

Back To Chiropractic Continuing Education Seminars

Back To Basics X-Ray Reading ~ 6 Hours

Welcome:

This course is approved for 6 Hours of Back To Basics X-Ray Reading for the Chiropractic Board of Examiners for the state of California and is also accepted in Colorado, Iowa, Michigan, Oregon and Washington.

This course counts as 6 Hours towards your Radiography Supervisor and Operator Permit renewal. Course must be completed before your permit expires.

There is no time element to this course, take it at your leisure. If you read slow or fast or if you read it all at once or a little at a time it does not matter.

How it works:

- 1. Helpful Hint: Print exam only and read through notes on computer screen and answer as you read.**
- 2. Printing notes will use a ton of printer ink, so not advised.**
- 3. Read thru course materials.**
- 4. Take exam; e-mail letter answers in a NUMBERED vertical column to marcusstrutzdc@gmail.com.**
- 5. If you pass exam (70%), I will email you a certificate, within 24 hrs, if you do not pass, you must repeat the exam. If you do not pass the second time then you must retake and pay again.**
- 6. If you are taking the course for DC license renewal you must complete the course by the end of your birthday month for it to count towards renewing your license. I strongly advise to take it well before the end of your birthday month so you can send in your renewal form early.**
- 7. Upon passing, your Certificate will be e-mailed to you for your records.**
- 8. DO NOT send the state board this certificate.**
- 9. I will retain a record of all your CE courses. If you get audited and lost your records, I have a copy.**

The Board of Chiropractic Examiners requires that you complete all of your required CE hours BEFORE you submit your chiropractic license renewal form and fee.

NOTE: It is solely your responsibility to complete the course by then, no refunds will be given for lack of completion.

Enjoy,

Marcus Strutz DC

CE Provider

Back To Chiropractic CE Seminars

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How To Look At Films

- What follows is my search pattern for how to look at films
- In each area, I will provide examples of things that we are most likely to see in that area

Cervical Spine

APOM

- Get out of way early
- Position of lateral masses
- Integrity of dens



Jefferson Fx



Jefferson Fx



Jefferson's Fx

- APOM show offset of lateral masses on C2
- Usually axial load with hyperflexion: falling forward landing on the top of your head
- Unsatble

Dens Fx



Dens Fx



Dens Fx

- Hard to see on plain film
- If any doubt go directly to CT
- Any mechanism of injury
- Usually unstable

Os Odontoidium



Os Odontoidium



Os Odontoidium

- Thick lucency separating dens from the body of C2
- Should follow with flexion/extension views
- Neurologic consult is helpful
- Avoid osseous adjusting of C1-3

Alignment

Lateral then AP

Overall Curve

Flat



Reversed



Anterolisthesis



Anterolisthesis

- Can result in central stenosis

Retrolisthesis



Retrolisthesis

- Can contribute to stenosis
- Can contribute to degeneration

Gravitational Line From C2



Gravitational Line From C2

- True vertical from tip of dens
- Should fall in anterior aspect of C7
- When anterior to C7, indicates increased stress on the C-T junction and predisposition to developing DJD there

Bone Density

- Lateral first
- Then AP

Hangman's Fx



Hangman's Fx

- Fx at pedicle body junction of C2 with minimal anterolisthesis of the body of C2
- Hyperextension injury

Compression Fx



Compression Fx

- Hyperflexion is main mechanism
- Wedge shape
- Step defect
- Zone of condensation

Clay Shoveler's Fx



Clay Shoveler's Fx

- Usually hyperflexion injury but can be from direct impact or muscular contraction
- Fx is proximal or middle third
- Usually some degree of inferior displacement
- Stable

Cervical Rib



Cervical Rib

- Can be unilateral or bilateral
- Can be freely mobile, fuse to adjacent rib, or form accessory joint with adjacent rib
- May be associated with TOS

Joints

Lateral then AP

Osteophytes



Osteophytes

- Small or big
- Only around the end-plated

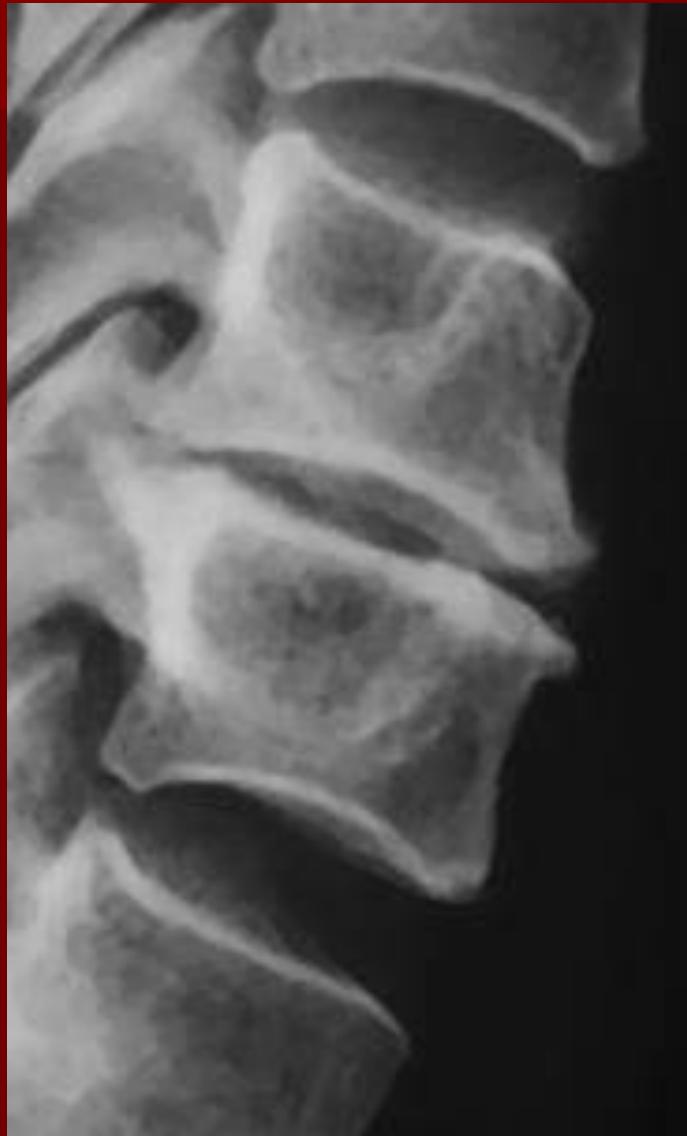
DISH



DISH

- Thick flowing anterior ossification
- Relative preservation of disc space
- At least 4 segments
- Predisposed to Diabetes m.
- Predisposed to OPLL

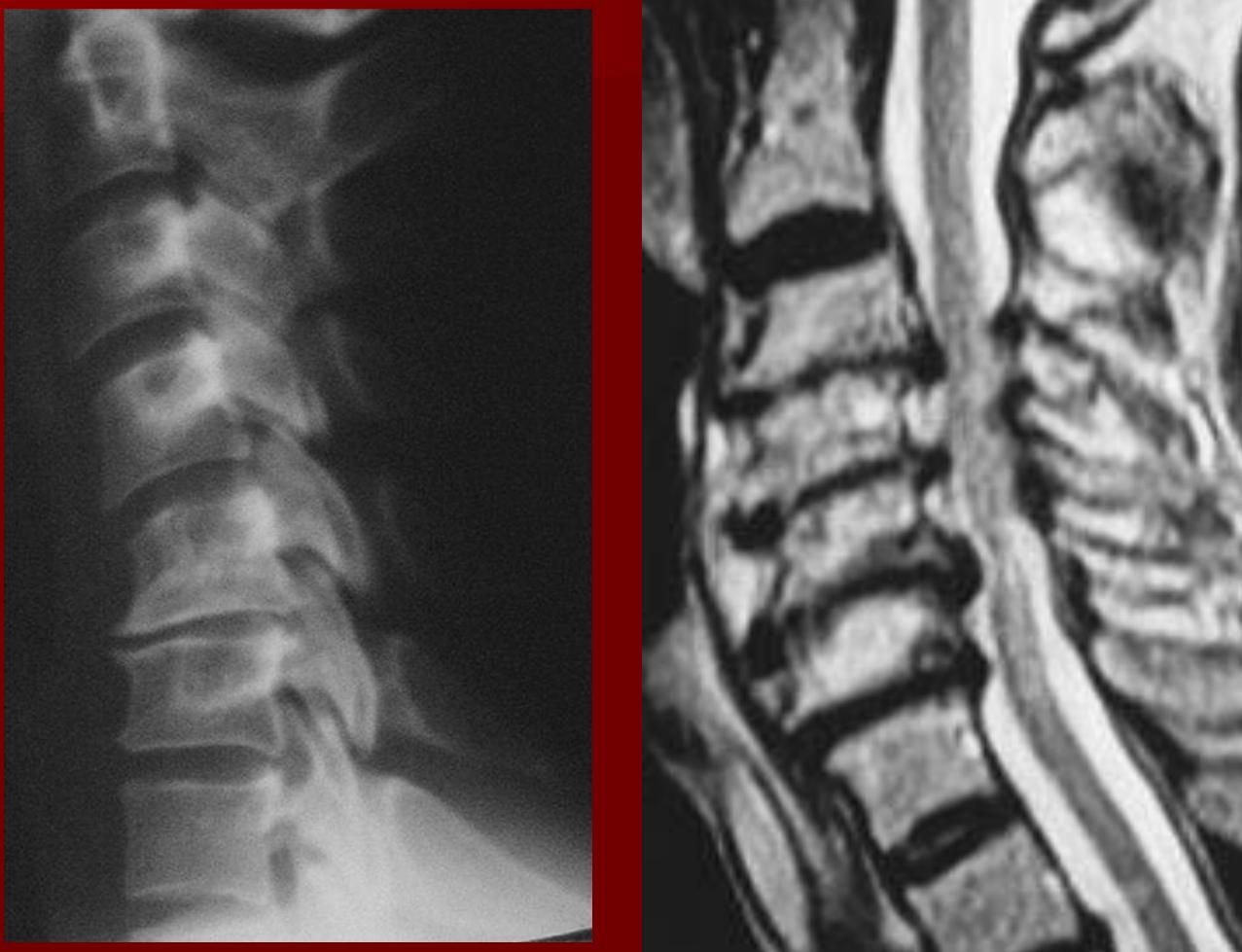
Discs



Discs

- Look for:
 - Narrowing
 - Vacuum phenomenon
 - Calcification
 - Posterior ridge/spurring

