Radiology Review Course 2015
University of Washington

Metabolic and Marrow Disease

W **Felix S. Chew, MD**
University of Washington

Disclosures

I have no disclosures.

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Learning Objectives

At the conclusion of this activity, participants will be able to:

- Identify and describe radiologic features of various metabolic bone diseases;
- Identify and describe radiologic features of various bone marrow diseases.
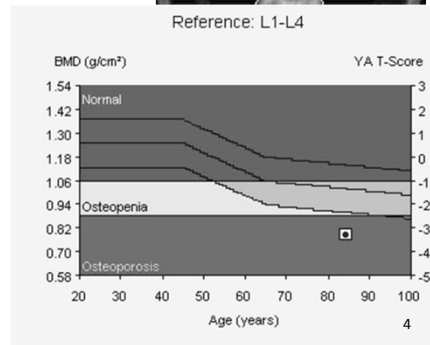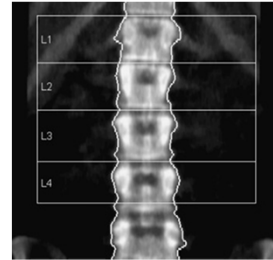
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1. Best diagnosis?

A. Normal
B. Osteopenia
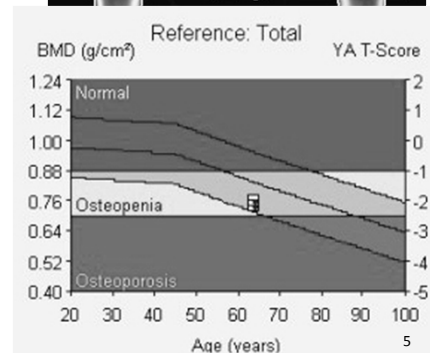C. Osteoporosis
* D. Established Osteoporosis

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DXA

- T-score—young normal reference mean (sex- and ethnicity-matched)
- Osteopenia = T-score between -1.0 and-2.5
- Osteoporosis = T-score of -2.5 or lower
- (Z-score—age-, sex- and ethnicity-matched normal)

Reference: L1-L4

BMD (g/cm²)   YA T-Score

DXA

- Osteopenia—risk of fractures doubles
- Osteoporosis—risk of fractures doubles again
- Low energy fracture = "established osteoporosis"

Reference: Total

BMD (g/cm²)   YA T-Score

2. The US Preventive Health Task Force recommends DXA for which group?

A. Postmenopausal women on HRT

B. Obese women (BMI > 30)

* C. Women who are 65 years or older

D. Men who are 85 years or older

DXA

- DXA screening for osteoporosis
- US Preventive Services Task Force: 65-year-old women or equivalent risk factors (esp. low body weight)
- Not for men
- Not for obesity
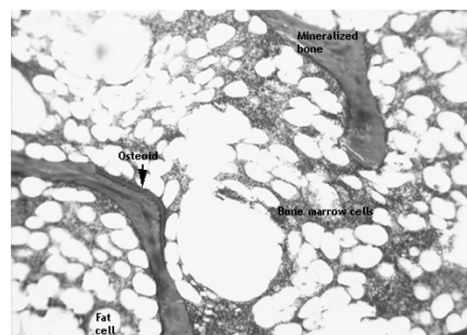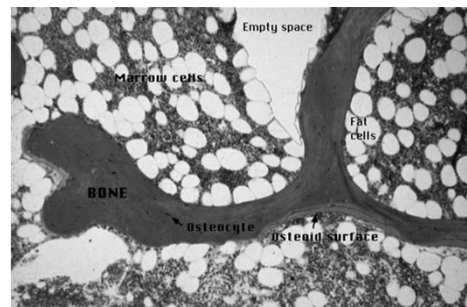
Aledronate (Fosamax)

- Patent expired 2008
- $7 billion market
- Once absorbed onto bone, estimated half-life of 10 years
- Number of fractures reduced by approximately 50% vs placebo
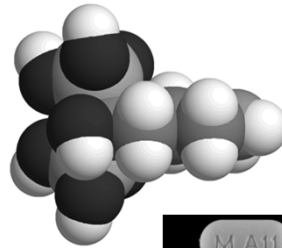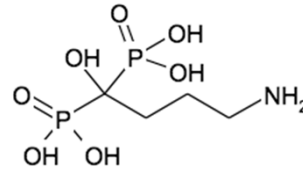
Bisphosphonate Actions

