LUMPS, BUMPS AND MASSES, HOW TO AVOID MISSING SOMETHING BIG

Ginger E Holt, MD

Centennial Medical Center/ Sarah Cannon Cancer Center

Nashville, TN

https://www.youtube.com/@gingerholt6078

ORTHOPAEDIC TUMORS: HOW TO STAY OUT OF COURT

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LUMPS, BUMPS AND MASSES, HOW TO AVOID MISSING SOMETHING BIG

- Sarcoma
  - Definition/Presentation
- Consequences of missing a sarcoma
- What to do if you miss a sarcoma
- How to identify a sarcoma
  - Sarcoma I.D.
  - Sarcoma mimicks

SARCOMA

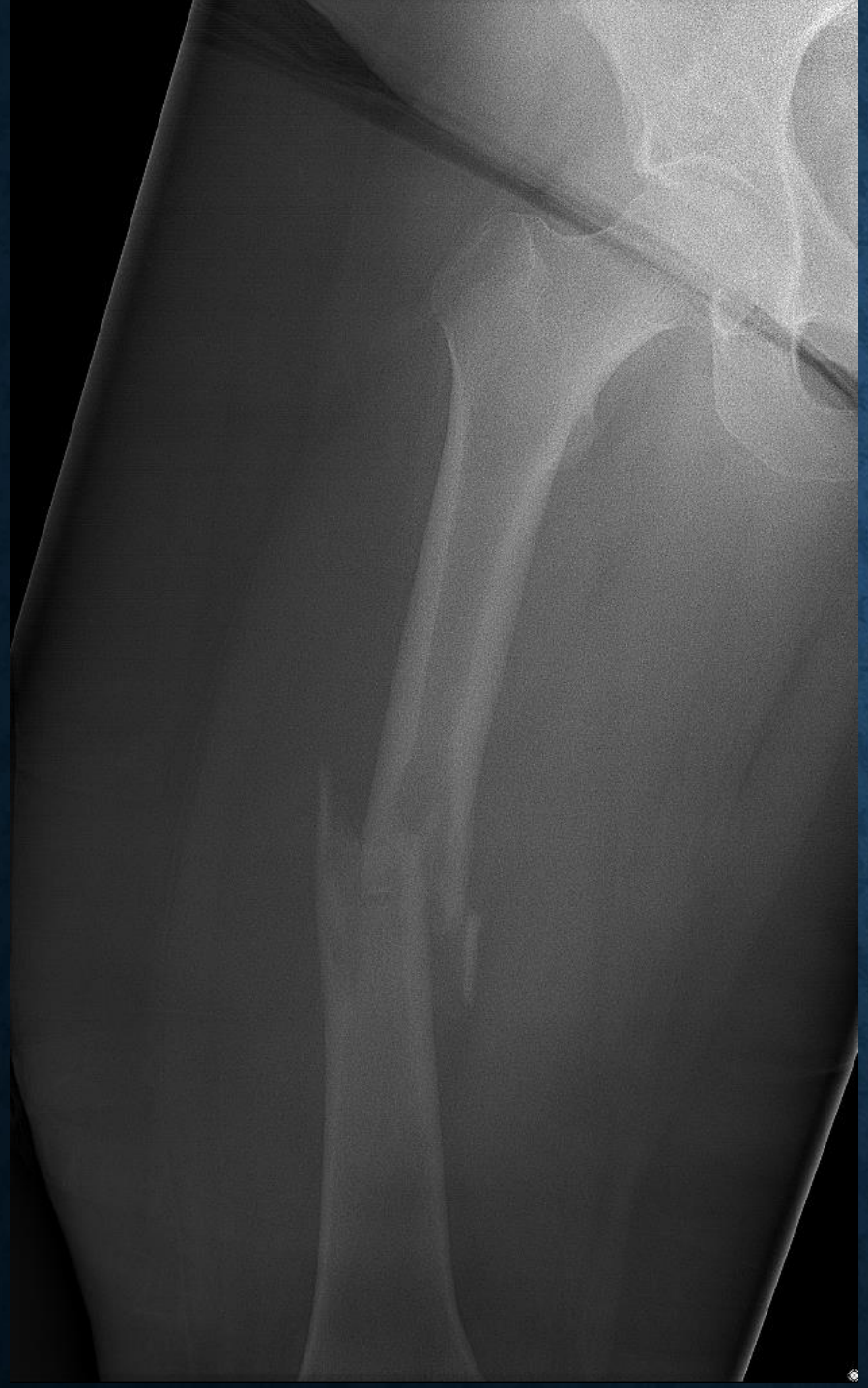
- Rare (20 STS/1 million)
- Mesenchymal derivation
  - Muscle, bone, tendon
  - Spine and extremities
- Bone
  - Osteosarcoma, Chondrosarcoma, Ewing sarcoma
- Soft tissue
  - Soft tissue sarcoma
- Metastatic disease (BLT KP – breast, lung, thyroid, kidney, prostate)

SARCOMA

- SOFT TISSUE
  - Presents as a lump, bump, mass
  - Painless
  - Deep or subQ
  - Present for a long time
  - Brought to light by trauma

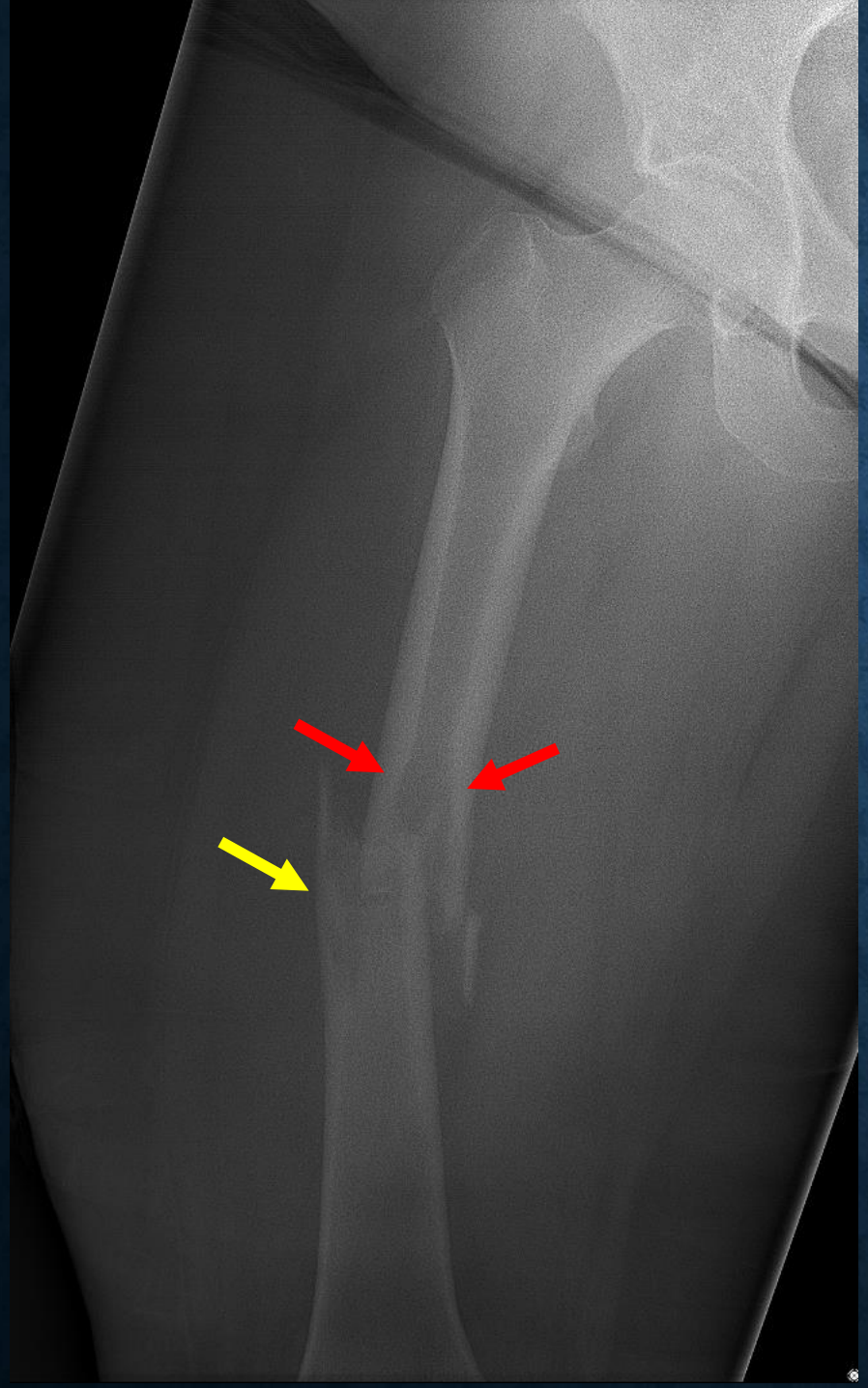
SARCOMA

- BONE
  - Pain
  - Pathologic fracture
  - May have an associated mass



DO YOU SEE A LESION?

- 74 YO with 2-3 months of right thigh pain, stood up from dinner table and heard and felt a snap in the right thigh and severe pain.



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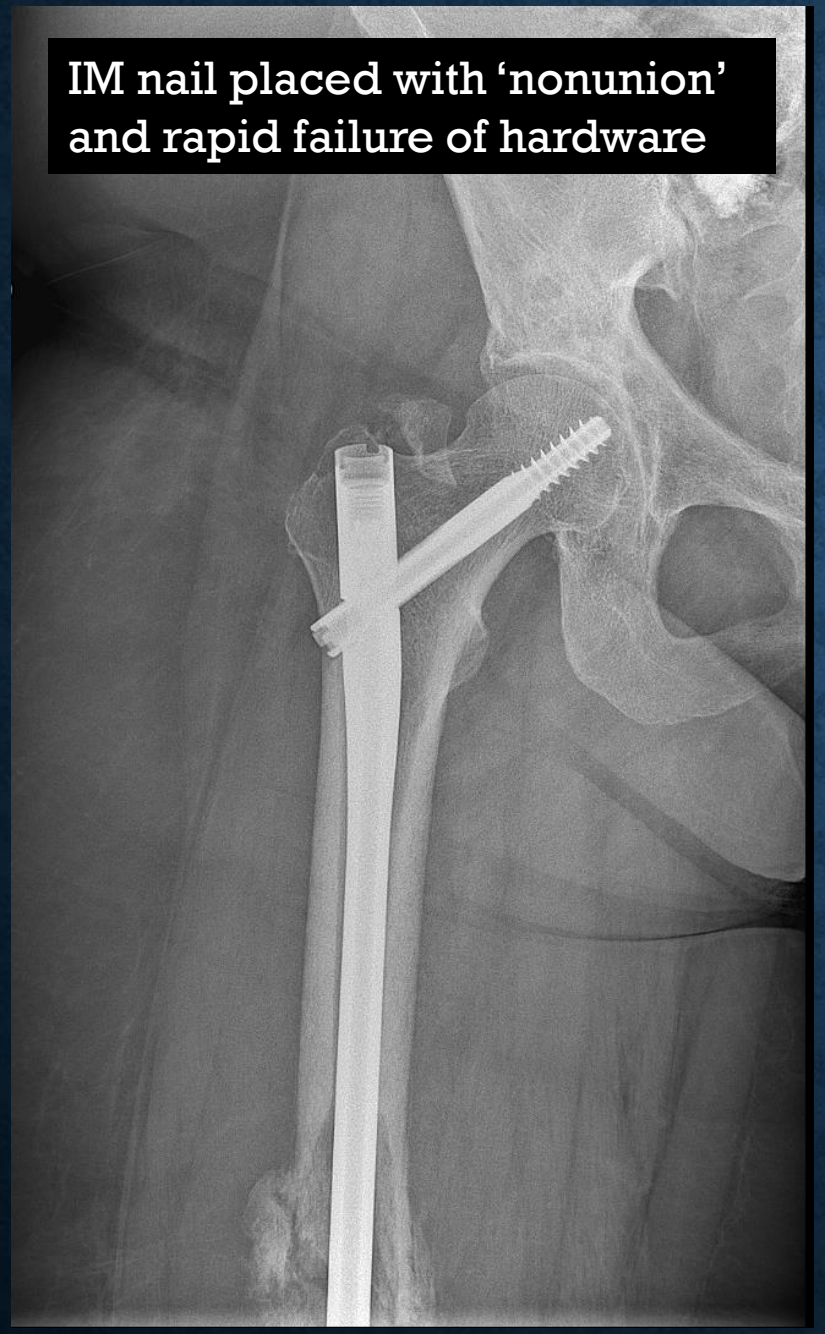
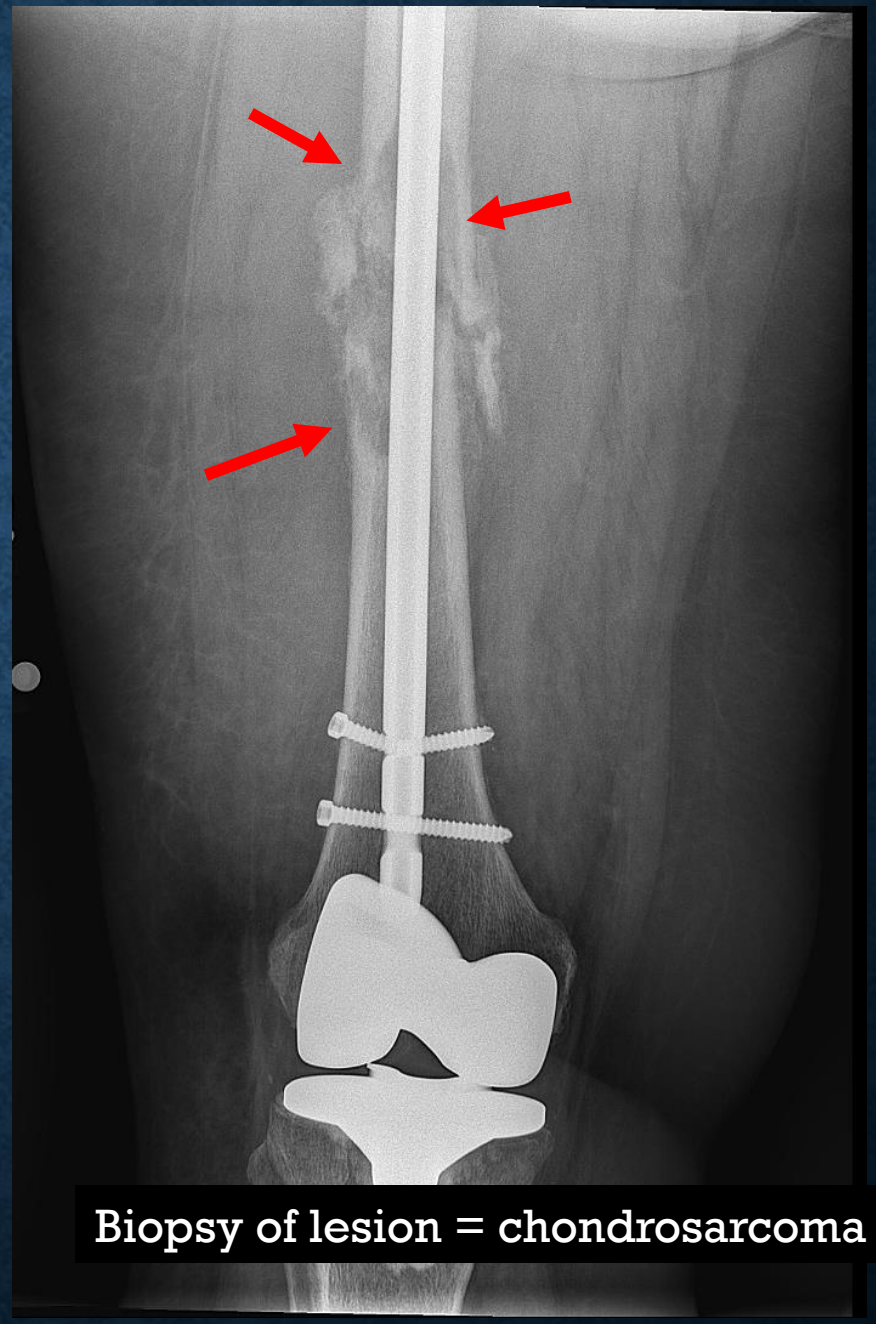
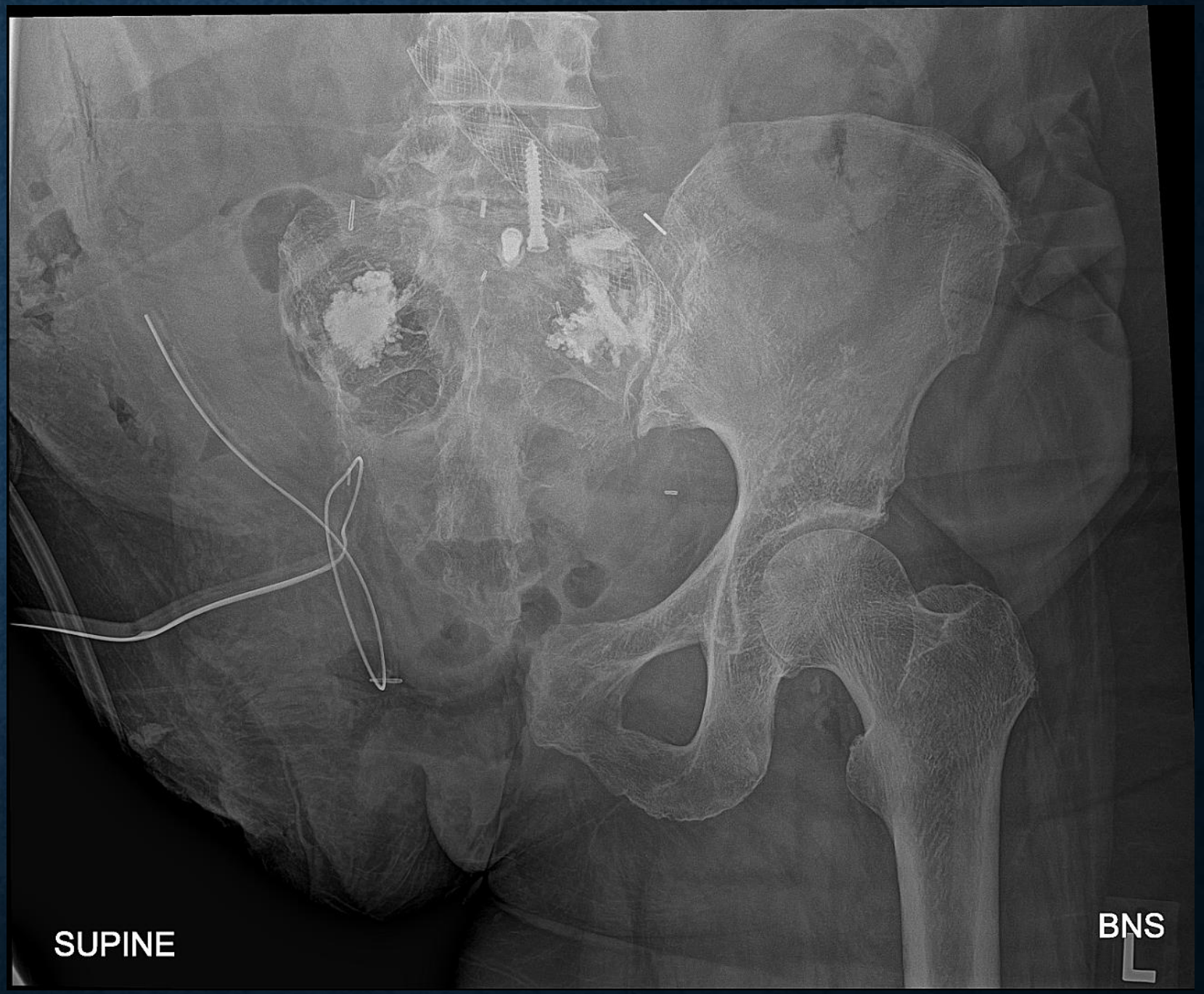

IM nail placed with ‘nonunion’
and rapid failure of hardware


Biopsy of lesion = chondrosarcoma

GIVEN DIAGNOSIS, CONTAMINATION, RAPID GROWTH OF A SOFT TISSUE MASS, HQ AMPUTATION PROVIDED



UNPLANNED EXCISIONS

- 1/3 of all soft tissue sarcomas are identified after unplanned excisions
- Unplanned sarcoma excisions can lead to increased rate of
  - Local recurrence
  - Advanced soft tissue coverage (flap) of the affected area
  - Amputation
  - Litigation

LITIGATION

Journal of SURGICAL ONCOLOGY

Explore this journal >

Research Article

Medical malpractice and sarcoma care—A thirty-three year review of case resolutions, inciting factors, and at risk physician specialties surrounding a rare diagnosis

Nathan W. Mesko MD ✉, Jennifer L. Mesko JD, Lauren M. Gaffney JD, Jennifer L. Halpern MD, Herbert S. Schwartz MD, Ginger E. Holt MD

First published: 22 August 2014 Full publication history

DOI: 10.1002/jso.23770 View/save citation

216 cases (total 242)

Verdicts/ settlements

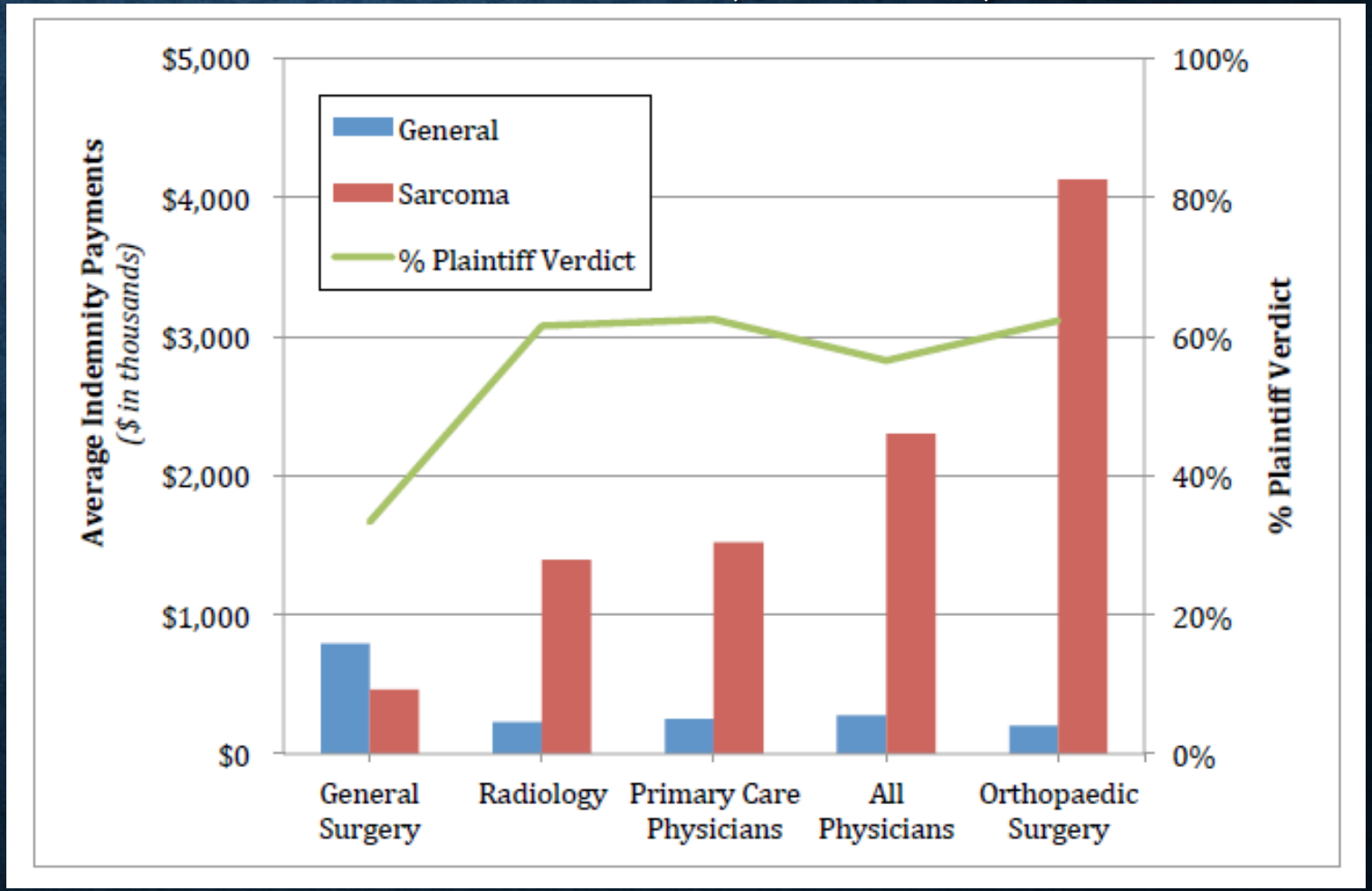
43% were settled in favor of the defendant

57% in favor of the Plaintiff

Sarcomas 10X higher!

