



Imaging The Musculoskeletal System

Part - 1

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OBJECTIVES

The main focus and objective of this lecture is to help students to be competent in looking at MRI scans and interpreting findings, by learning:

IMPORTANT SITES

Biological anatomic
analyzing findings

BONE DENSITY
BONE TEXTURE
DISTORTION /
DISPLACEMENT OF
NORMAL STRUCTURES

“Where to look & What to look for”

- Recognize features of certain disease entities





IMAGING THE MUSCULOSKELETAL SYSTEM

PLAIN FILM

Corner Stone

COMPUTED TOMOGRAPHY

MAGNETIC RESONANCE IMAGING

Useful in complex

Let's see

bone,

e

ULTRASOUND

ANGIOGRAPHY

Vascularity
Mapping
Embolization

AR MEDICINE

Bone scan is very sensitive but is relatively non-specific

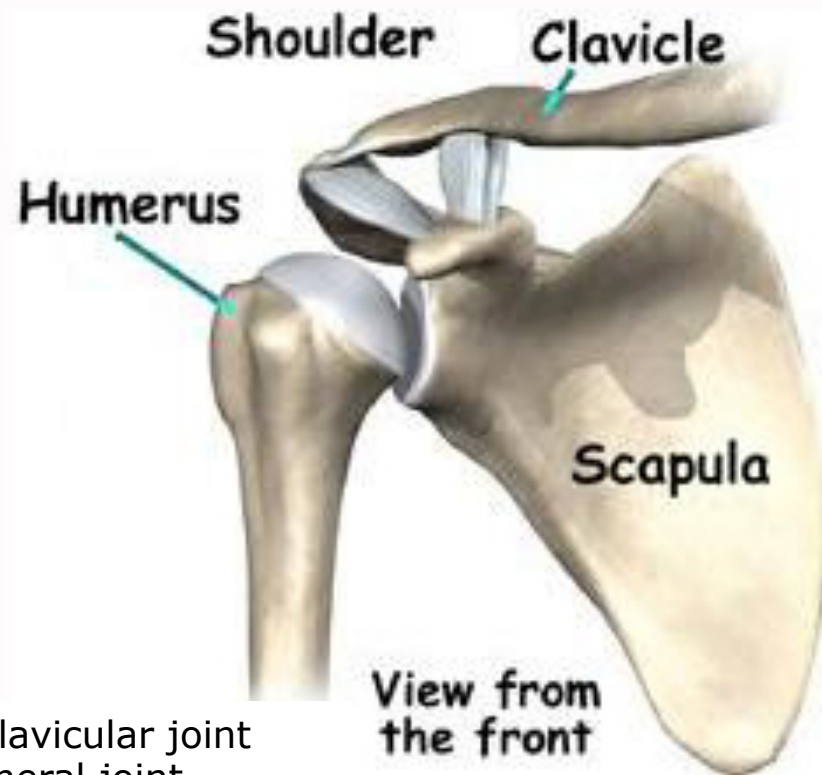
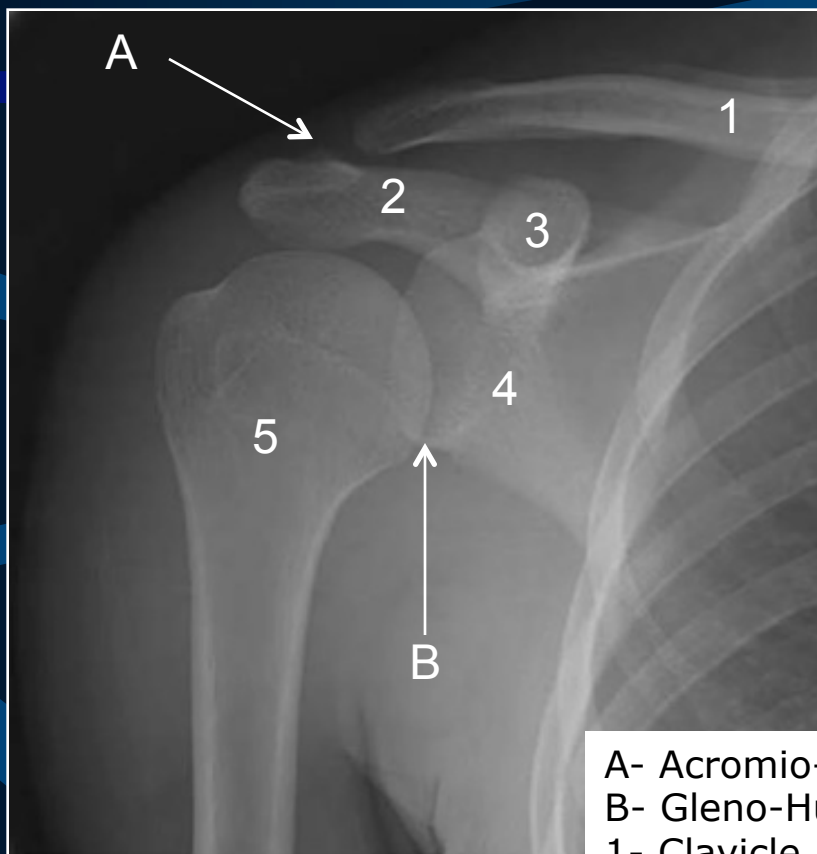
- Tendons/Ligaments/Muscles.
- Detect fluid collections around joints or within muscles.
- Soft tissue masses and cysts.