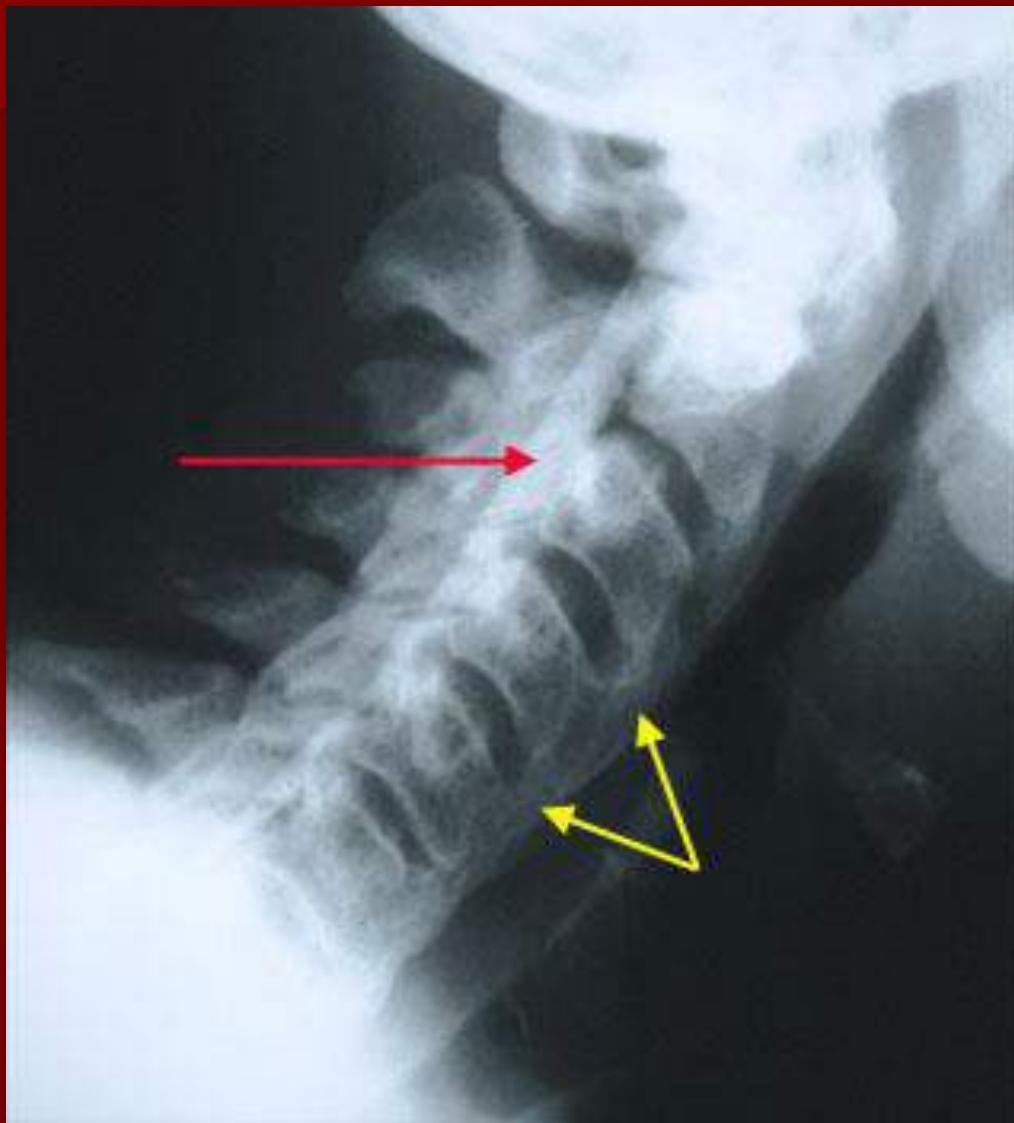
Posterior Ridge



Posterior Ridge

- Can be a cause of central stenosis

OPLL



Ossification of Posterior Longitudinal Ligament

- When visible on X-ray is an absolute contra-indication to manual adjusting of the involved segments

Uncovertebral Joints



Uncovertebral Joints

- When DJD present causes them to extend lateral to vertebral bodies on AP film and may cause the pseudo fracture on the lateral film
- Often associated with upper extremity complaints

Anterior Soft Tissue Space Widening



Anterior Soft Tissue Space Widening

■ 3 causes:

- Hematoma
- Mass
- Infection

Trachea Position



Displaced Trachea

■ Follow with a chest X-ray

■ DDx:

- Sub-sternal thyroid
- Teratoma
- Thymoma
- T cell lymphoma

Lung Apices



Pancoast Tumor

Lung Apices

- Should be clear bilaterally
- If not, follow with a chest X-ray

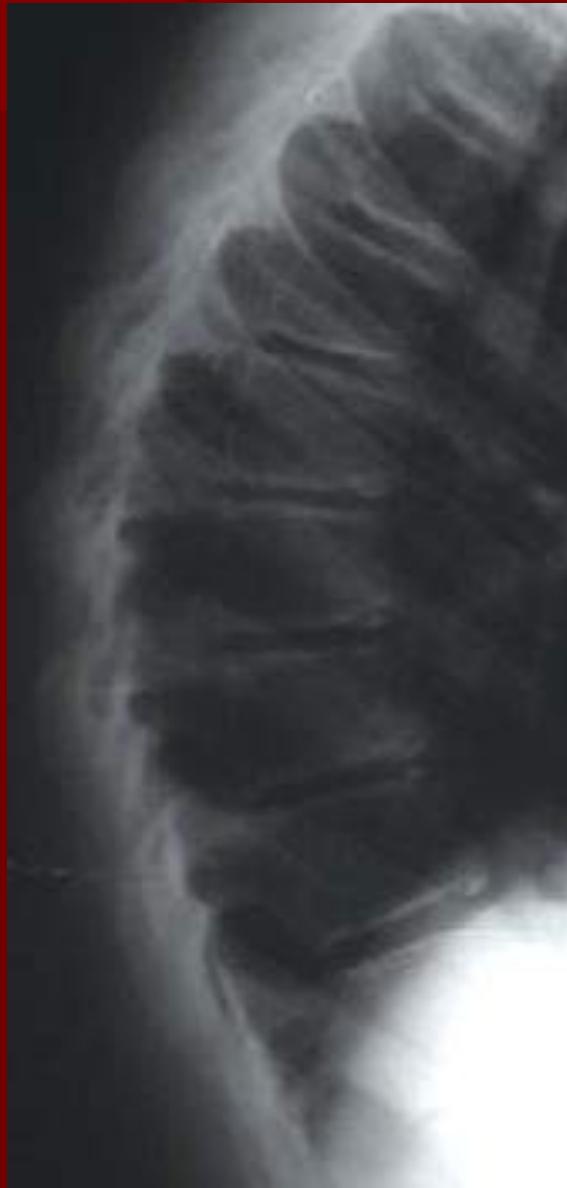
Thoracic Spine

- Alignment: AP then lateral
- Bone density: AP then lateral
- Joints: lateral then AP
- Soft tissue: AP then lateral

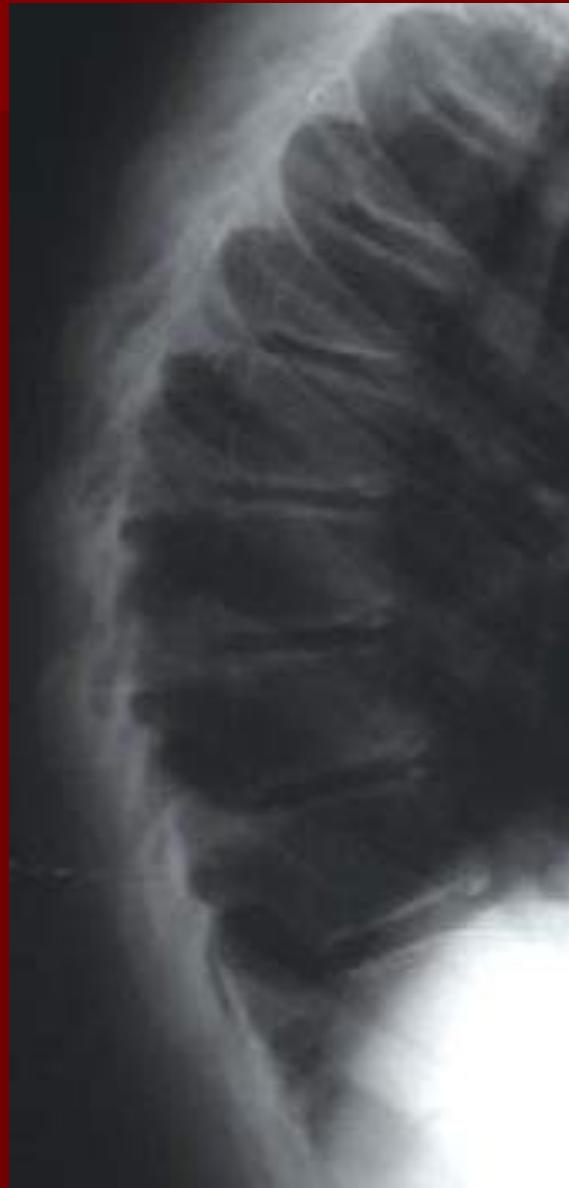
AP Alignment



Kyphosis



Schuermann's



Schuermann's

- Increased kyphosis
- Multiple schmorl's nodes

Bone Density



Bone Density



Ivory White Vertebra

- Blastic mets: no change in size
- Paget's: enlarged with square anterior body
- Lymphoma: normal size with anterior body erosion

