

Spring CME Conference

Practical Radiology

March 6-8, 2025 | Clearwater, FL & Online

Hip and Peri-hip causes of pain

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McGovern
Medical School



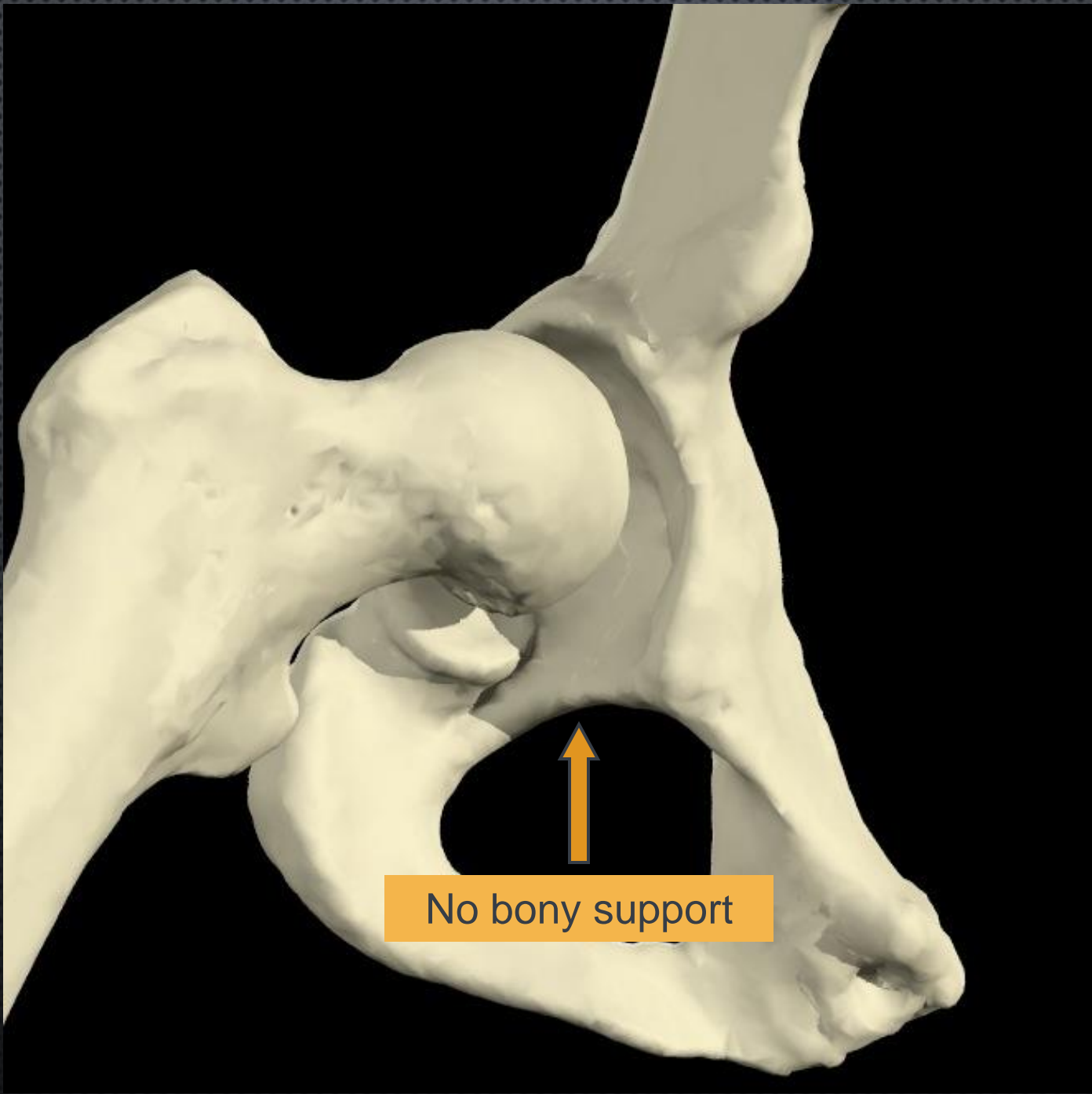
No financial disclosure

Objectives

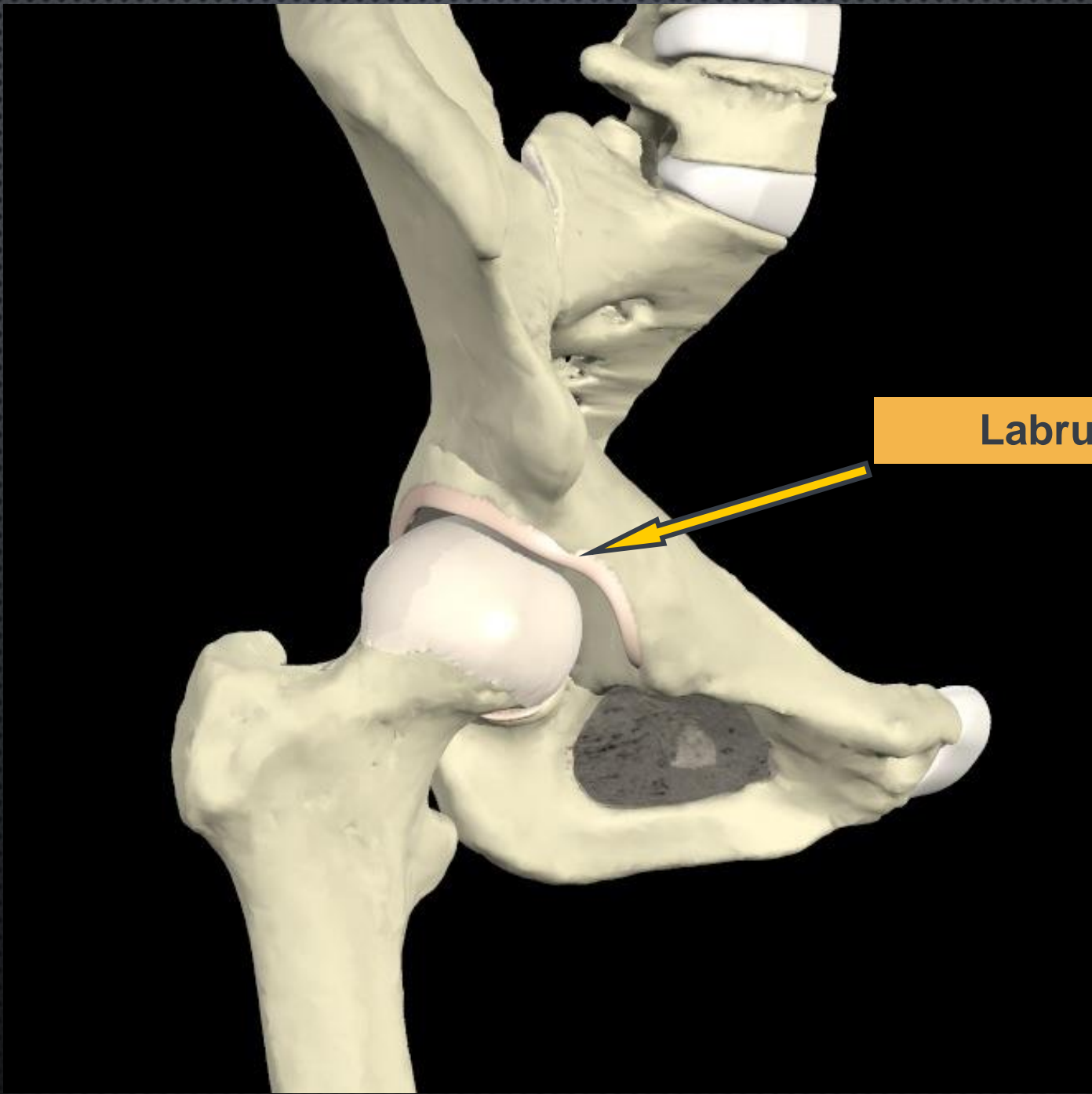
- Review surgical bony anatomy of the hip
- Understand pathophysiology of hip injuries
- Recognize peri-hip causes of pain
- Avoid pitfalls
- **Clinical** importance of various presentations

Hip anatomy

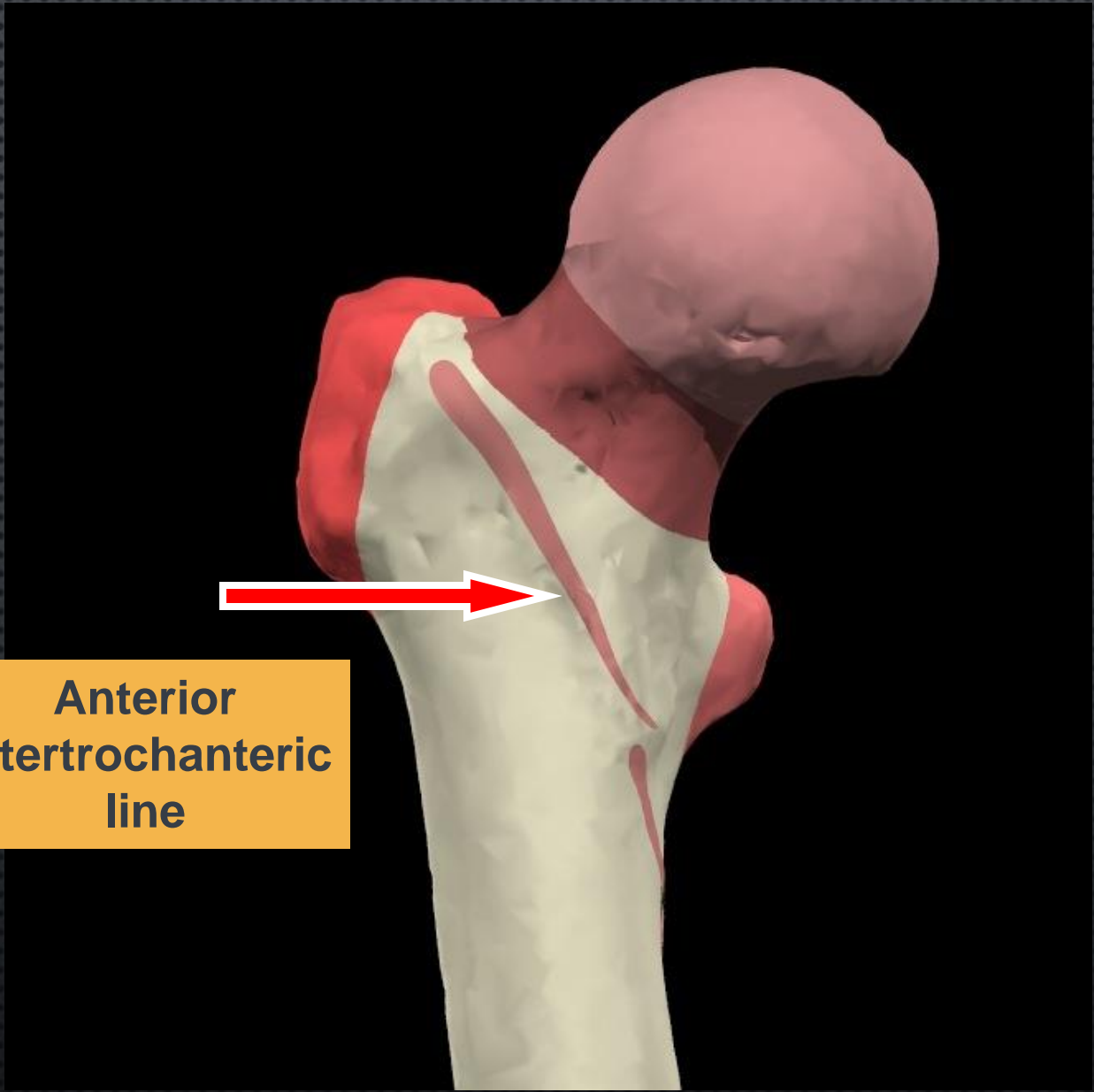
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No bony support



