Rad Lab 6 Unknowns: Musculoskeletal

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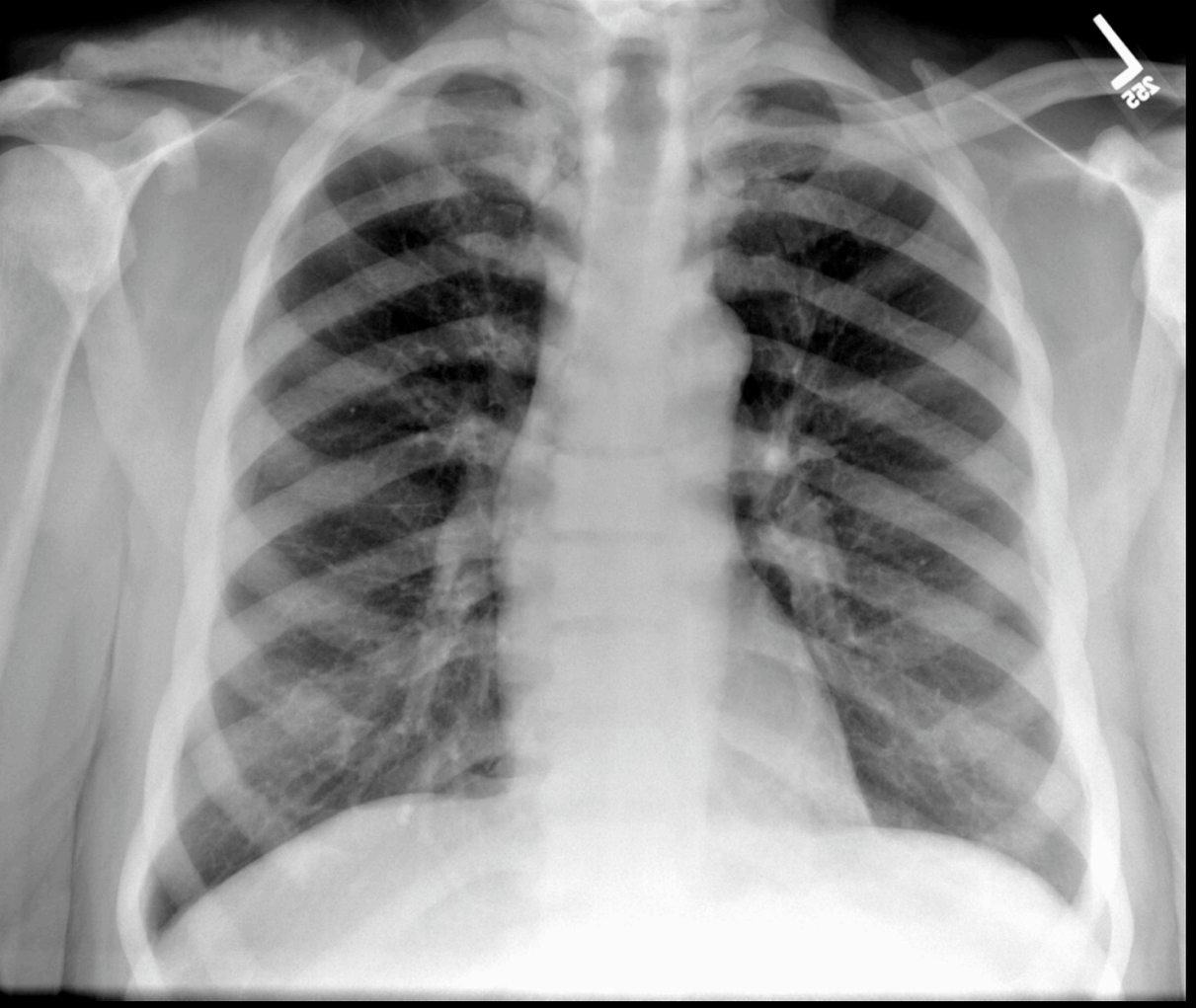
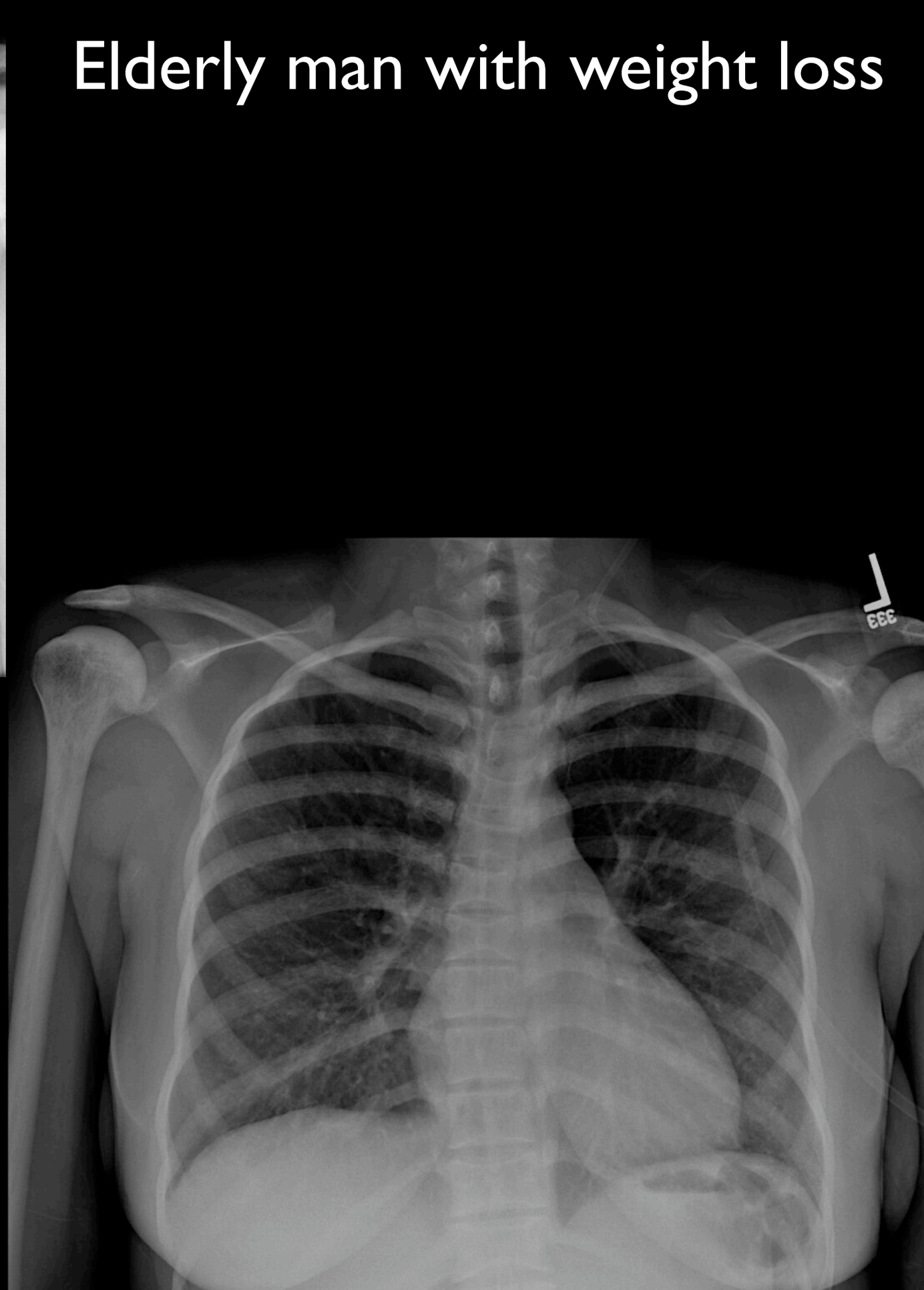
Here are two men, one 70, the other 28. Focus on the bones on the next two slides (the second is a magnification view). They share a common radiographic appearance with different causes.

