Οστικό οίδημα στο πόρισμα της MRI: ποιες κλινικές συσχετίσεις μπορεί να κάνει ο θεράπων ιατρός (Ρευματολόγος ή Ορθοπαιδικός);

Apostolos Karantanas

University of Crete

Plan

Clinical approach of non neoplastic

bone marrow edema

Skip: ~~trauma-related BME~~

MRI is superior for imaging the bone marrow

Ability to clearly distinguish fat from other tissues

MRI: very sensitive

Can bone marrow edema be seen on STIR images of the ankle and foot after 1 week of running?

L. Trappeniers [a], M. De Maeseneer [a,*], F. De Ridder [a], F. Machiels [a], M. Shahabpour [a], C. Tebache [a], R. Verhellen [b], M. Osteaux [a]

Eur J Radiol 03

What does BME represent?

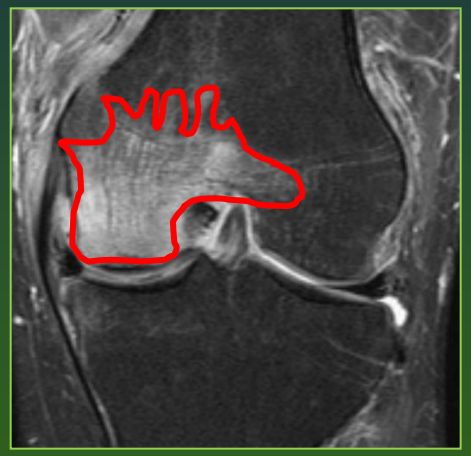
- Edema
- Hemorrhage
- Necrosis
- Inflammation

- Better to use the term

Bone marrow “edema-like”

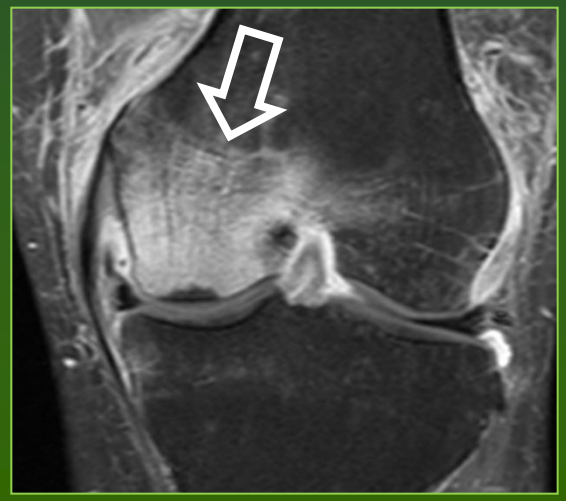
Bone marrow "oedema": MRI findings

- *Low SI on T1-w*



46 male
Pain 2w

- *High SI on FS PD/T2-w, STIR*



- *Enhancement on fat suppressed T1-w*

aBMEs

Recent onset of pain, MRI +

Hip and pelvis

Knee

Ankle

aBMEs

- Transient BME syndrome/TOH - RMO
- Insuff. Fx / SONK
- BME in AVN
- Infection / inflammation

Bone marrow edema syndrome.
Korompilias AV, Karantanas AH, Lykissas MG, Beris AE. Skeletal Radiol. 2009

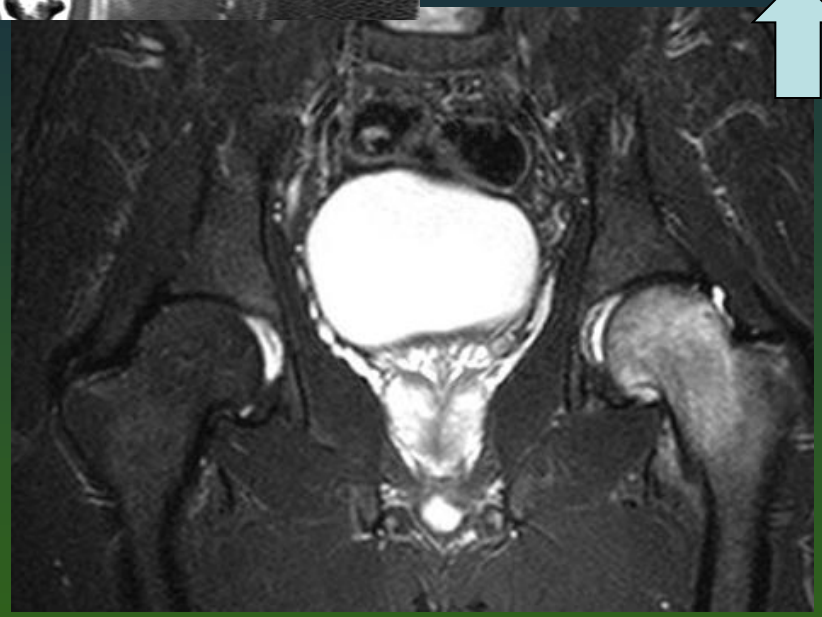
TRANSIENT BONE MARROW OEDEMA SYNDROME (TRANSIENT OSTEOPOROSIS OF THE HIP)

- TOH introduced by *Lequesne* (Ann Rheum Dis 1968)
- Middle-aged men - pregnant women (M/F:3-4/1)
- ***Histology***: BME, inflammation, bone desorption and formation, No necrosis
- *Berger CE et al. Bone 03; Karantanas AH. Eur Radiol 07*