Rib Fx



Rib Fx

- Often hard to see
- Need multiple obliques as well as a frontal film

Compression Fx



Compression Fx

- Hyperflexion is main mechanism
- Wedge shape
- Step defect
- Zone of condensation

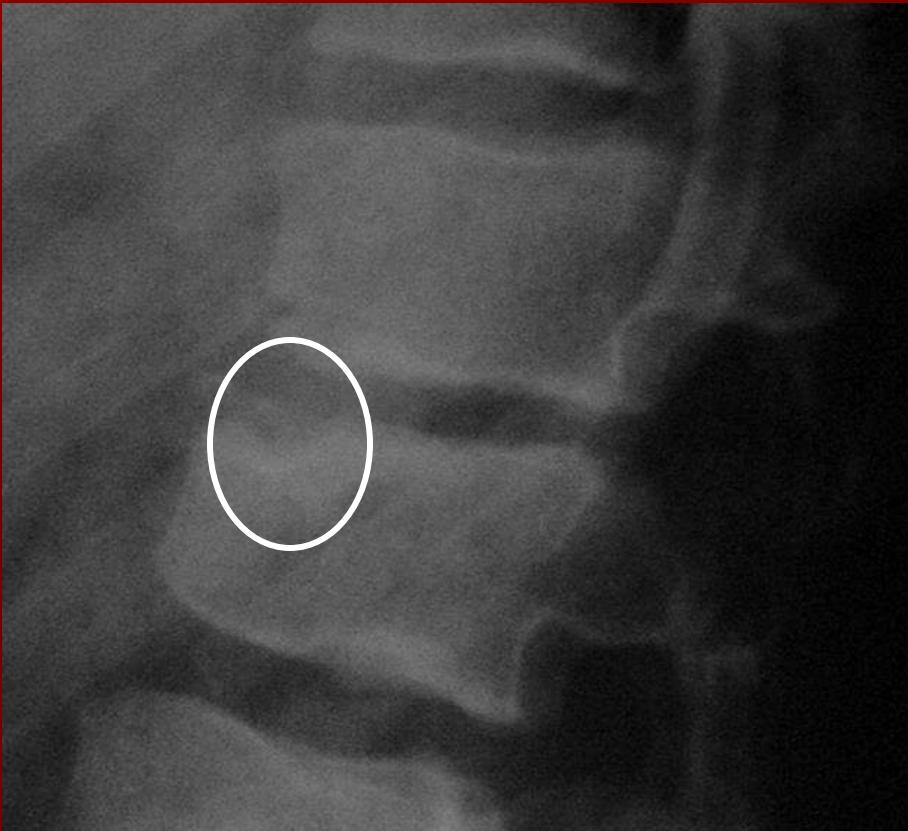
Osteophytes



DISH



Schmorl's Nodes



Schmorl's Nodes

- Helmet shaped defects about 1/3rd of end plate in length
- One or both end-plates
- A type of disc herniation and may result in DJD

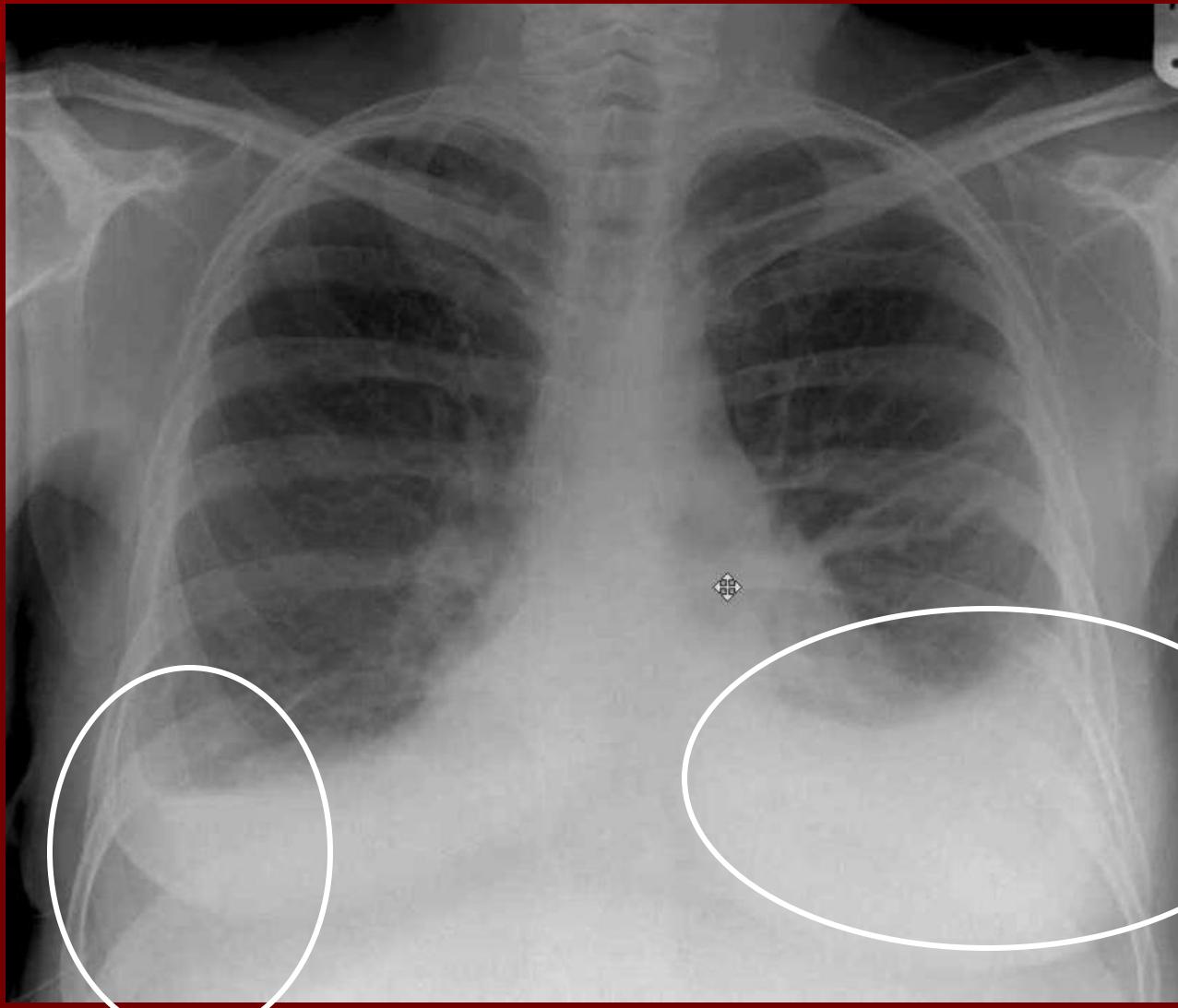
Lung Fields

- Be sure they are clear

Blastic Mets With Multiple Nodlues



Obliteration of the Costophrenic Angles



Obliteration of the Costophrenic Angles

- Often due to serious underlying pathology
- Refer for chest X-ray and a thin section CT