- Is there a generalized abnormality you can pick up on? Describe it.
- Is there a more focal abnormality of bone in the older man? Locate and describe it.
- Come up with a differential diagnosis. (clue: consider the age and sex of these patients)

Case 1





Elderly man with weight loss

Young black man with recurrent bone pain

Case 1

Compare the abnormal bones on the left with the normal comparison below.

70 year old

normal

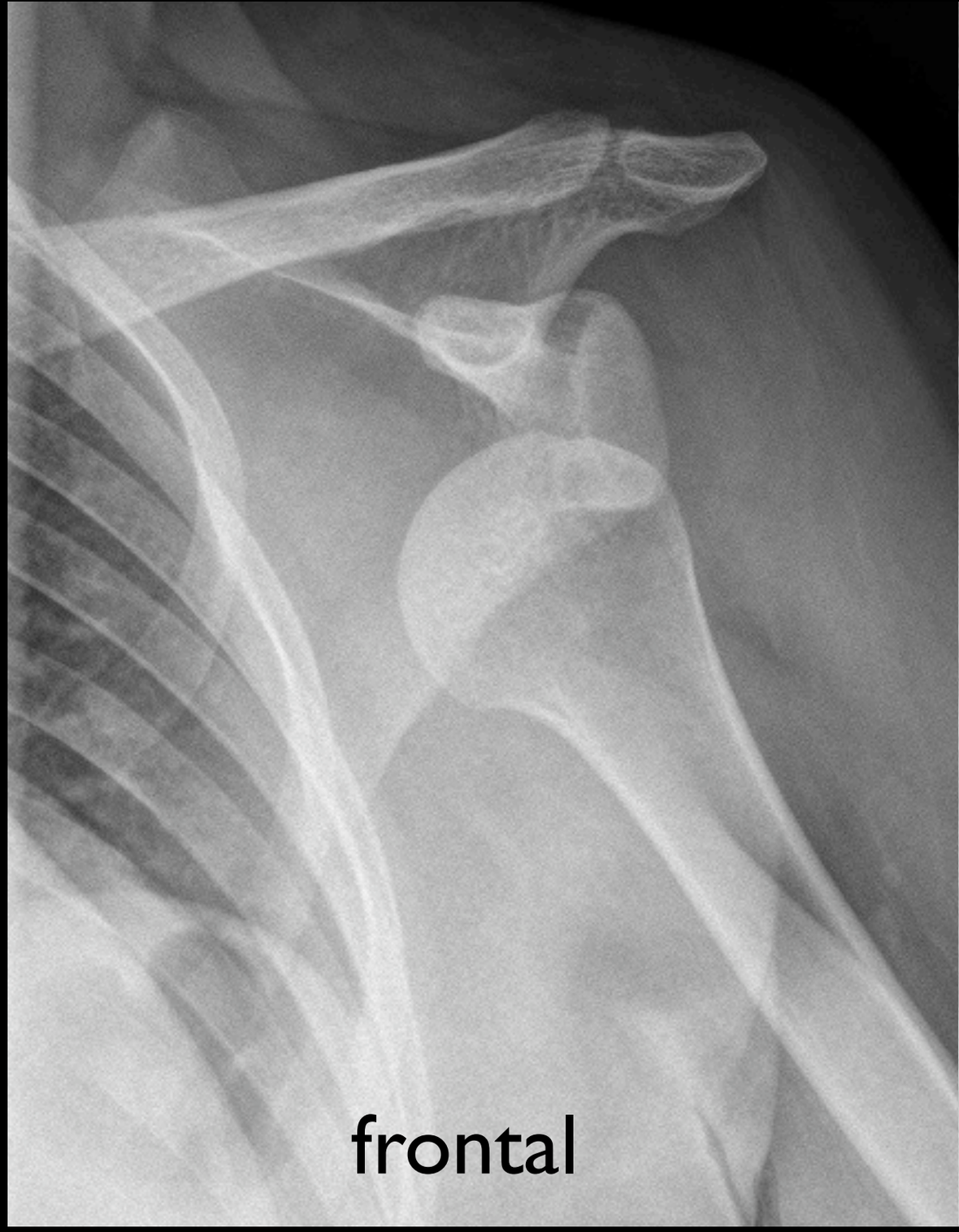
Case 1

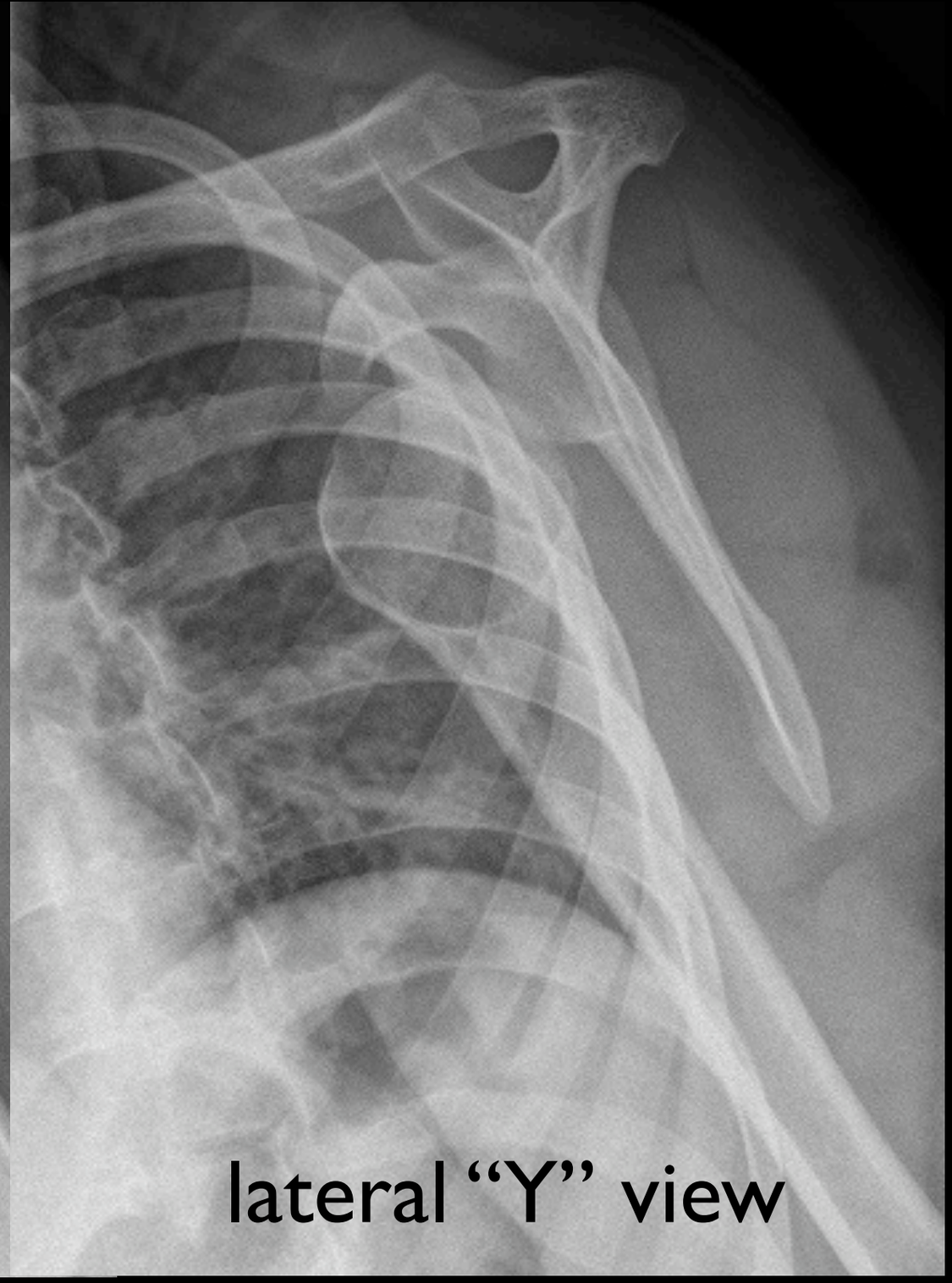
