

A BEGINNER'S GUIDE TO ORTHOPEDIC ONCOLOGY

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Disclosures

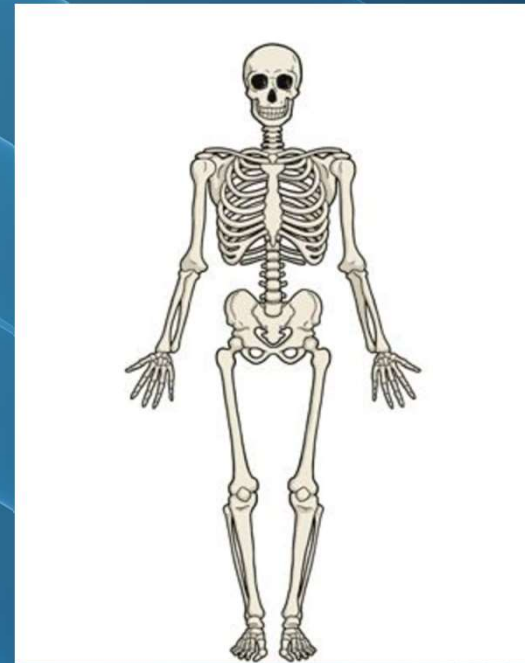
I have no relevant relationships to disclose.



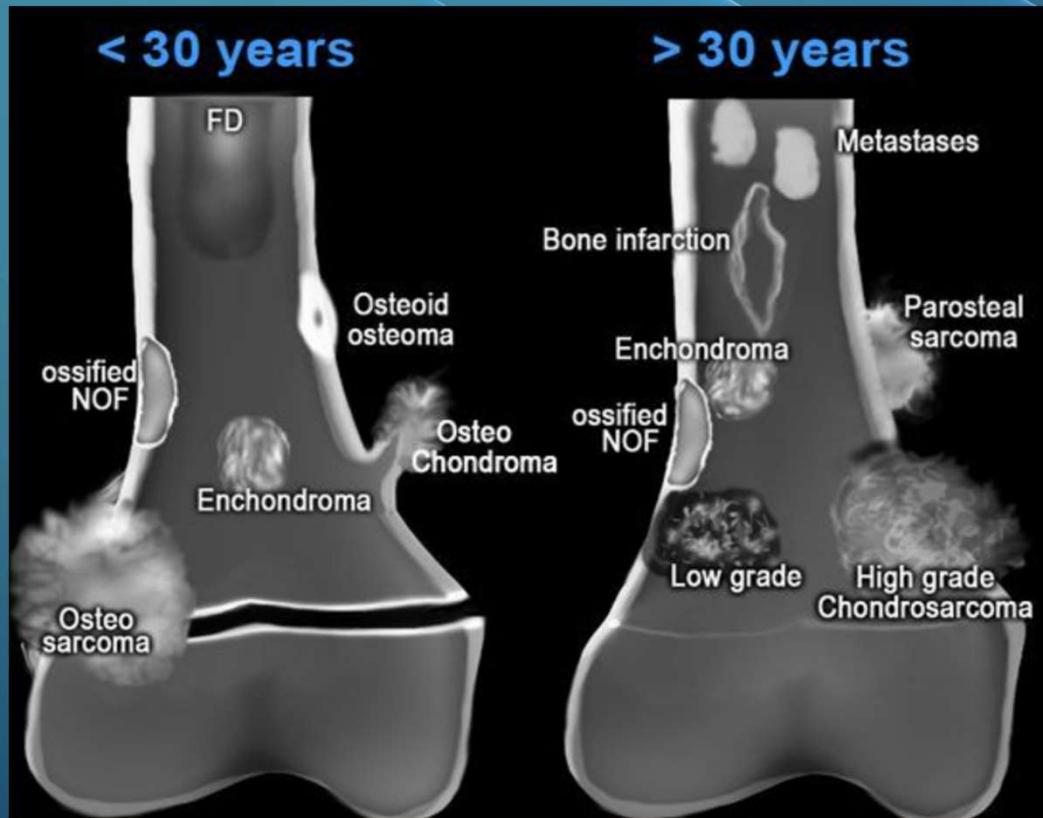
- ▶ Learn to identify various bone and soft tissue tumors
- ▶ Appropriate work up needed
- ▶ When and why to make a referral
- ▶ Informing/educating your patient

MOST COMMON BENIGN BONE LESIONS

- ▶ Osteochondroma
- ▶ Enchondroma
- ▶ Non-ossifying Fibroma
- ▶ Chondroblastoma
- ▶ Bone cysts – Unicameral/Aneurysmal
- ▶ Giant Cell Tumor
- ▶ Osteoid Osteoma
- ▶ Fibrous Dysplasia
- ▶ Myositis Ossificans
- ▶ Osteomyelitis



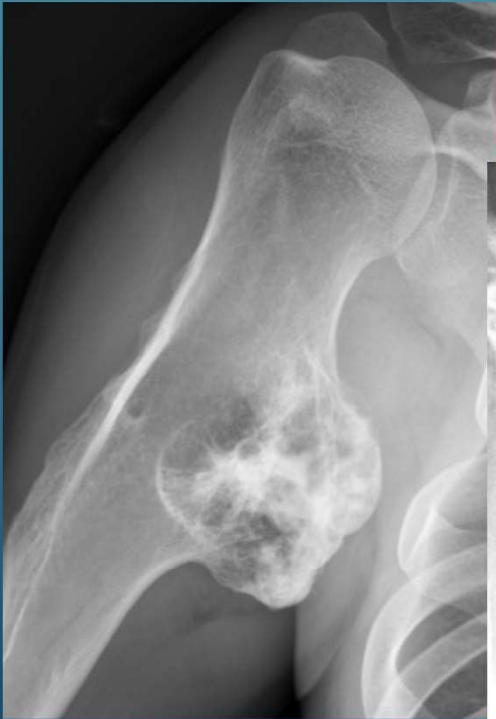
AGE/LOCATION OF BONE TUMORS



What to do?

- Age of patient
- Location of tumor
- Xray

OSTEOCHONDROMA

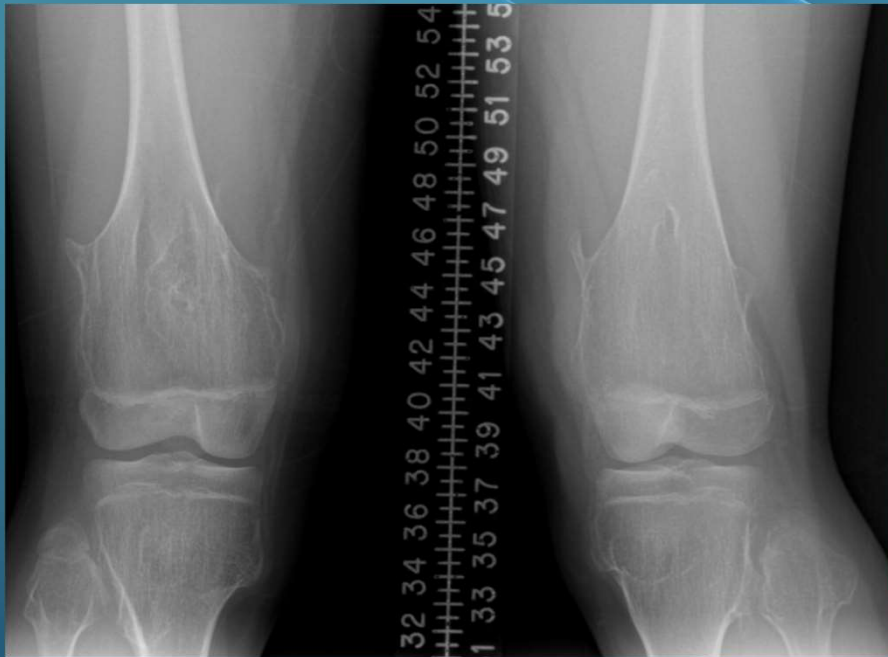


- Most common childhood benign bone tumor
- Exostosis stops growing at skeletal maturity

MHE

(MULTIPLE HEREDITARY EXOSTOSIS)

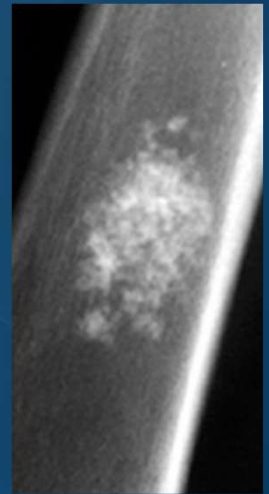
- Adults with MHE have a 5 -10% of malignant transformation
- Exostosis at the shoulder and pelvis are more likely to become malignant
- Look for increasing pain and size of tumor
- Autosomal dominant – 50/50 chance of children having disease



What to do?

- Limb lengths in children need to be monitored w/ xray and limb length studies
- No labs needed
- Do NOT order an MRI
- Refer

ENCHONDROMA



What to do?