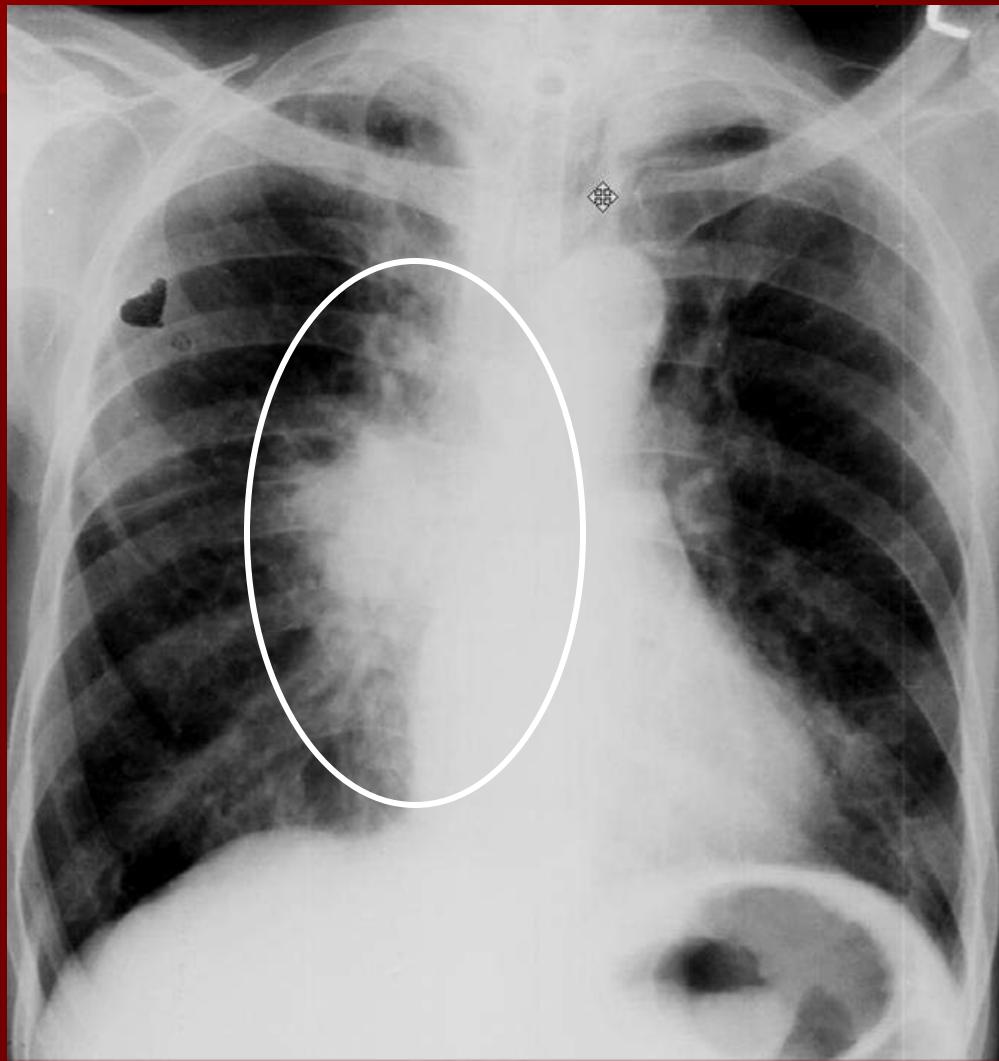
Heart Size



Heart Size

- If more than 50% of total diameter of chest then cardiomegaly
- Need a chest X-ray to verify
- Most common cause if CHF

Mediastinum



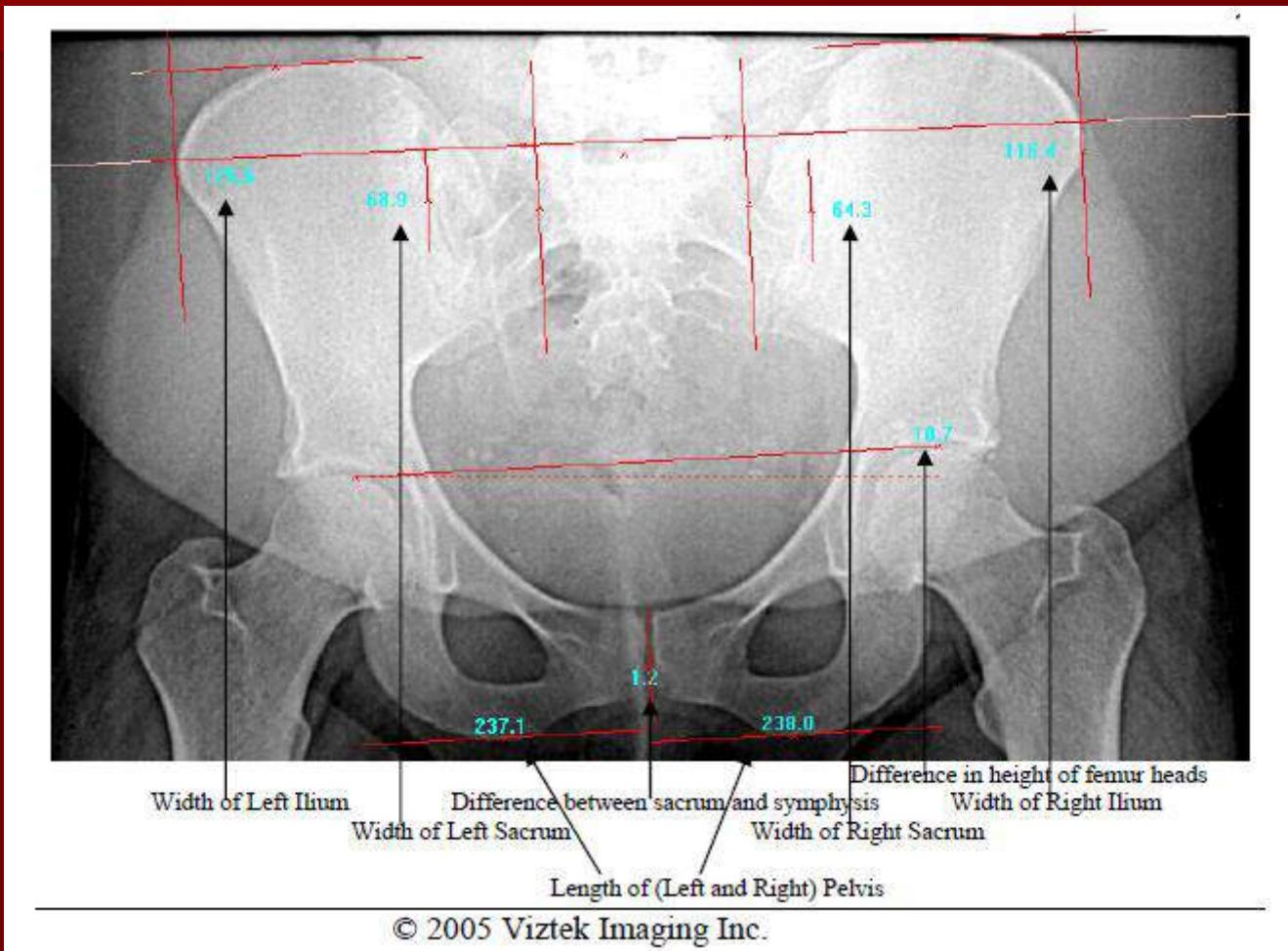
Mediastinum

- When a widened must follow with chest X-ray
- Most common causes are tumor and infection

Lumbopelvic Spine

- Alignment: AP then lateral
- Bone density: AP then lateral
- Joints: lateral then AP
- Soft tissue: lateral then AP

Pelvic Leveling



Lateral Curvature



Lordosis



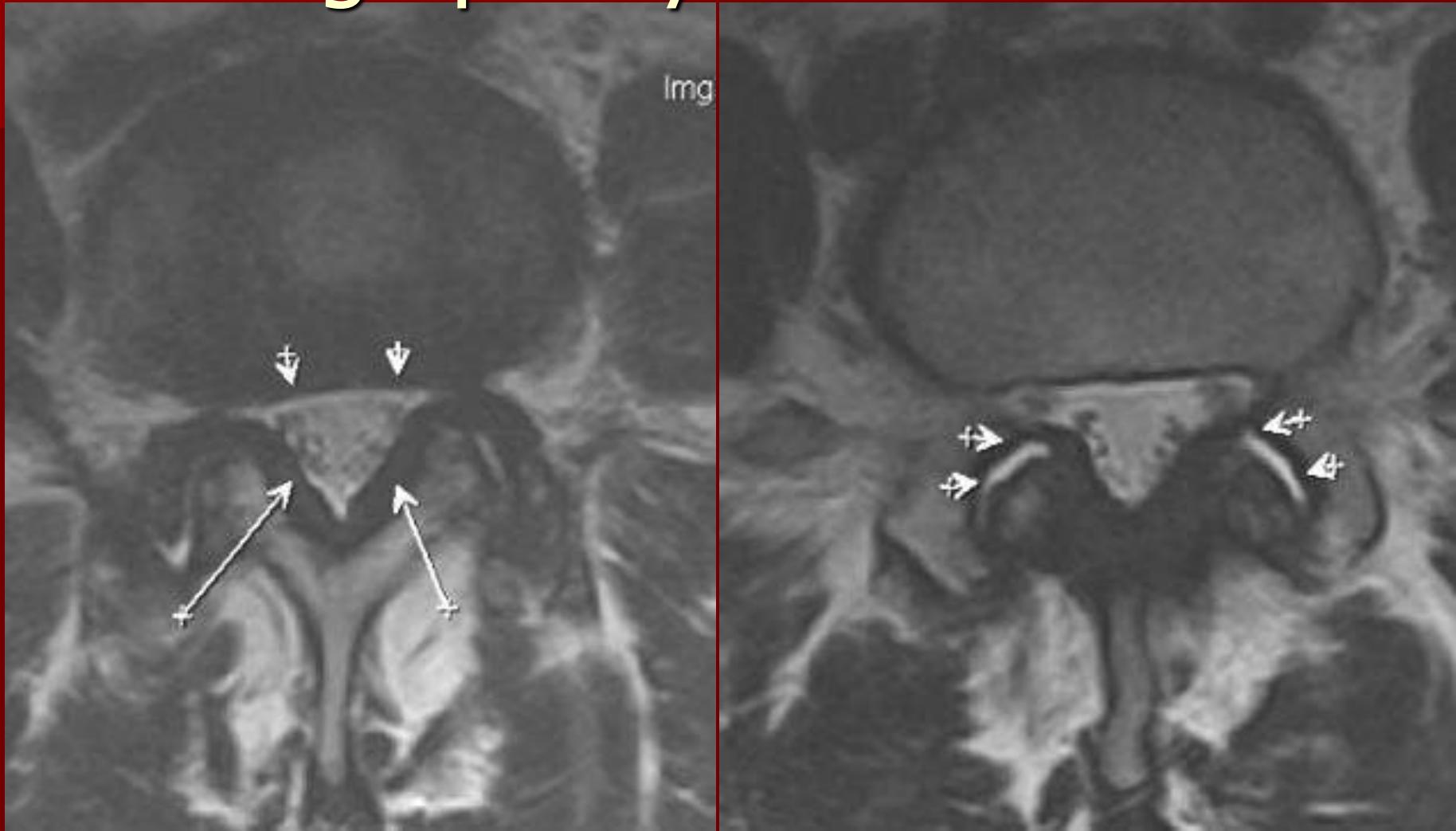
Anterolisthesis (degenerative)