MUSCULOSKELETAL RADIOLOGICAL ANATOMY



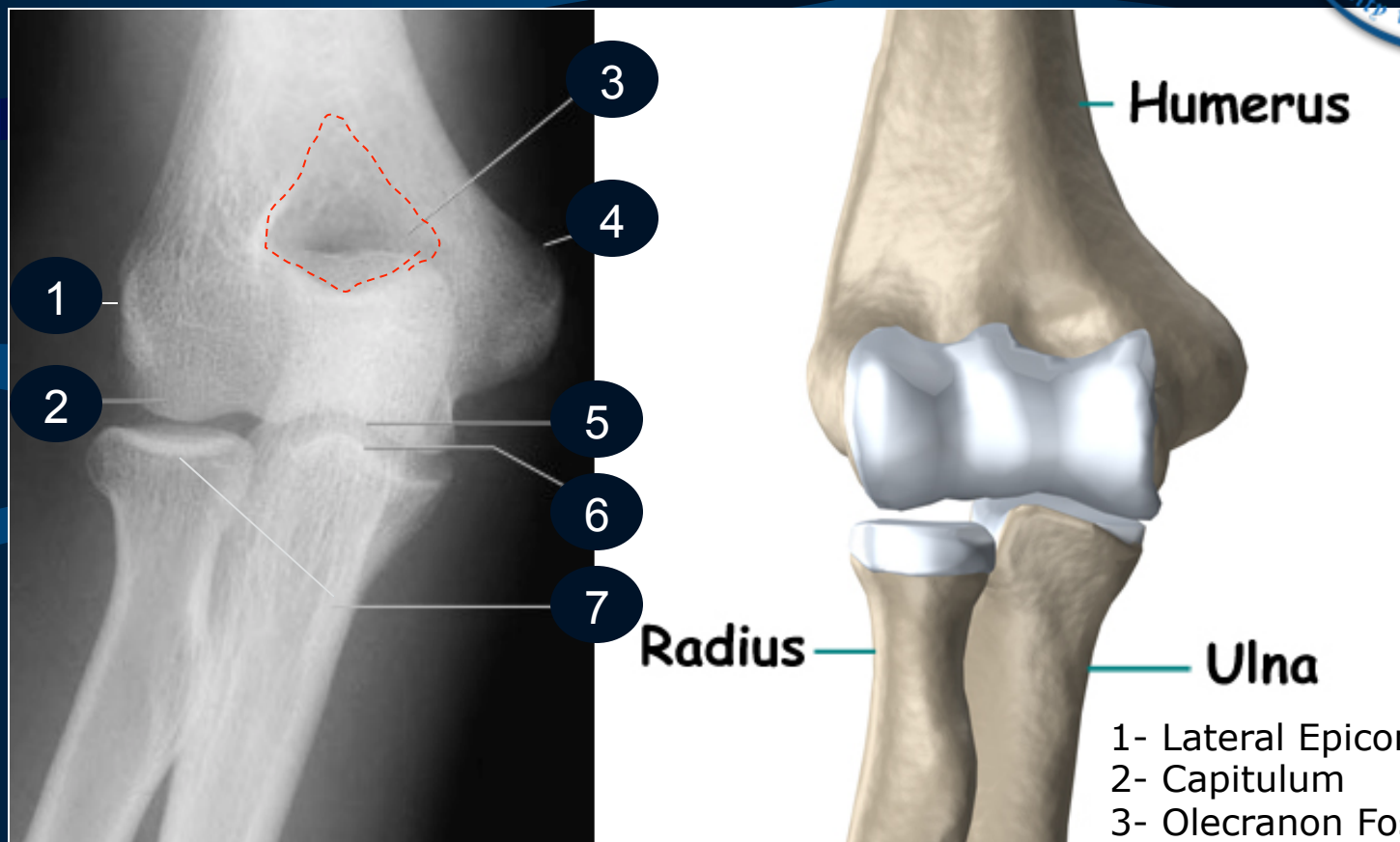
Musculoskeletal Radiological Anatomy



- A- Acromio-Clavicular joint
- B- Gleno-Humeral joint
- 1- Clavicle
- 2- Acromioclavicular joint
- 3- Coracoclavicular joint
- 4- Glenoid process
- 5- Humerus



Musculoskeletal Radiological Anatomy



- 1- Lateral Epicondyle
- 2- Capitulum
- 3- Olecranon Fossa
- 4- Medial Epicondyle
- 5- Trochlea
- 6- Coronoid Process
- 7- Radius Head