-Xray

-Usually an incidental finding; benign cartilage lesion
-Patient may present with fx of finger after lifting something heavy

OLLIER DISEASE



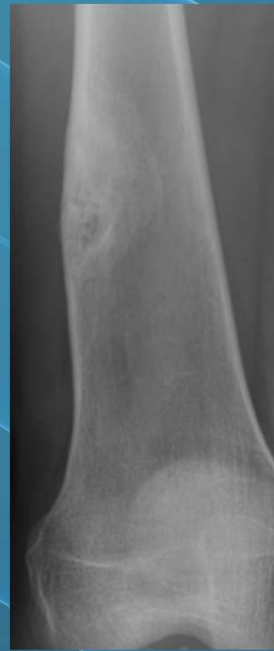
- Multiple enchondromas which are benign cartilage lesions that grow within the bone
- Usually in limb bones but can be anywhere
- Results in bone deformity/possible fractures



What to do?

- Xray
- Monitor limb lengths
- Refer

NON-OSSIFYING FIBROMA

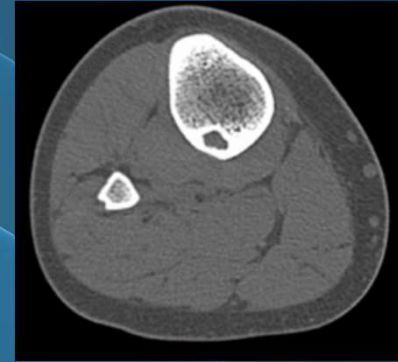
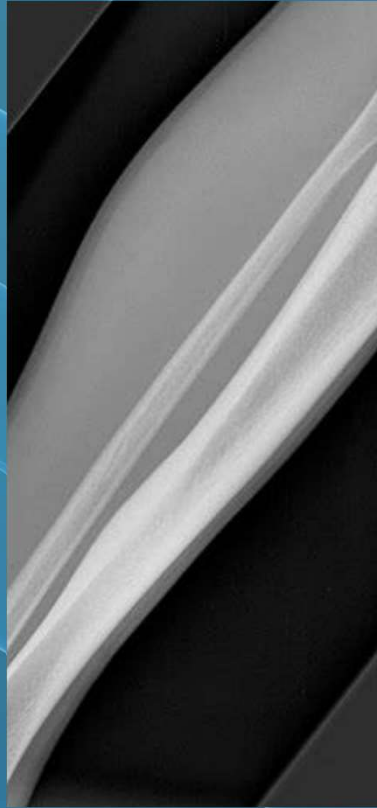


- Very common; incidental finding; usually asymptomatic
- Age: < 20
- Eccentric in metaphysis of long bones
- Does not need treatment unless impending fracture
- Xray

16 yo M w/ pathologic fracture of the right tibia after fall off a skateboard

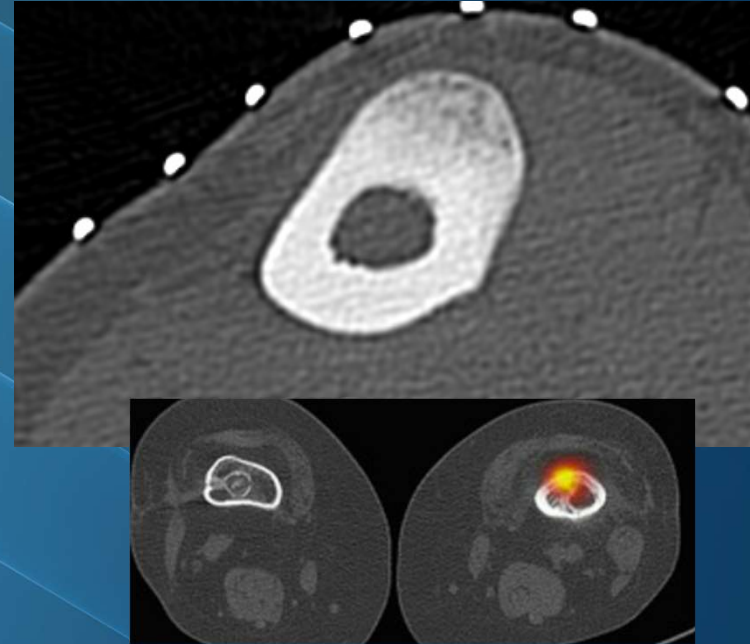


OSTEOID OSTEOOMA



- Benign
- Usually in younger patients (ages 5 -35)
- Painful! Especially at night
- Most often found in long bones of lower limb
- Intracortical nidus

16 yo M basketball player w/ increasing lower leg pain w/o hx of injury



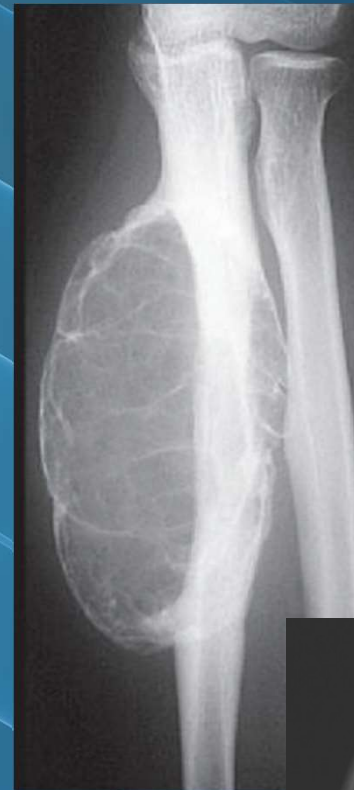
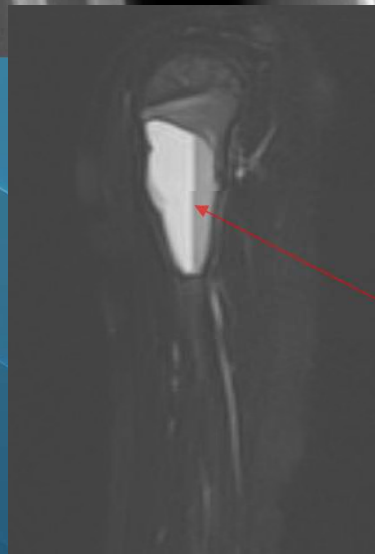
What to do?

- Usually responds well to NSAID's
- Xray, CT and SPECT scan
- Can be treated with RFA/curettage
- Refer

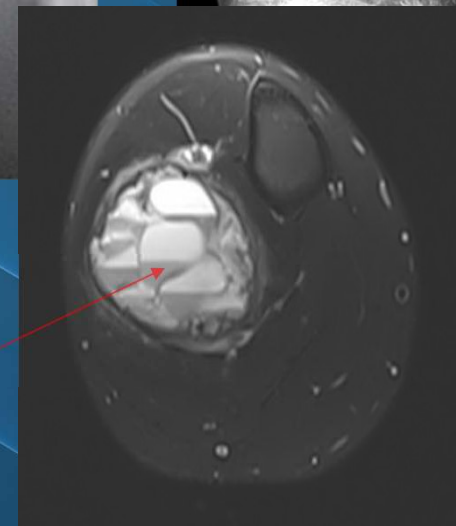
BONE CYSTS



Unicameral Bone Cyst



Aneurysmal Bone Cyst



Fluid-fluid levels

7 yo M seen since the age of 4 with multiple fractures through UBC



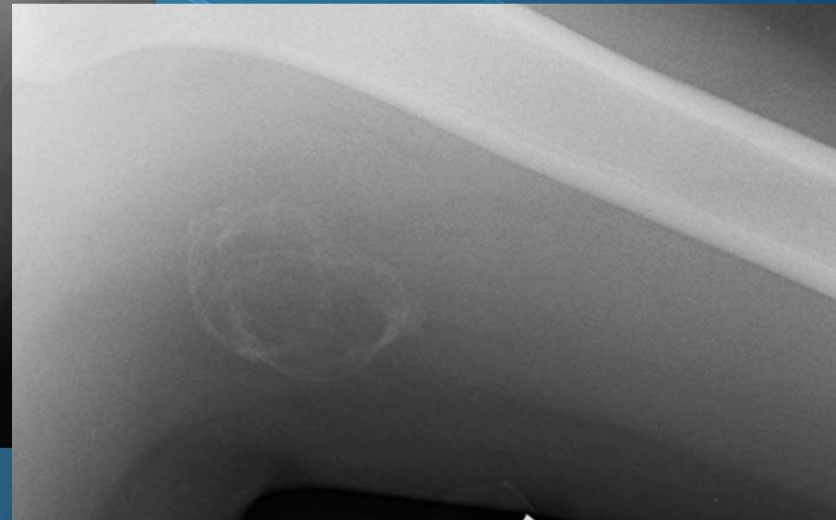
What to do?