AVERAGE GENERAL SPECIALTY INDEMNITY PAYMENTS VERSUS SARCOMA INDEMNITY PAYMENTS ($274,887)

- Jury verdict
  - d/p = 33/27
  - Avg award = $3,955,560
- Settlement
  - d/p = 4/71
  - Avg award = $1,442,560



------- % verdicts/ settlements in favor of plaintiff

5 R'S UNPLANNED EXCISION STS/ WHOOPS SURGERY

- Repent
- Retain (a lawyer)
- Re-image
- Radiate
- Re-excise

‘WHOOPS’ - BONE SARCOMA

RACE

- Repent
- Attorney
- Chemotherapy
- Eliminate (Amputate)

SOFT TISSUE MASSES - 4 THINGS TO REMEMBER

- NOT every mass is a lipoma
- Cysts vs STS
- SubQ lesions - 32% of soft tissue sarcomas present as
- Get an MRI
  - w/wo contrast

MASSES

- Orthopaedic Providers
  - recognize the unique characteristics of benign and malignant soft-tissue masses
  - determine which masses require further evaluation
- Evaluation and management of these soft-tissue masses is critical for optimal patient outcomes

SOFT TISSUE MASSES

- Benign and malignant soft-tissue masses have a similar presentation:
  - **Painless** soft-tissue mass
  - **Growing** soft-tissue mass
- History and physical examination
- Imaging (MRI)
- Ultimately BIOPSY for diagnosis

EVALUATION OF A MASS

- History
  - Chronicity
  - Pain
  - Other masses
  - Personal history of cancer
  - Evidence of trauma
- Physical
  - Size
  - Depth
  - Consistency
  - Skin
- Imaging
  - Plain xray
  - CT/ultrasound?
  - MRI
- Evaluation of a METastatic lesion (HOLE in bone)
  - CT x 3
  - WBBS
  - SPEP/UPEP
  - Biopsy

HISTORY - PERTINENT QUESTIONS INCLUDE THE FOLLOWING:

- Chronicity?
  - Rapid growth of a soft tissue mass is an indication of:
    - aggressiveness
    - signals potential high-grade malignancy
  - STS can be slow growing and chronic

HISTORY

- Are there any other masses?
  - Neurofibromatosis
  - Maffuci's
  - Lipomatosis

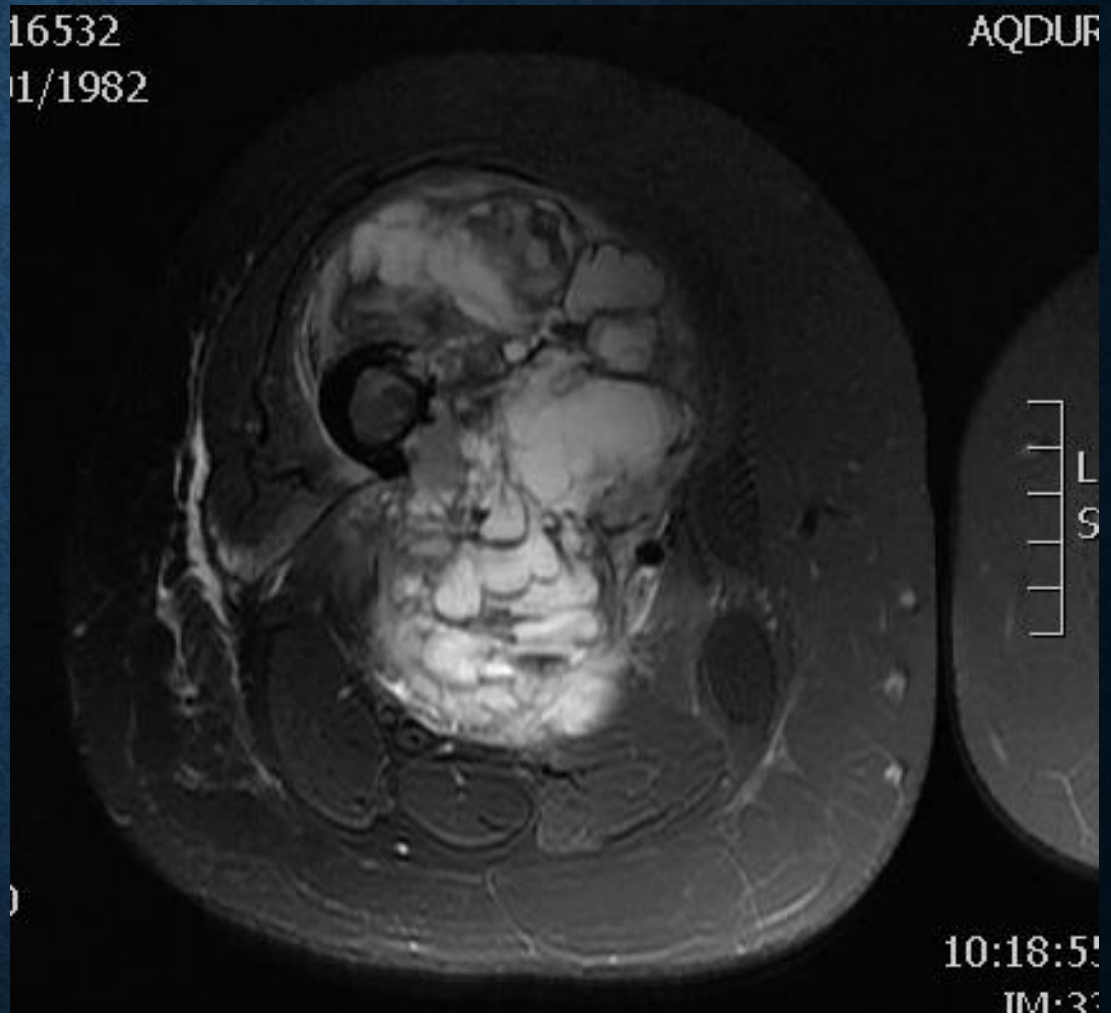
Clinical image shows multiple soft tissue vascular malformations Dx = maffuci syndrome

IS IT PAINFUL?

- AVM - Intermittent dull, aching or cramping discomfort
- Schwannomas - Radiating pain
  - a positive Tinel's sign and pain when percussed

IS IT PAINFUL?

- A sharp or aching pain associate with weight bearing → bone erosion
  - More aggressive soft tissue masses may invade or scallop the adjacent bone over time
  - Bone sarcoma
  - Metastatic tumor



A soft tissue sarcoma is eroding the femur creating bone pain

IS THERE ANY HISTORY OF TRAUMA OR PRIOR HISTORY OF CANCER?

- Trauma may result in myositis ossificans or a calcified hematoma.
- **BEWARE of the spontaneous hematoma**

PHYSICAL EXAM

- **Size - >5 cm**
- Direct measure of the palpable mass
- Compare limb circumferences measurements with the contralateral limb
  - Helpful in appreciating the size of a deep mass

PHYSICAL EXAM

- **DEPTH**
- Masses that are more superficial to the fascia are more likely to be benign
- Nearly 85% of soft tissue sarcomas are deep to the investing fascia
- SubQ = myxofibrosarcoma and dermatofibrosarcoma protuberans

- Image shows a right posterior popliteal fossa mass, subcutaneous, firm Dx=myxofibrosarcoma

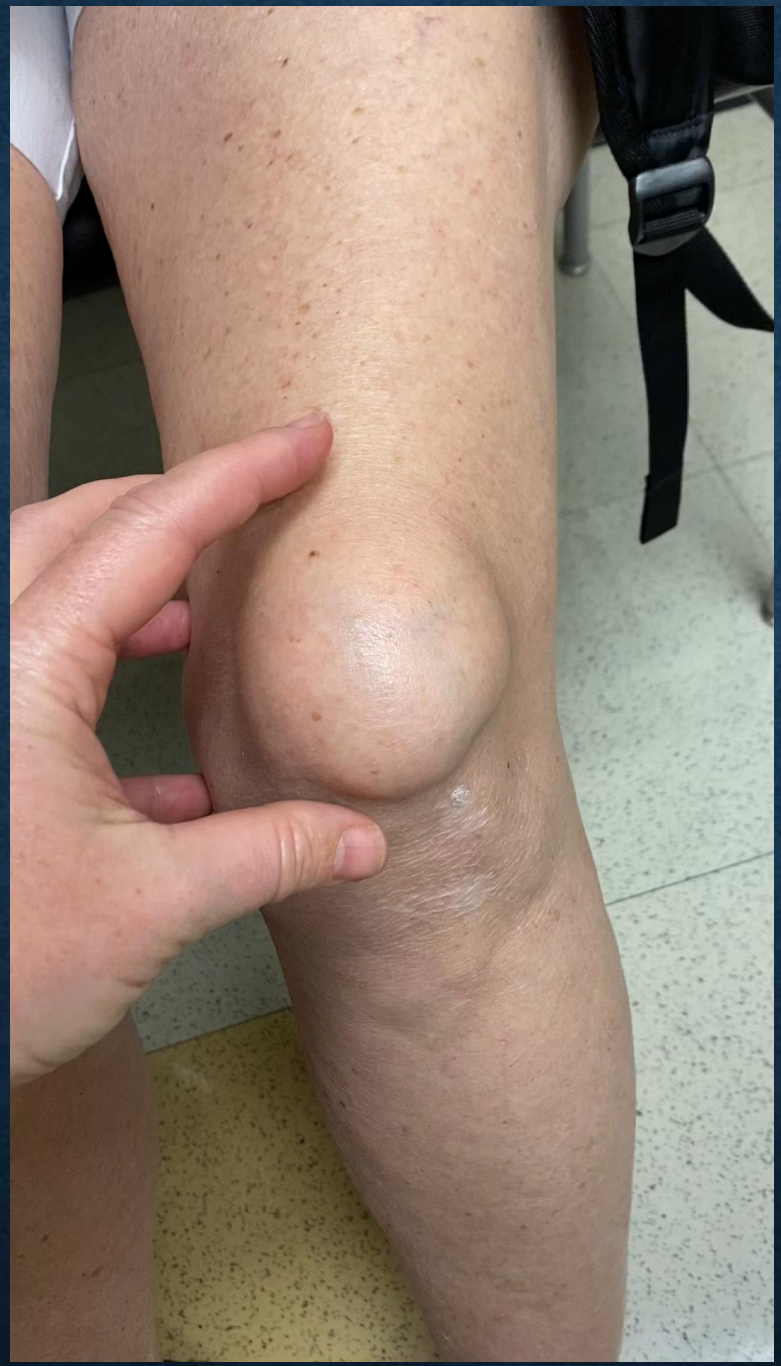
PHYSICAL EXAM

- **DEPTH**
  - Masses that are more superficial to the fascia are more likely to be benign
  - Nearly 85% of soft tissue sarcomas are deep to the investing fascia
  - Notable exceptions include myxofibrosarcoma and dermatofibrosarcoma protuberans

- Image shows a right posterior popliteal fossa mass, subcutaneous, firm Dx=myxofibrosarcoma

PHYSICAL EXAM

- **Consistency**
- DOUGHY - Softer than muscle is a characteristic of lipomas
  - Mobile and soft
- FIRM – like an inflated rubber ball common of sarcomas
  - Fixed and firm



- **Mobility**
- Fixed – suggest an underlying bony origin or a more infiltrative lesion

SPECIFIC FINDINGS CAN NARROW THE DIFFERENTIAL DIAGNOSIS EVEN FURTHER

- Ganglion cysts may transilluminate with a light
- Vascular lesions (hemangiomas, arteriovenous malformations) may have bruits or palpable thrills.
- Peripheral nerve sheath tumors may have a positive Tinel sign or pain with compression

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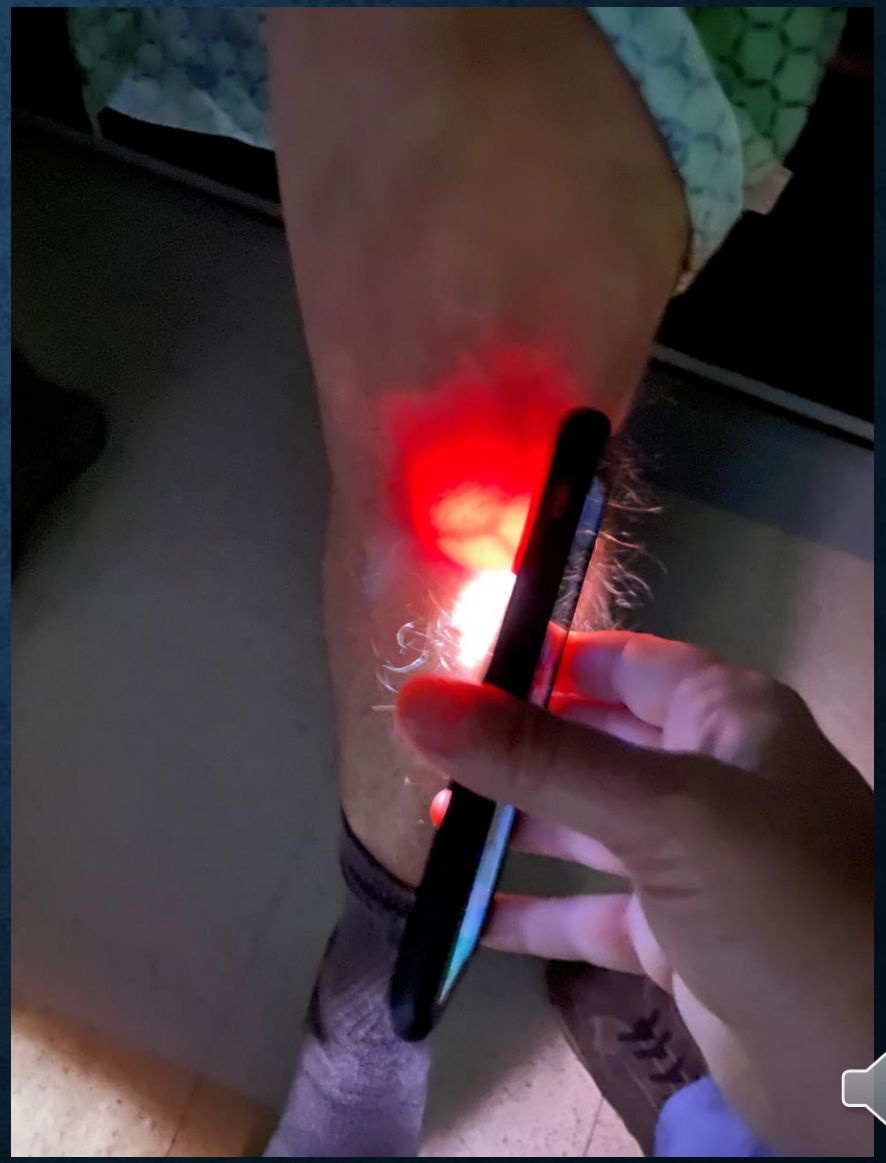

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- Peripheral nerve sheath tumors may have a positive Tinel sign or pain with compression
- Aspiration of a ganglion yields fluid/ apple jelly vs STS – no yield

AVOIDING UNPLANNED RESECTION OF A SOFT TISSUE SARCOMA

Trans-illuminate (light)

Aspirate (apple jelly)

MRI

CLUES TO THE FINAL DIAGNOSIS

- Complete exam –
- Examine the entire extremity
- Compare to contralateral side
- Pulses
- Skin
- Skin lesions or cutaneous nodules, satellite masses
- Lymph nodes
- Enlarged lymph nodes

A MASS THAT IS (SHOULD RAISE SUSPICION FOR A MALIGNANCY)

- Large (>5 cm)
- Deep (in relation to investing fascia)
- Firm as compared to the surrounding muscle
- Growing

- Small, superficial masses are more likely to be benign, with the caveat that up to 32% of soft-tissue sarcomas can present this way

MRI scan of the extremity w/wo Contrast

FINDINGS THAT WARRANT CONTINUED CONSERVATIVE OBSERVATION BUT NOT LOST TO FOLLOW-UP

- Small, superficial mass that is doughy and consistent with lipoma
- Mass with fluctuate in size (increases and decreases) consistent with a ganglion cyst or intramuscular hemangioma
- Mass that initially develops after trauma

SOFT TISSUE MIMICKS

- Lipoma
- Cysts
- Schwannoma (benign peripheral nerve sheath tumor)

#1 LIPOMA VS A STS

- Recognize a STS (vs lipoma)
- Hx – painless and slow growing
- May have multiple
- Soft/ doughy

