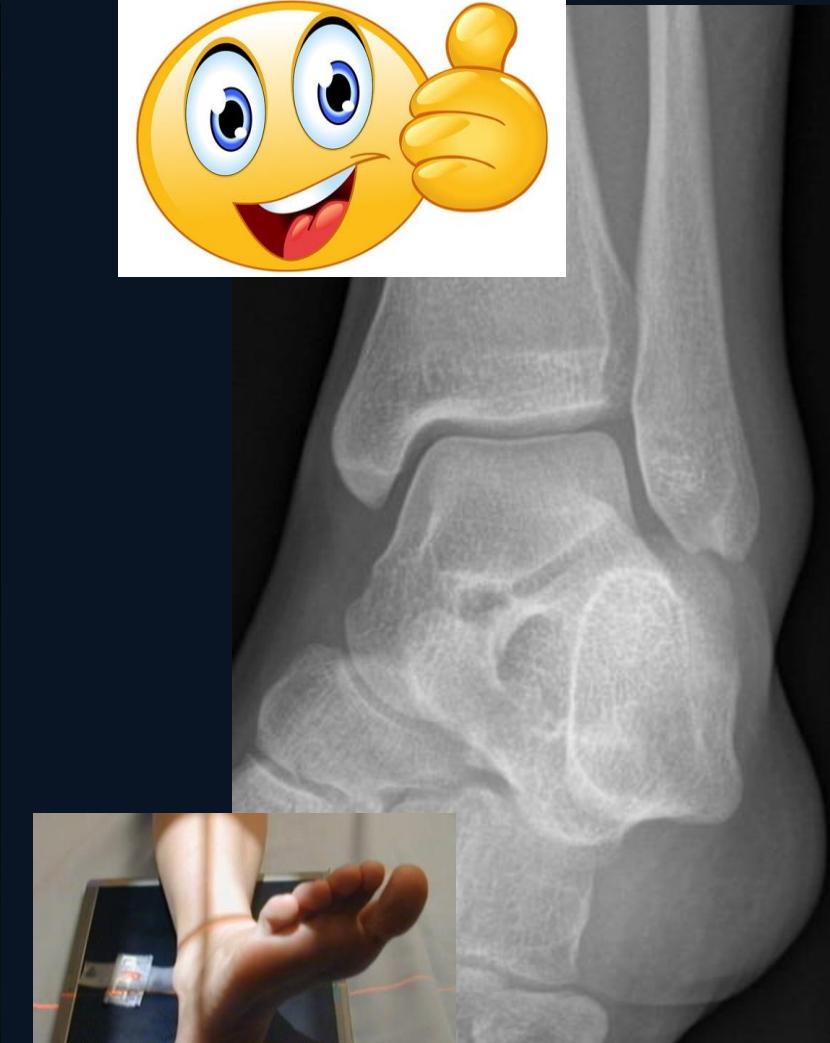


# Basic views, foot

painful ankle and foot



# Basic views, ankle



15-20° medial rotation

R

Τι βλέπουμε?

Τι συνάγουμε?



Τι βλέπουμε?

Τι συνάγουμε?

# OA cases

CPPD

RA



**RA**

Τι βλέπουμε?

Τι συνάγουμε?

73f



45f, hand and feet pains

**RA**



Τι βλέπουμε?

Τι συνάγουμε?



Medicowesome  
2017 :)

Pencil-in-cup



Mutilans PSA

Τι βλέπουμε?

Τι συνάγουμε?

# Gout



# Psoriatic arthropathy

Ossification plantar fascia, distal Achilles



R

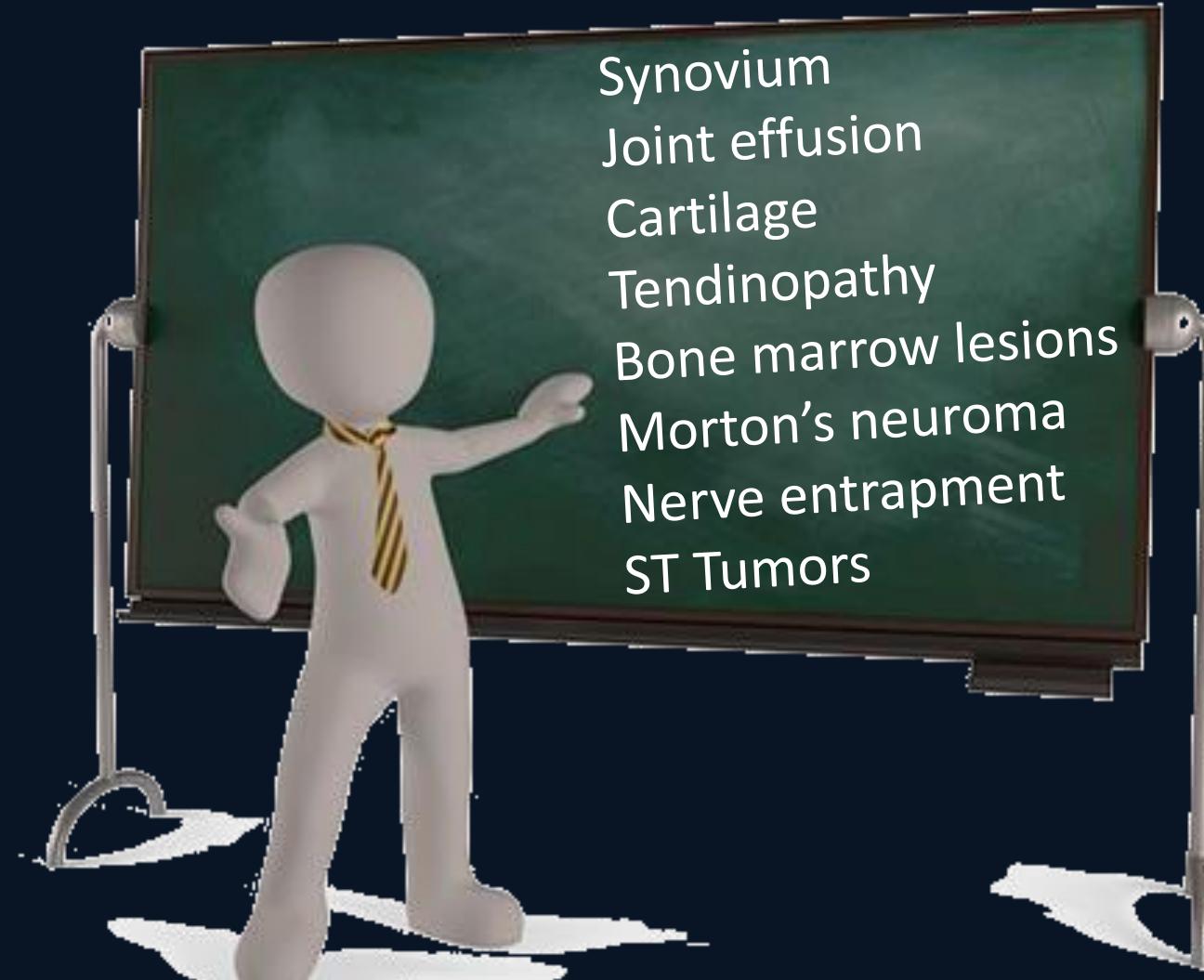


Reactive arthritis

Achilles calcific tendinopathy

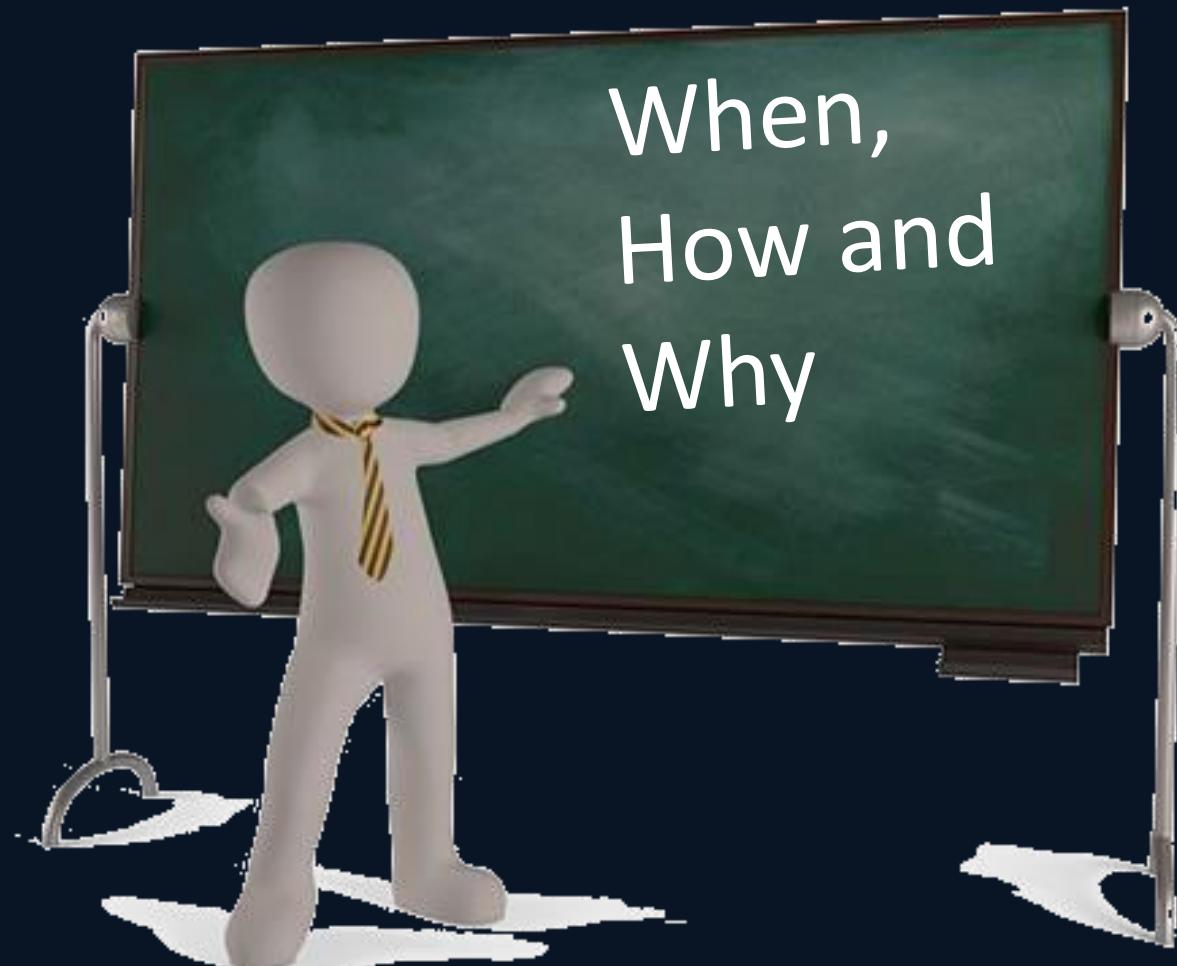


# What we miss



Synovium  
Joint effusion  
Cartilage  
Tendinopathy  
Bone marrow lesions  
Morton's neuroma  
Nerve entrapment  
ST Tumors

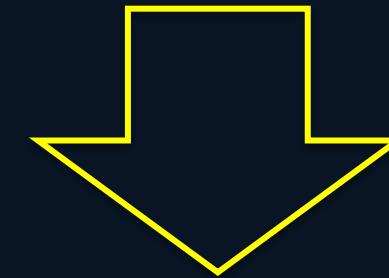
# Aims



# Aims



Radiographs are **NOT** diagnostic  
Strong clinical suspicion

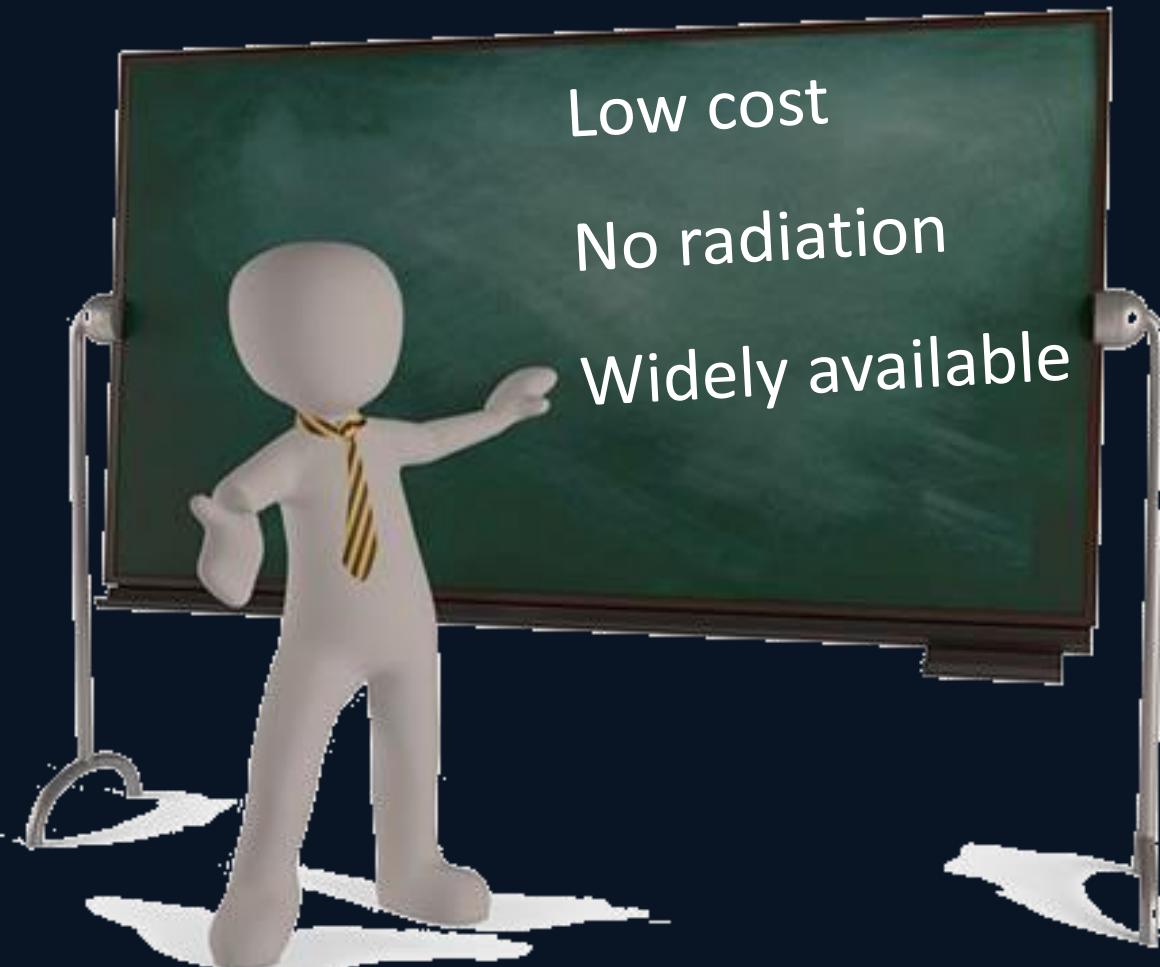


Many pts with non  
Rheumatologic disorders,  
present to Rheumatology clinic

# Middle age and elderly: disorders to consider

- PTT dysfunction + other tendinopathies
- OA
- Diabetic foot
- Insufficiency fractures
- Impingement syndromes, Soft tissue tumors