Anterolisthesis (degenerative)

- Causes central and lateral recess stenosis
- Usually results in LBP as well as leg pain and/or paraesthesia
- Prognosis guarded

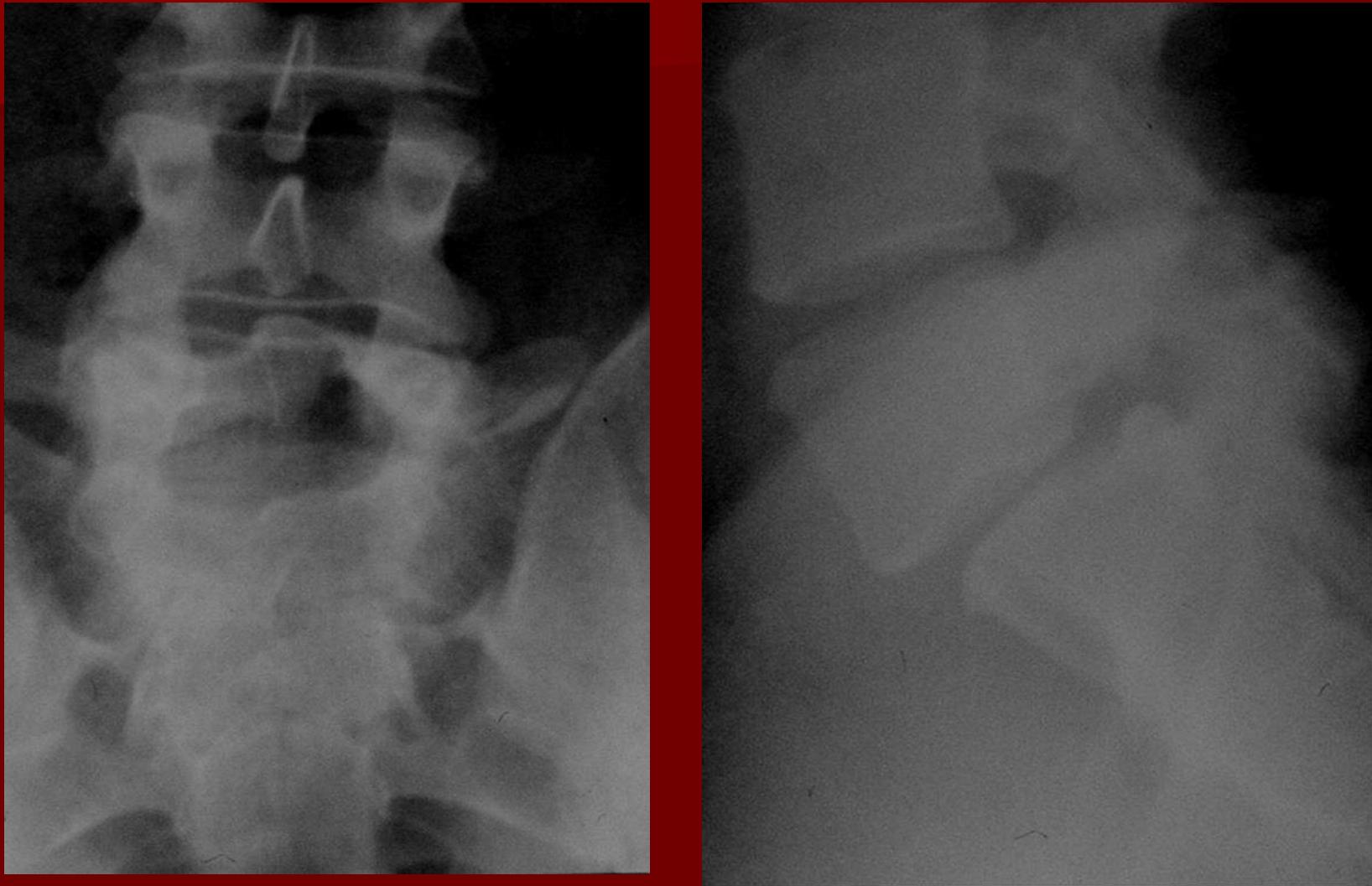
Deg Spondy with Stenosis



Central Stenosis

Lateral recess stenosis on left

Anterolisthesis (isthmic)



Anterolisthesis (isthmic)

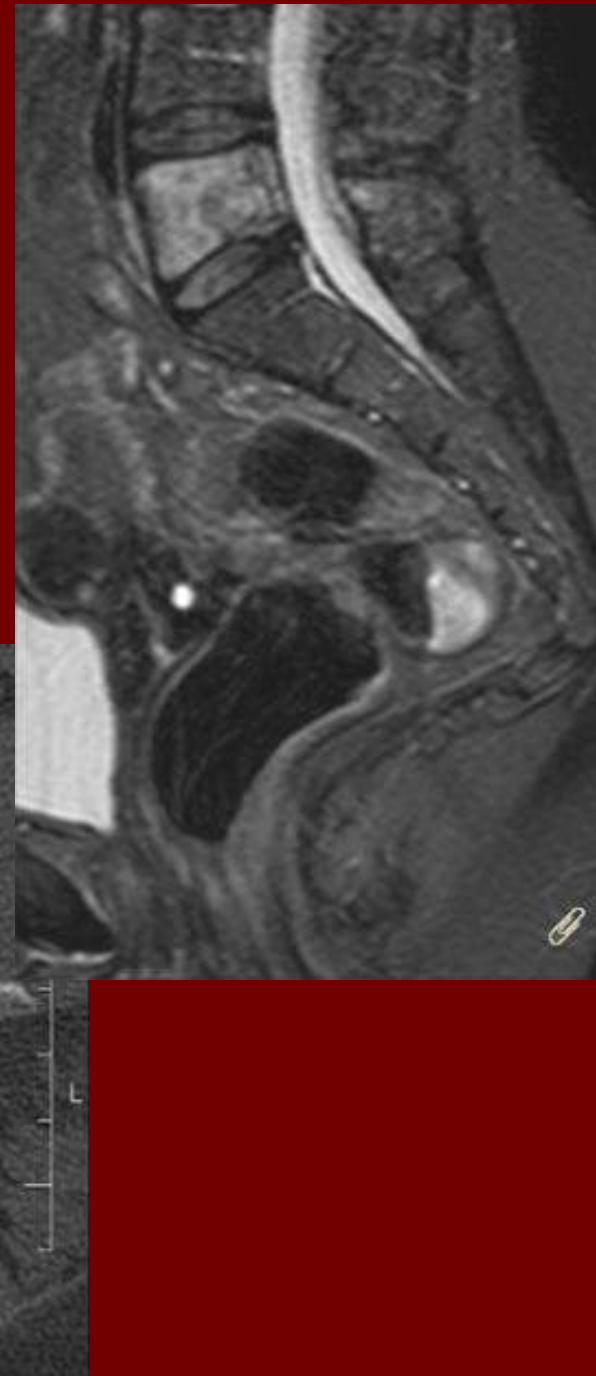
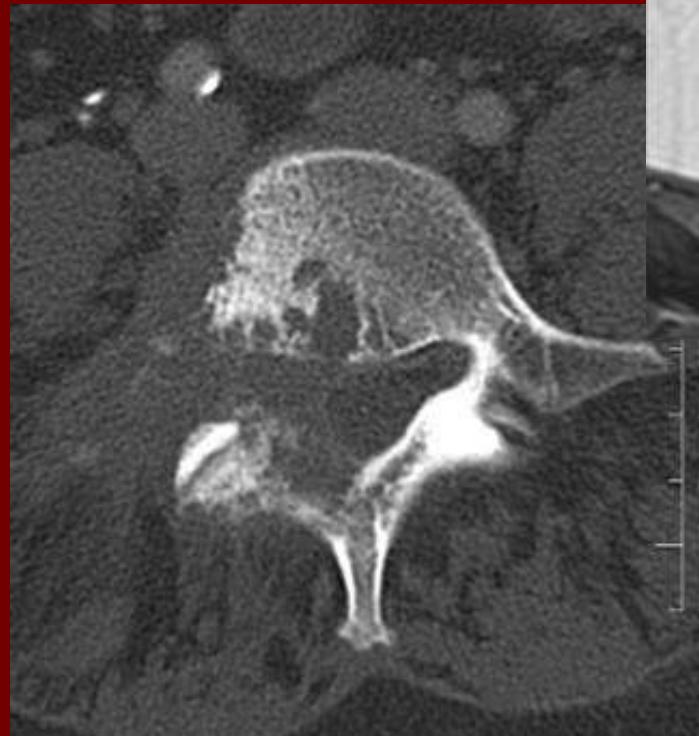
- When slippage is present the pars defects are usually old and inactive
- If there is a question as to whether the pars defects are active (current stress fx), then order an MRI or a SPECT scan