28 year old

Football player, the victim of a rough tackle!

- What happened to this patient's shoulder?
  How can you tell in which direction, anterior vs. posterior?
- "clue:" examine the lateral view of the scapular

Case 2


frontal


lateral “Y” view

Can you outline on both views the clavicle? acromion? coracoid? glenoid? and scapula?

Case 2

“Why” is the lateral called the “Y” view?

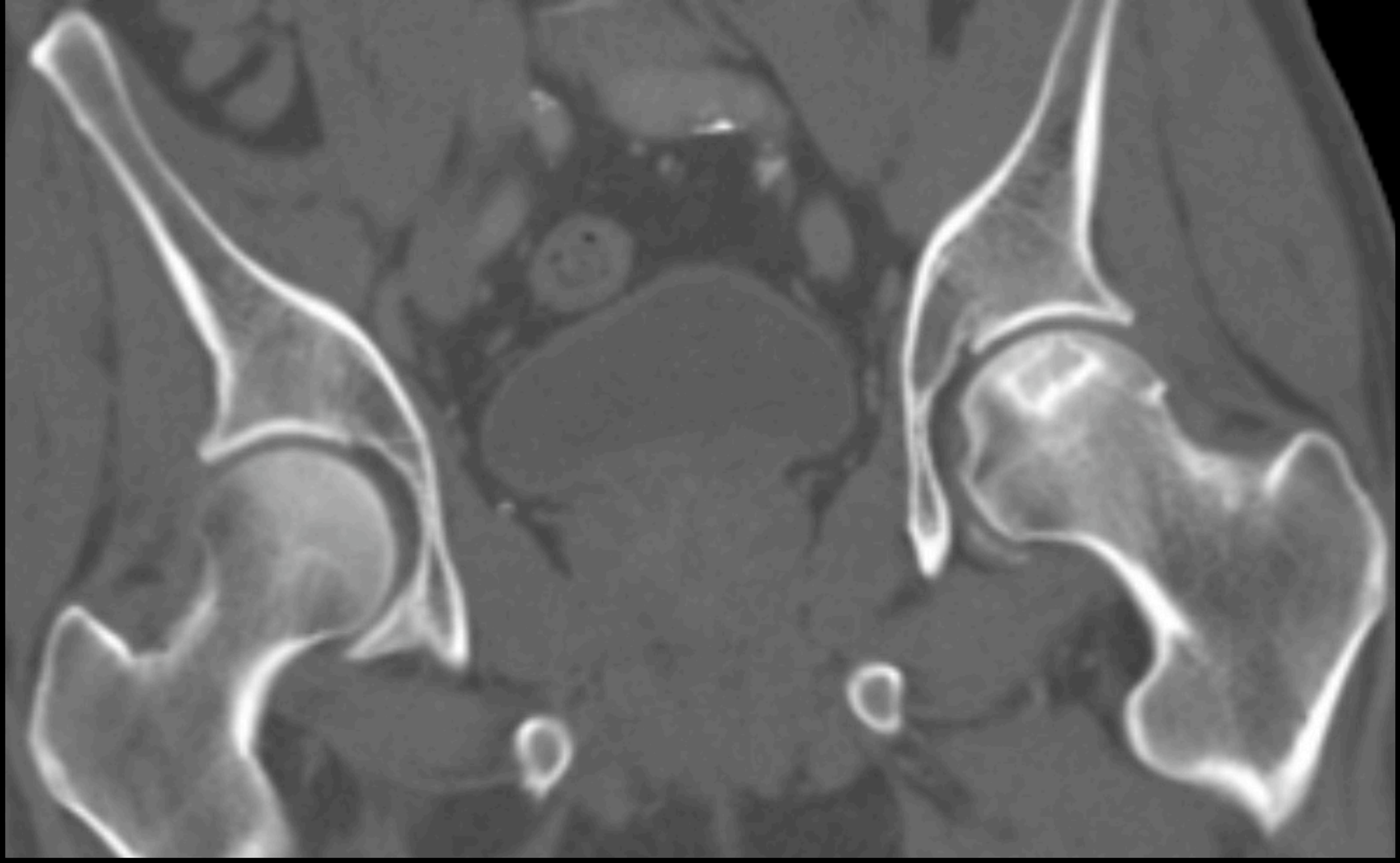
This patient, on steroids for organ transplant, complains of hip pain.