55y male

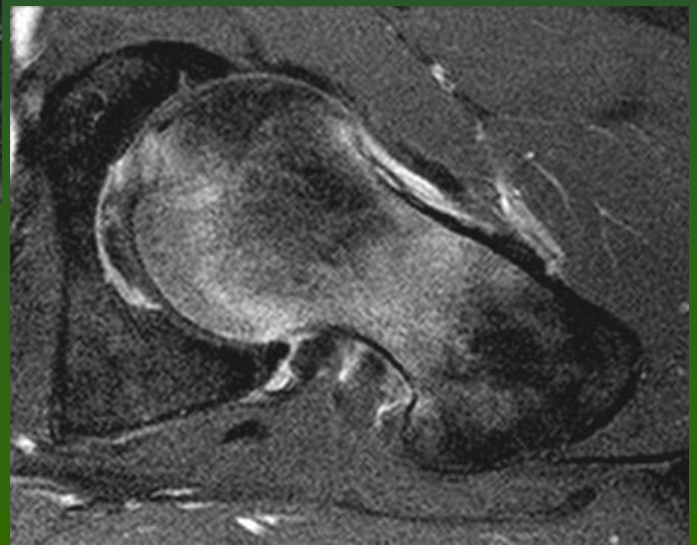
T1-w

STIR



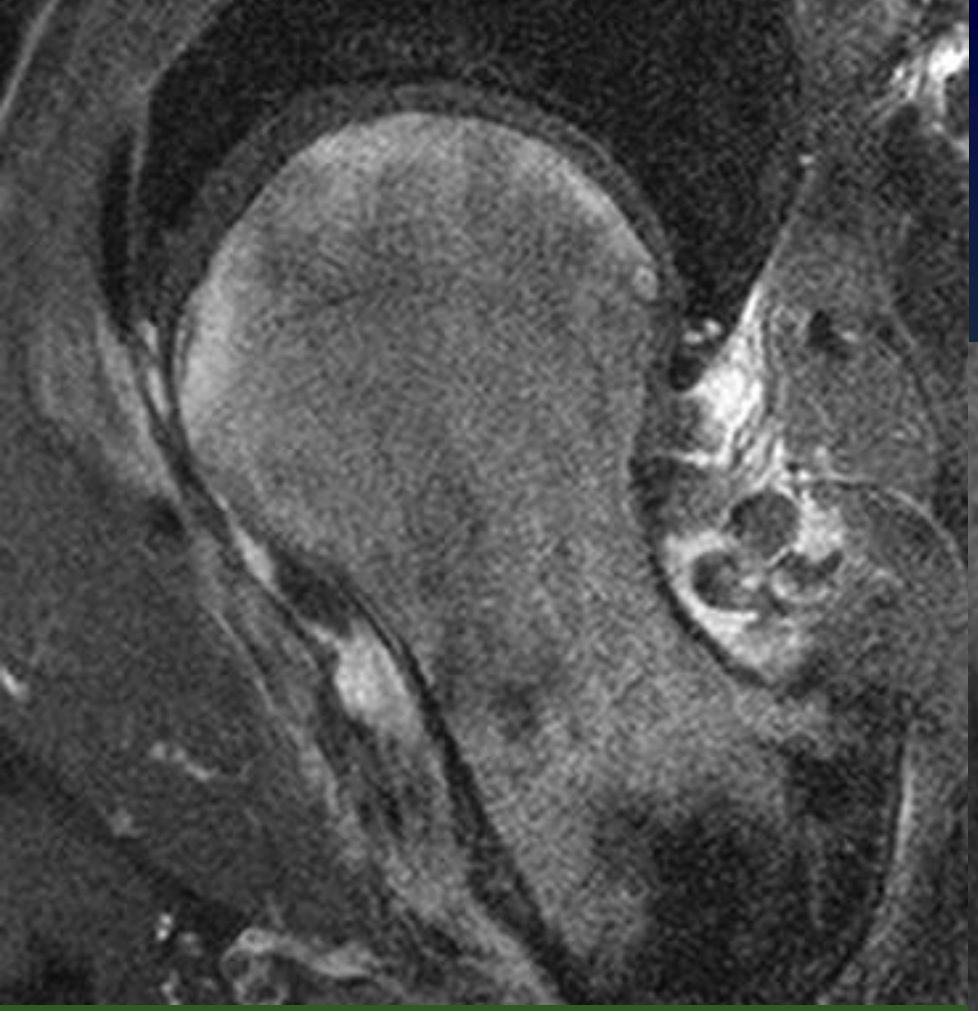
TOH

Gd FS T1-w

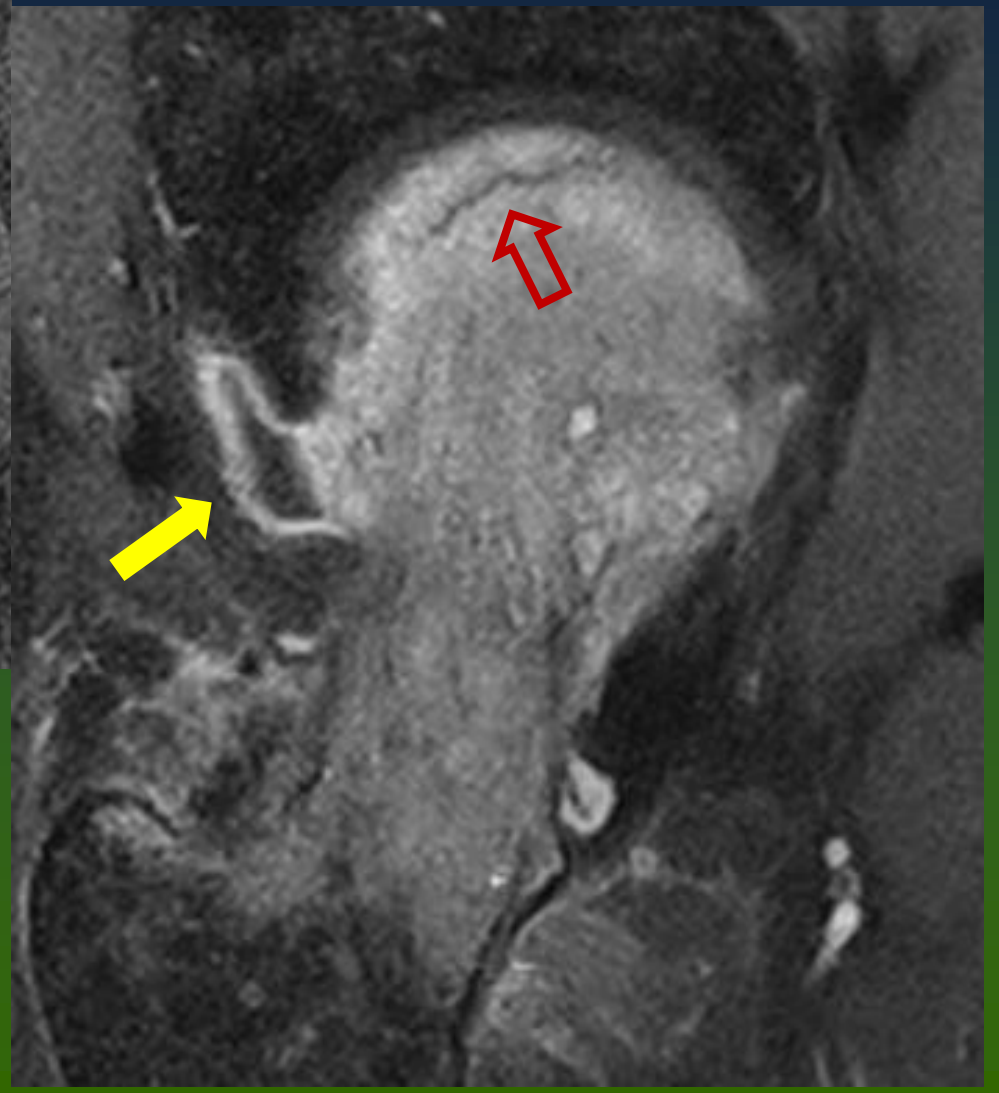


Malizos KN, Karantanas AH. Eur J Radiol 04

Transient osteoporosis



Fat-suppressed contrast-enhanced T1-w



Occult epiphyseal

insufficiency fractures

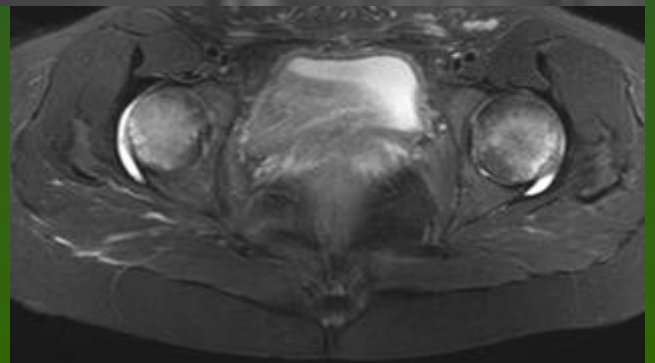
50%

"Oedema like" area enhances

Synovitis and joint fluid: constant findings

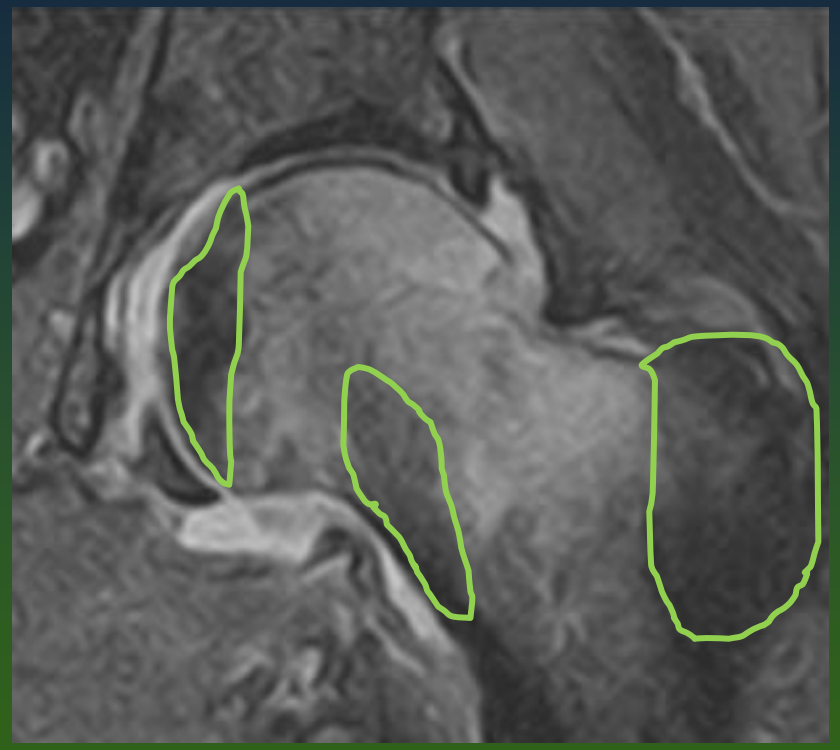
TOH

STIR



Pain bilateral 3d trimester, few days postpartum, 32 y/o

Transient osteoporosis



- “**sparing**” sign 90%
- disappears with disease progression
- 20% migratory pattern

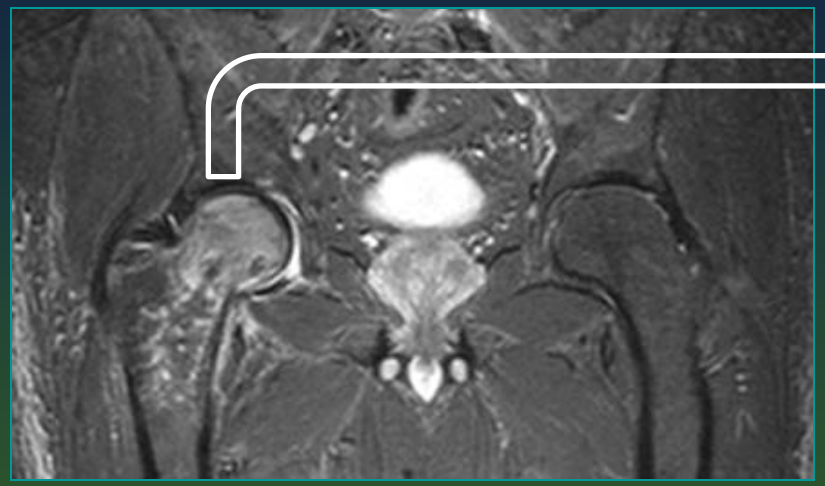
European Journal of Radiology 84 (2015) 431–436

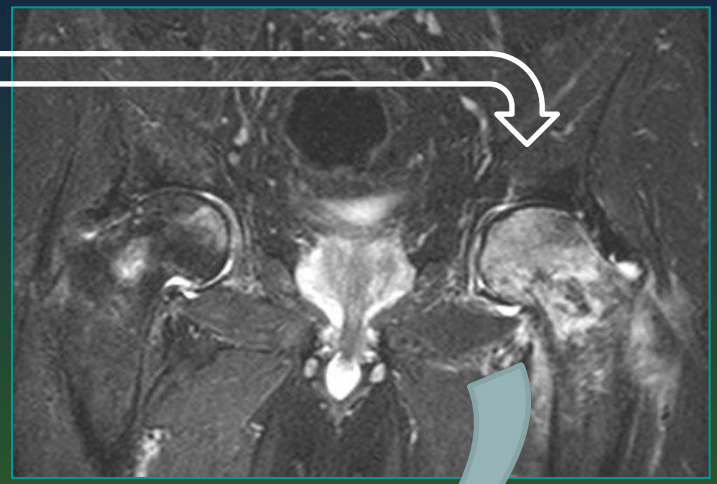
MR imaging of transient osteoporosis of the hip: An update on 155 hip joints

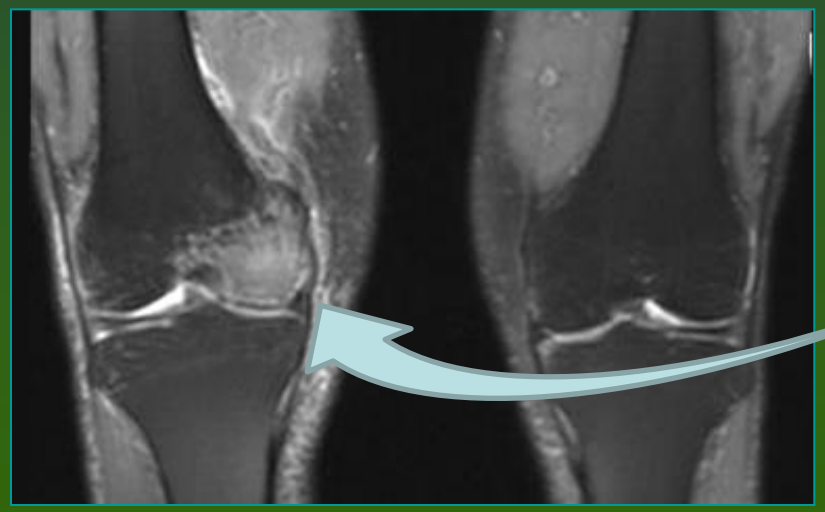
Michail E. Klontzas[a], Evangelia E. Vassalou[a], Aristeidis H. Zibis[b], Antonia S. Bintoudi[c], Apostolos H. Karantanas[a,*]

Regional migratory osteoporosis

20% of TOH cases





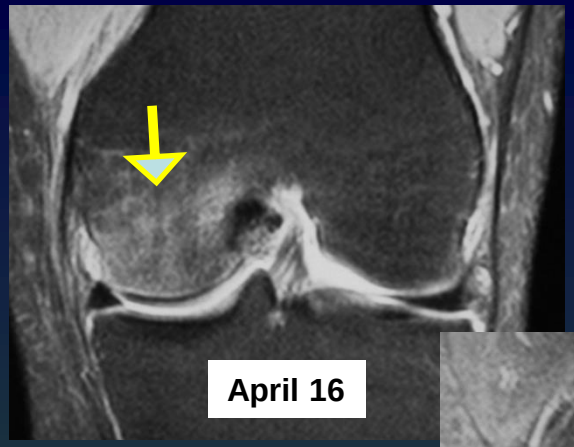


?? Systemic osteopenia

Regional Migratory Osteoporosis

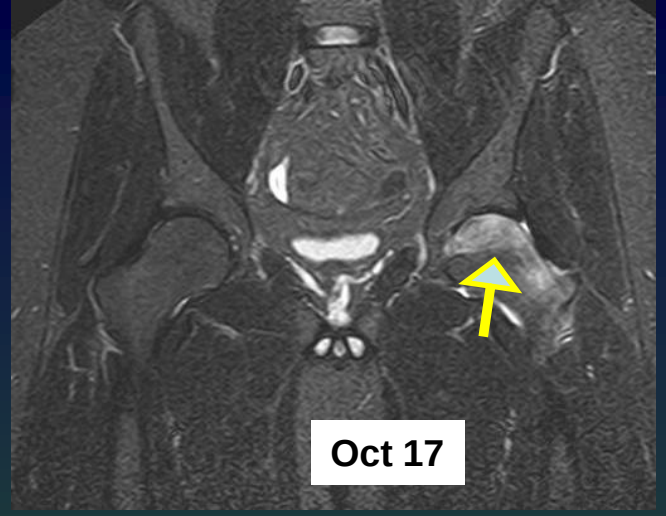
- First described by *Duncan* in 1969
- Arthralgia migrating in other joints or the same joint
- Weight bearing joints lower appendicular skeleton
- Clinical findings, x rays, MRI: similar to TOH
- All cases transient