Labrum



**Anterior
Intertrochanteric
line**

Fovea



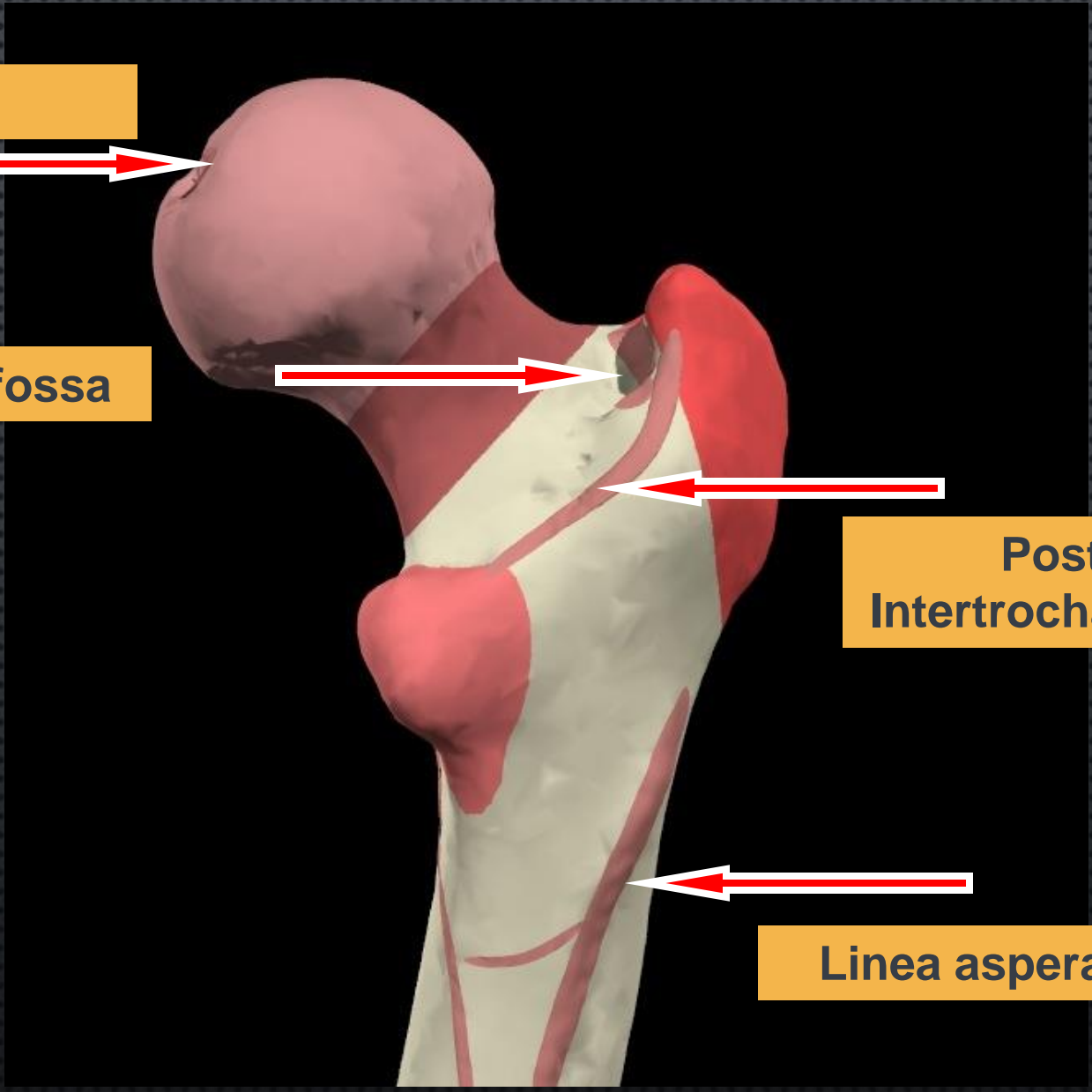
Pyramiform fossa



**Posterior
Intertrochanteric line**

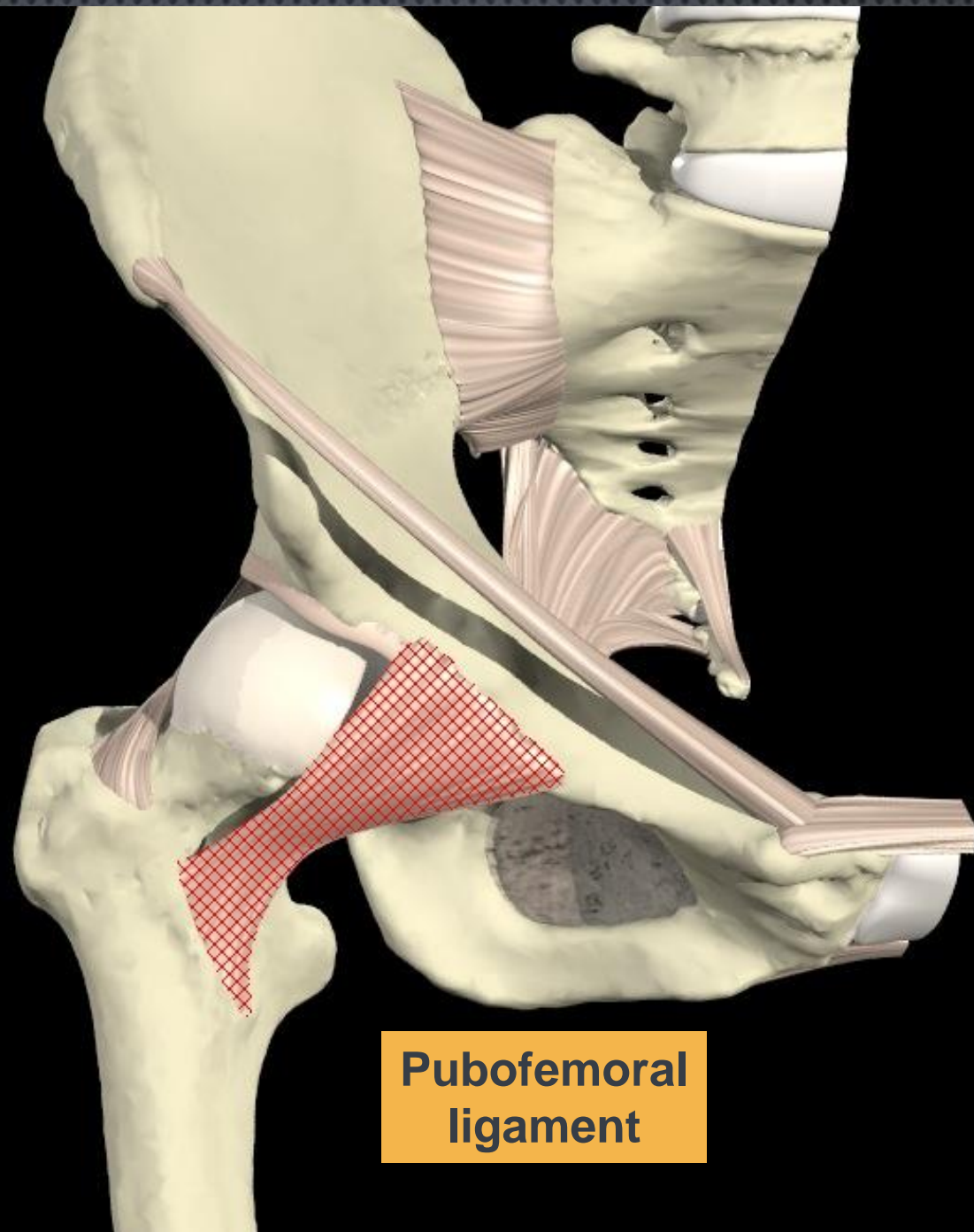


Linea aspera



Ligaments of the hip

1. Pubofemoral
2. Ischiofemoral
3. Iliofemoral
4. Ligamentum Teres
5. Transverse ligament



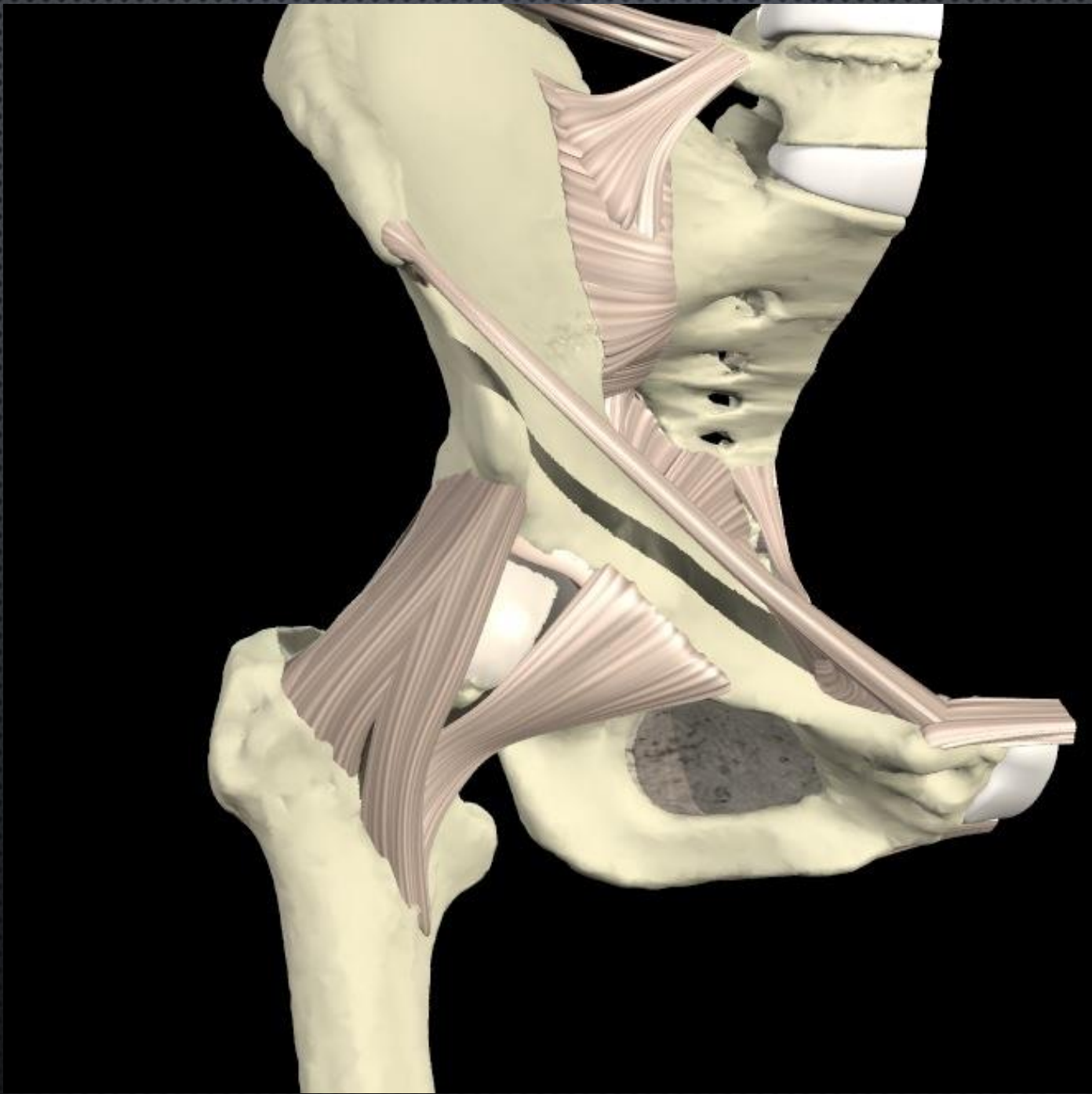
**Pubofemoral
ligament**

Ischiofemoral
ligament



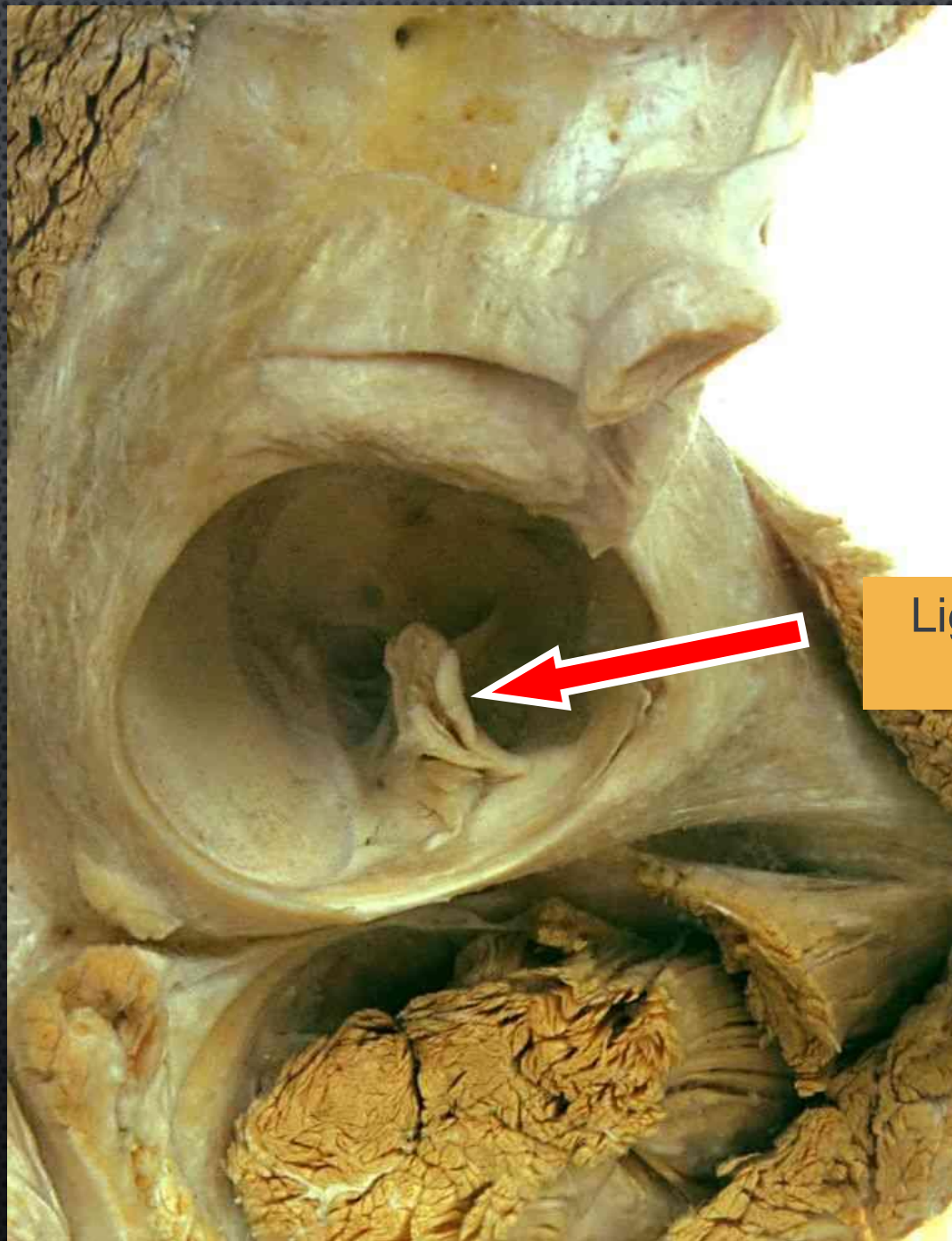
Greater
trochanter
posterior



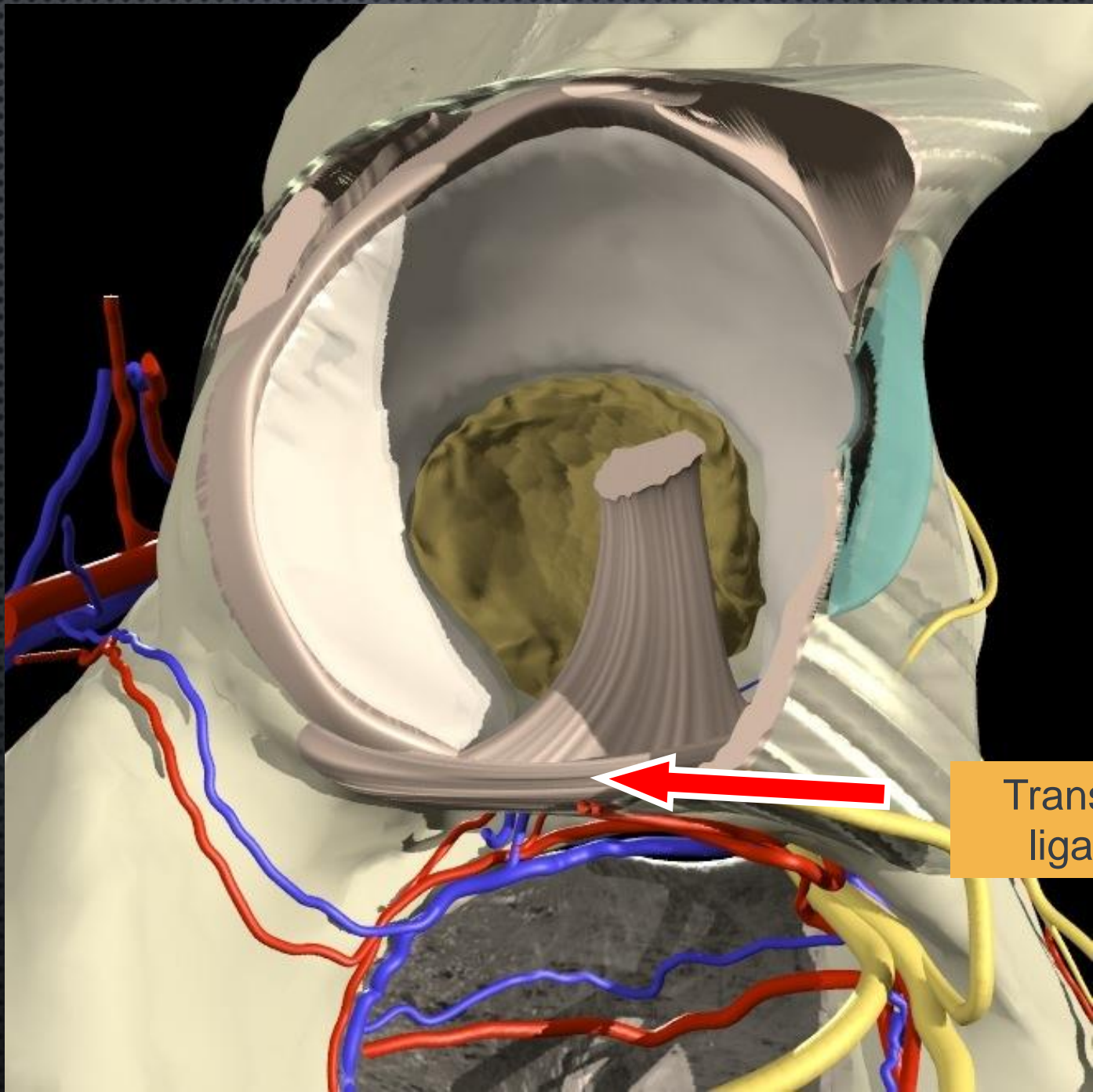




Iliofemoral
ligament



Ligamentum
teres



Transverse
ligament

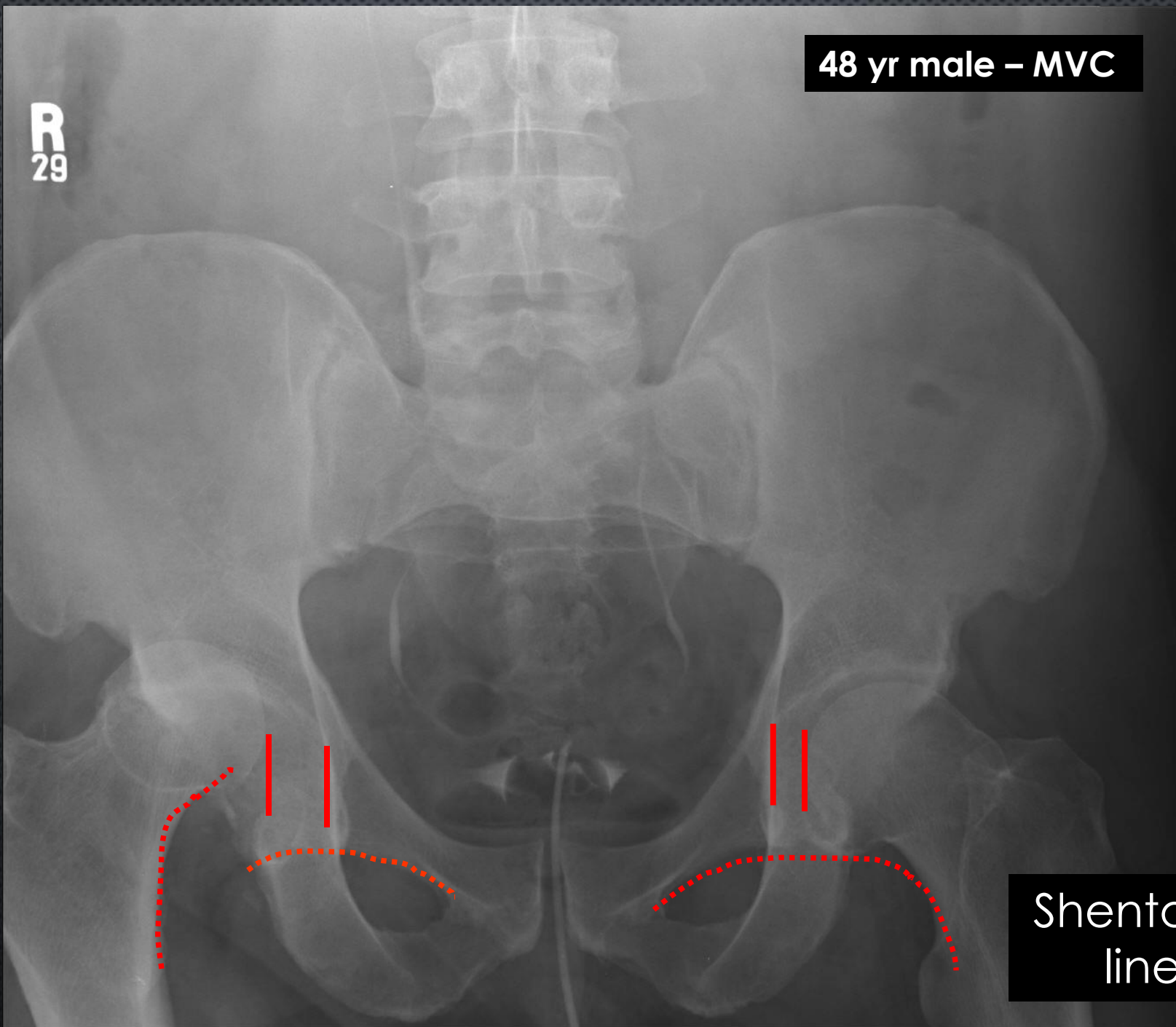
Hip dislocations

Hip dislocation

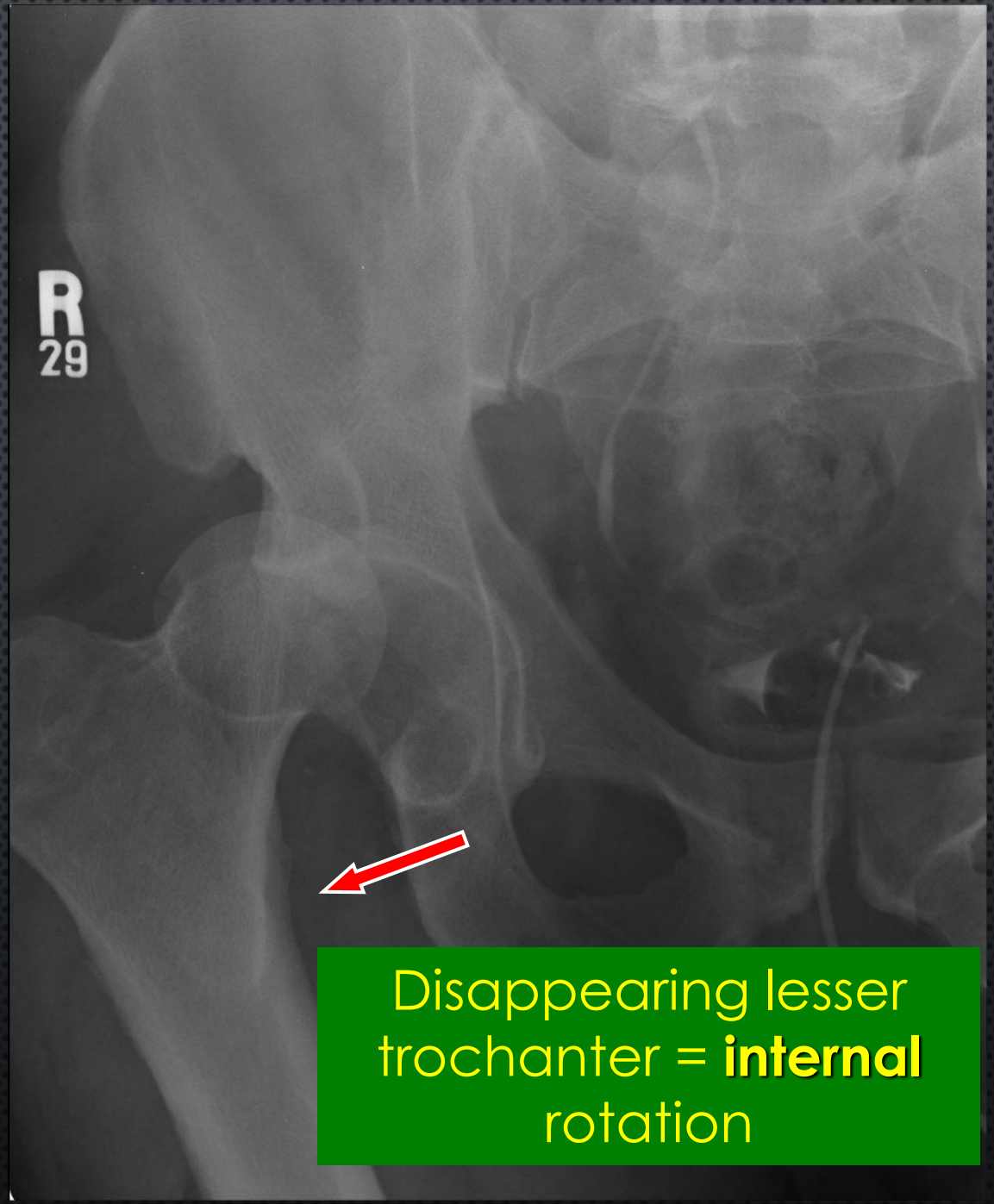
- Types of dislocation
 - Posterior
 - Commonest type – 80-90 %
 - Anterior
 - Rare less than 10 %

48 yr male – MVC

R
29



Shenton's
line



R
29



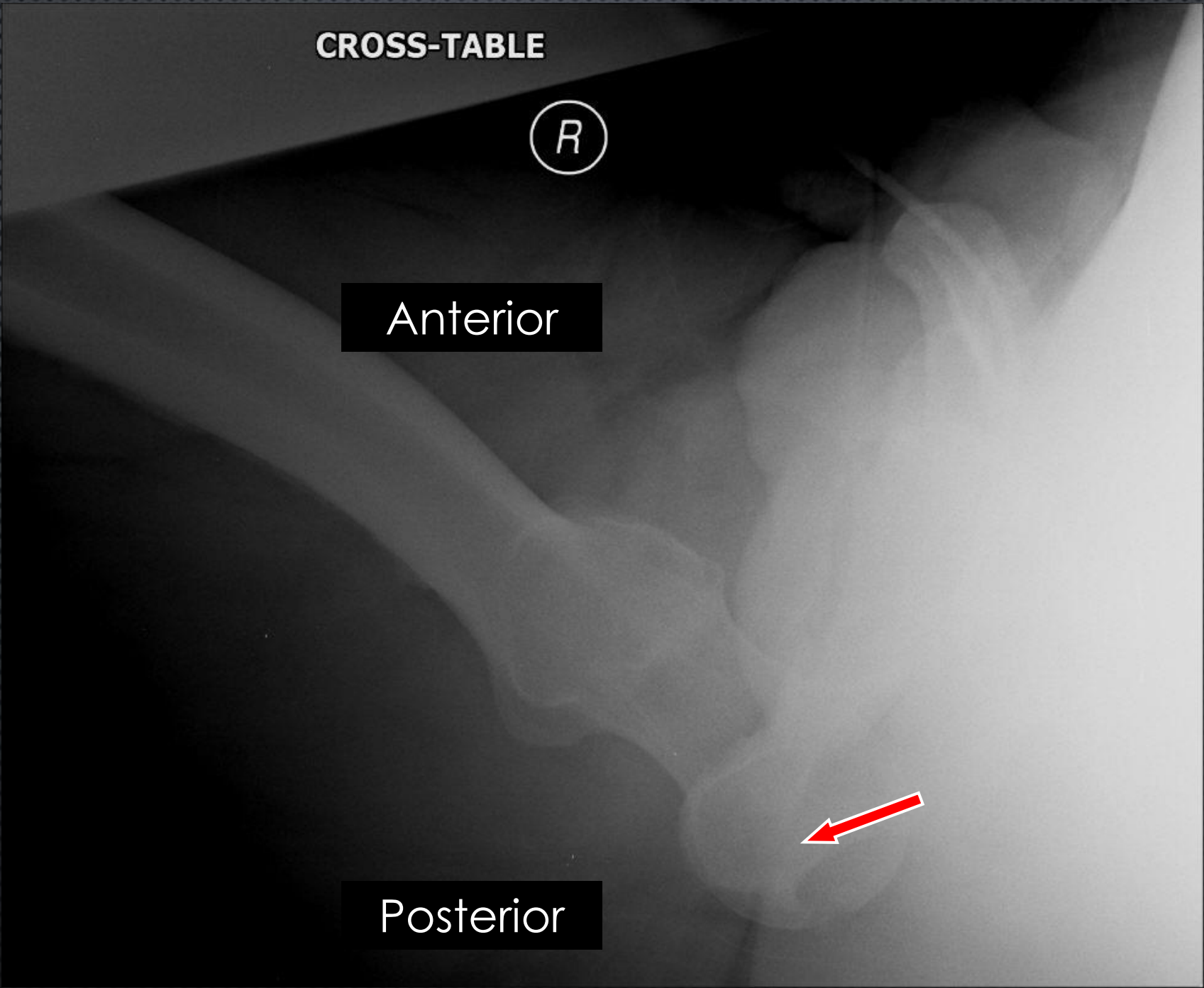
Disappearing lesser trochanter = **internal** rotation

CROSS-TABLE

(R)

Anterior

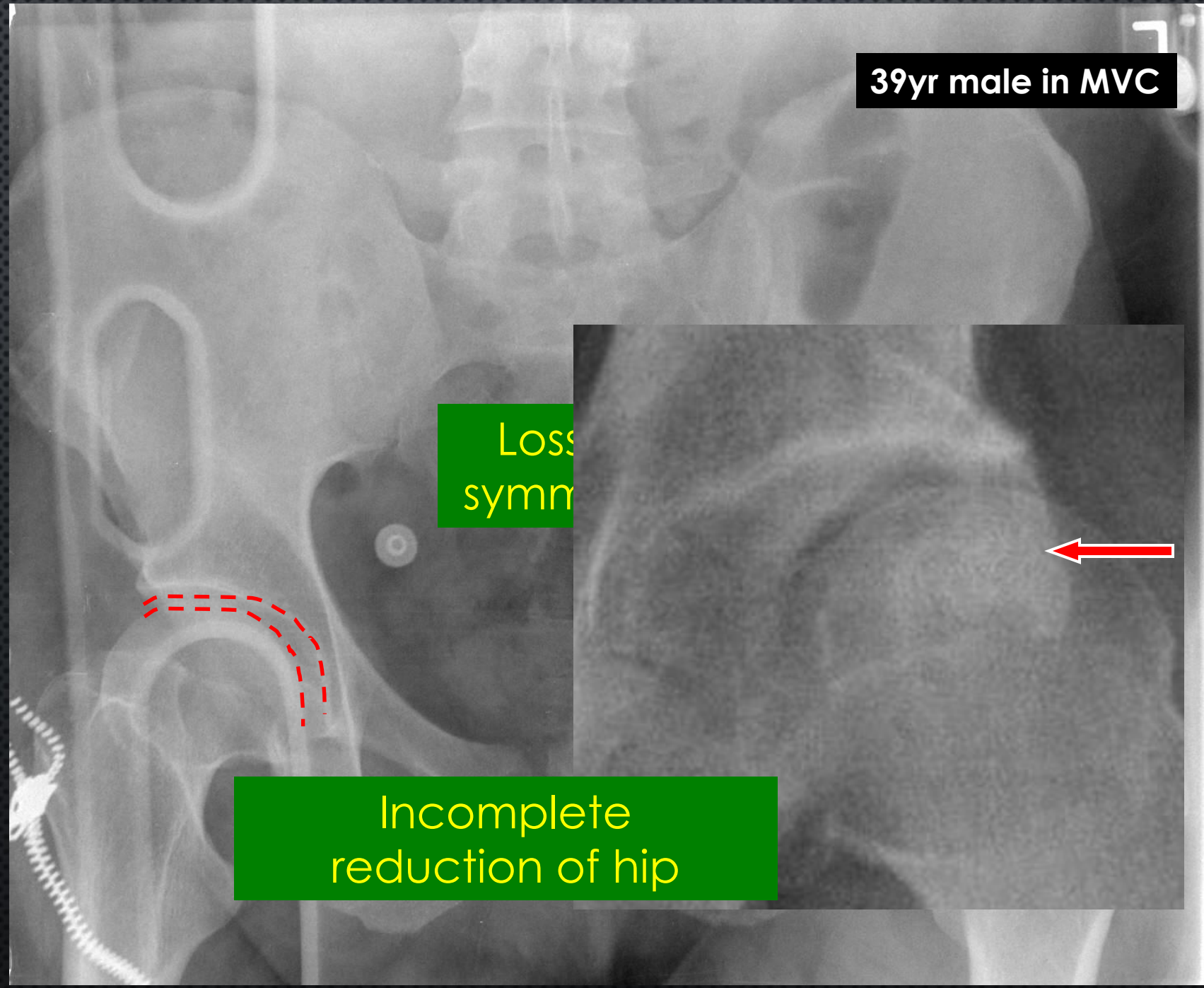
Posterior



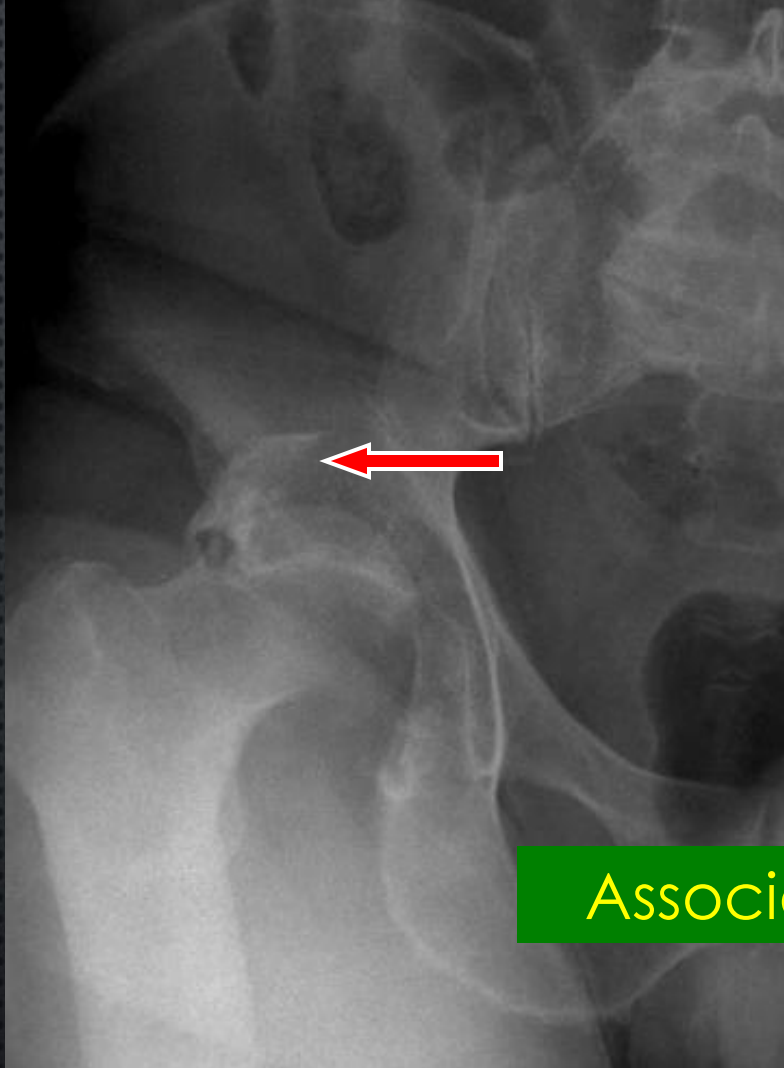
39yr male in MVC

Loss
symm

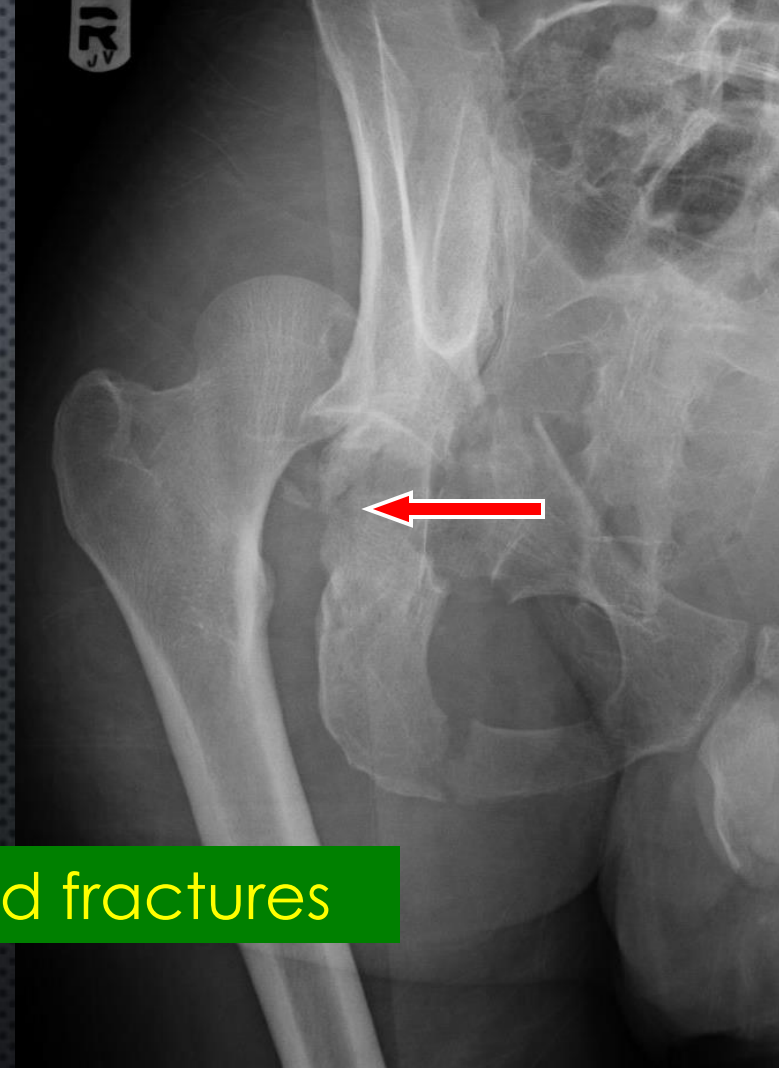
Incomplete
reduction of hip



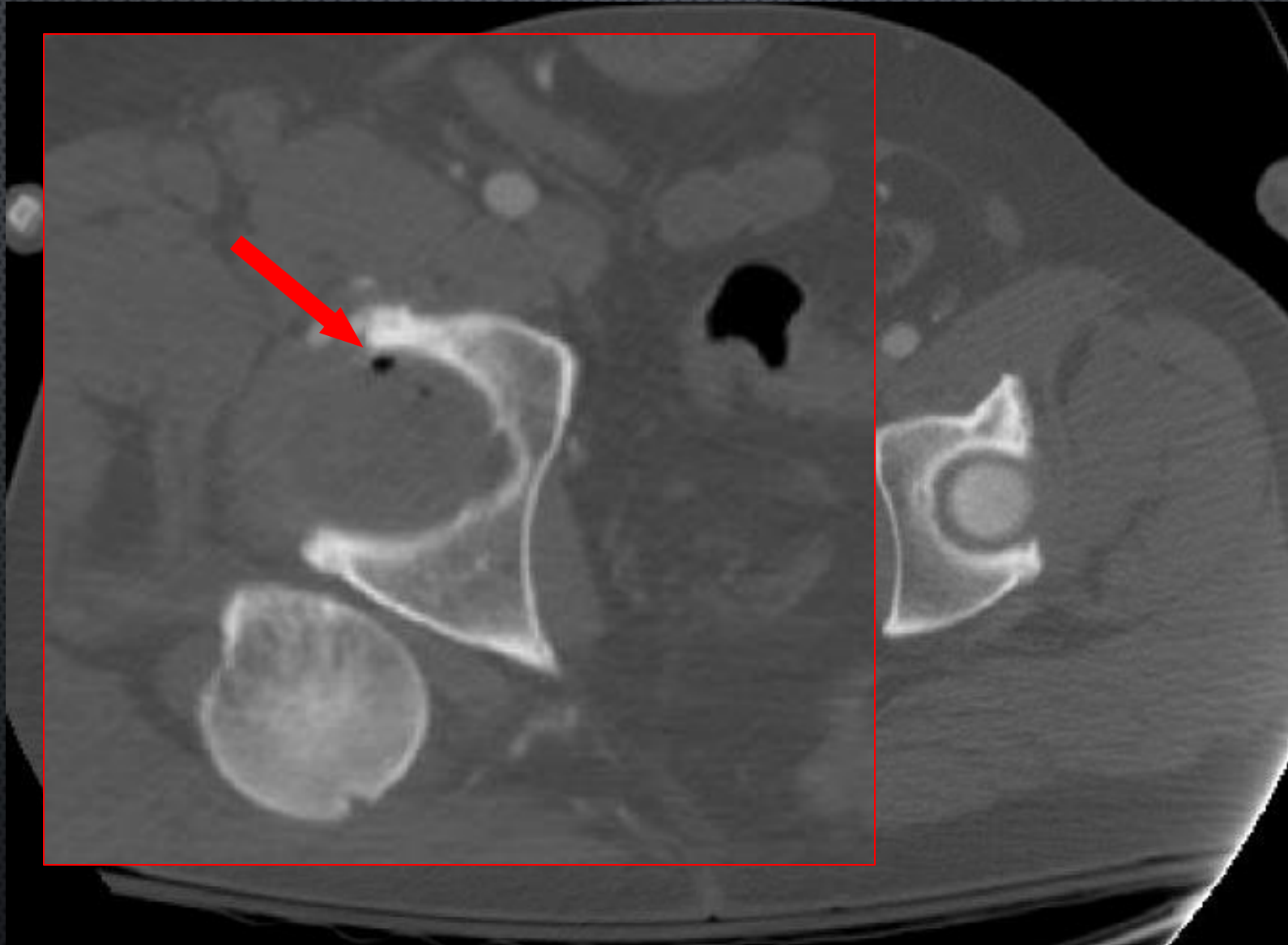
42yr old in MVC



33yr old in MVC



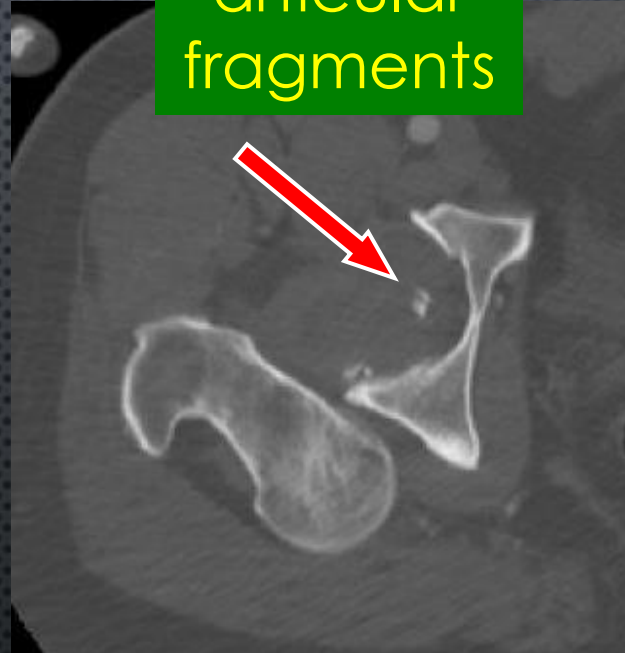
Associated fractures



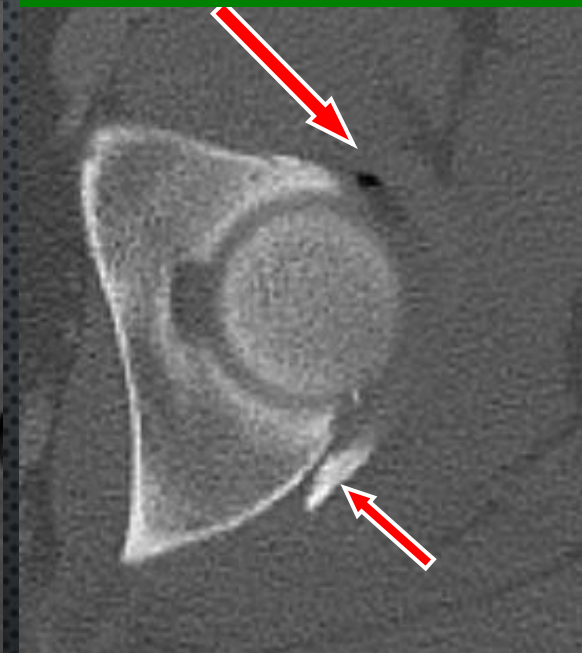
CT reveals all!