#1 LIPOMA VS A STS

- Recognize a STS (vs lipoma)
- Hx – painless and slow growing
- May have multiple
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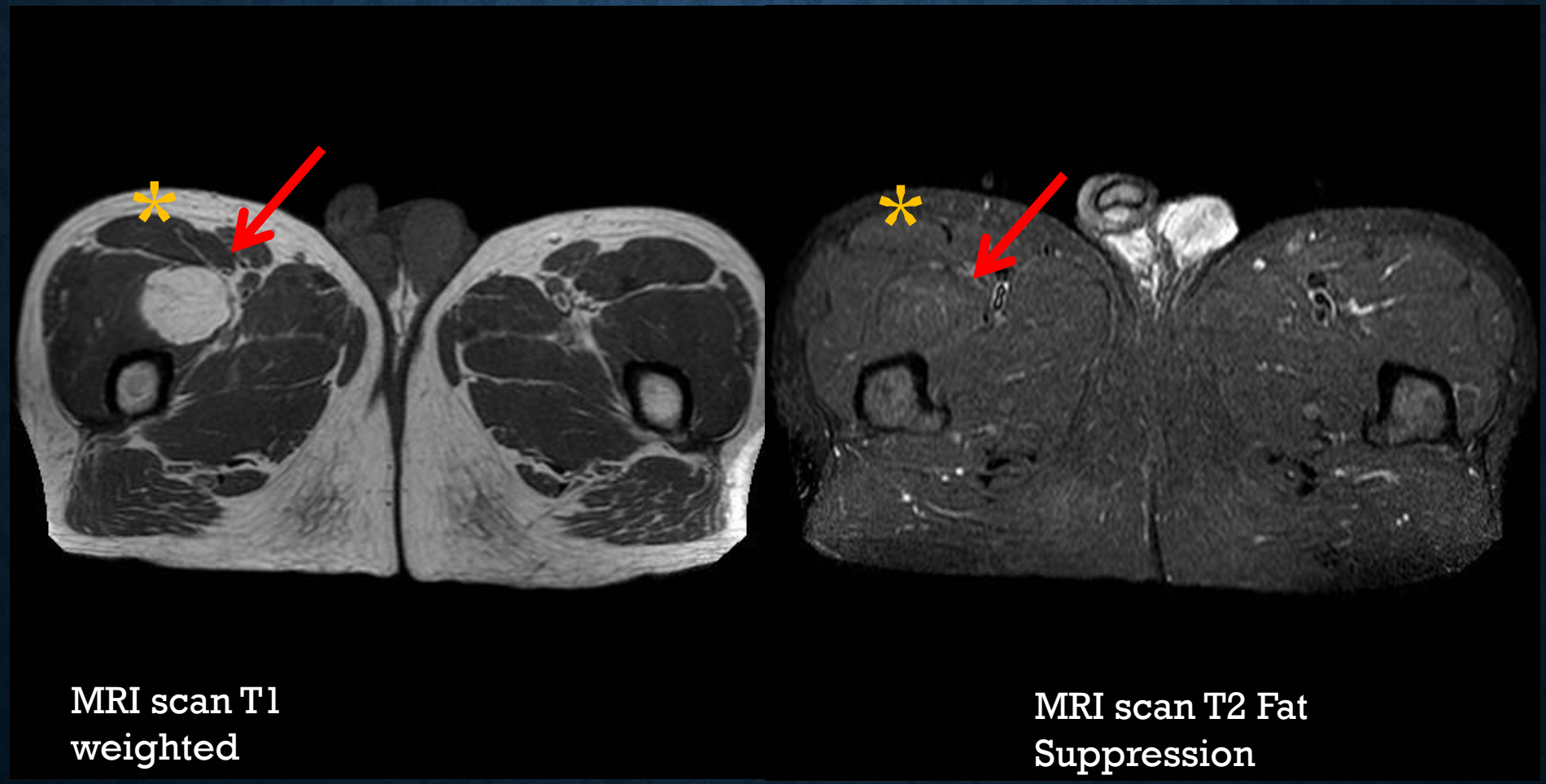
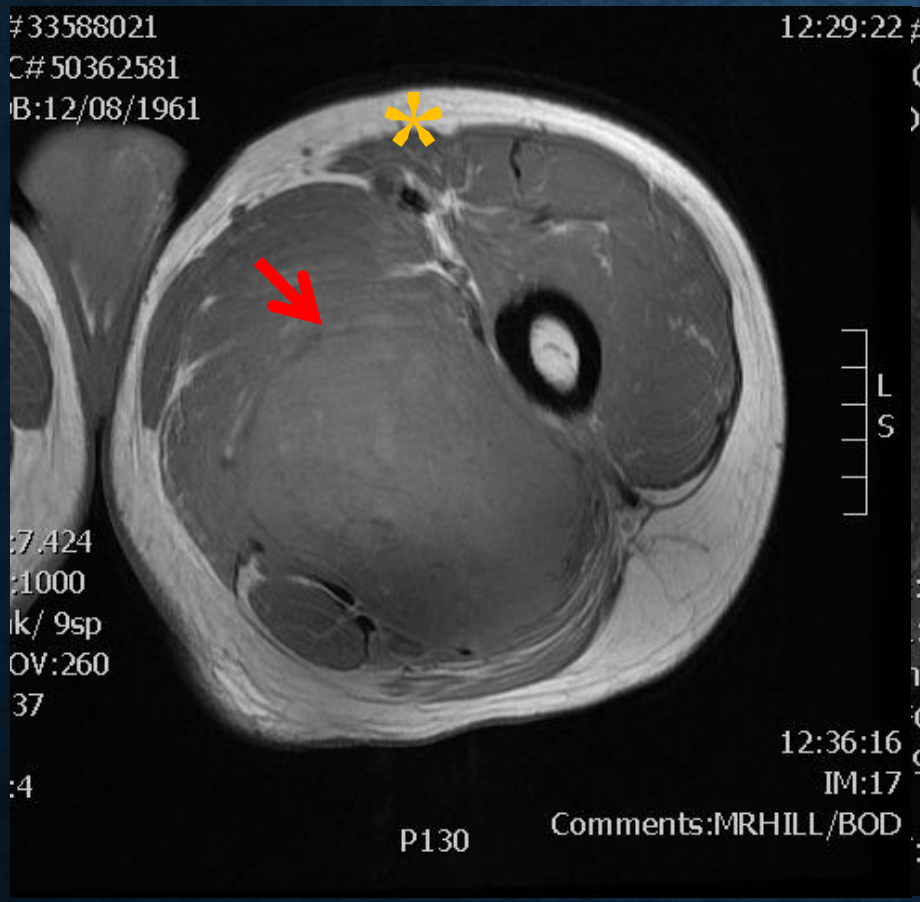
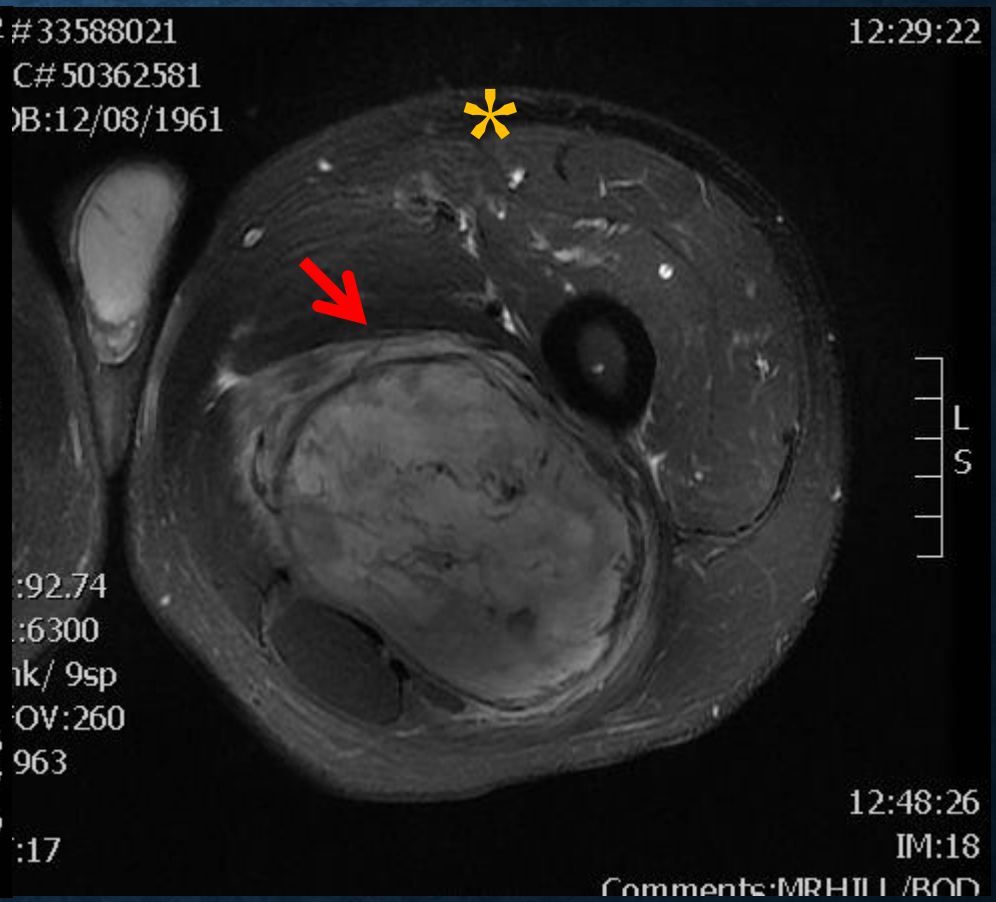
FAT MASSES
LIPOMA VERSUS SOFT TISSUE SARCOMA



SOFT TISSUE SARCOMA

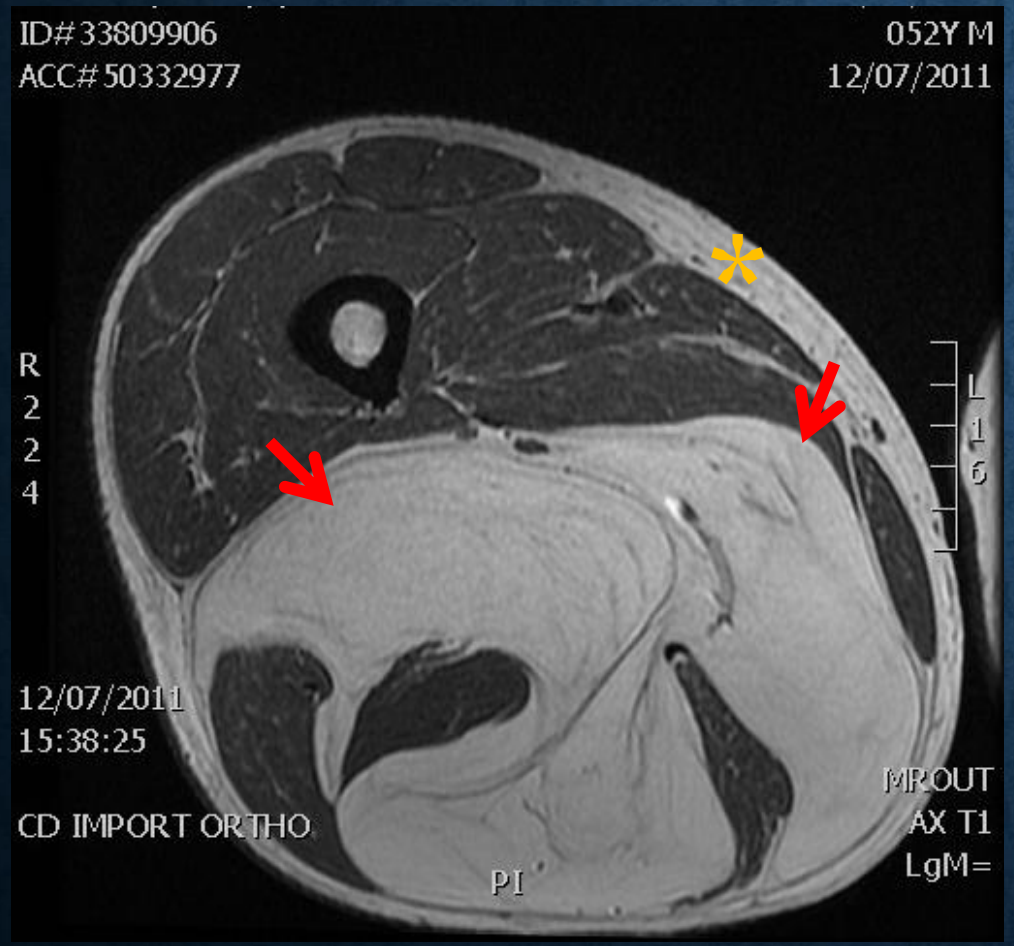


MRI scan T1 weighted

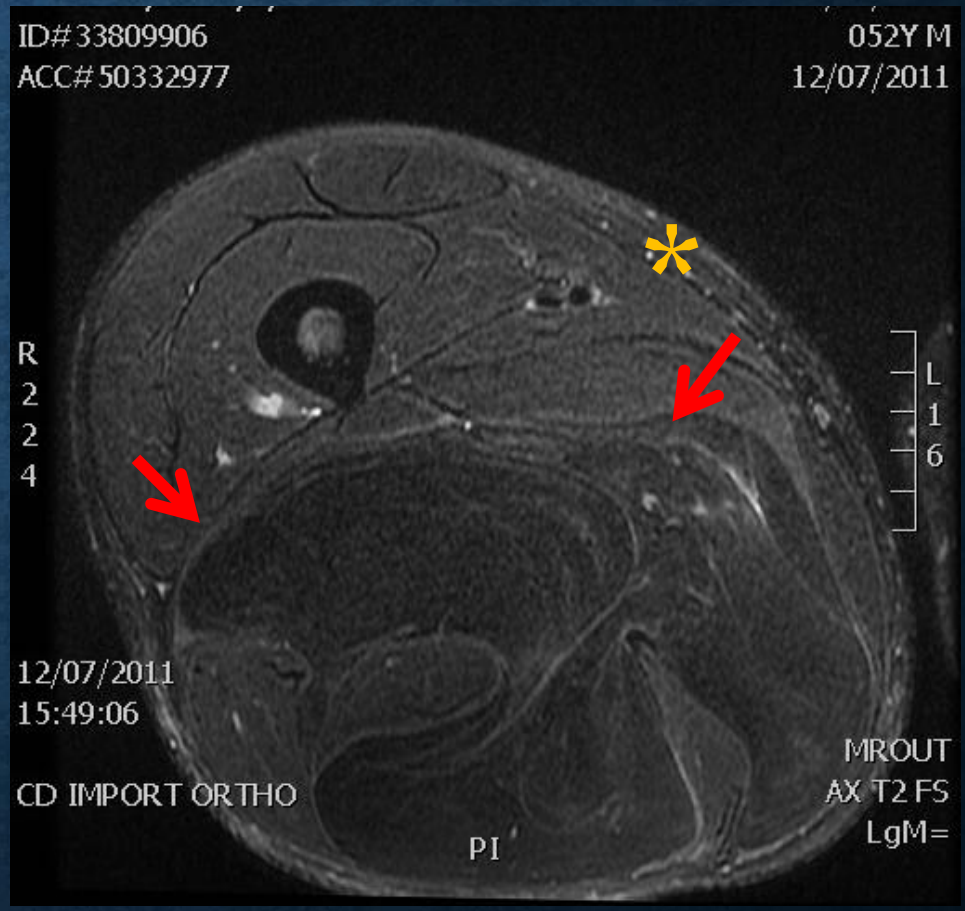


MRI scan T2 Fat Suppression

LIPOMA

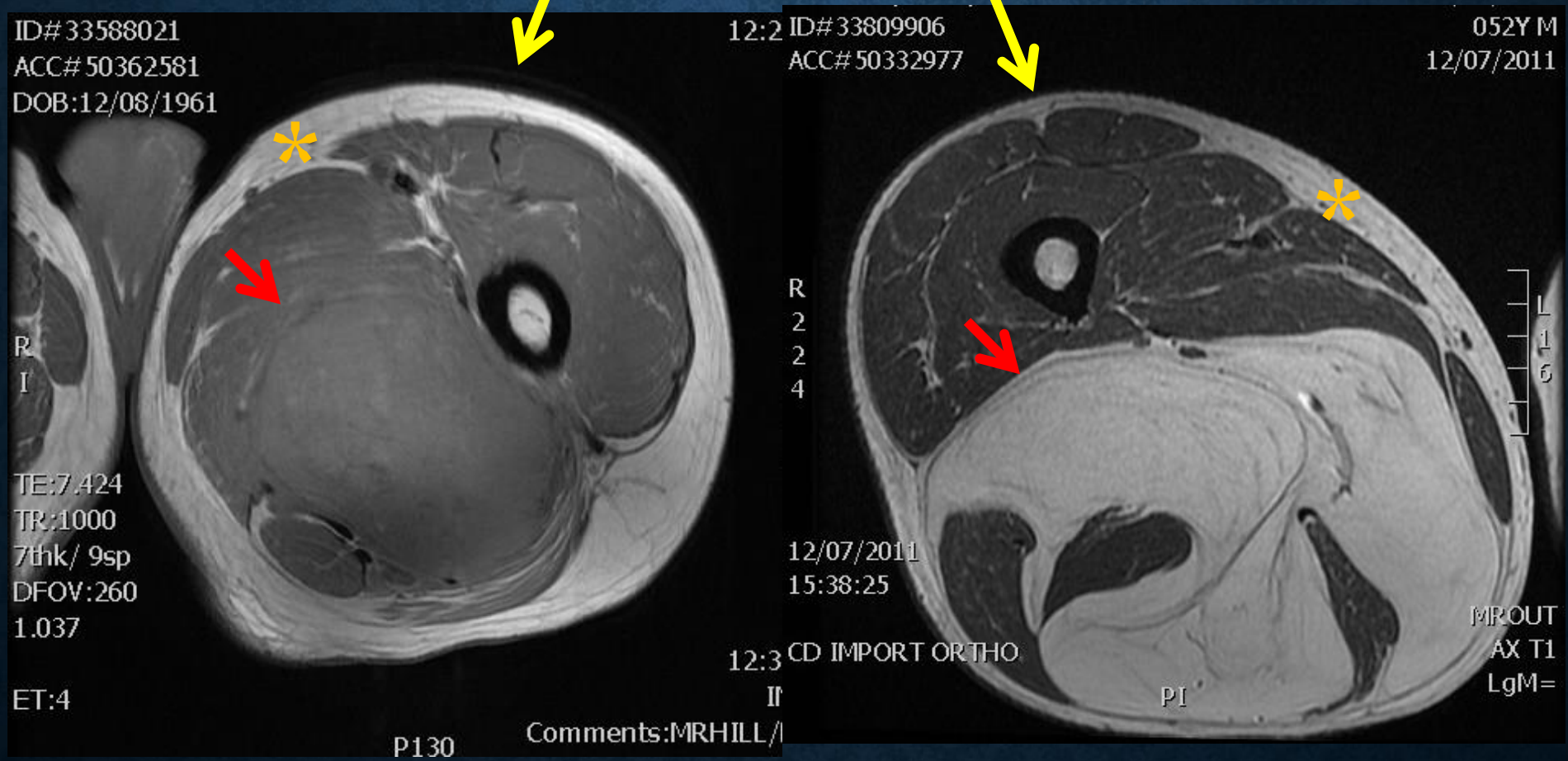


MRI scan T1 weighted



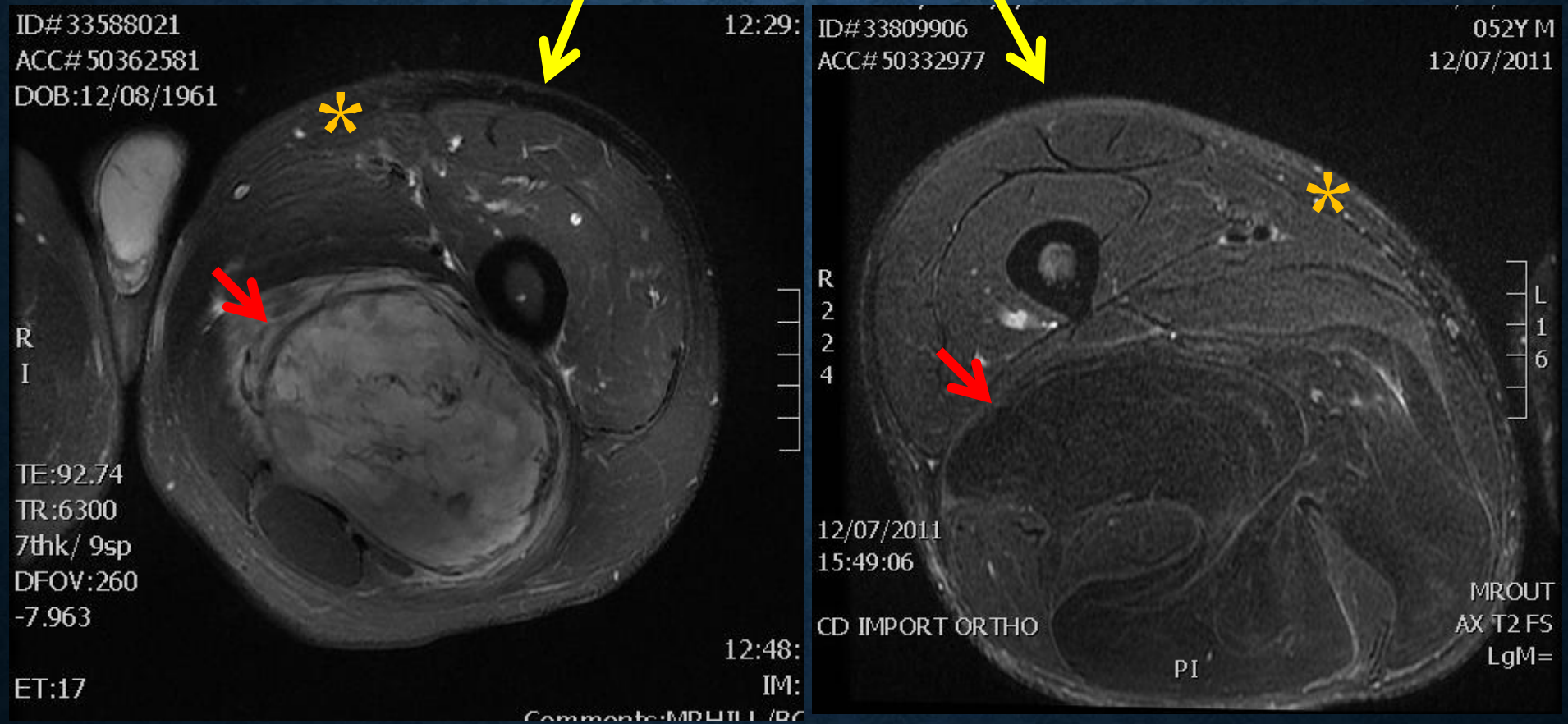
MRI scan T2 Fat Suppression

STS VS LIPOMA



MRI scan T1 weighted

STS VS LIPOMA



MRI scan T2 Fat Suppression

WHEN TO LEAVE FAT MASSES ALONE

- > 5 cm
- Deep To Fascia
- ‘atypical’ findings on MRI scan
  - Striations
  - Heterogeneity

#2 CYSTS – TROUBLE

- Wrist ganglion cysts
  - Size
  - Wrong location
  - Not a cyst
- Parameniscal cysts
  - No association with meniscus
- Baker's cysts
  - Wrong location
  - Not a cyst

GANGLION CYSTS - WRIST

- Ganglion cysts are common and account for the majority of masses found about the wrist
- Both symptomatic and asymptomatic ganglion cysts has been reported as high as 50% of the population.
- Account for 50-70% of all masses about the hand and wrist, and are a common source of dorsal wrist pain in patients.

WRIST GANGLION - TROUBLE

- Atypical characteristics include
  - a non-joint location
    - appearing more distal/ proximal than the wrist
  - rapid growth
  - lack of a fluctuating course

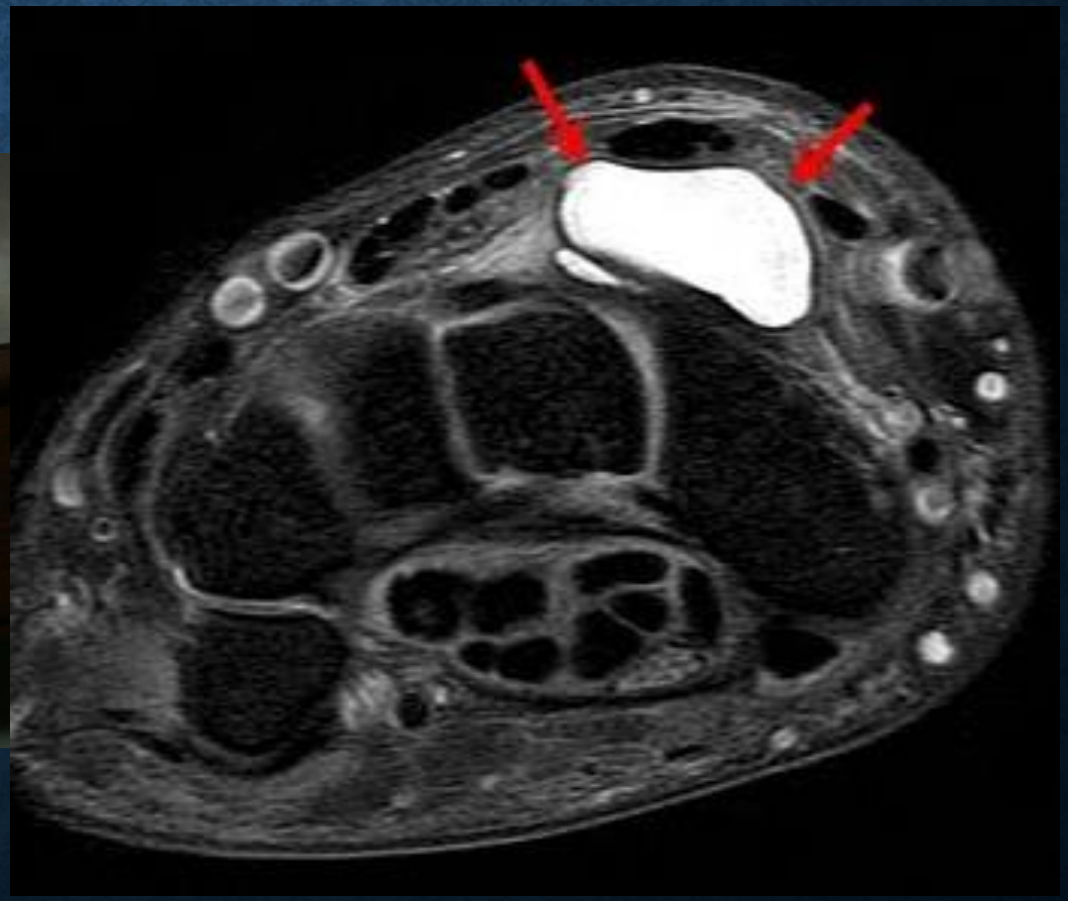
Trans-illuminate (light)

Aspirate (apple jelly)