- Xray
- MRI w/ and w/o
- Refer

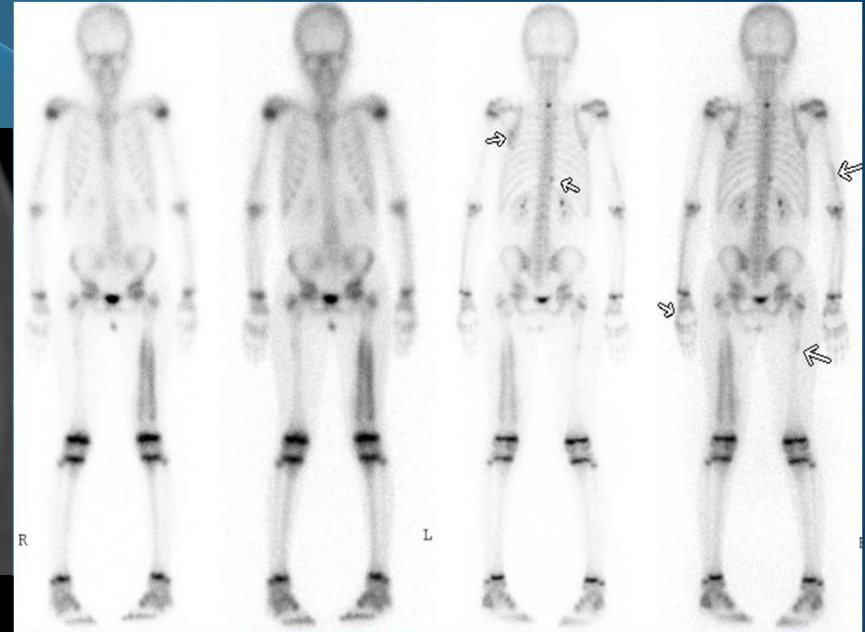
MYOSITIS OSSIFICANS/HETEROTOPIC OSSIFICATION



- Bone forms within the muscle/soft tissue
- Can form after spinal cord injury
- Usually occurs after an injury
- Benign and does not require surgery unless painful



10 yo F w/ hx of child abuse and L thigh pain



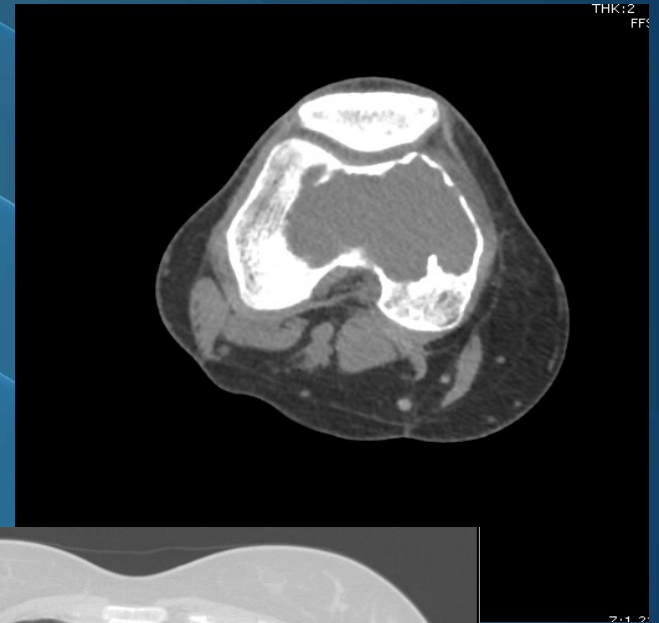
What to do?

- Not an urgent referral
- Xrays
- Labs: Alkaline phosphatase

GIANT CELL TUMOR OF BONE



14 yo F w/ fullness to the medial left knee that causes pain especially with activity and wakes her from sleep. She also has had several episodes of hemoptysis.

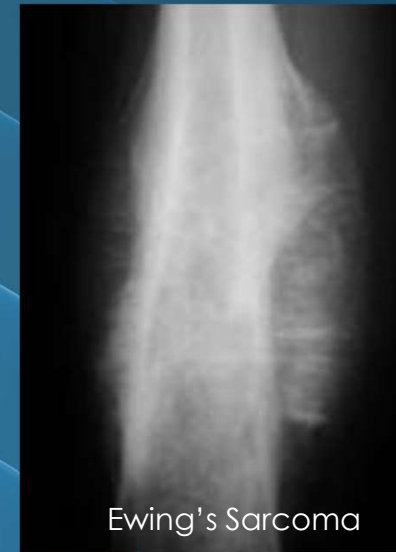


What to do?

- Benign Lesion
- Crutches if indicated
- X-rays/CT
- Refer

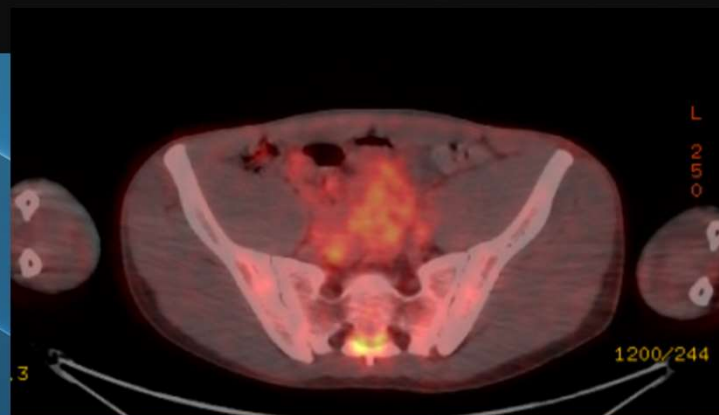
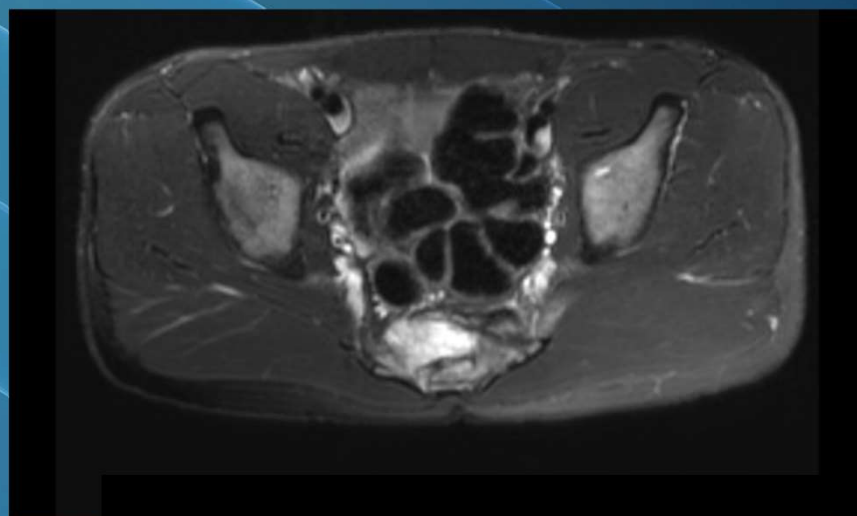
MALIGNANT BONE TUMORS

- ▶ Ewing's Sarcoma
- ▶ Chondrosarcoma
- ▶ Osteosarcoma
- ▶ Parosteal Osteosarcoma
- ▶ LCH
- ▶ Lymphoma
- ▶ Multiple Myeloma
- ▶ Metastatic Disease



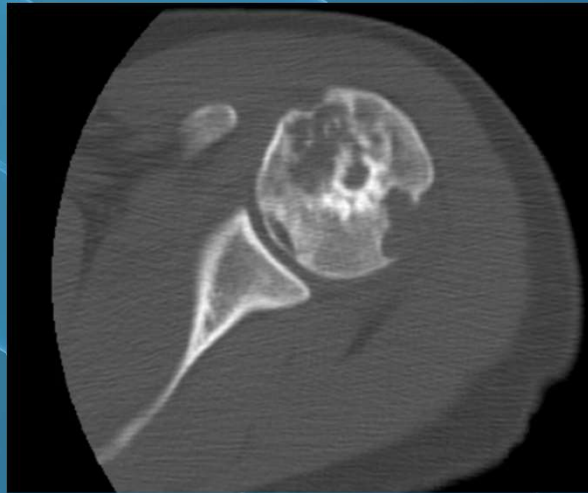
EWING'S SARCOMA

18 yo M w/ hx of low back pain and constipation. Several months later, he is still having severe constipation and urinary retention w/ indwelling catheter placed for several weeks.