- Which hip hurts? What findings support this conclusion?
- In this setting, what's the most likely diagnosis?

Case 3

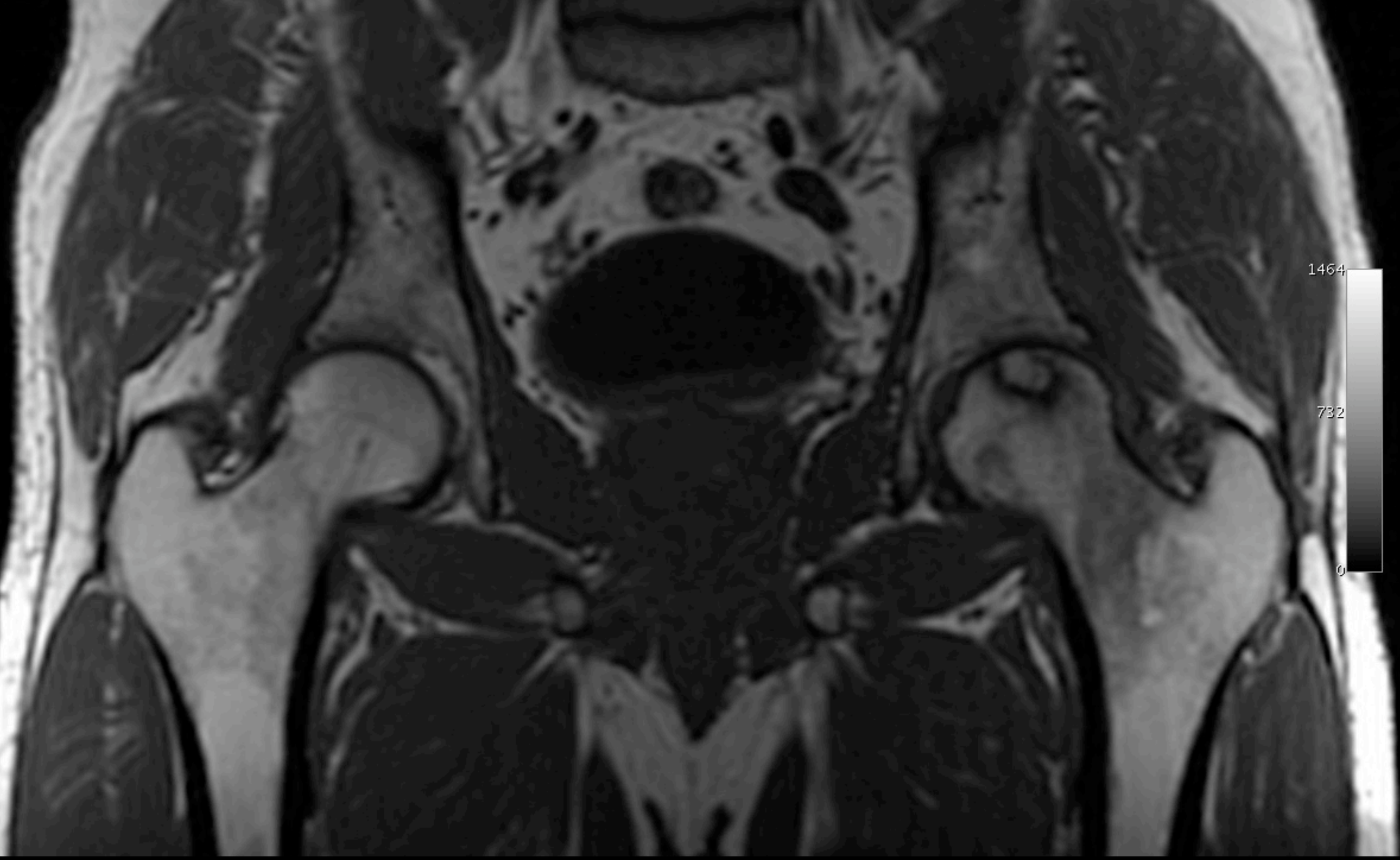
Do you see areas of sclerosis (increased bone density) or lysis (abnormal lucency)?