Good

- Decrease bone resorption
- Increase BMD
- Increase in bone volume
- Increase bone strength first 5 years
- Lower fracture rate in first 5 years, compared to placebo

Not so Good

- Decrease bone formation
- Half-life in bone greater than 10 years
- Potential for increased micro-damage (some animal studies report "increased brittleness")
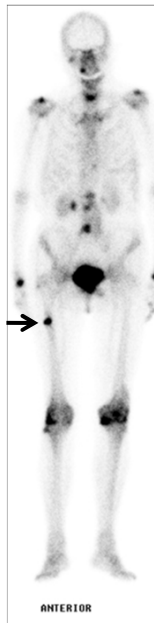- Long-term effects on bone are unknown

3. Best diagnosis?

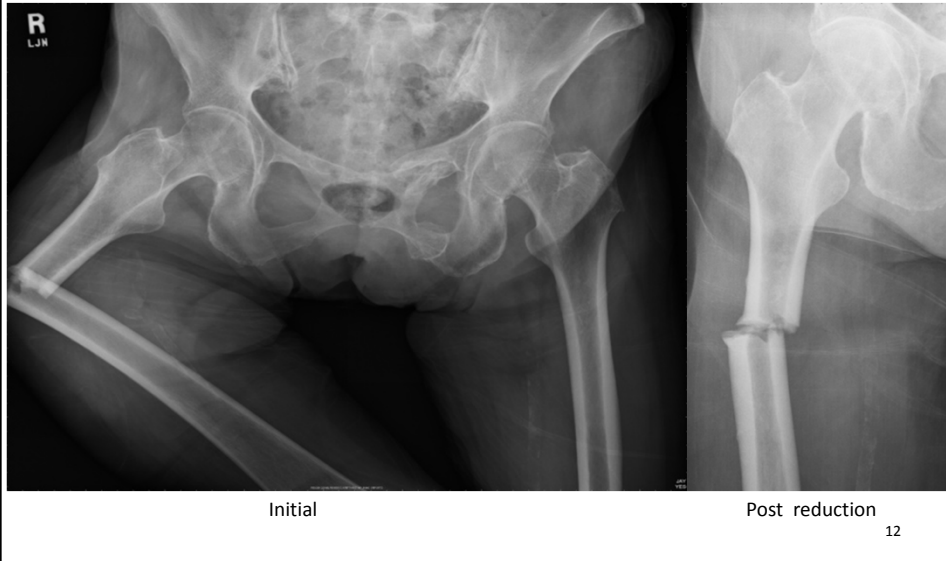A. Osteomalacia
* B. Stress reaction
C. Brown tumor
D. Metastasis