Foveal avulsion



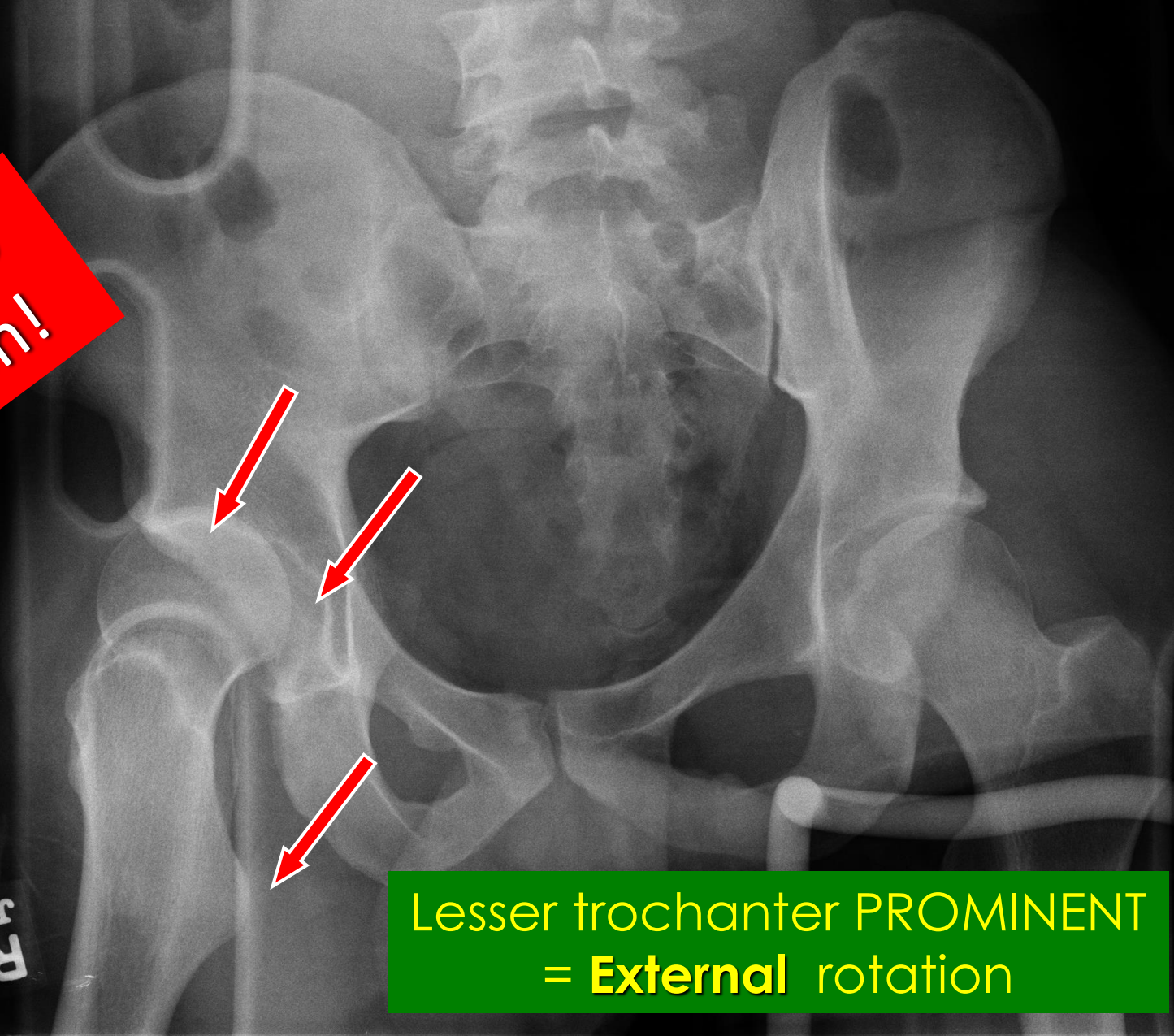
Intra-articular fragments



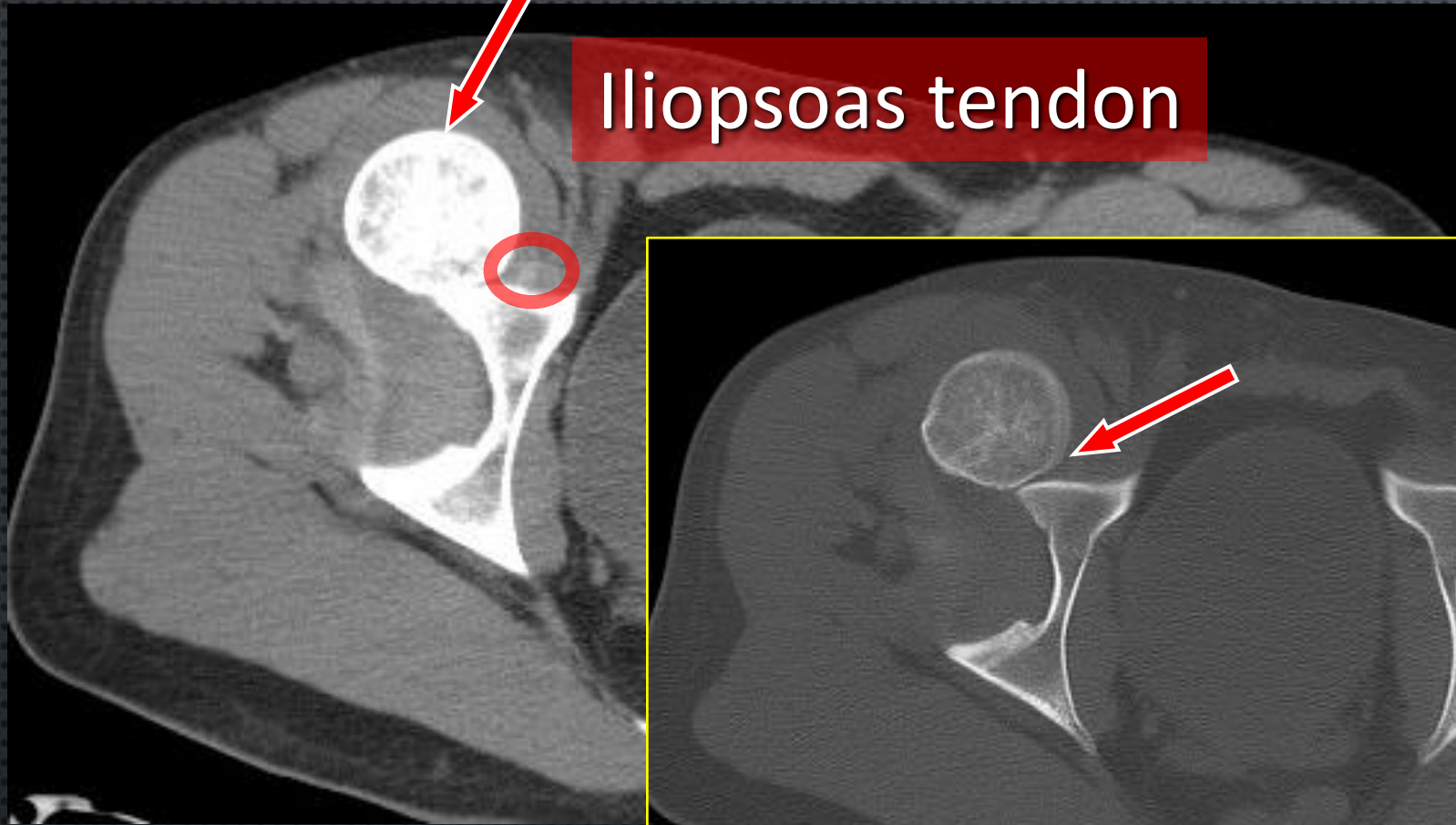
Vacuum = prior dislocation

What about the rare type....
MVC – Hip pain

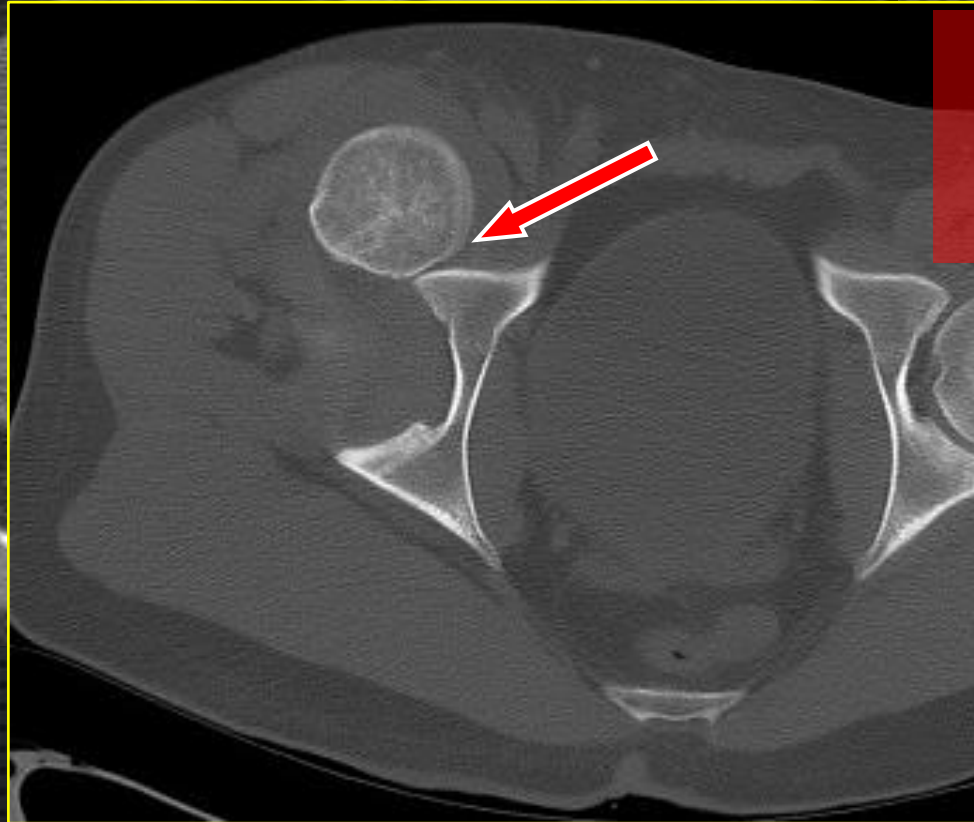
Anterior hip dislocation!



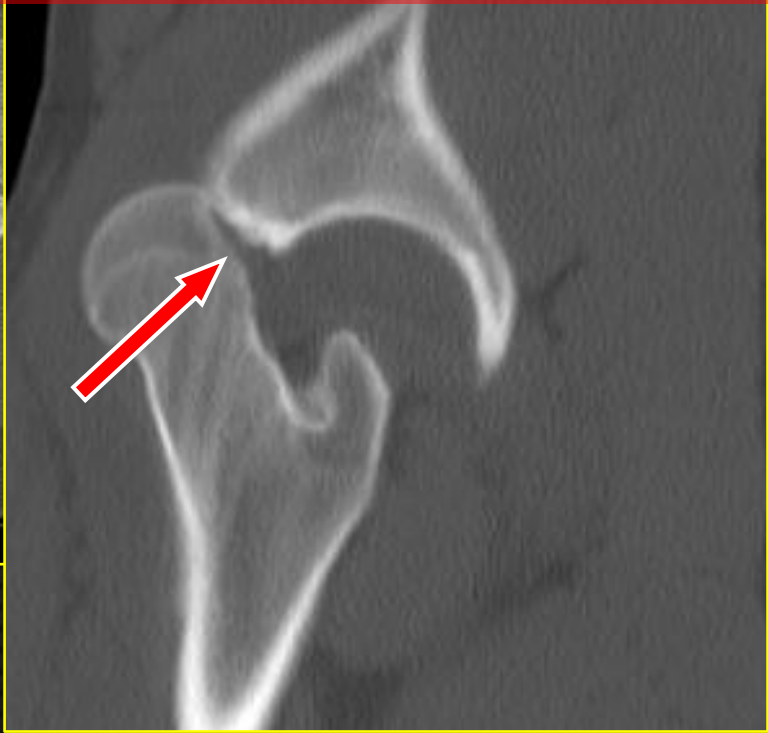
Lesser trochanter PROMINENT
= **External** rotation



Iliopsoas tendon

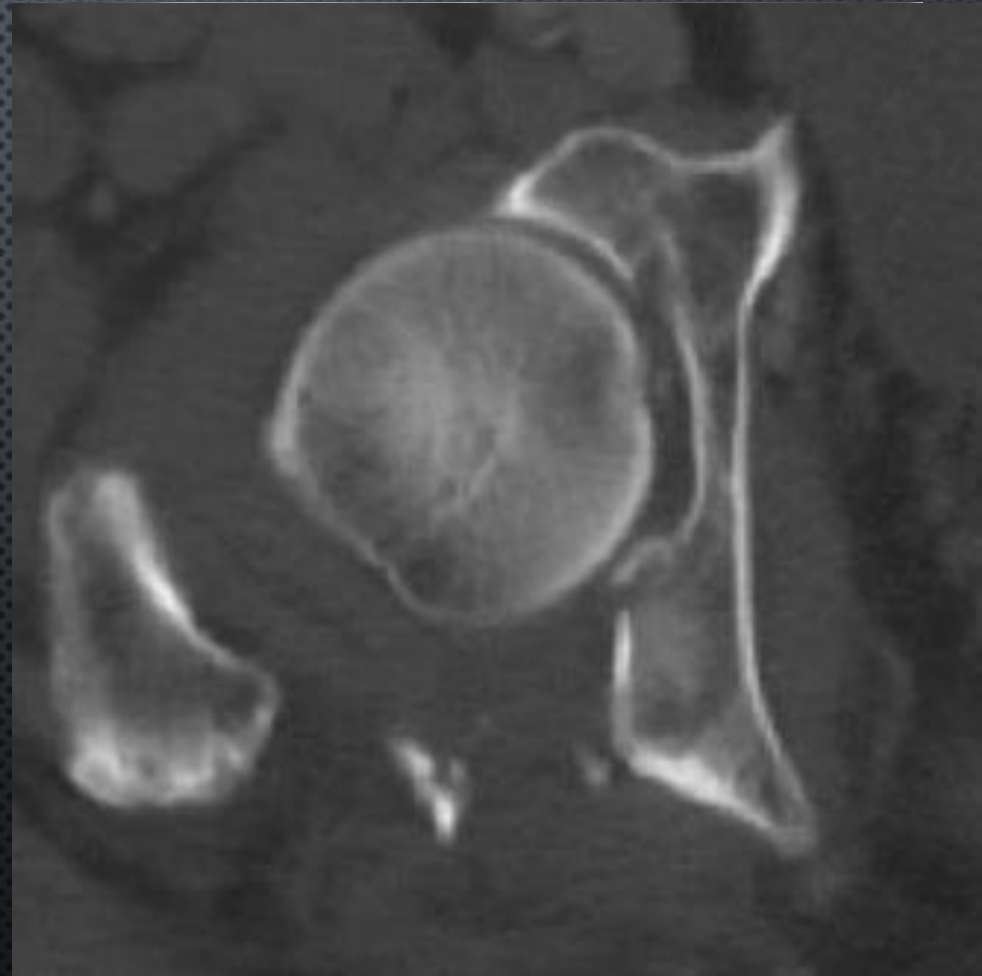


Impacted anterior dislocation



What the clinician wants to know?

- Is it completely or partially reduced?
- Are there any intra-articular fragments?
- Any associated fractures?



Femoral head trauma.....

Femoral head fractures

Types

- Compression
- Shear

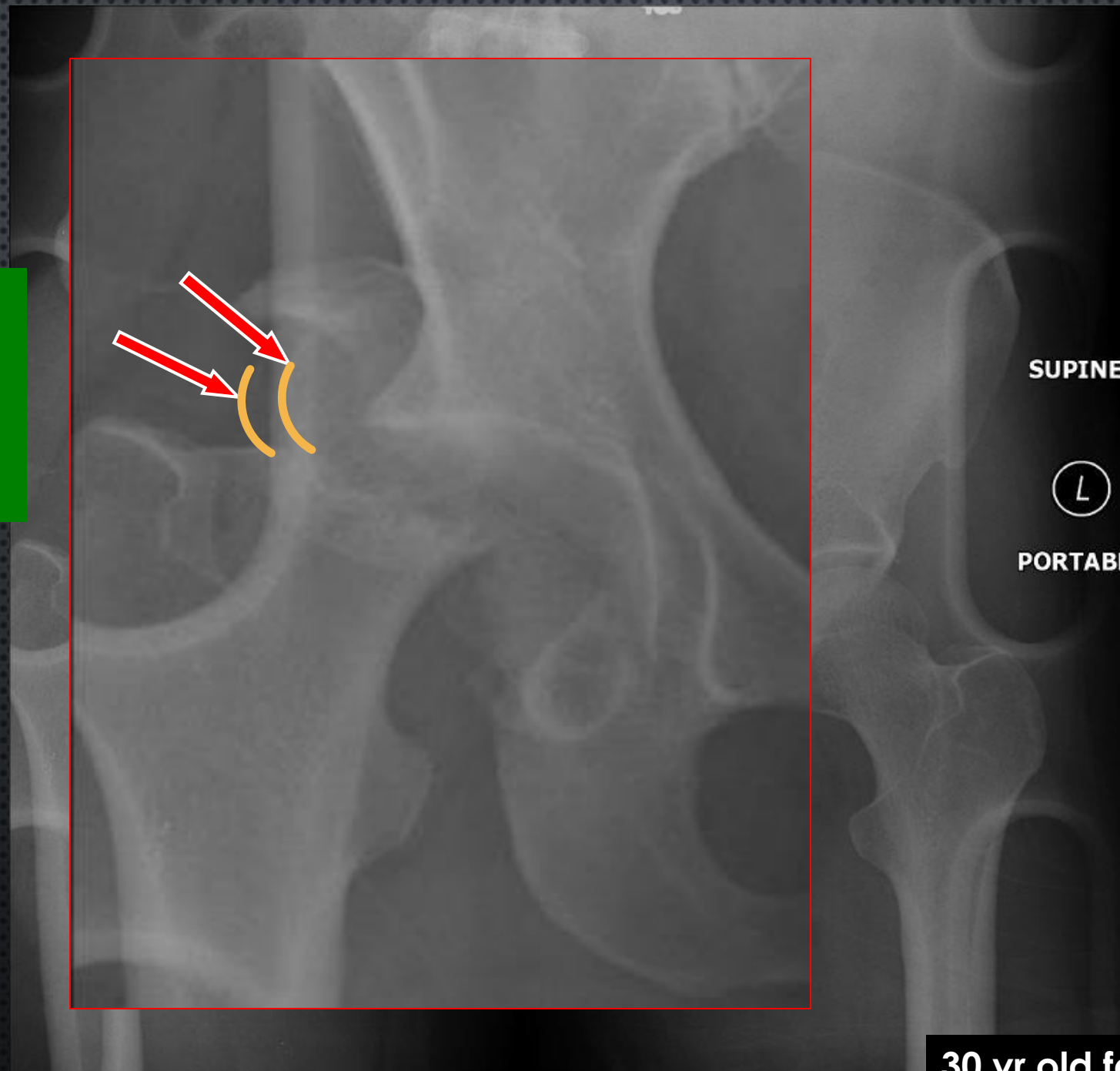
Associated fractures

- *Acetabulum*
- *Neck of femur*



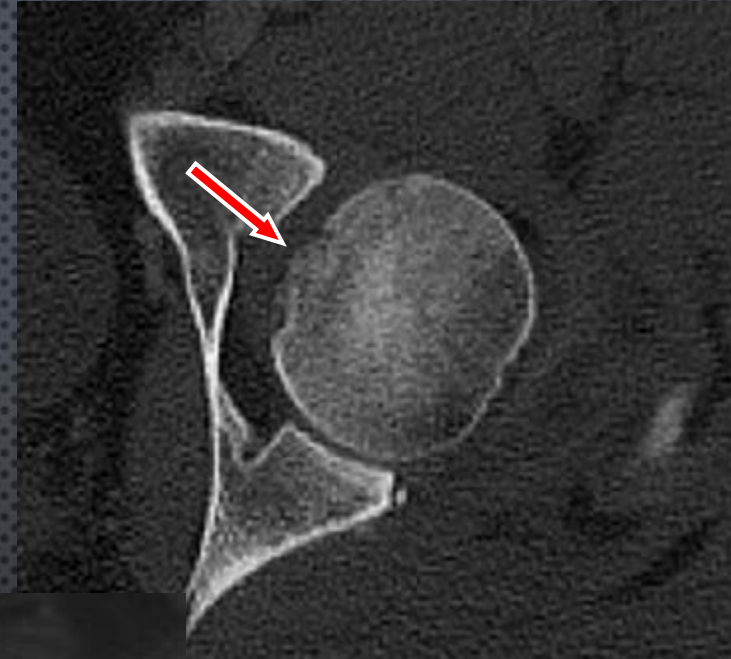
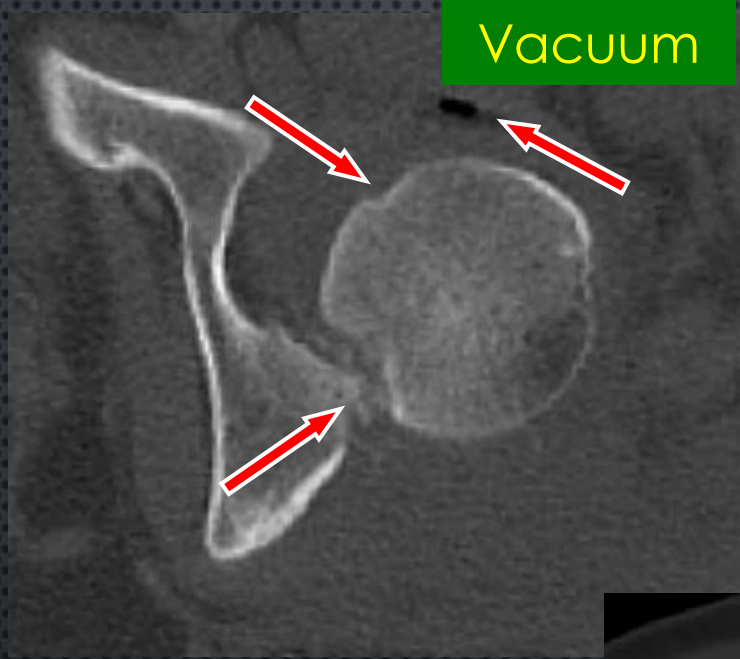
30 yr old female MVC

**Femoral
head
impaction
injury**



30 yr old female MVC

Compression type - CT



subchondral injury
>2mm depression

Weight bearing
zone

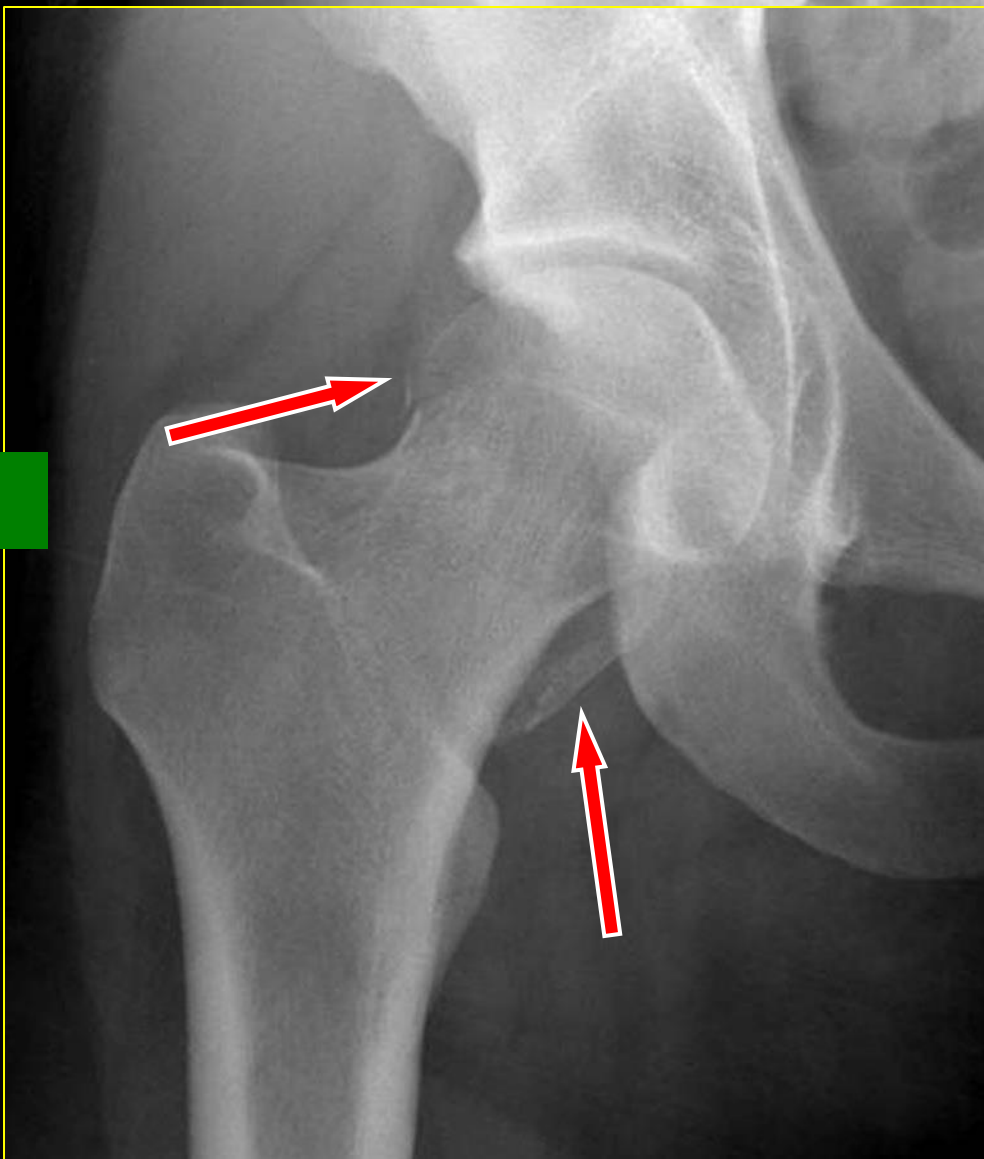


48 yr old male MVC



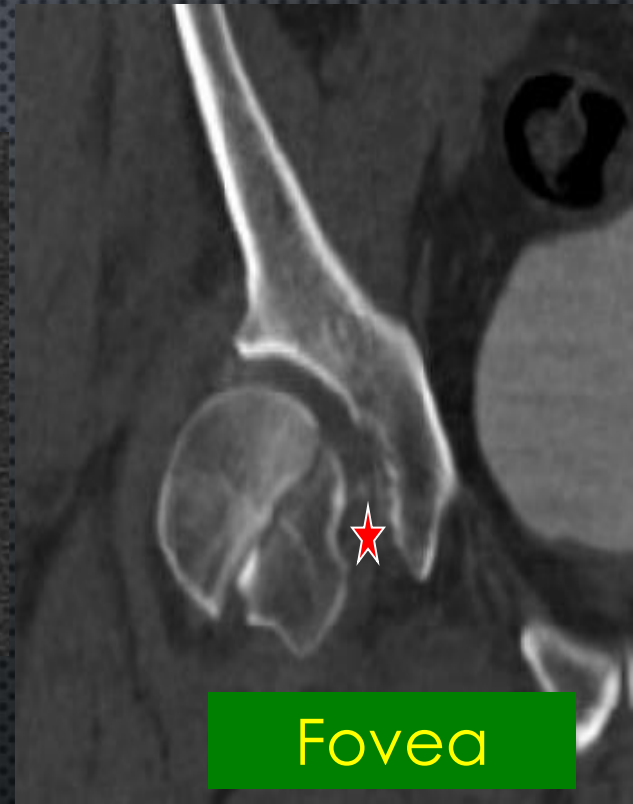
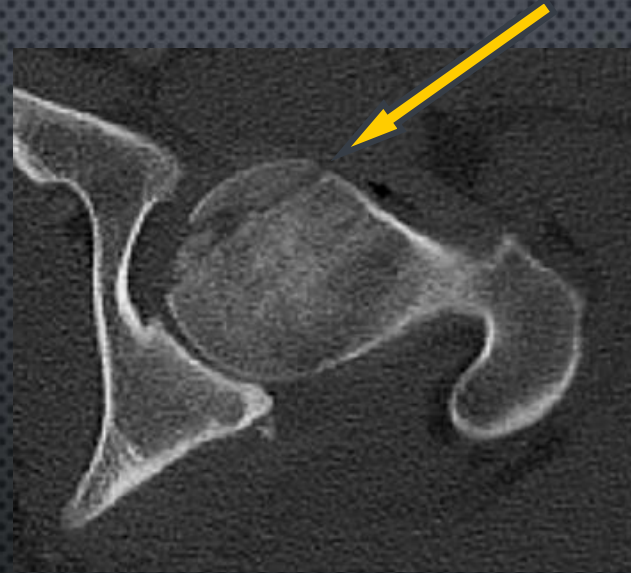
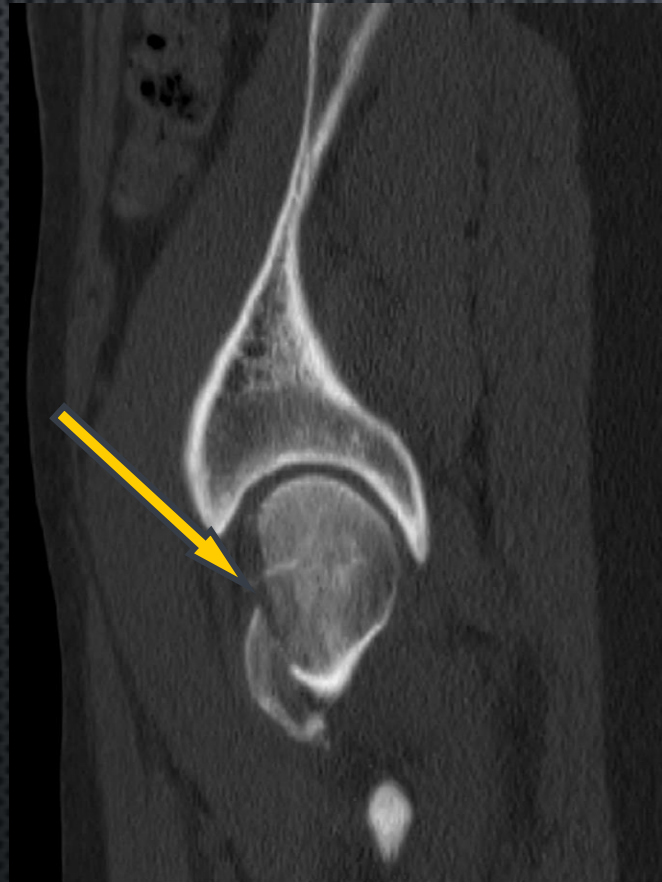