35 male

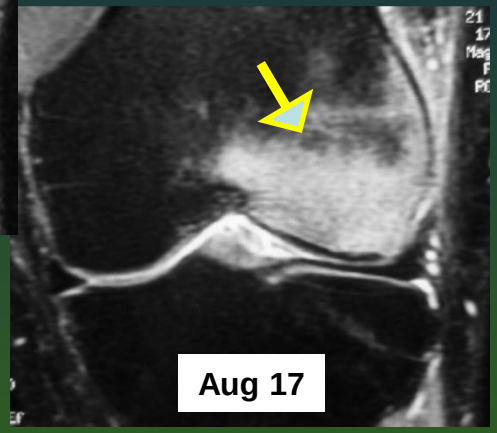


April 16

June 16



Oct 17



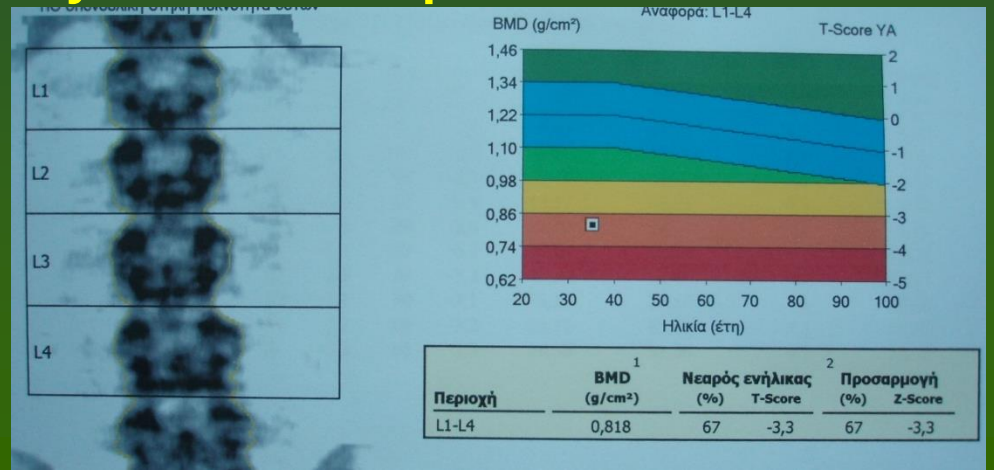
Aug 17

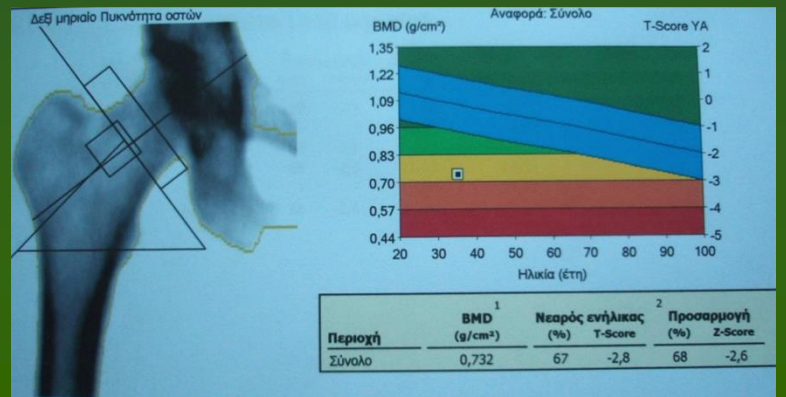
21/22 males*

** Karantanas AH, et al.*

Eur J Radiol 08

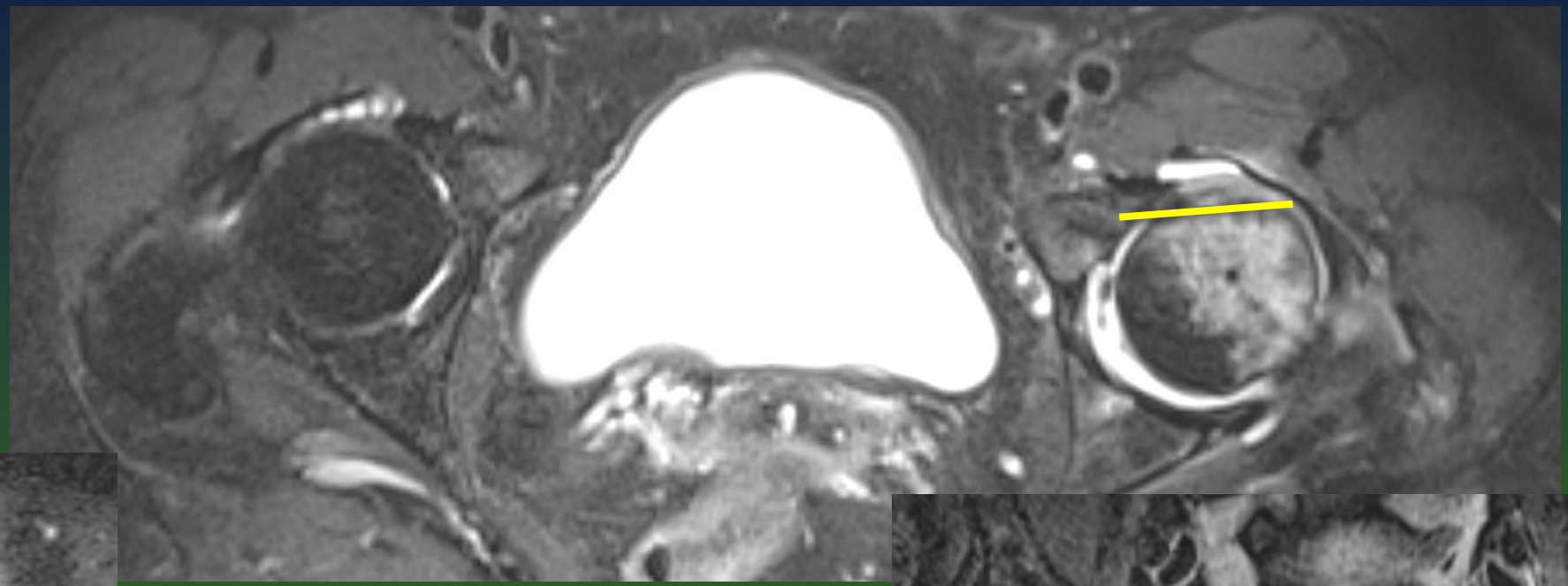
Systemic osteoporosis

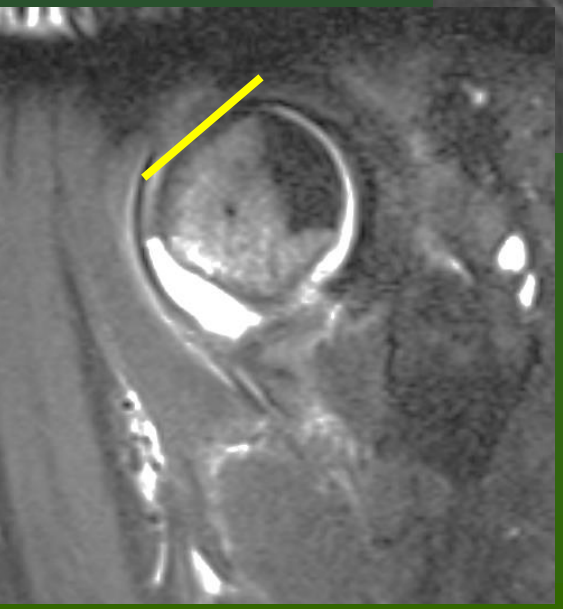




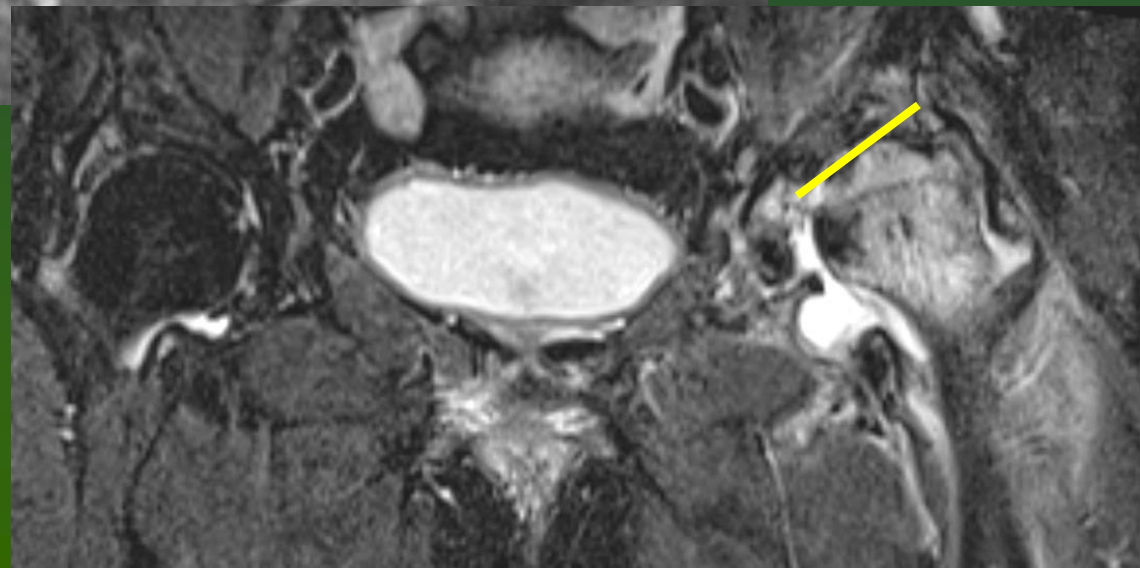
Apparent Insufficiency fracture

elderly, osteoporosis





80f



THE TAKE-HOME MESSAGE

What to do??

- **Rest & Weight-Bearing Restrictions**

  Limiting or eliminating weight-bearing activities, often using crutches

- **Pain killers**

- **DEXA lumbar spine**

- *Transient BME syndrome/TOH - RMO*
- *Insuff. Fx/SONK*
- *BME in AVN*
- *Infection / inflammation*

Spontaneous osteonecrosis of the knee

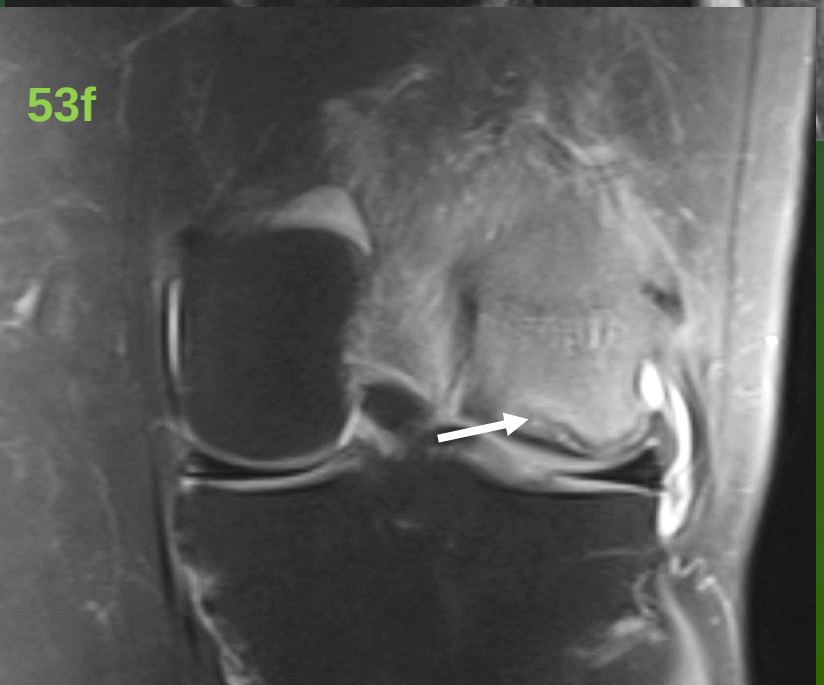
- **Ahlback's disease** *Ahlback S, Arthritis Rheum 1968*
- **Acute onset of pain**
- **Medial femoral condyle, lfc-tibia, 6^{th}-7^{th} decades, women**
- **Meniscal degeneration, OA, low BMD**
- **Subchondral insufficiency fx** *Yamamoto, Skeletal Radiology 00*
- **9.4% among pts >65y presenting with sudden onset of knee pain**

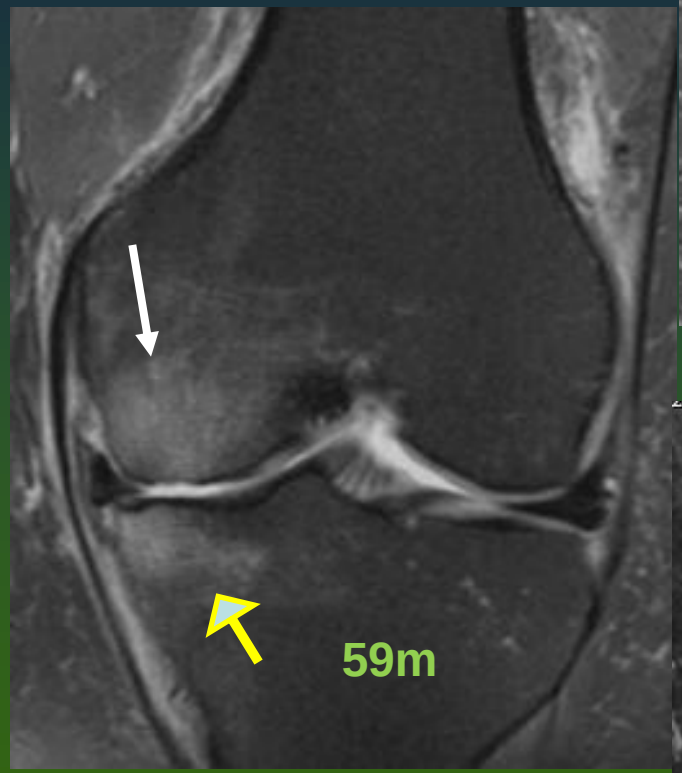
Pape D, et. al. Knee Surg Sport Traum Arthr 2002

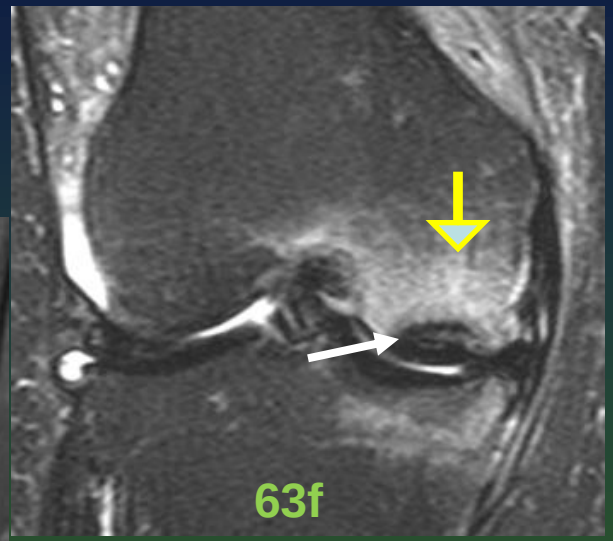
- **pts with knee pain and KL 1,2 knee x rays, SONK 10% - OA 8.5%**