85 F aching pain, bisphosphonates x 6y

Bisphosphonate-Related Fx

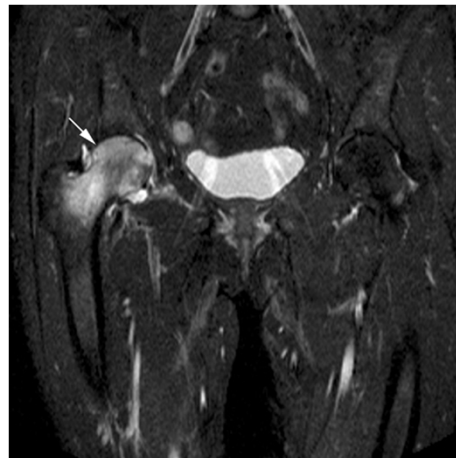## Stumbled and fell

Initial   Post reduction

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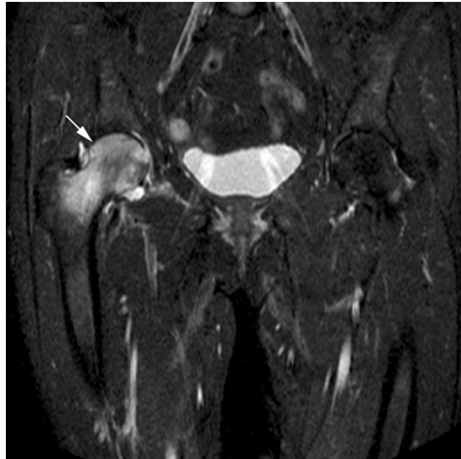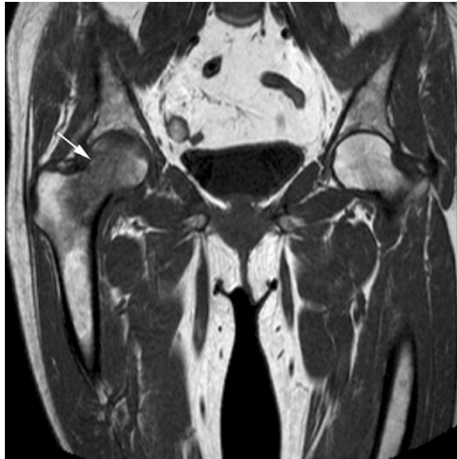## 4. Best diagnosis?

* A. Transient osteoporosis
  B. Osteonecrosis
  C. Osteoarthritis
  D. Insufficiency fracture

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Transient Osteoporosis

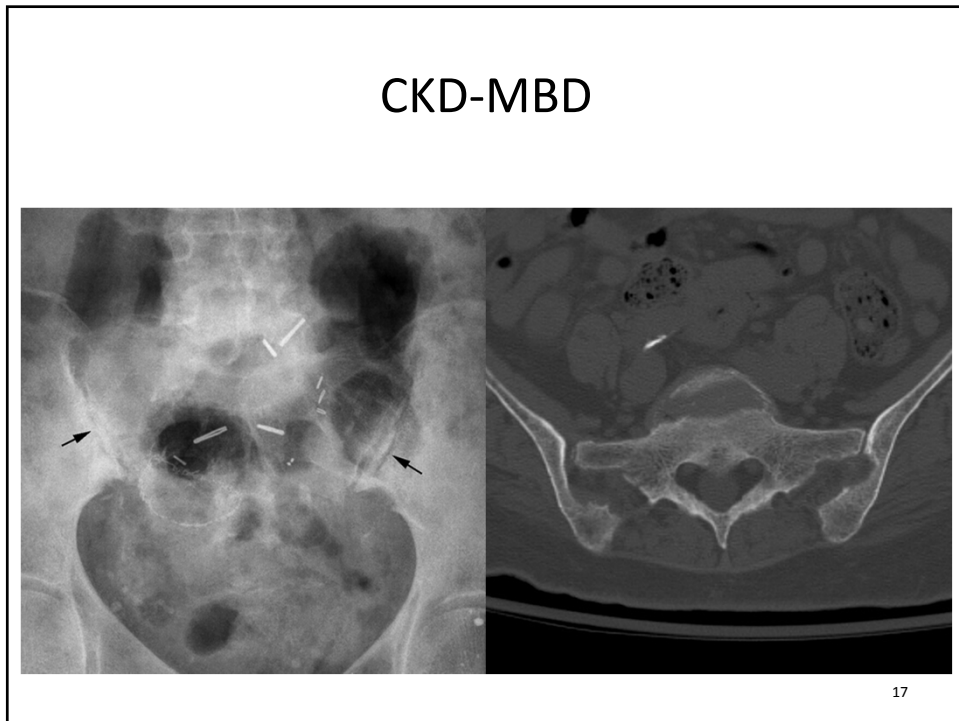STIR T1

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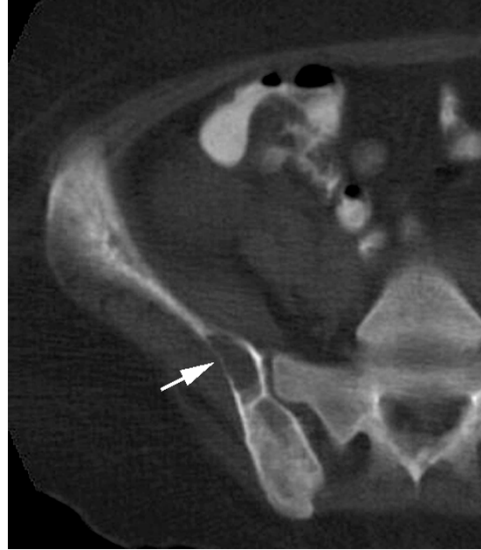5. Best diagnosis?