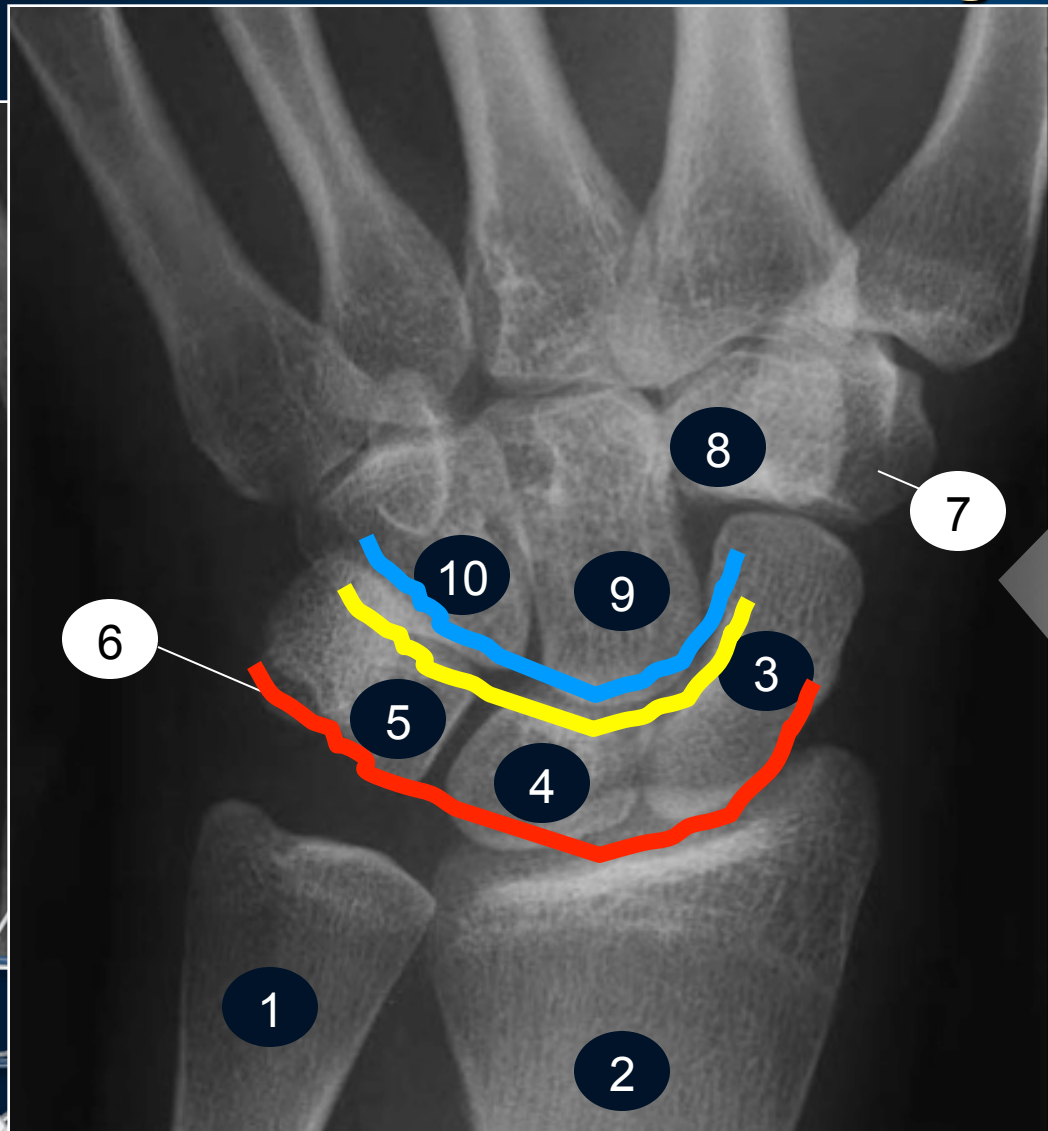


Musculoskeletal Radiological Anatomy





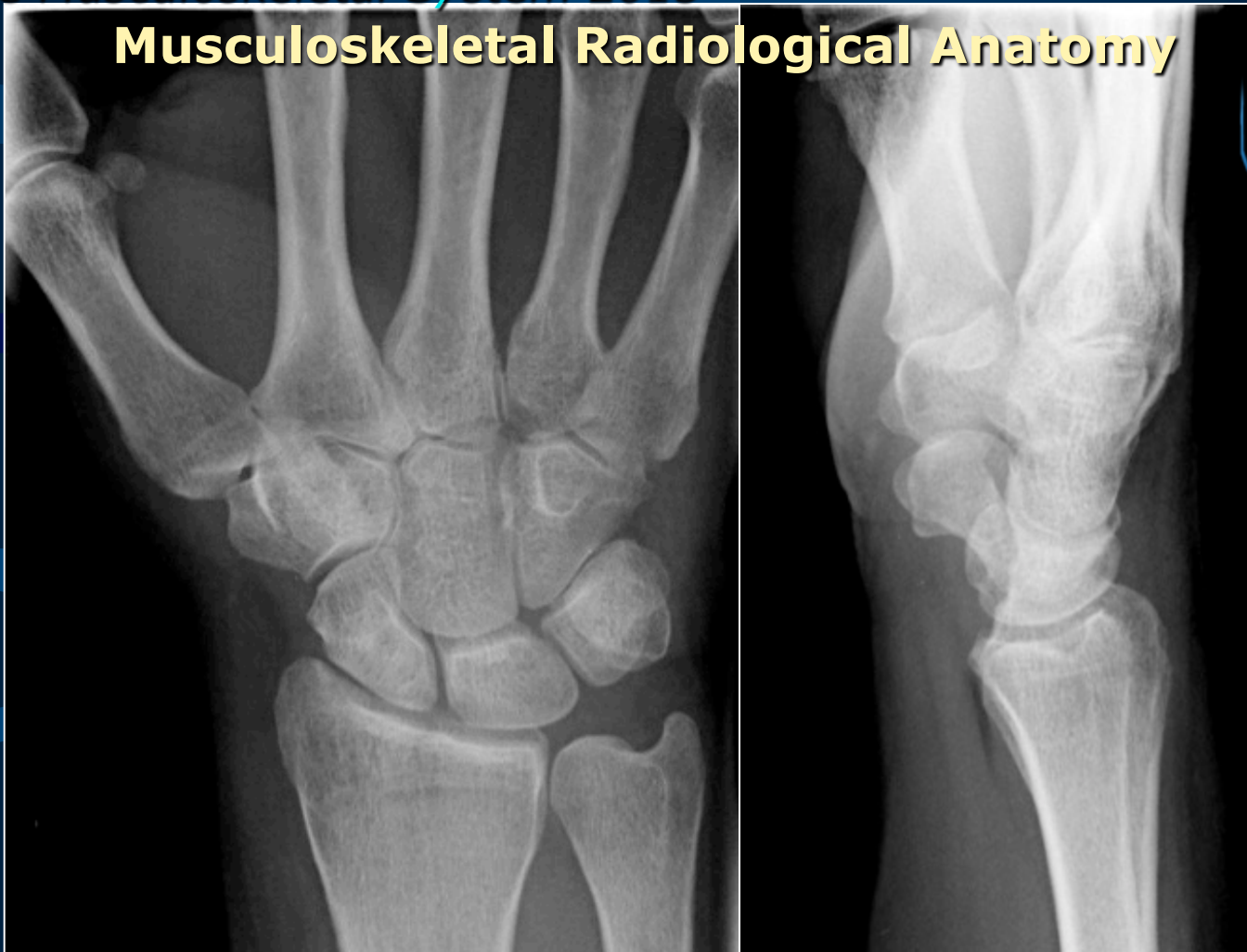
Musculoskeletal Radiological Anatomy