Retrolisthesis

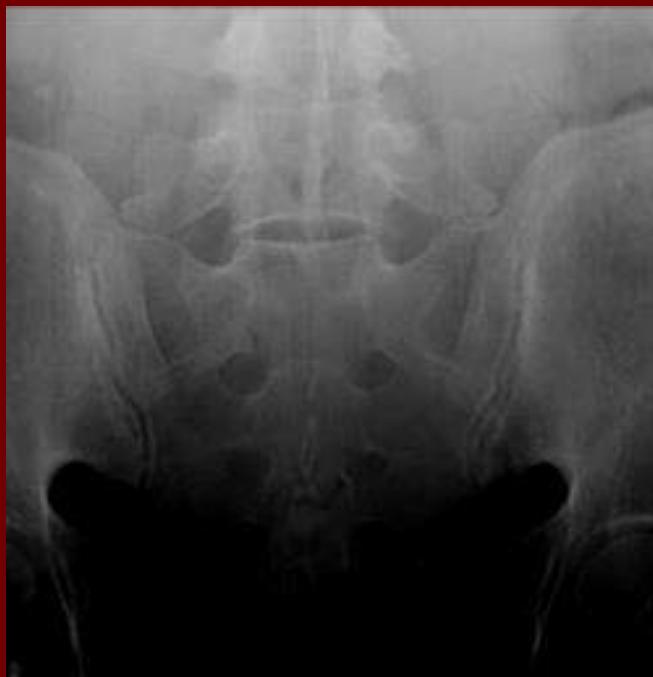


Bone Density

Missing pedicle
from lytic Mets



Transitional Segment



Transition Segment

- Only symptomatic if has accessory joint
- Predisposes to disc herniation, as well

Osteophytes



DISH



Discs



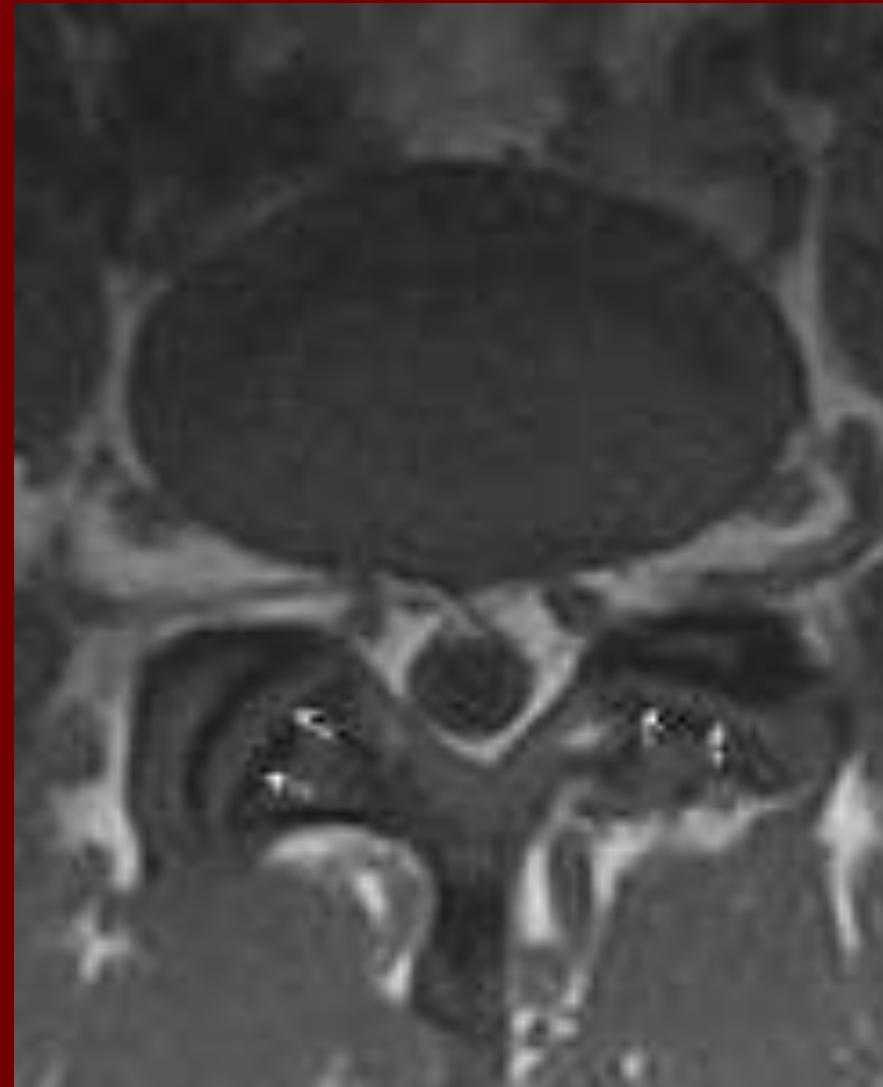
Posterior Ridge



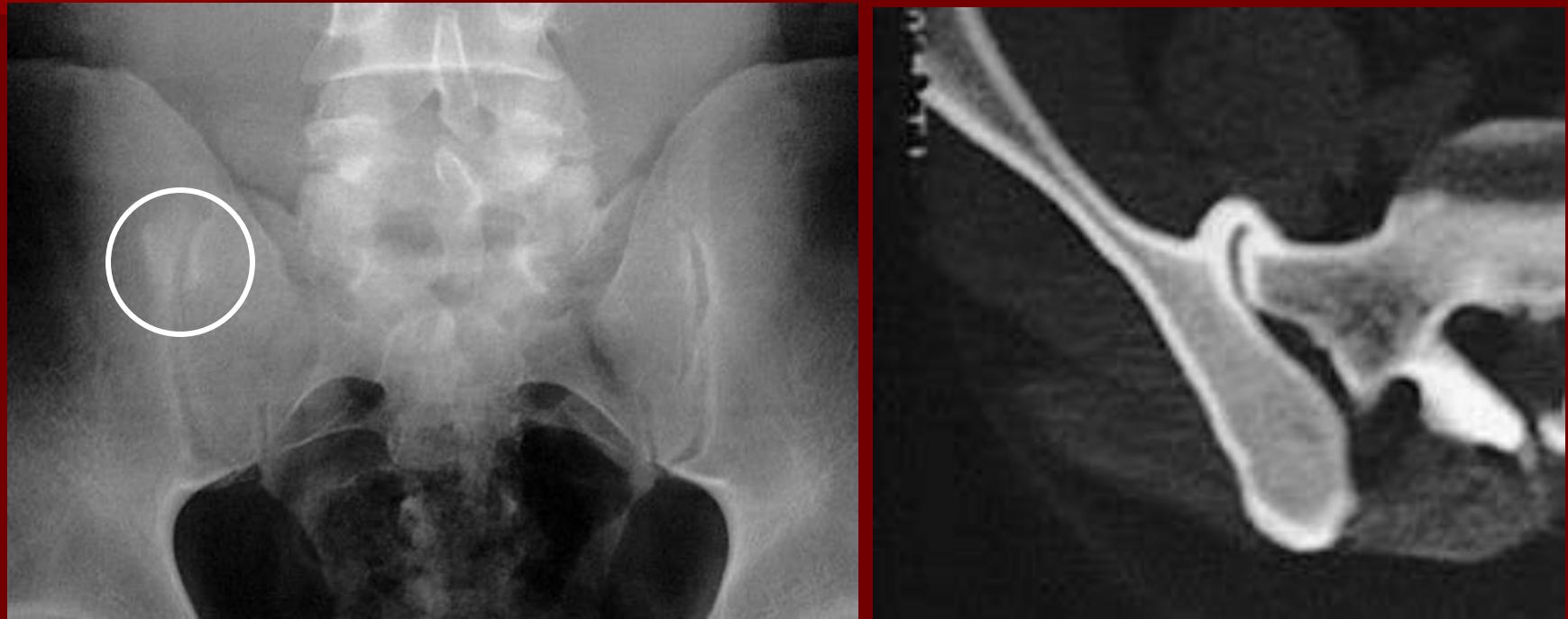
Facet OA



Tropism



SI OA



**Most commonly seen at junction of upper 1/3rd
and lower 2/3rds of SI joint**

SI AS



Early



Late

AS in SI

- Early: erosions, sclerosis on both sides of joint, bilateral and symmetric
- Late: fusion

Abdominal Aorta



Abdominal Aorta

- Atherosclerosis is a common finding
- Should order a lipid panel
- When greater than 3.8 cm in diameter it is considered an aneurysm

Kidney Stone



Kidney Stone

- Common incidental finding
- 90 % calcify
- Homogenous calcification seen para-spinally on the AP film and projecting over or near the body on the lateral film
- Should follow with IVP or diagnostic ultrasound

Gall Stones



Gall Stones

- Only 20% calcify
- Less dense centrally
- Right upper anterior abdomen
- Often multiple
- Follow with diagnostic ultrasound

Uterine Fibroid



Uterine Fibroid

- Common incidental finding in post-menopausal women
- Usually of no clinical significance
- Mottled or mulberry-like calcification in pelvic cavity
- Singular or multiple, small or large

Hip

- Alignment: AP then lateral
- Bone density: AP then lateral
- Joints: AP then lateral
- Soft tissue: AP then lateral

Alignment



Slipped Epiphysis



Slipped Epiphysis

- Klein's line does not intersect femoral head
- Often seen in the Frolich body type
- Limp with hip flexed and internally rotated
- Ortho referral

Bone Density



FIGURE 1. Plain-film radiograph of the left hip in a 75-year-old woman with left buttock pain. The femoral neck appears to be shortened superiorly, and the edge of the femoral head appears to be impacted on top of the femoral neck (arrow). However, the fracture is not well characterized on the radiograph.