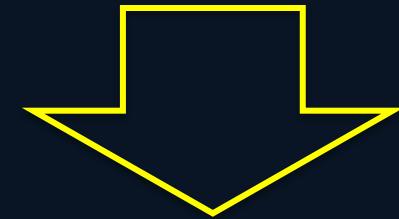
# How and why: Ultrasonography



Ohrnsord S, Backhaus M

Clin Exp Rheumatol 15

Rheumatologic disorders



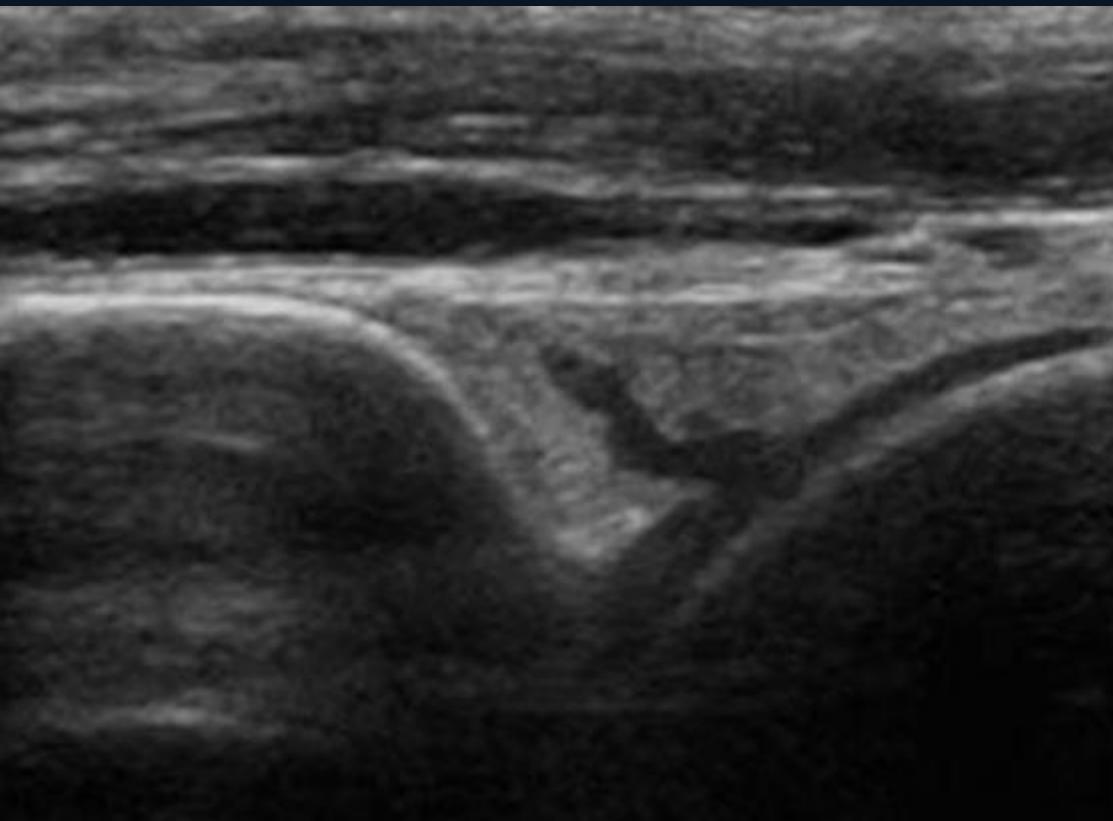
Quick evaluation

- Joint effusion
- Synovitis
- Tenosynovitis
- Erosions

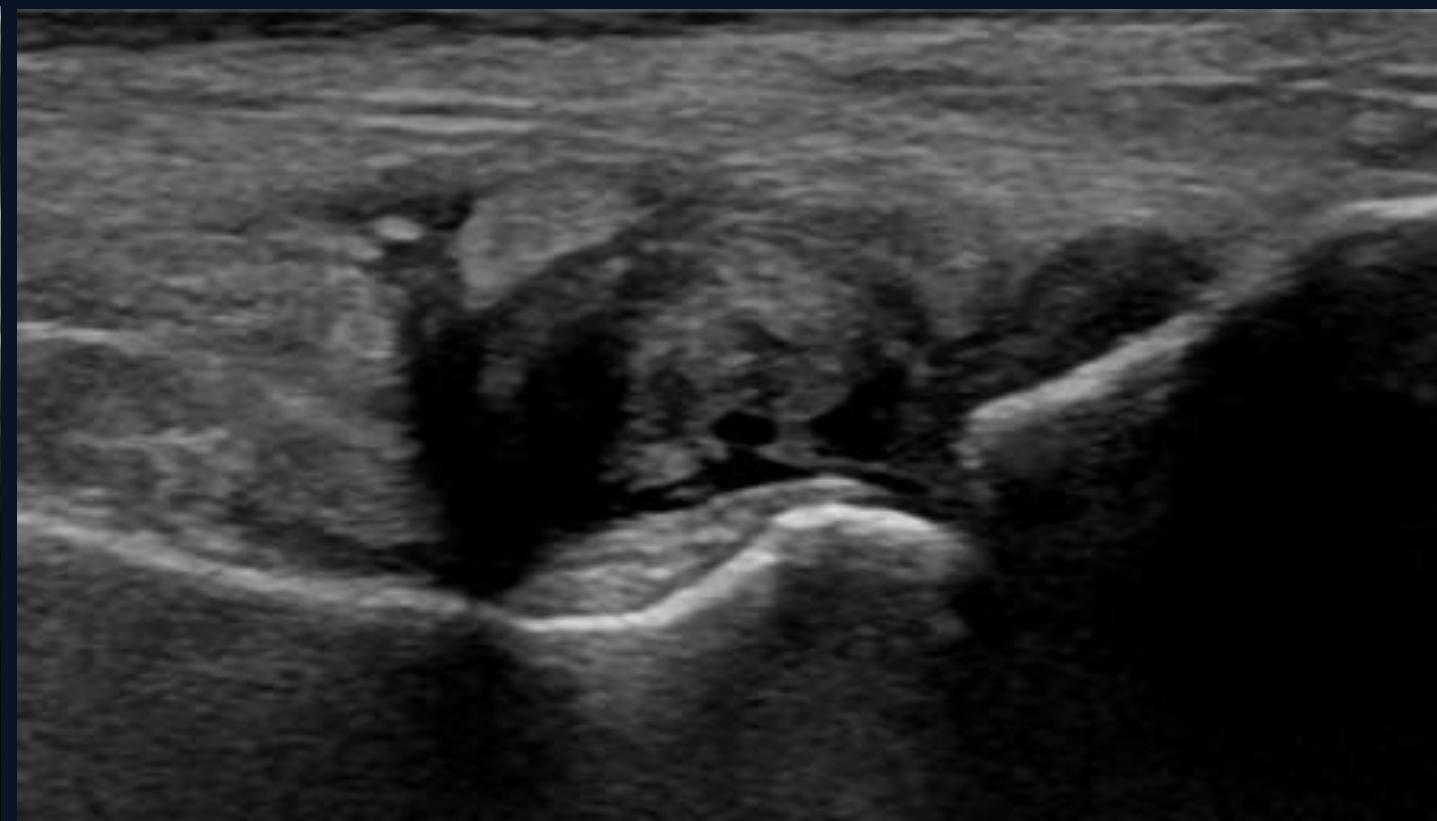


# Synovitis

Anterior recess

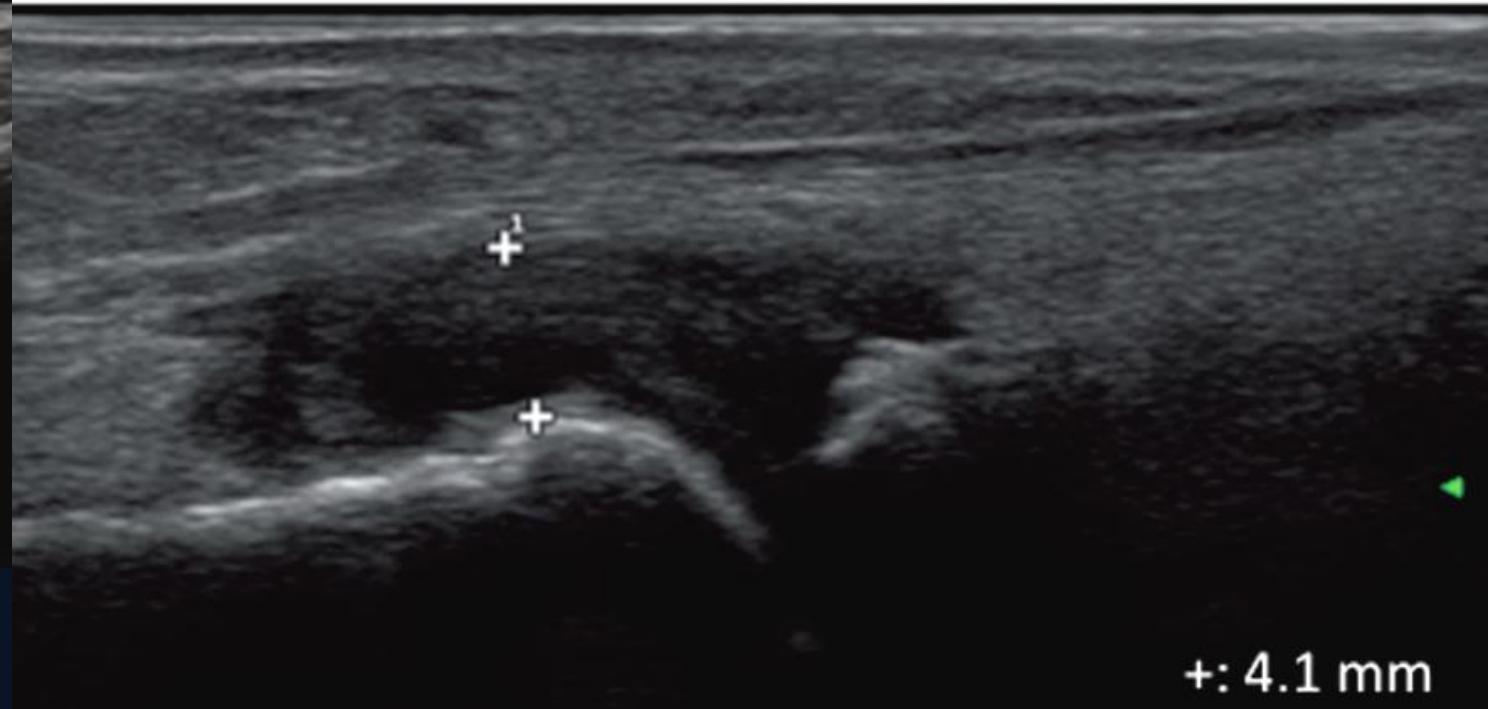


Metatarsophalangeal joint



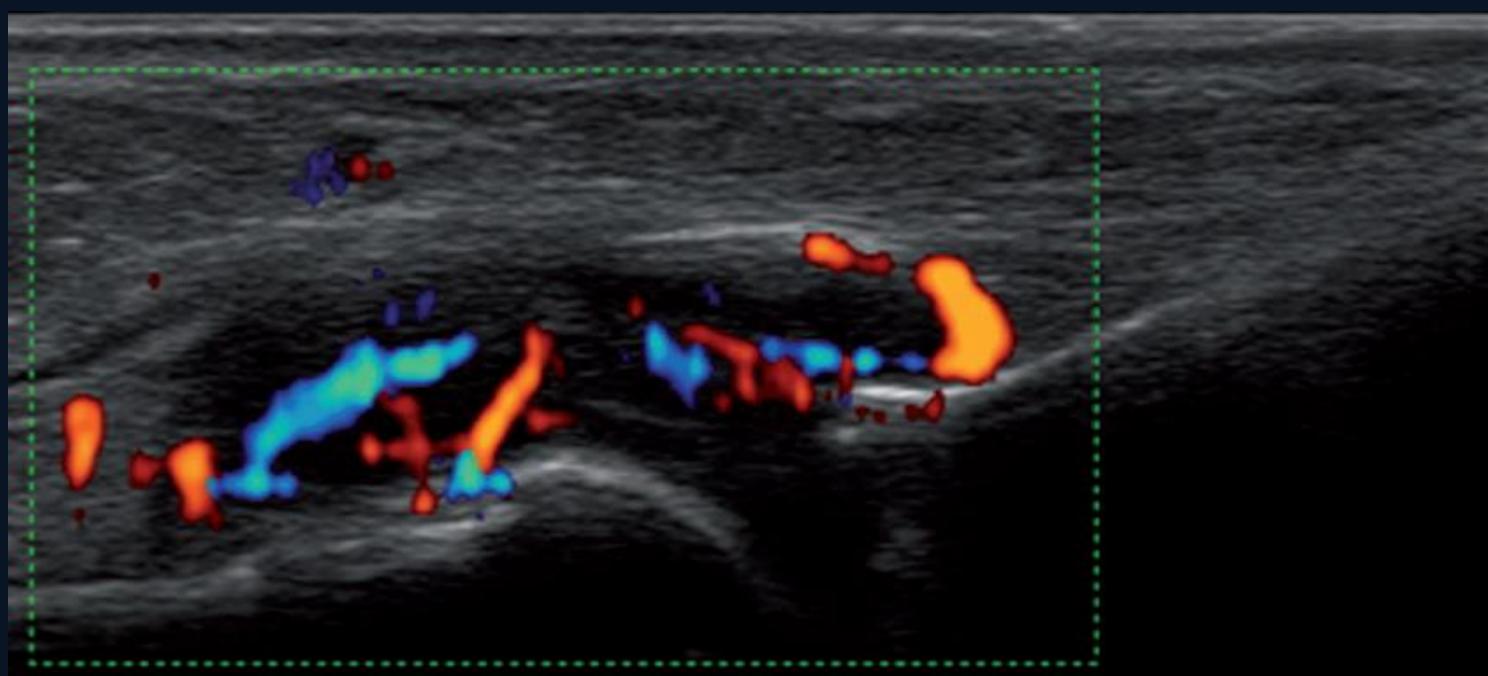


MTP 1 joint : effusion and synovial thickening



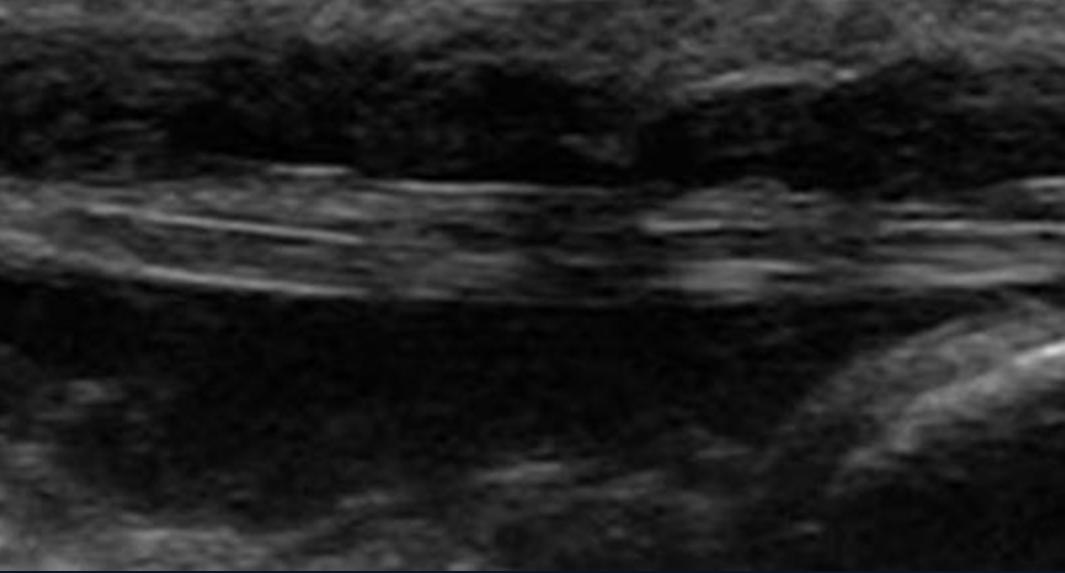
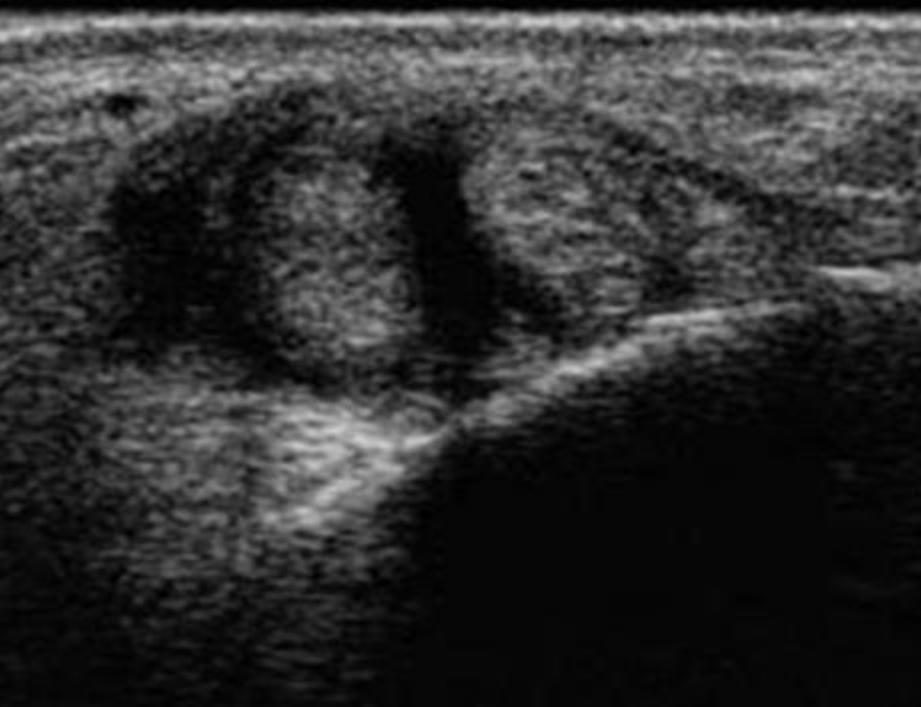
+: 4.1 mm