A. Pyrophosphate arthropathy
B. Amyloidosis
* C. Secondary hyperparathyroidism
D. Gout

CKD-MBD

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CKD-MBD

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6. Best diagnosis?

A. Multiple myeloma
B. Unicameral bone cyst
C. Metastasis
* D. Brown tumor

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Brown Tumor (Osteitis fibrosa cystica)
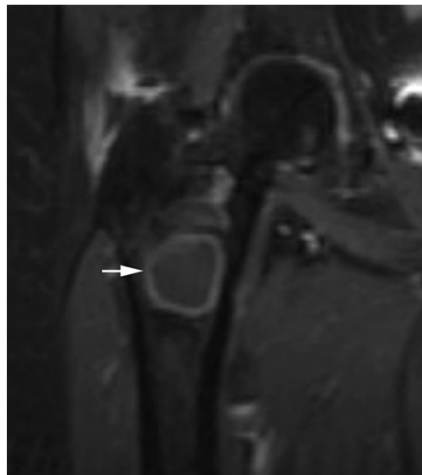
Brown Tumor
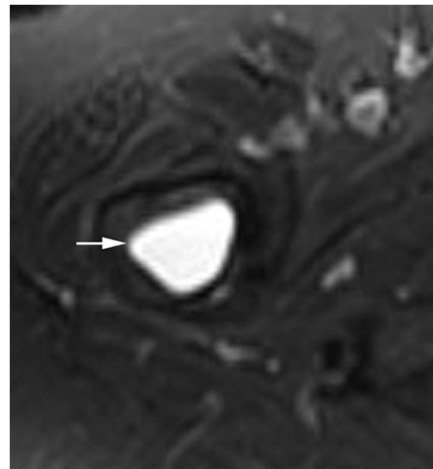

T1

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Brown Tumor
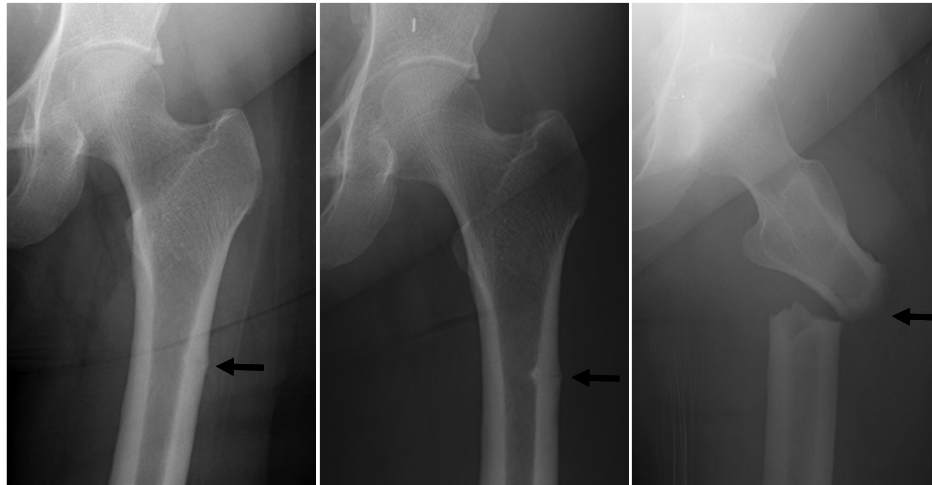