CHONDROSARCOMA

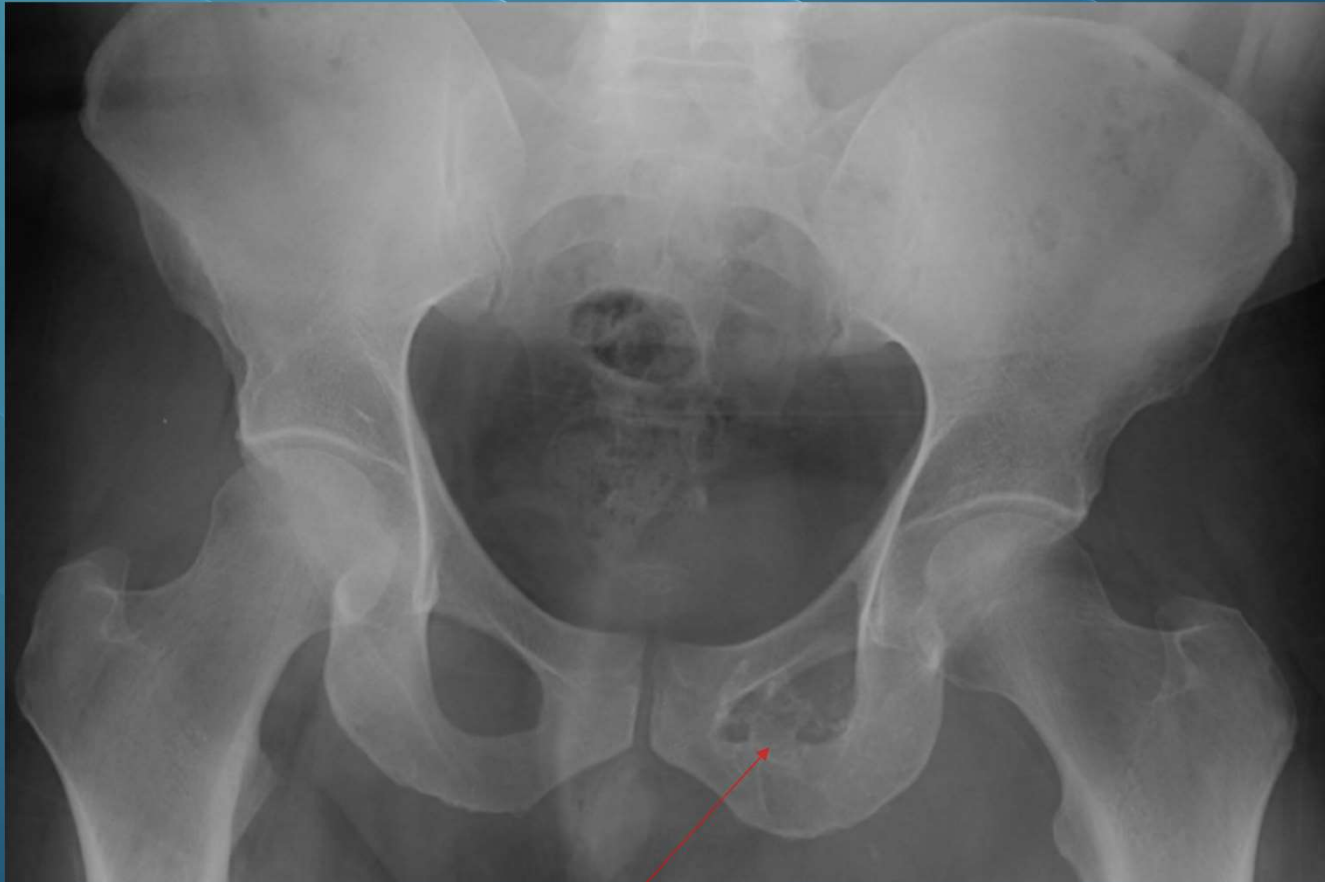
50 yo F presents with increasing pain to left shoulder; no hx of injury



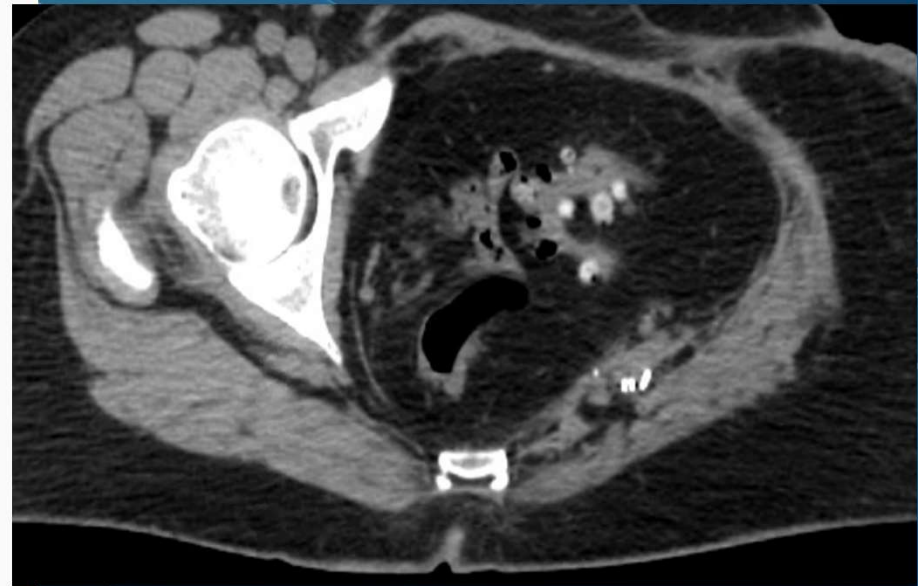
What to do?

- Xray
- CT
- Refer

56 yo male complains of pain in left thigh
He was prescribed physical therapy for almost a year



Grade 2 Chondrosarcoma left pelvis

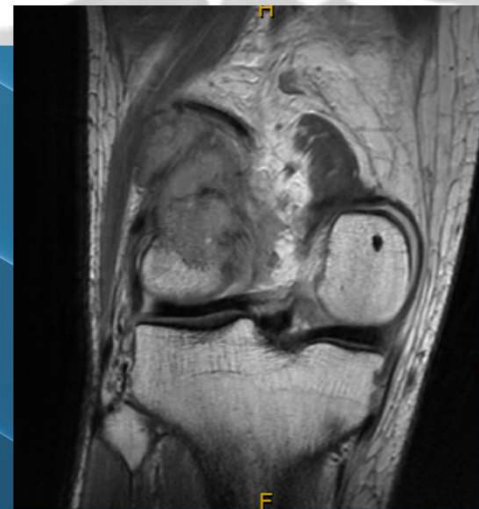
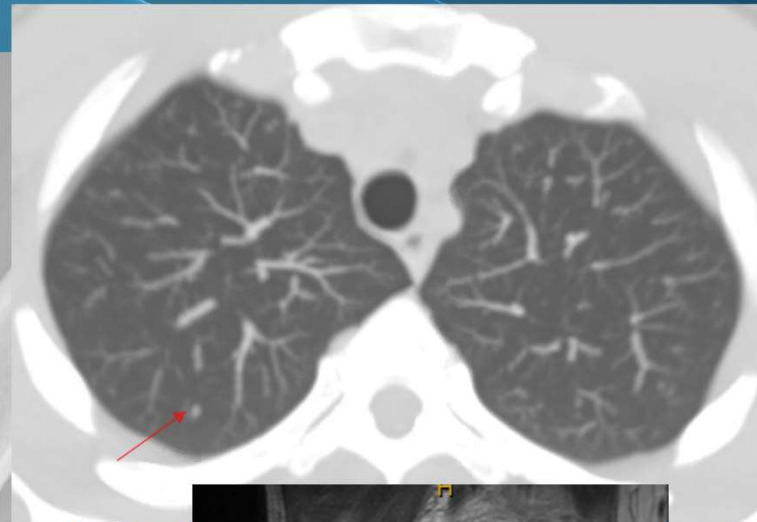


What to do?

- Xray
- MRI w/ and w/o
- Urgent Referral!

OSTEOSARCOMA

23 yo M w/ hx of right knee pain x 4 months w/ recent fall on a boat dock

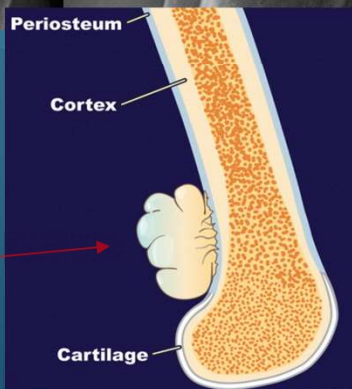
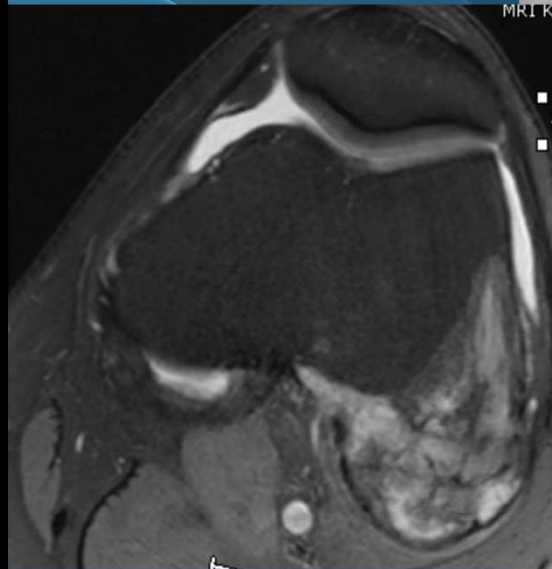
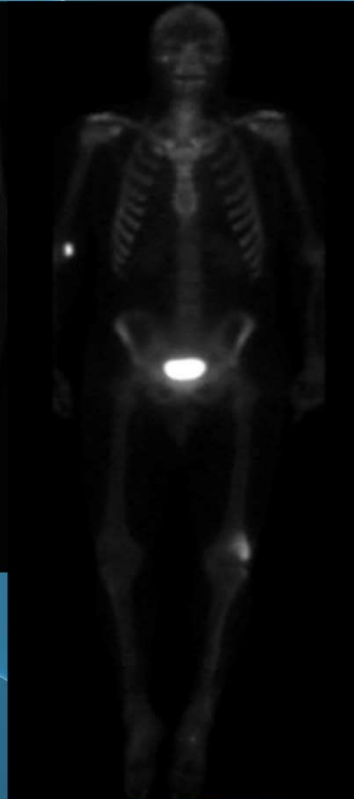


What to do?