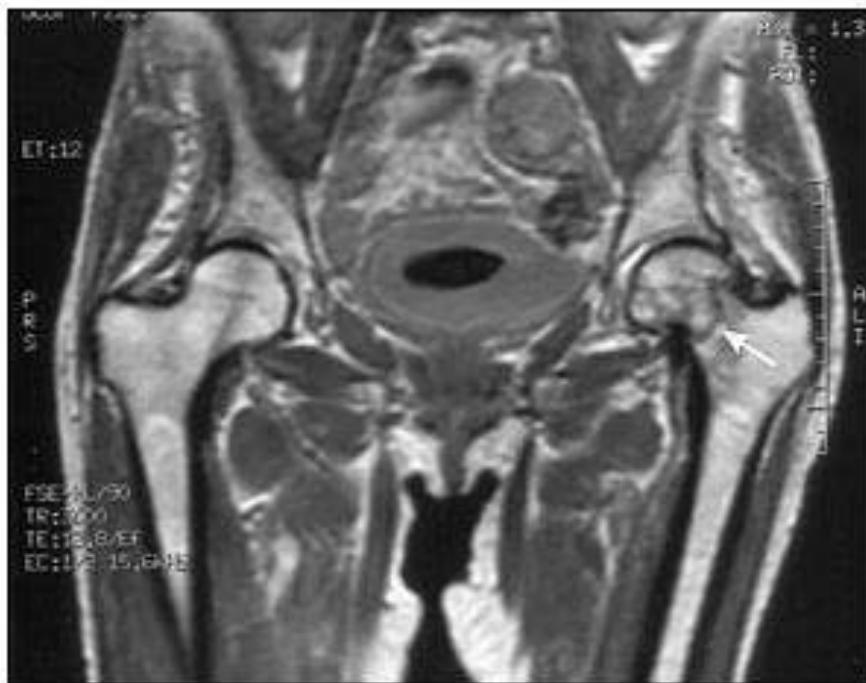


FIGURE 2. Coronal T₁-weighted magnetic resonance imaging study of the hip joints in the patient in Figure 1. This study confirmed the presence of a left nondisplaced femoral neck fracture (arrow).

AVN



AVN

- Mixed increased/decreased density in the epiphysis
- Look for signs of collapse
- Bilateral MRI of hip indicated since it is often bilateral
- Ortho referral

Overcoverage



Overcoverage

- When greater than 45 degrees
- Has been associated with femoro-acetabular impingement syndrome (FAI)

Acetabular Dysplasia



Acetabular Dysplasia

- When angle less than 20 degrees
- Often associated with recurrent hip pain

OA

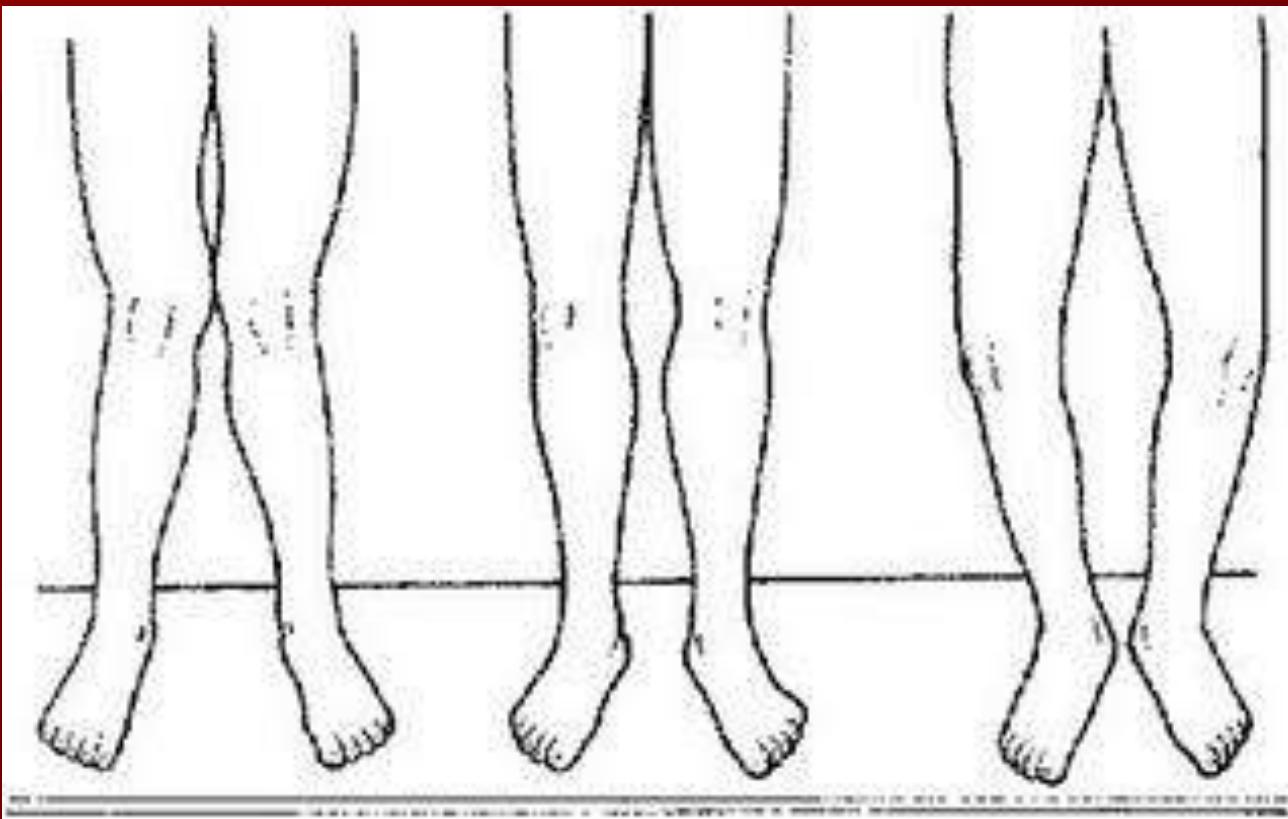


Joint narrowing, osteophytes, subchondral cysts

Knee

- Alignment: AP then lateral
- Bone density: AP then lateral
- Joints: AP then lateral
- Soft tissue: AP then lateral