Synovitis of the MTP joint 2 at dorsal aspect  
power Doppler ultrasound

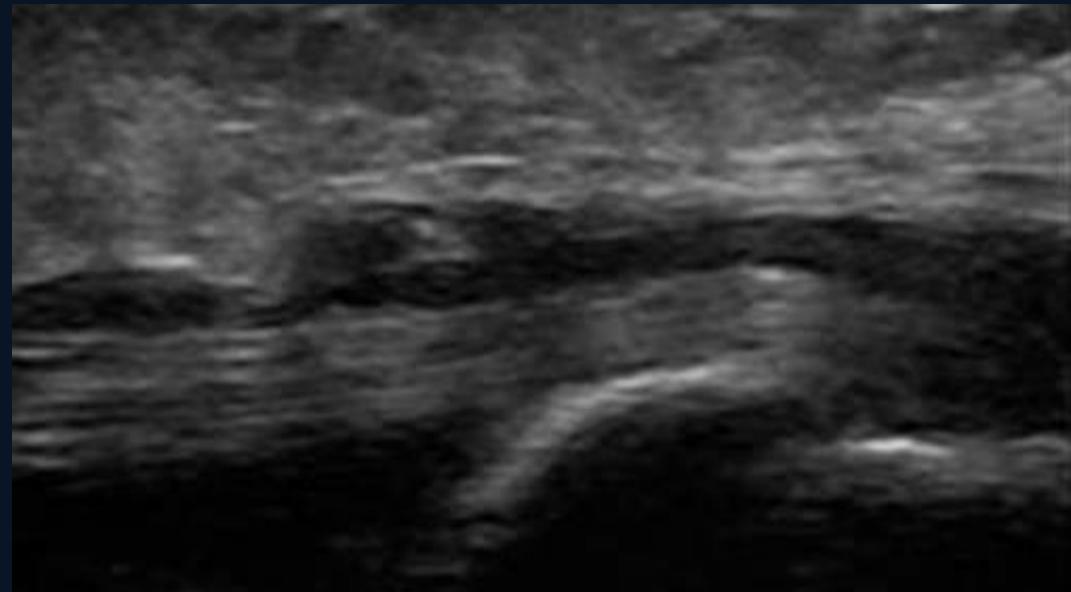


# Tenosynovitis

Peroneal tendons

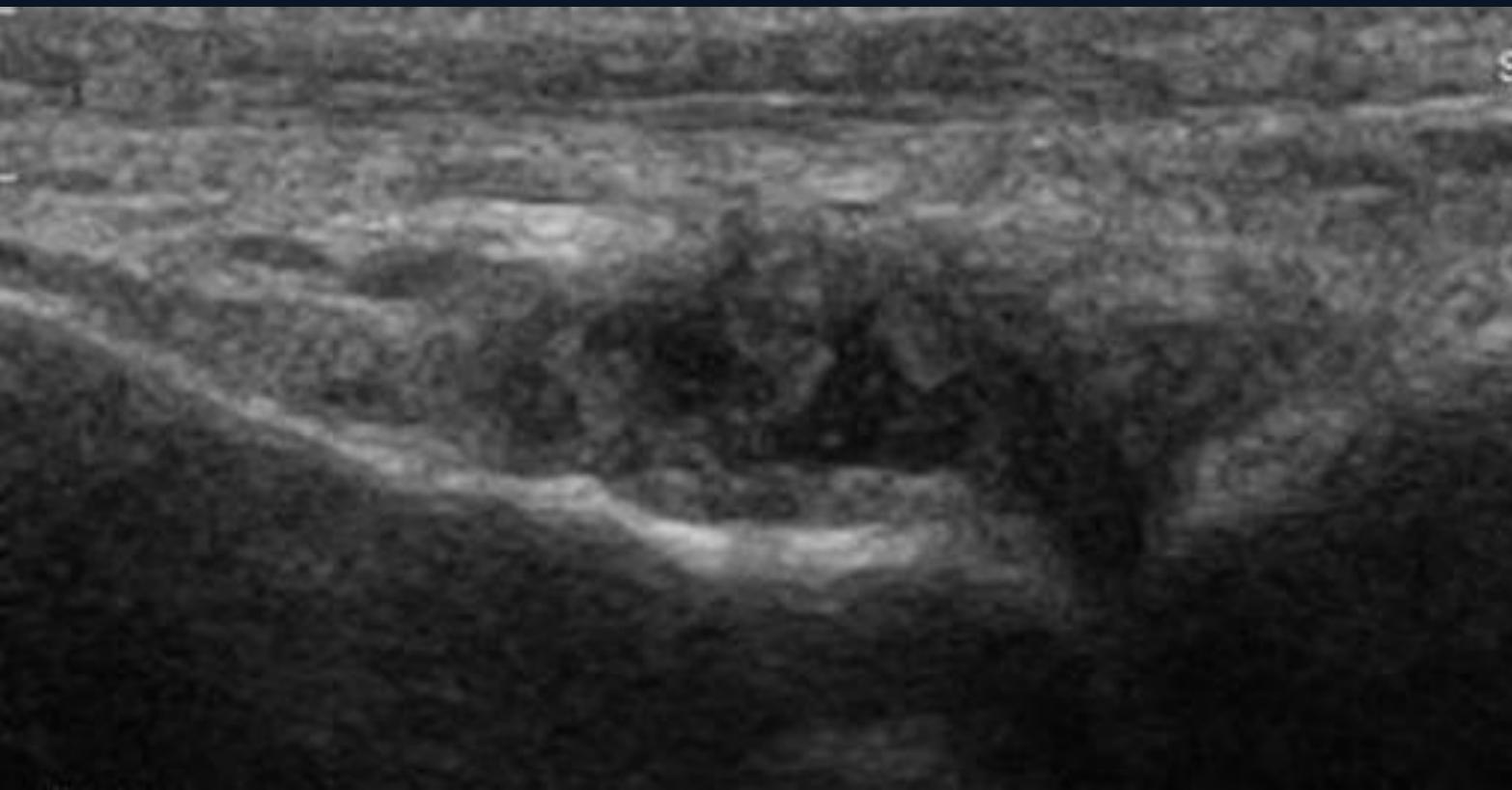


Flexor digitorum and  
Flexor hallucis longus



# Combined pathology

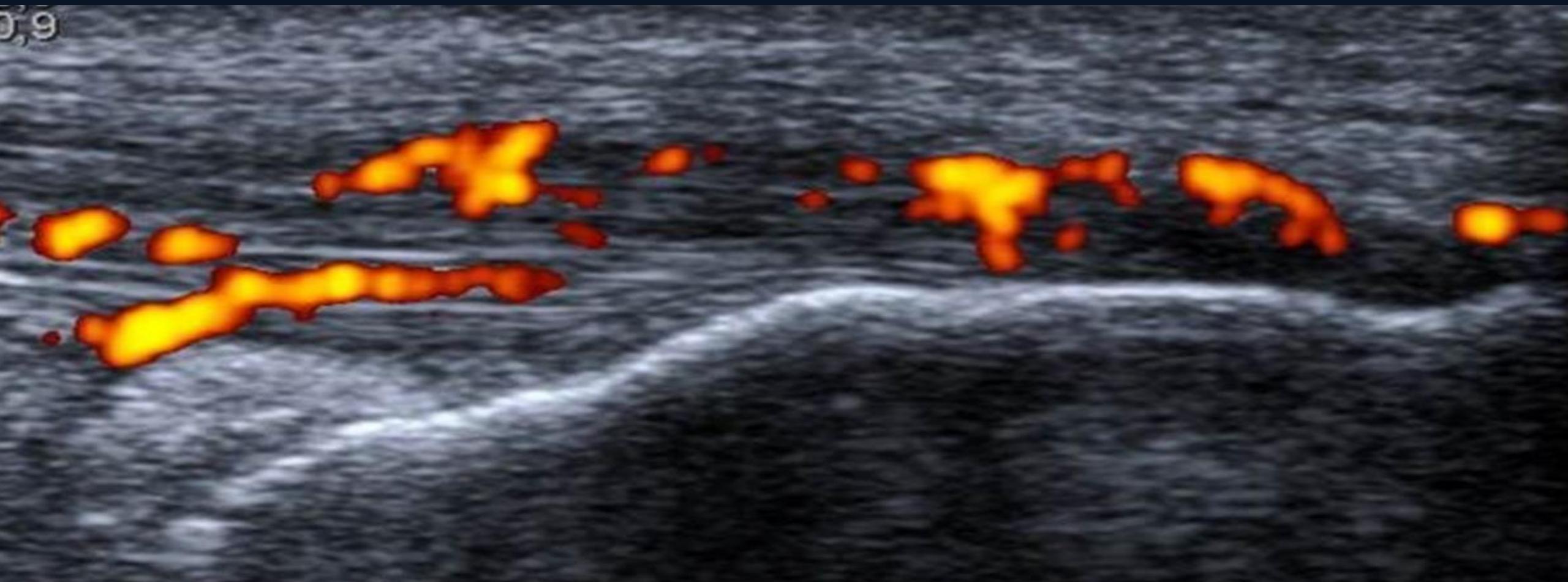
Synovial thickening MTP



Intermetatarsal bursitis



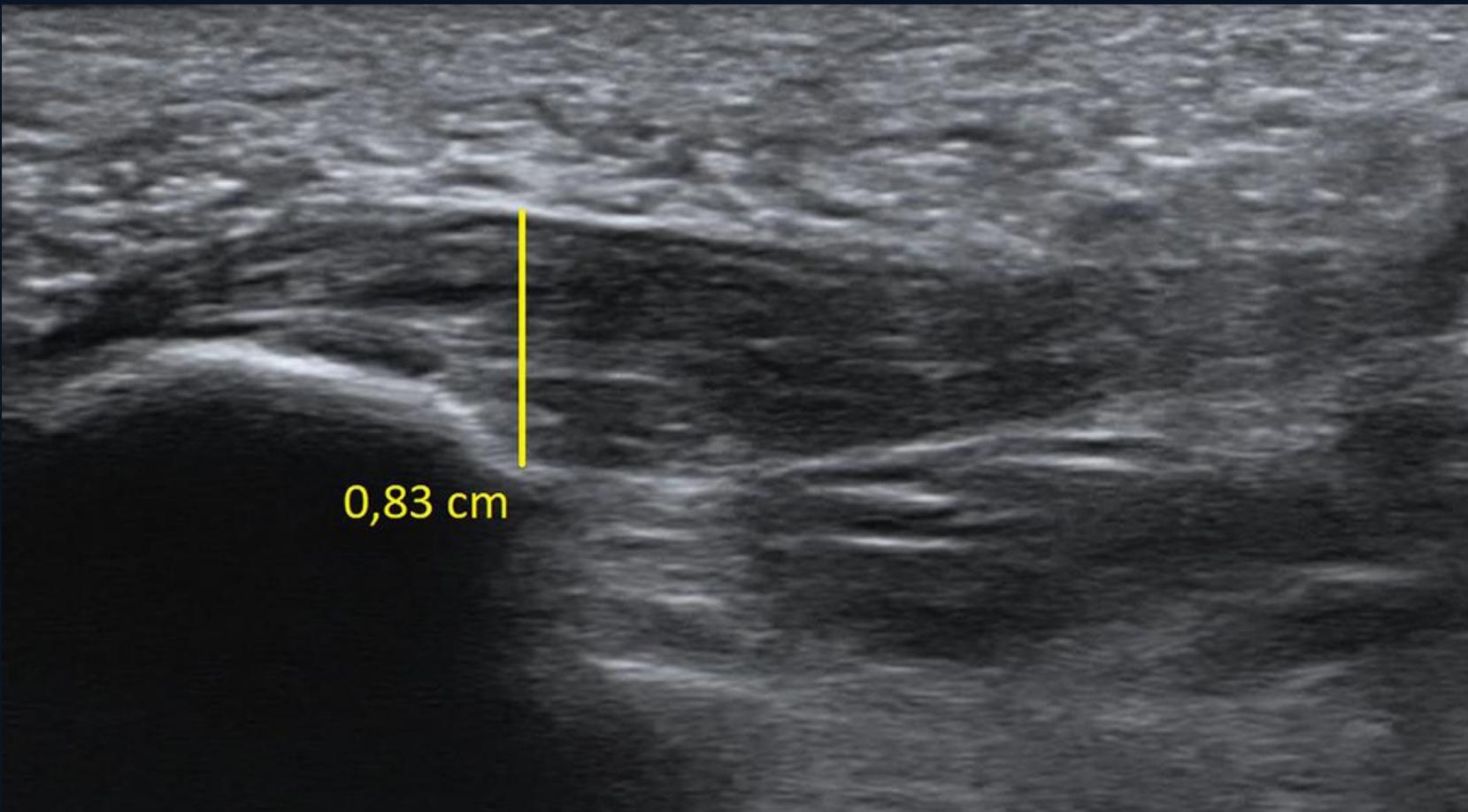
- In 2003, increased vascularity of entheses started to be considered as a specific sign of enthesitis



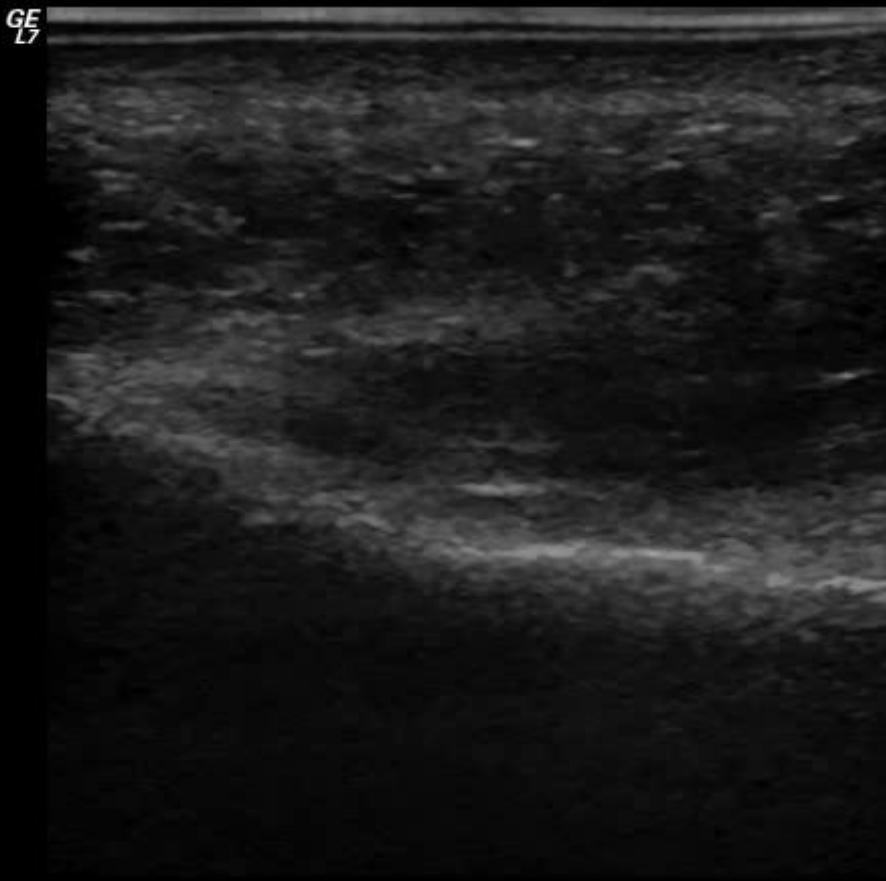
# Is there any plantar aponeurosis?



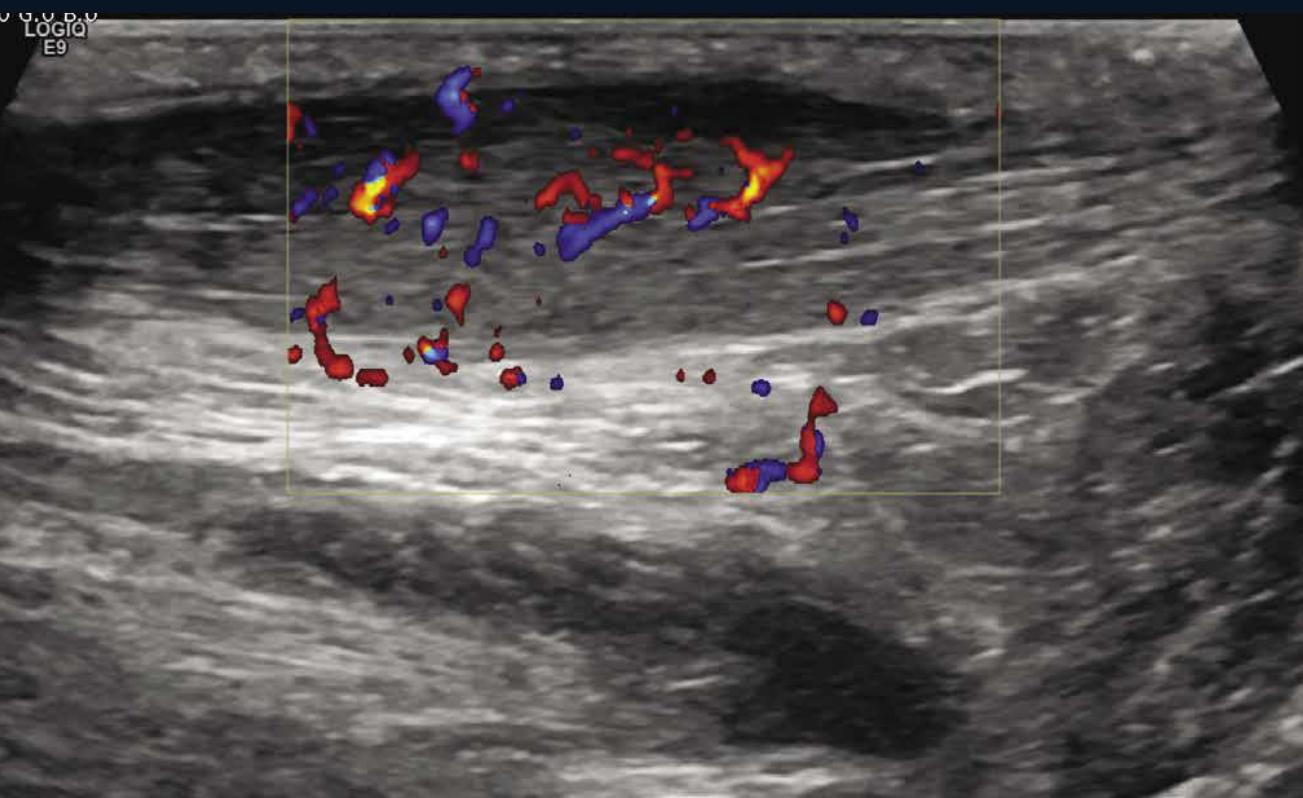
# Next step US



# US guided treatment



# US guided treatment, Achilles



US-guided high-volume injection for Achilles tendinopathy

George A. Kakkos<sup>1</sup>, Michail E. Klontzas<sup>1,2,3</sup>, Emmanouil Koltsakis<sup>1</sup>,  
Apostolos H. Karantanas<sup>1,2,3</sup>

*J Ultrason* 2021

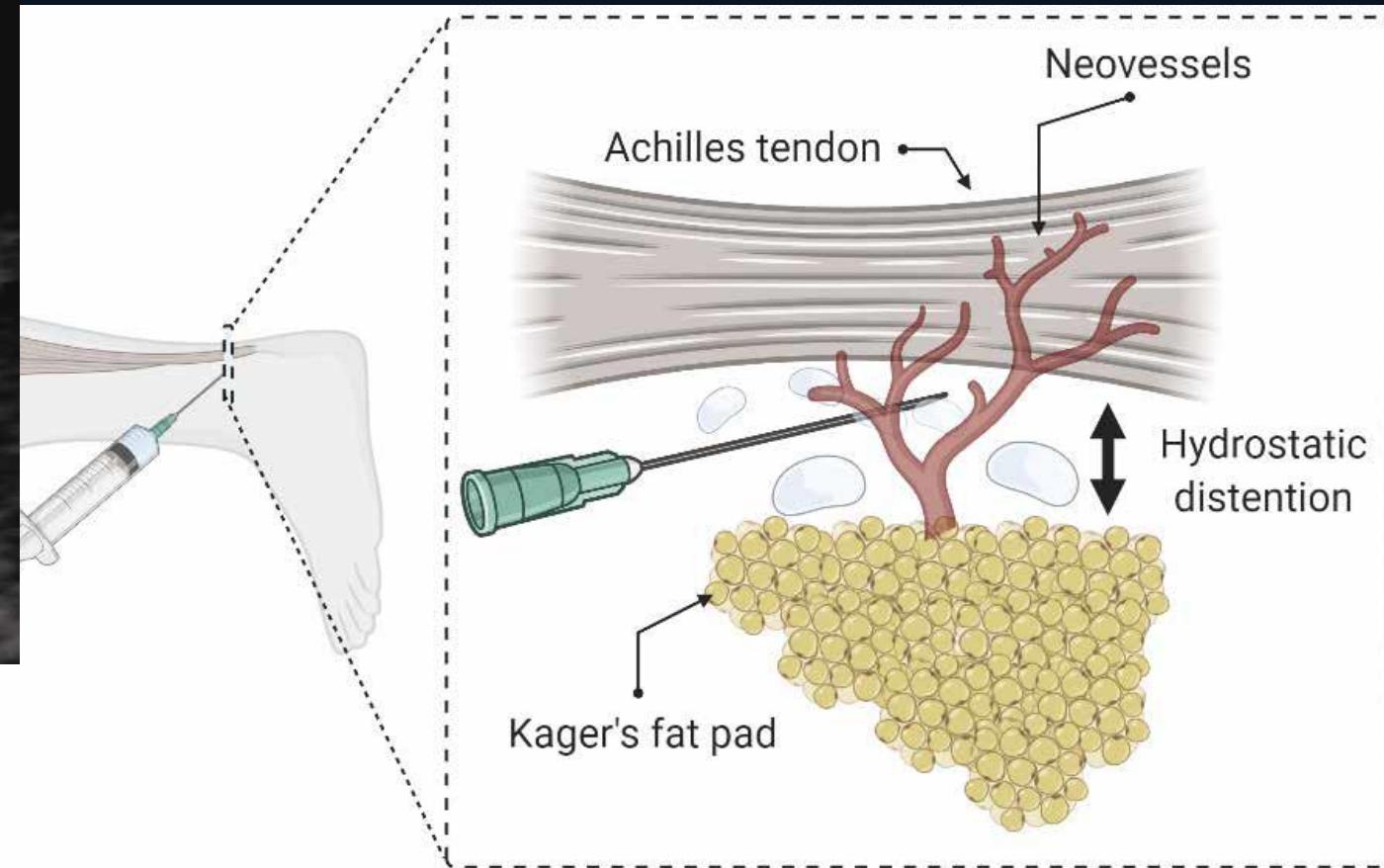
# US guided treatment, Achilles



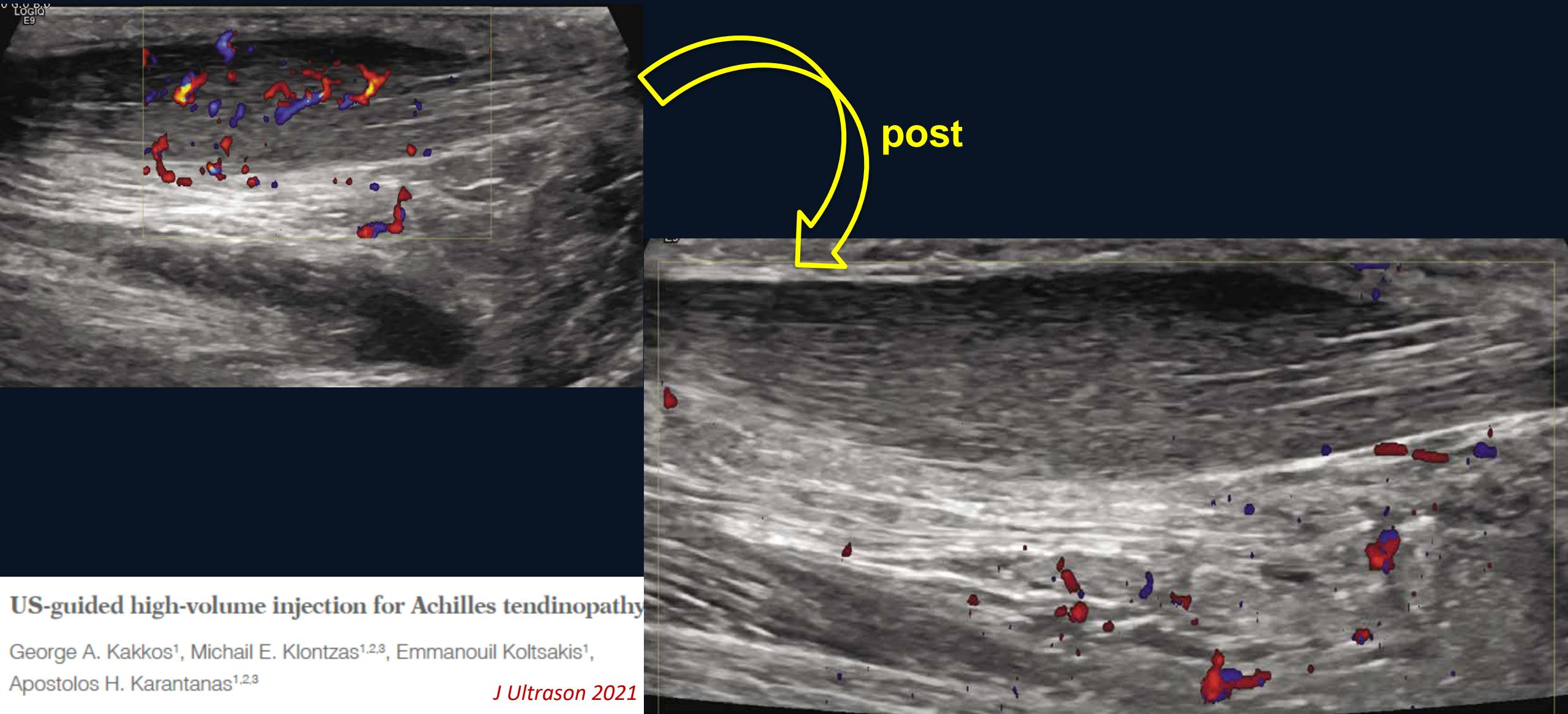
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*J Ultrasound* 2021