- Crutches
- Xray, TBBS, MRI, CT CAP
- Urgent referral!

PAROSTEAL OSTEOSARCOMA

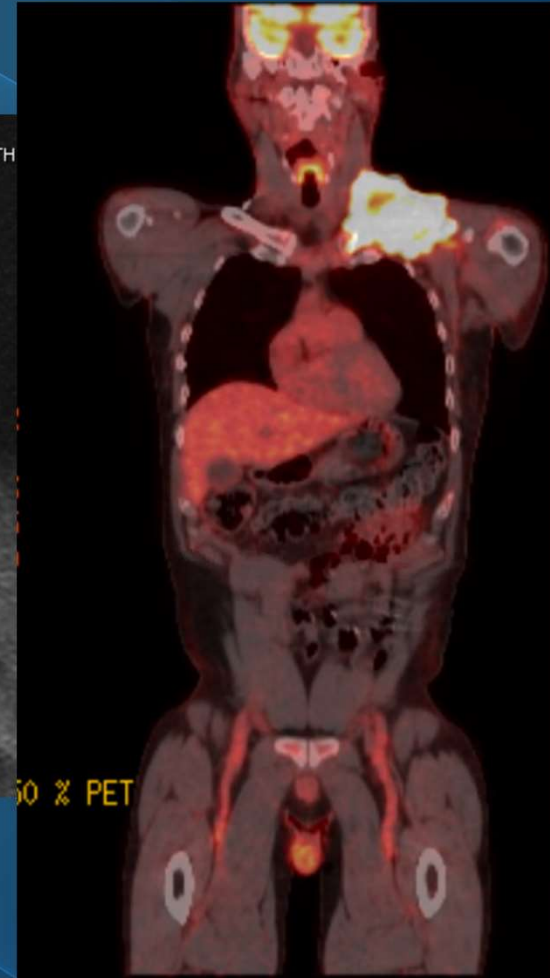
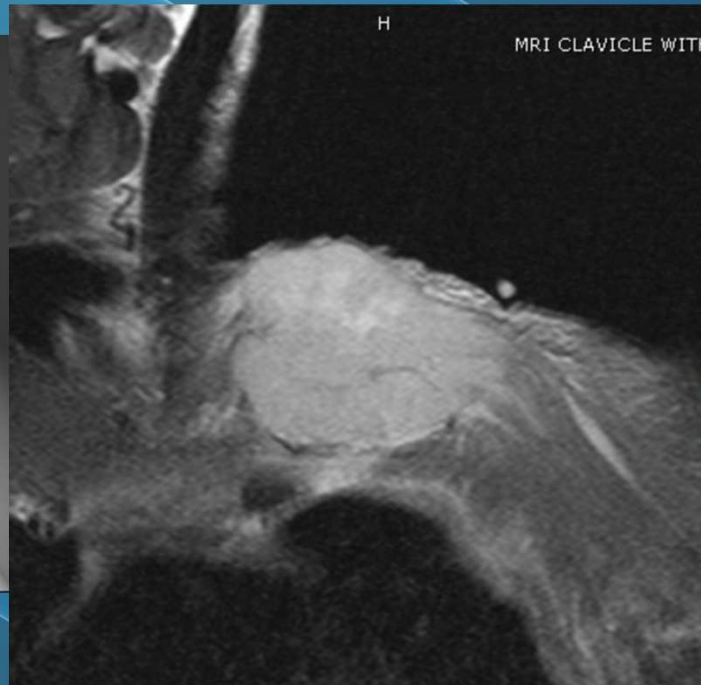
28 yo M w/ 3 month history of L knee pain and swelling after wrestling injury. The knee was aspirated but he continued with pain. Xrays later taken showed an incidental lesion.



Think of a piece of gum stuck to the bone

LYMPHOMA

57 yo M w/ slowly enlarging mass over several months and bruising over the area w/ minimal discomfort

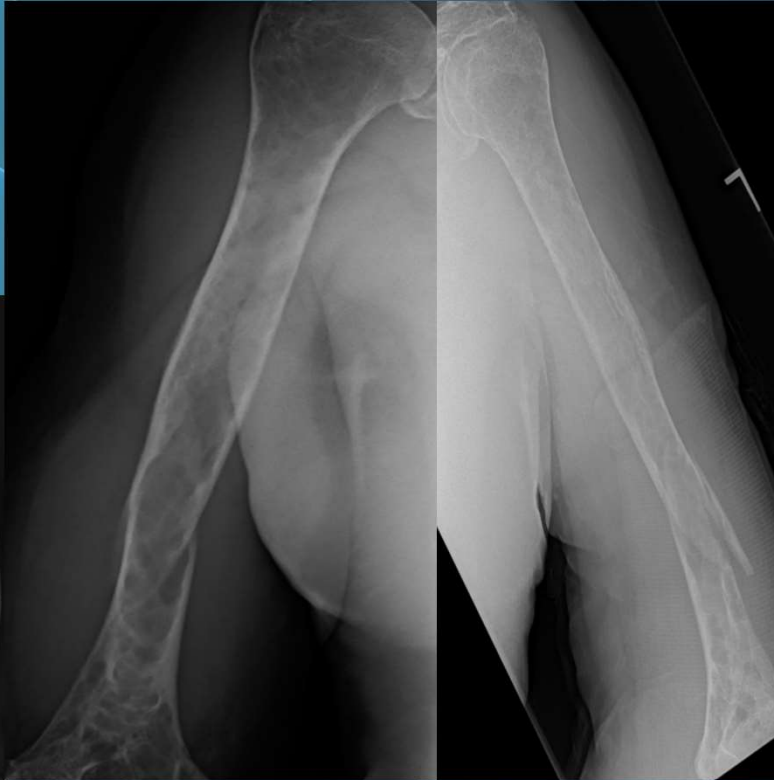


What to do?

- Xray
- MRI w/ and w/o
- CBC
- Refer

MULTIPLE MYELOMA

64 yo M w/ bilateral arm fractures

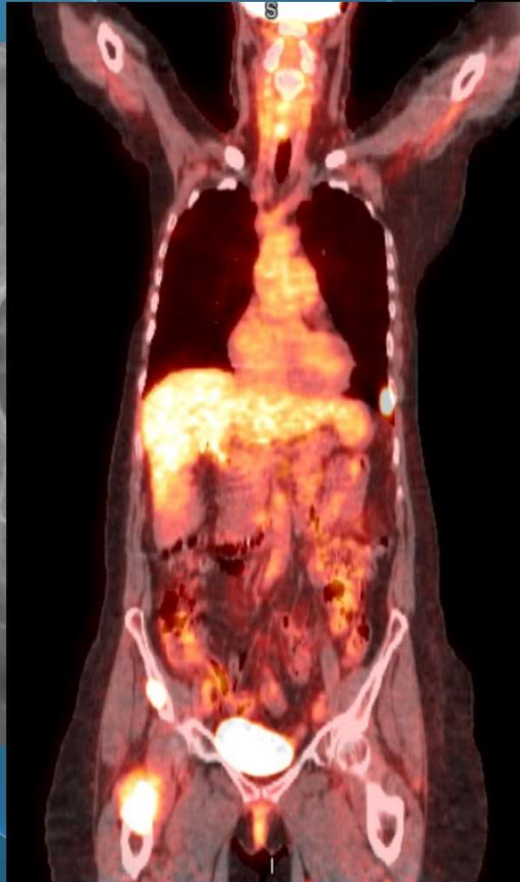
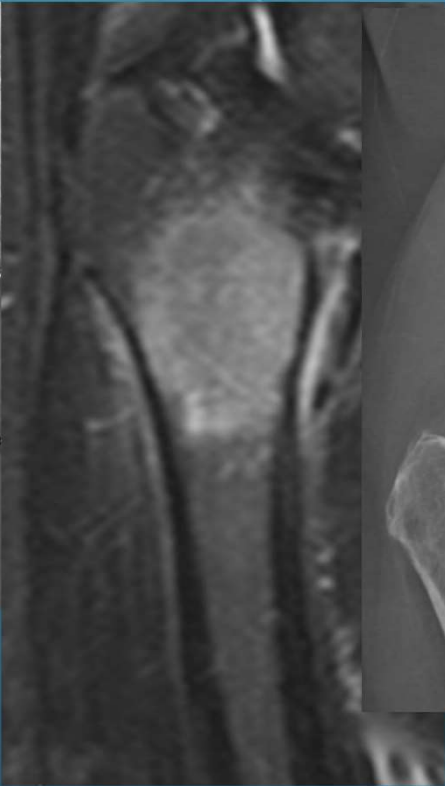


What to do?