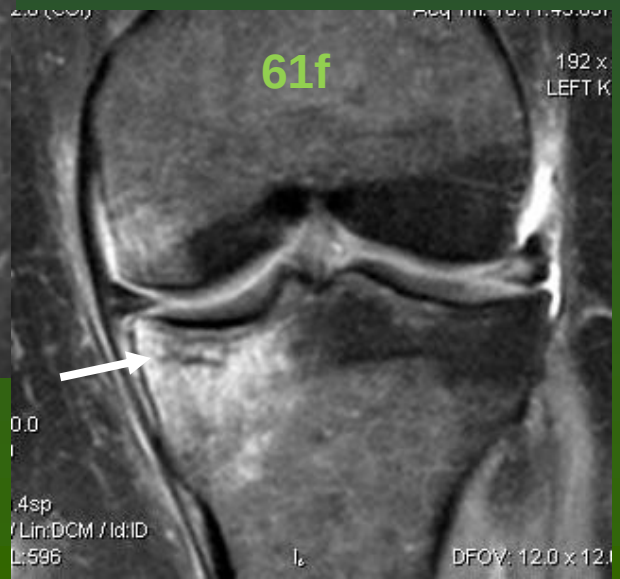
Karachalios T, Karantanas A, et al. Eur J Radiol 2004

Insufficiency fx

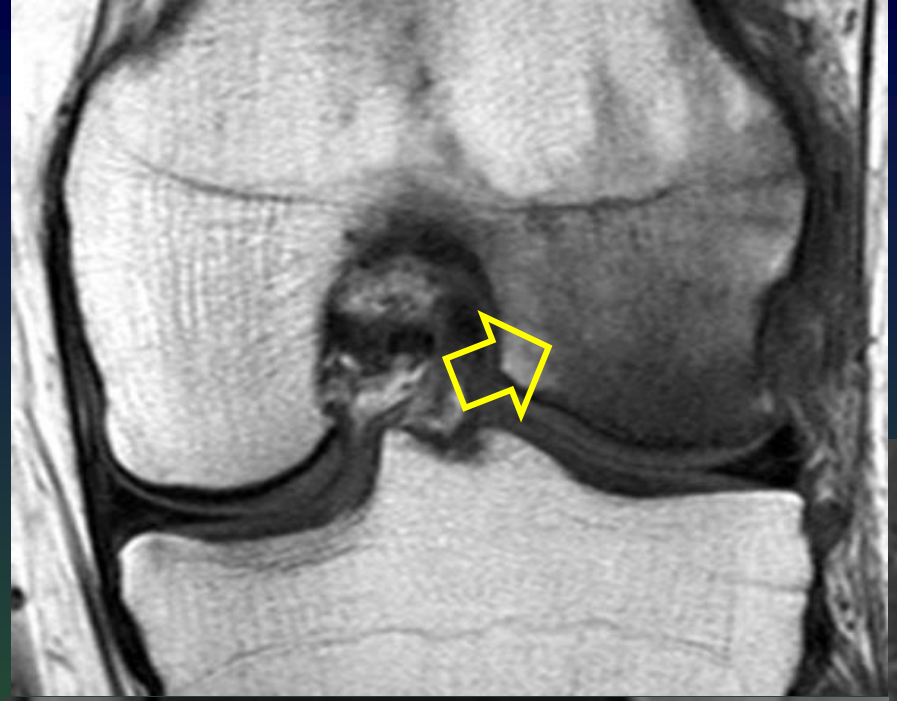


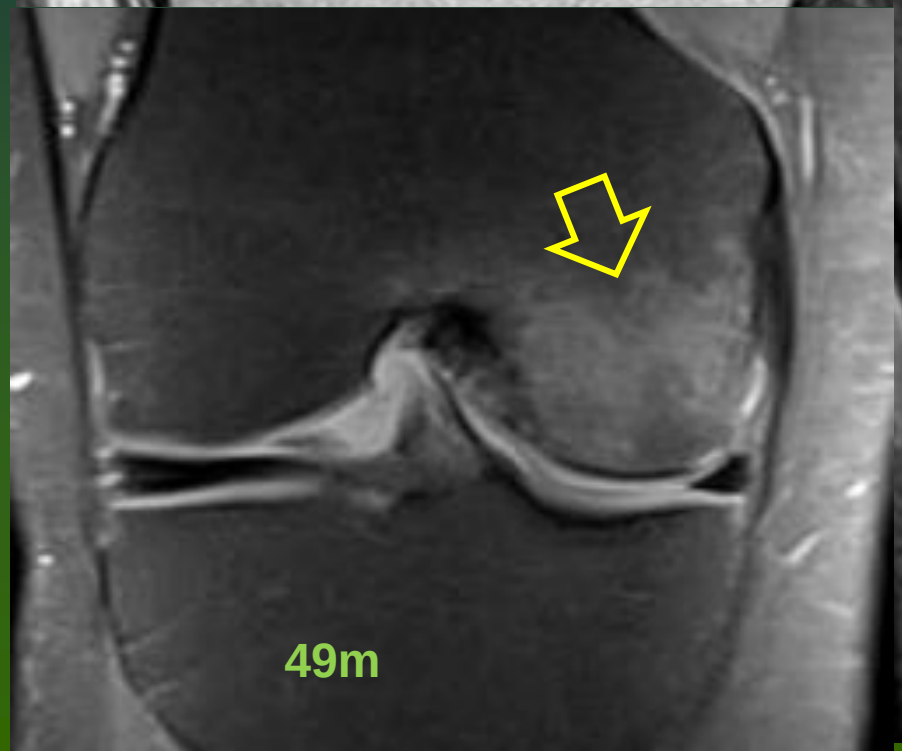




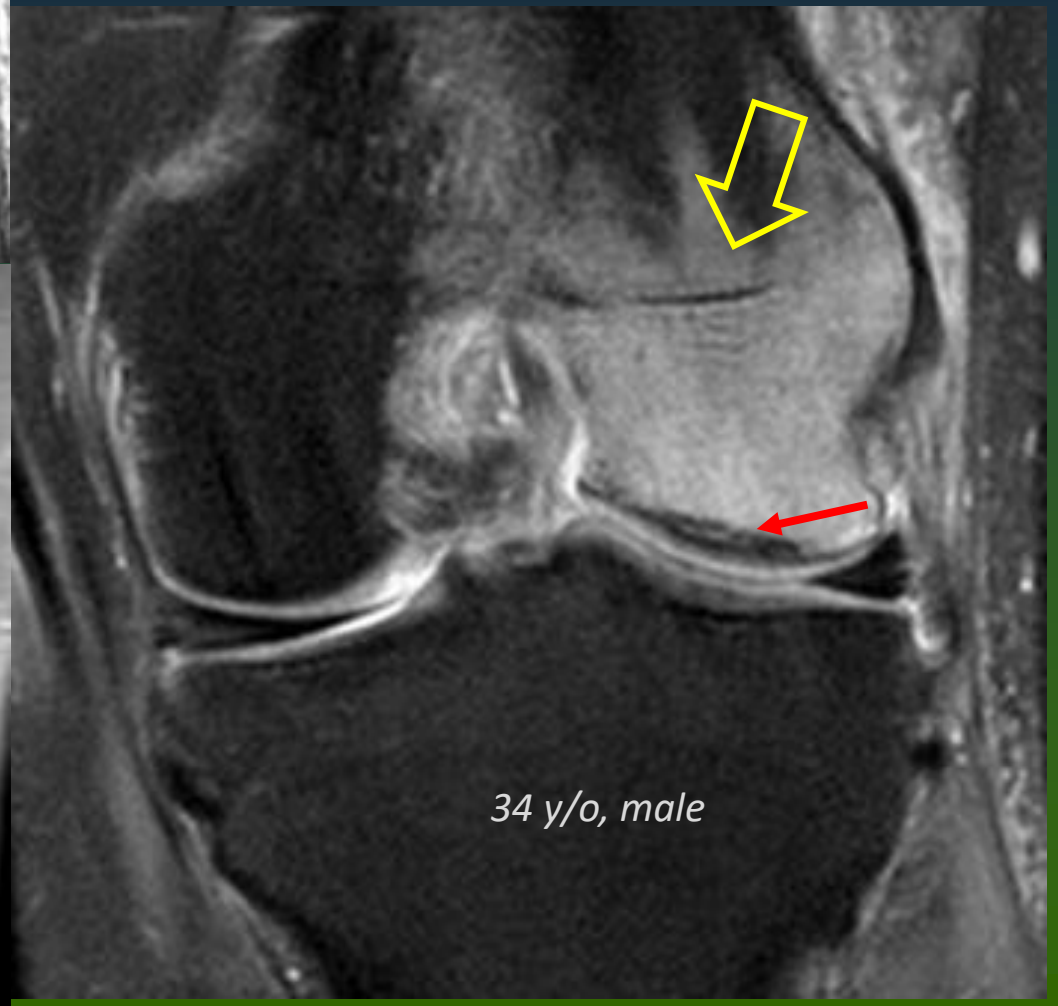


Insufficiency fx



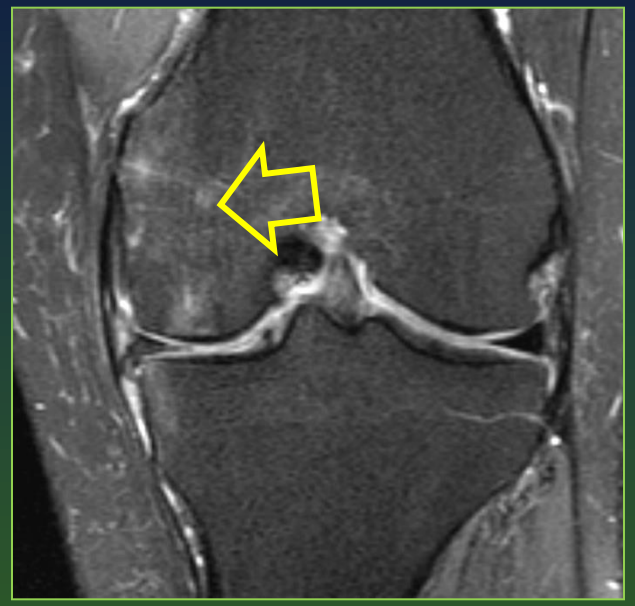


Malabsorption



27 Aug 2018

45m, 1m pain



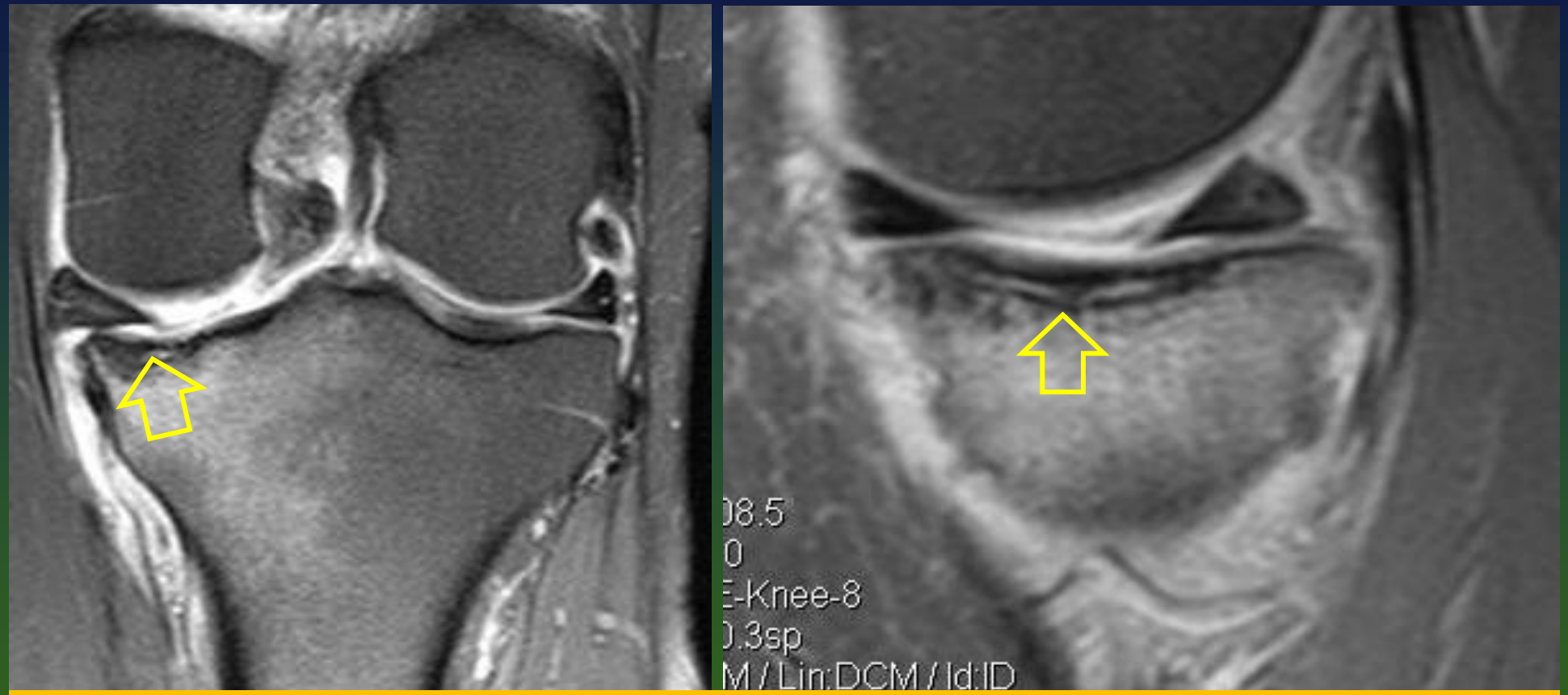
2 Dec 2018

5 May 2019

SONK is a misleading terminology!!!