Shear fx

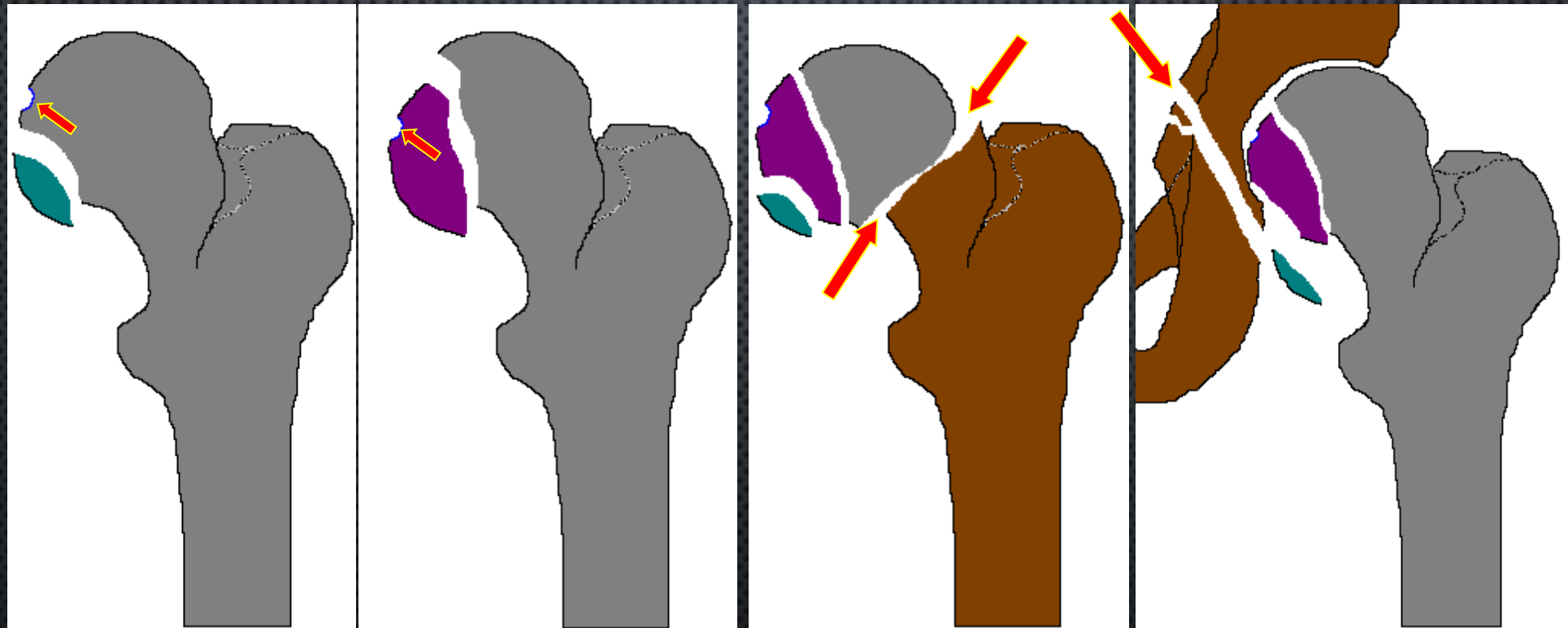


48 yr old male MVC

Shear type - CT



The Pipkin Classification



Type I

Type II

Type III

Type IV

What the clinician wants to know ?

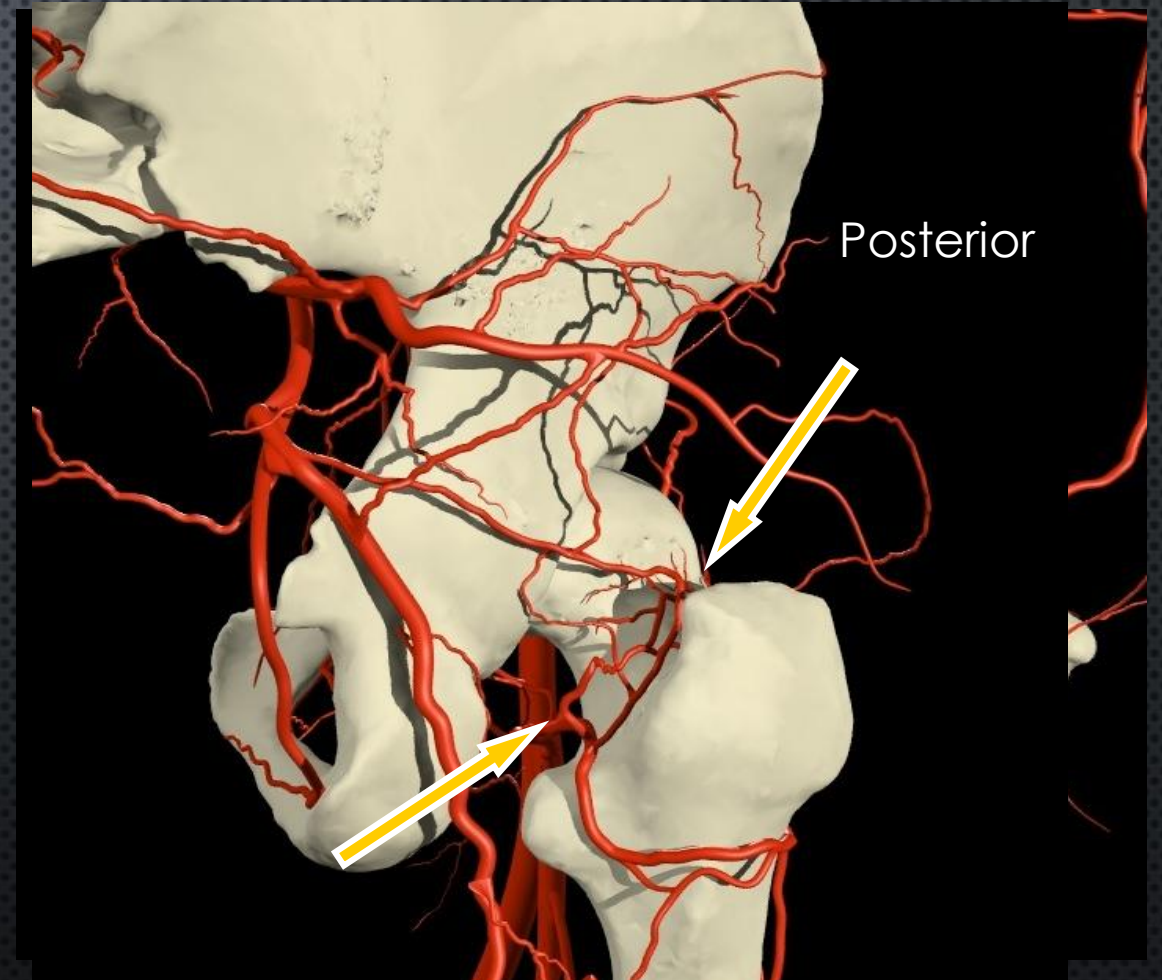
- Compression or Shear ?
- Shear
 - **Relationship to fovea –weight bearing surface**
(Pipkin classification)
- *Associated fractures*



Neck of femur

Relevant anatomy

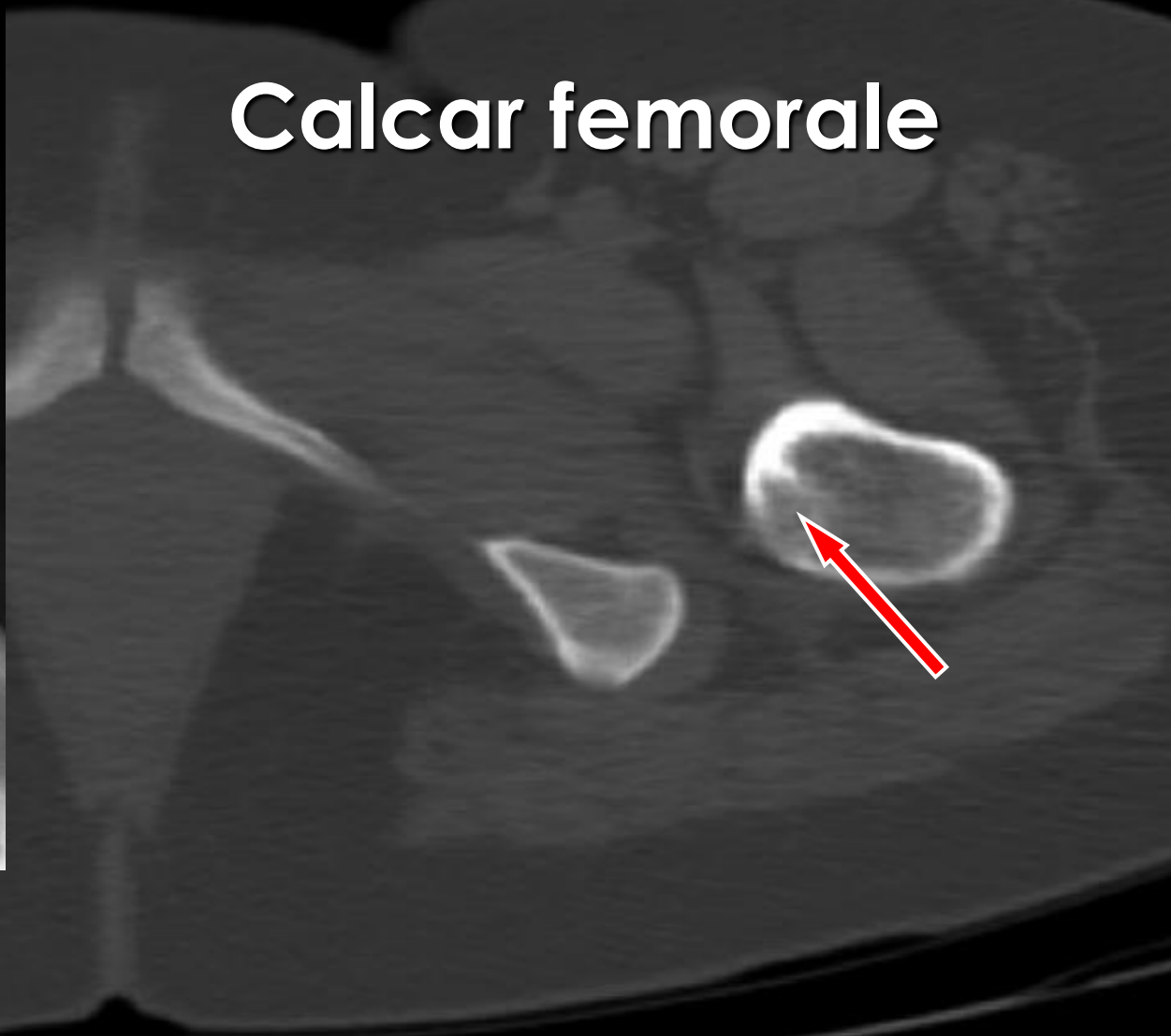
- Circumflex vessels – majority of blood supply
- **Foveal artery – about 10% contribution**
- Extra capsular fractures less likely to compromise femoral head vascularity



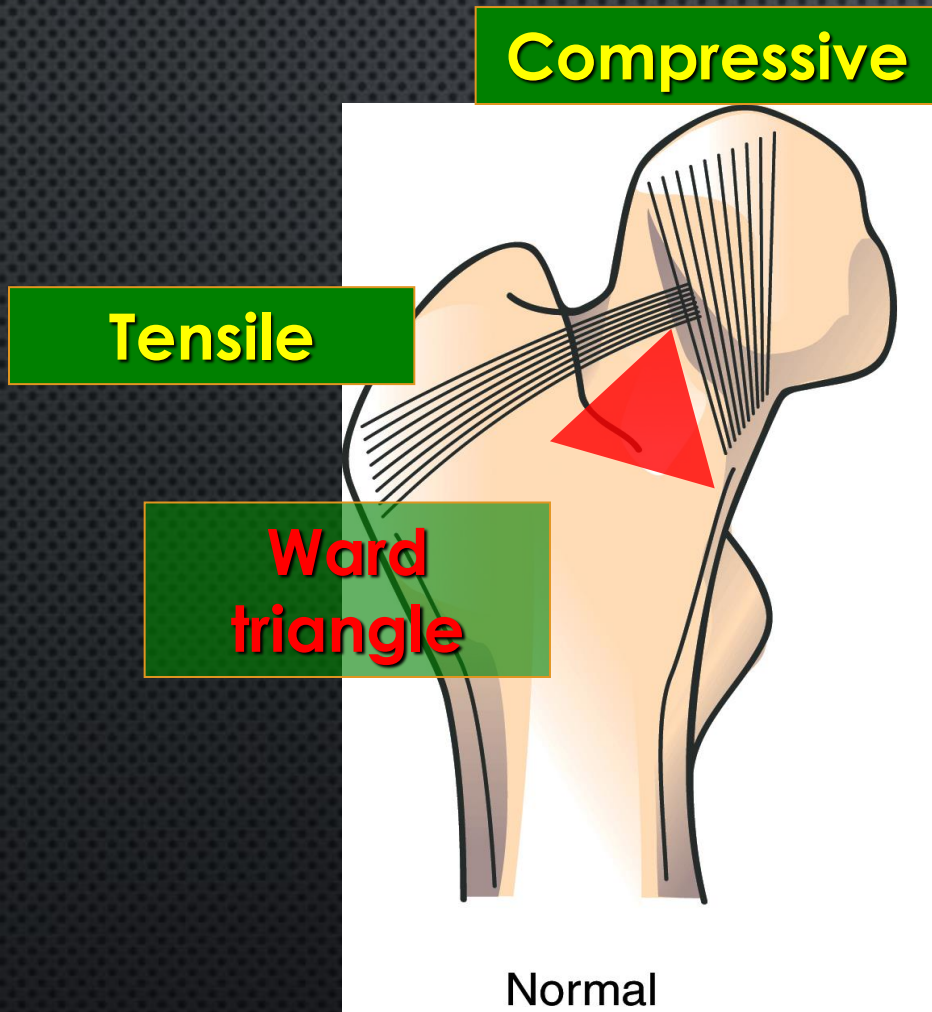


Clinical anatomy...

Calcar femorale



Trabecular pattern – The key!



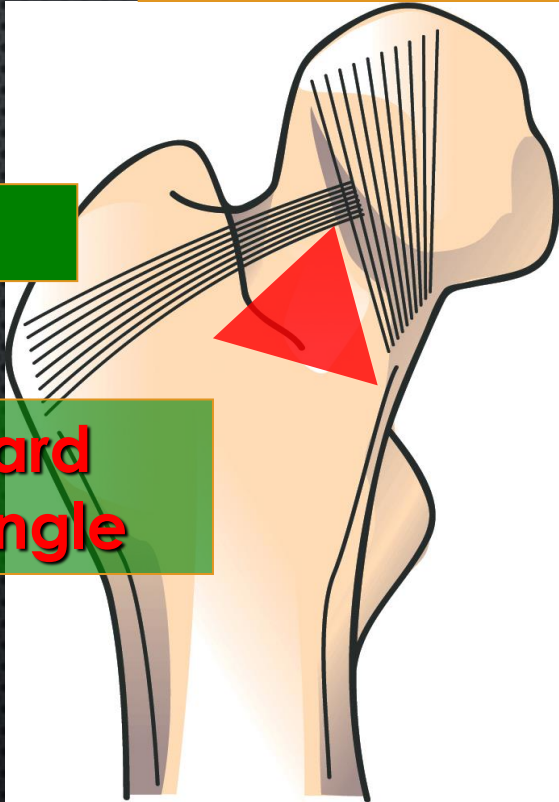
Redrawn with permission from Radiology of Skeletal Trauma , L.F.Rogers, Ed 3

Trabecular pattern – The key!

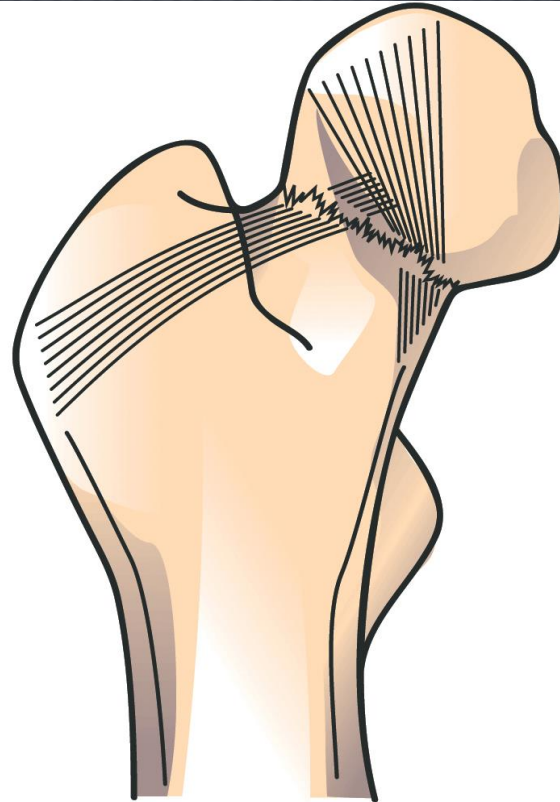
Compressive

Tensile

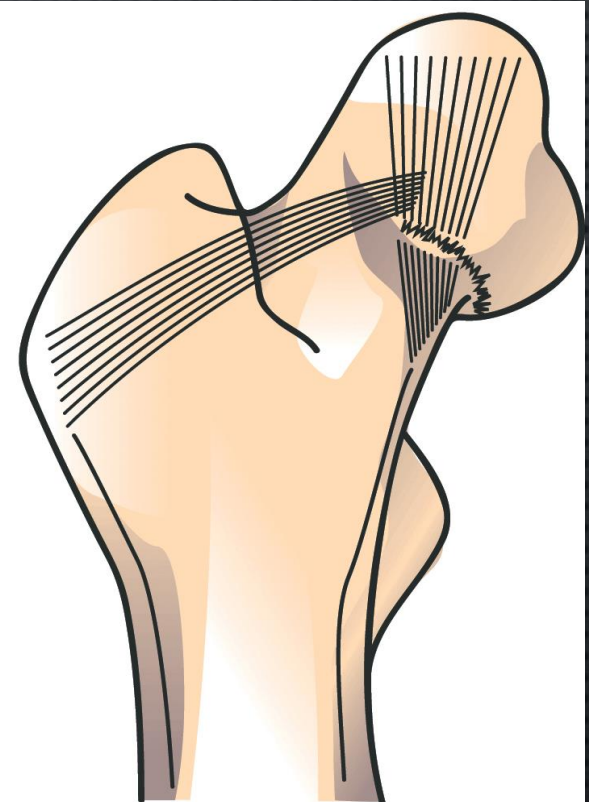
**Ward
triangle**



Normal



Valgus Fx.

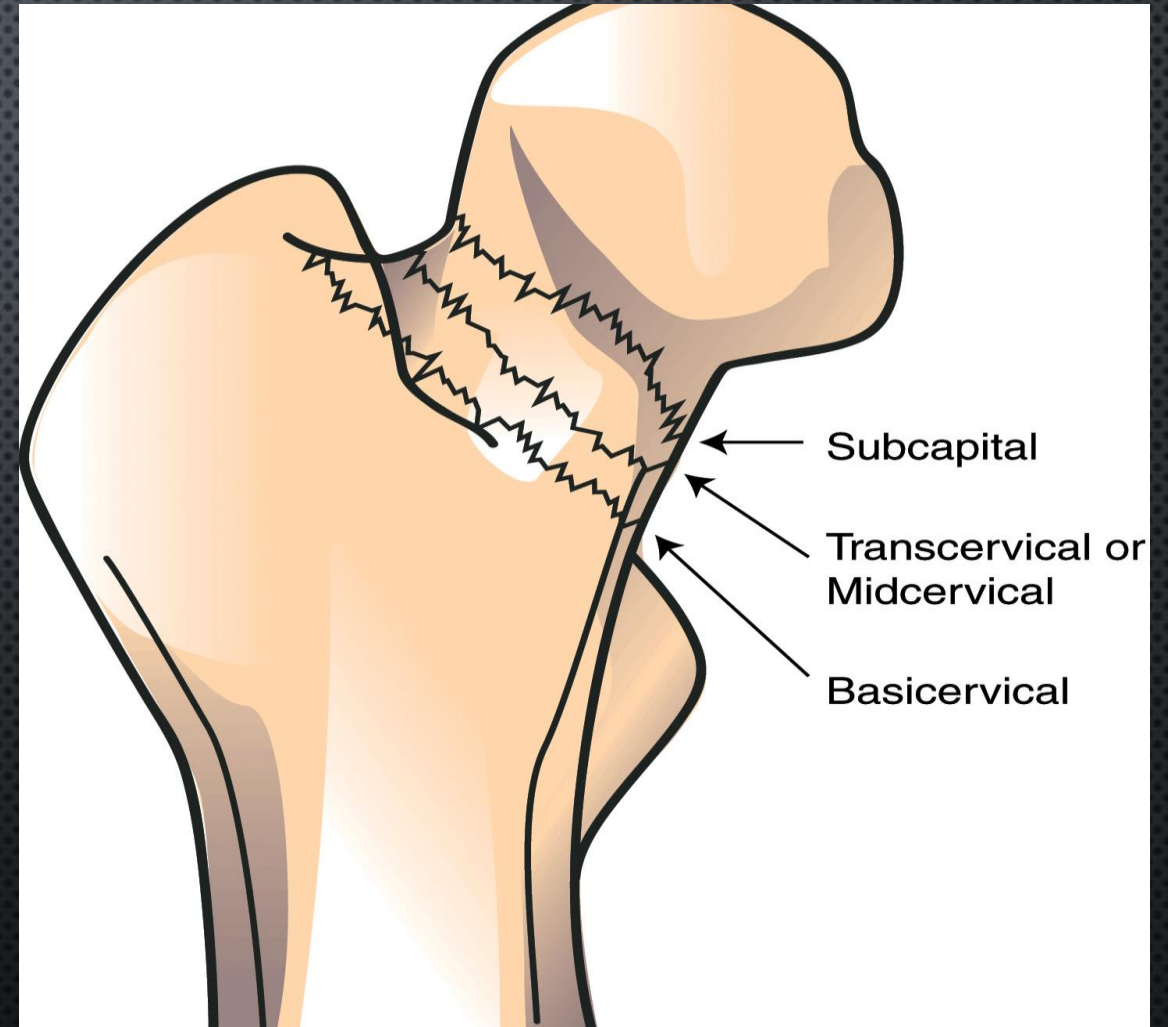


Varus Fx.