Valgus/Varus



Genu valgum

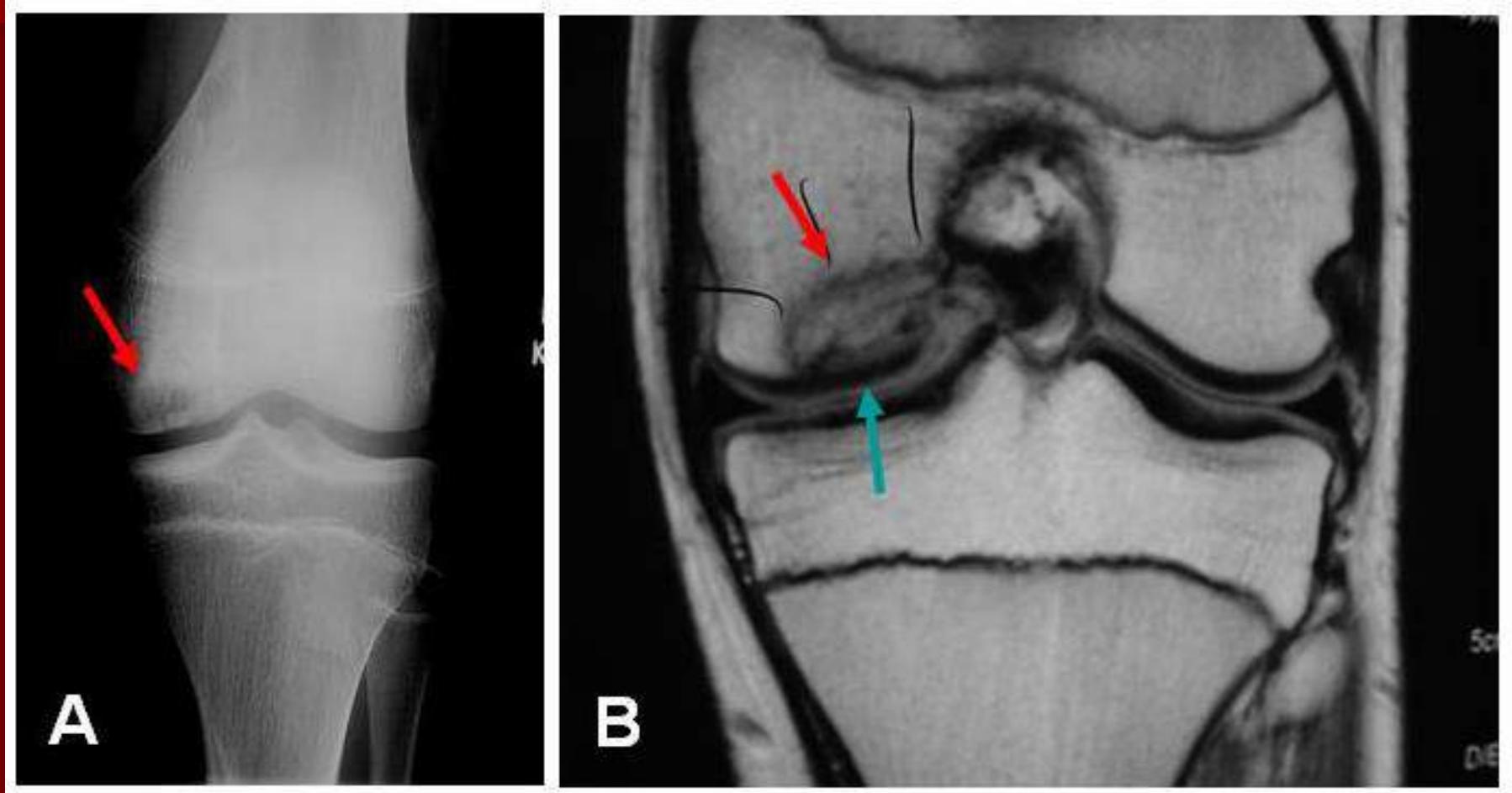
Normal

Genu varum

Patellar Height



Osteochondral Defect



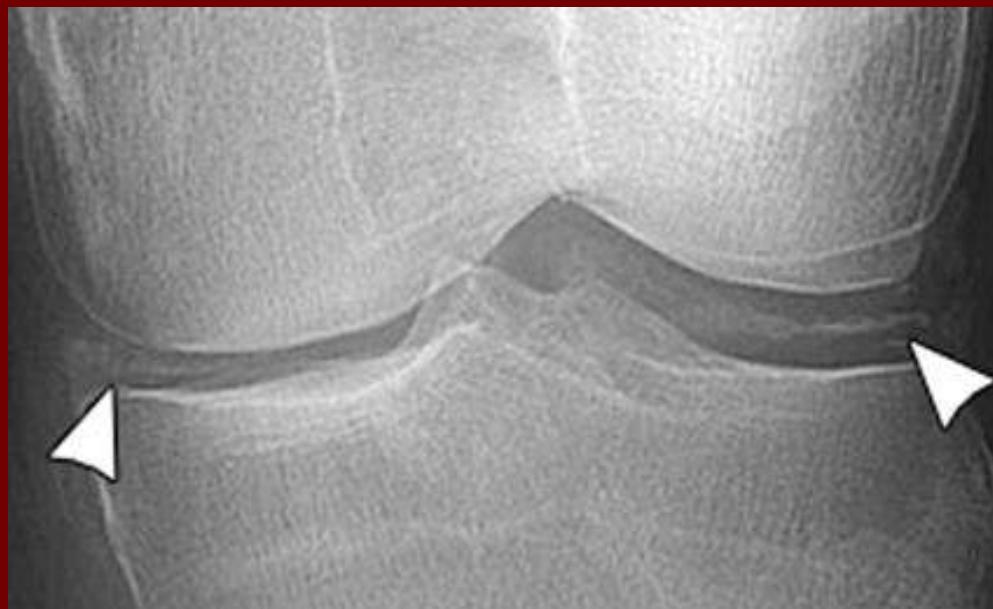
Osteochondral Defect

- Helmet shaped defect on articular surface with or without a joint mouse
- MRI is indicated
- Often mimics a meniscus tear

Osteophytes



CPPD



CPPD

- Calcification of meniscus or articular cartilage
- Accelerates OA

Os fabella



Ankle/Foot

- Alignment: AP then lateral
- Bone density: AP then lateral
- Joints: AP then lateral
- Soft tissue: AP then lateral

Fx



FX



Calcaneal Stress Fx



OA



Osteochondral Defect (See Knee)



Soft Tissue



Soft Tissue Swelling



Great Toe Angle



Longitudinal Arch



Jones FX



Jones FX

- Most common fx in foot
- Due to inversion sprain of ankle
- Stable

Bedroom Fx



OA



Gout



Gout

- Random joint distribution (except 1st MTP)
- Peri-articular erosion with overhanging margin sign
- Often preserves the joint space until late in the disease

Shoulder

- Alignment: external then internal
- Bone density: external then internal
- Joints: external then internal
- Soft tissue: external then internal

AC Separation

II



III



Grade I AC Separation

- Normal alignment
- Clinical only
- 1-4 weeks to healing

Grade II AC Separation

- Elevation of clavicle but still articulates with the acromion
- 1-12 months to healing

Grade III AC Separation

- Elevation of clavicle and does NOT articulate with the acromion
- 1-12 months to healing
- May have residuals

Clavicle Fx

Sc. 2/2

Im: 1/1

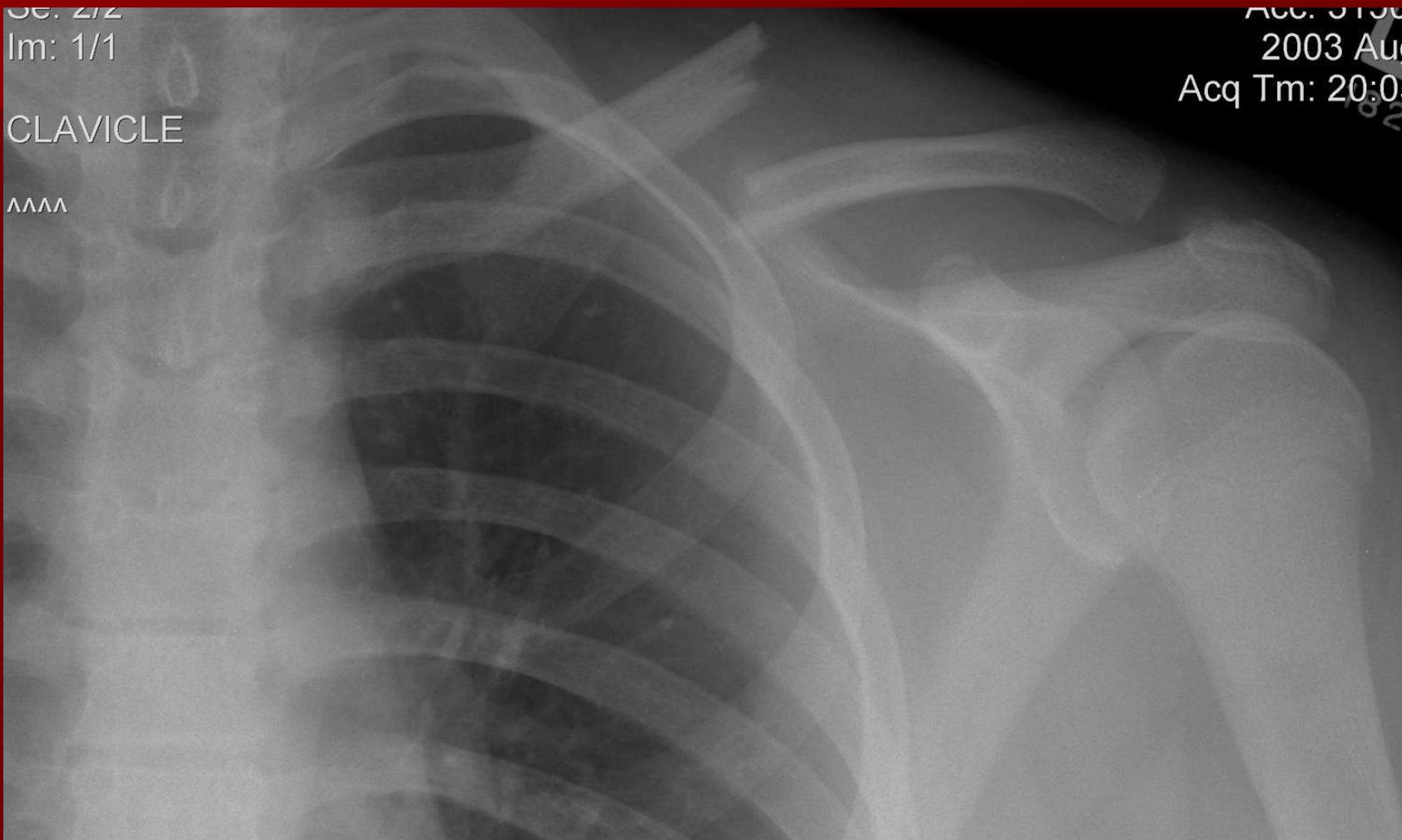
CLAVICLE

^ ^ ^ ^

Acc. 3130

2003 Au

Acq Tm: 20:0



AC OA



AC OA

- May have local symptoms
- No longer considered to be a cause of impingement syndrome

Calcific Tendonitis (HADD)



Calcific Tendonitis (HADD)

- Usually dominant shoulder
- Well defined, homogenous soft tissue calcification that relocates on opposing views

Hand/Wrist

- Alignment: AP, oblique then lateral
- Bone density: AP, oblique then lateral
- Joints: AP, oblique then lateral
- Soft tissue: AP, oblique then lateral

Negative Ulnar Variance

Kienbock's
AVN of lunate



Negative Ulnar Variance

- Short ulna
- Increases biomechanical stress in wrist
- Predisposes to AVN of lunate

Colle's Fx



Colle's Fx

- Usually a fall on outstretched hand with wrist in extension
- Fx of distal radius with posterior displacement and/or angulation of the fracture fragment

Scaphoid Fx



Scaphoid Fx

- Most common fx in wrist
- Often occult
- Can lead to non-union or AVN if not stabilized early

Phalynx fractures



Phalynx fractures

- If no significant displacement and/or angulation then stable and buddy tape

OA



OA

- In wrist, 1st carpal metacarpal articulation
- In hands, DIP and PIP
- Osteophytes the hallmark sign

RA



RA

- All intercarpal joints, MCP and PIP
- Erosions, joint narrowing, joint deformities, bilateral

CPPD



CPPD

- Calcification of triangular fibro cartilage
- OA at MCP joints

Thanks for taking this course!
I hope you enjoyed the seminar!
Now take the exam & email your answers in a
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marcusstrutzdc@gmail.com



Hope To See You Soon
Back To Chiropractic CE Seminars!
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Thanks, Marcus Strutz, DC