Acute nontraumtic adult knee pain: the role of MRI
Fotiadou A, Karantanas A.
Radiol Med. 2009

Insuff. Fx: prognosis



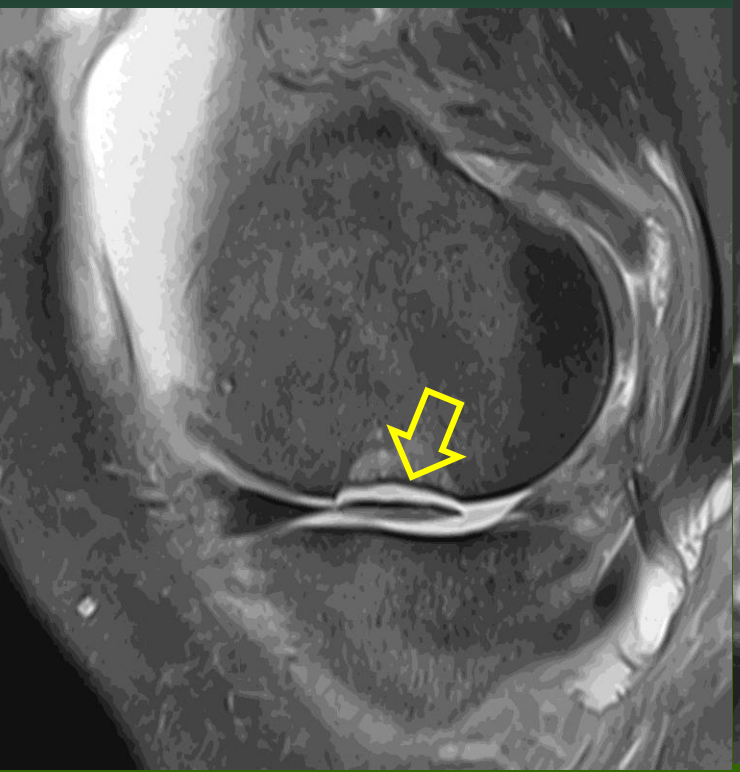
"the age and sex of the patient, the duration of symptoms before imaging and the BMD appear to correlate with the final outcome"

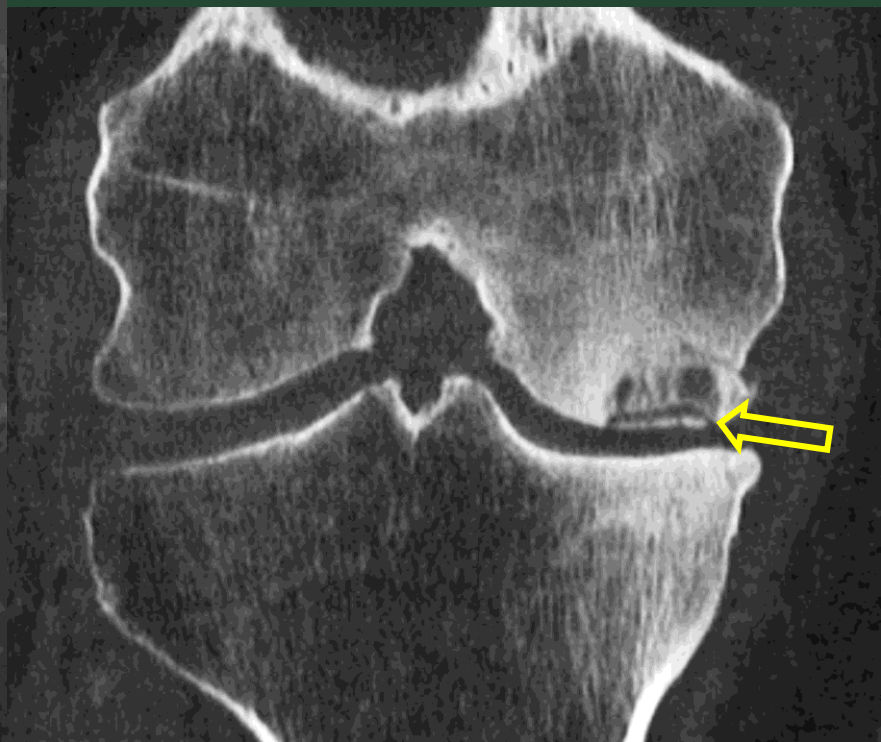
Karantanas AH, et al. Eur J Radiol. 2008

Delayed diagnosis

60f, 7m pain

Osteoporosis





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- **Pain killers**

- **DEXA lumbar spine**

- *Transient BME syndrome/TOH - RMO*
- ***Insuff. Fx/SONK***
- ***BME in AVN***
- *Infection / inflammation*

Avascular necrosis

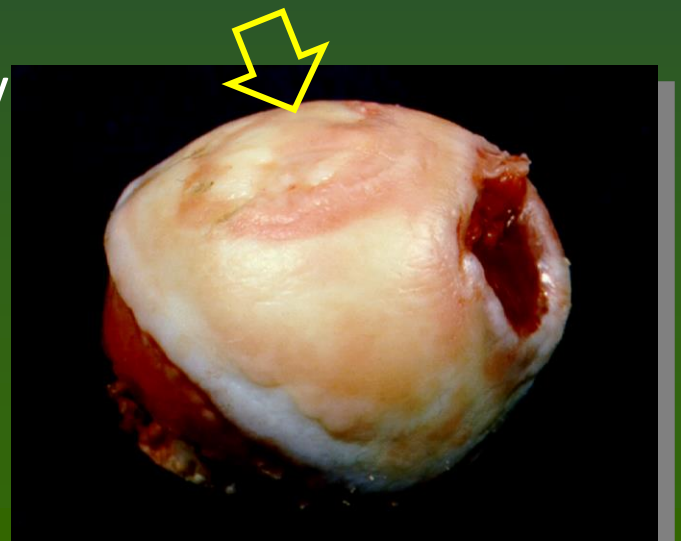
Young adults

Deterioration despite treatment

Femoral head common location

Subchondral fractures, progressive arthropathy

following collapse of the articular surface



European Journal of Radiology 63 (2007) 16–28

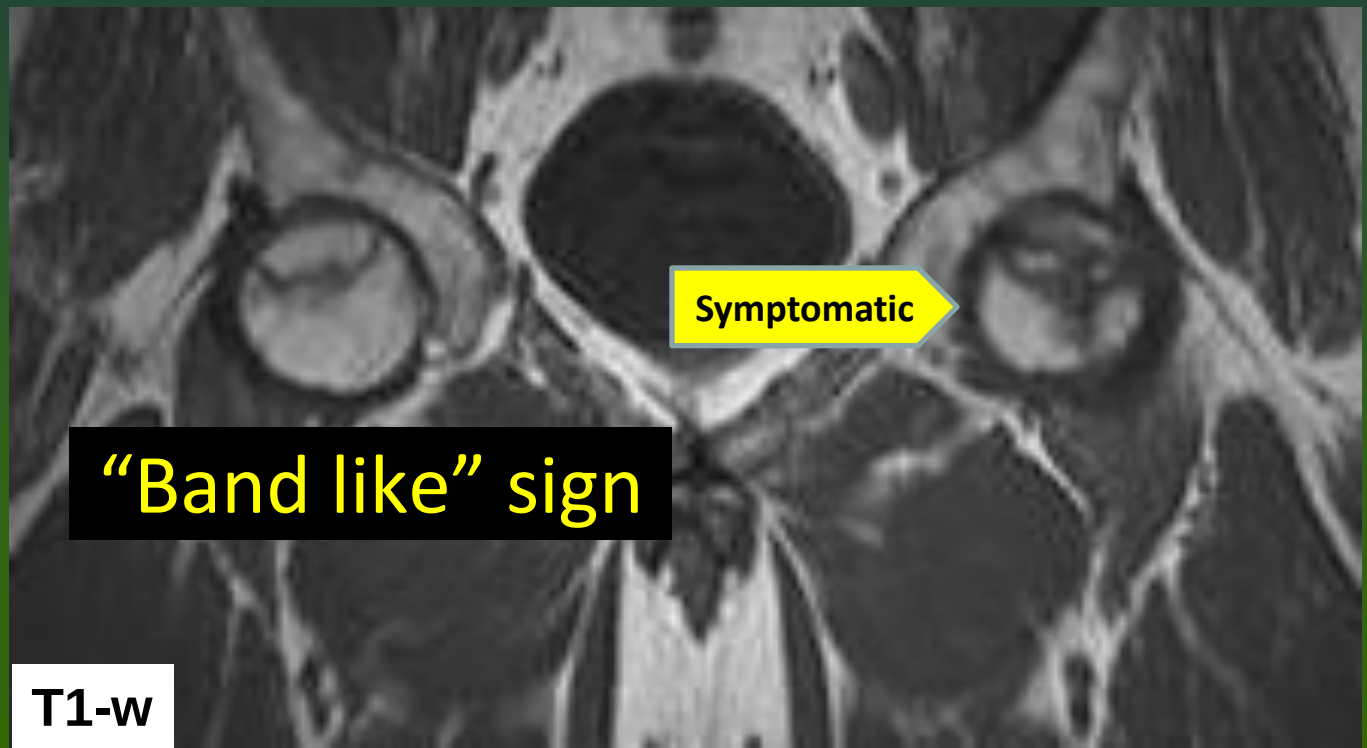
Osteonecrosis of the femoral head: Etiology, imaging and treatment

Konstantinos N. Malizos[a,*], Apostolos H. Karantanas[b], Sokratis E. Varitimidis[a], Zoe H. Dailiana[a], Konstantinos Bargiotas[a], Thomas Maris[c]

Pain and AVN

Marrow oedema → Never before “bands”, result of collapse

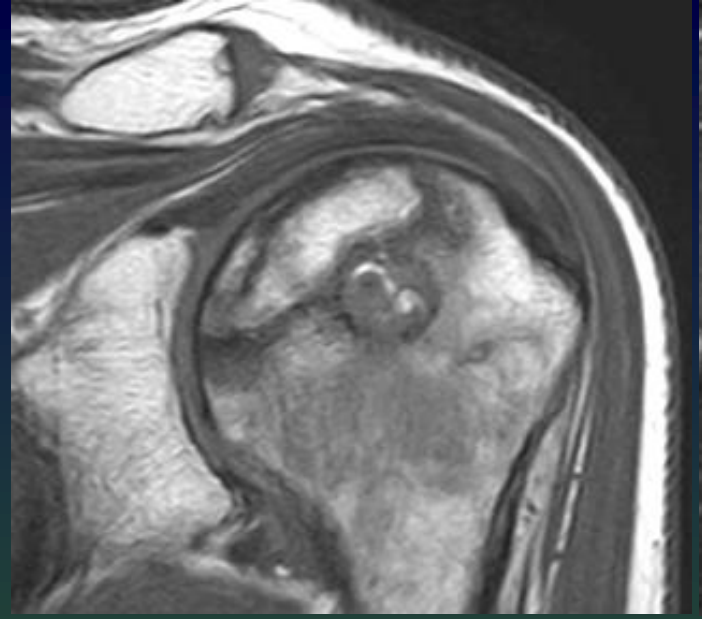
Joint effusion

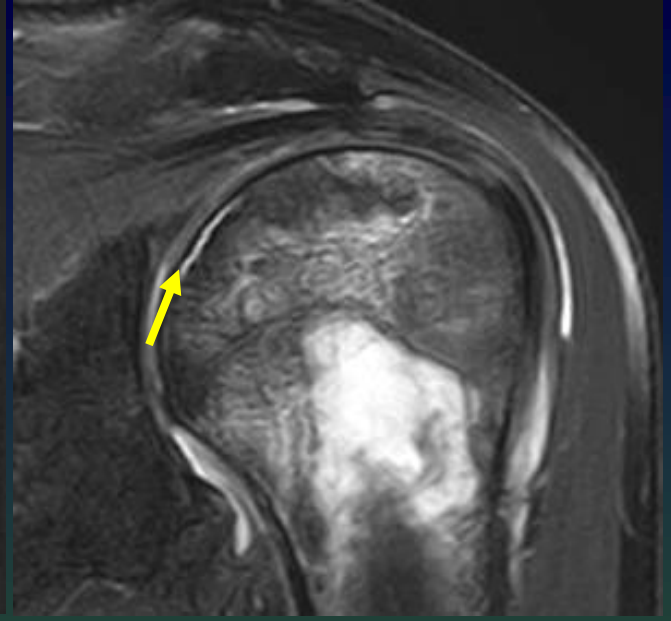


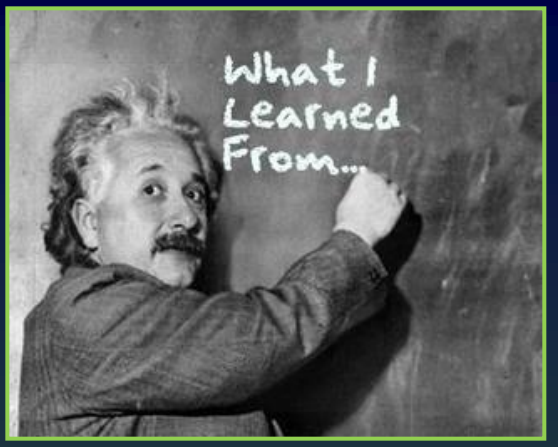
Karantanas AH.