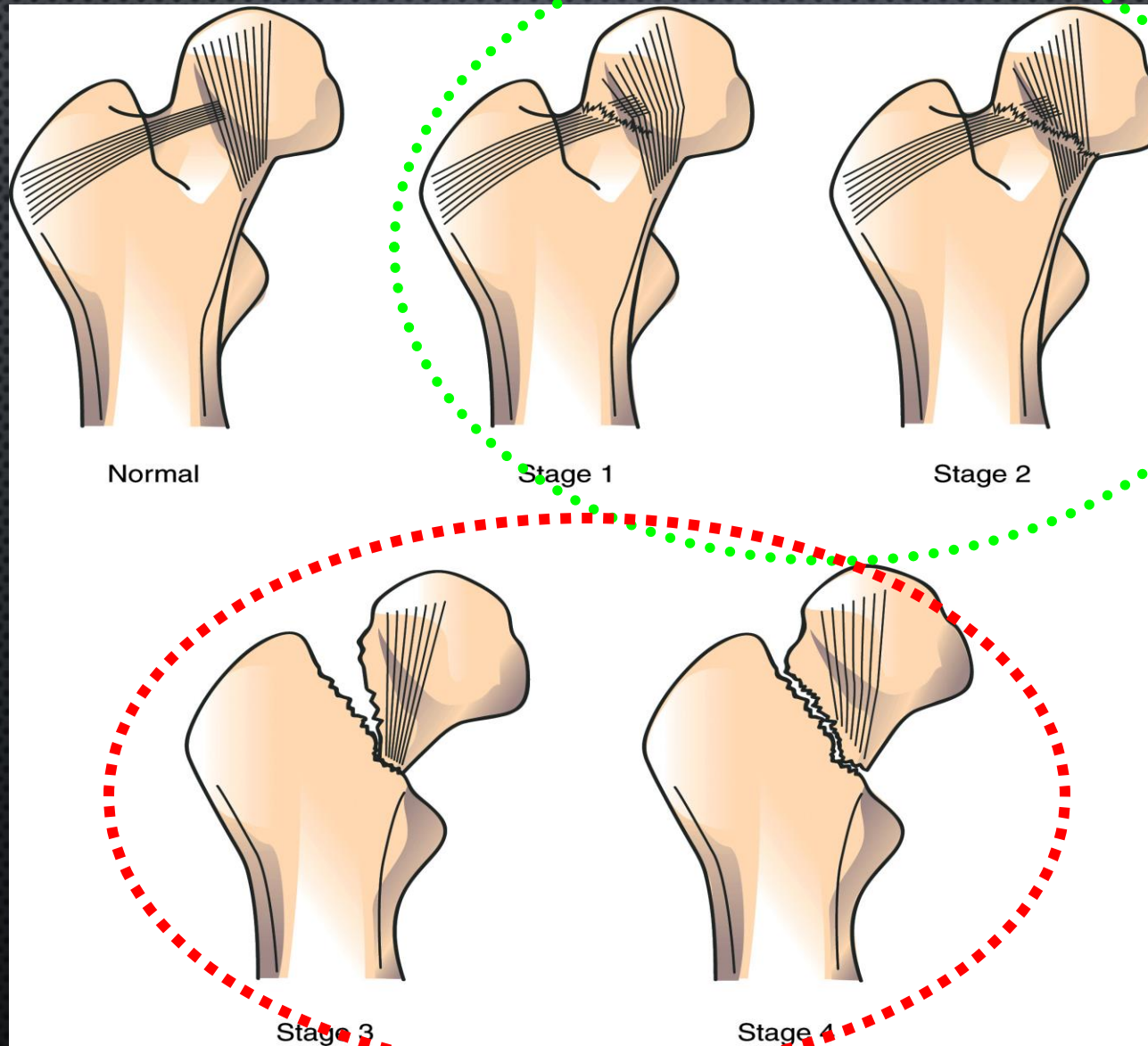
Redrawn with permission from Radiology of Skeletal Trauma , L.F.Rogers, Ed 3

Types of NOF fractures

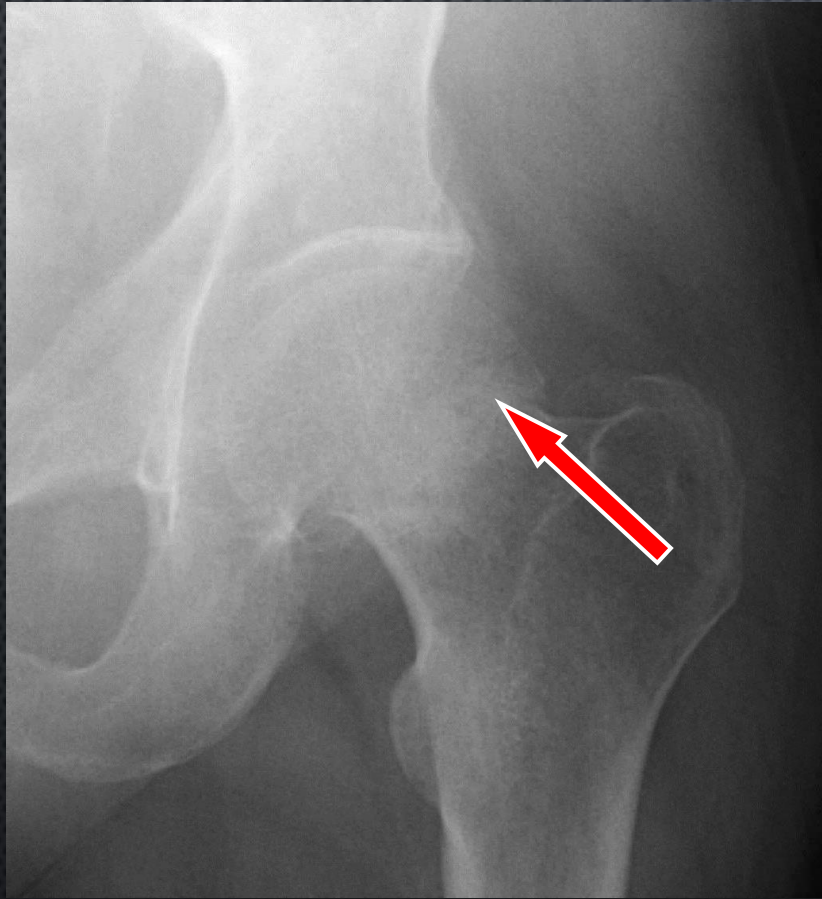
- Most common is subcapital
- Basicervical and midcervical are usually complete fractures
- Peda fxs more commonly basicervical



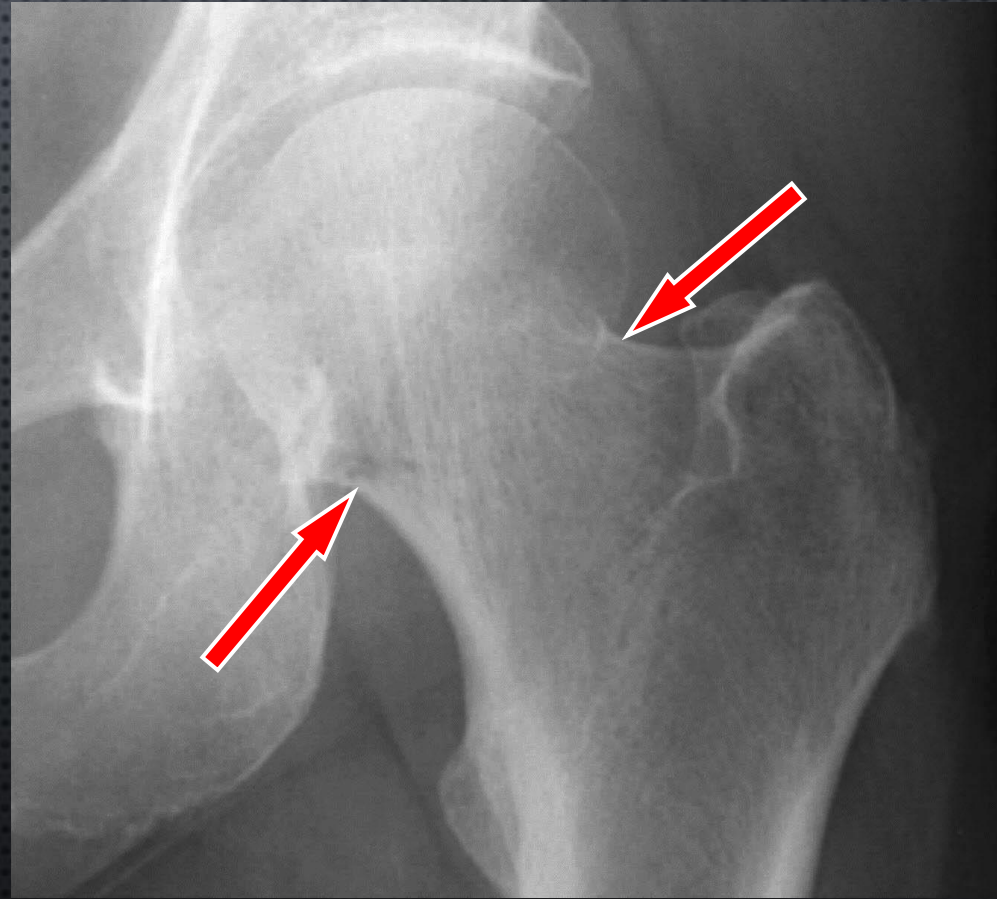
Garden classification



Garden classification

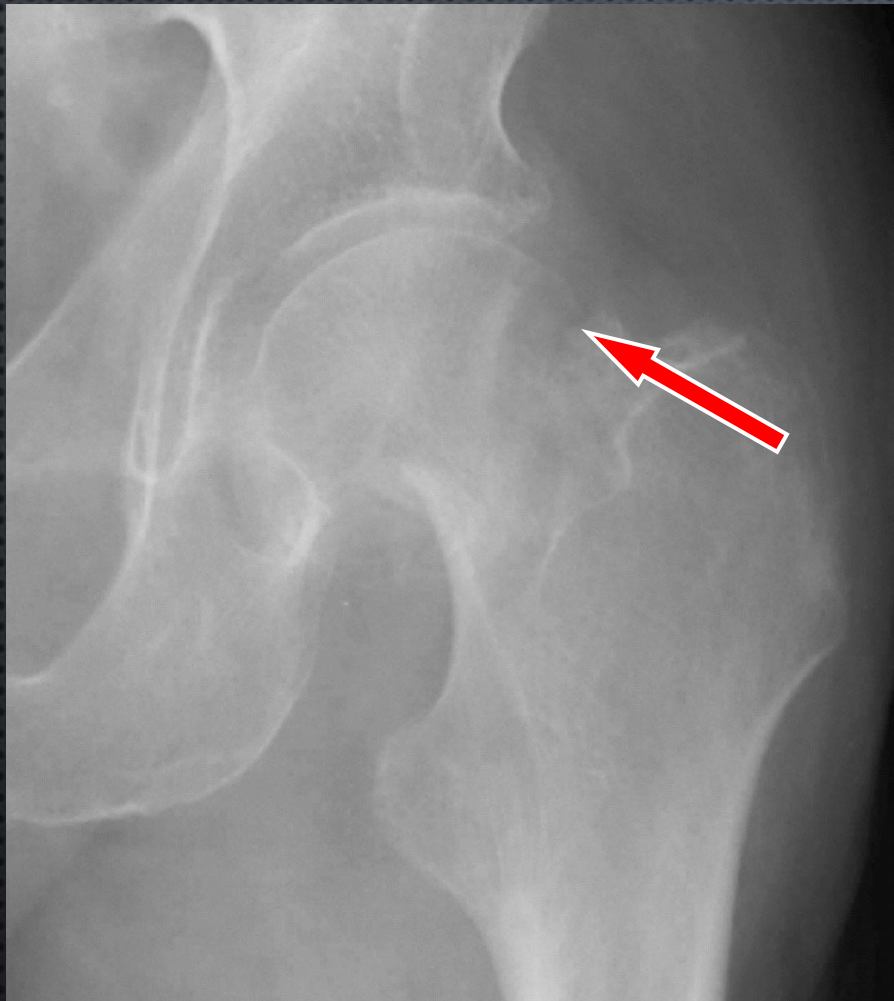


Type 1

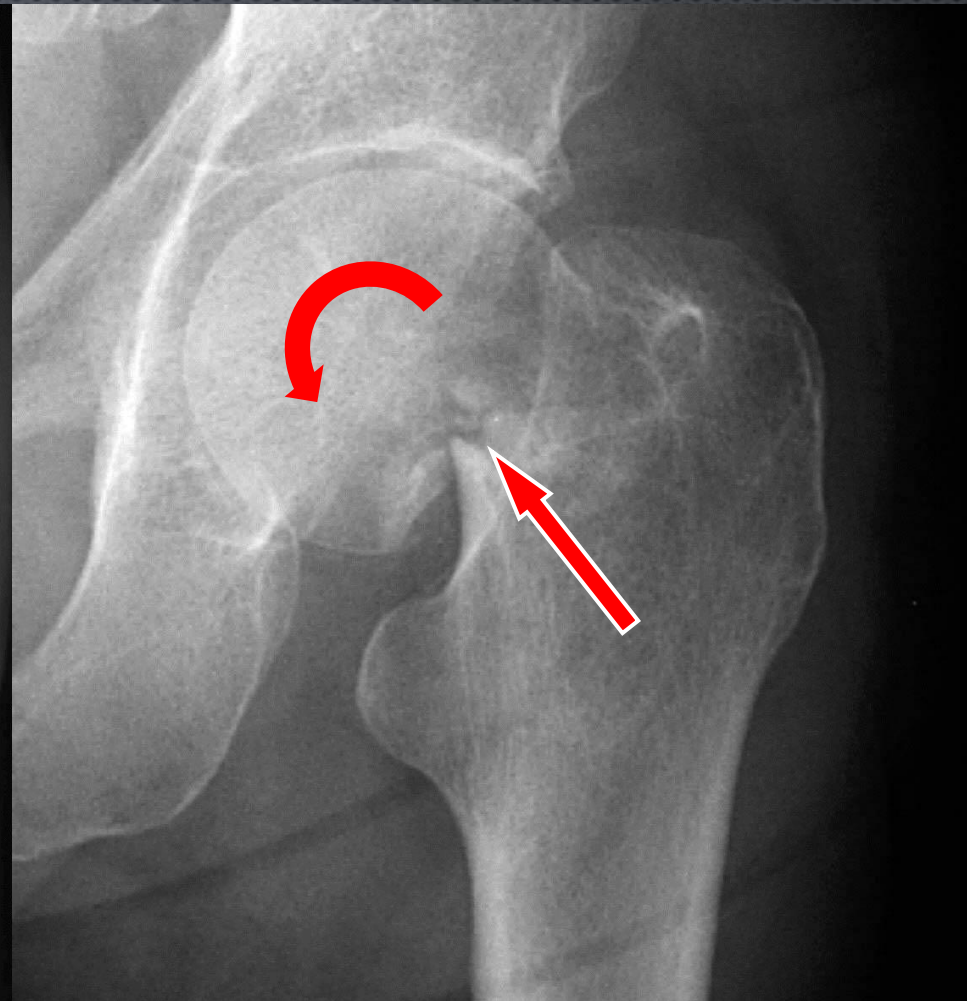


Type 2

Garden classification



Type 3

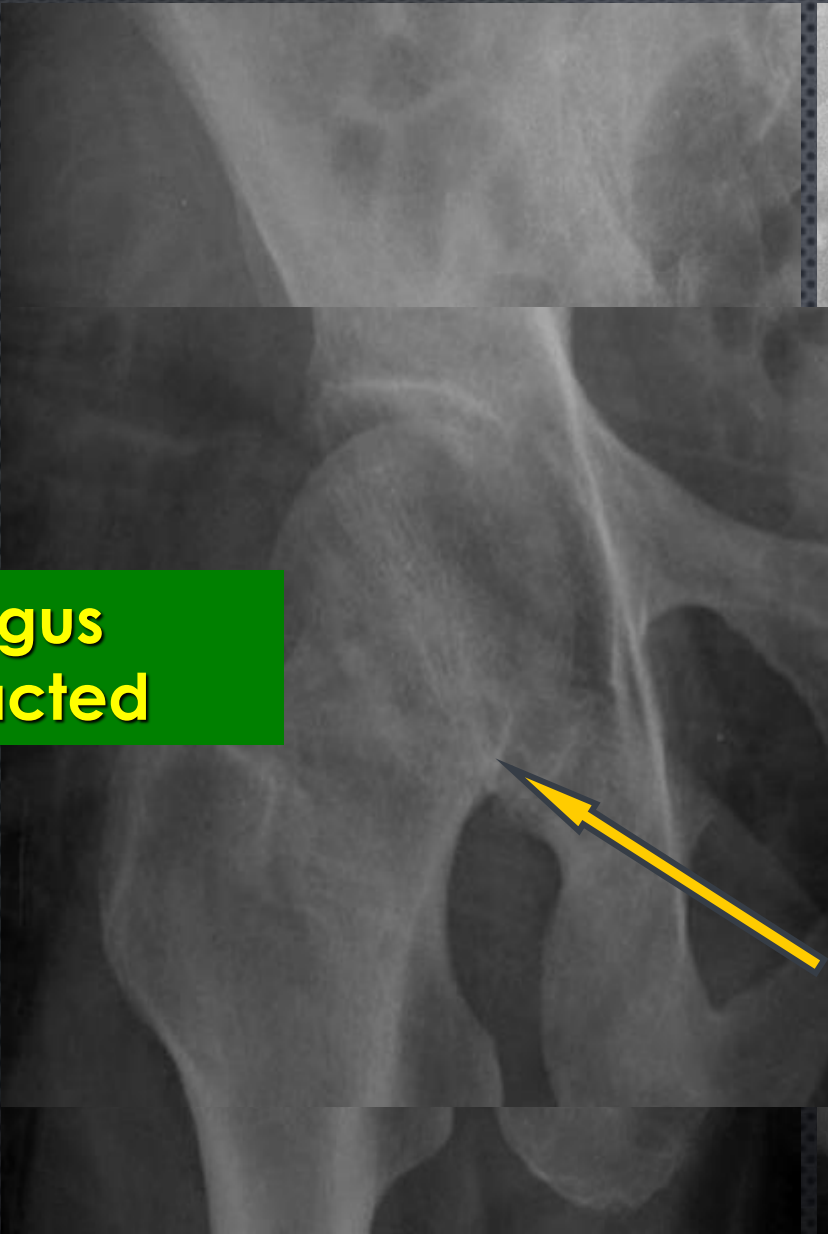


Type 4



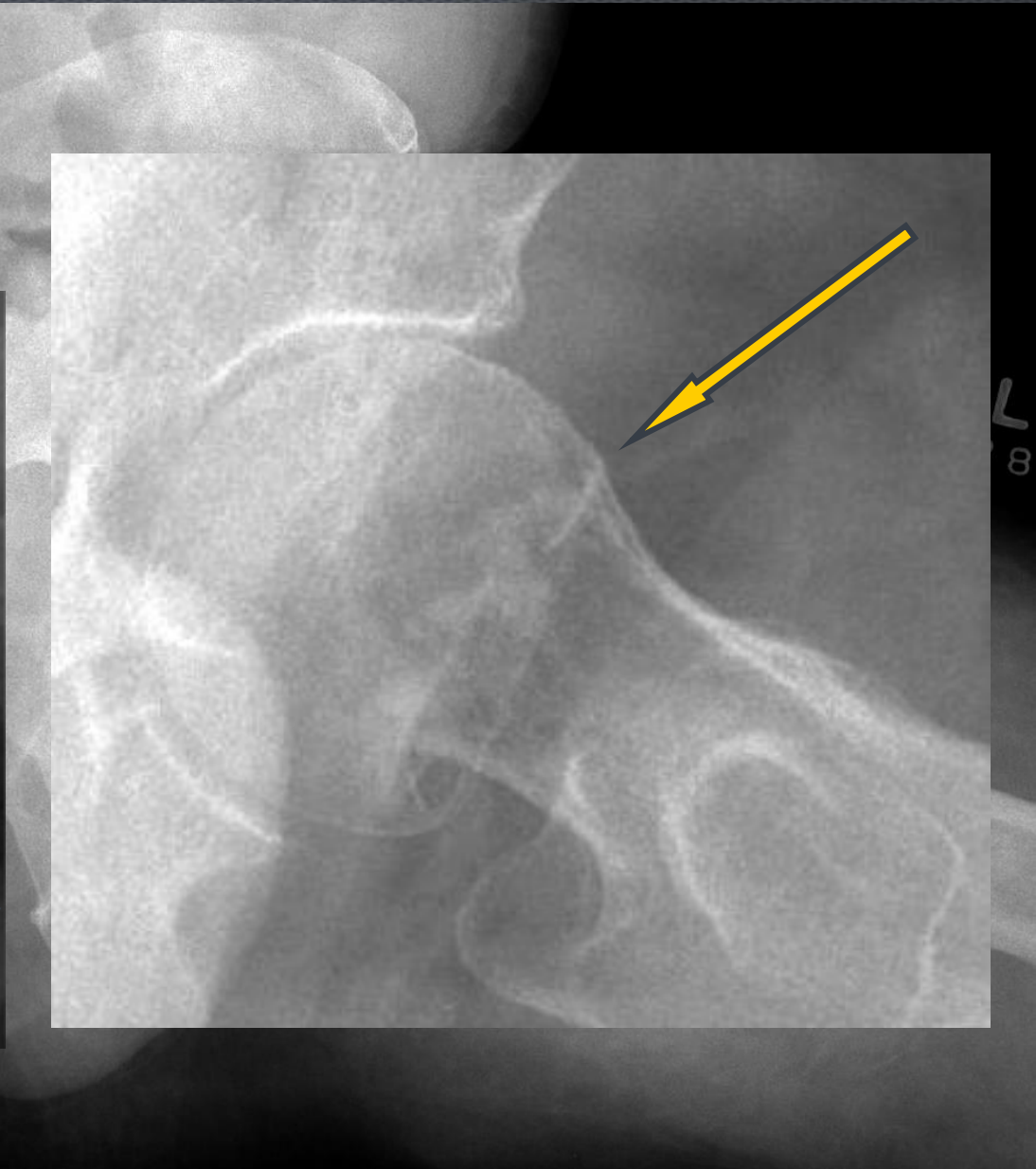
23 yr male - MVC





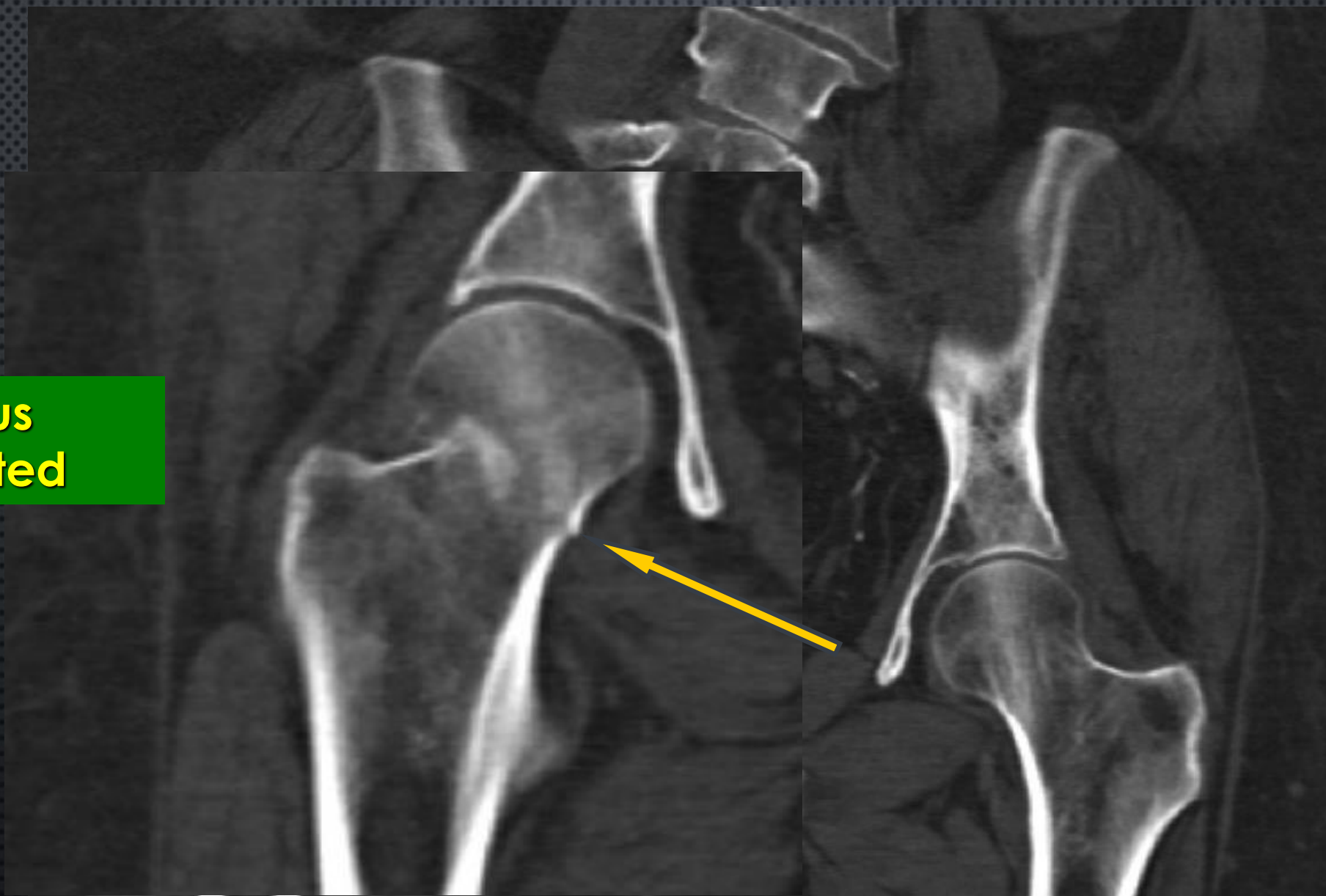
Valgus impacted

23 yr male - MVC

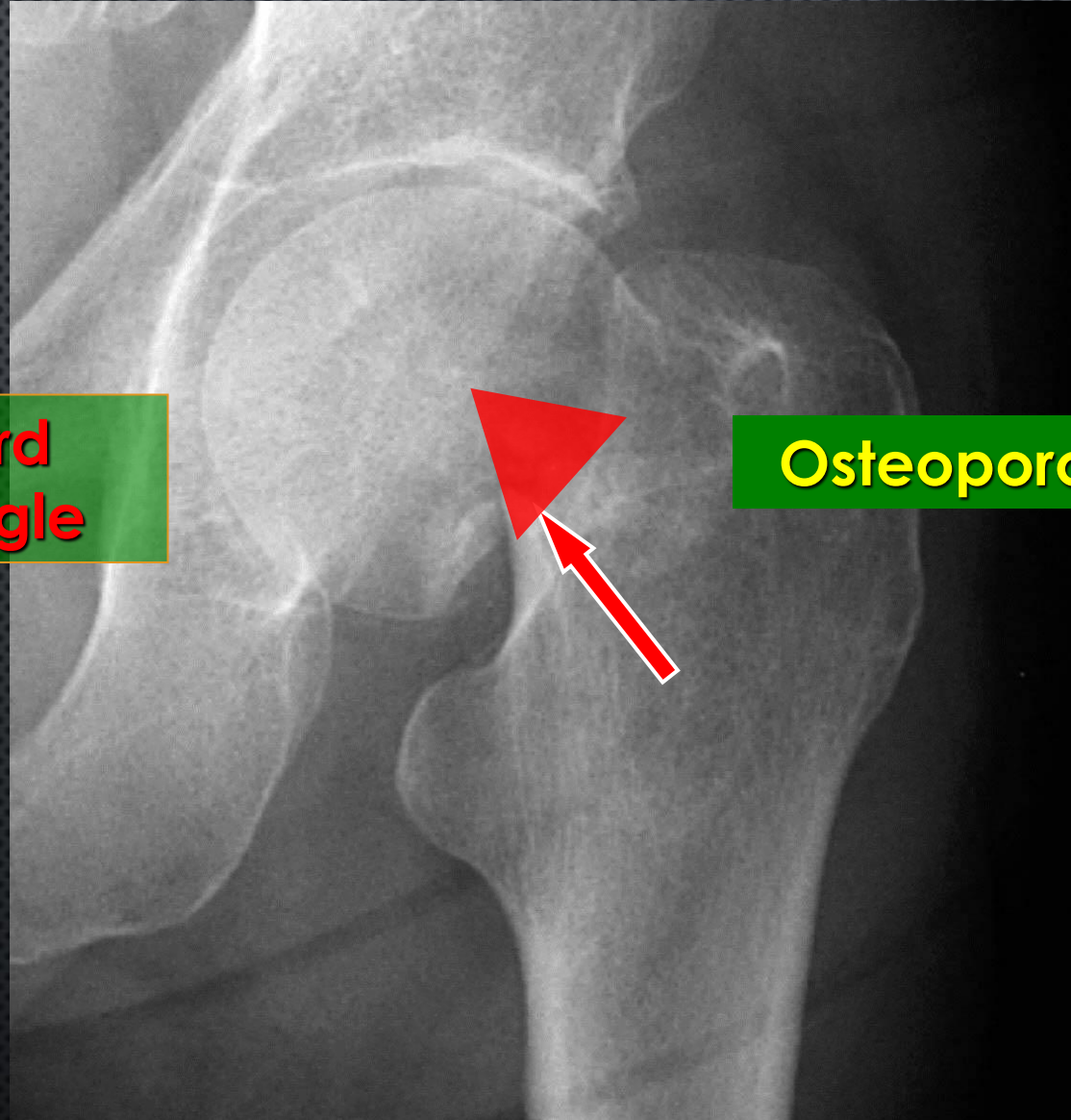


46 yr female - MVC

**Valgus
impacted**



77 yr female

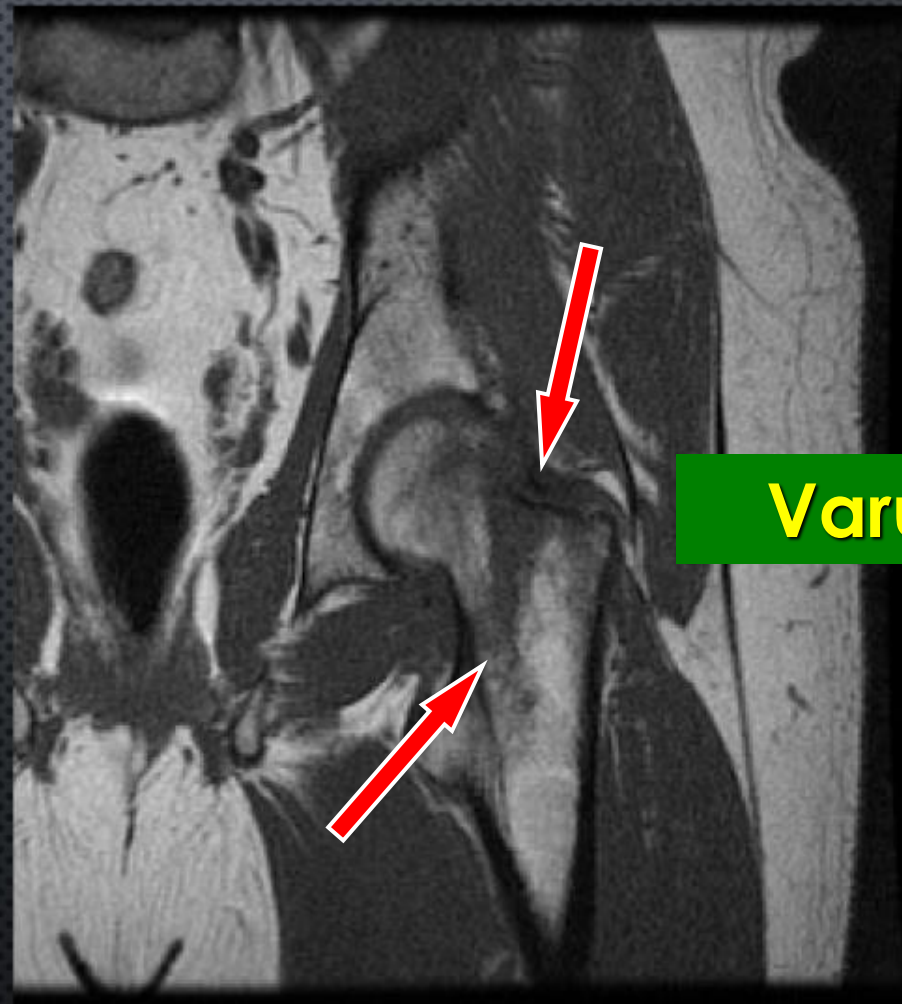
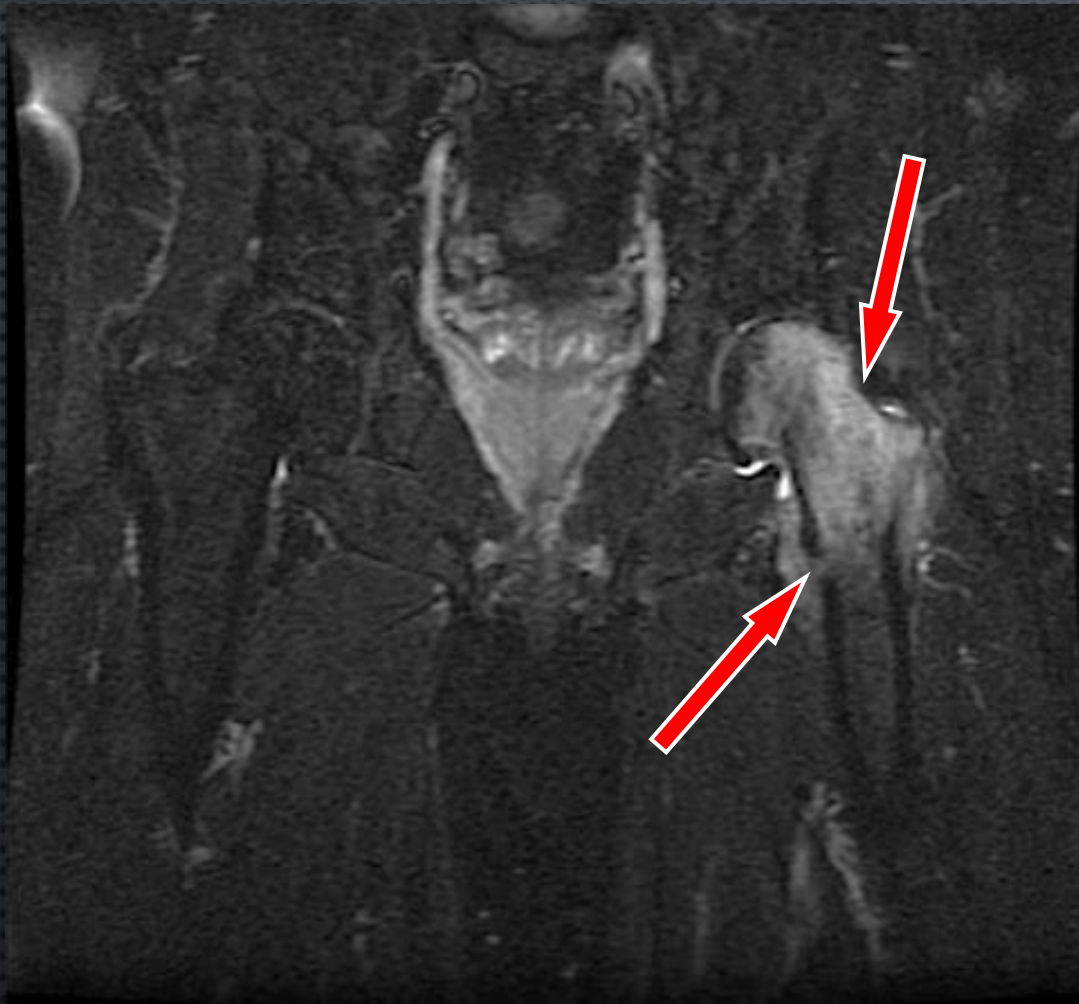


Ward triangle

Osteoporotic fx

Beware of the persisting hip pain
Time to notch it up...