# US guided treatment, Achilles

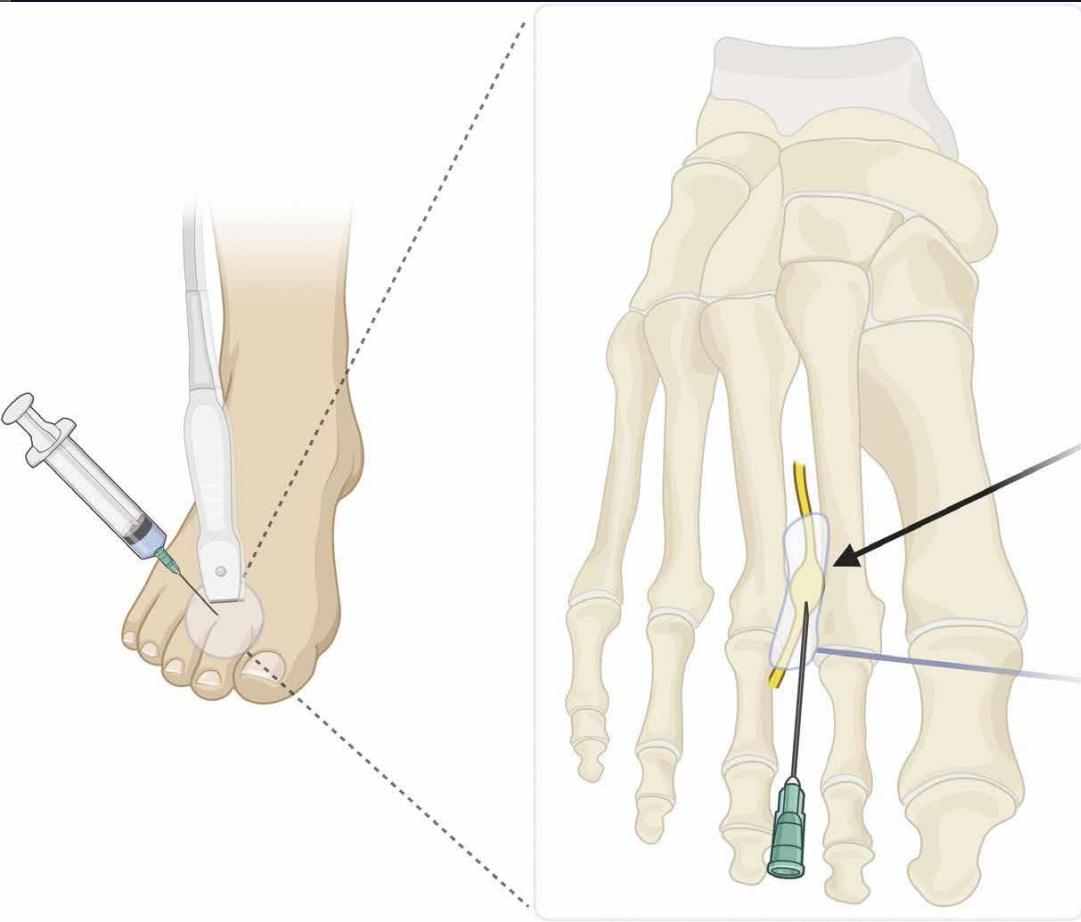
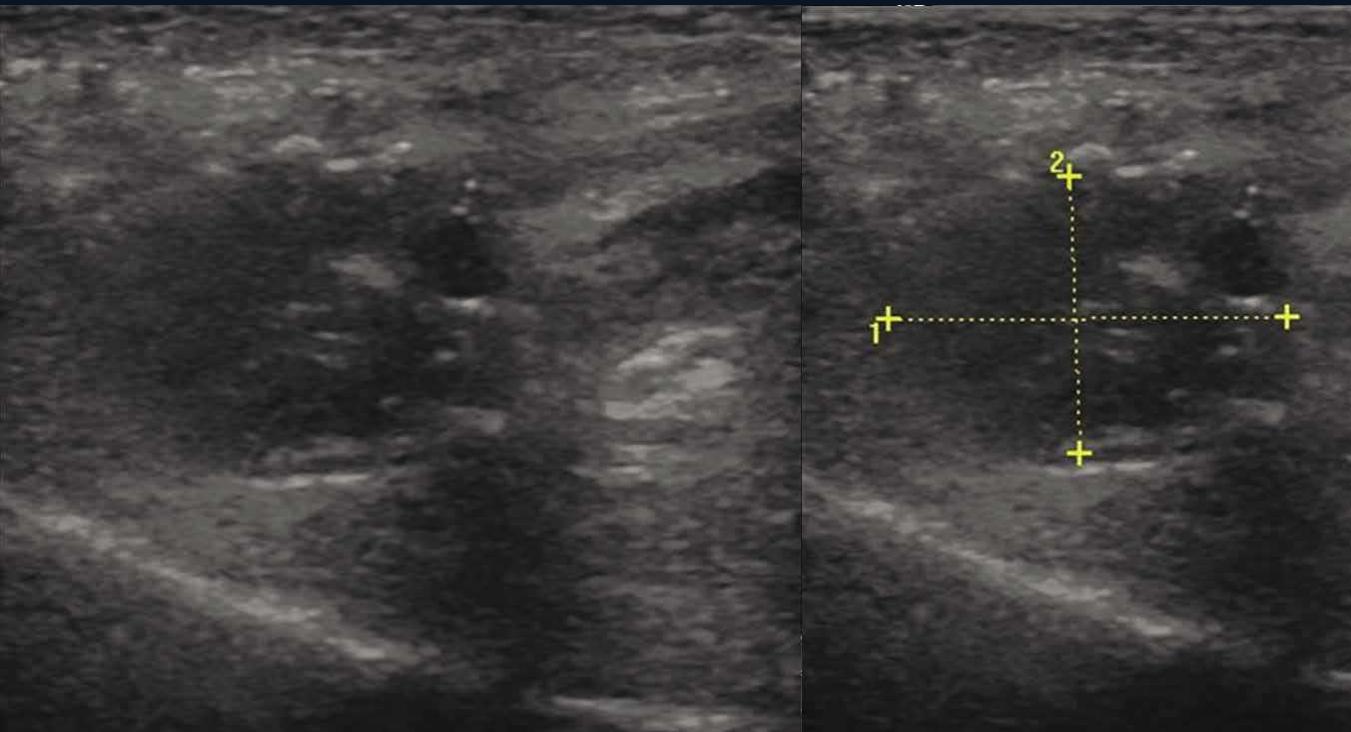


US-guided high-volume injection for Achilles tendinopathy

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# US guided treatment, Morton

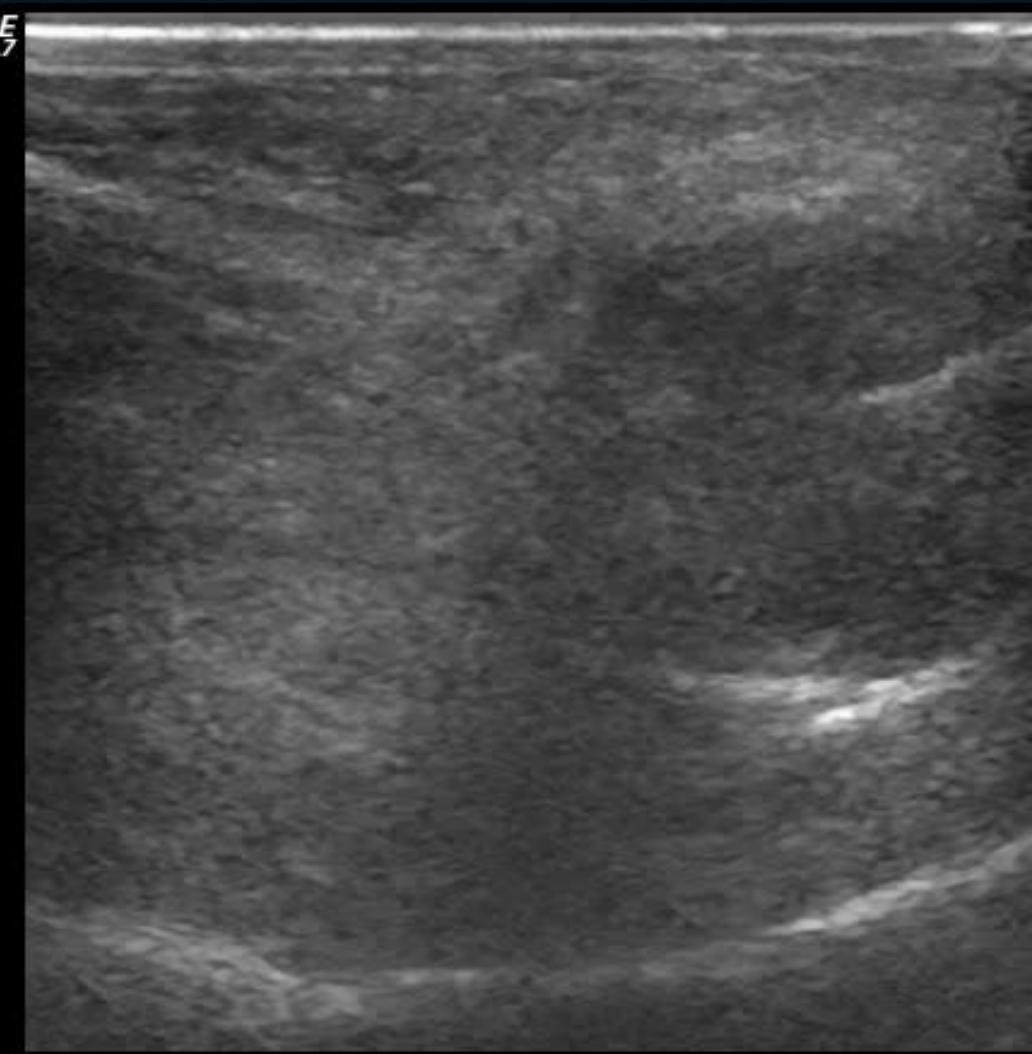
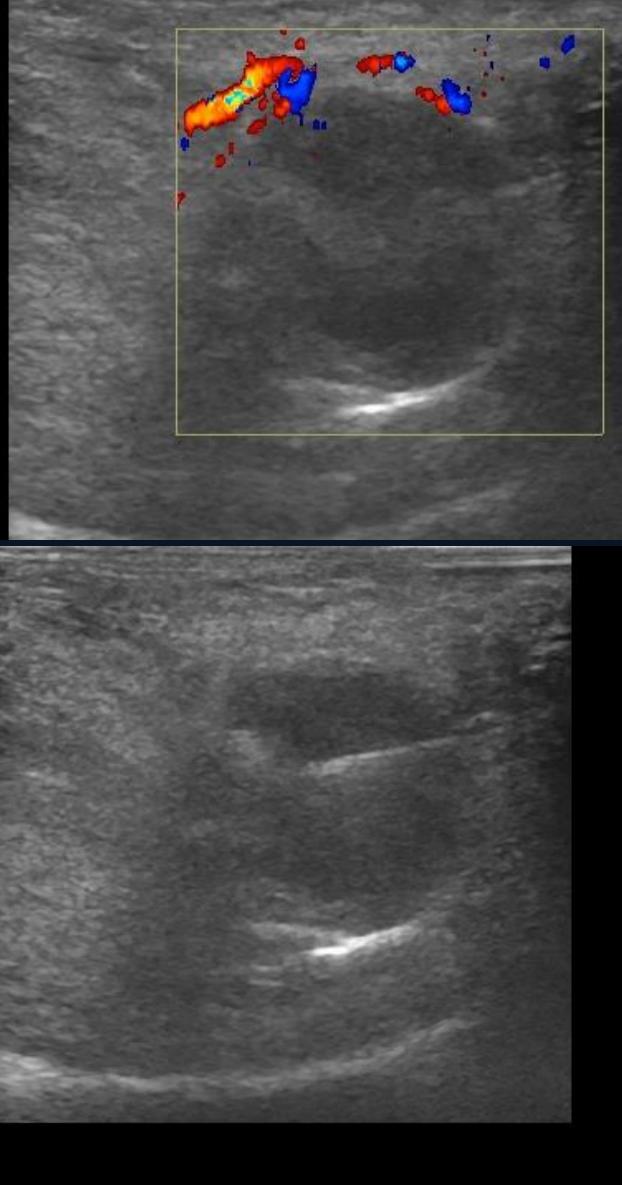


Ultrasound-guided treatment of Morton's neuroma

Michail E. Klontzas<sup>1,2,3</sup>, Emmanouil Koltsakis<sup>1</sup>, George A. Kakkos<sup>1</sup>,  
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# US guided treatment, Morton



Ultrasound-guided treatment of Morton's neuroma

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04/11/09 15:00:45 ADM

041109-145635

MI 0.6 TIs 0.7 10L  
MscSkel

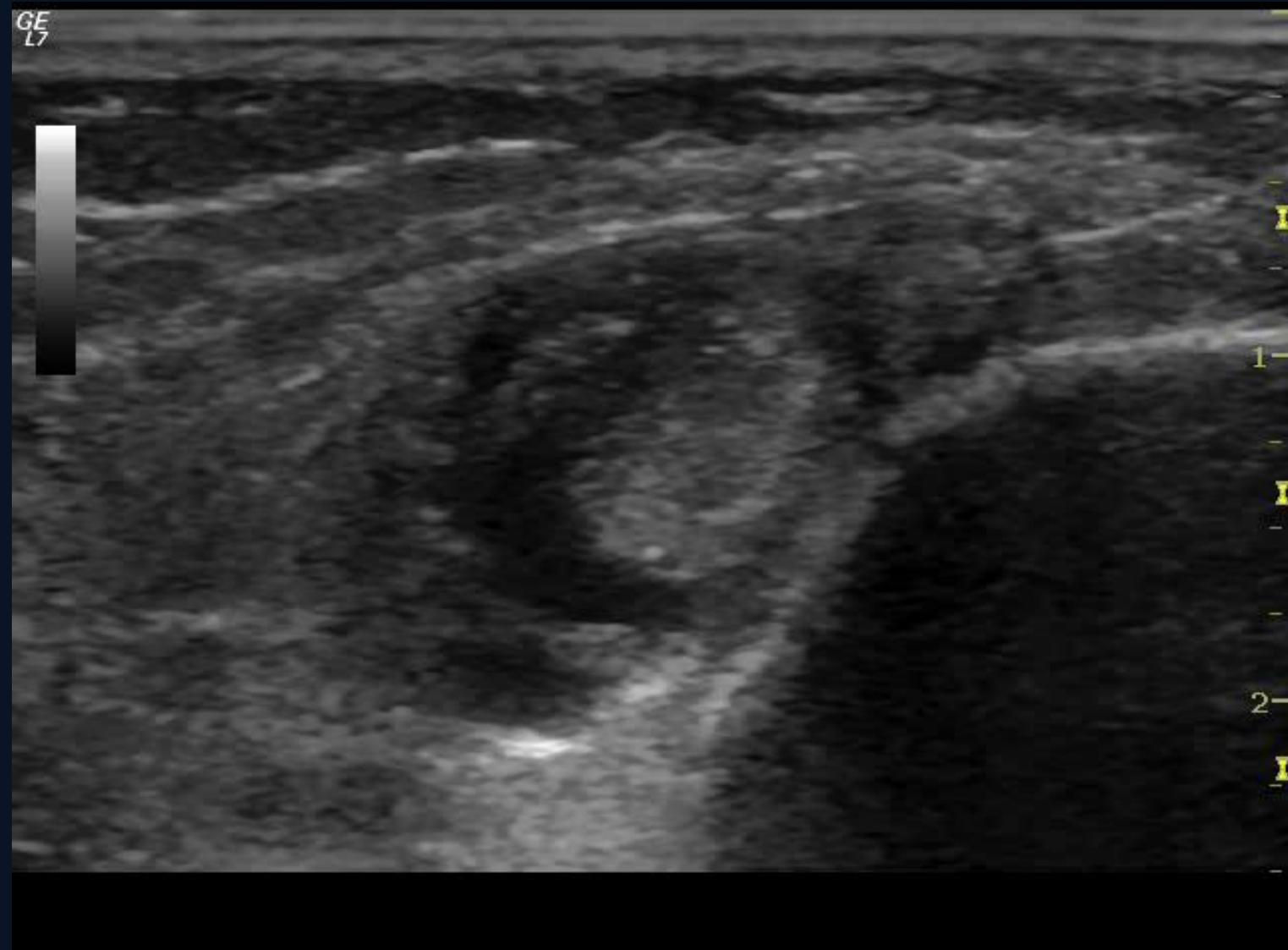
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Frq 10.0 MHz  
Gn 70  
E/A 2/3  
Map P/O/O  
D 3.0 cm  
DR 75  
FR 42 Hz  
AO 100 %  
1  
2  
3

UN HOSP HERAKLION  
04/11/09 15:06:13 ADM 041109-145635

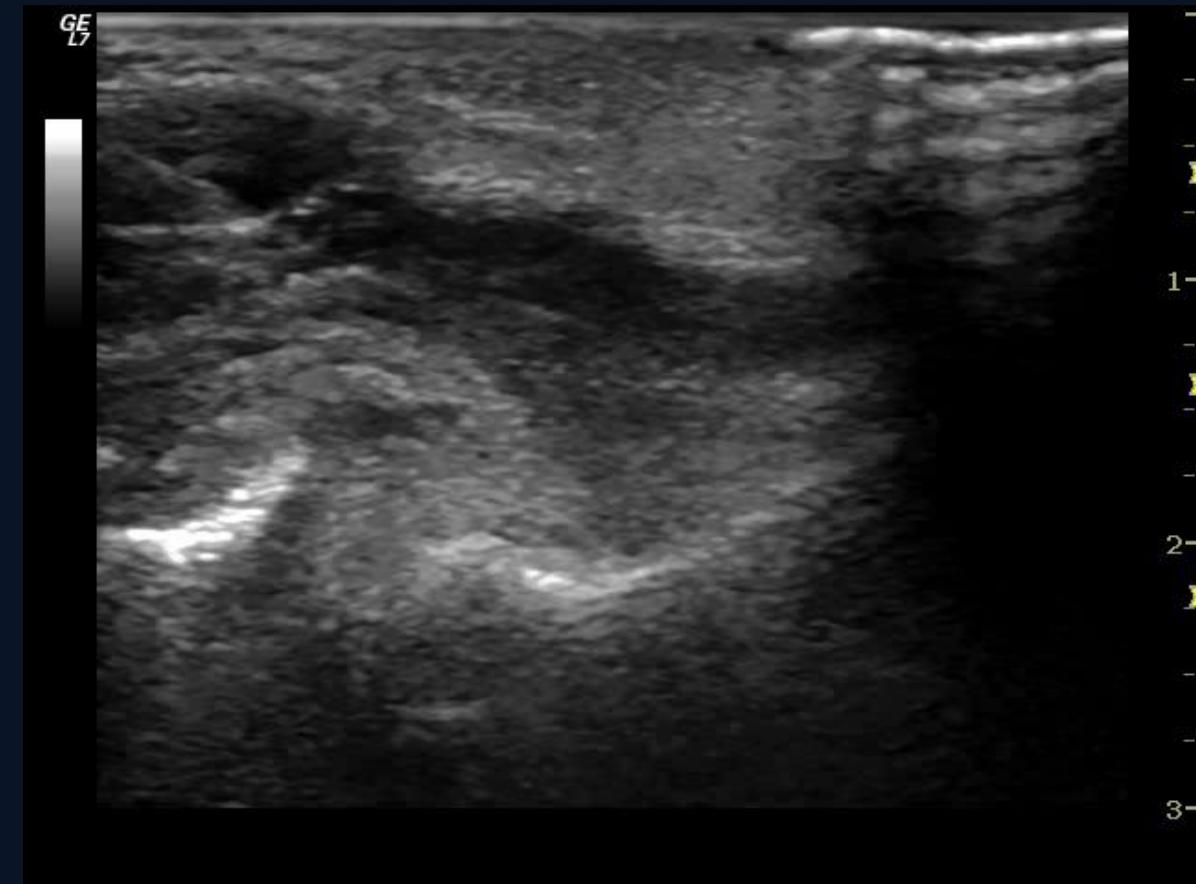
MI 0.6 TIs 0.7 10L  
MscSkel

B  
Frq 10.0 MHz  
Gn 70  
E/A 2/3  
Map P/O/O  
D 2.5 cm  
DR 75  
FR 42 Hz  
AO 100 %  
1  
2