MRI

GANGLION CYSTS - WRIST

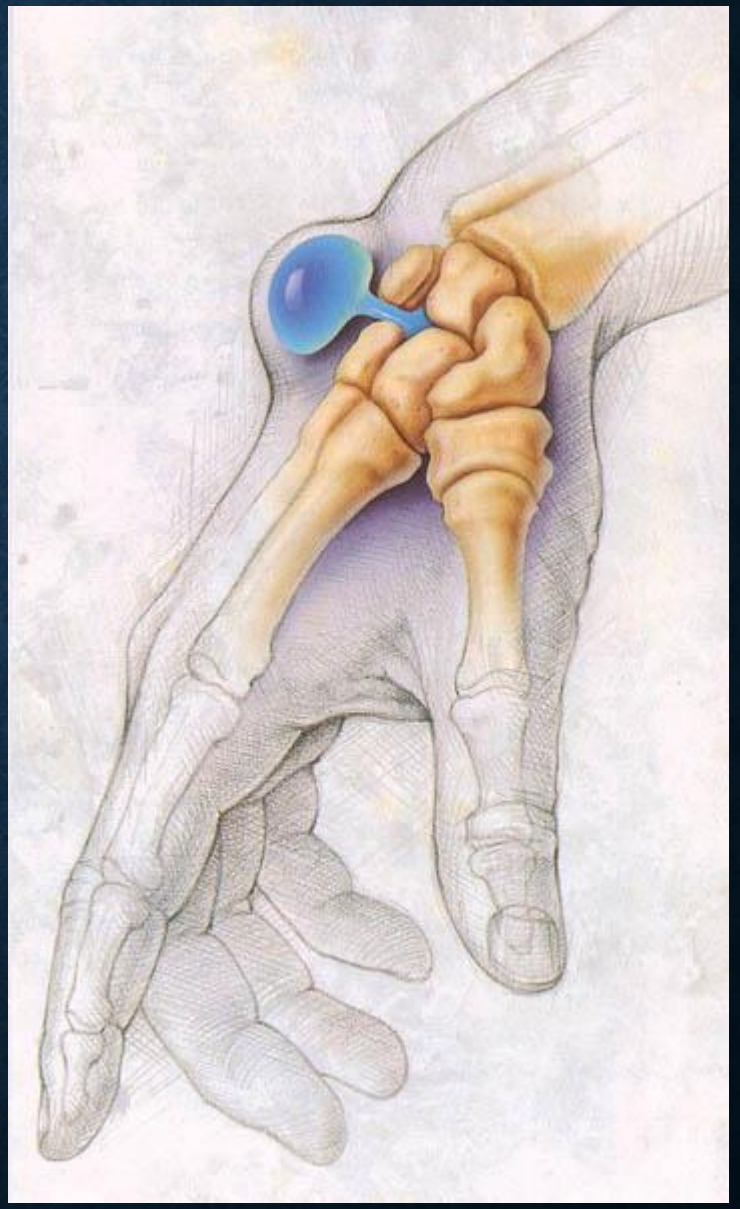
- Dorsal
- Associated with joint



GANGLION CYSTS - WRIST

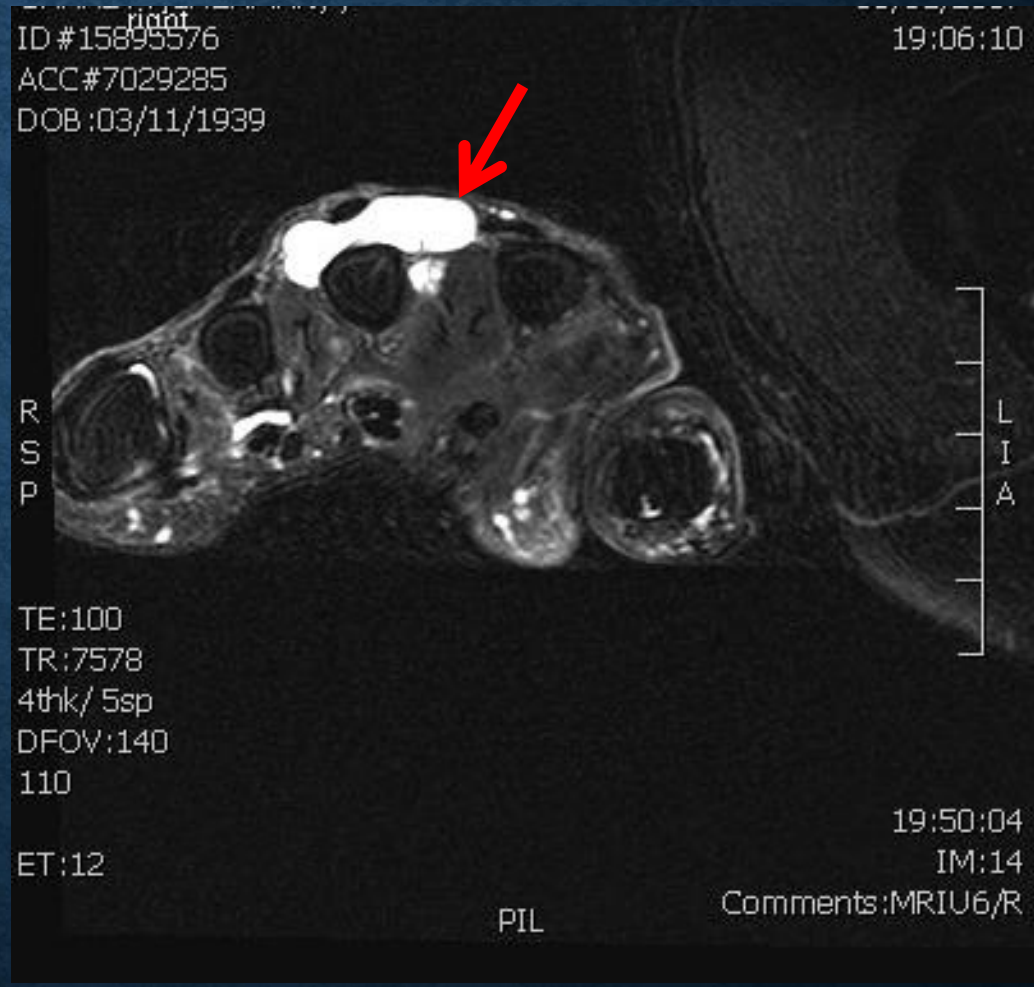
- ‘Apple Jelly’

UNCOMMON APPEARANCE



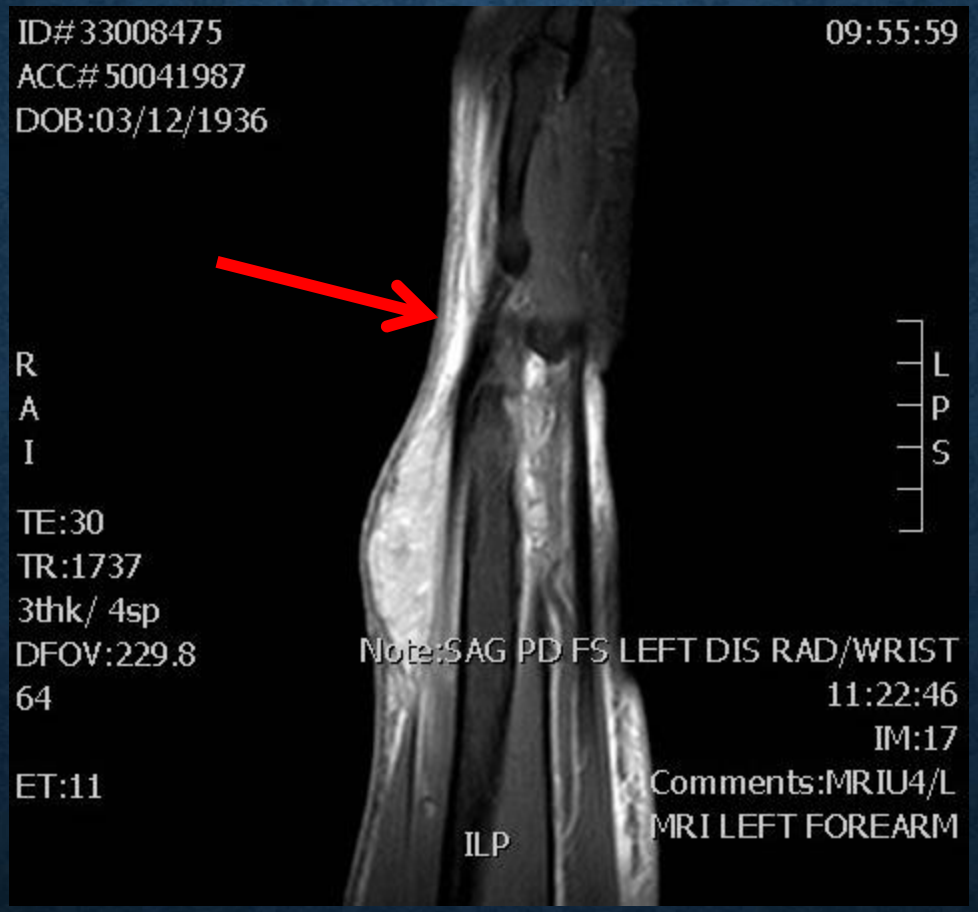

CENTIMETERS
Celestone® Soluspan®*
brand of
betamethasone sodium phosphate
and betamethasone acetate
Injectable Suspension, USP
brand of rapid and reposing injectable

STS



Ganglion Cyst

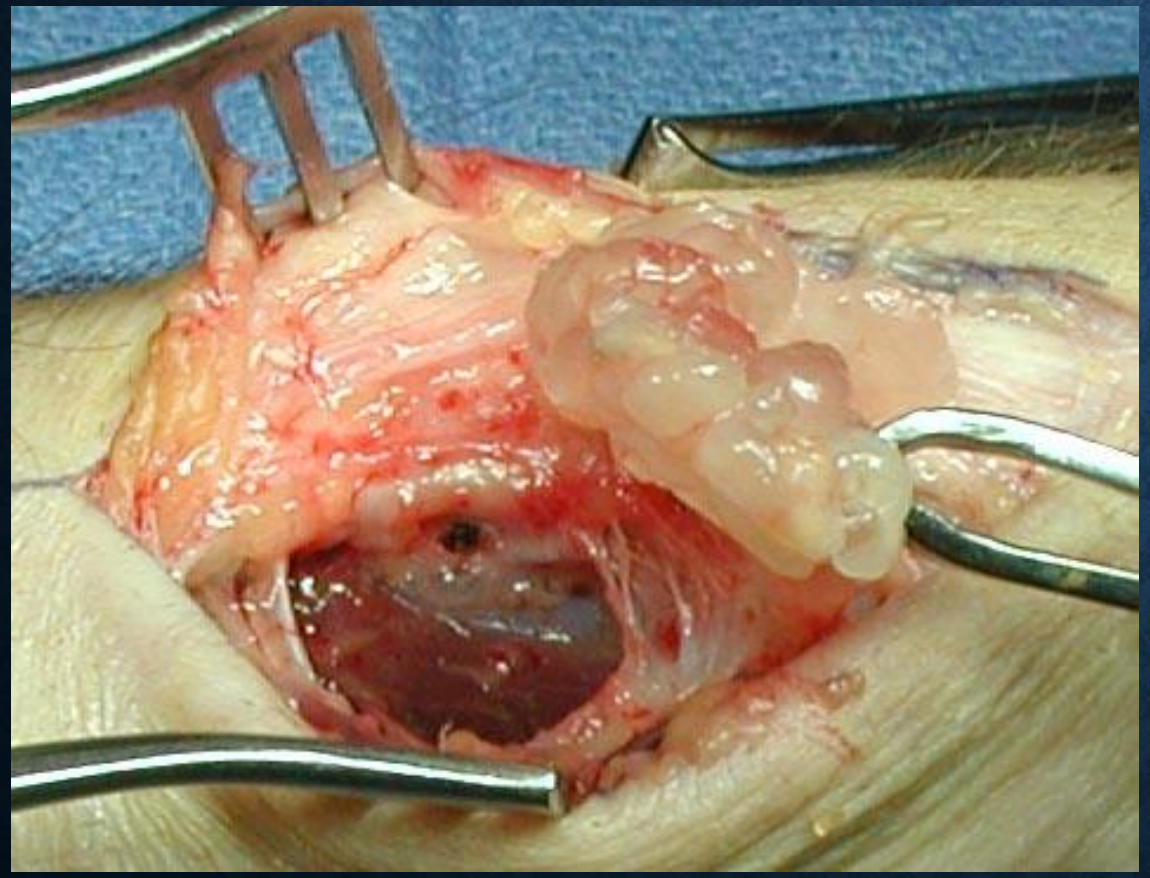
NO ASSOCIATION WITH THE JOINT!



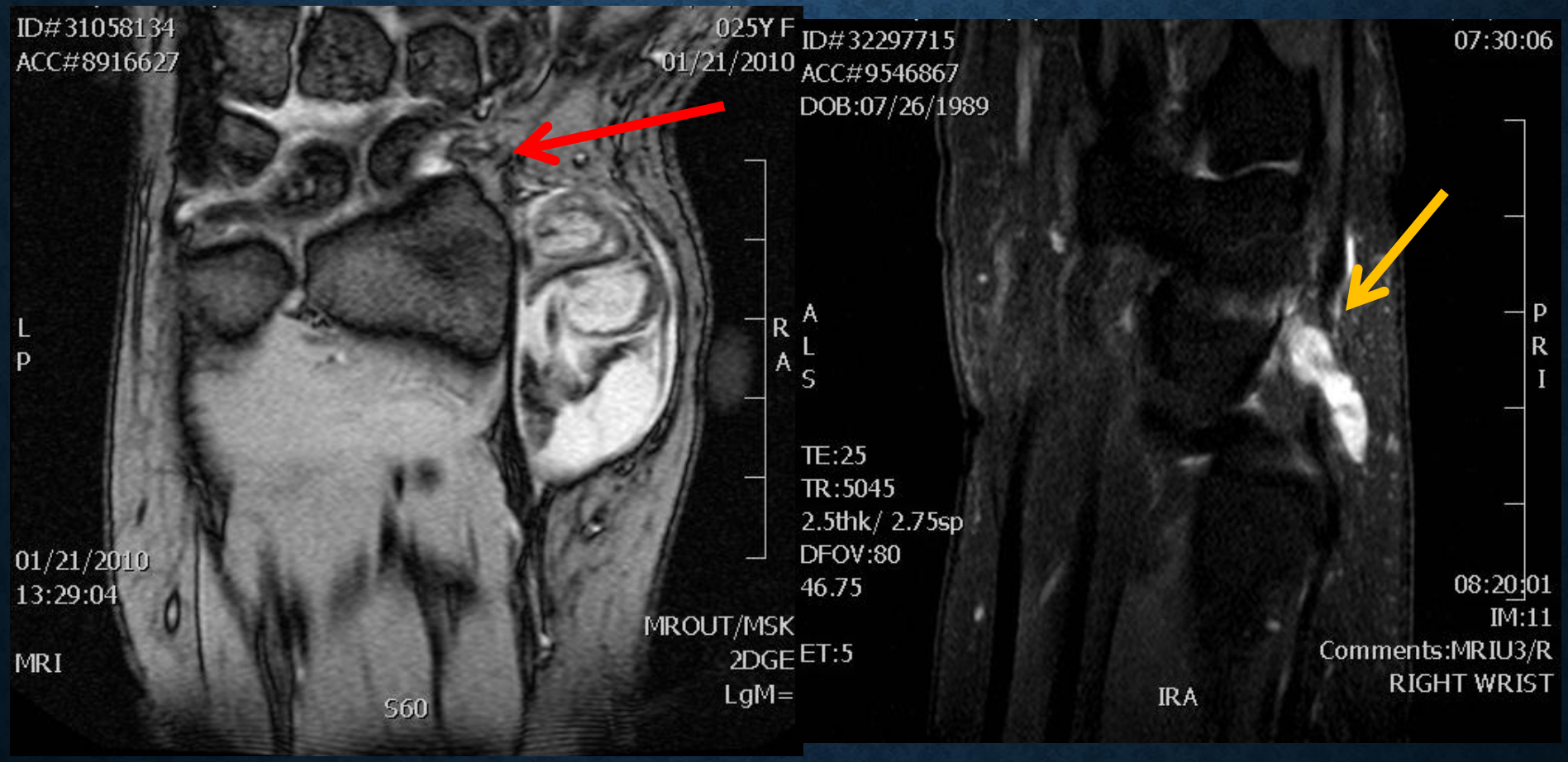
STS

CYST VS. SARCOMA

- Ganglion cyst = Apple jelly

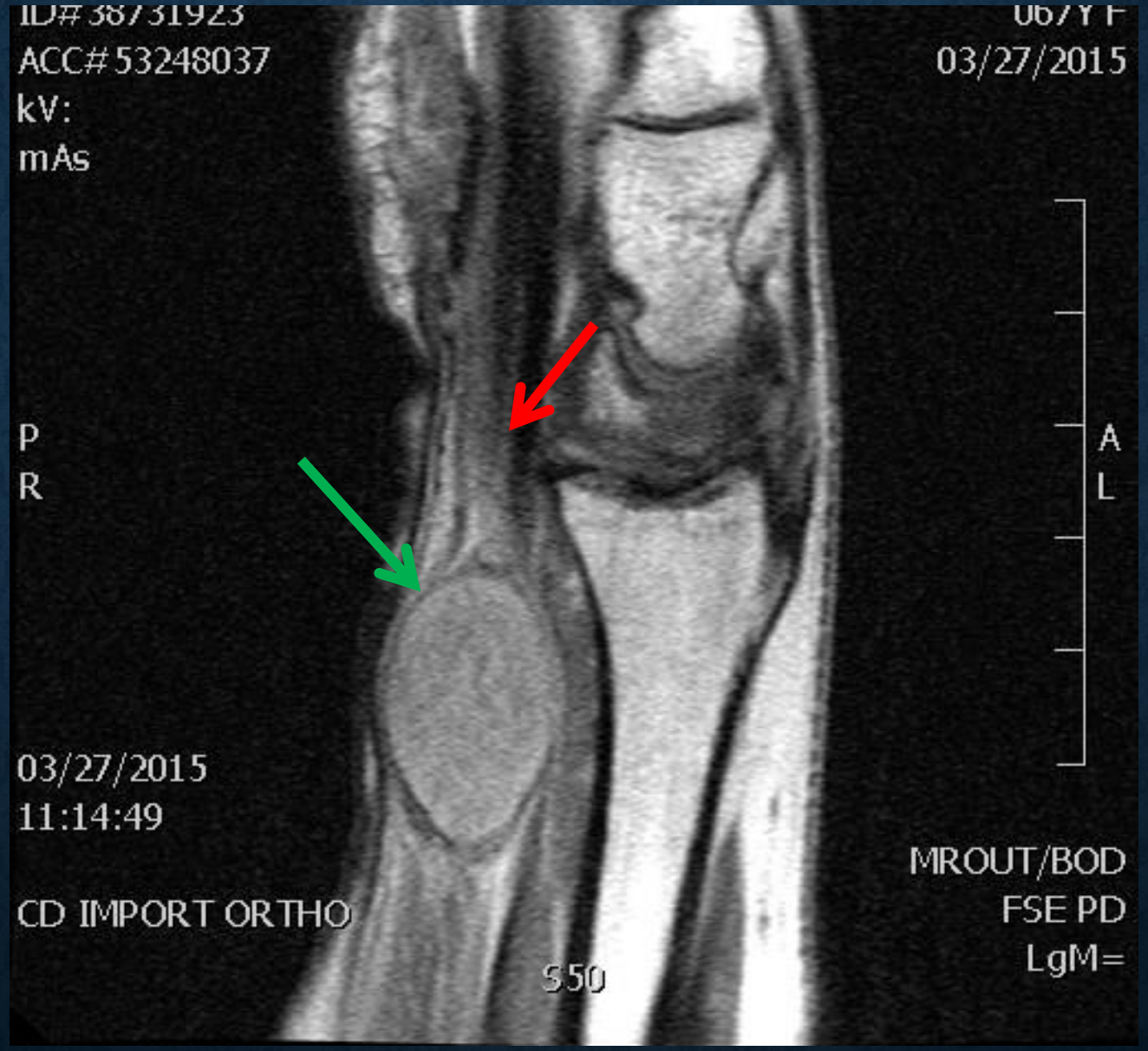


Sarcoma = NO APPLE JELLY



STS

Ganglion Cyst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WRIST GANGLION - TROUBLE

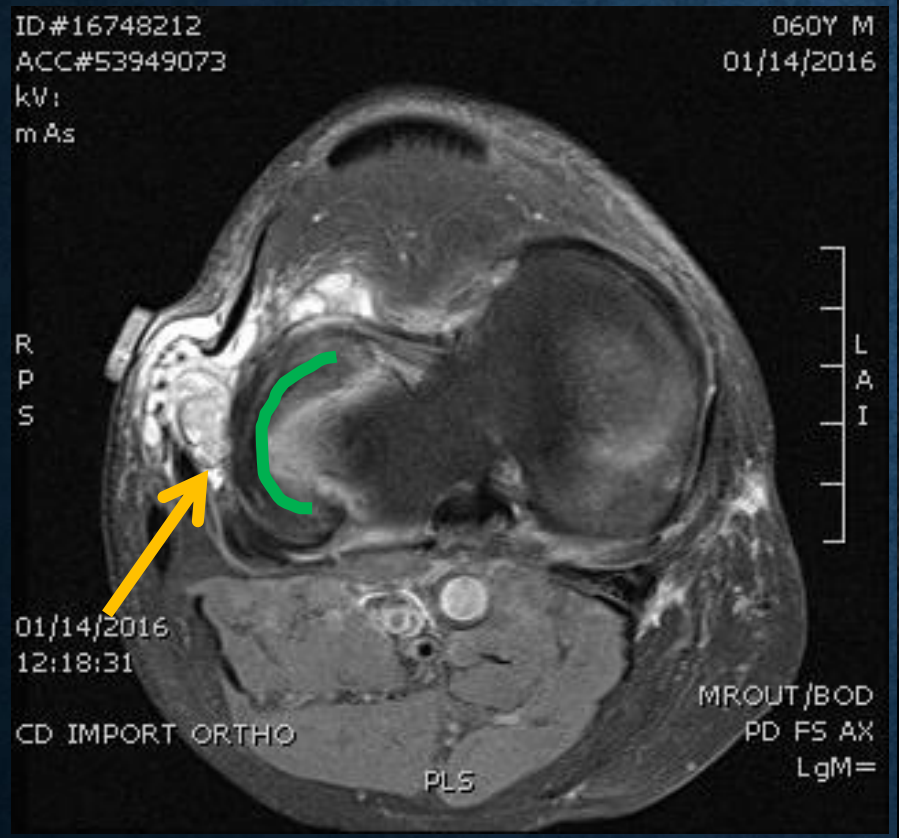
- Atypical characteristics include
  - a non-joint location
    - appearing more distal/ proximal than the wrist
  - rapid growth
  - lack of a fluctuating course
  - appearing more distal than the wrist