T1 FS Gd   STIR

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CKD-MBD Post-transplant fx

Thigh and groin pain   2 years later   4 years later
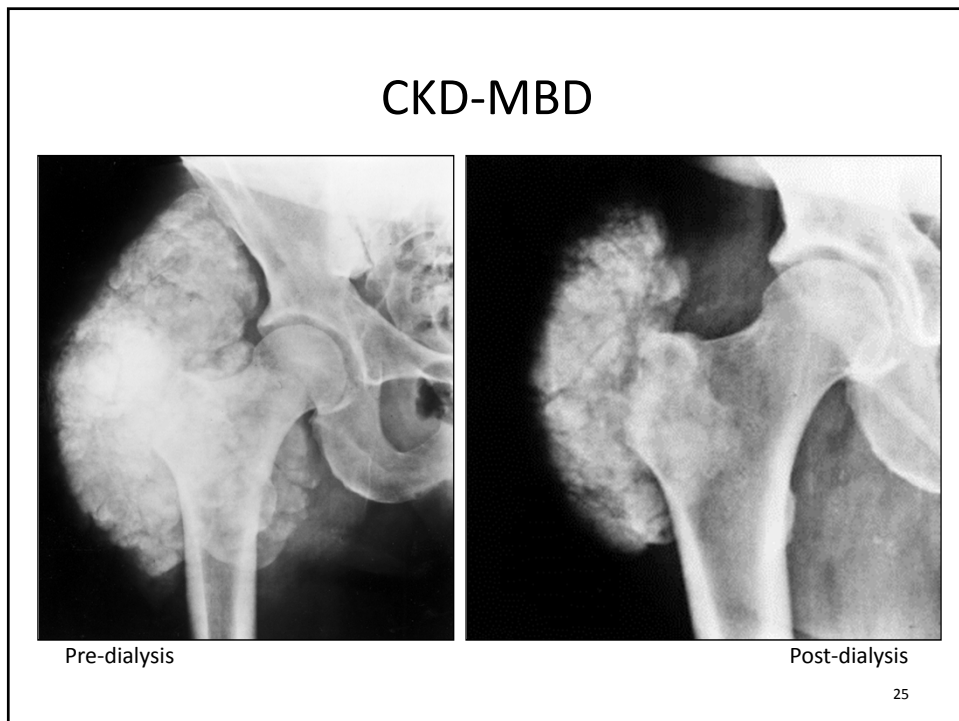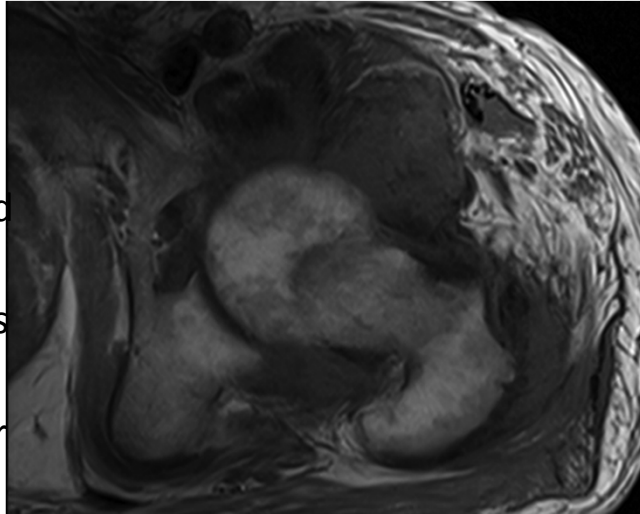
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8. Best diagnosis?

A. Tophaceous gout
* B. Ollier Disease
C. Dialysis-related tumoral calcinosis
D. Synovial osteochondromatosis

CKD-MBD

Pre-dialysis

Post-dialysis
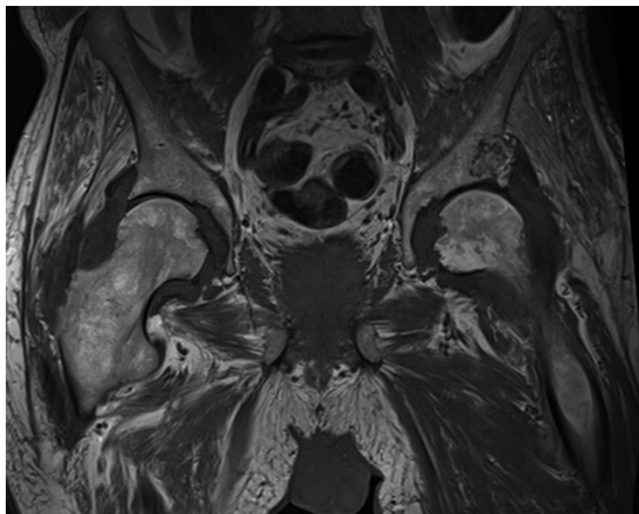
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CKD-MBD

Pre-dialysis

Post-dialysis

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9. CRF, dialysis. Best diagnosis?