Case 3



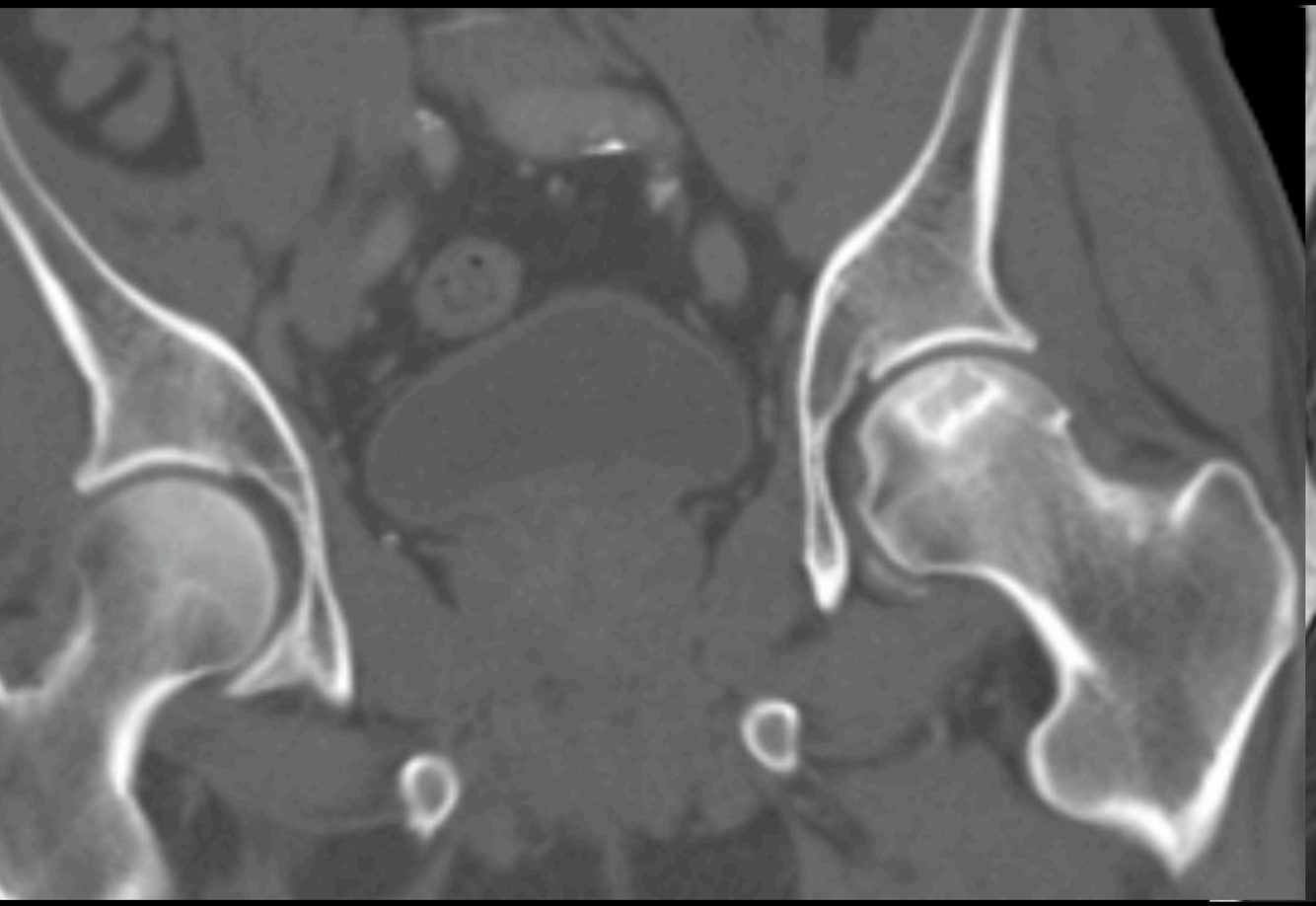
What imaging modality is this? Why is it now easier to identify subtle abnormalities?