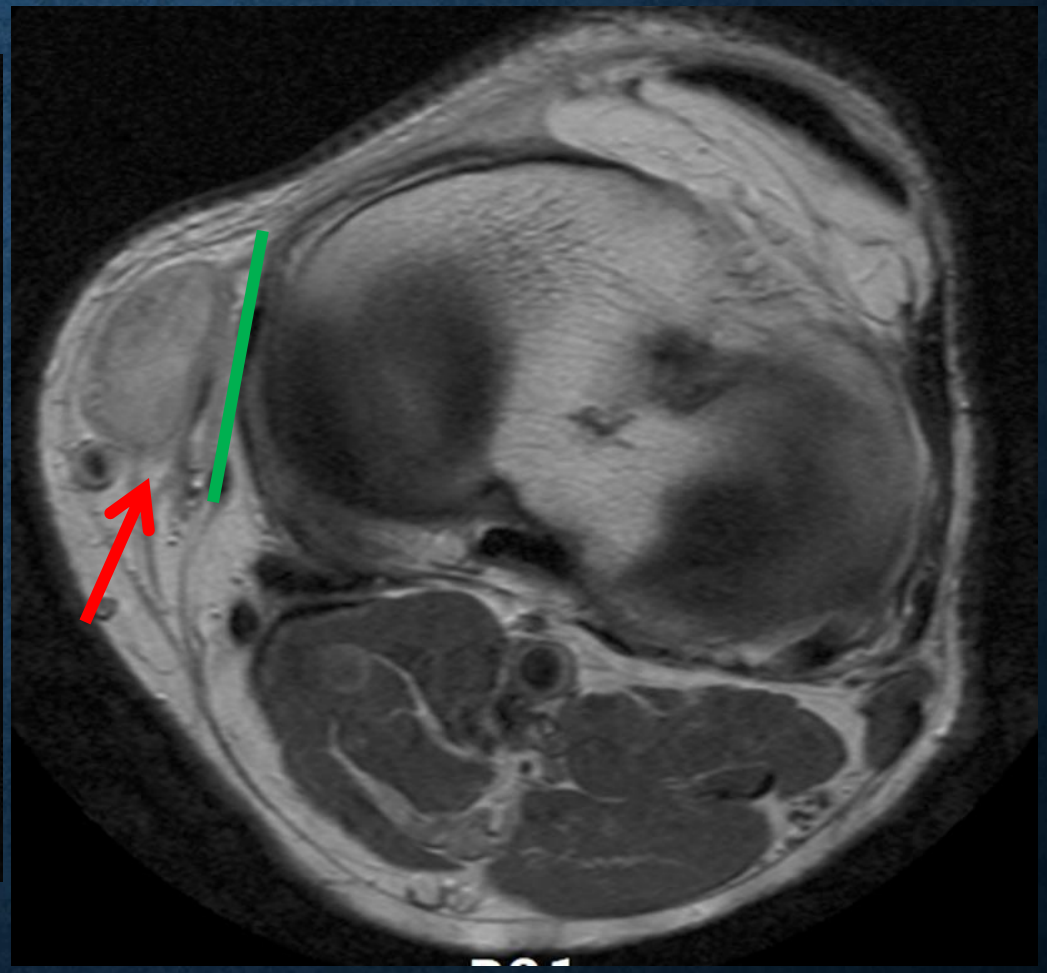
Trans-illuminate (light)

Aspirate (apple jelly)

MRI

PARAMENISCAL CYST VS STS



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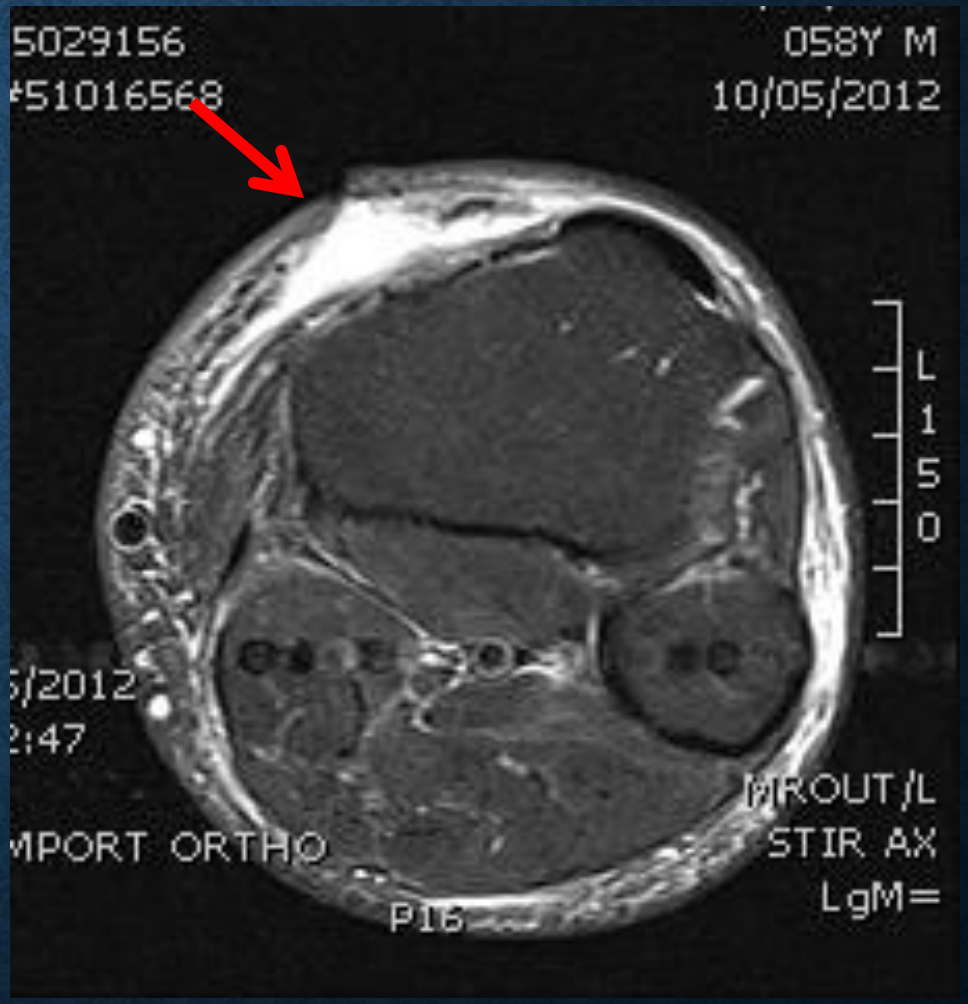
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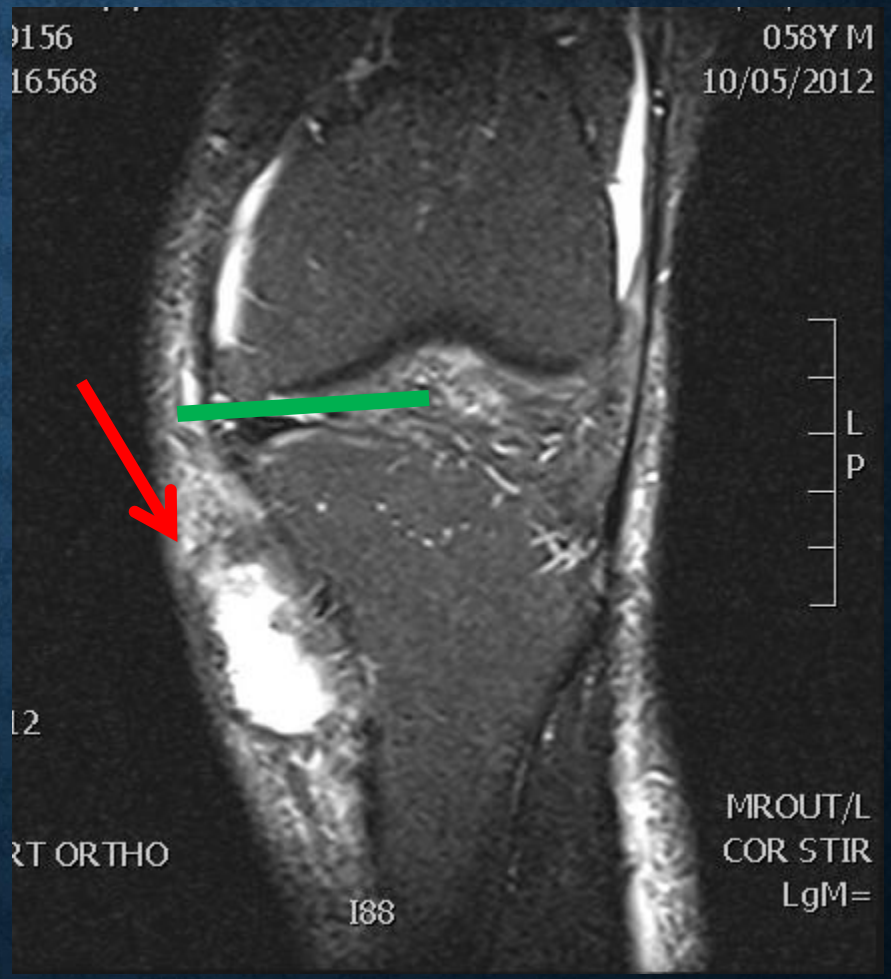
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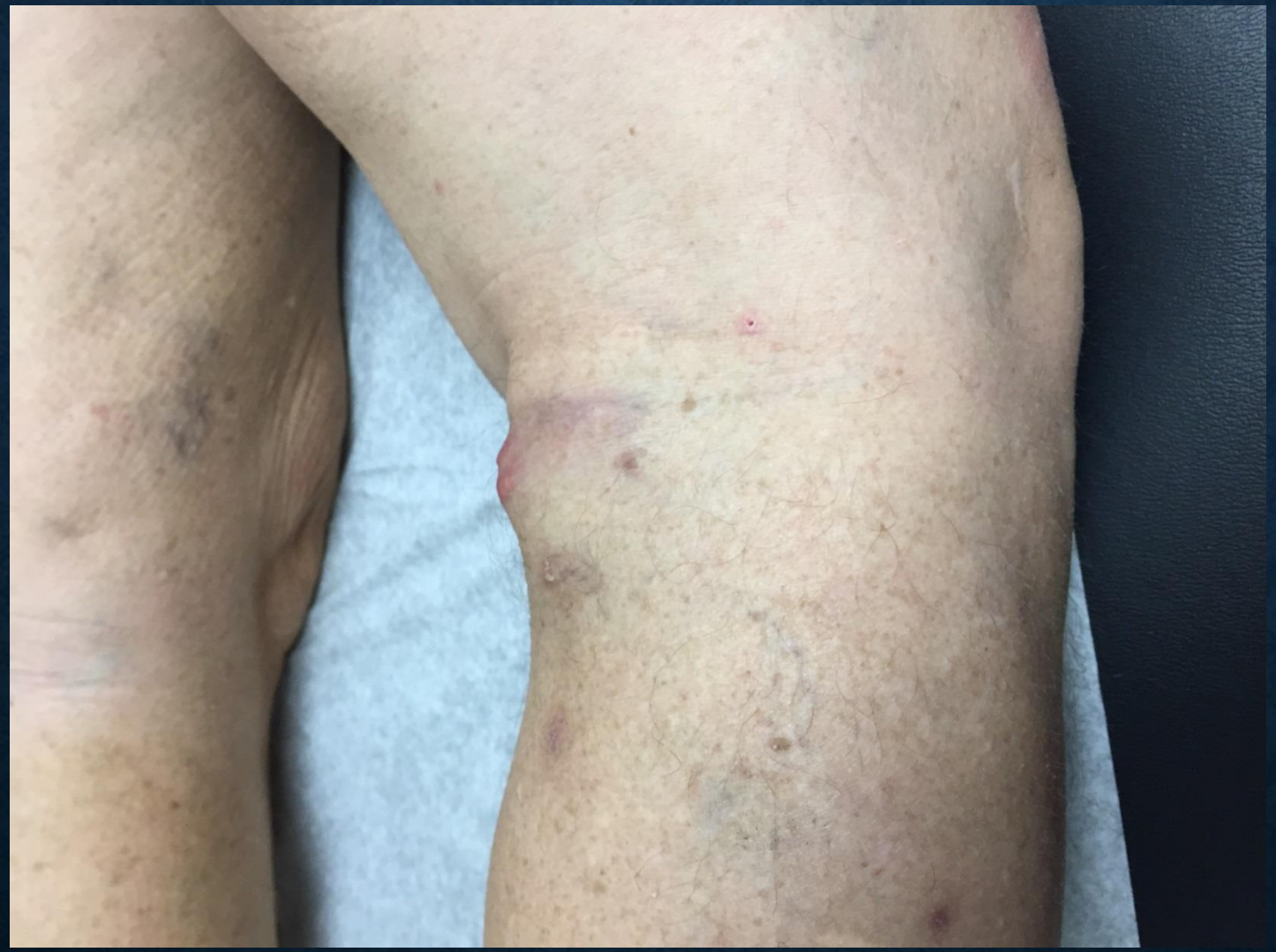
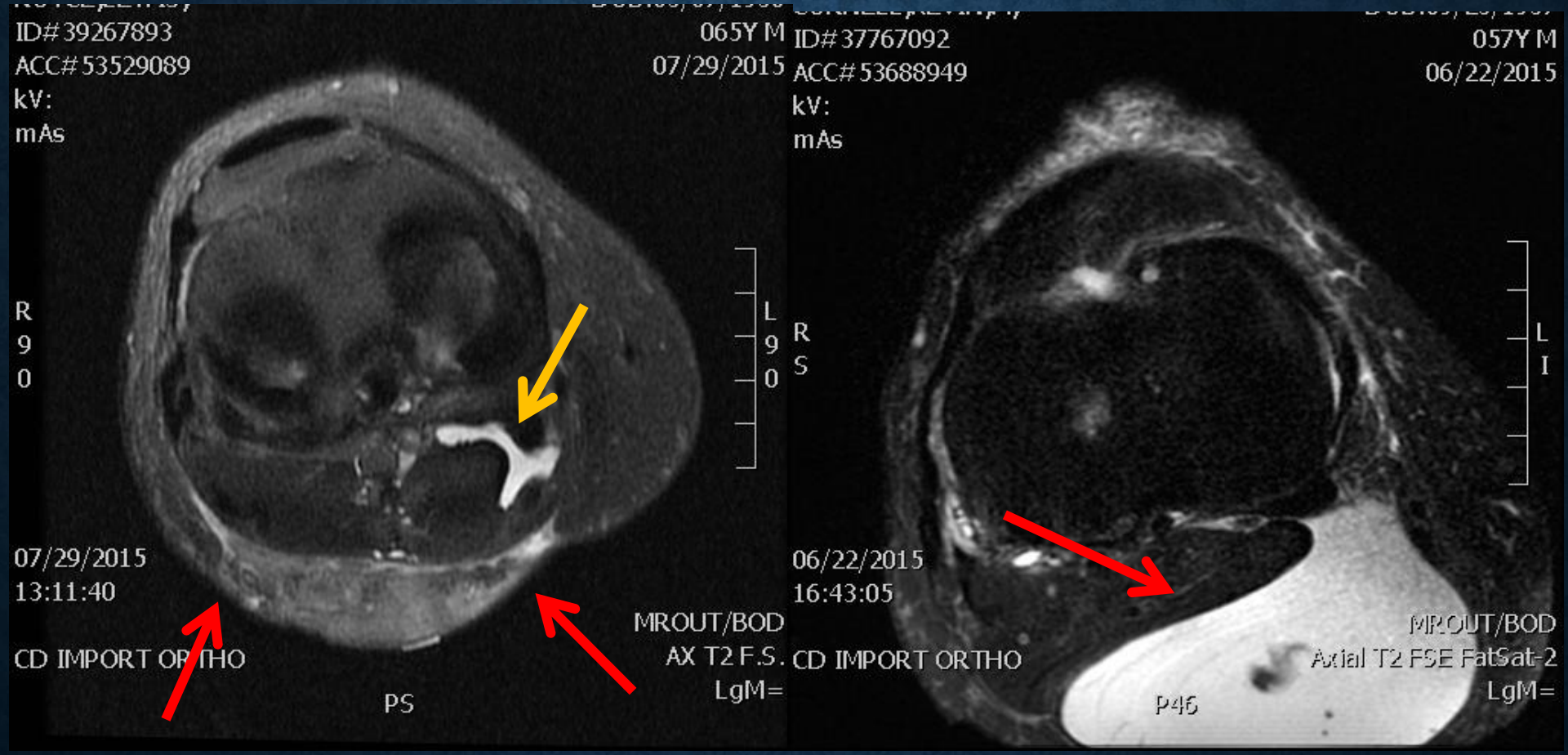
BAKER'S CYST

- Arise from meniscal tear
- Arise between the tendons of the
  - medial head of the gastrocnemius and the semimembranosus muscles

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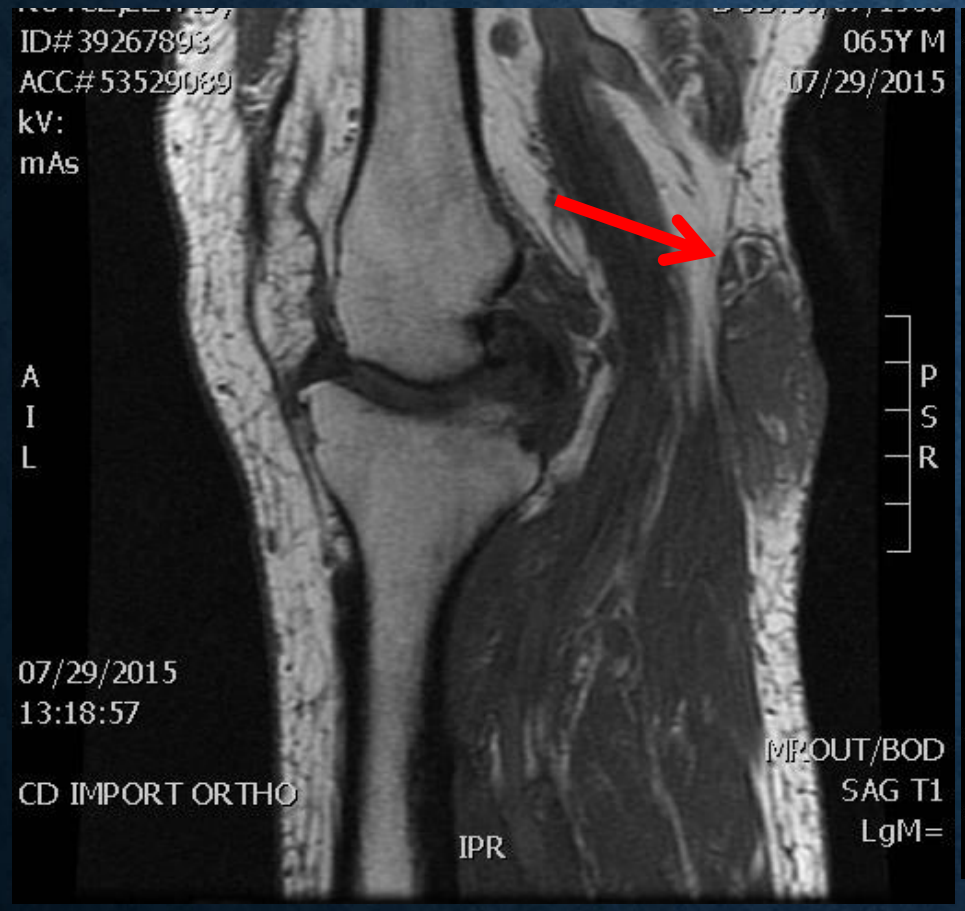
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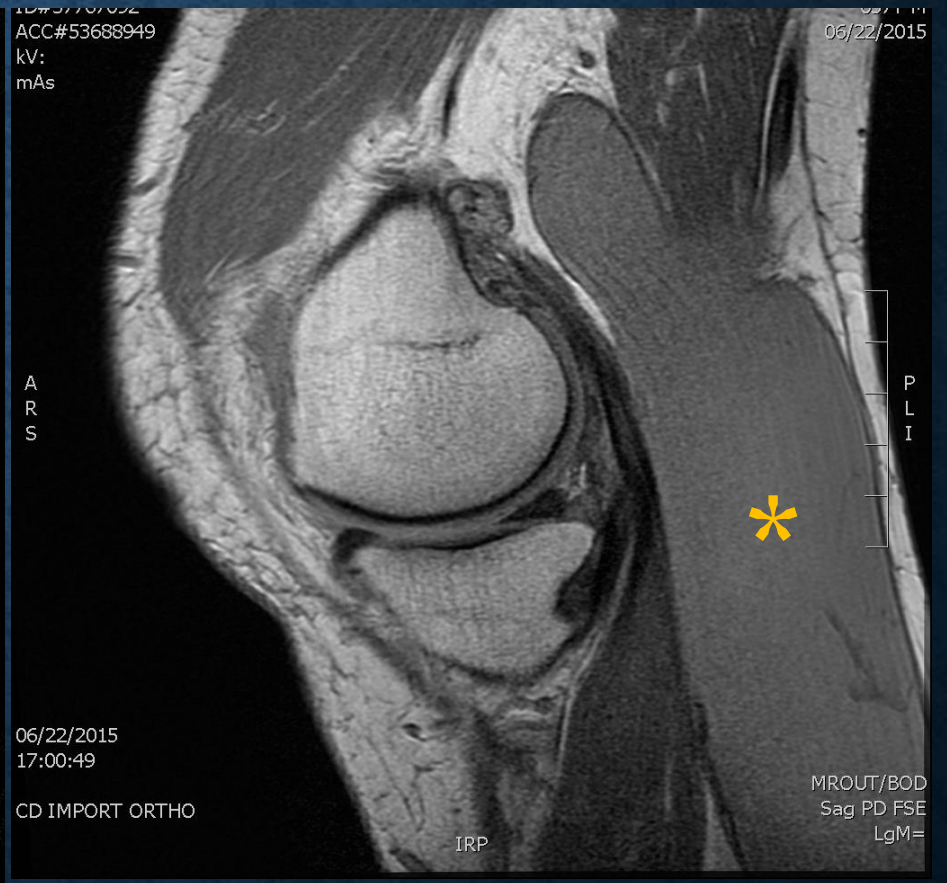
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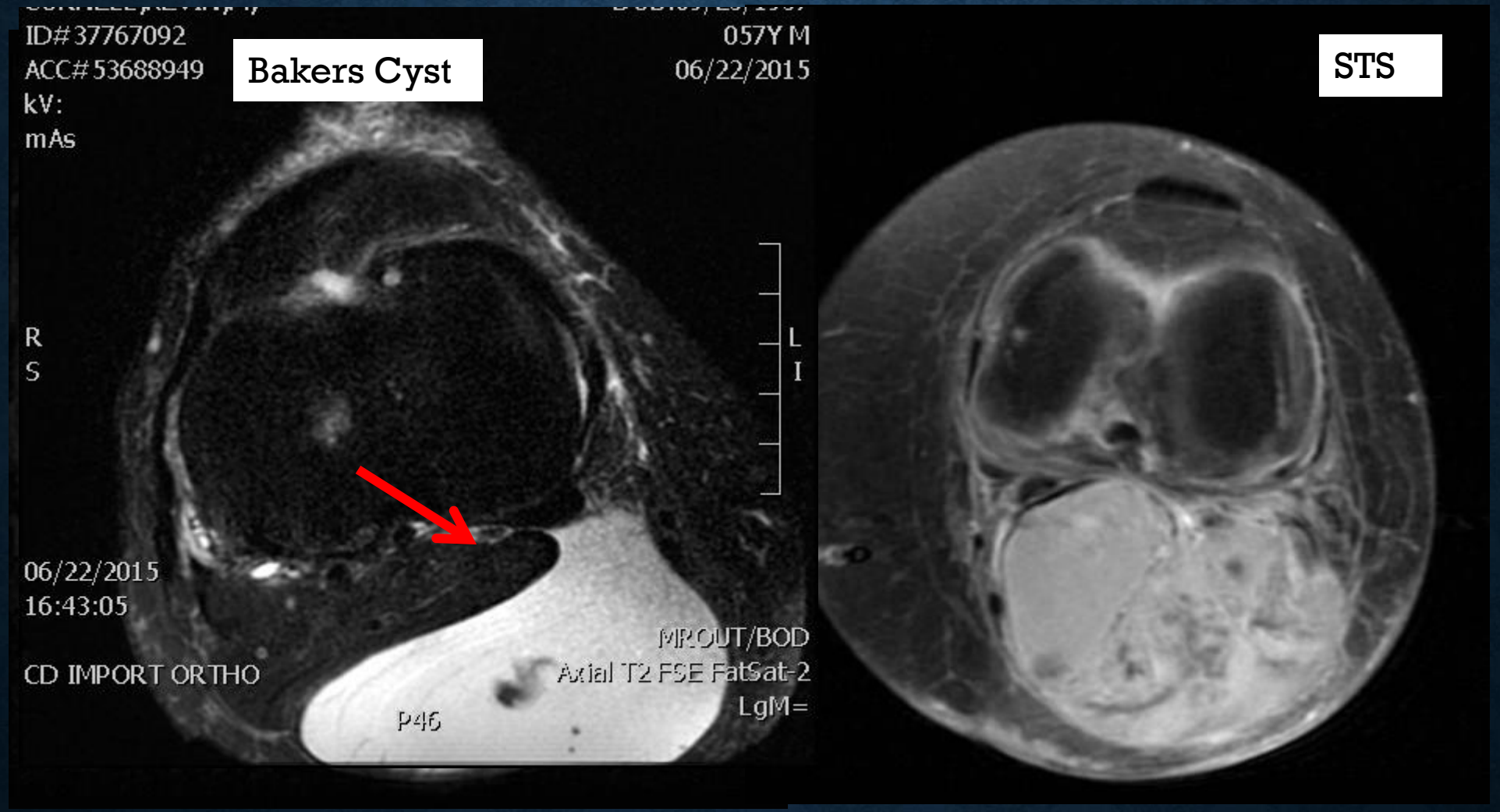
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4 THINGS TO REMEMBER: BONE – WHOOPS SURGERY