MRI



Varus fx

71yr female persisting pain – questionable trauma

Neck of femur stress reaction



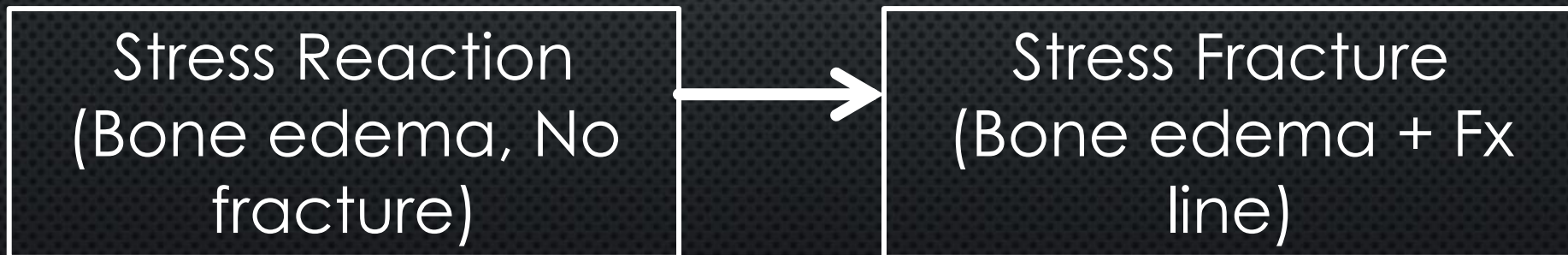
19yr male gymnast



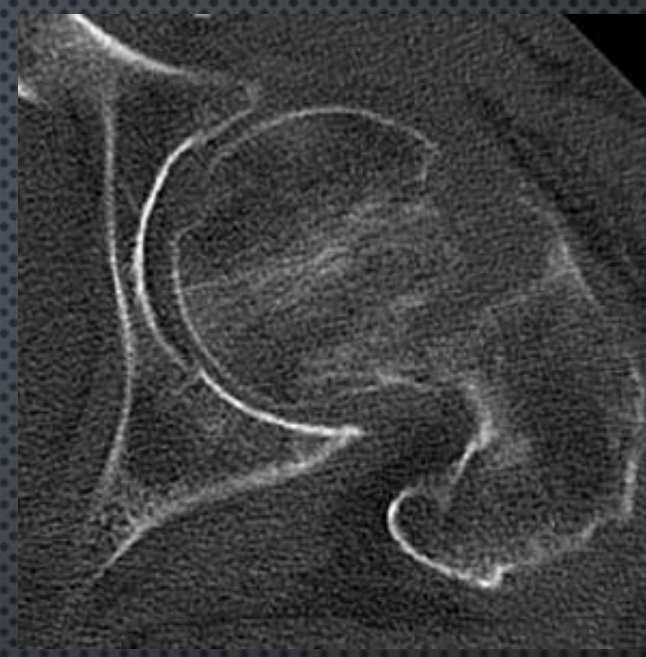
25yr female
Pain for 4weeks

Stress fracture

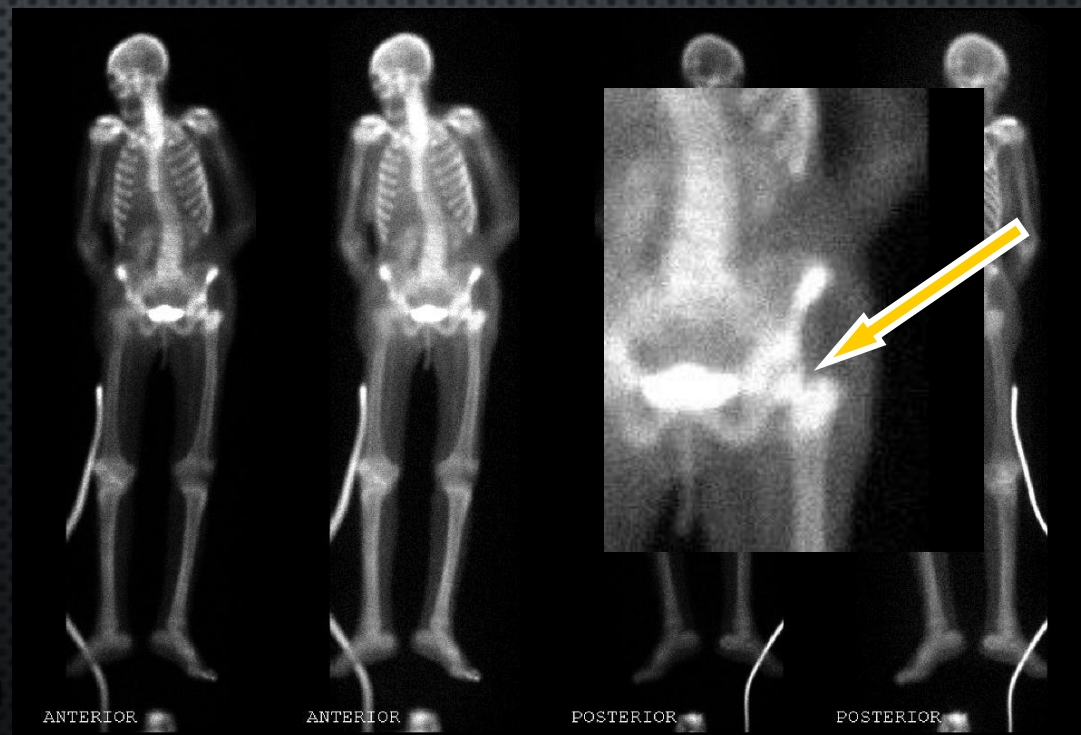
- Stress fracture, 2 types
 - **Fatigue**: abnormal stress, normal bone
 - **Insufficiency**: normal stress, abnormal bone
- Natural progression

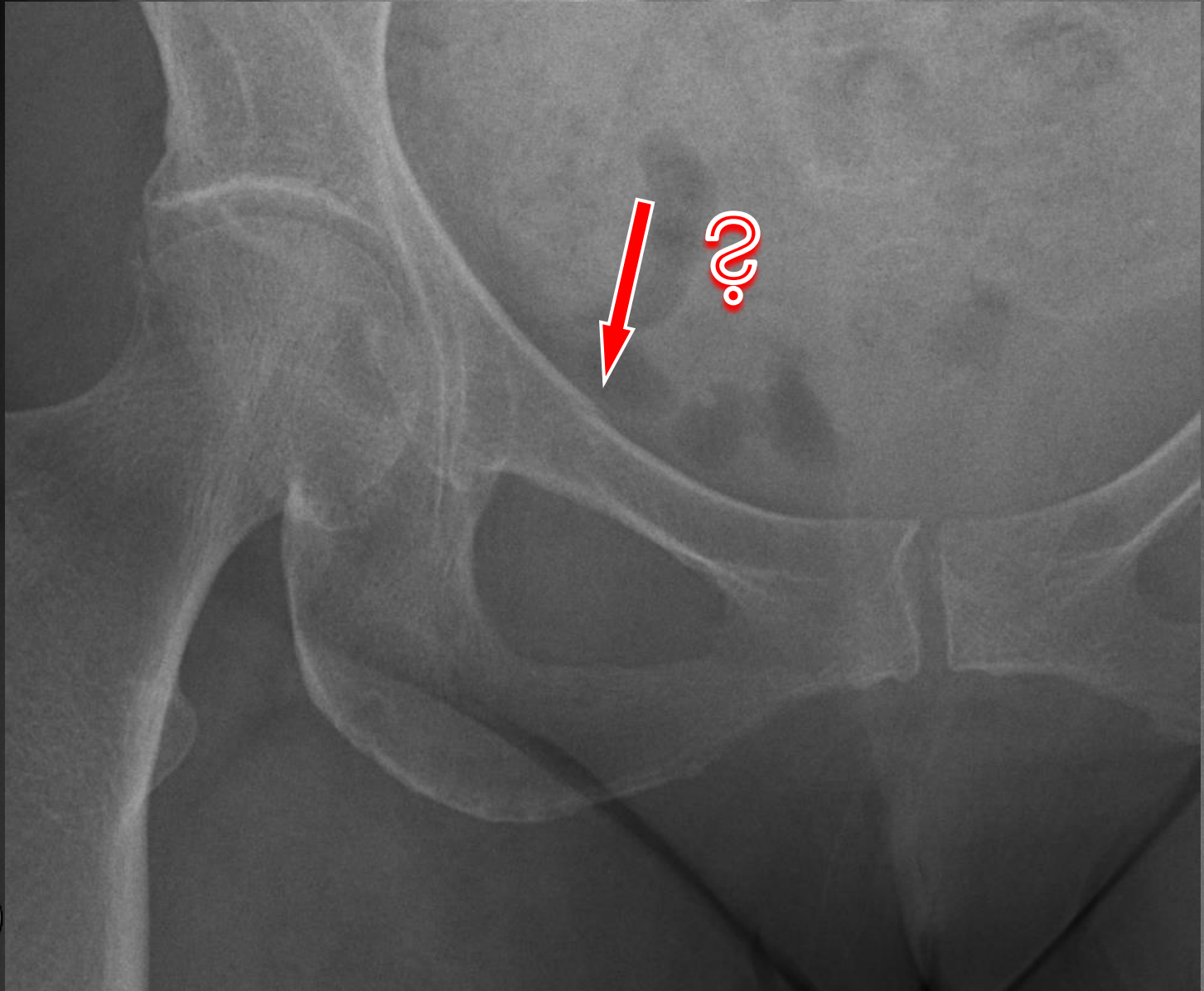


Path fx



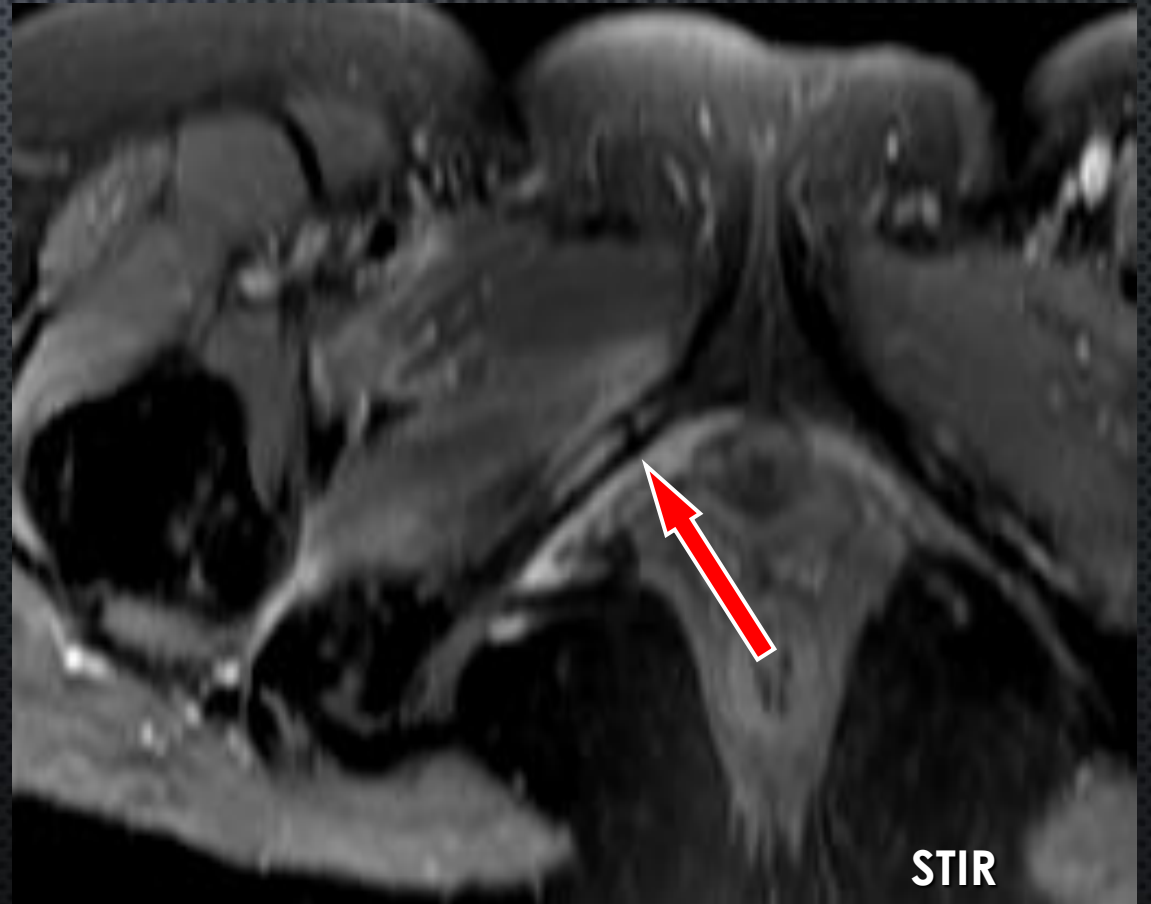
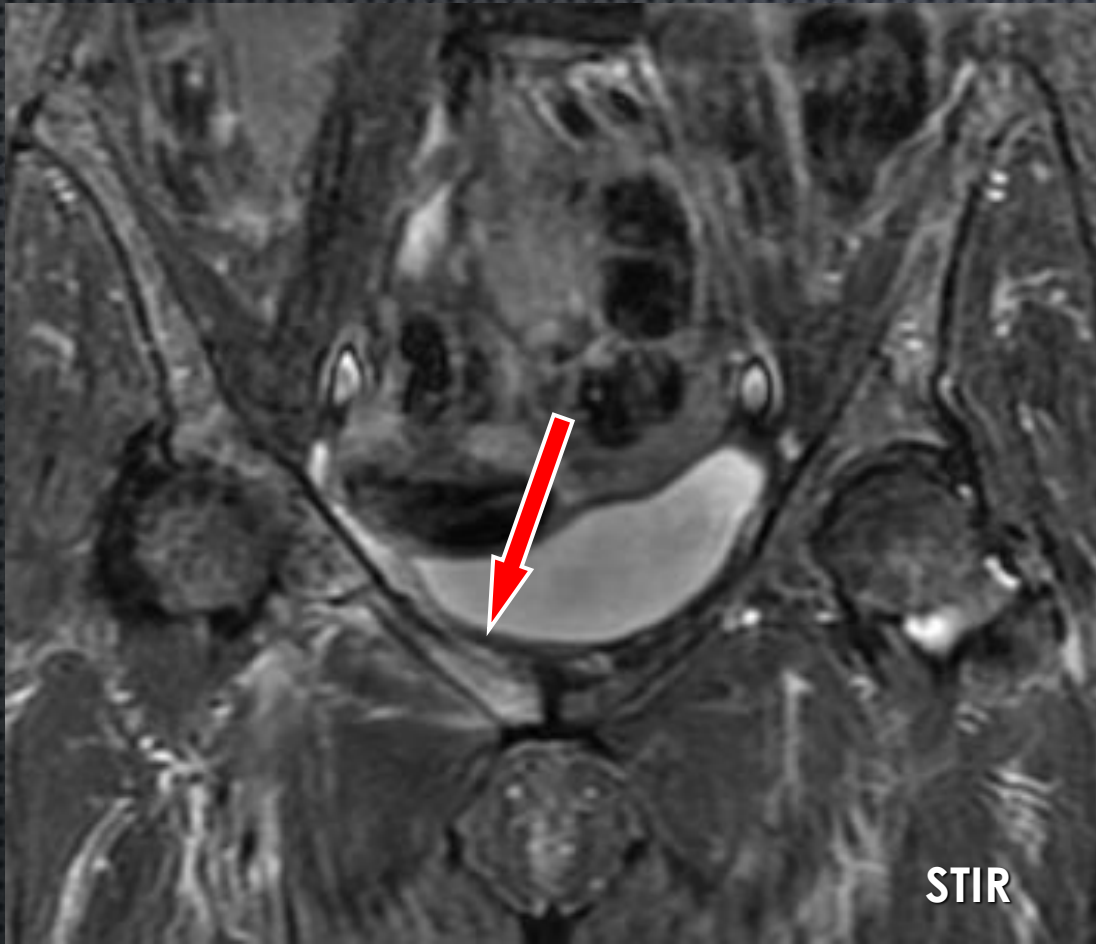
81yr female fall – H/O lung ca

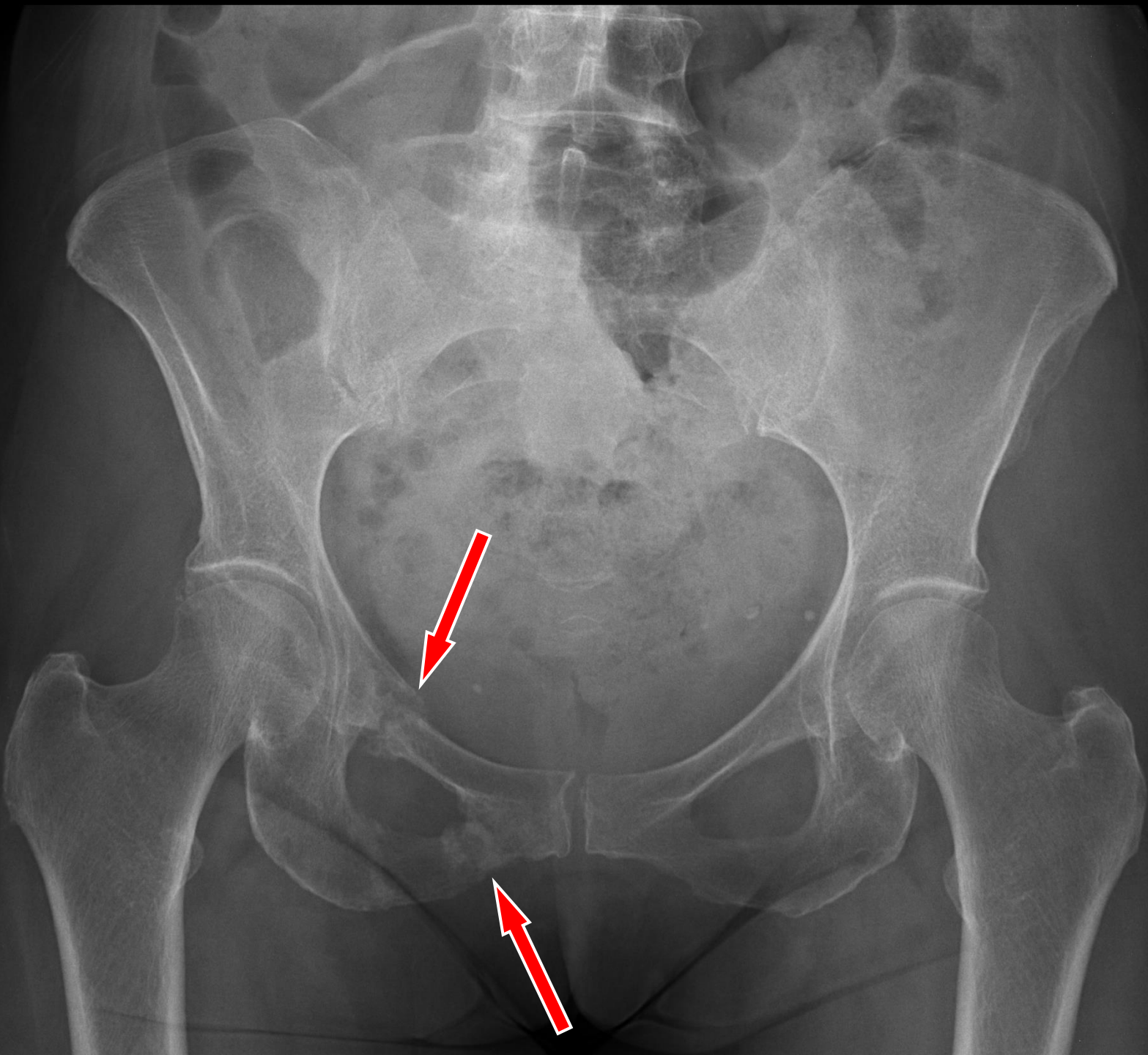




(R)

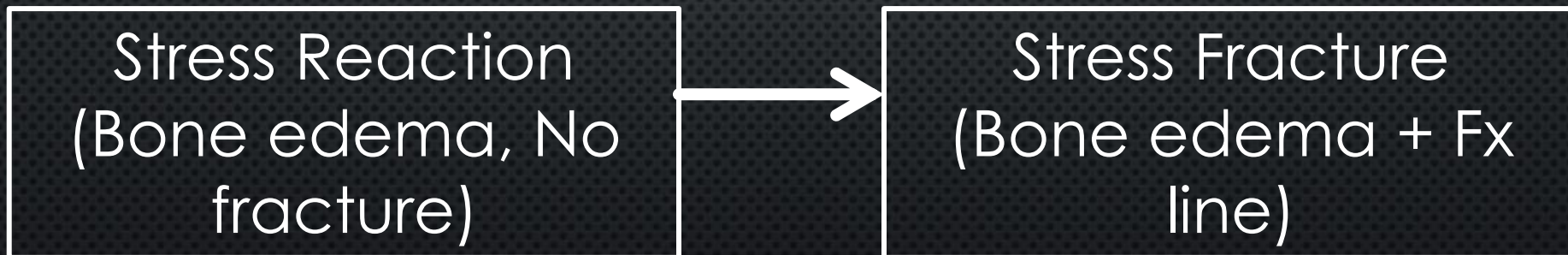
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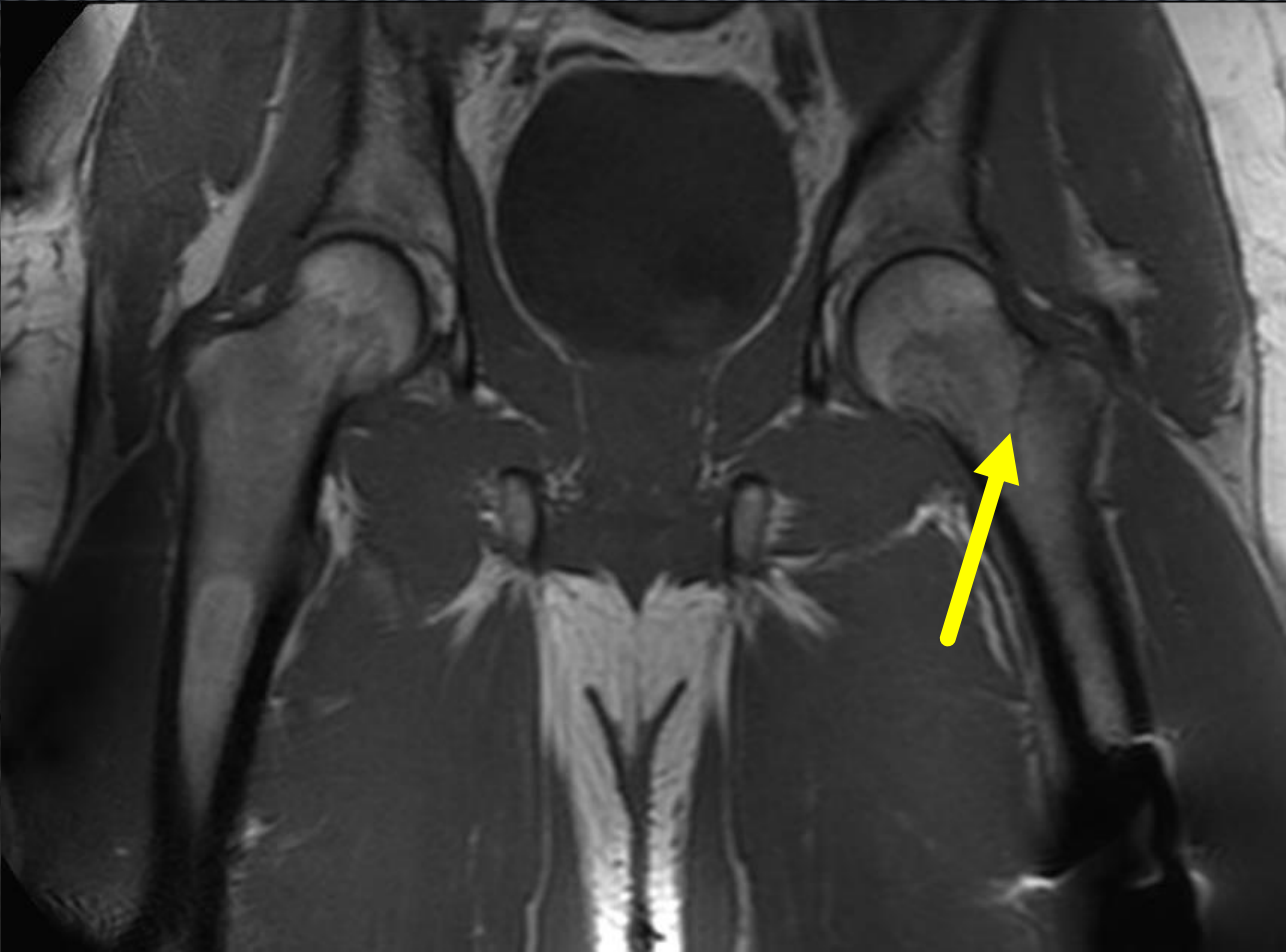
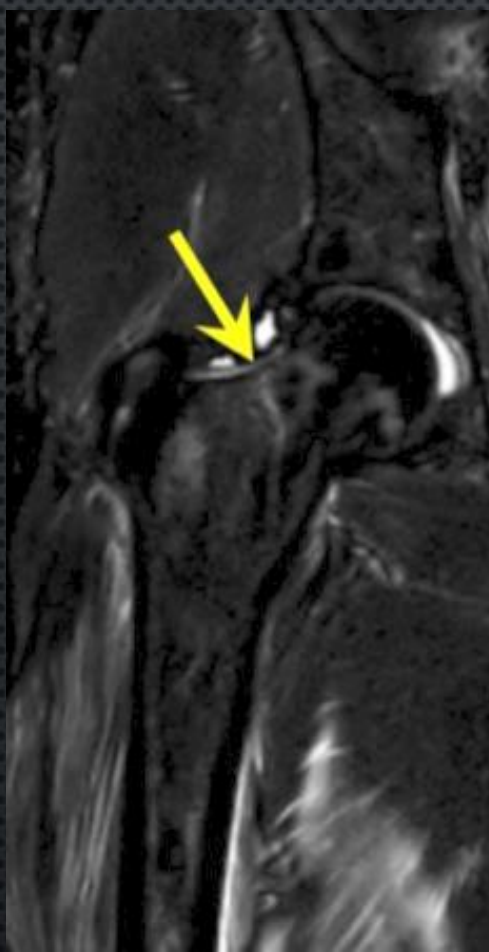


Pubic stress fracture

- Stress fracture, 2 types
 - **Fatigue**: abnormal stress, normal bone
 - **Insufficiency**: normal stress, abnormal bone
- Natural progression

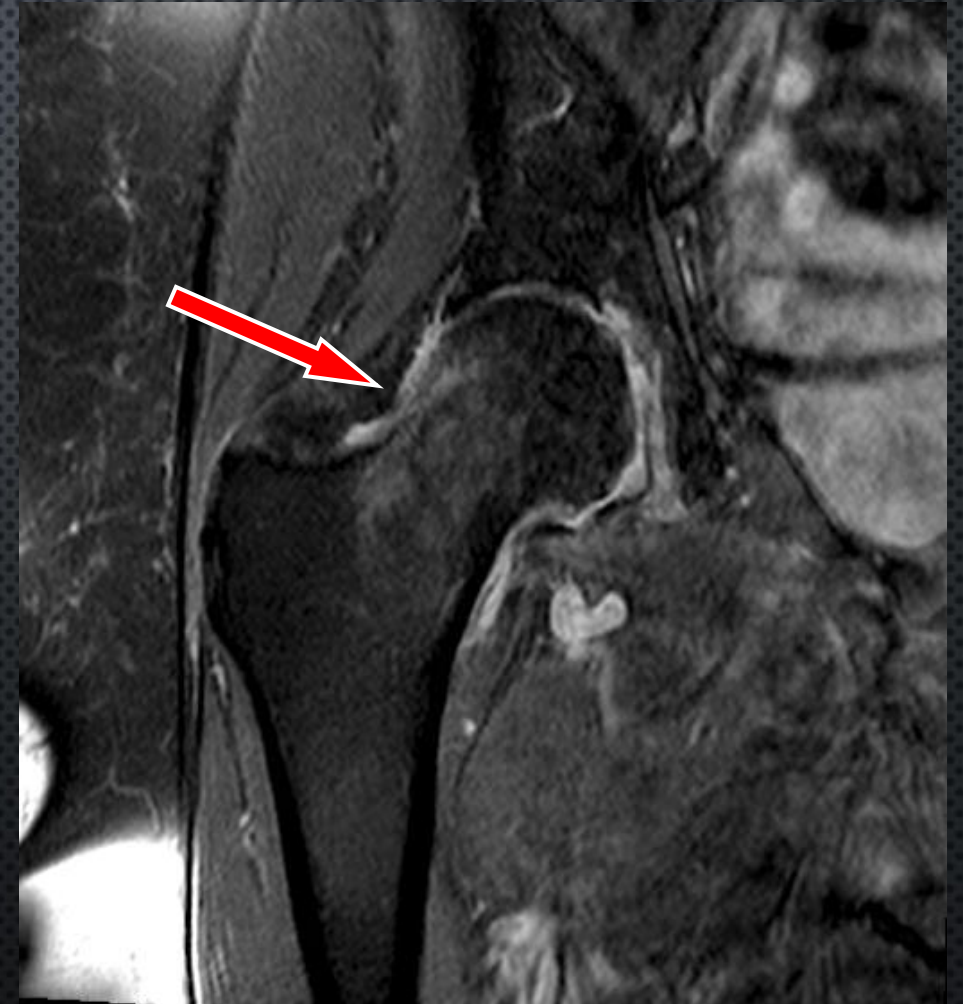


High velocity mid shaft of femur fx... NECK??