A. Synovial osteochon-dromatosis

B. Rheumatoid arthritis

* C. Amyloidosis

D. Pigmented villonodular synovitis

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Dialysis-Related Amyloidosis

T1

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Dialysis-Related Amyloidosis

10. CKD. Best diagnosis?

A. Osteoarthritis

* B. Osteomalacia

C. Amyloidosis

D. Secondary hyper-parathyroidism

Osteomalacia

Osteomalacia

- Accumulation of unmineralized osteoid on bone surfaces due to defective mineralization

Osteomalacia

Insufficient or impaired metabolism of Vit D or P

- Renal tubular acidosis
- CKD
- Malabsorption
- Hypophosphatemia
- Anticonvulsants
- Malnutrition
- Tumor-induced

"Got phosphate, calcium, or vitamin D?"

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10. CKD. Best diagnosis?

A. Spondylodiskitis

B. Ankylosing spondylitis

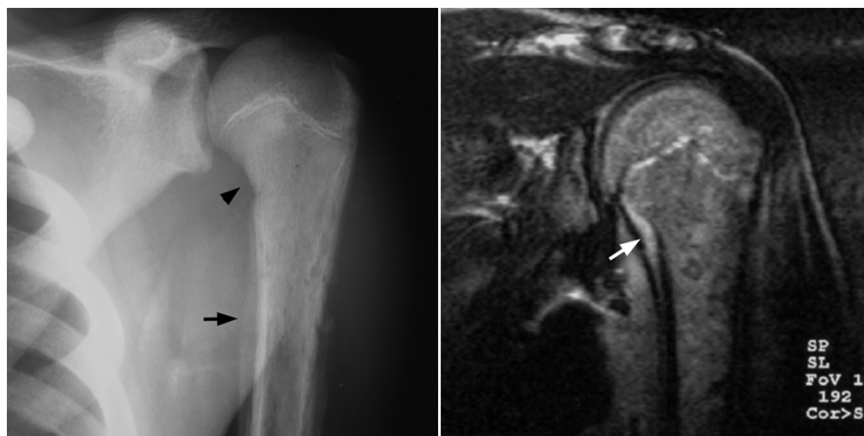C. Sickle cell disease

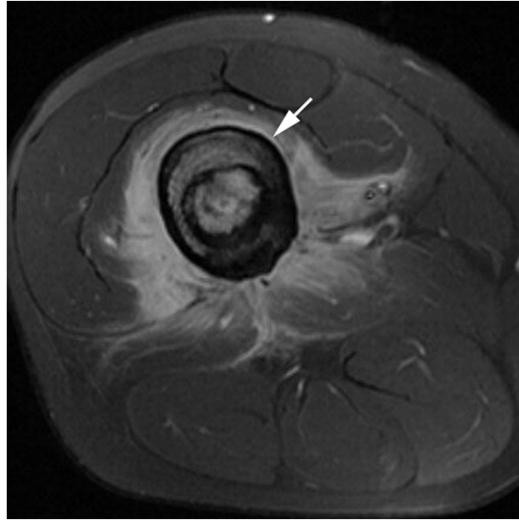* D. Secondary hyper-parathyroidism

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11. Best diagnosis?