Expert Opin Med Diagn. 2013

50 y/o, f, bilateral AVN, pain right side

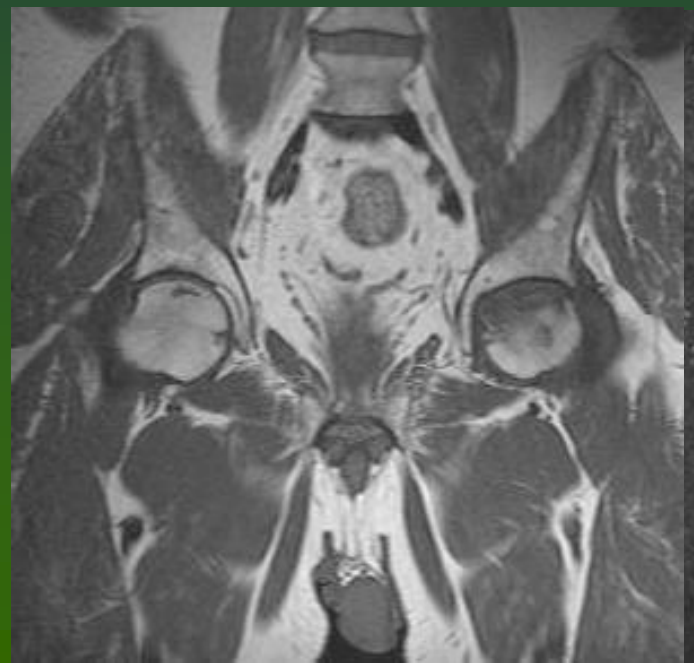


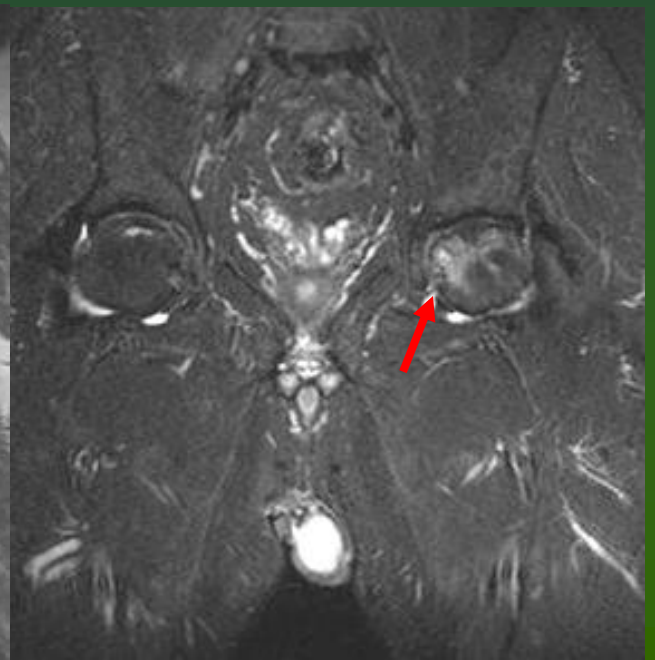




AVN

BME = advanced disease

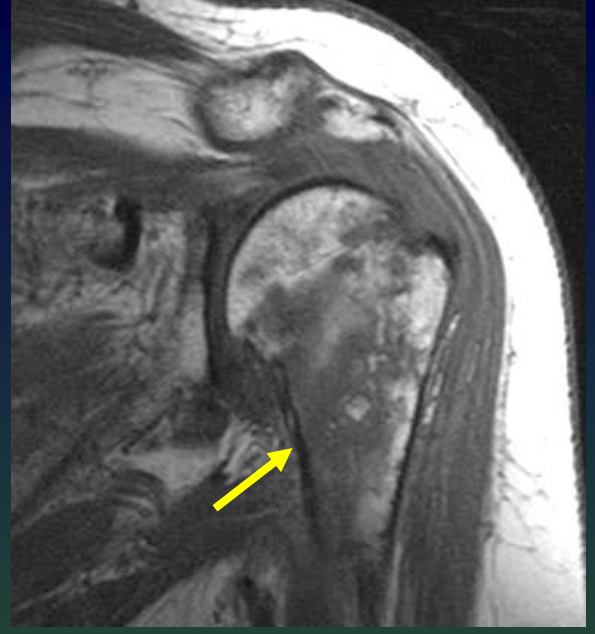




- *Transient BME syndrome/TOH - RMO*
- ***Insuff. Fx/SONK***
- *BME in AVN*
- ***Infection / inflammation***

Infection - Inflammation

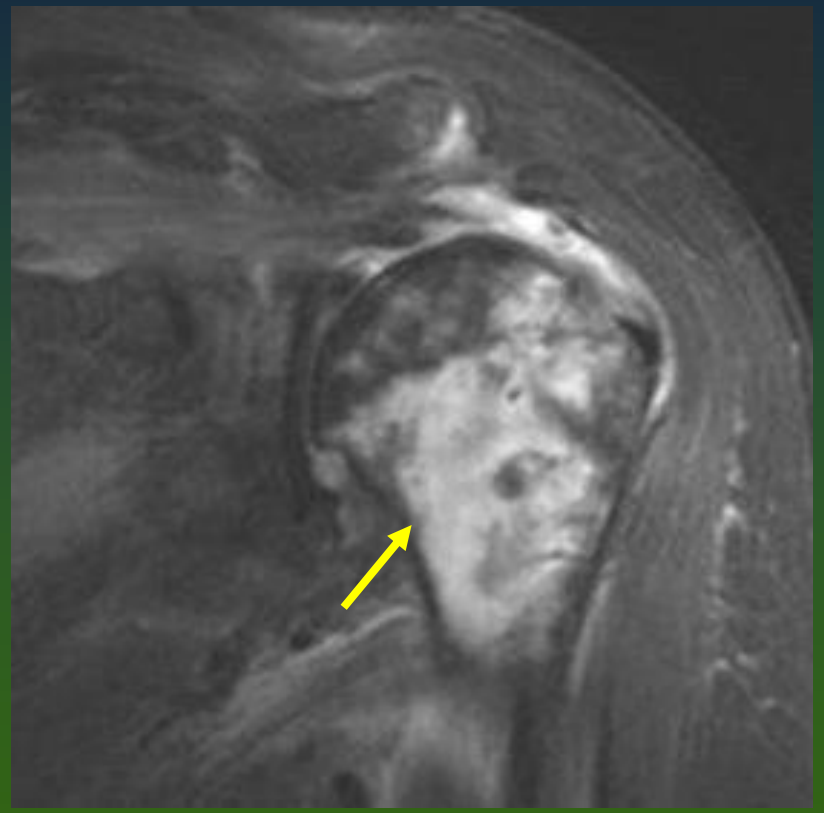
- Osteomyelitis
- Septic arthritis
- Septic arthritis and osteomyelitis
- BME secondary to inflammatory arthropathy