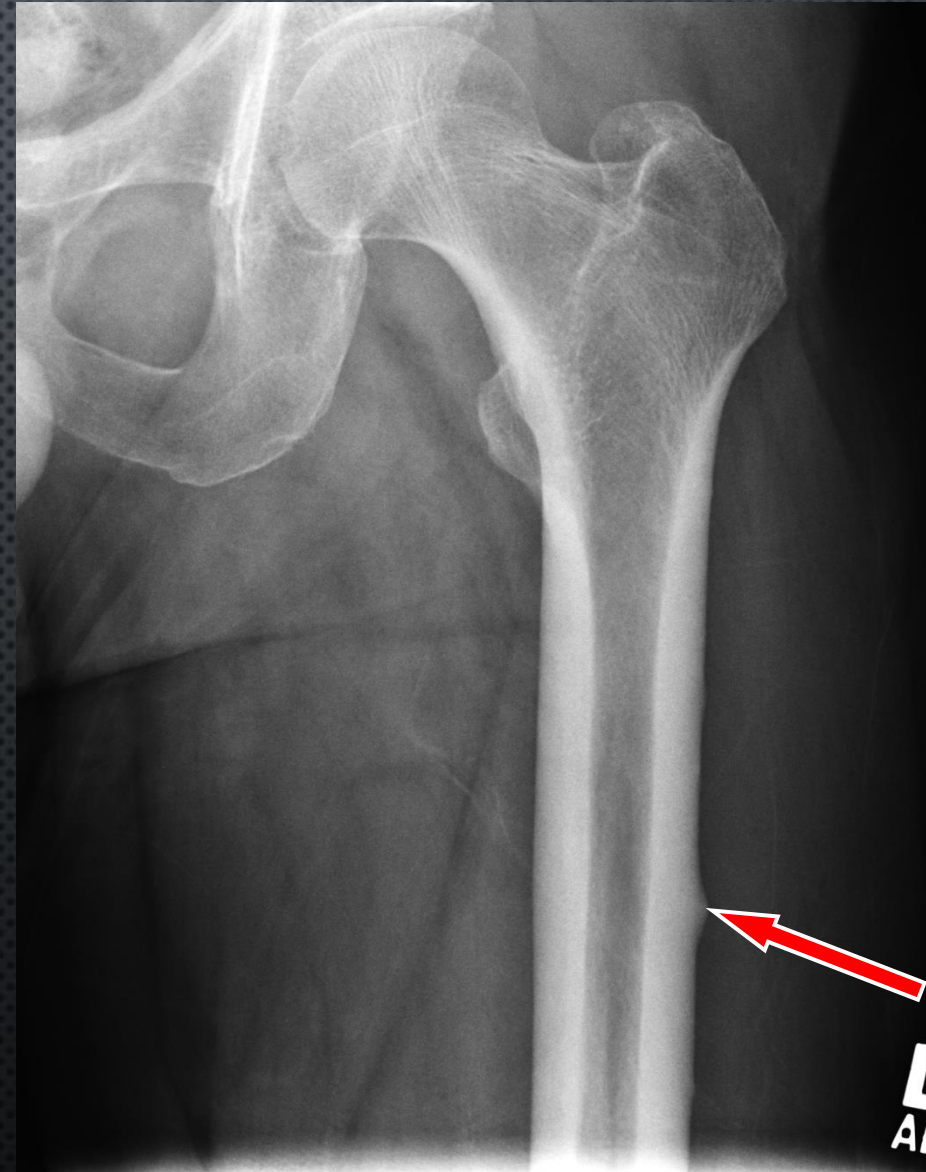
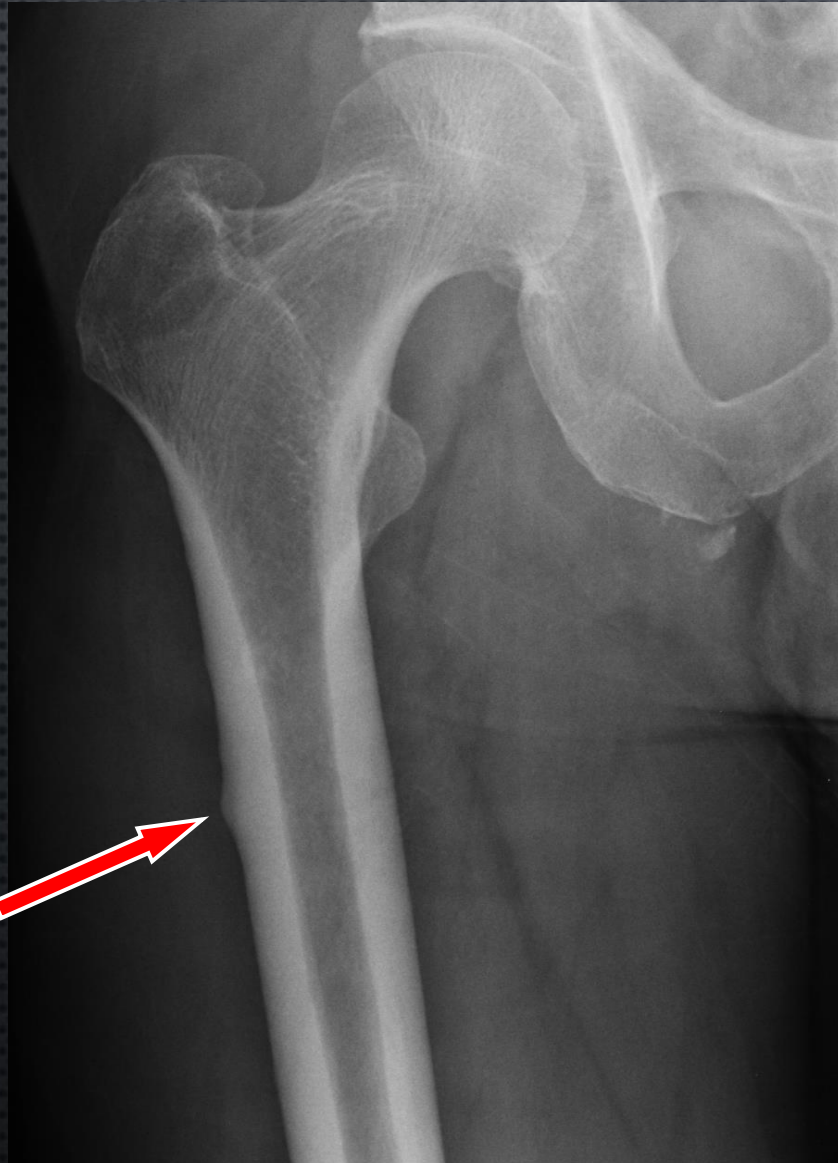
So what is clinically relevant in NOF fxs?

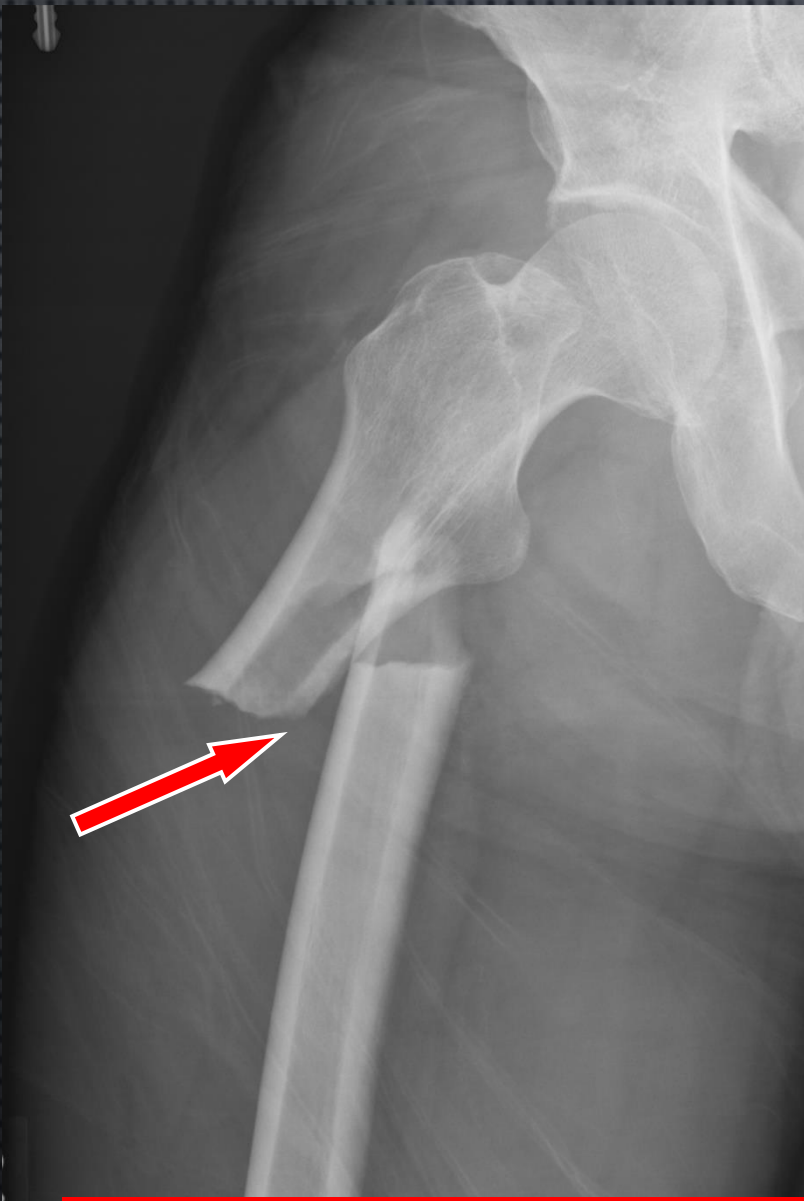
- Location – subcapital / basicervical / Calcar
- Complete / incomplete / displacement
- Varus type – lateral cortex involvement
- Occult - **MRI**



Moving a bit more distal

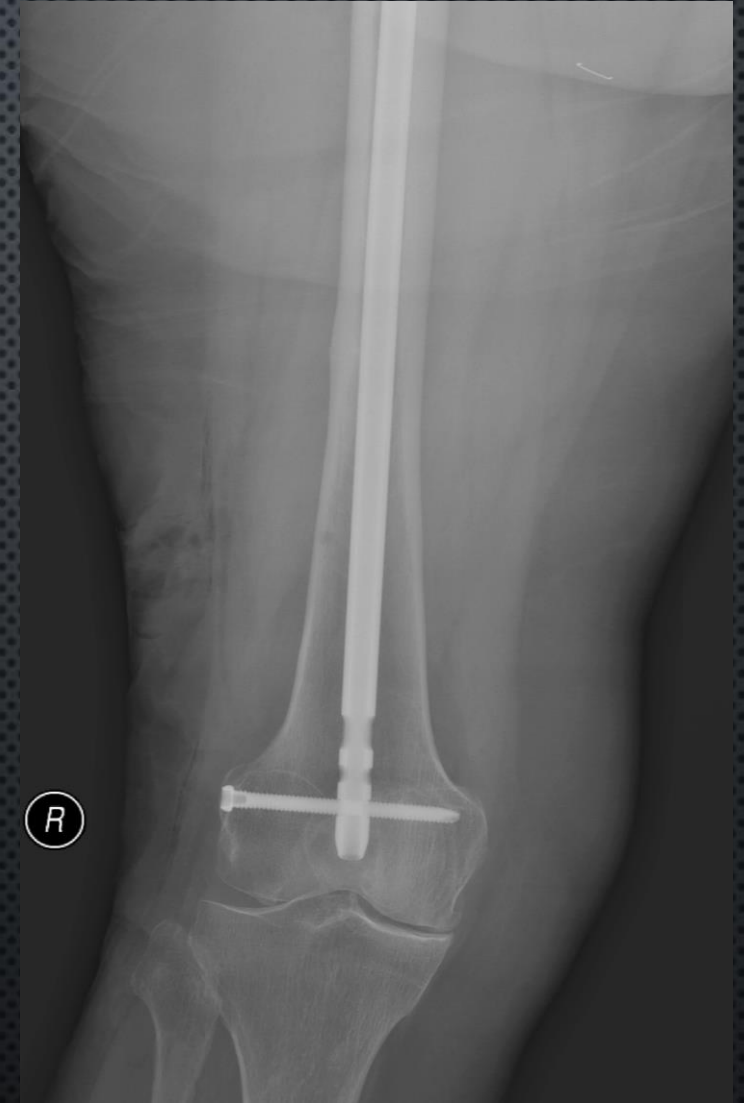
Bilateral dull ache in the hips – 2 months





Bisphosphonate related fracture

Rt hip pain- 3 months



Bisphosphonate related fracture – atypical location

Bisphosphonate related femoral fracture

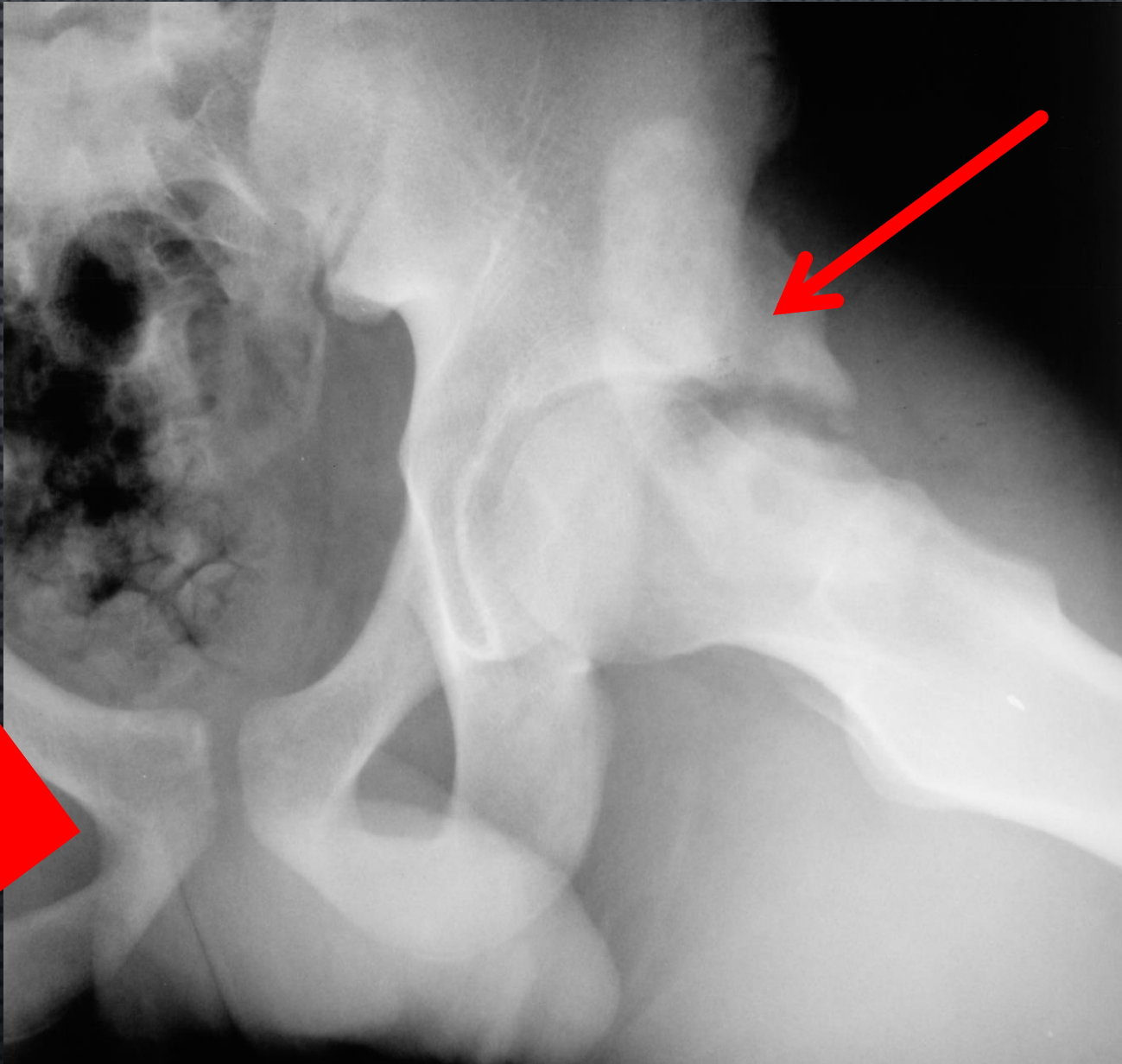
- Typically history of bisphosphonate use for >2 years
- Typically bilateral
- Classic location
 - Cortical beaking lateral cortex - subtrochanter femur
 - Progresses stress fracture → complete fracture



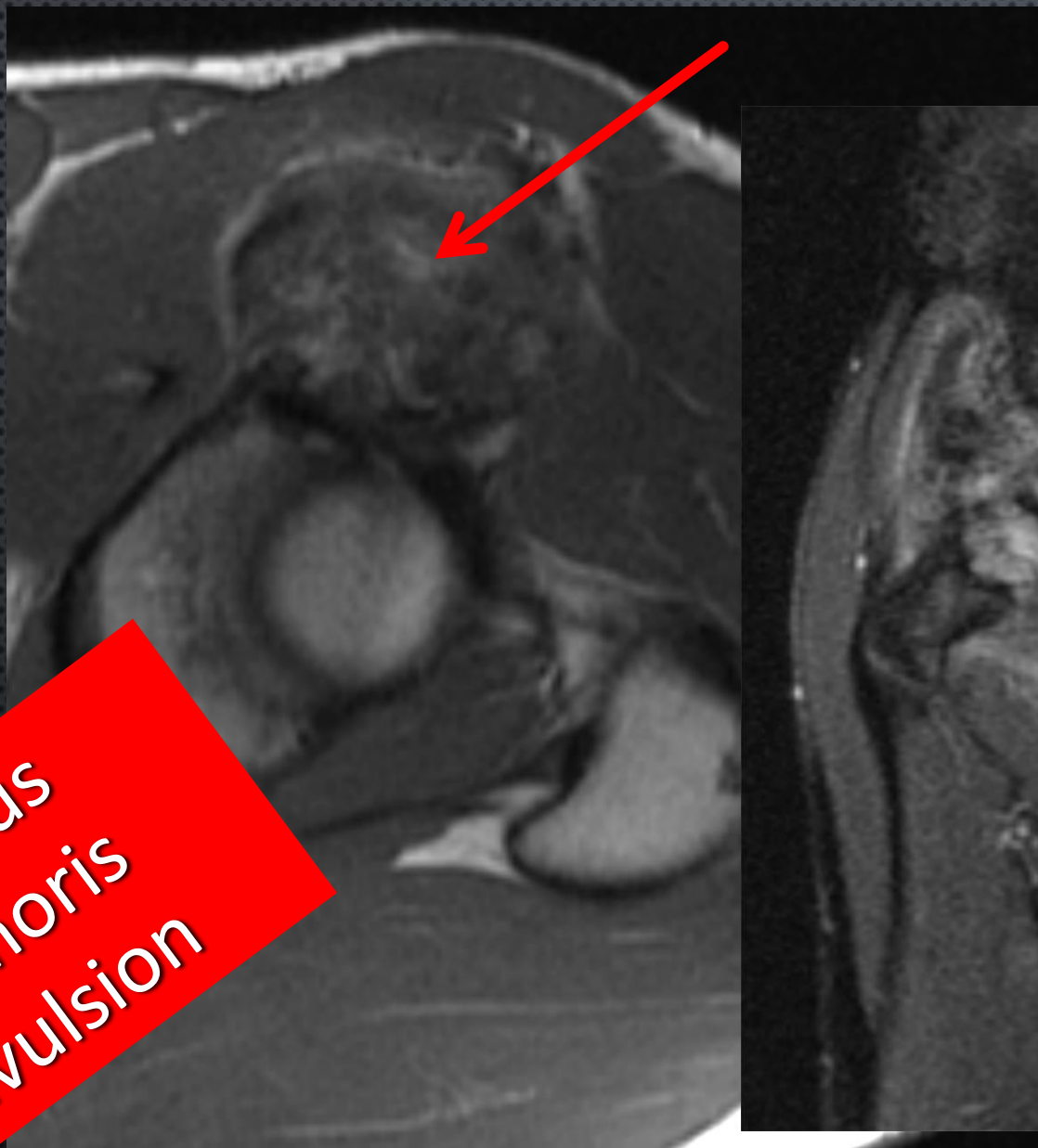
- Intramedullary nailing – prophylactic
- Teriparatide

Lets' move a bit away from the femur

25 year old ... trip and fall 3+ weeks ago
Hip pain....