- Evaluation of a METastatic lesion/ hole in bone >50
  - CT x 3
  - WBBS
  - SPEP/UPEP
  - Biopsy
- LOW threshold for MRI
- Enchondroma vs Chondrosarcoma
- Arthroplasty in a met or chondrosarcoma (caveat arthroplasty)

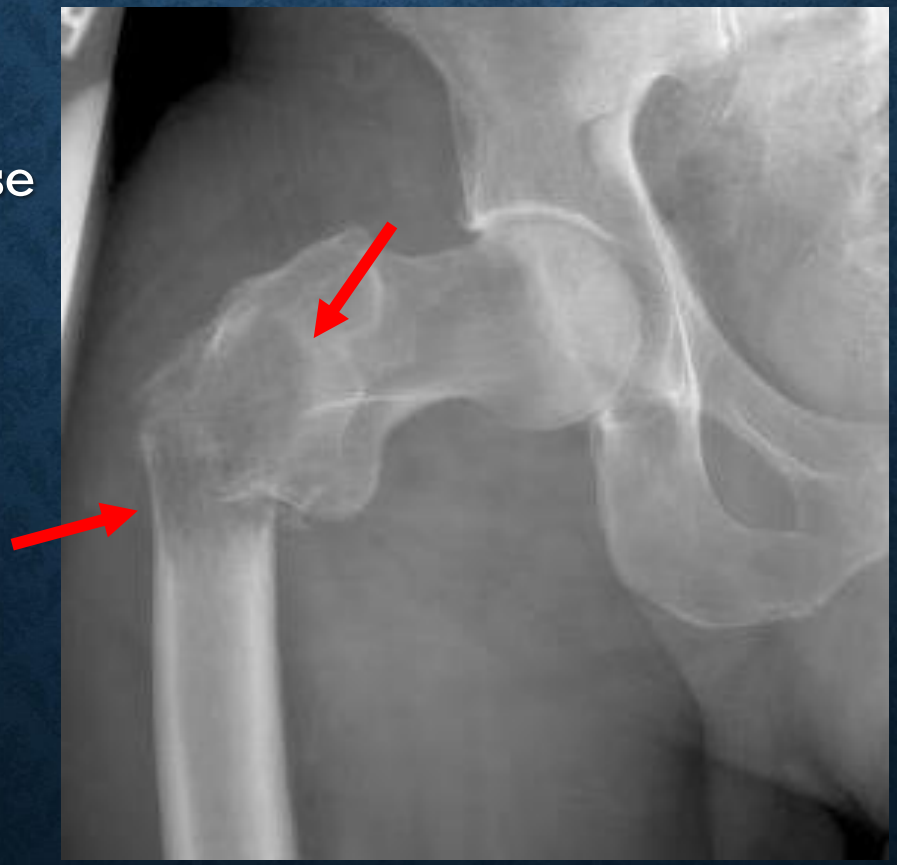
METASTASES

- Prostate
- Thyroid
- Breast
- Lung
- Kidney

BLT and a **K**osher **P**ickle

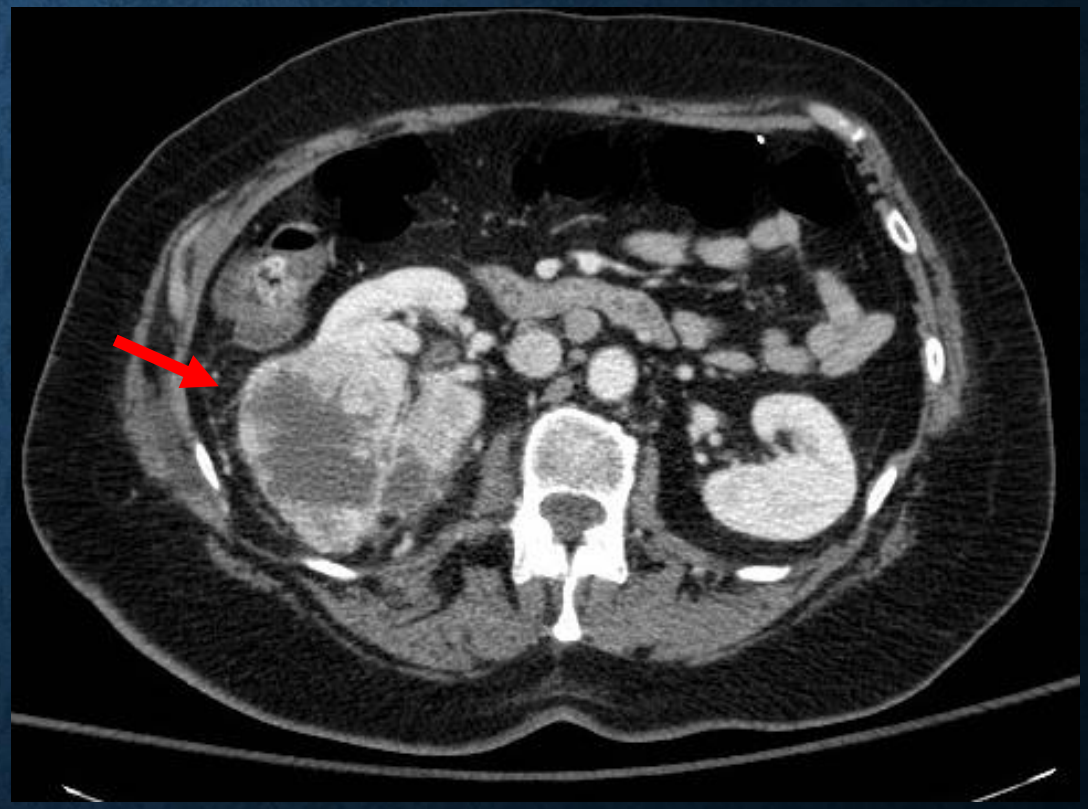
METASTATIC BONE DISEASE

- Patient 55 or greater
- Lytic bone lesion
- Mets until proven otherwise

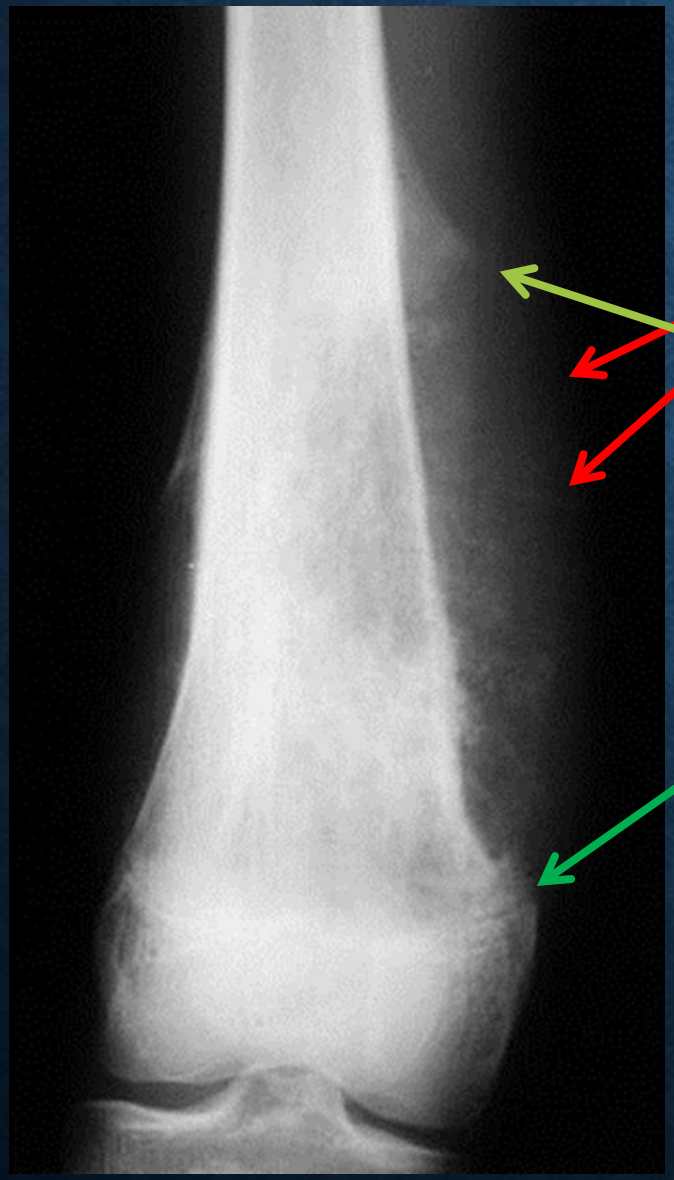


METASTASES – GENERAL EVALUATION

- CT chest/ abdomen/ pelvis
  - Diagnosis locates 1° lesion 85% of cases
- Whole body bone scan
  - Staging, can help with metastatic Dx if > 1 lesion
- LABS
  - PSA or SPEP/UPEP



OSTEOSARCOMA

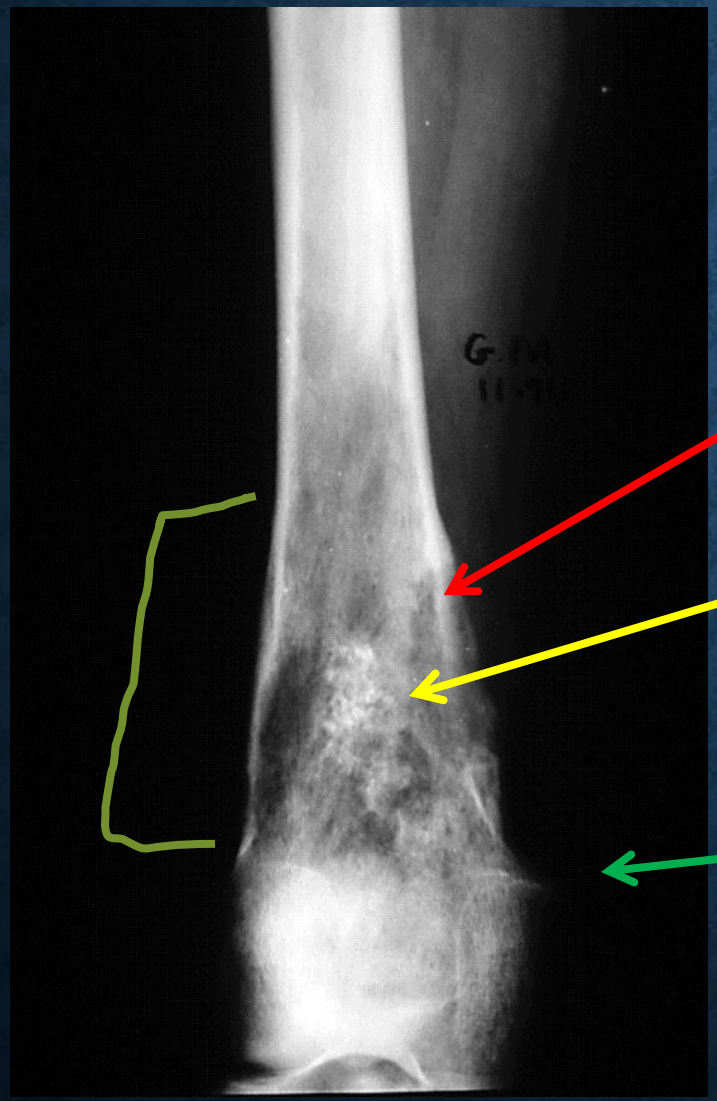


- Location — Metaphyseal
- Tumor — Aggressive soft tissue mass
- Bone — Codman's triangle
- Matrix — Bone

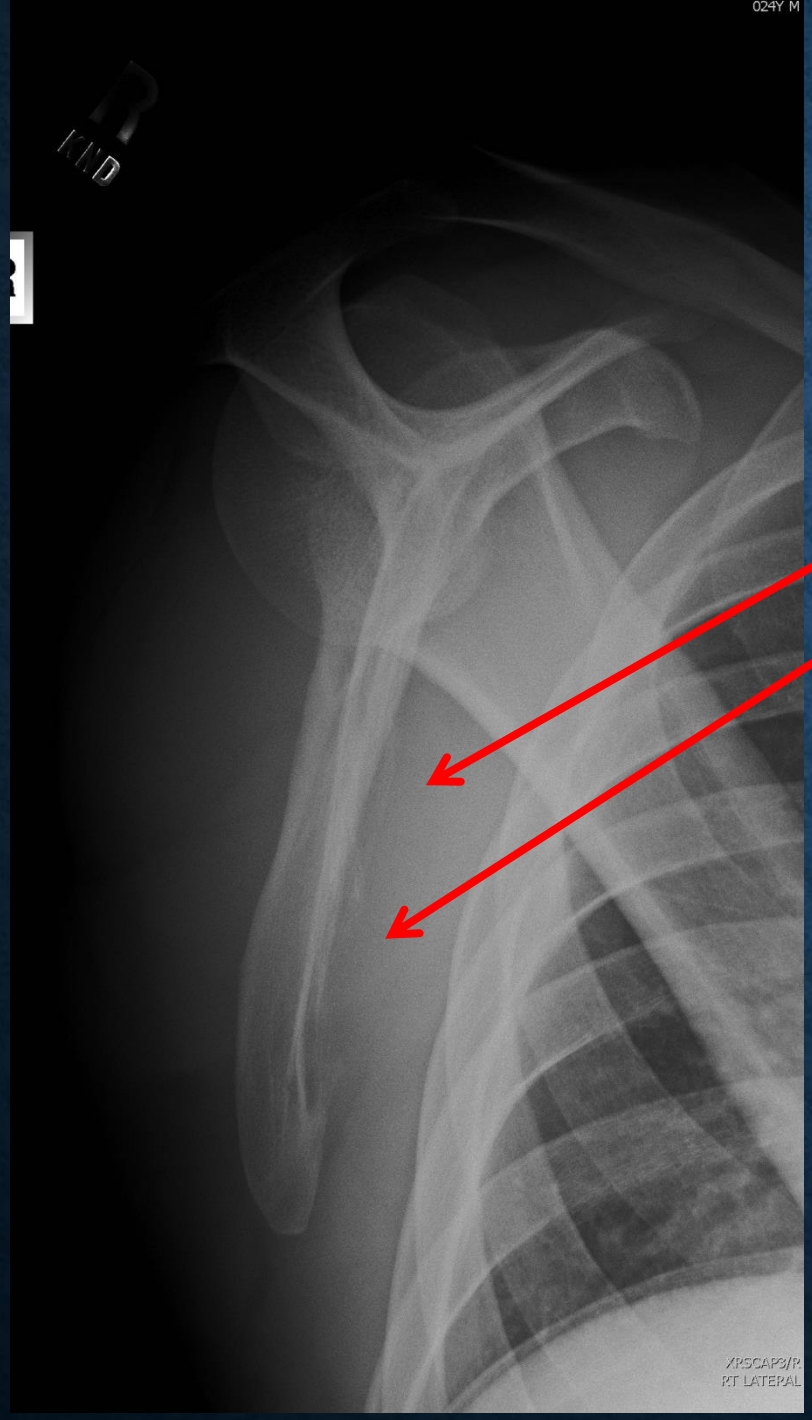
- Skeletally immature

Usually with soft tissue extension

CHONDROSARCOMA



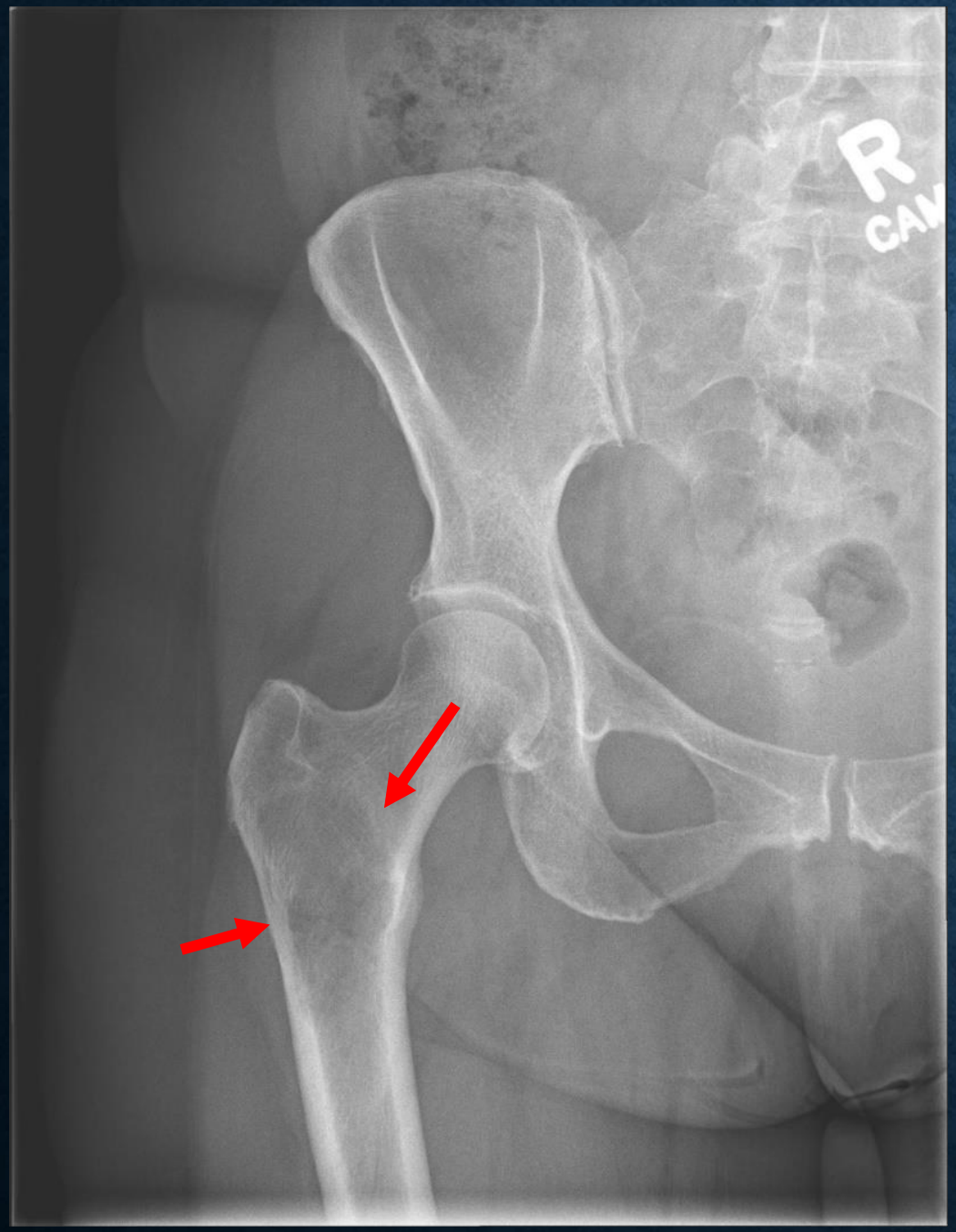
- Location — Metaphyseal
- Tumor — Slowly expanding
- Bone — Slowly expands/ endosteal scalloping
- Matrix — Cartilage
- Skeletally mature



EWING SARCOMA

- Location — Diaphyseal/ flat bones
- Tumor — Aggressive, large soft tissue mass
- Bone — Onion skin/ Codman's triangle
- Matrix — Small round blue cells