# US guided tenosynovitis treatment



# US guided ganglion drainage

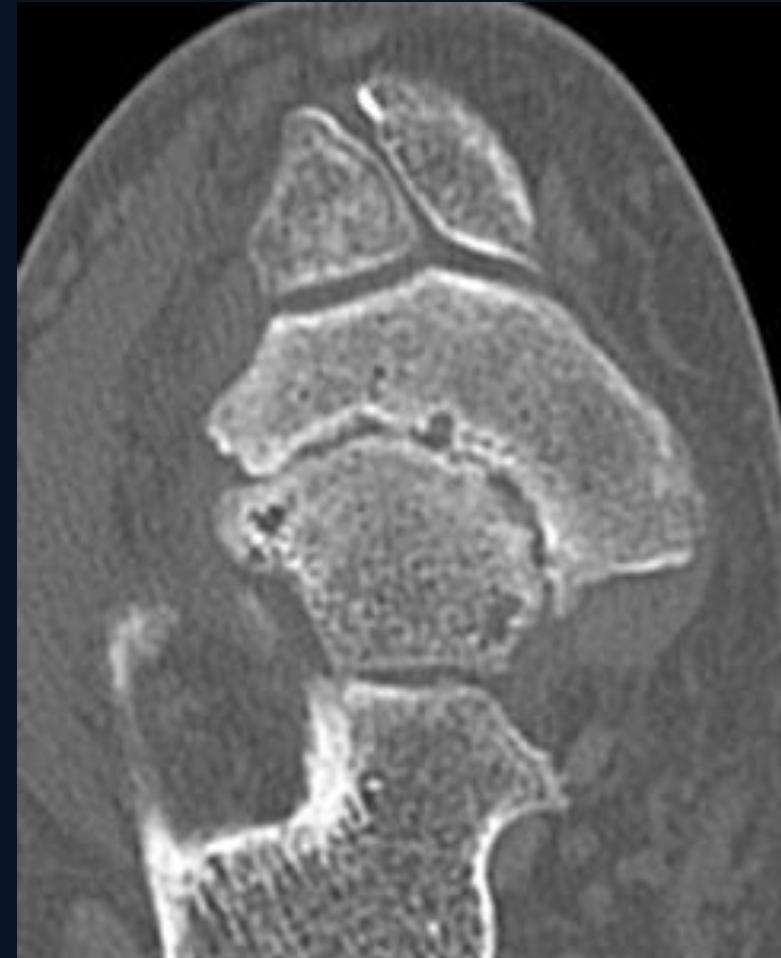


# Why CT: superb osseous imaging

Anterior impingement syndrome + secondary OA



RA

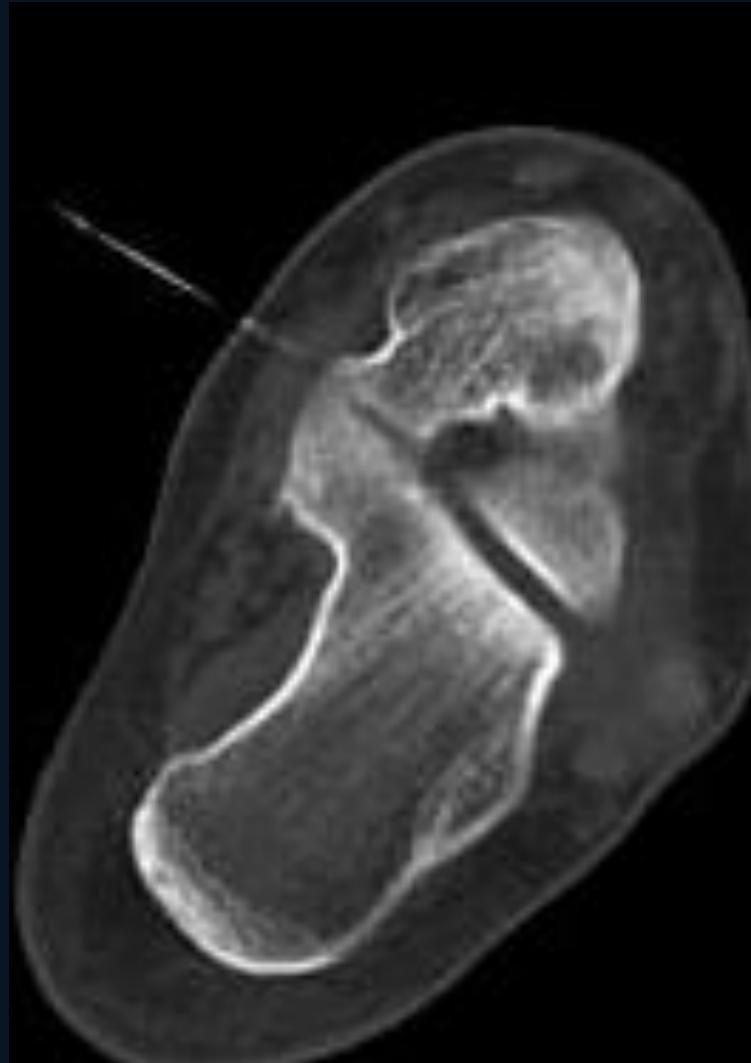


# CT: indications

- HADD-BCP
- Loose bodies – synovial osteochondromatosis
- Osseous tumors
- CT guided injections – biopsies
- Trauma, Postoperative, post-traumatic OA
- Infections
- MRI contra-indicated

# Post-traumatic OA, 60m, 40y injury





# Why MRI

Bone marrow

Articular cartilage

Synovium

Soft tissues



# MRI indications

- Variable disorders in the area

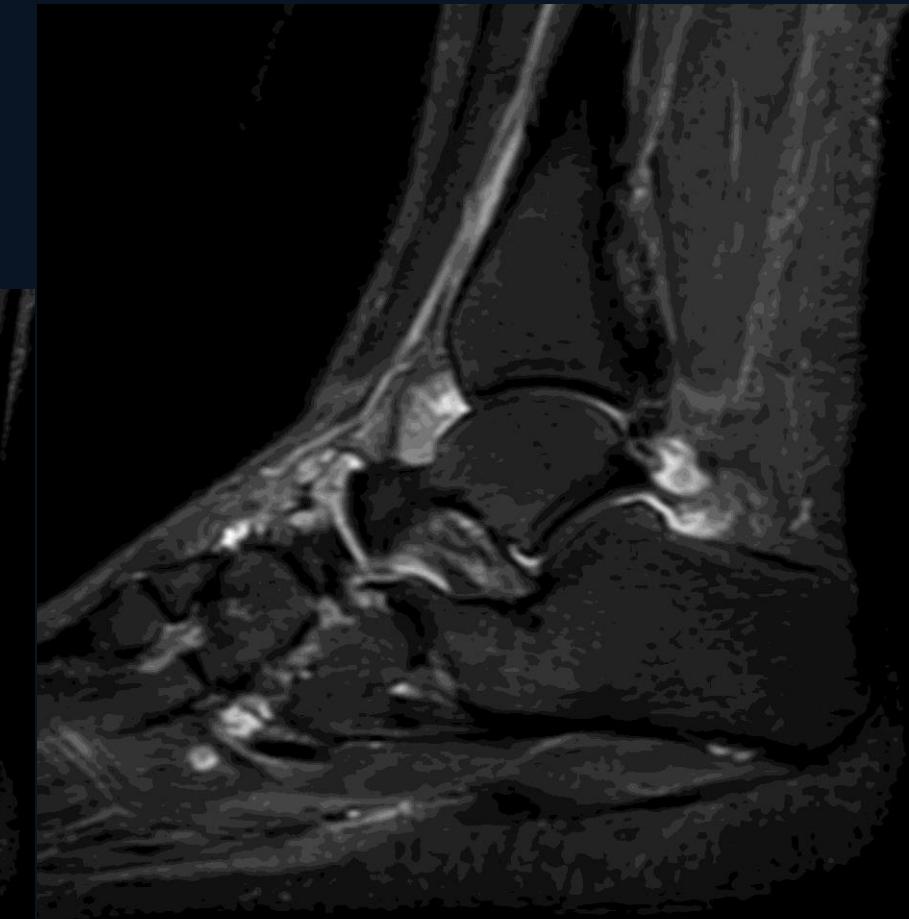
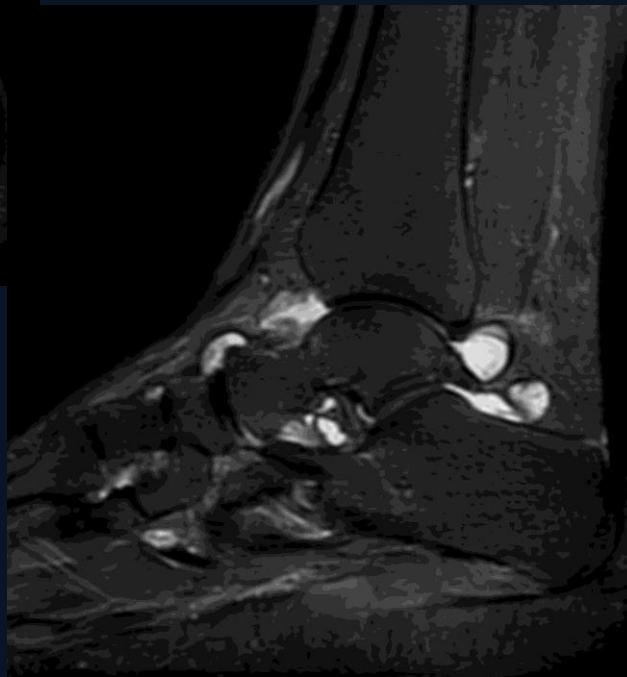
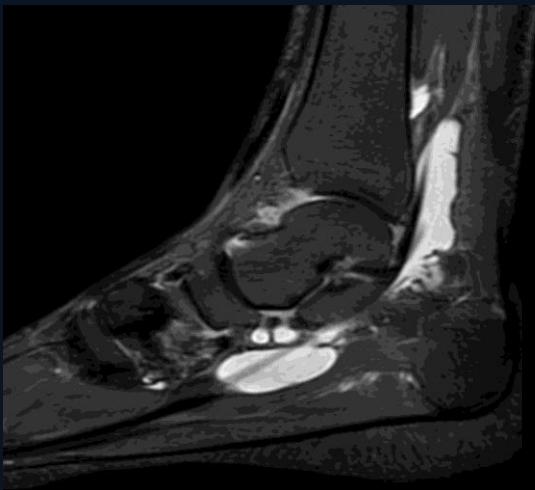
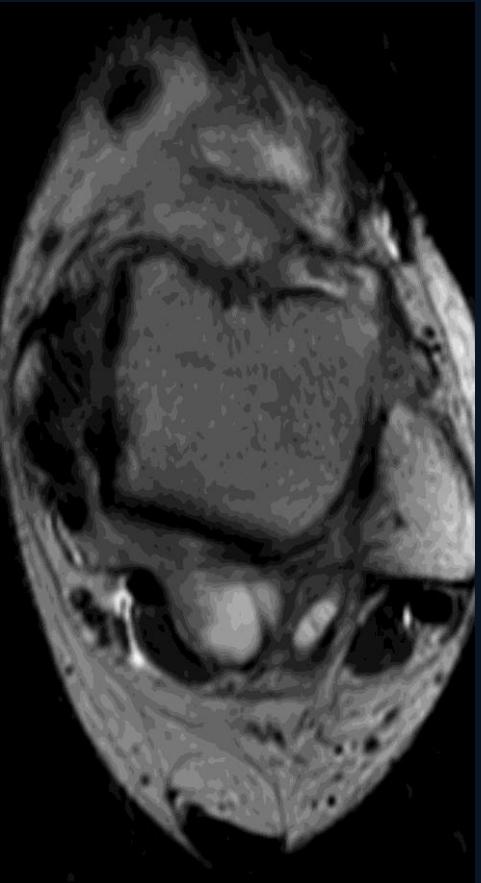


# Case 1: 23 female, pain and swelling bilateral

L

Do we need MRI? No, US could depict all these changes

R



# Case 2: 59 female

fs PD

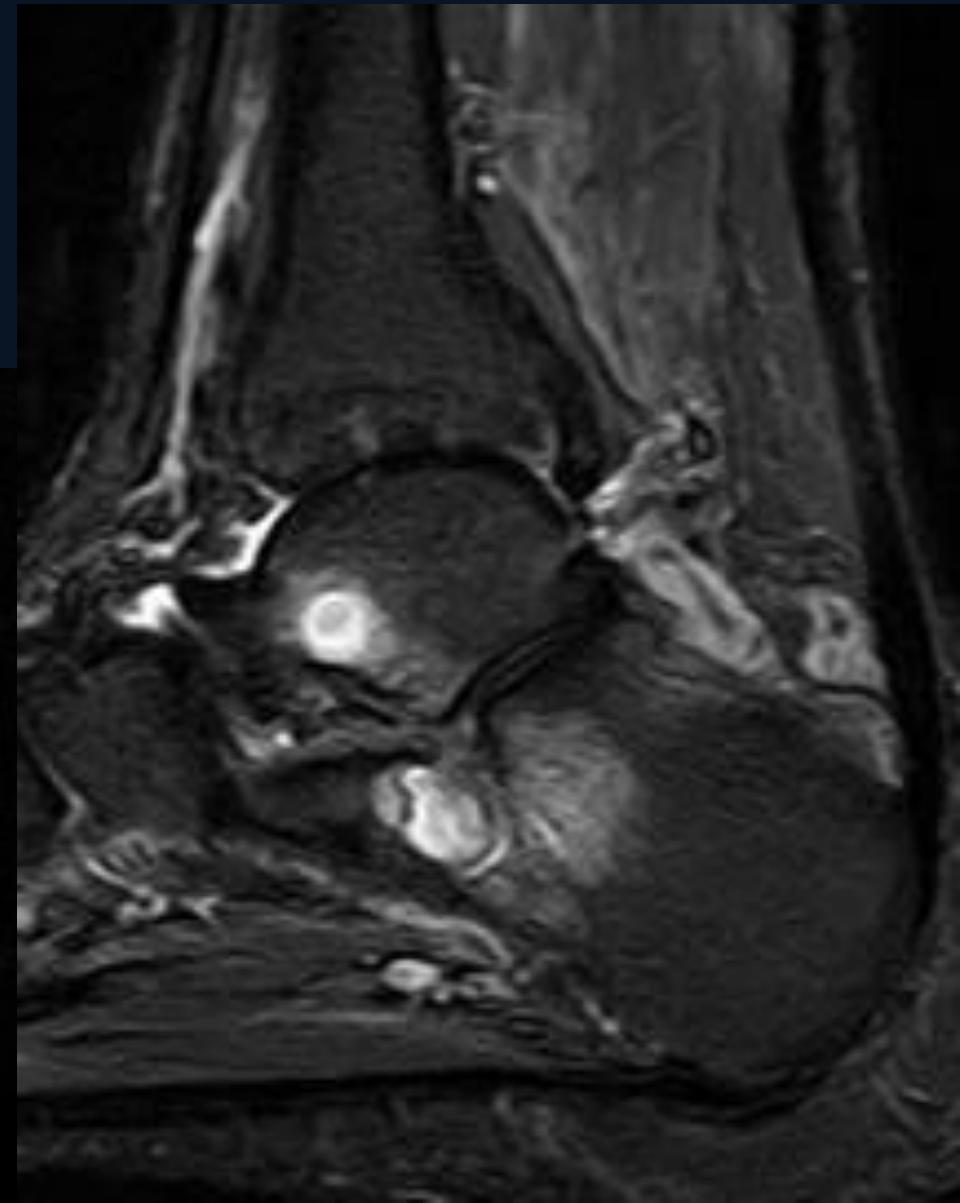
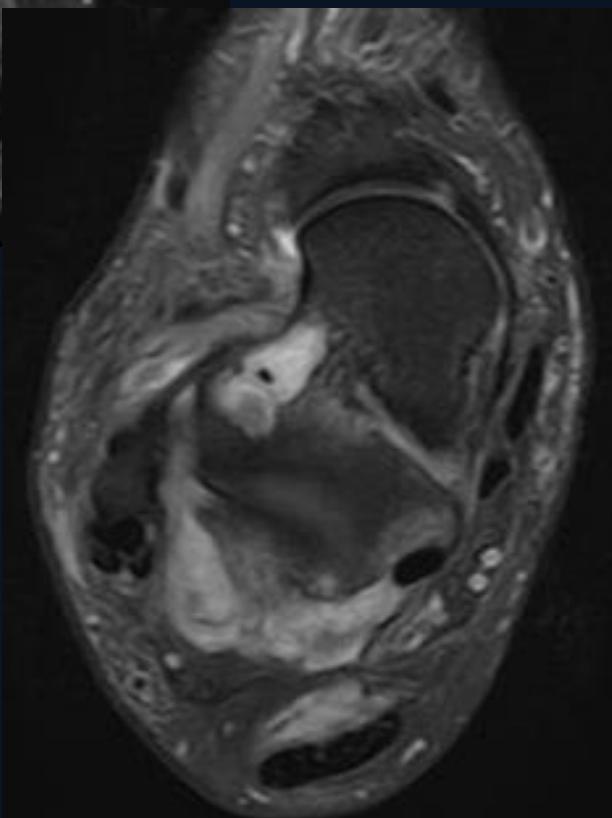
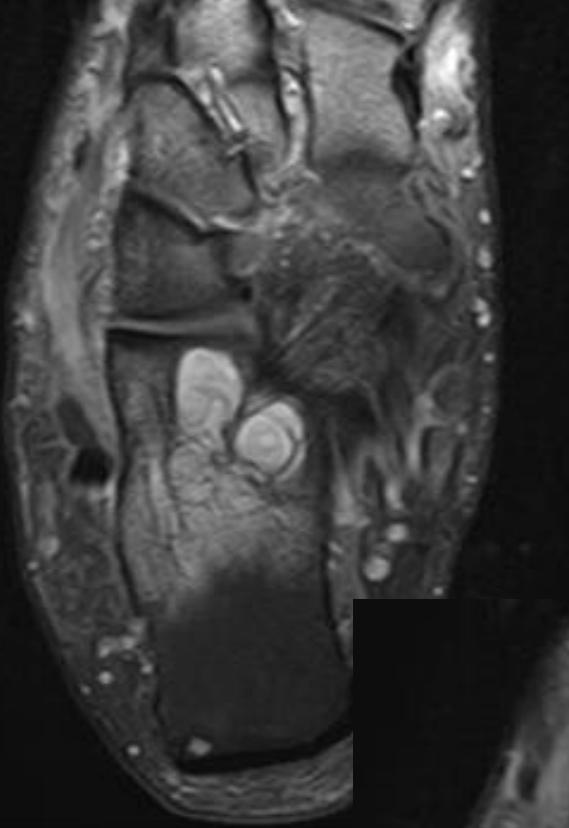


Do we need MRI?