T1

Recent injection
In 4d, pyretic, WBC

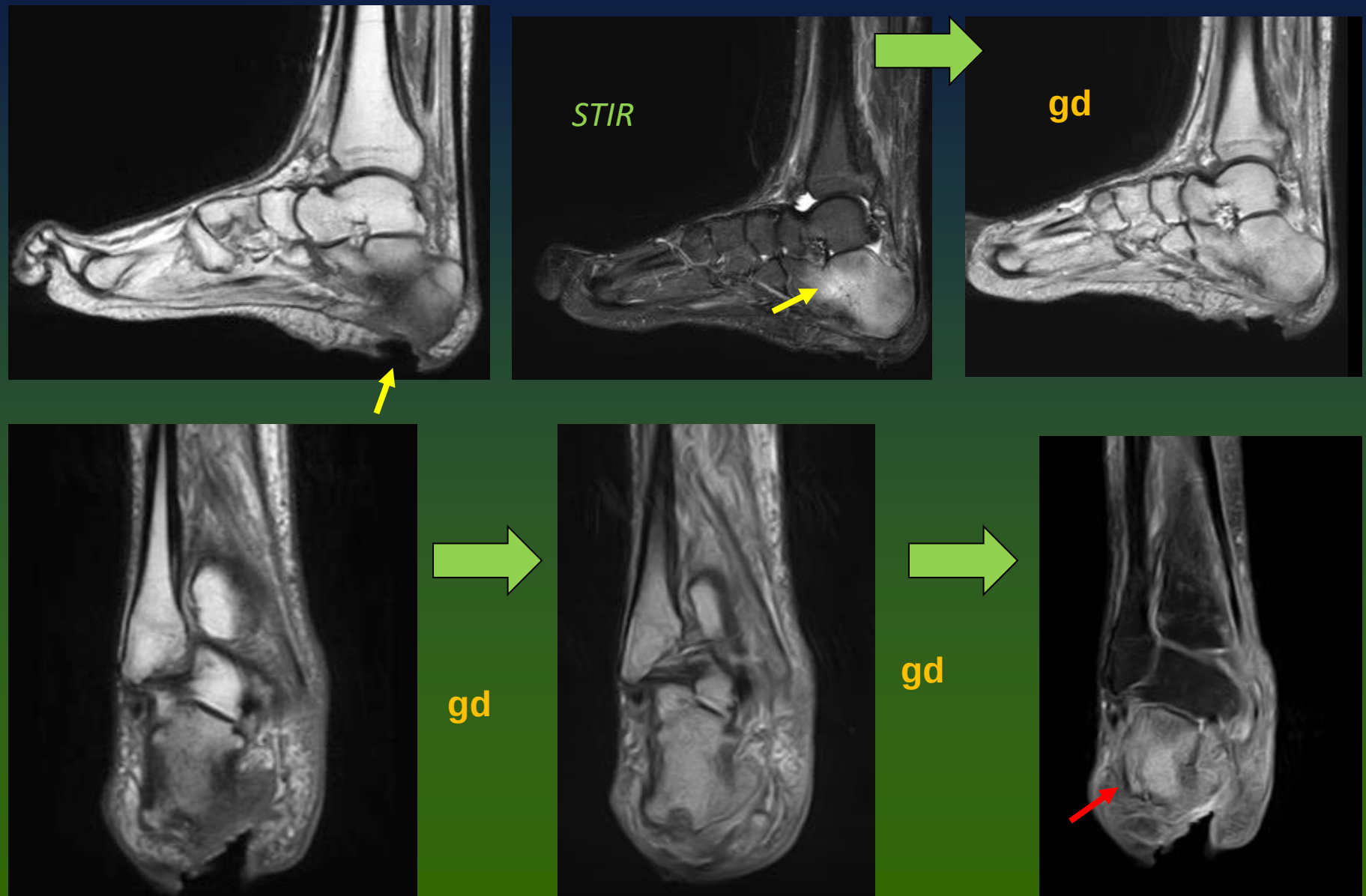
Iatrogenic infection



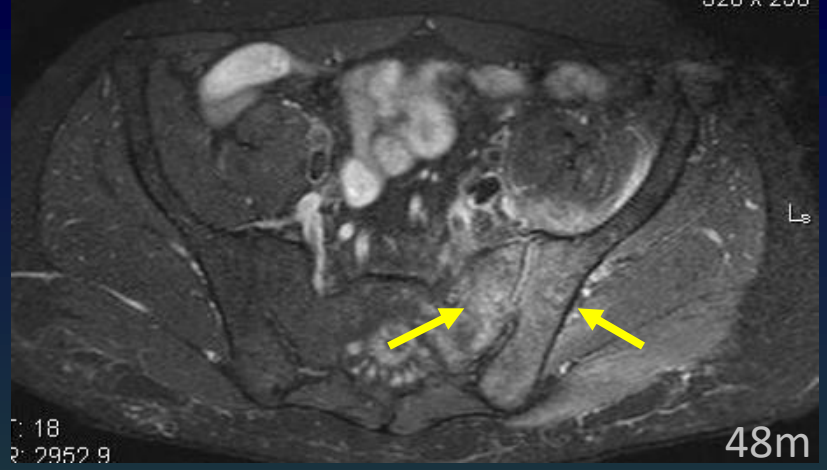
FS PD

FS Gd T1

19m, osteomyelitis os calcis



STIR



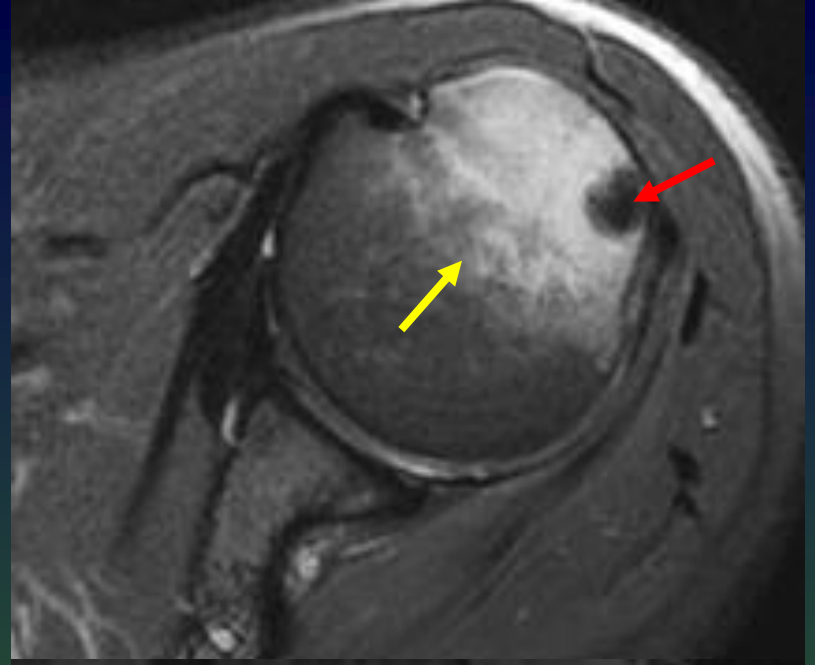
Staph

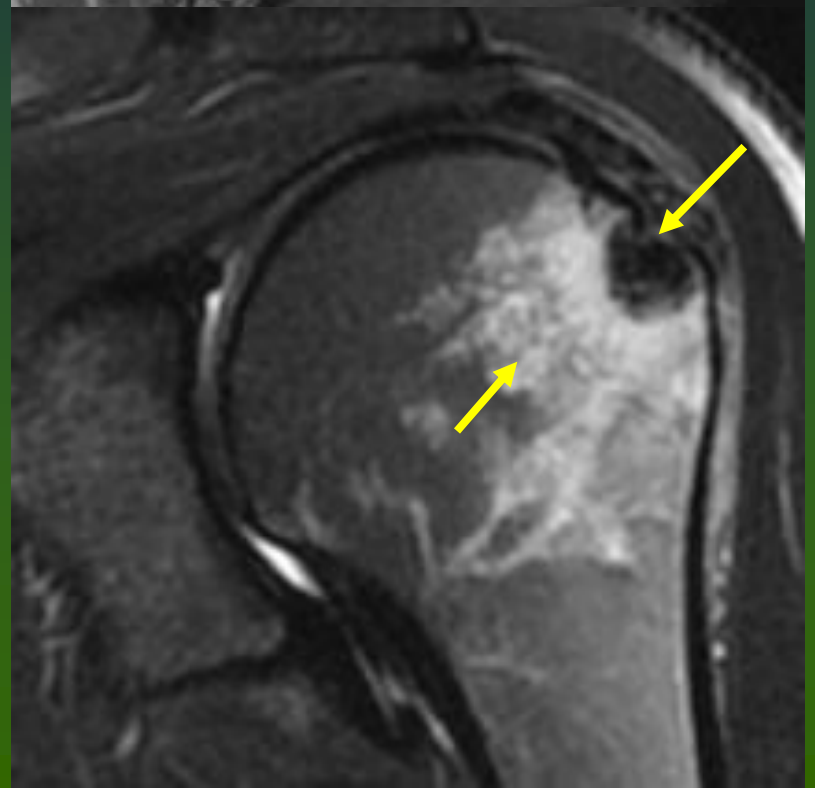
Gd fs T1

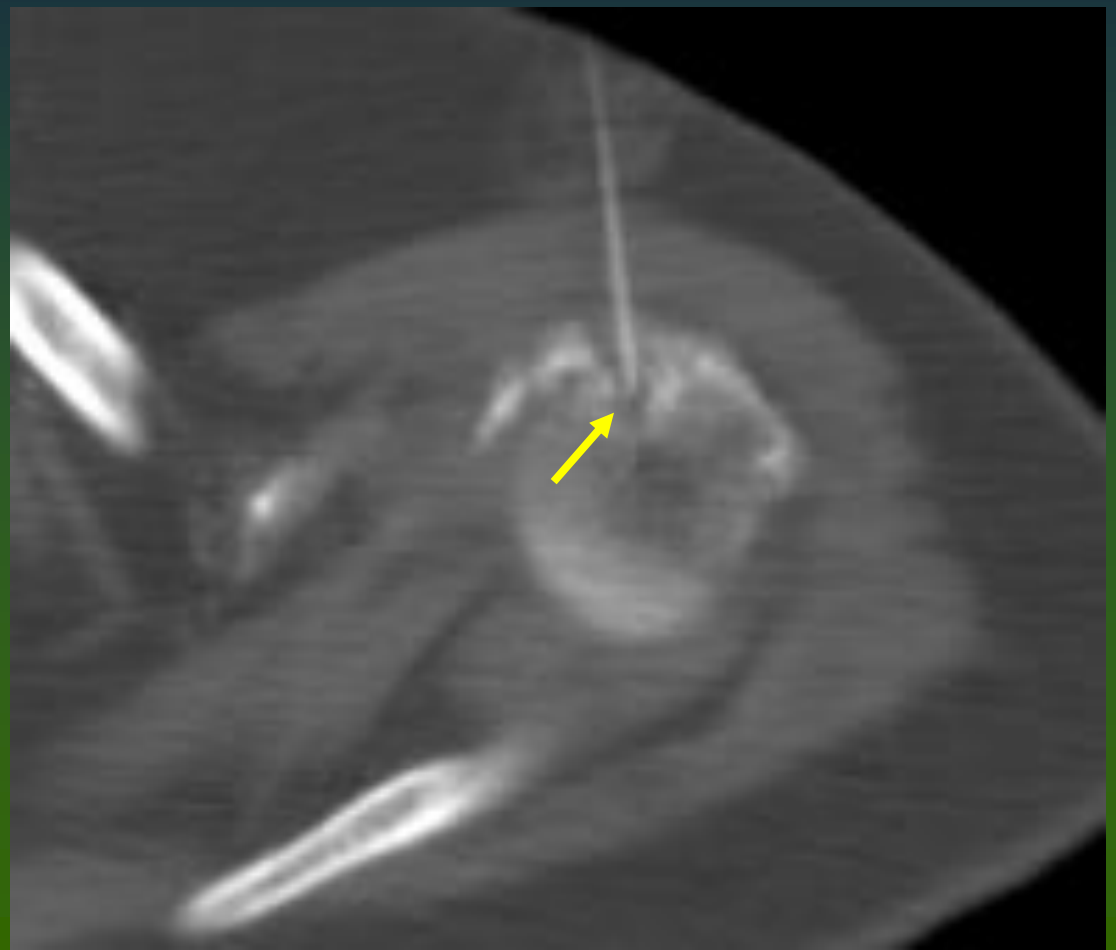
Brucellosis

HADD

intraosseous calcific tendinopathy

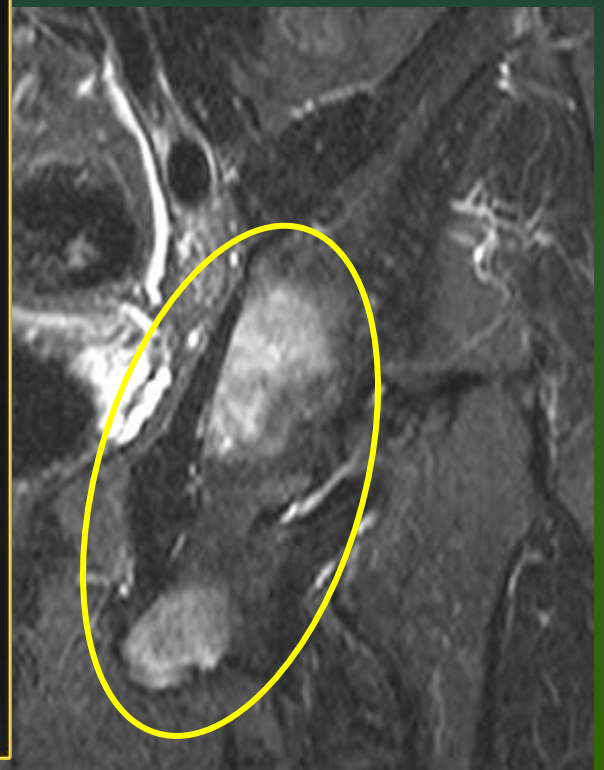




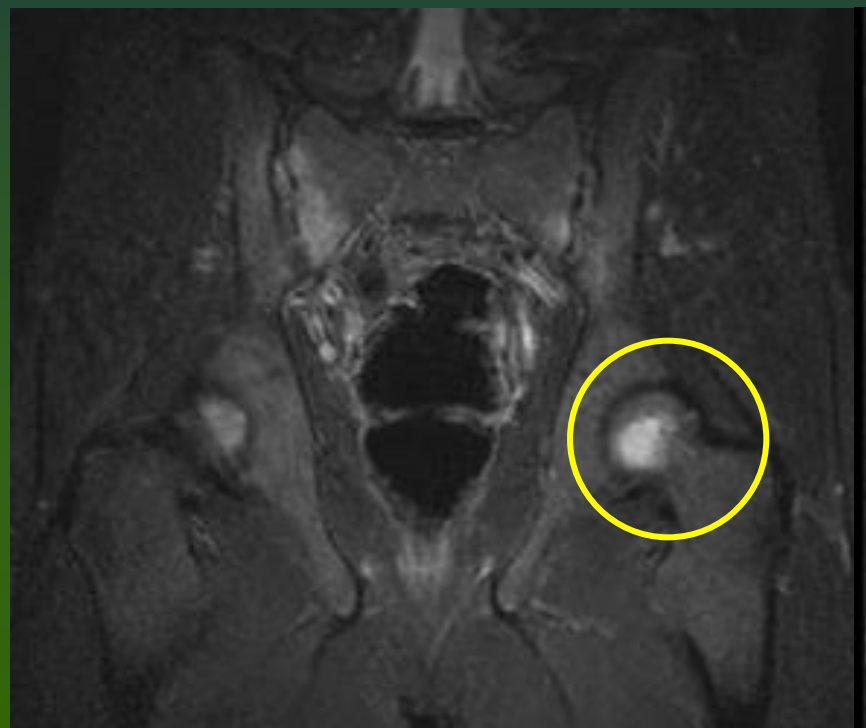


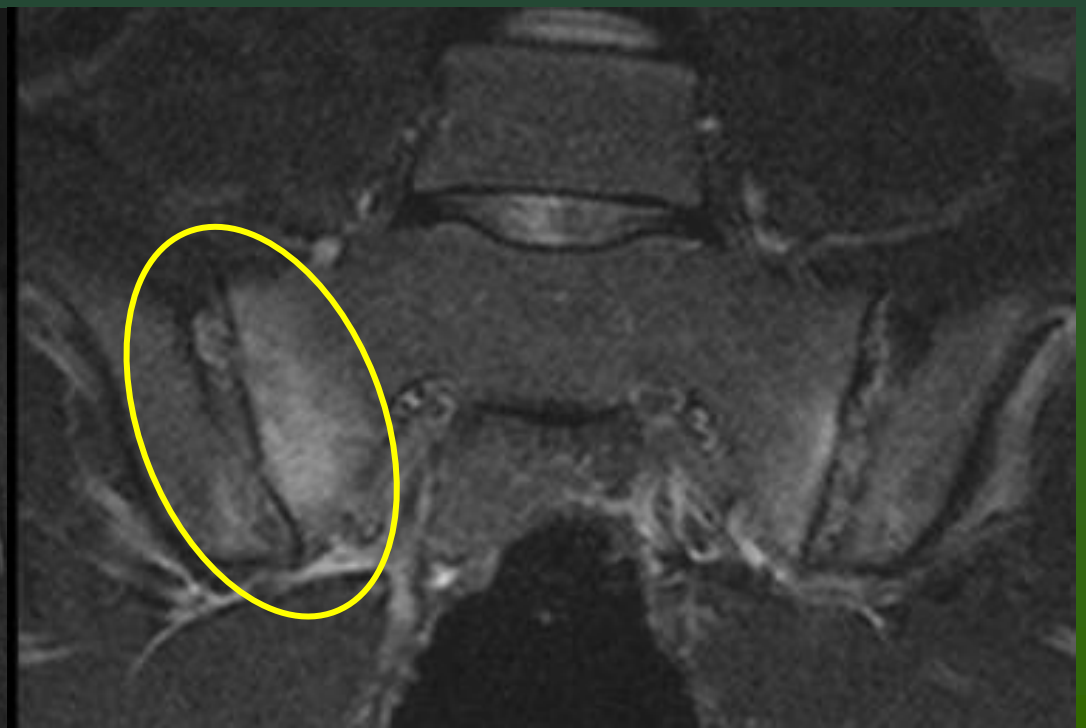
Groin and fip pain few w
28 m
Hx of LBP 10y prior to imaging