- Skeletally immature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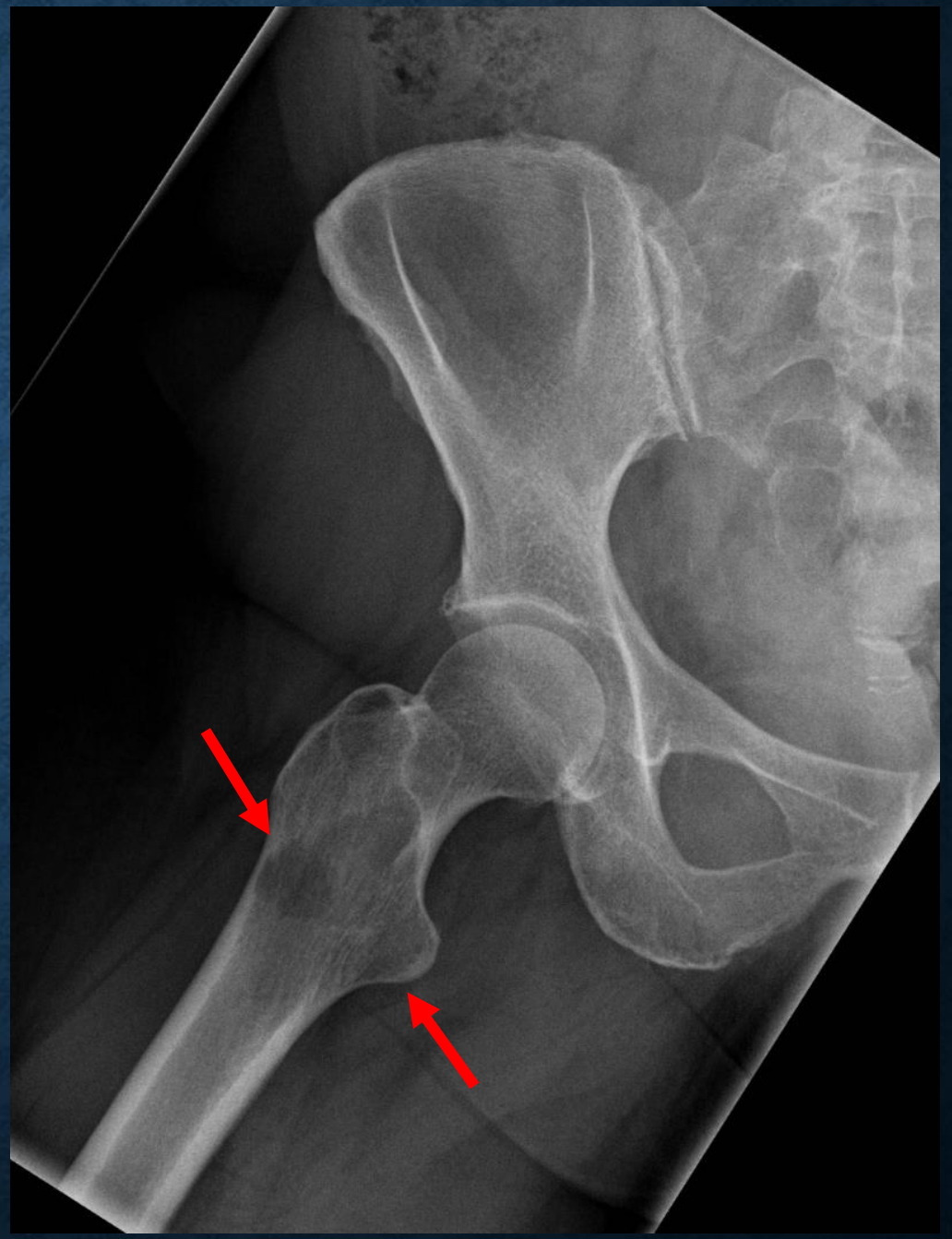
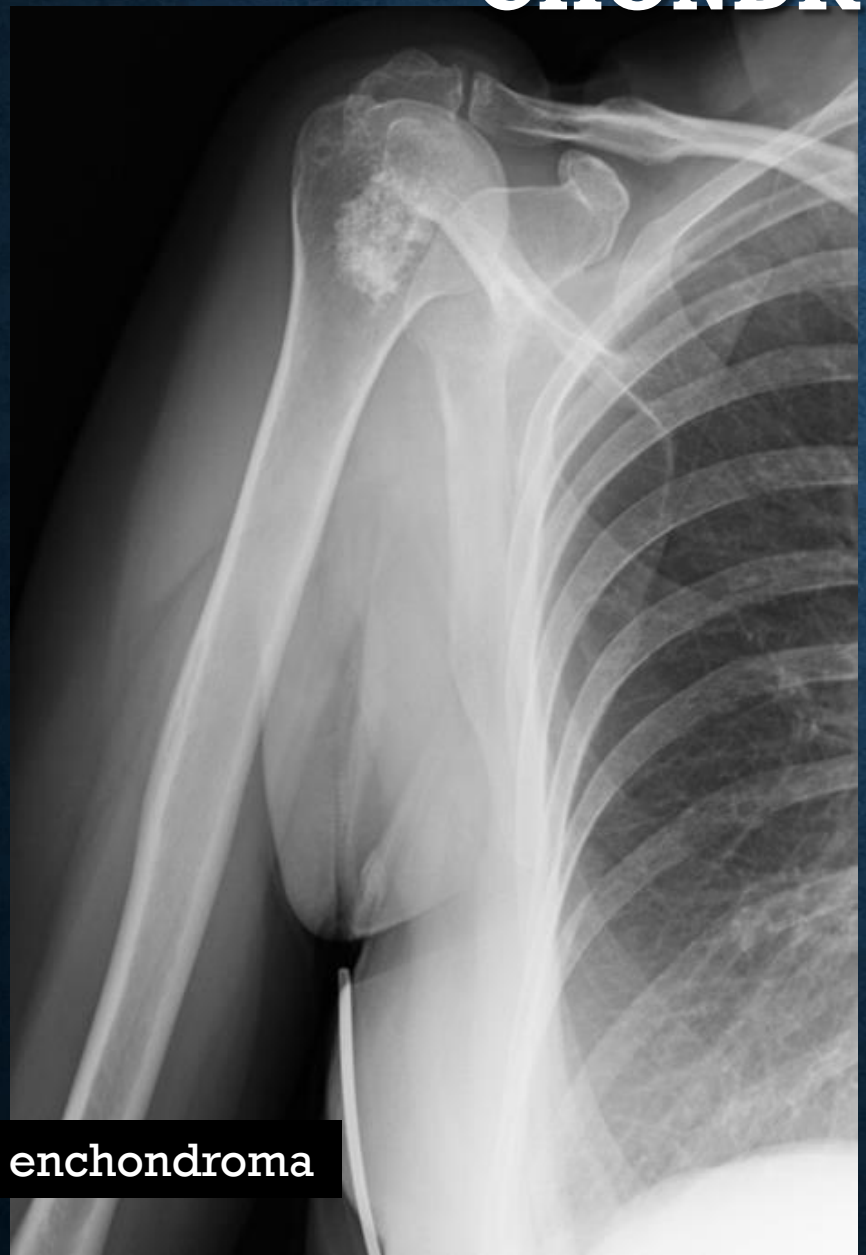


ENCHONDROMA VS. CSA

enchondroma

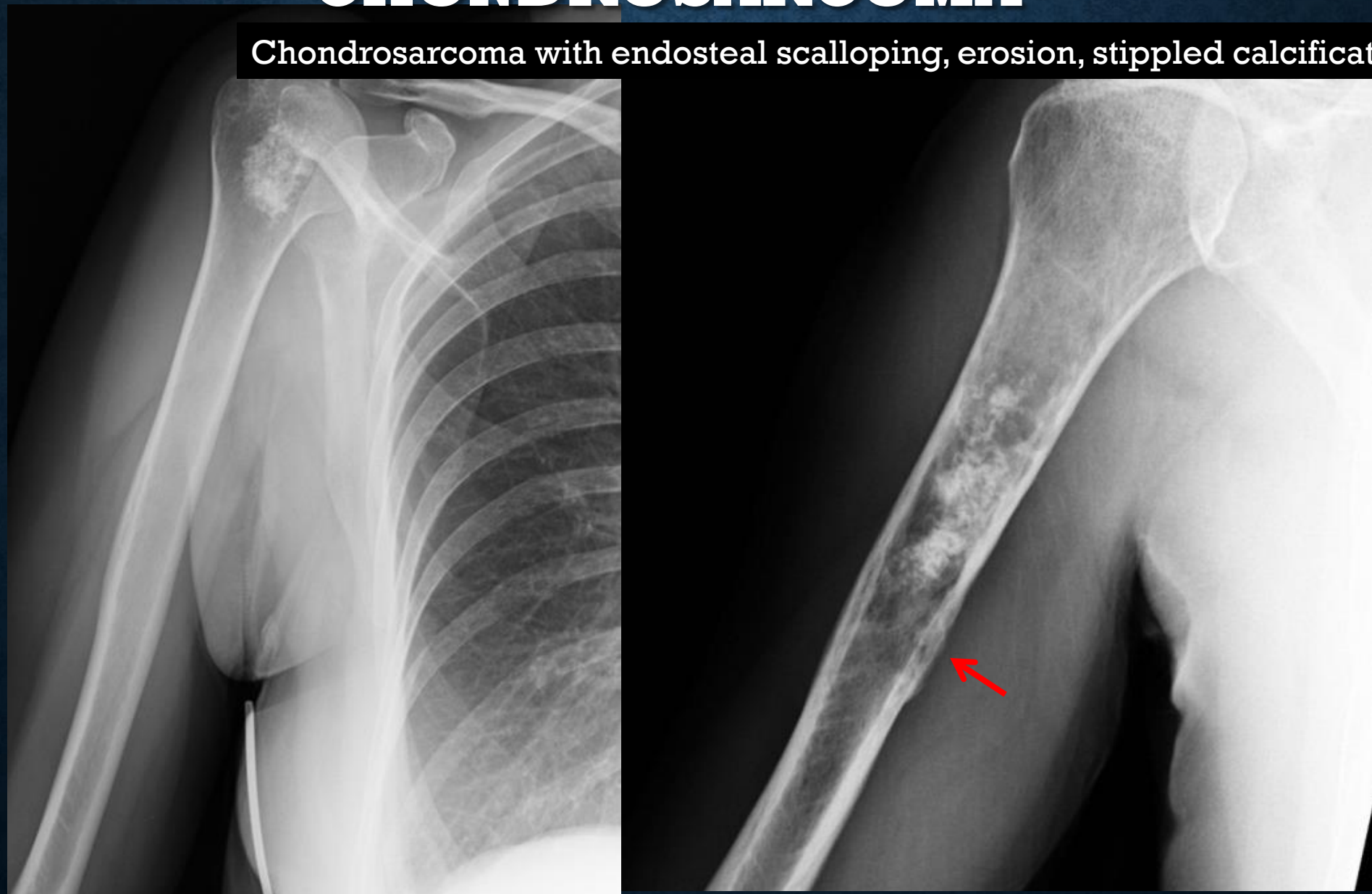
CSA – bone architecture is changed, PAIN IS PRESENT

ENCHONDROMA VS CHONDROSARCOMA



ENCHONDROMA VS CHONDROSARCOMA

Chondrosarcoma with endosteal scalloping, erosion, stippled calcifications

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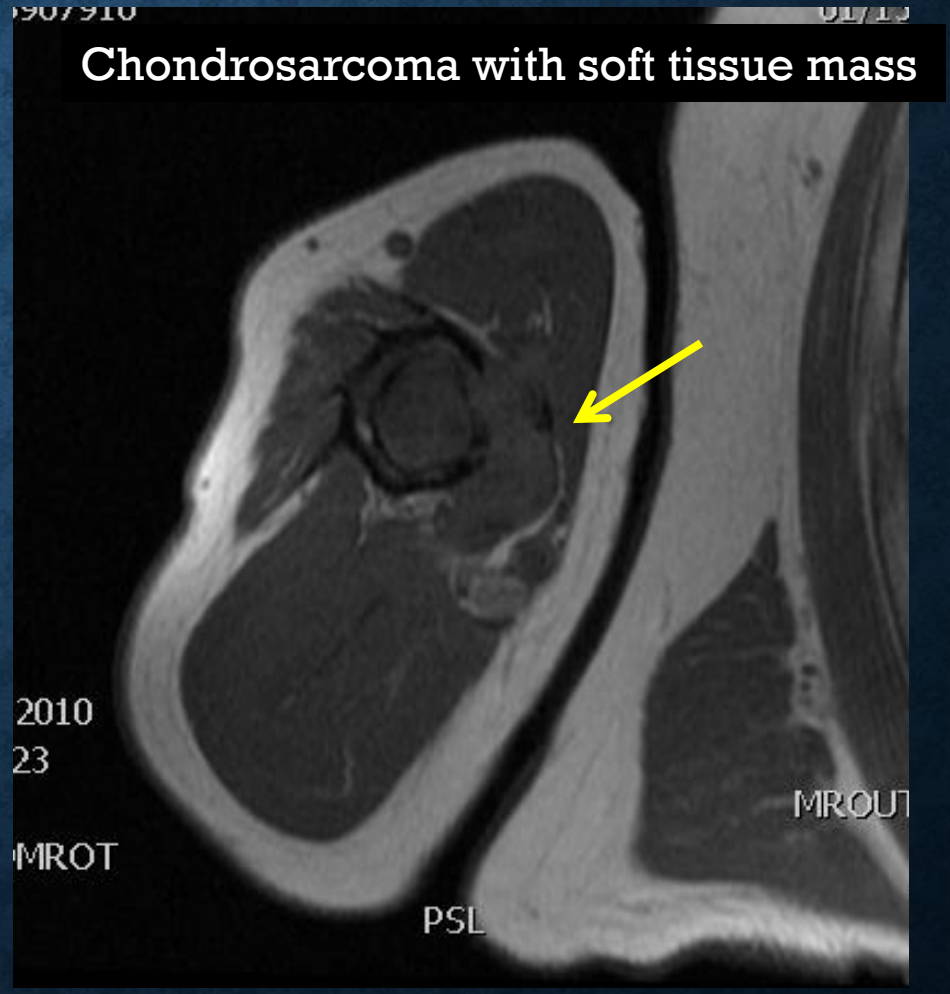
Chondrosarcoma with soft tissue mass
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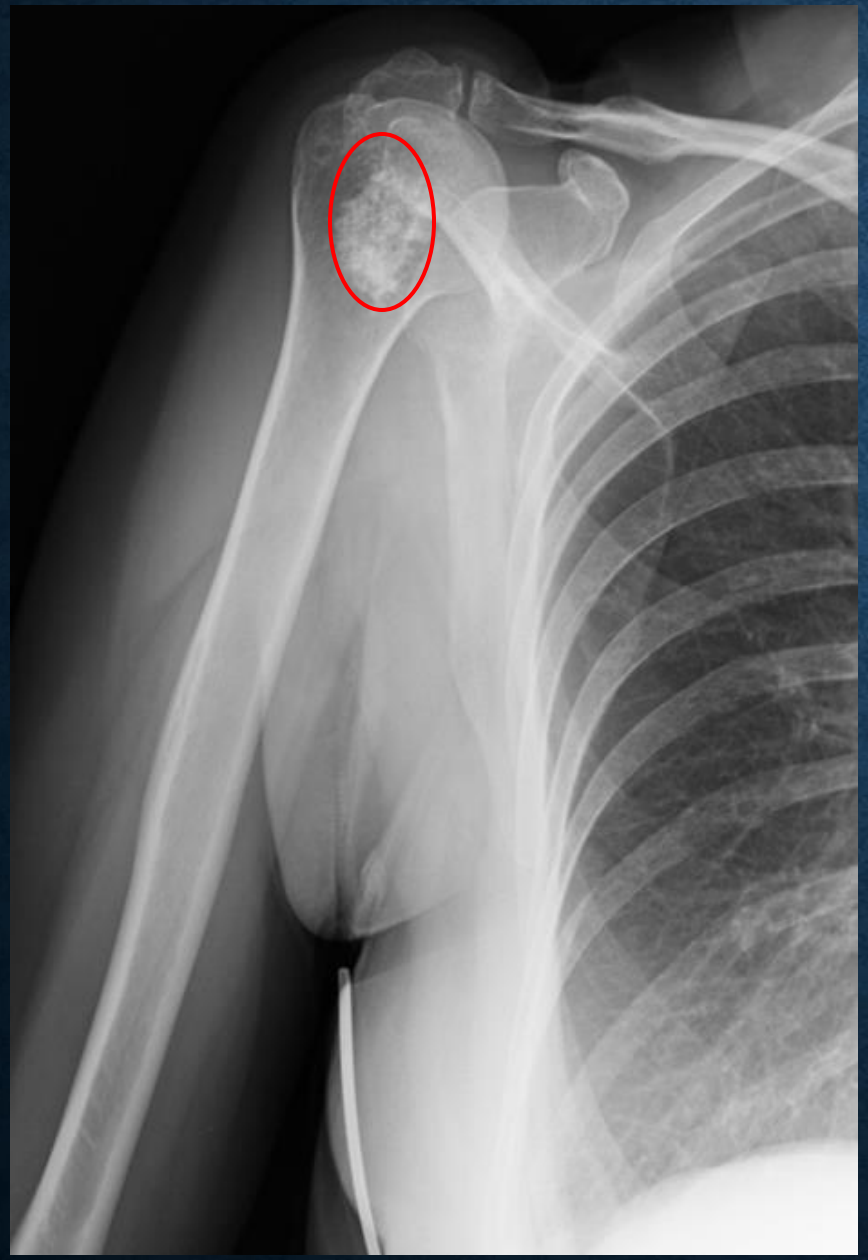
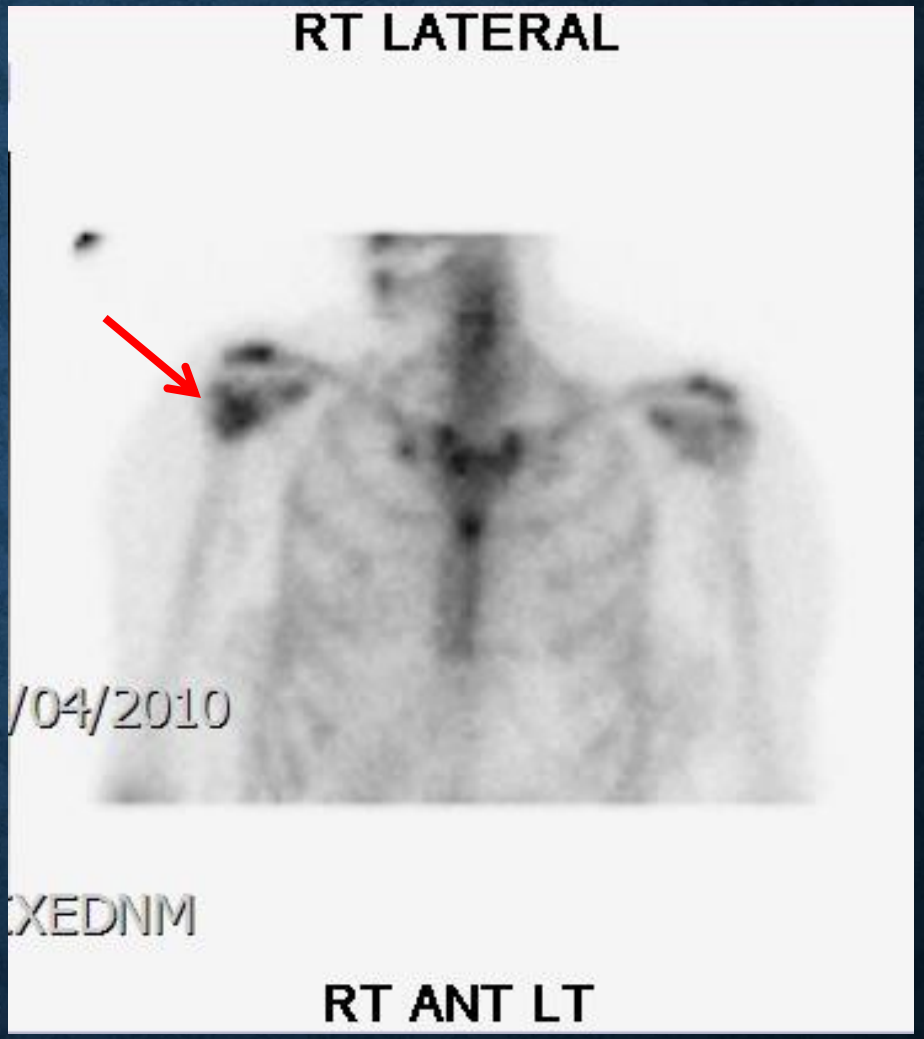
DIAGNOSIS – IMAGING

Enchondroma has normal bone architecture

Chondrosarcoma deforms the bone and it expands

ENCHONDROMA





NOF VS CMF

CMF – lesion has poor border at intramedullary space and at cortical

NOF - well formed, deformed cortex and prominent neo-corticalization at intramedullary space

NON-OSSIFYING FIBROMA

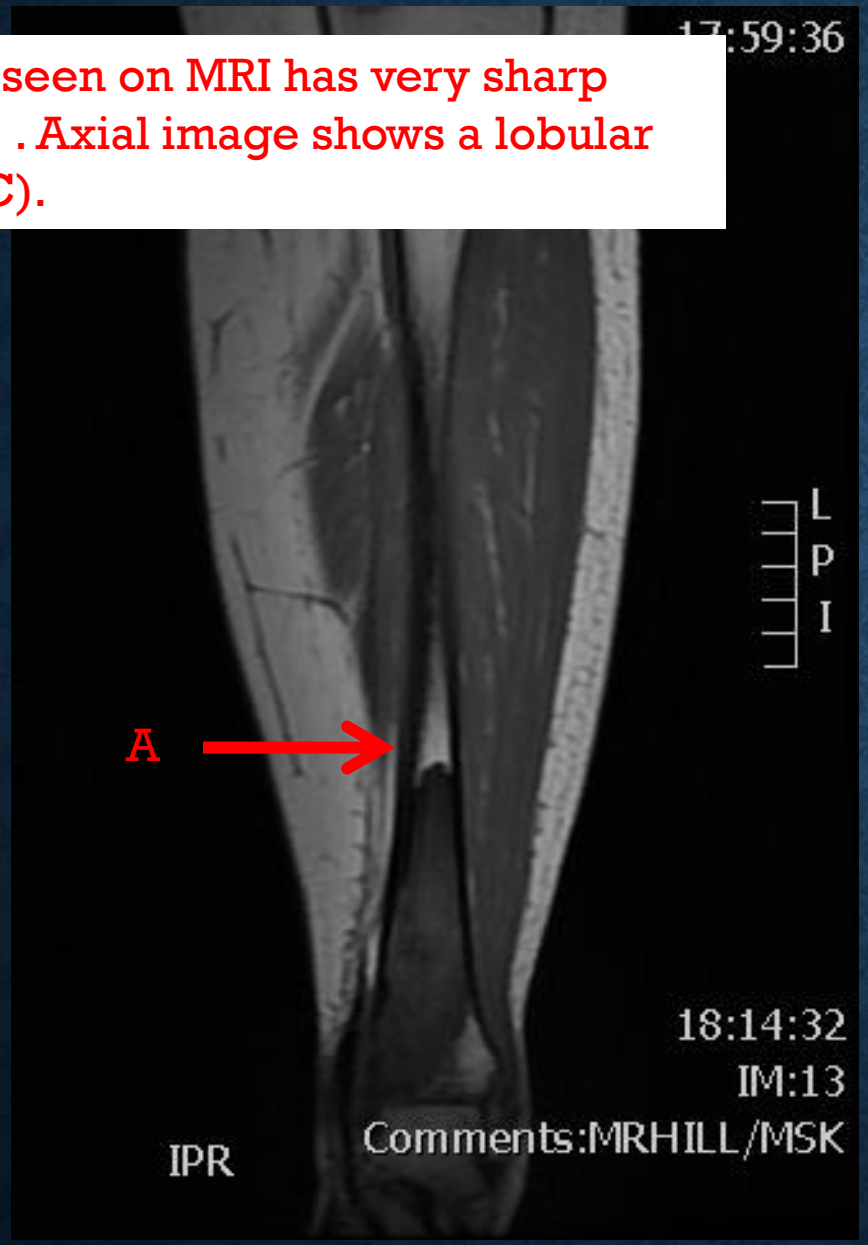
- Eccentric, lytic, metaphyseal, 'bubbly'
- Distal femur, distal or proximal tibia
- Associated with anterior bow to tibia
- Fracture risk with large defect