- Will usually be in an older patient
- CBC, CMP
- SPEP/UPEP
- Skeletal survey
- Refer

METASTATIC BREAST CANCER

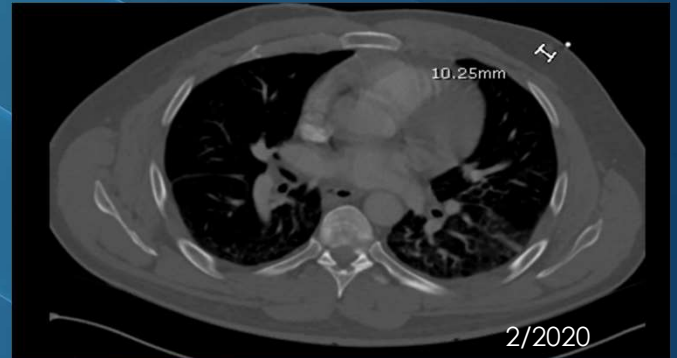
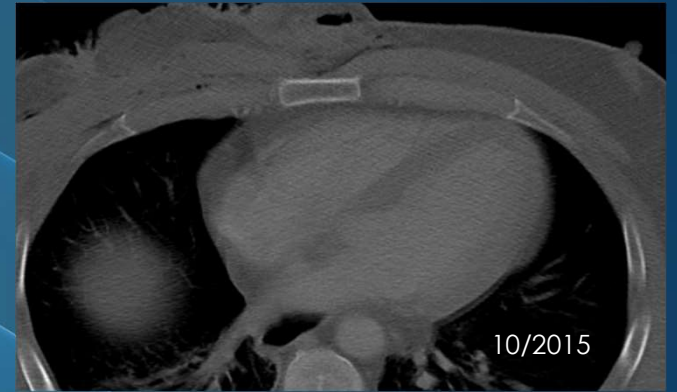
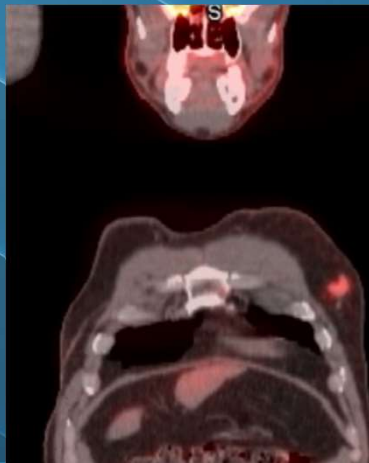
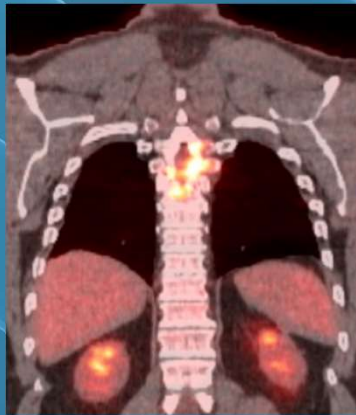
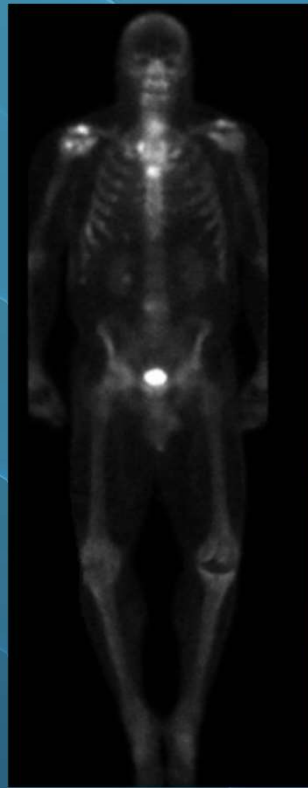
71 yo F w/ hx of breast cancer who chose "alternative therapy" now with increasing right hip pain.



What to do?

- Xray
- Crutches
- MRI w/ and w/o
- TBBS
- Urgent referral!

63 yo M w/ acute onset of upper back pain after working on a fence. After several weeks of pain, he saw a chiropractor for manipulation followed by several more months of continued pain.



SOFT TISSUE TUMORS

BENIGN

- ▶ Lipoma
- ▶ Atypical lipomatous tumor/Well differentiated Liposarcoma
- ▶ Schwannoma
- ▶ Myxoma
- ▶ Hemangioma
- ▶ Fibromatosis

MALIGNANT

- ▶ Pleomorphic undifferentiated sarcoma
- ▶ Liposarcoma (low – high grade)
- ▶ Synovial sarcoma
- ▶ Rhabdomyosarcoma
- ▶ Myxofibrosarcoma



*Things to think about:

Size – large/rapidly growing/painful tend to be malignant

Location – Deep vs. superficial

Imaging – bony erosion/infiltrating – tend to be malignant

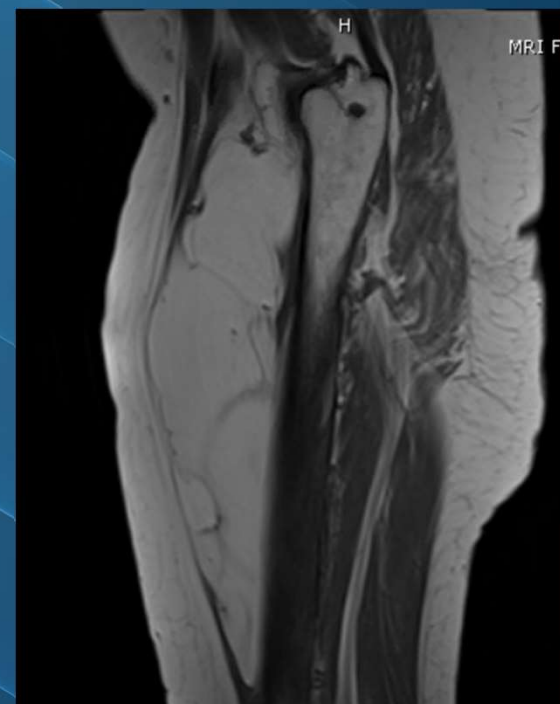
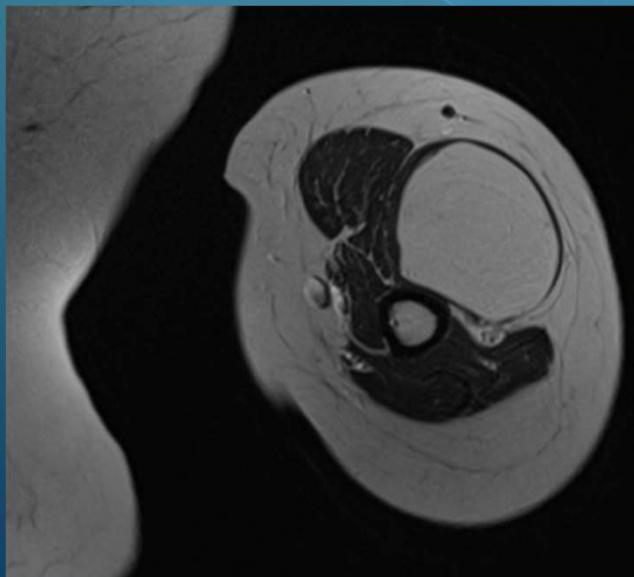
LIPOMAS

Lipoma

- benign
- Order MRI w/wo
- Surgical excision
- MDM2 negative
- Should not recur
- No further treatment

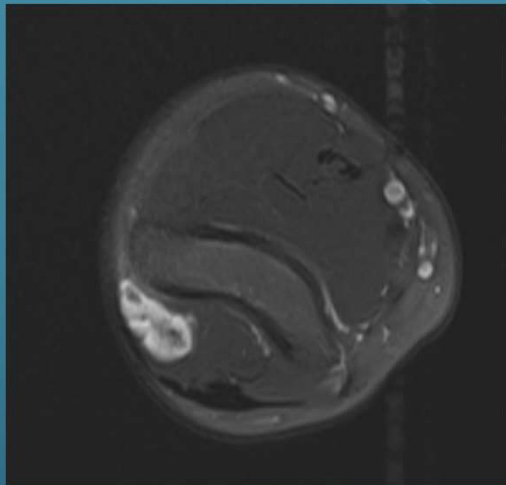
Atypical Lipomatous Tumor/Well Differentiated Liposarcoma