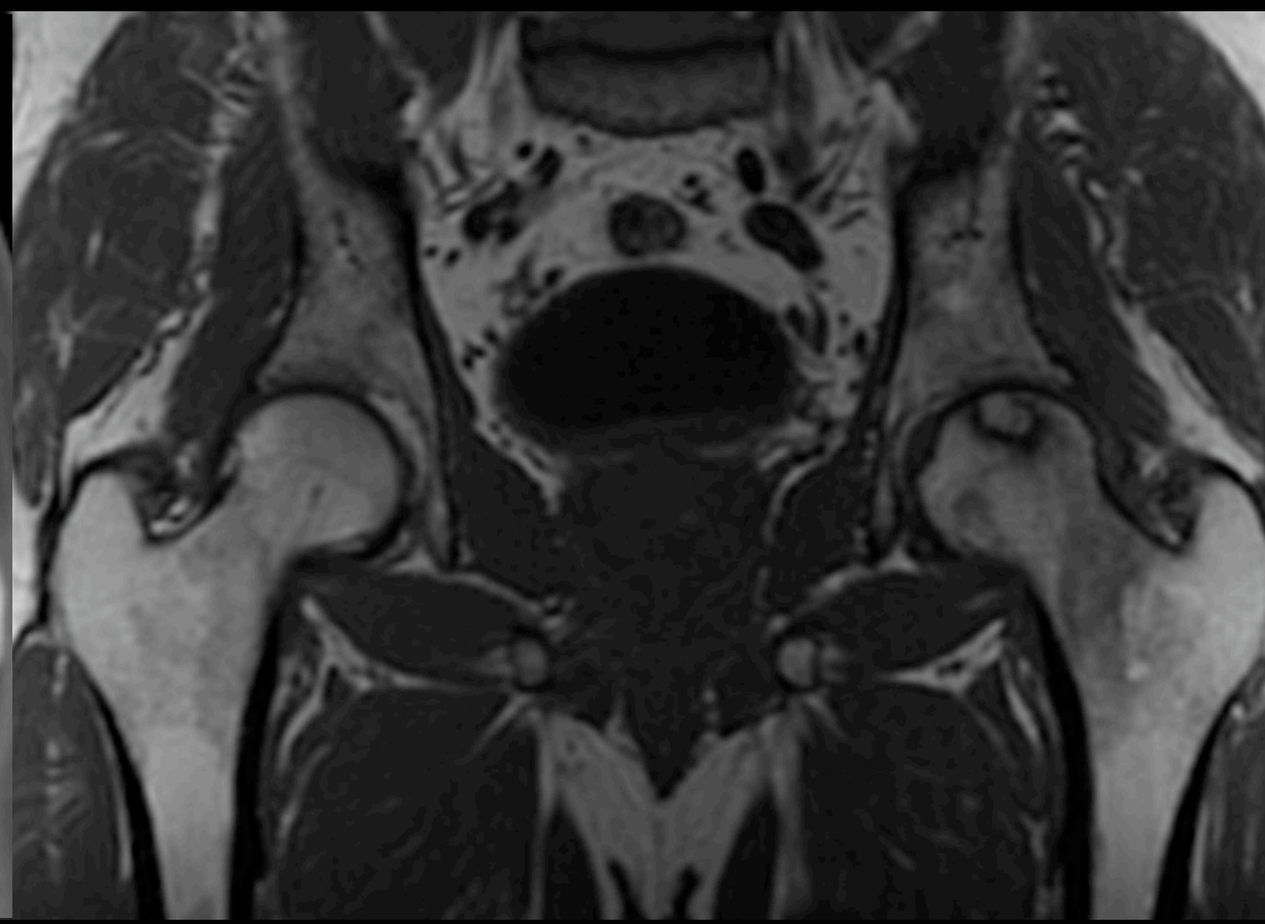
Case 3



This patient went on for an additional study. What modality is this?

Case 3





modality A

modality B

Compare the appearance of cortical bone and fat between these two studies.

Can you match the following terms to the appropriate modality?

attenuation, intensity, T1 weighting, bone setting, signal, Hounsfield unit, gadolinium, iodine

Case 3

Patient with renal disease and elbow pain

- Identify evidence for soft tissue swelling (clue: palpate the back of your own elbow for comparison)
- Distinguish fat from fluid/water opacity
- How does this help identify the elbow "fat pad" or "sail" sign?

Case 4

Can you identify both the subcutaneous fat and the elbow joint "fat pad"?

Can you point out the transition between normal and edematous subcutaneous fat?

Case 4

What's your differential diagnosis?

Pedestrian struck by car with knee pain

- the first image is a normal lateral knee film for comparison
- again, can you distinguish between the opacities of air, fat, and fluid/soft tissue?

Case 5

normal lateral knee

Case 5

Identify the quadriceps muscle, the quadriceps tendon, and subcutaneous fat. How would the opacity of fluid compare?

Case 5 Our unfortunate patient: Can you identify the fracture?

Do you see the horizontal level cephalad to the patella?*

How does this help indicate how the image was taken...with a vertical or a horizontal beam (cross-table)?

Case 5

*see close-up on next slide

What is the nature of the fluids that comprise the horizontal interface you see? How can you tell?

Case 5

clue: think “balsamic vinegraitte”!

55 year old diabetic male with painless foot swelling

- Can you identify 3 of the 4 basic radiographic opacities on this plain film?
- Which opacity is missing, and why?
- Which opacity is present in the wrong tissue, and what does that signify?
- Why do you think this patient experienced no pain?

Case 6

Can you appreciate the swelling? Feel the dorsum of your own foot.