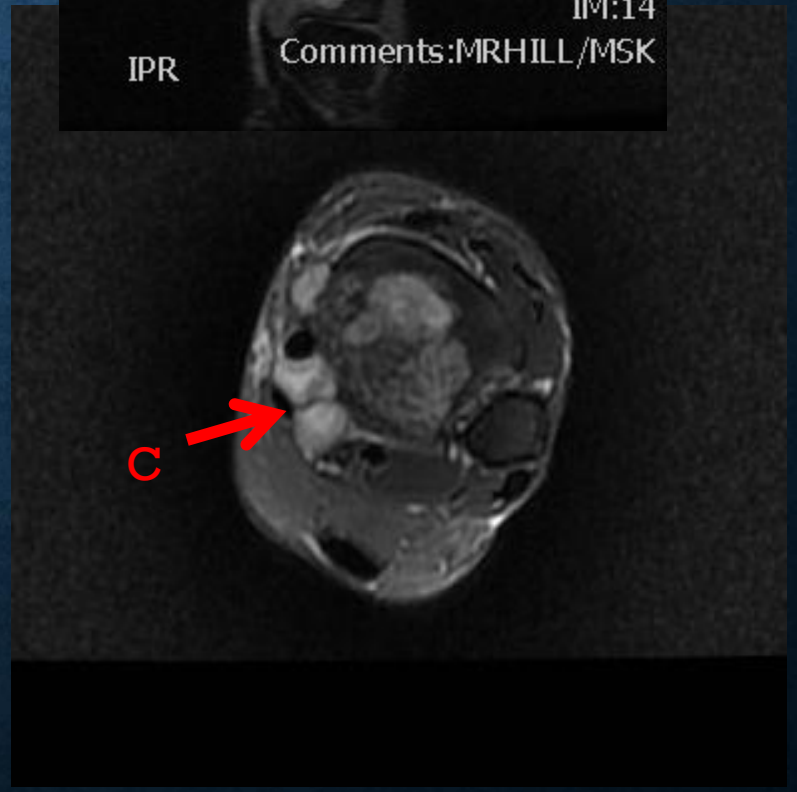
NON-OSSIFYING FIBROMA

- Exaggerated subperiosteal osteoclastic resorption during metaphyseal remodeling
- At site of tendon insertion

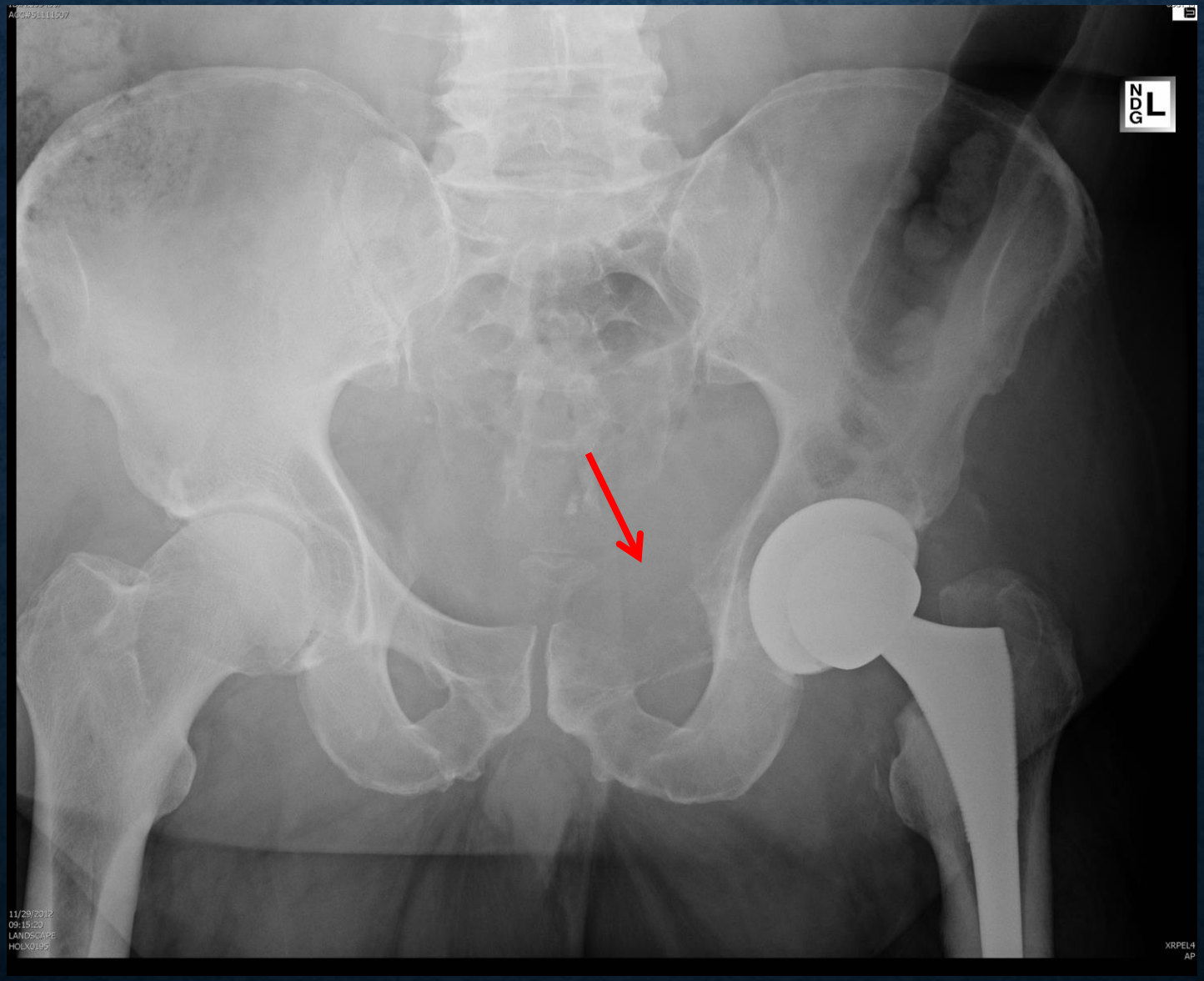
CHONDROSARCOMA VS MET

Chondrosarcoma seen on MRI has very sharp borders (A and B) . Axial image shows a lobular soft tissue mass (C).



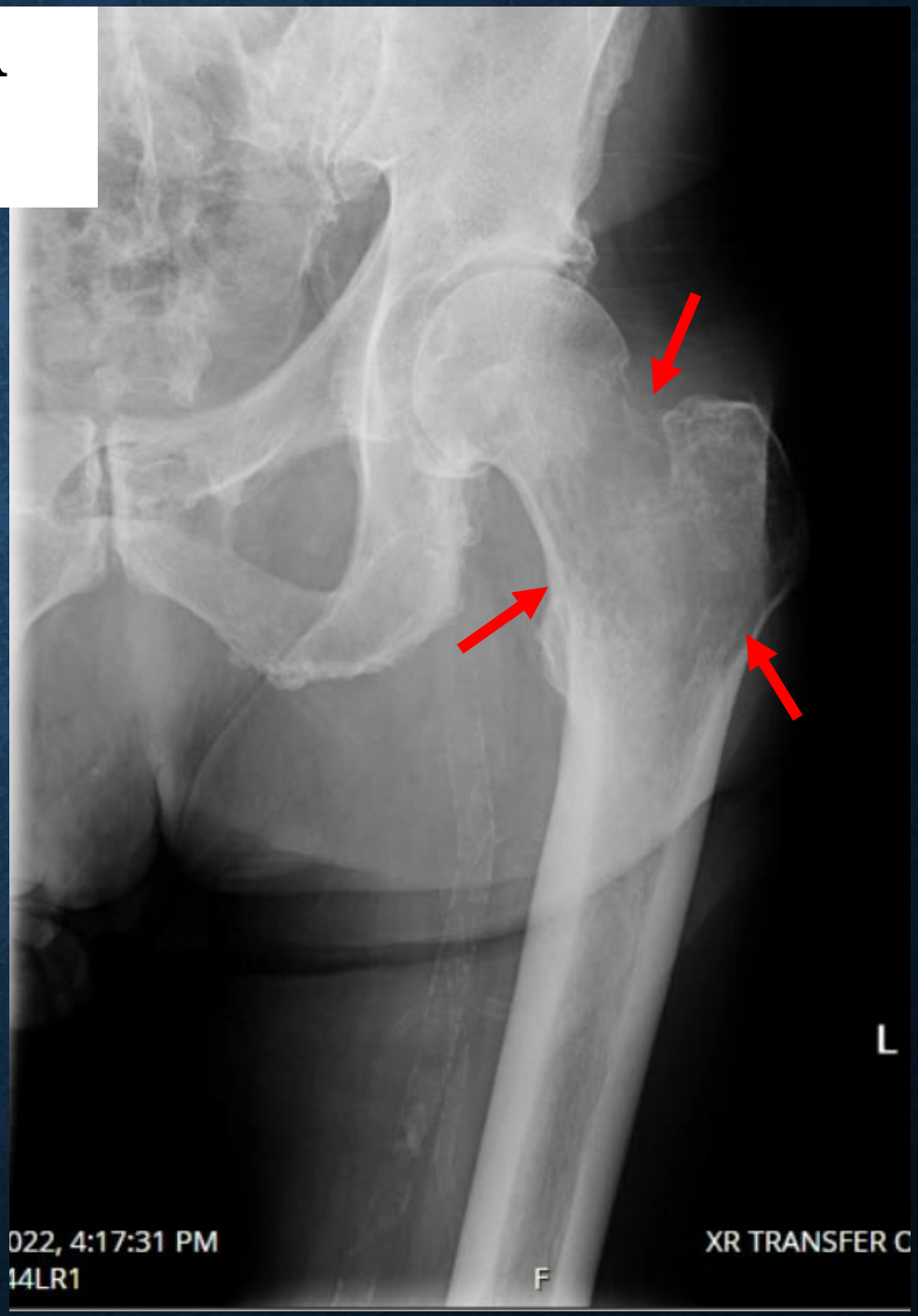


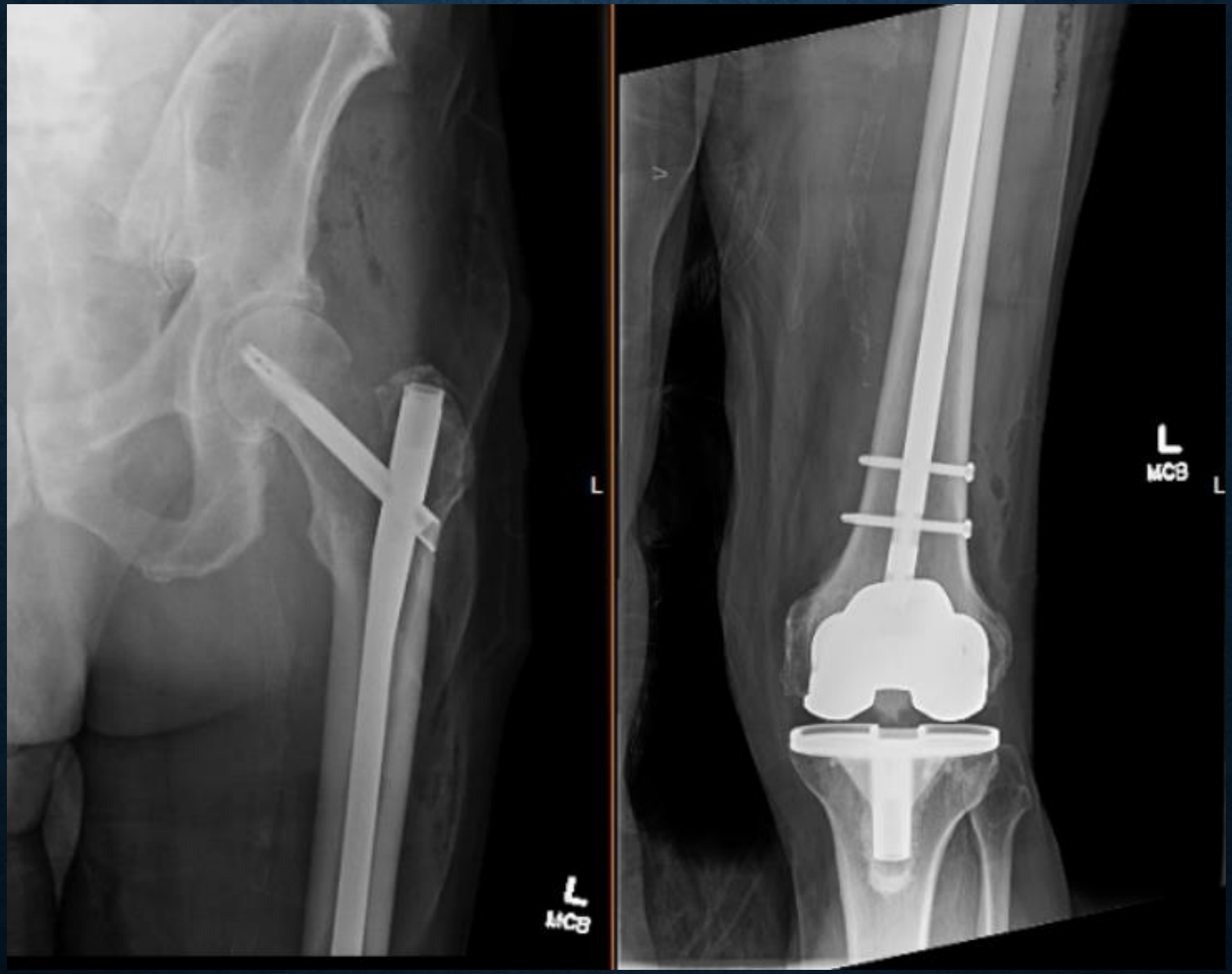
CAVEAT ARTHROPLASTY



DO YOU SEE A LESION?

DO YOU SEE A LESION?

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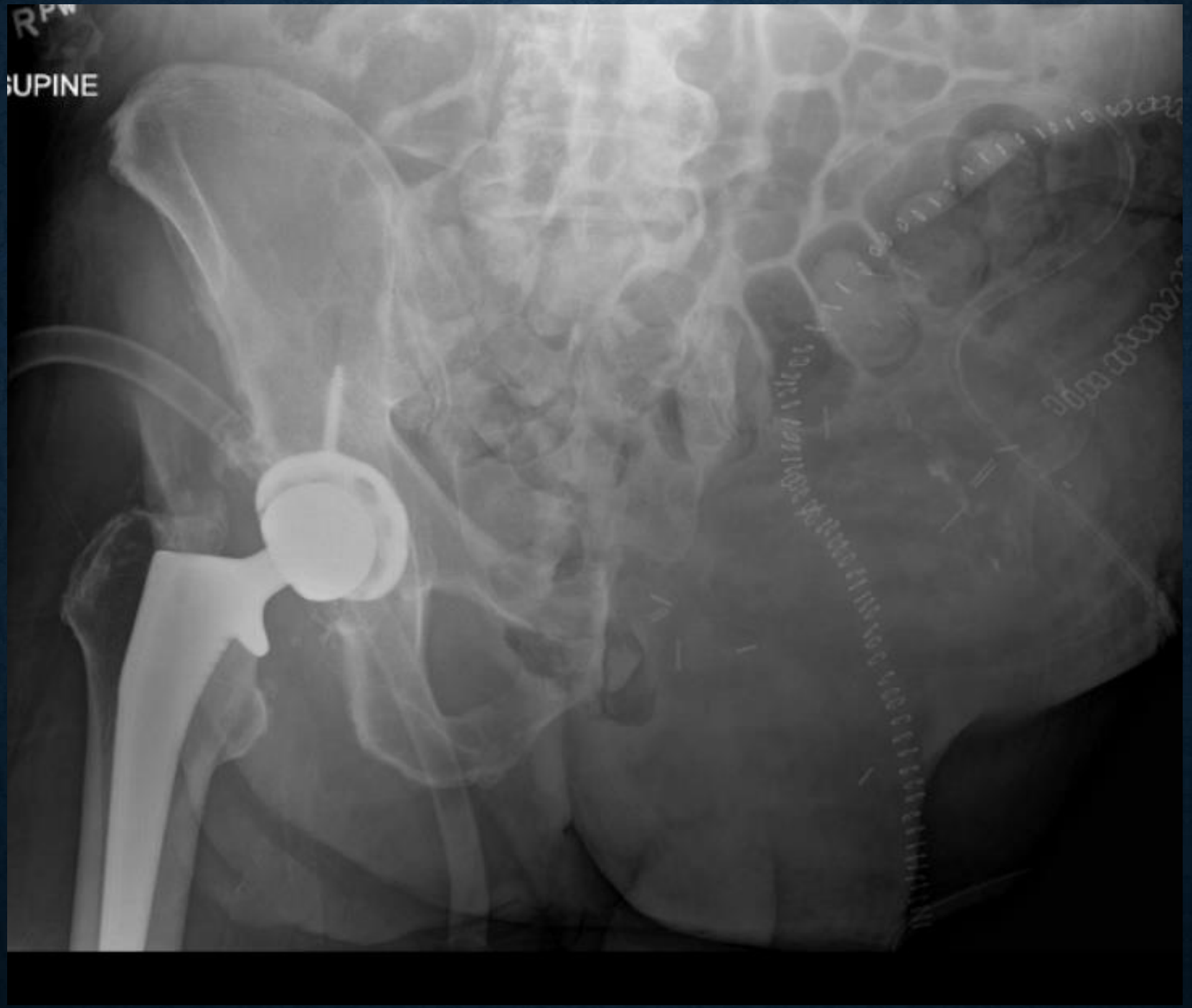
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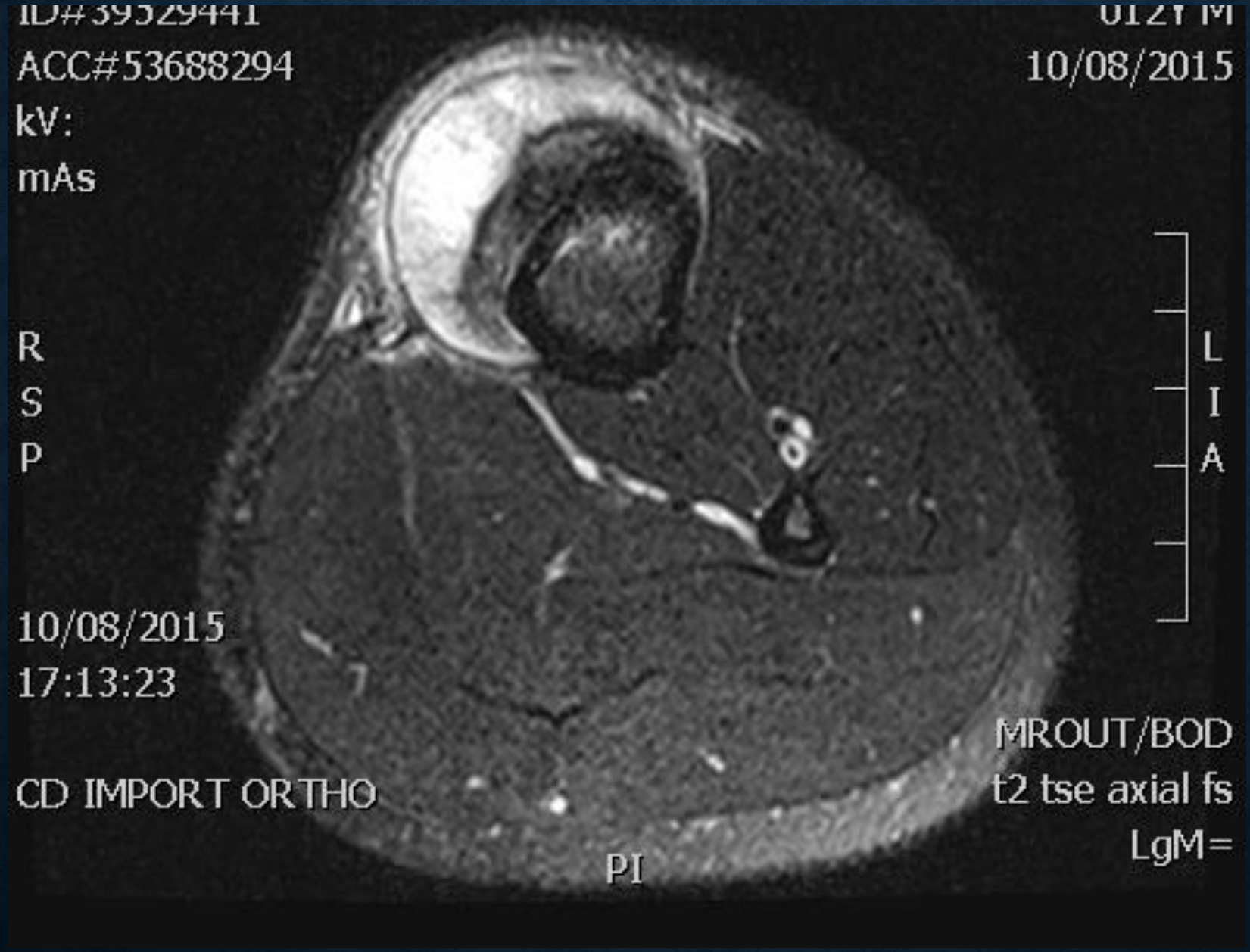
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PATIENT OVER 50 WITH A HOLE IN THE BONE

- Pay attention to outliers
- Short interval follow-up
- Soft tissue masses
  - symptoms are important
  - low threshold for an MRI
- Bone lesions
  - symptoms are important
  - low threshold for an MRI

Evaluation of a METastatic lesion (HOLE)

- CT x 3
- WBBS
- SPEP/UPEP
- Biopsy

MRI scan of the extremity w/wo contrast – tumor protocol (if possible)