- benign
- Order MRI w/wo
- Surgical excision
- MDM2 positive
- Risk of local recurrence
- Should be followed for recurrence
- Does not need radiation/chemo

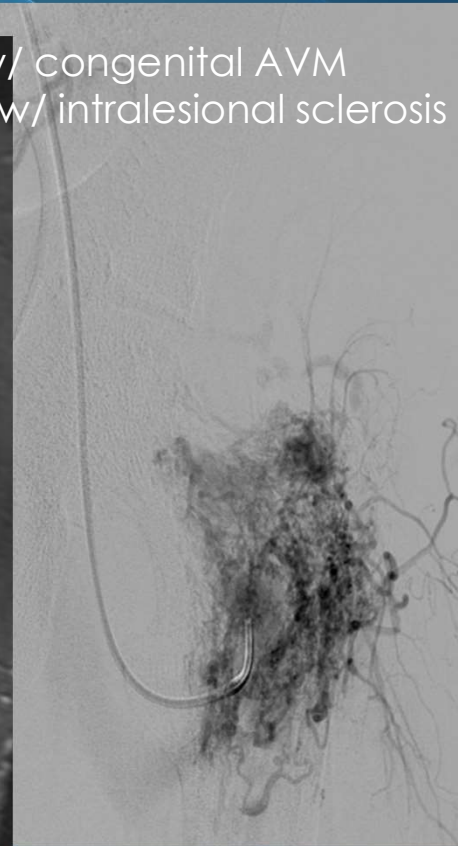
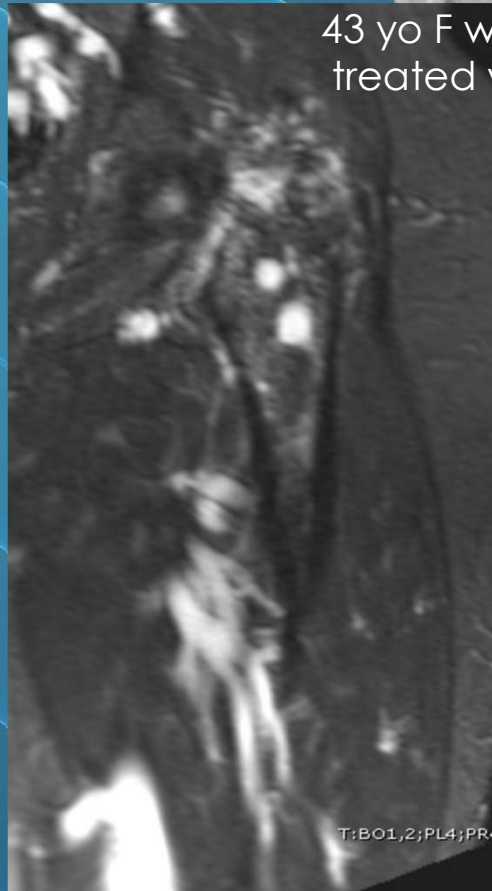


HEMANGIOMA/AVM

13 yo M w/ fullness R elbow



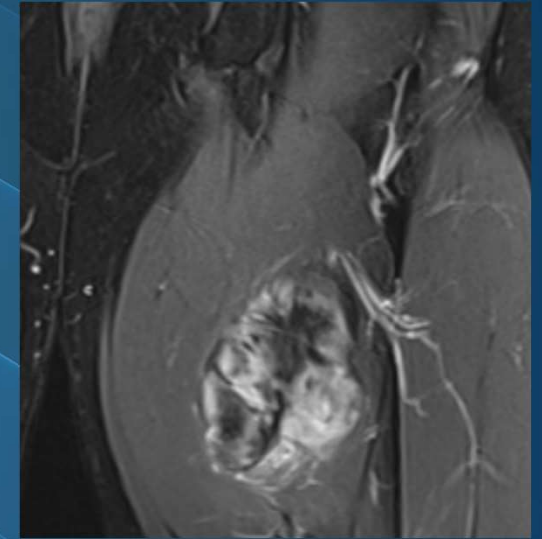
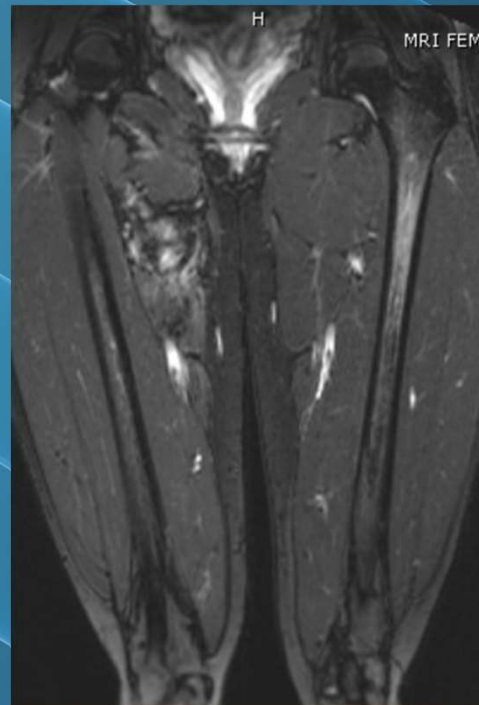
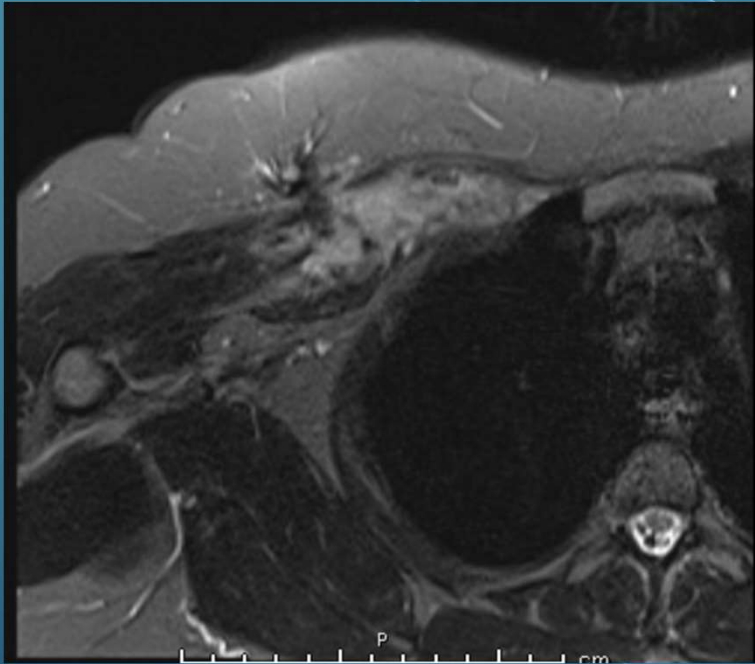
43 yo F w/ congenital AVM
treated w/ intralesional sclerosis



What to do?

- Not an urgent referral
- Xray
- MRI w/ and w/o
- Compression device

FIBROMATOSIS

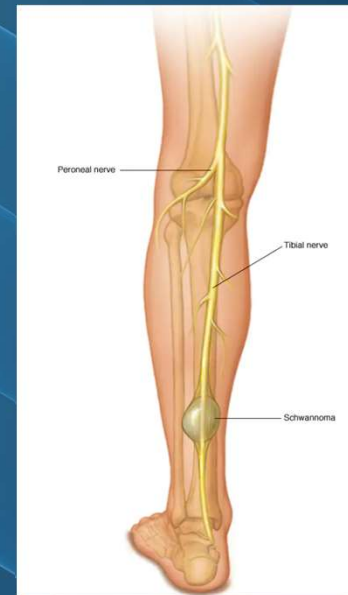


What to do?

- Xray, MRI w/ and w/o
- Biopsy
- Surgery vs. Sorafenib vs. Radiation
- Benign; Does not need chemotherapy

SCHWANNOMA

- Most common peripheral nerve sheath tumor in adults
- Usually a painless mass
- Patient may have nerve pain in the limb
- Benign lesion



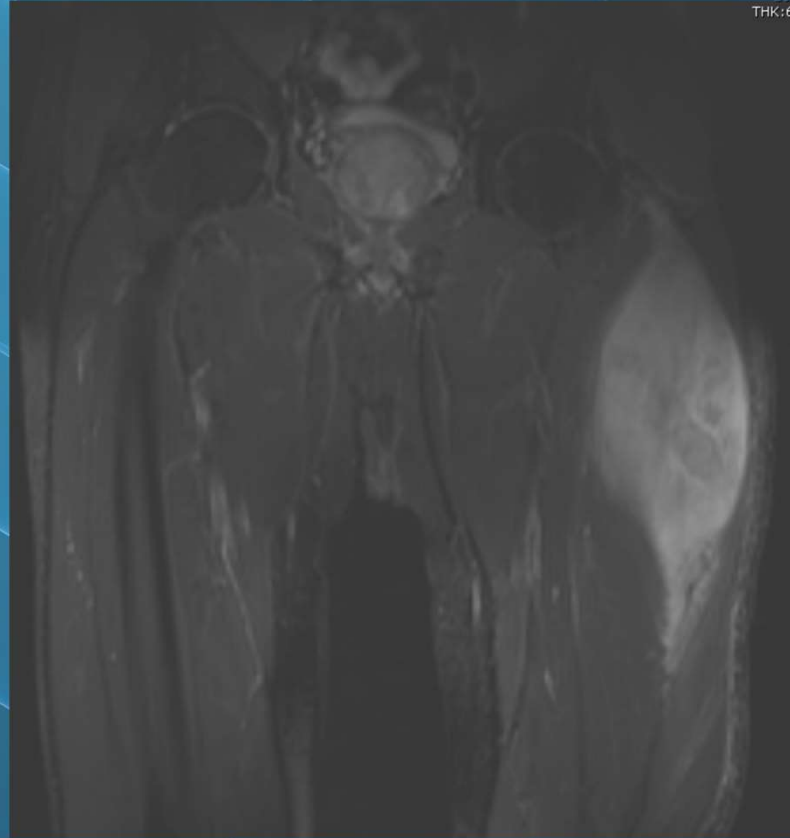
What to do?