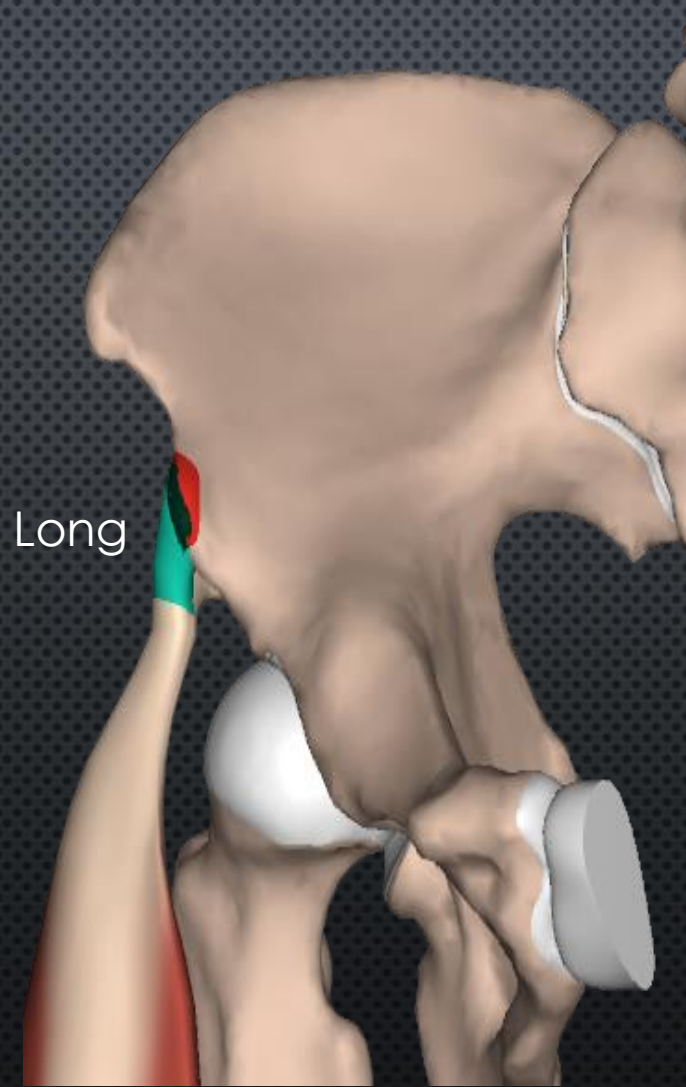
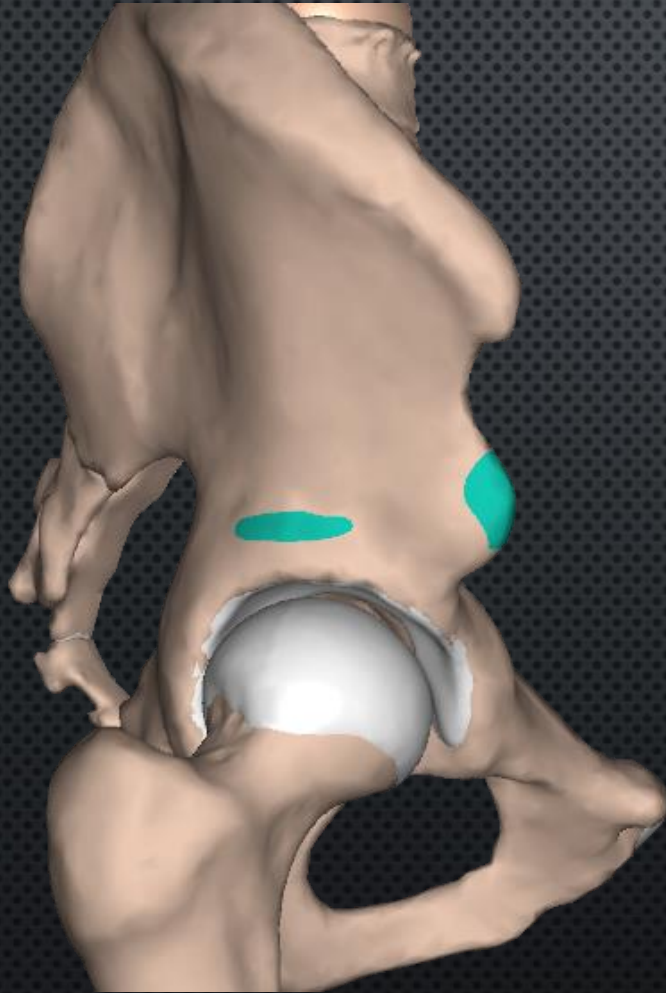


Rectus femoris avulsion

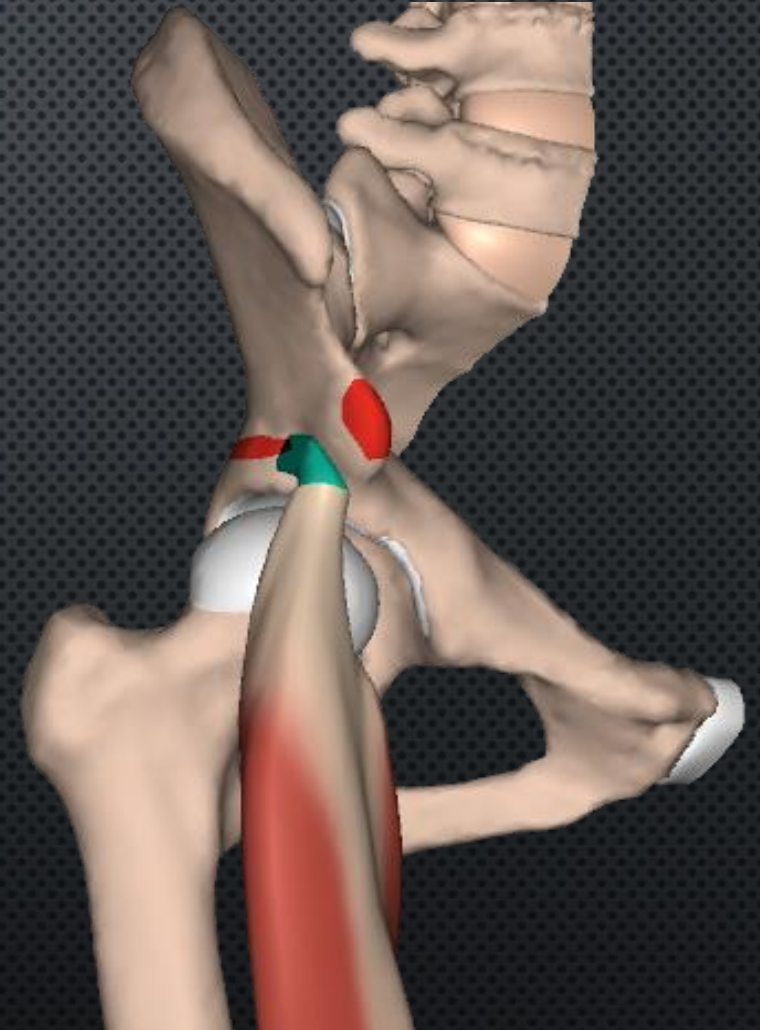


Rectus
femoris
avulsion

Rectus femoris attachments



Long / Straight head



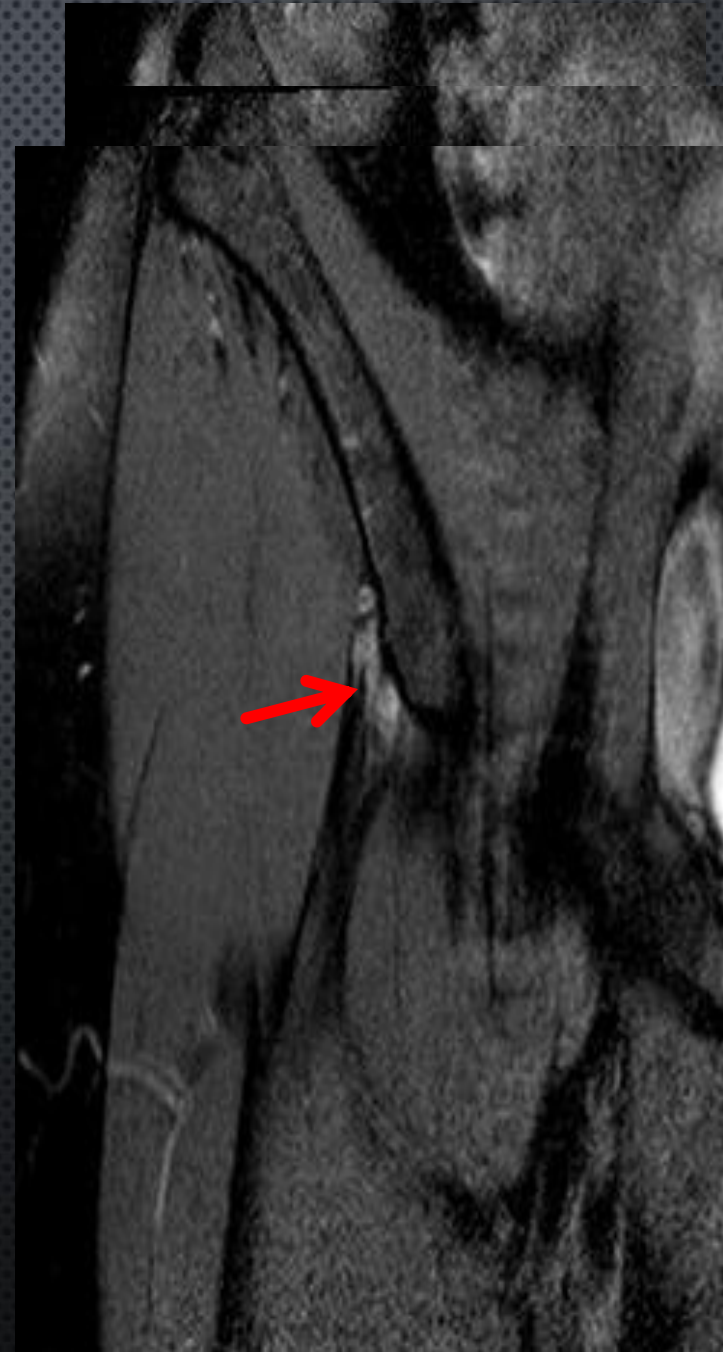
Reflected head

Rectus femoris tear

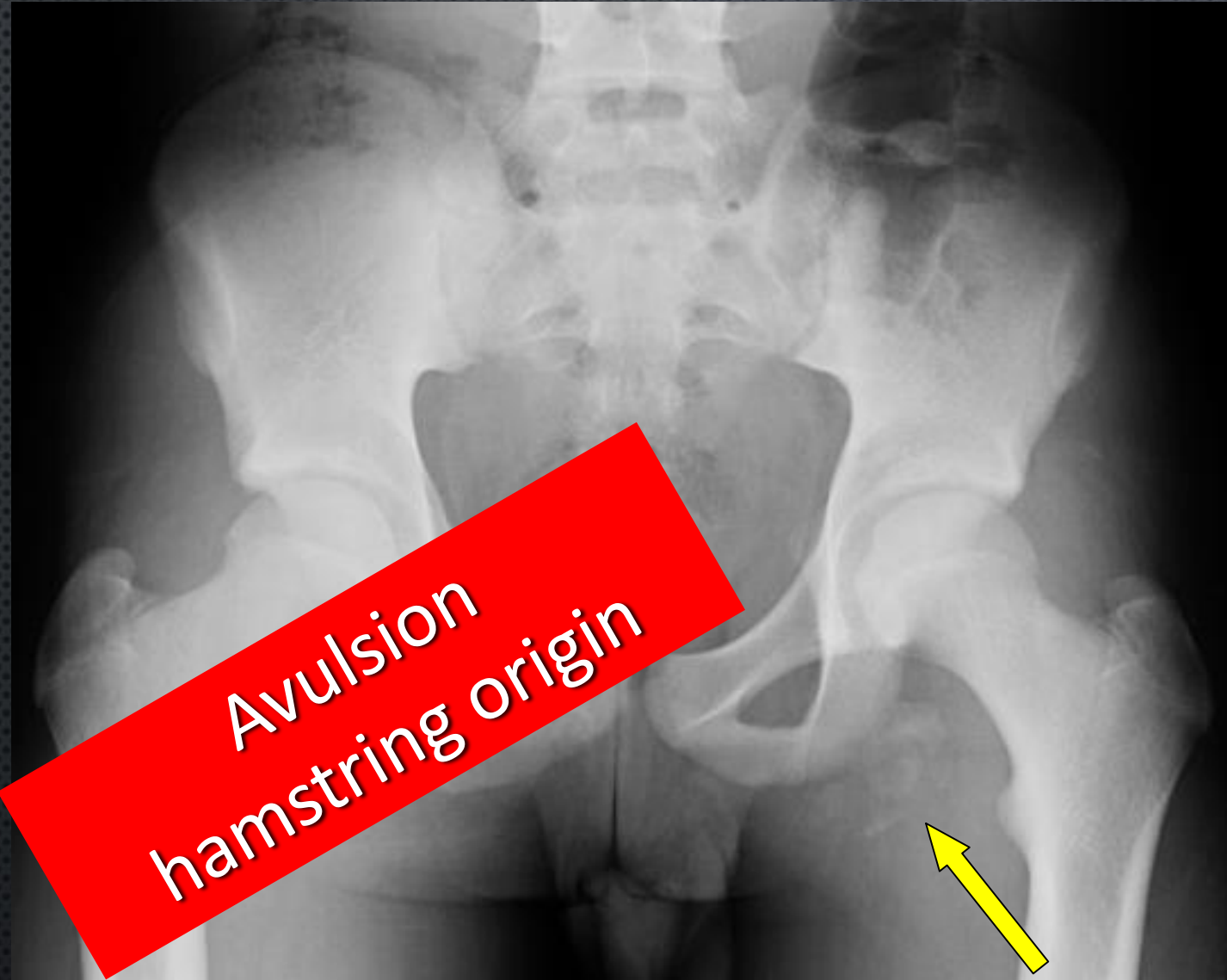
- Acute / chronic
- Partial or complete
- Bony fragment – if so how far displaced

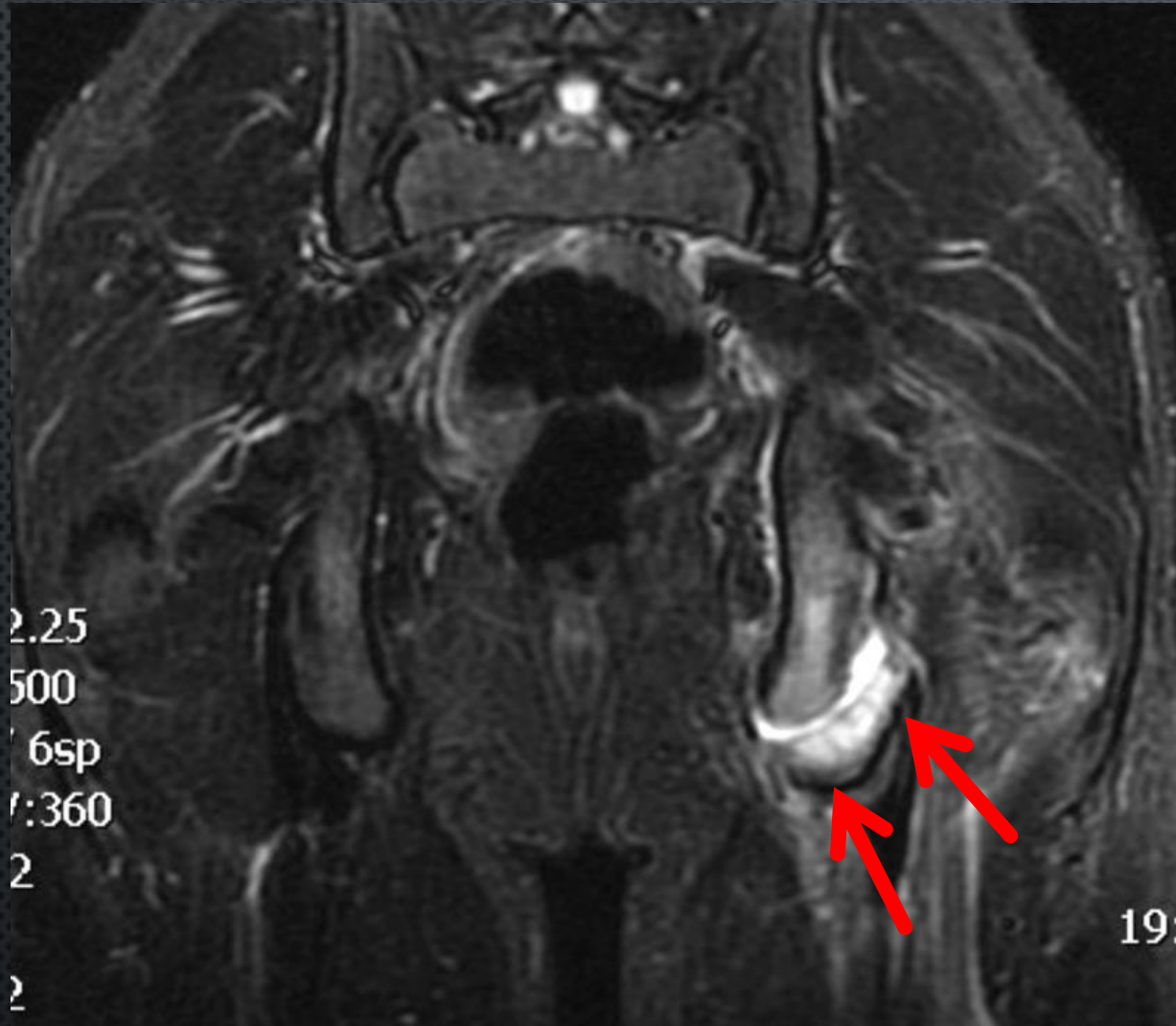
Rx

- Rest /conservative
- Surgical fix



Fall from horse .. Hip pain...





**Complete avulsion
hamstring origin**

Hamstring avulsion... What is relevant

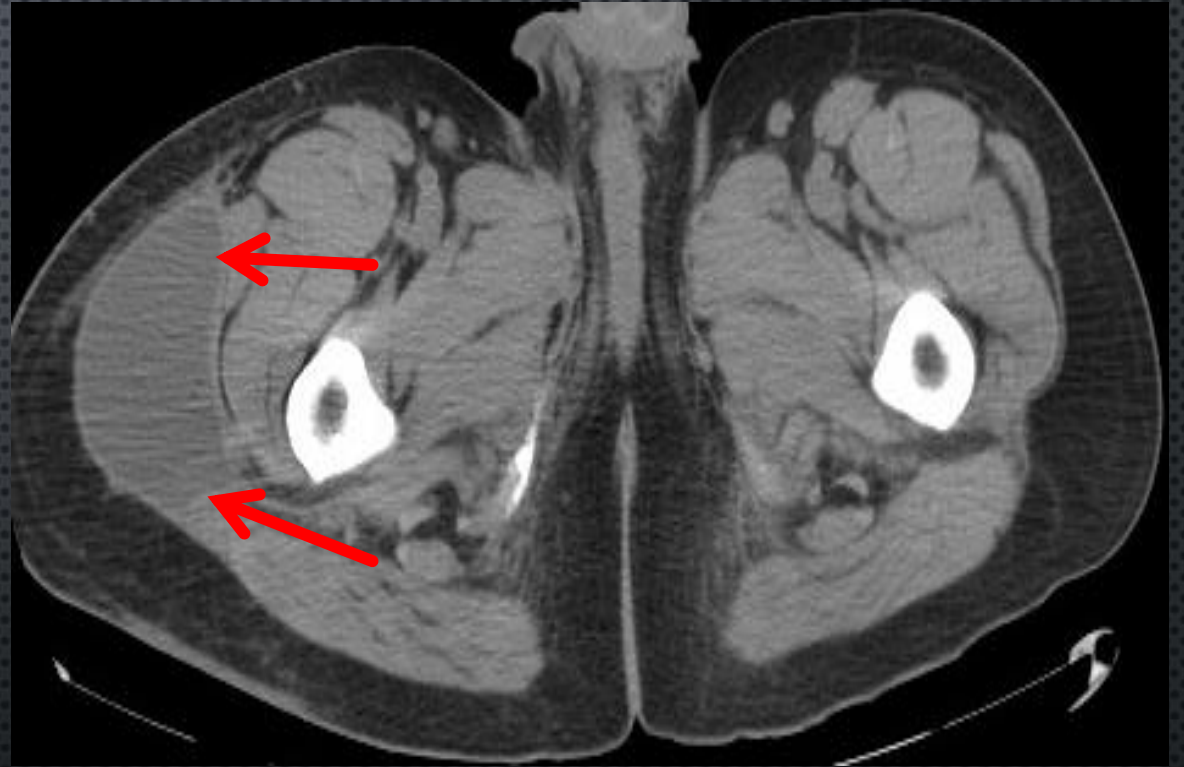
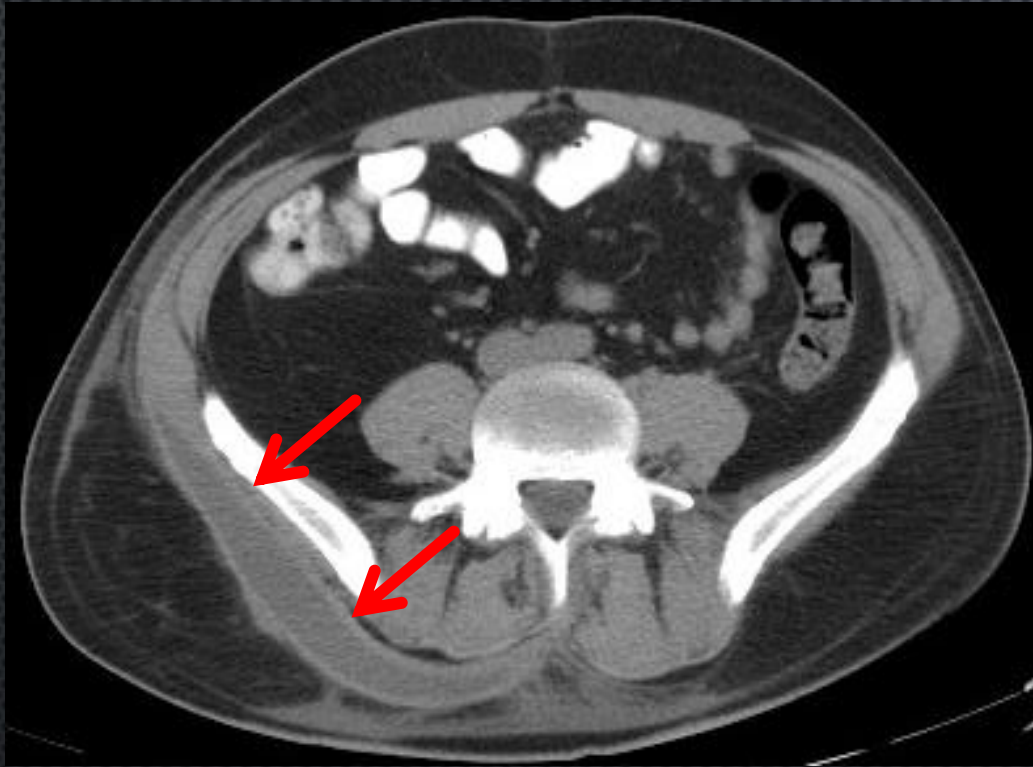
- Partial or complete
- Bony fragment +/-
- Distance of retraction

R_x

- If more than 2cm displaced – consider surgery

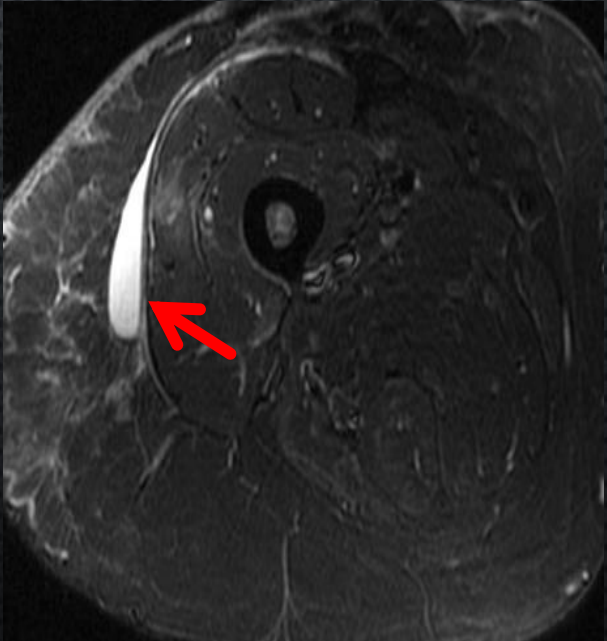
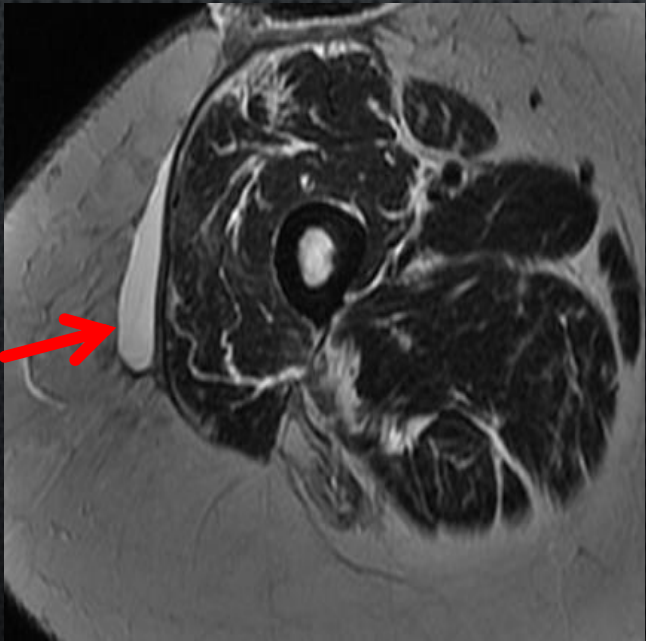


Motor vehicle collision .. Hip pain...



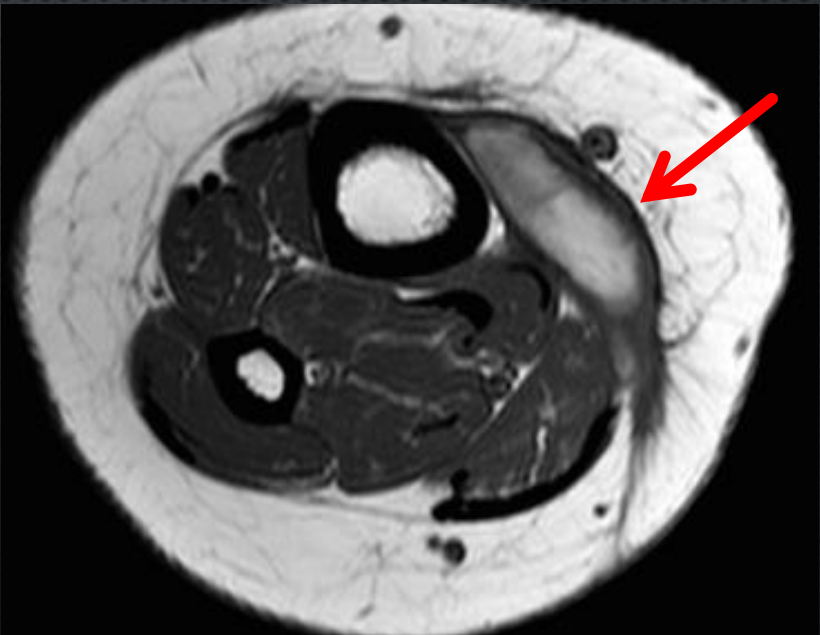
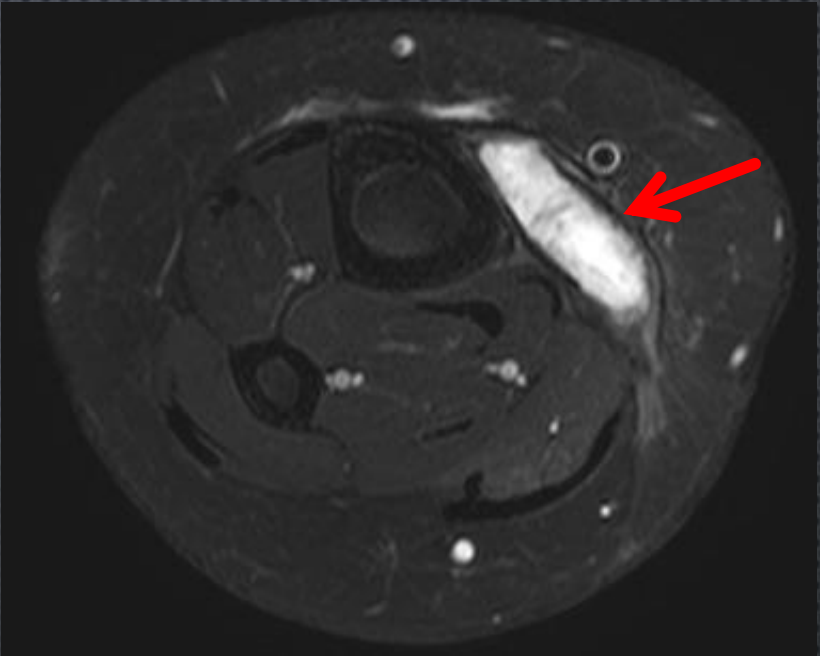
Morel-Lavallée lesion

Morel-Lavallée lesion



10yr

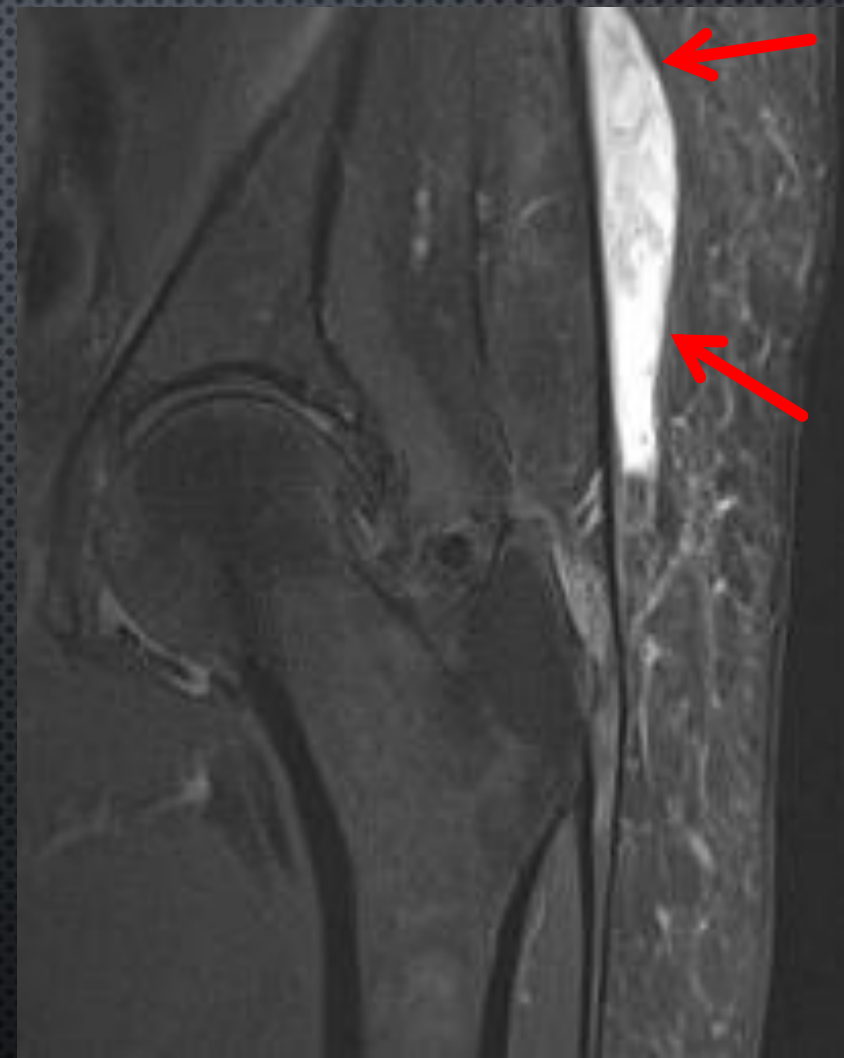
Morel-Lavallée lesion



Morel-Lavallée lesion



T1



T2

Morel-Lavallée lesion

- Traumatic degloving injury - shear
- Collection of blood & lymph
- Inflammatory reaction creates a pseudocapsule
- **Complications** – infection



Summary...

Clinically
relevant

- Dislocations - Lesser troch = direction of rotation
- Femoral head
 - vascularity
 - Weightbearing zone involvement
- Beware of the varus (lateral neck) fxs!
- Subtroch – atypical fxs (bisphosphonate)
- Other causes – avulsions / soft tissue lesions

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Thank you for your attention!

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