YES, US could not  
depict BME

Gd

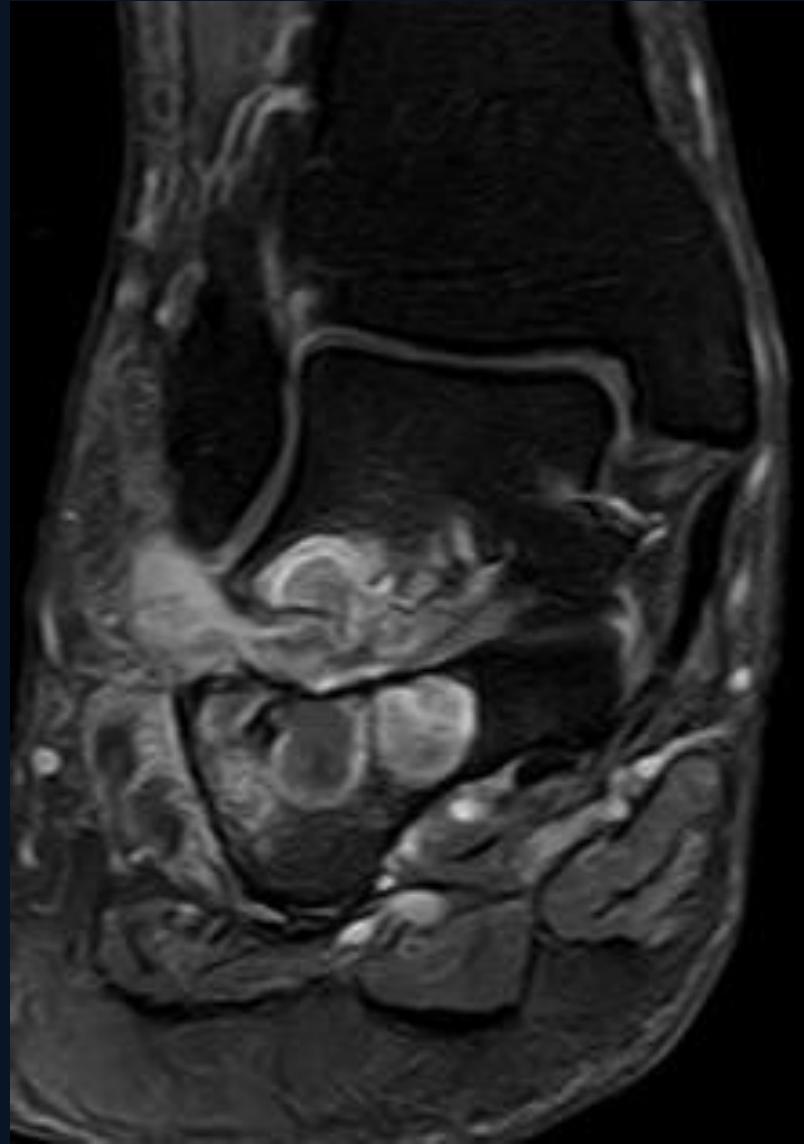
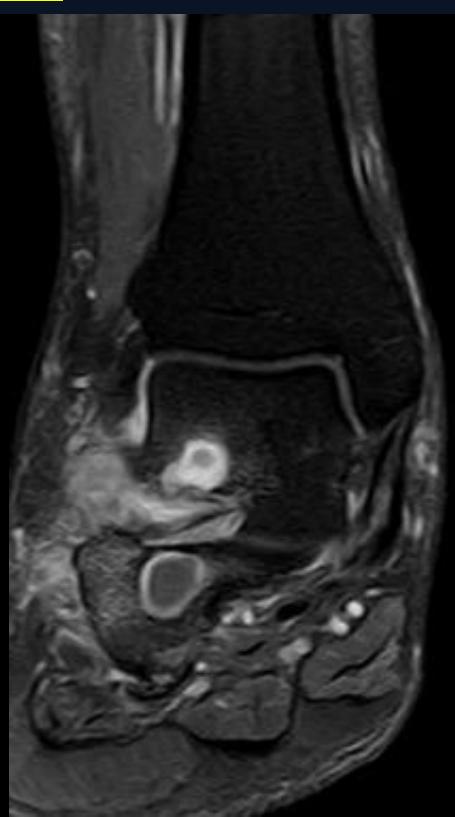
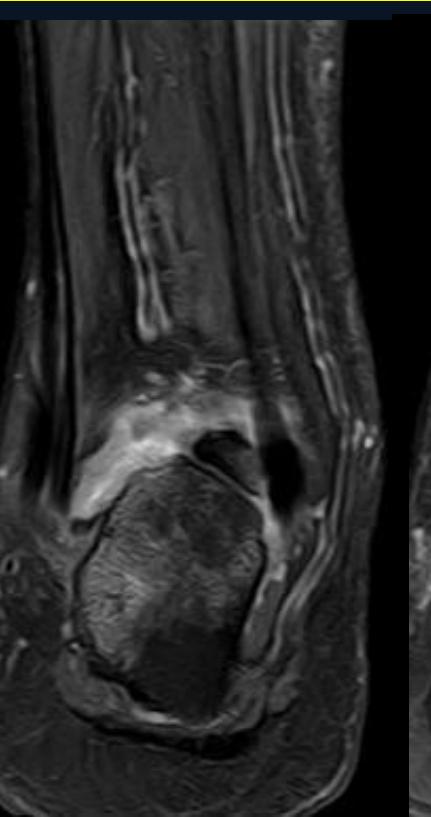
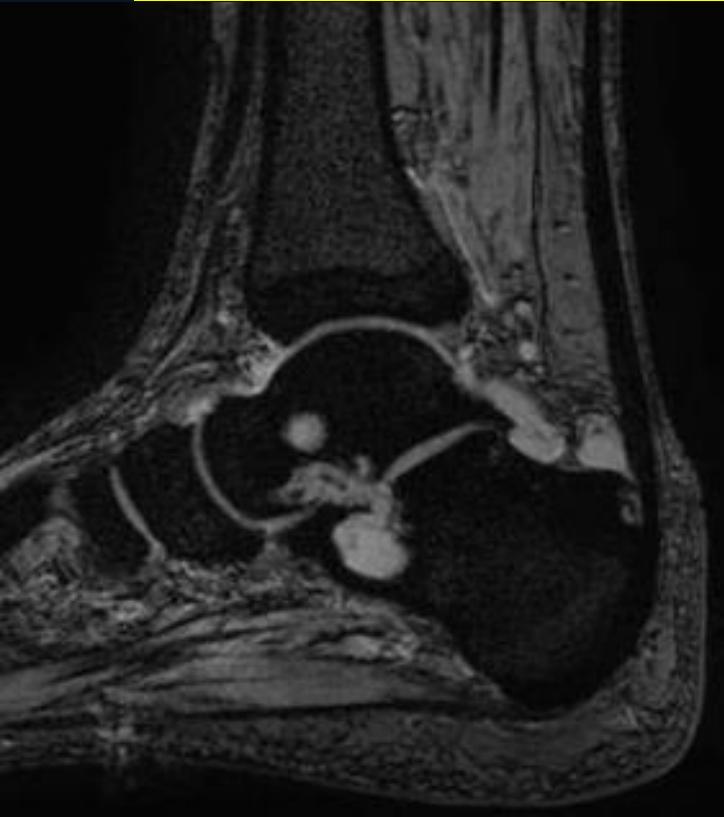
# Case 3: 66 male, pain 6m, RF+



# Case 3: 66 male, pain 6m, RF+

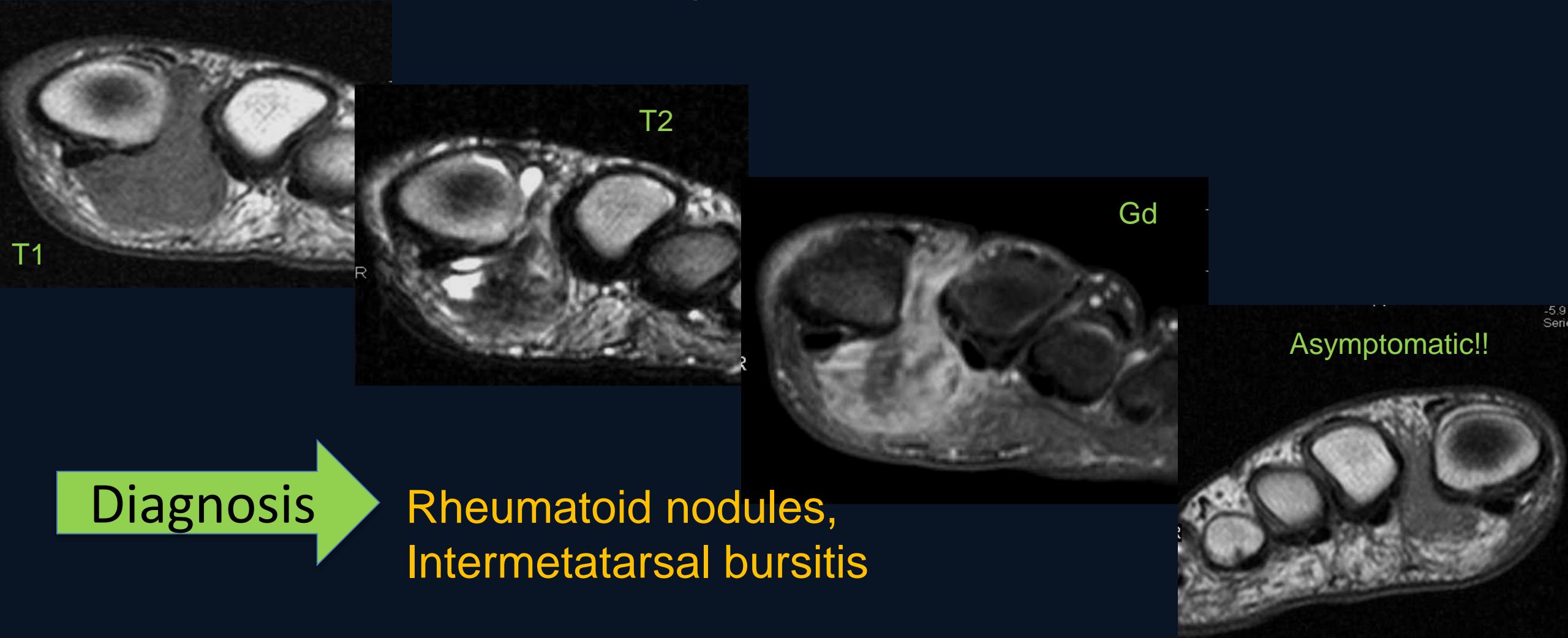
Do we need MRI?

YES, US could not depict deep erosions



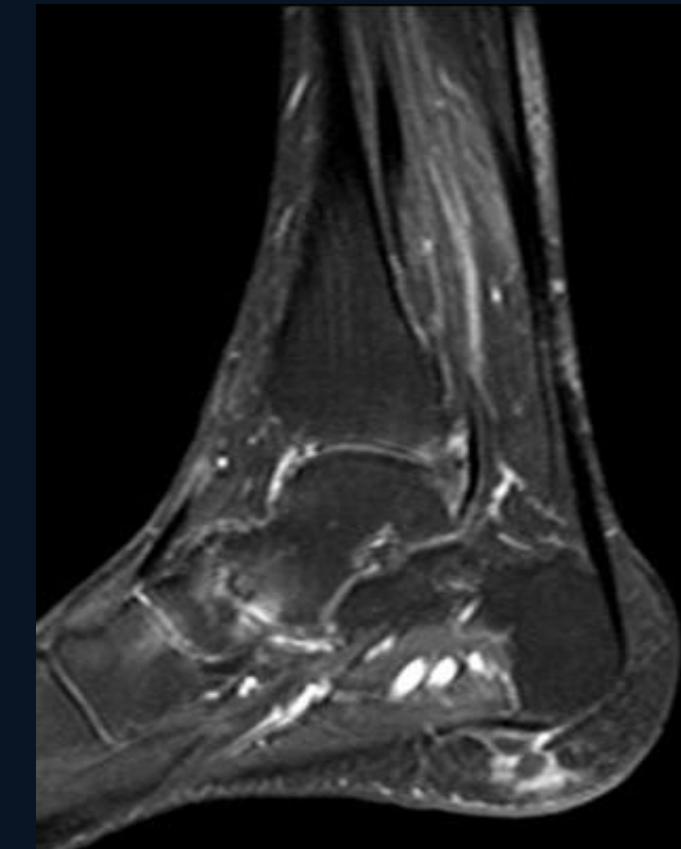
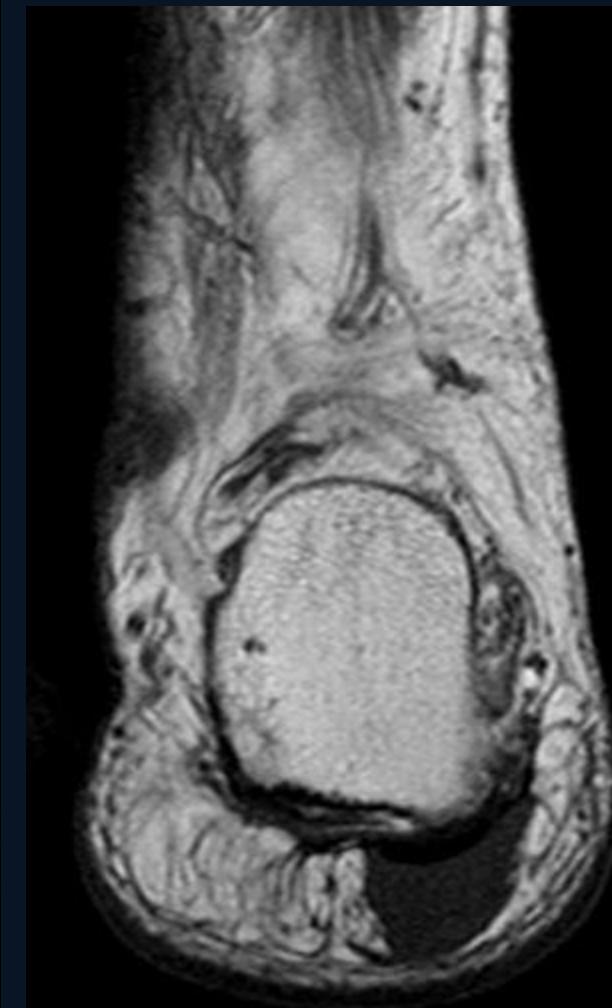
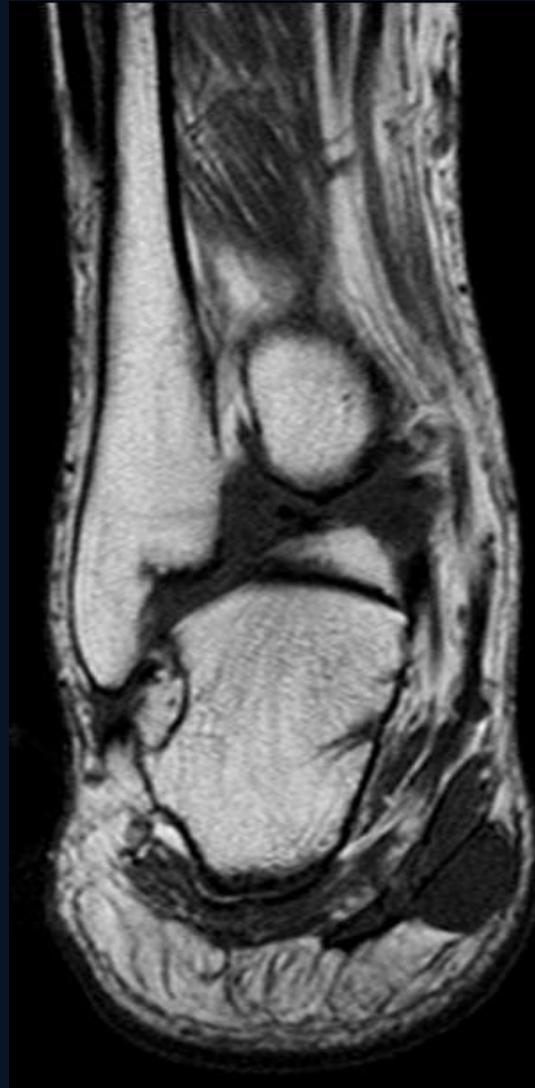
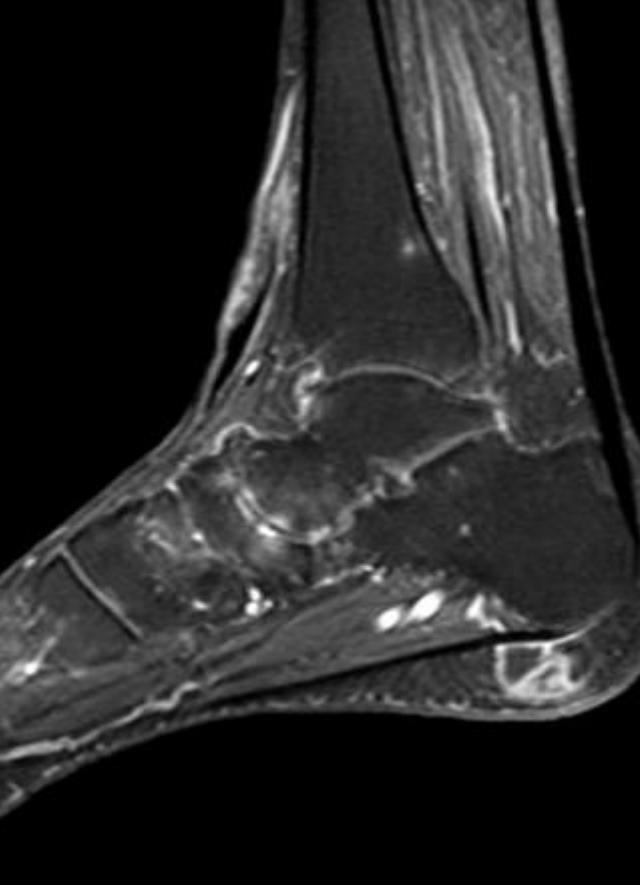
# Case 4: long Hx of RA, pain intermetatarsal, palpable plantar masses

Initial clinical diagnosis: Morton's neuromas



46m  
RA 29y

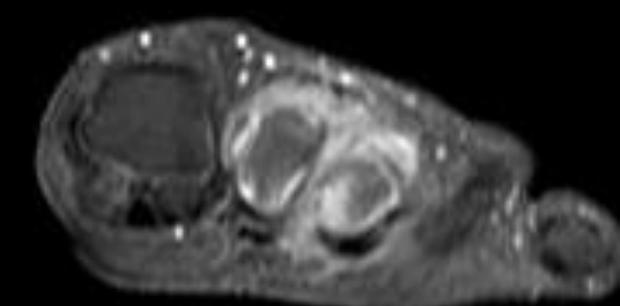
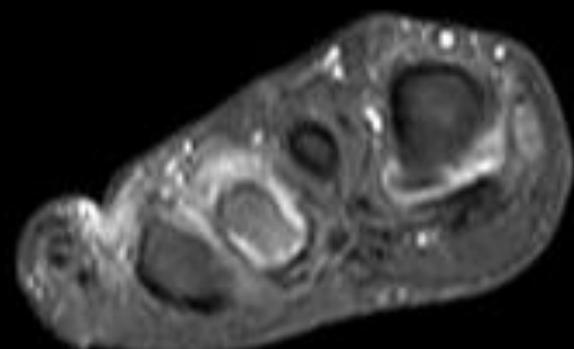
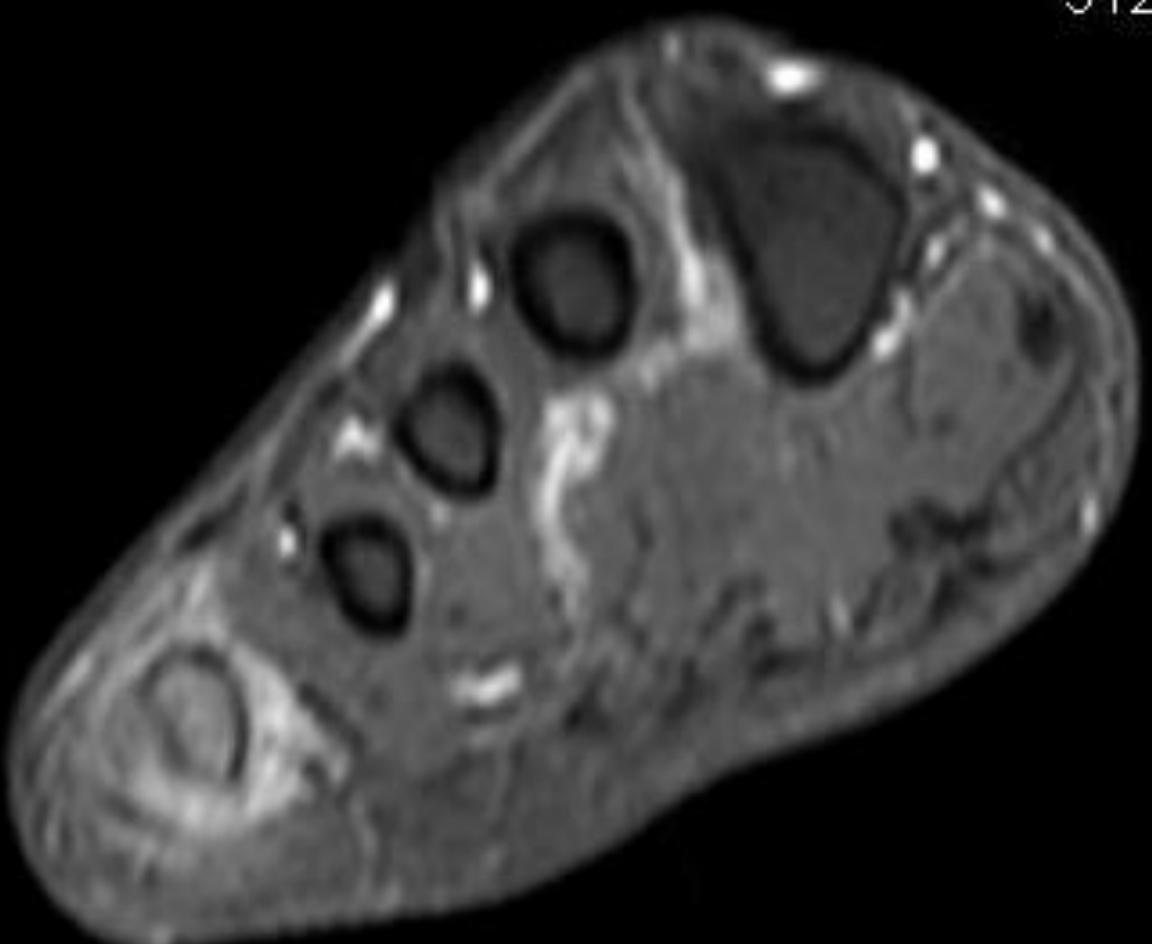
## Case 5: long Hx of RA, rheumatoid nodules