A. Metastasis

* B. Osteomyelitis

C. Primary sarcoma

D. Hyperparathyroidism

Osteomyelitis
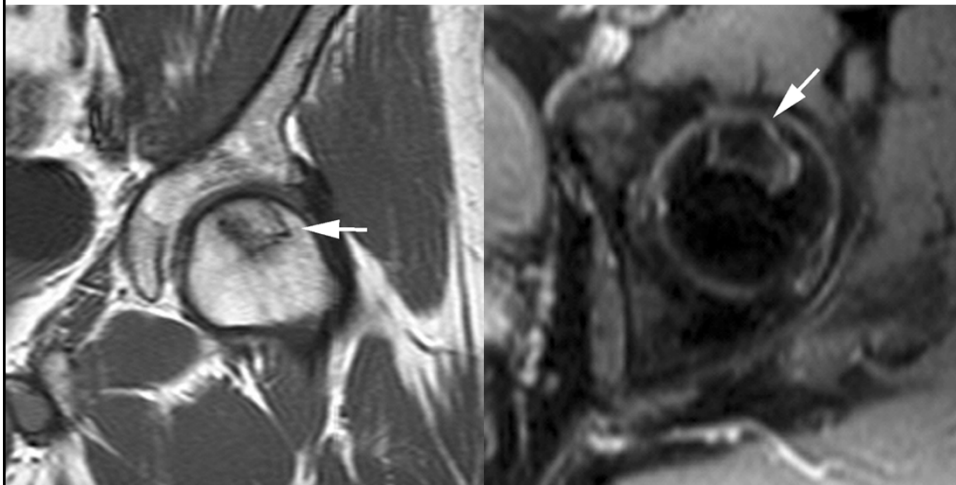
Osteomyelitis

12. Best diagnosis?

A. Osteoarthritis

* B. Osteonecrosis

C. Metastasis

D. Psoriatic arthritis
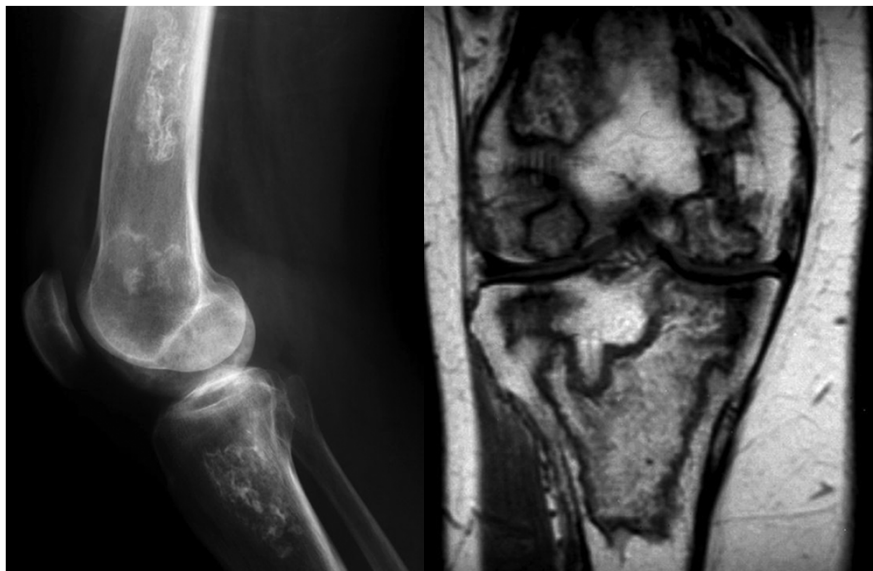

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Bilateral Osteonecrosis

Osteonecrosis

Osteonecrosis

Osteonecrosis

13. Best diagnosis?

A. Paget disease
* B. Sickle cell disease
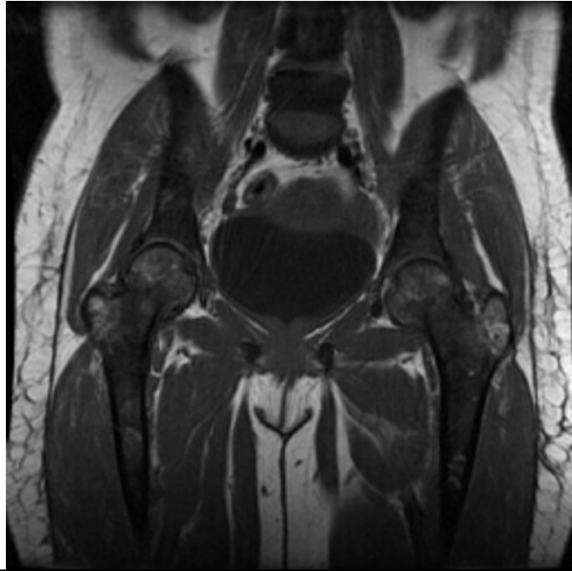C. Osteopetrosis
D. Thalassemia

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Sickle Cell Disease

Sickle Cell Disease

Thank you!

1. Which condition and radiologic manifestation match most closely?

A. Osteomalacia : subperiosteal bone resorption
B. Osteoporosis : Looser zones
∗ C. Bisphosphonates : stress fractures
D. Secondary hyperparathryroidism : fragility fractures

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2. Which condition and radiologic manifestation match most closely?

A. Osteomyelitis : Looser zones
∗ B. Osteoporosis : fragility fractures
C. Bisphosphonates : brown tumors
D. Osteonecrosis : periosteal reaction

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