AS

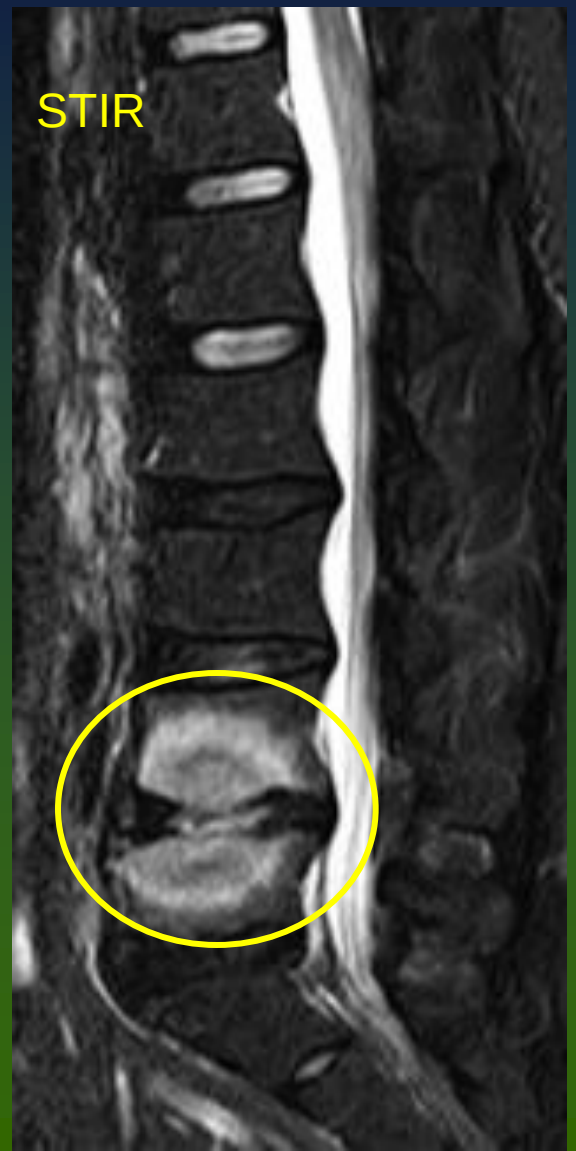


20 y/male, axSpA



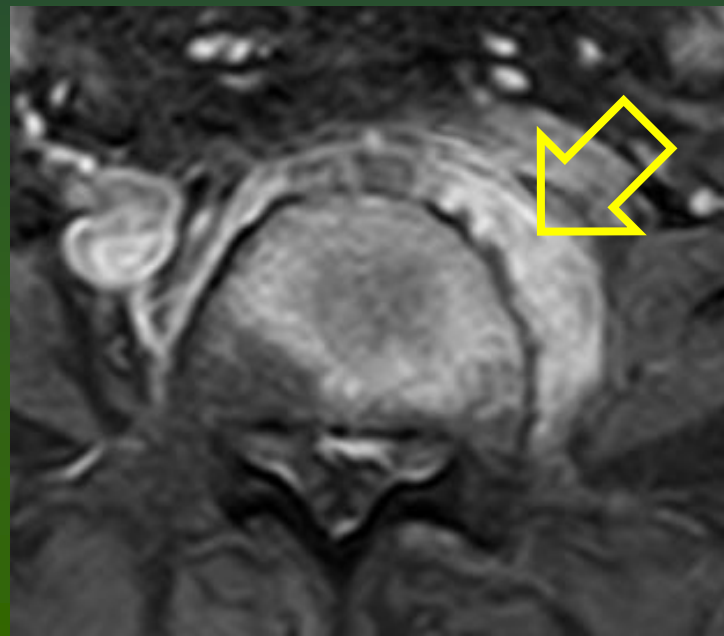


38m, known SIJ-axSpA 7y, acute LBP

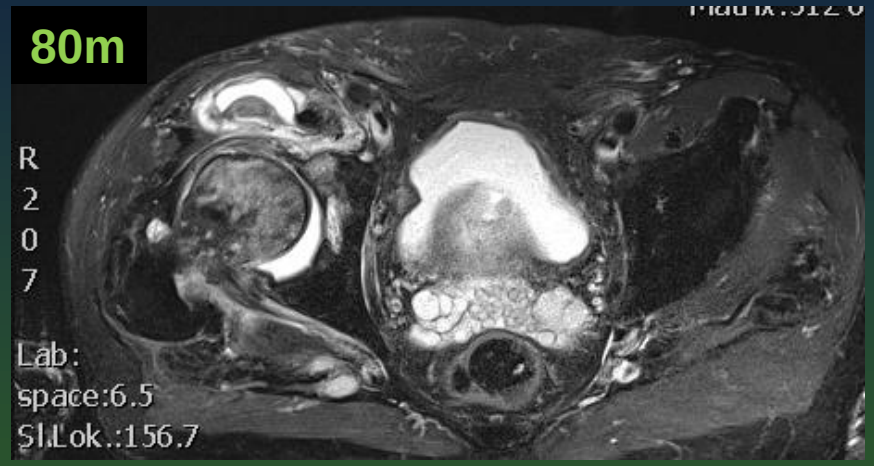


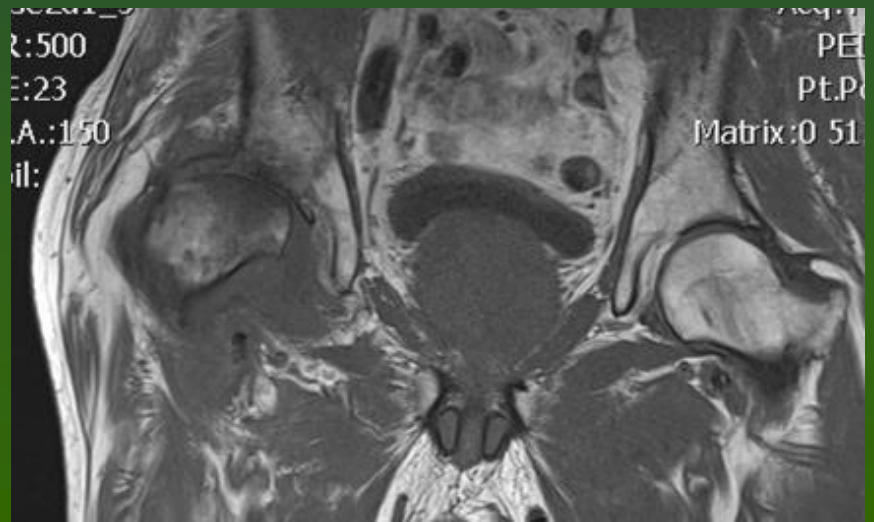
Aseptic spondylodiscitis

Andersson's lesion



MRI Limitations





CPPD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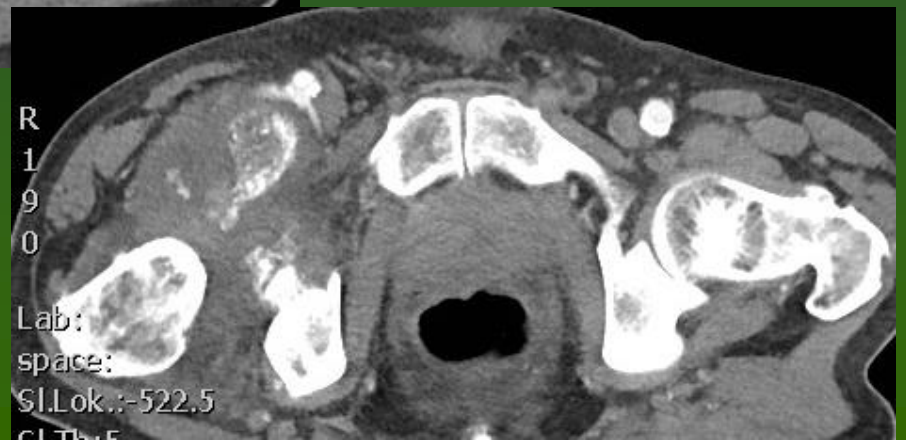
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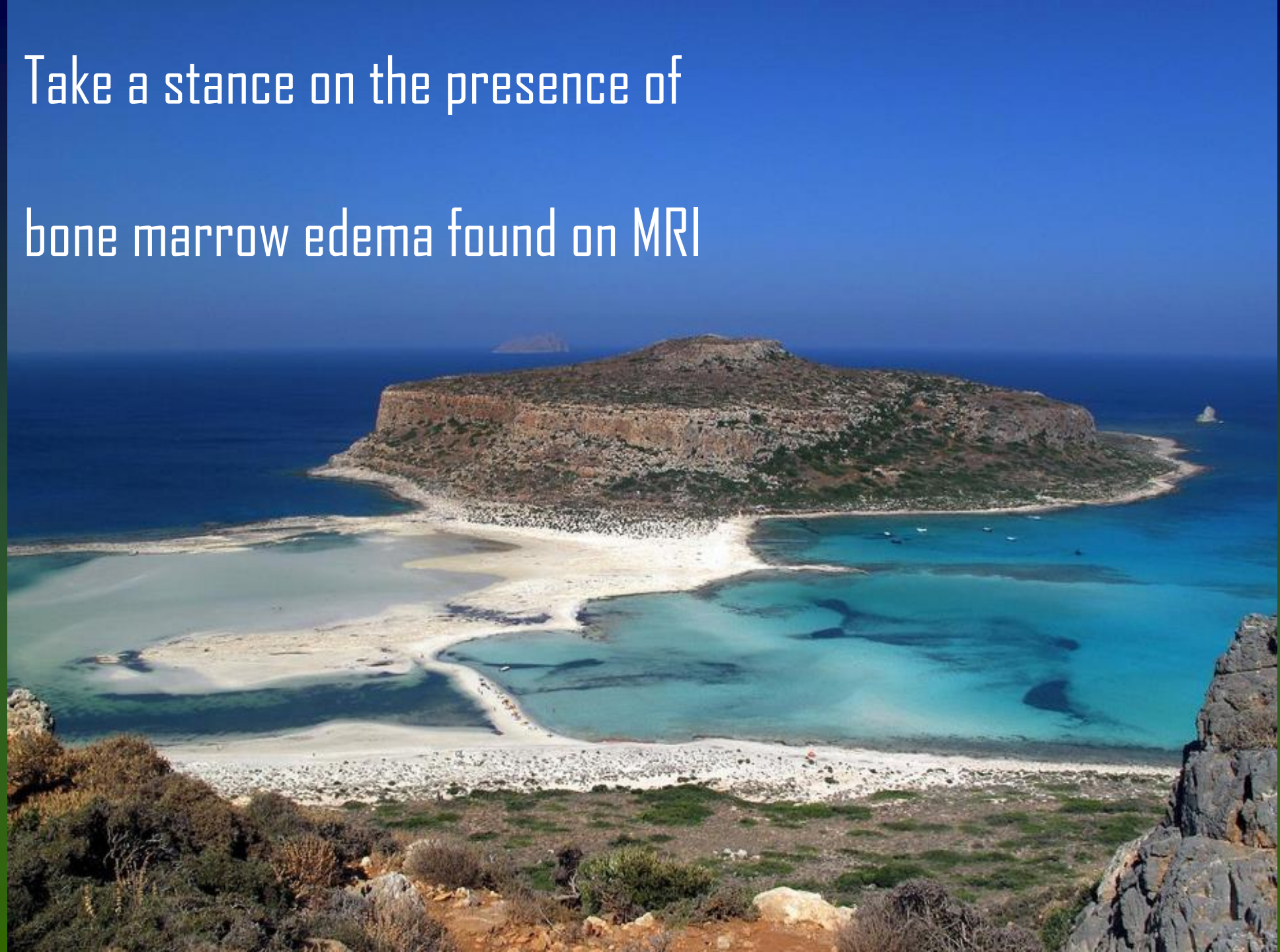
Take home aBMEs

- Wide spectrum
- Knee: insuff. Fx
- Hip common location TOH – RMO
- axSPA
- Hx important

Take a stance on the presence of

bone marrow edema found on MRI



Thank you