Case 6: 49m

512

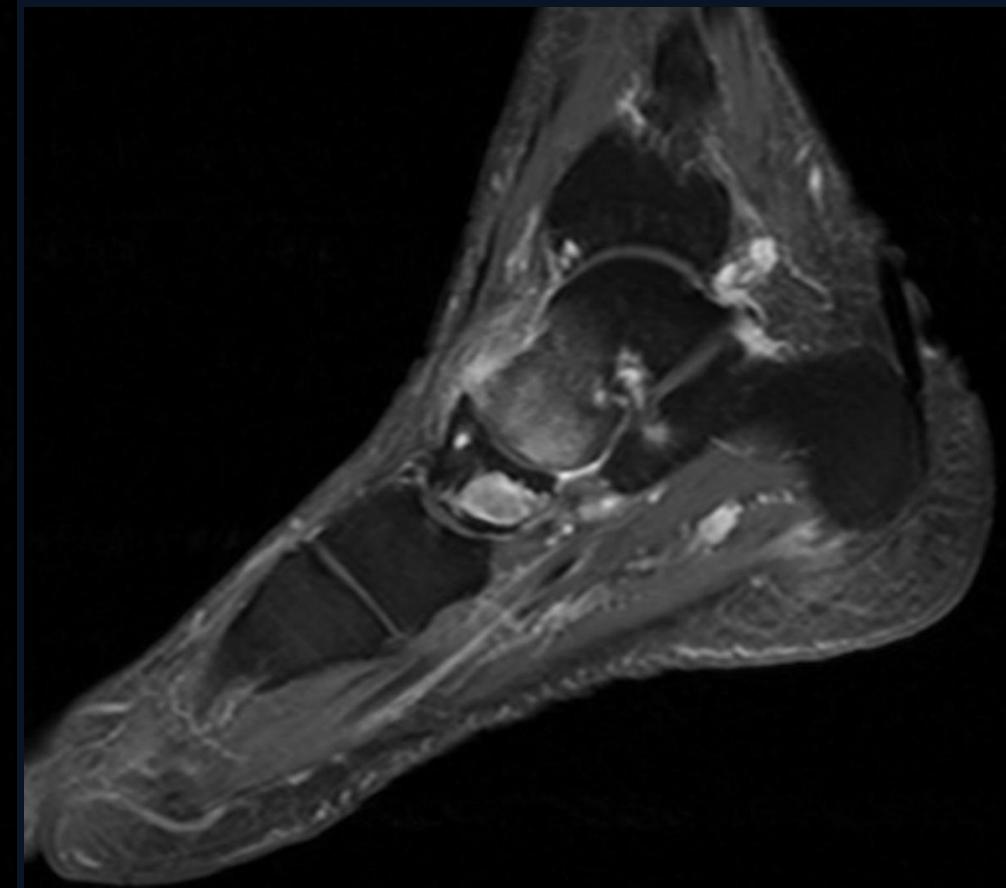
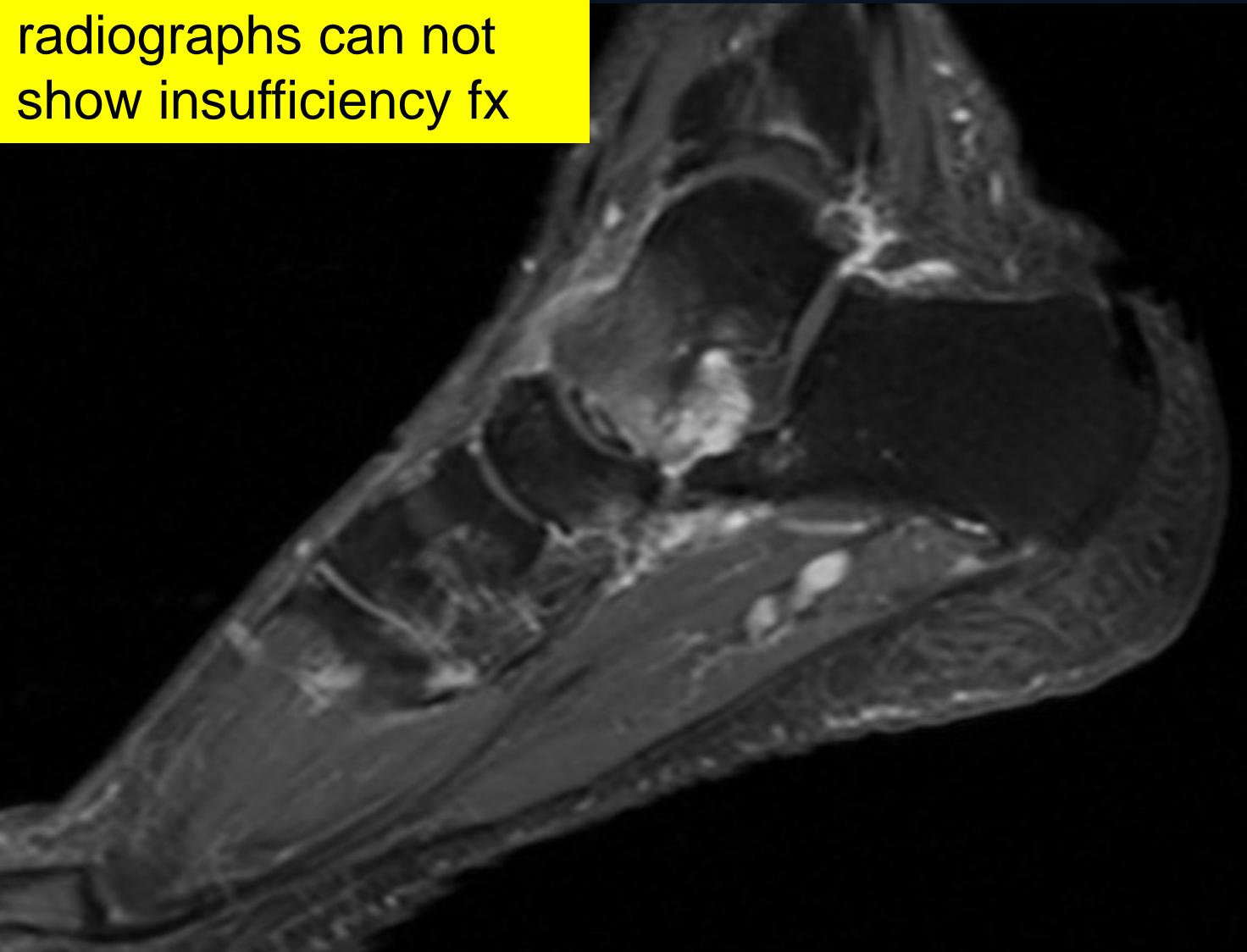
RA



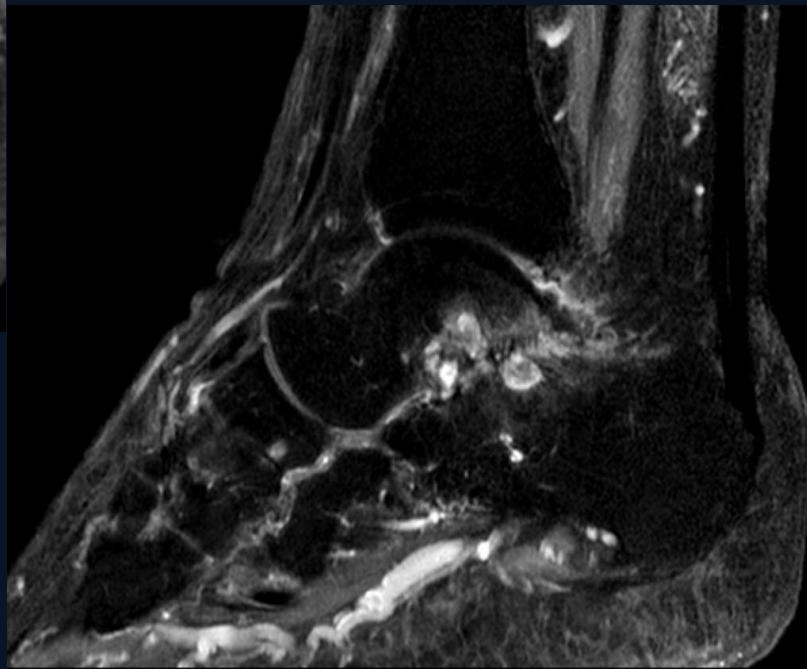
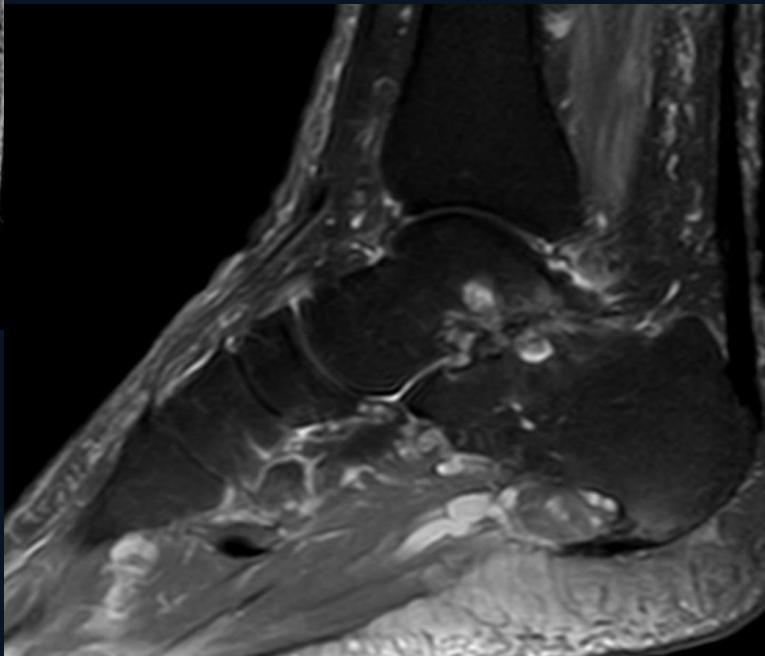
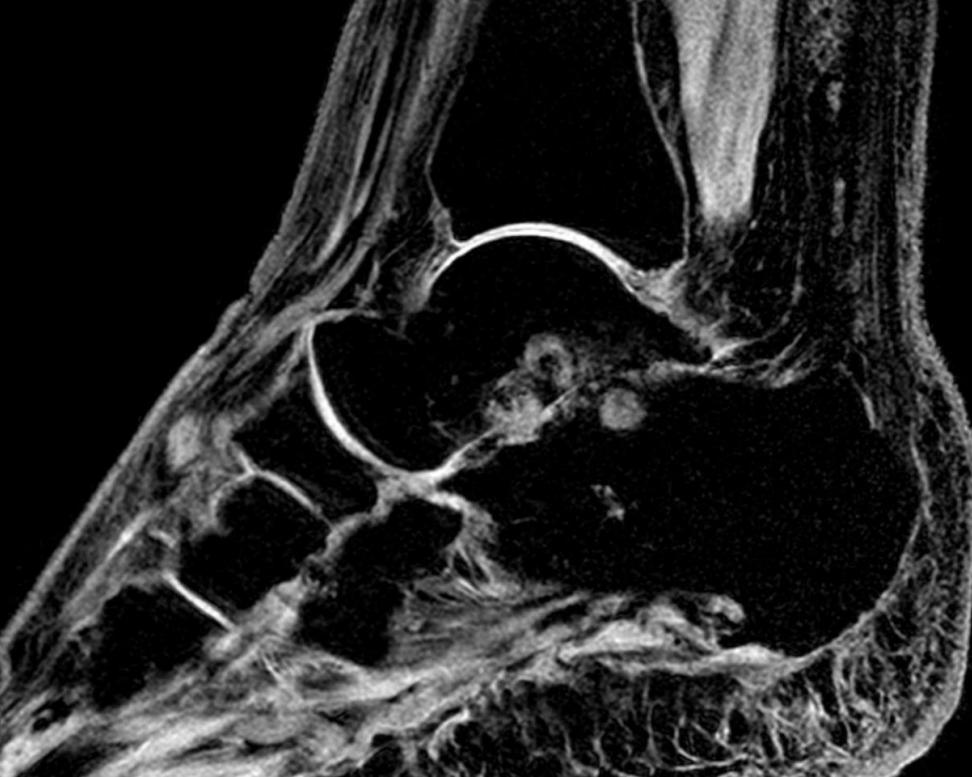
Do we need MRI?

YES, US and  
radiographs can not  
show insufficiency fx

## Case 7: 60 m, RA



# Case 8: 67 m, 130kg



Clinical diagnosis OA

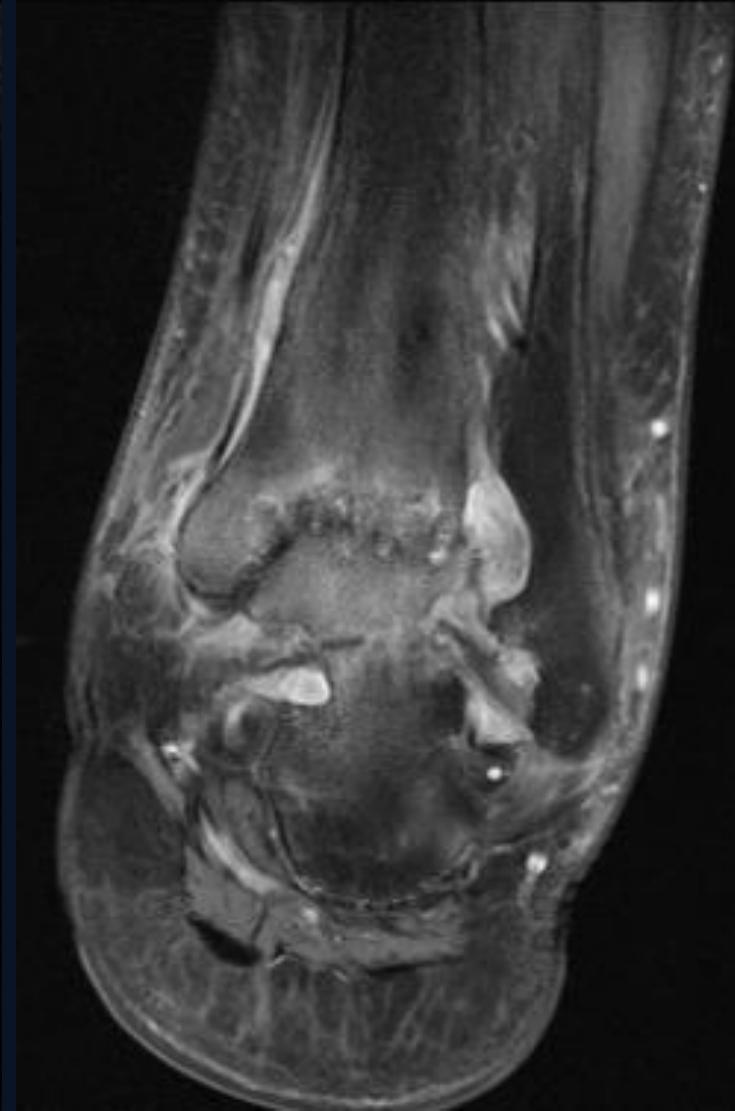
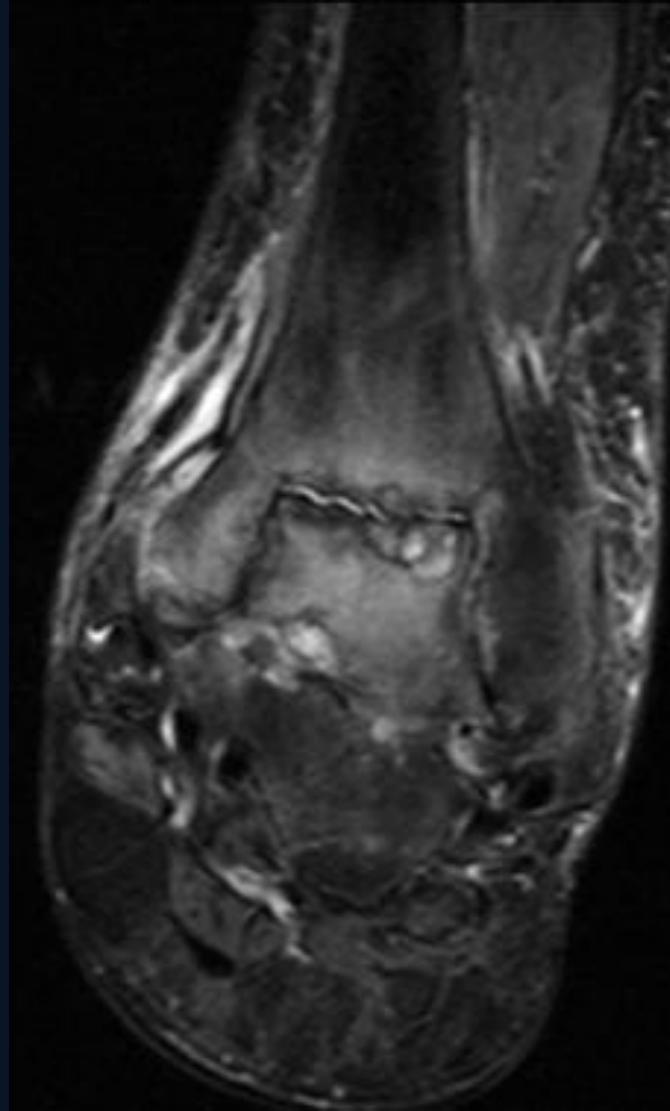
MRI: RA