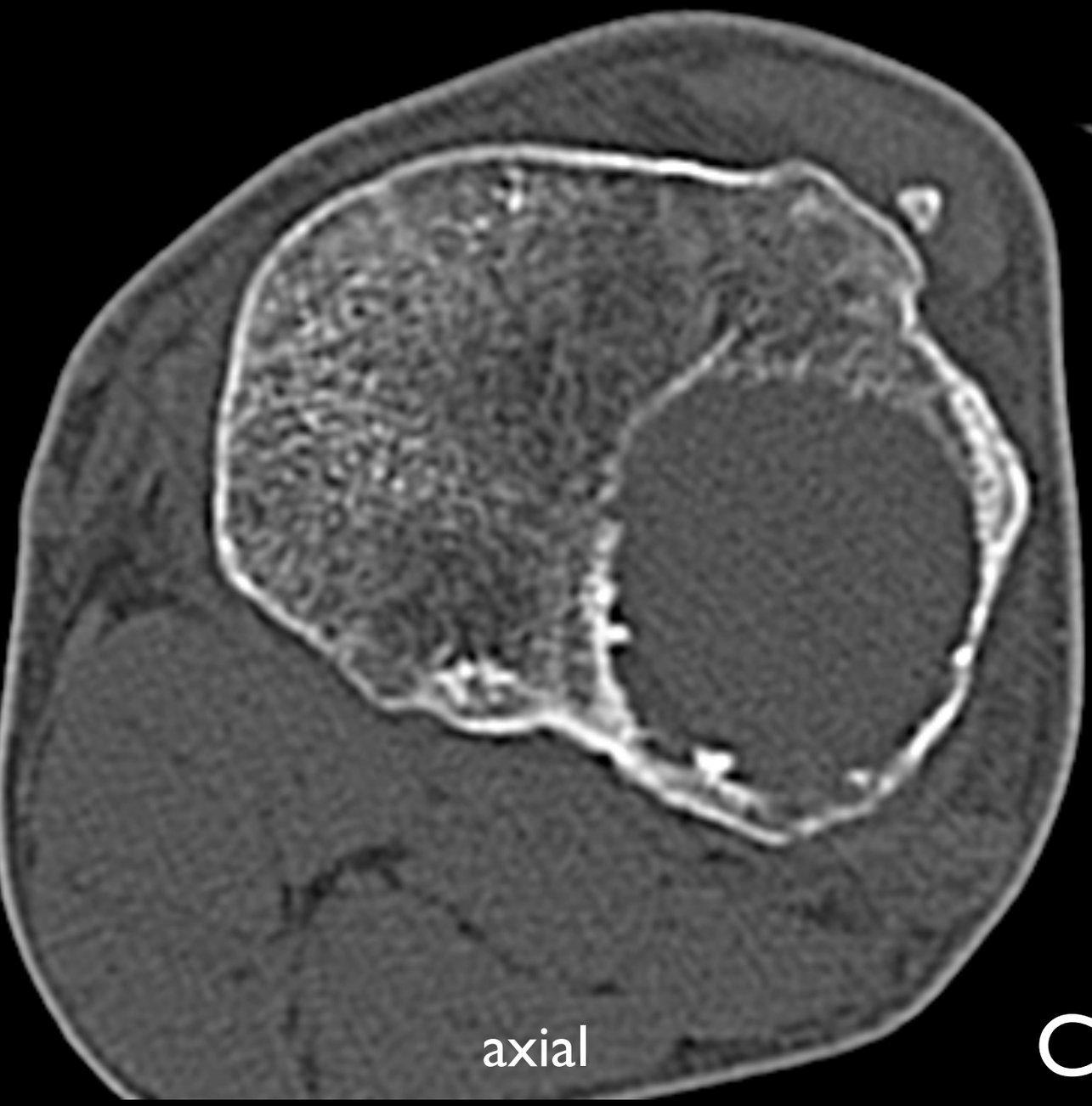
Case 6

This 42 year old woman complains of several months of worsening knee pain.

- identify cancellous vs. cortical bone
- do you see a “lytic” area, i.e. a focal area of missing bone?
- describe the location of the lesion

Case 6

Case 6



CT

Describe the changes to both the cancellous and cortical bone

Are the margins sharply defined or indistinct? Sclerotic or permeative?

What does this say about the biology of the lesion?

Case 6

Tripped on curb

- why do you always need two views at 90 degrees, especially in trauma?
- what has occurred at the ankle joint?
- identify the “ankle mortise,” medial and lateral malleoli, tibiotalar joint, and calcaneus

Case 7

lateral

frontal “mortise” view

Case 7

85 year old male with deformity of the thigh

- compare the trabecula, cortex, and size of the femur between the two sides
- what's the second exam? is this an isolated bone abnormality

Case 8

Case 8

What study did the patient then undergo?

Why are the two images "reversed?"

Does this disease involve one or multiple bones?

What is causing certain areas to appear more "white?"

Case 8

Shortly afterwards, this gentleman felt a sudden “snap” while getting to his car.

Discuss why such a “simple” action could lead to this complication.

Case 8