- Xray, MRI w/ and w/o
- Refer

SOFT TISSUE SARCOMAS

- Over 50 different types of soft tissue sarcomas
- Sarcomas are more common in adults (>40) than children
- Represent 1% of all malignancies
- In 2023 it is estimated that at least 13,400 soft tissue sarcomas will be diagnosed in children and adults
- Overall mortality 50%
- Prognosis based on: Histological type, grade, size, depth and location

65 yo M w/ hip pain for several months

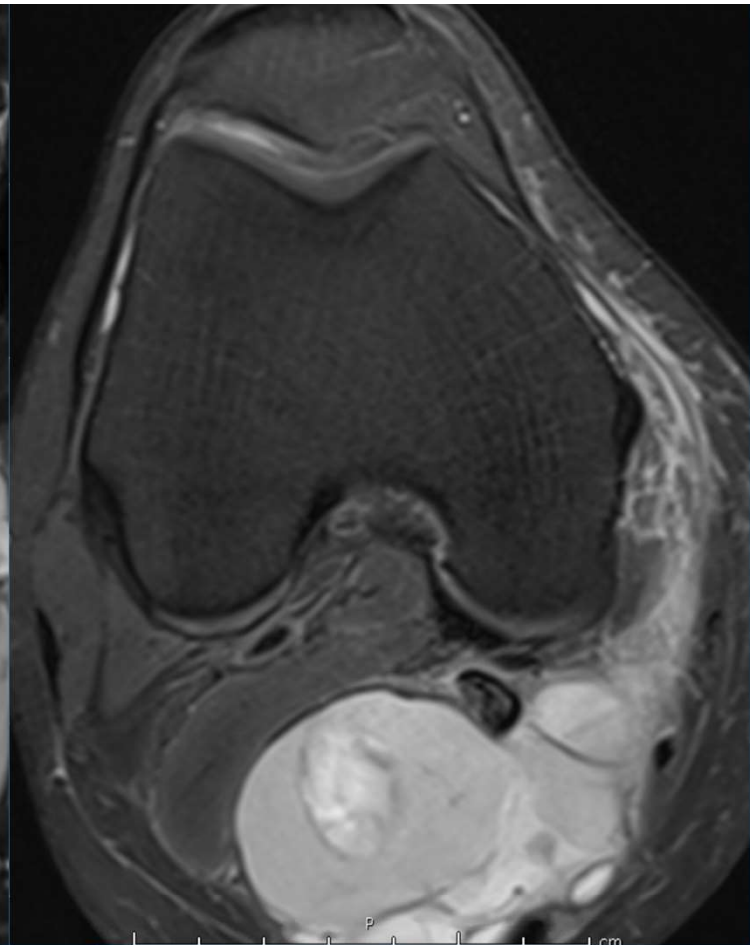
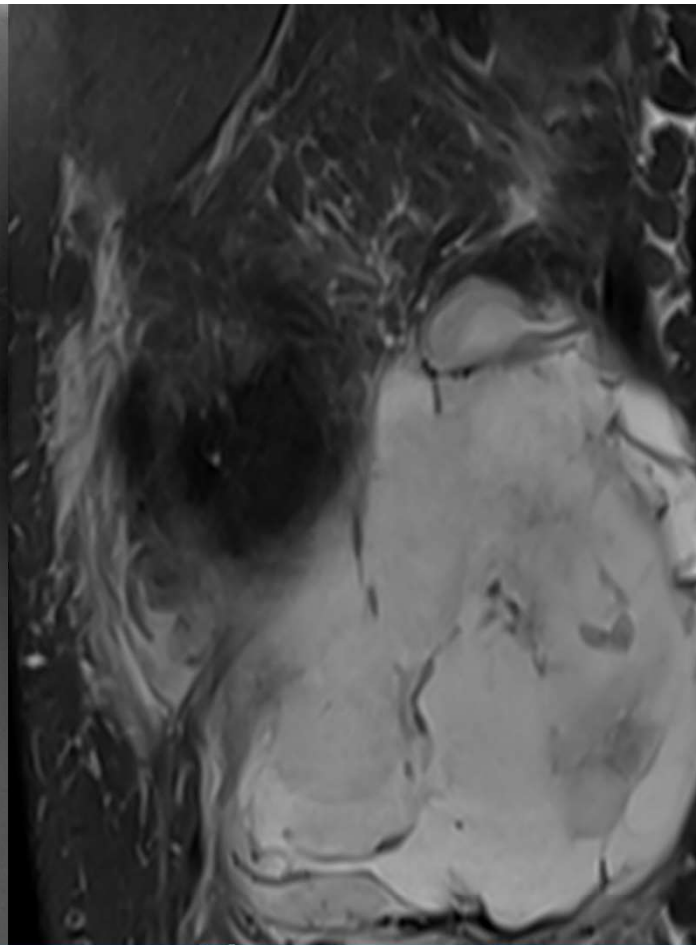


- What to do?
- Xray
 - MRI w/ and w/o
 - CT CAP
 - Urgent referral!

High-grade myxofibrosarcoma

43 yo male w/ R knee pain for >3 months; no history of injury





High grade sarcoma

Treatment:

- Radiation
- Surgery – Limb salvage vs. amputation
- Chemo

Take Home Points:

- Listen to your patient – Take a good history
- Do a physical exam
- Order the appropriate imaging studies
- Read your own imaging studies
- Educate your patient



Delay in diagnosis can be costly for you and your patient!

- Patient outcome can be based on making a timely referral
- Do not try and treat on your own
- The most common reason for malpractice claims/litigation is delay in diagnosis ¹.

1. CORR (2020) 478:2239-2253.

THE IMPORTANCE OF READING THE STUDIES YOU ORDER!

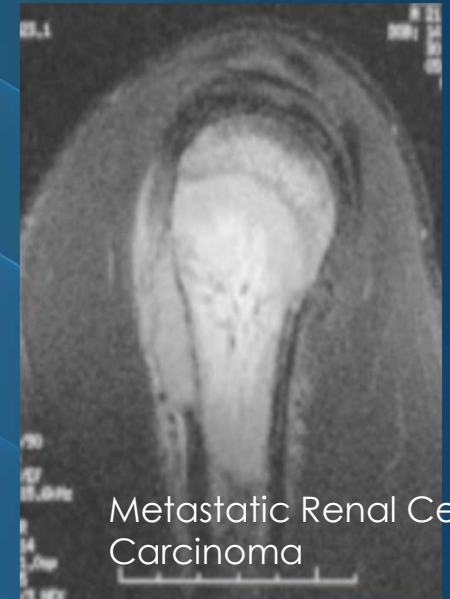
LOOK!



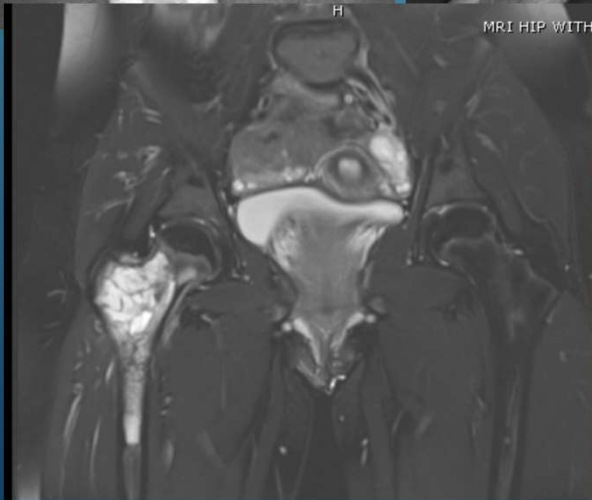
Normal?



Normal?



Metastatic Renal Cell Carcinoma



Telangiectatic Osteosarcoma



Lesion in humerus?



Metastatic Renal Cell Carcinoma



QUESTIONS?

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