# Case 9: RA hx 5y, pain foot 2y, 64f



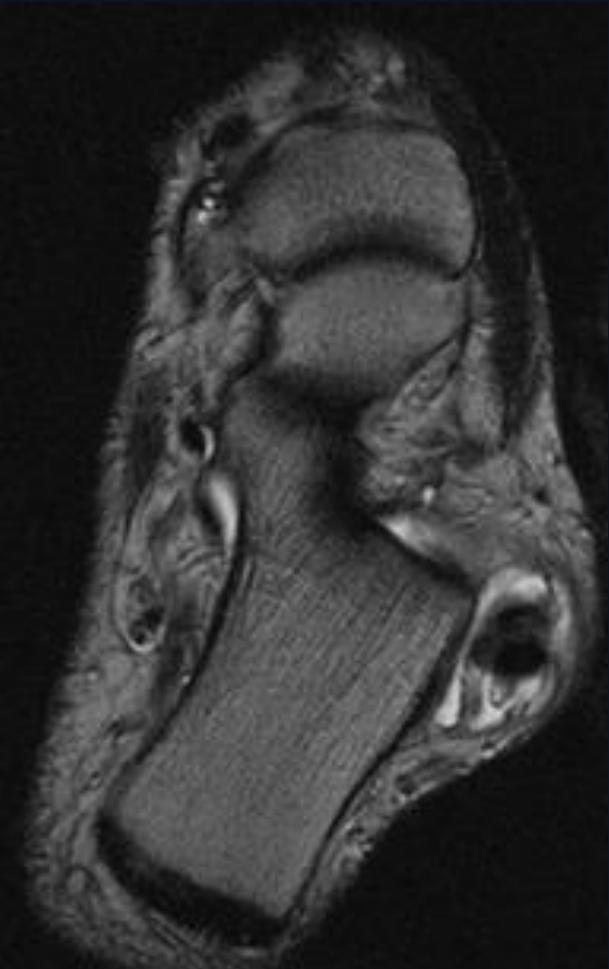
RA

OA

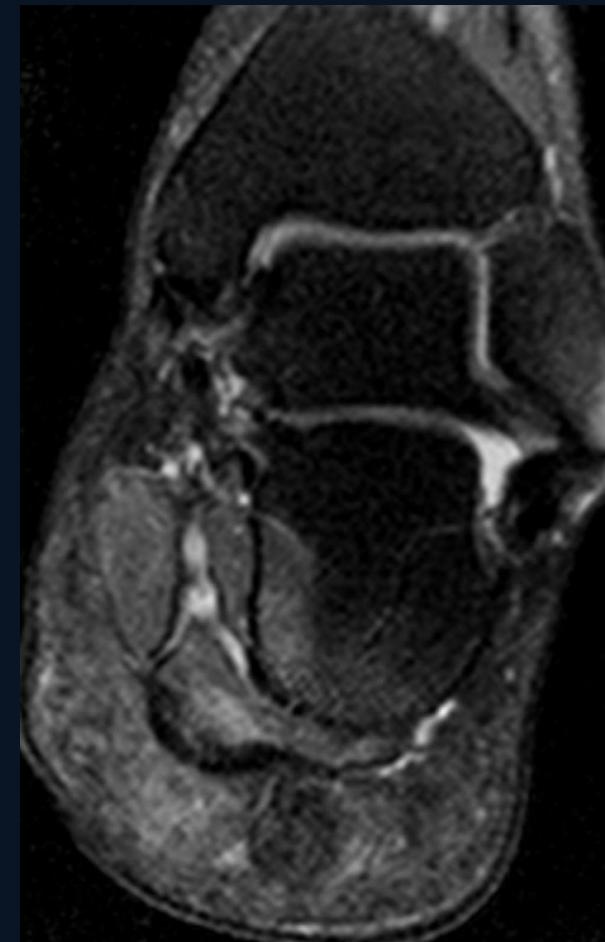
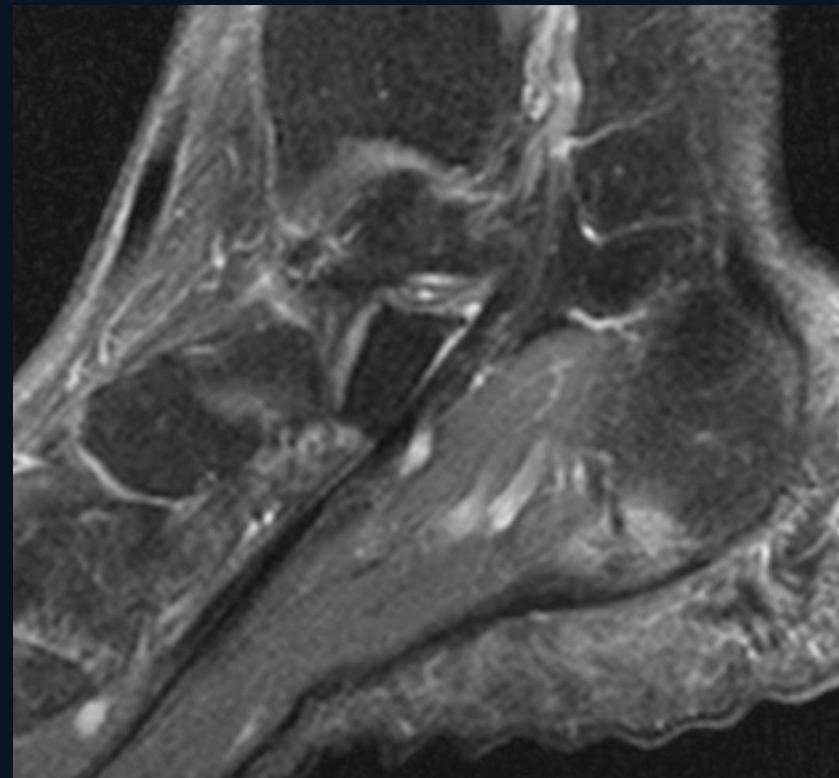


# Mimickers, differentials

Stenosing tenosynovitis

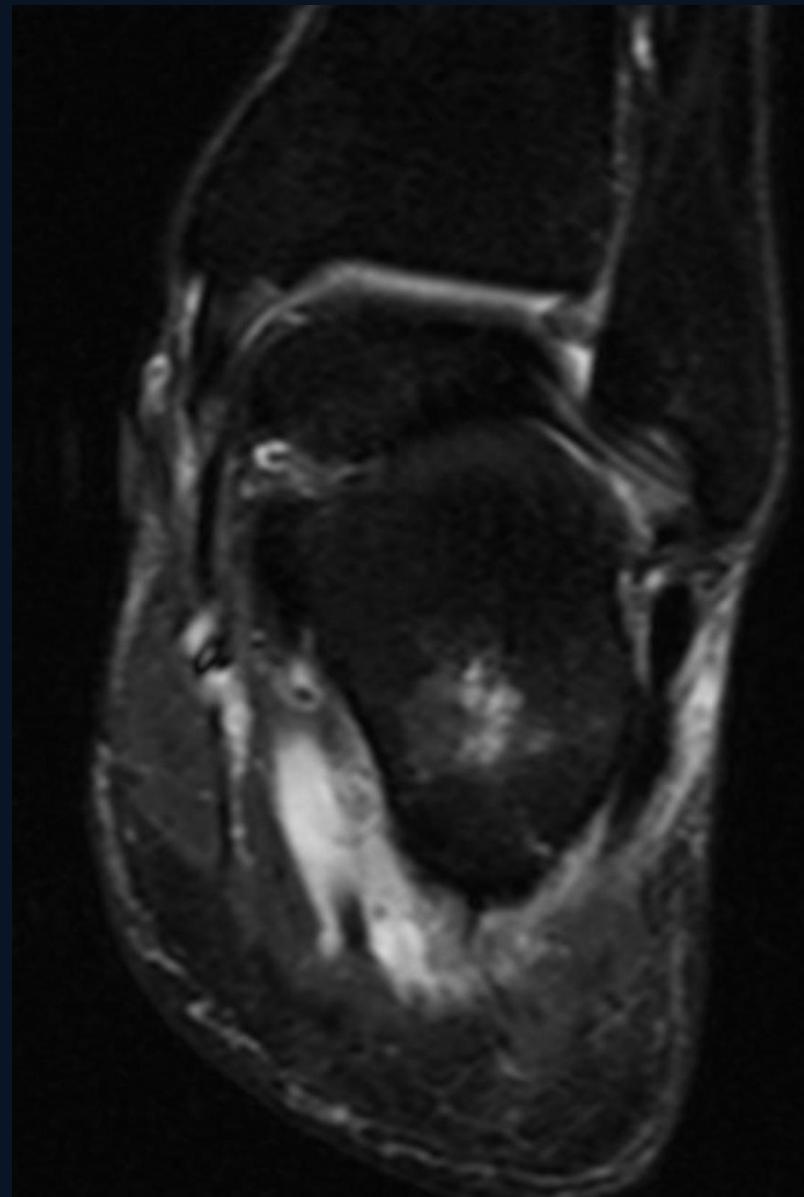


Plantar aponeurosis with BME



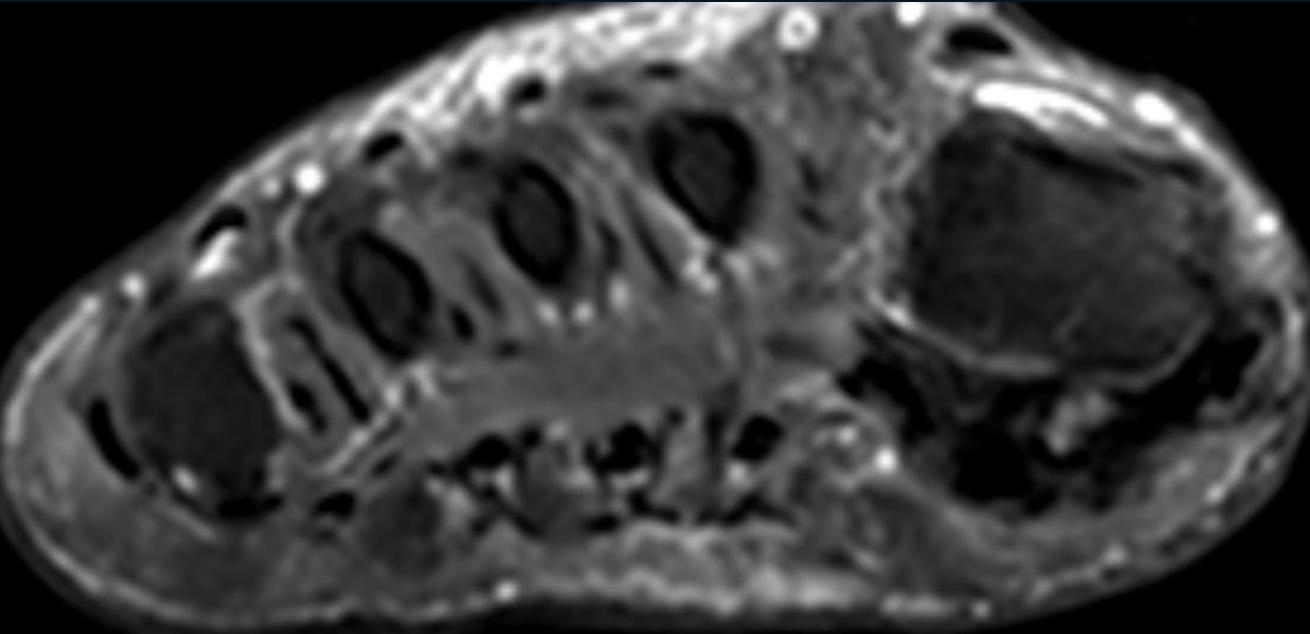
# Mimickers, differentials

Baxter's neuropathy

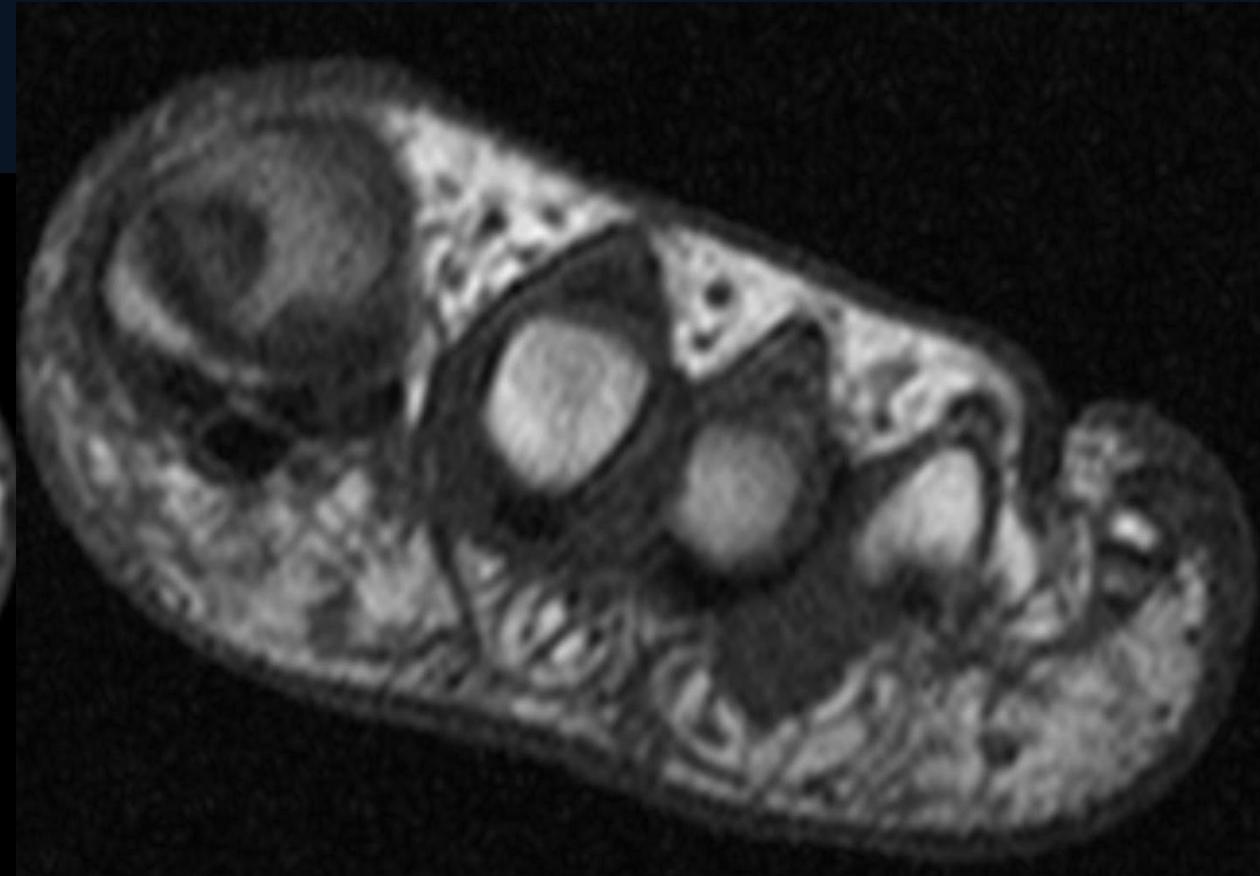


# Mimickers, differentials

Sesamoiditis



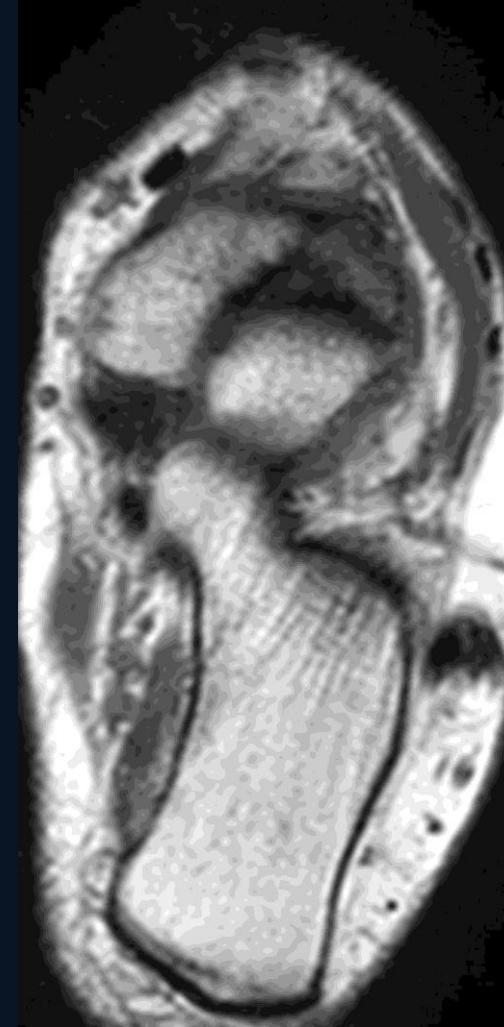
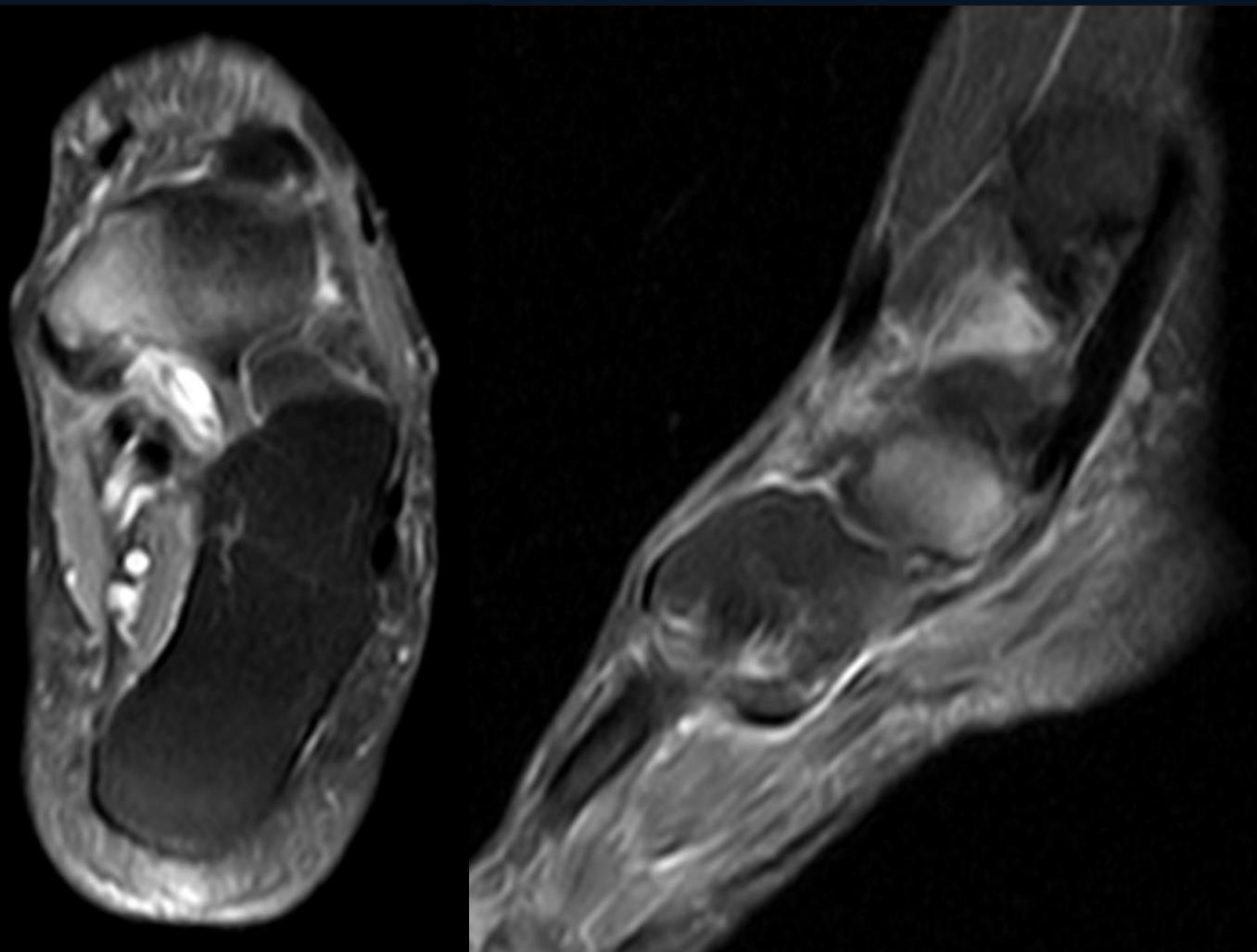
Morton's neuroma



# Mimickers, differentials

60f, PTT dysfunction

48f, Mueller Weiss



# So, overall, what should I do?

- Discuss with a radiologist you trust and communicate
- Take advantage of the best practice for the benefit of your pts



Καλό αποκαλόκαιρο...!