- ### Bones of the Wrist
- 1- Ulna
 - 2- Radius
 - 3- Scaphoid
 - 4- Lunate
 - 5- Triquetrum
 - 6- Pisiform
 - 7- Trapezium
 - 8- Trapezoid
 - 9- Capitate
 - 10- Hamate
- ©MMG 2003



Musculoskeletal Radiological Anatomy



Three carpal arcs should be traced:

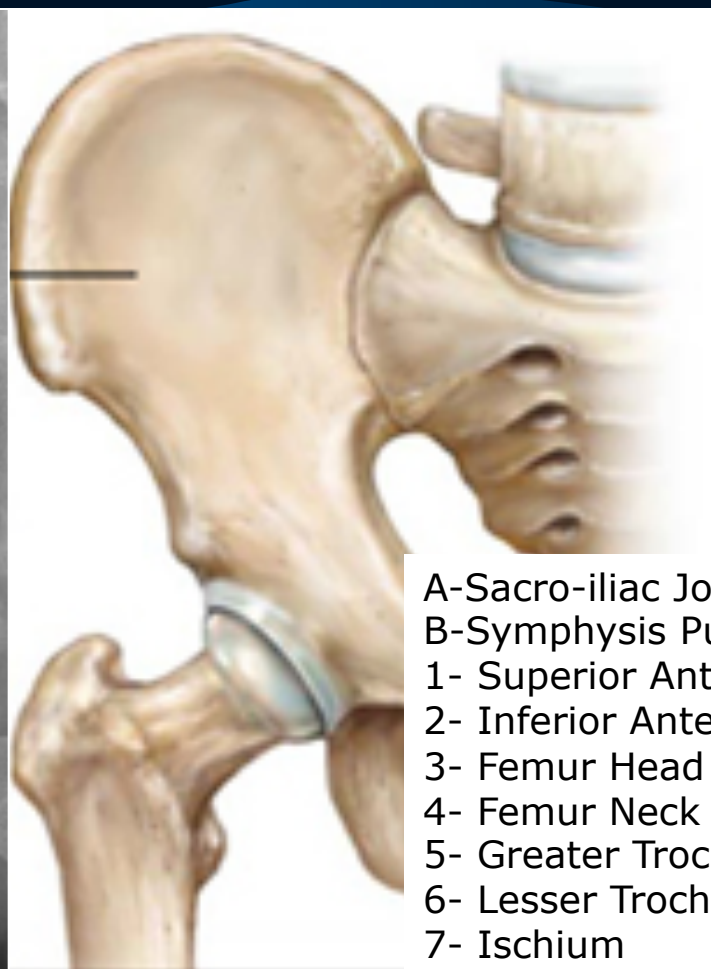
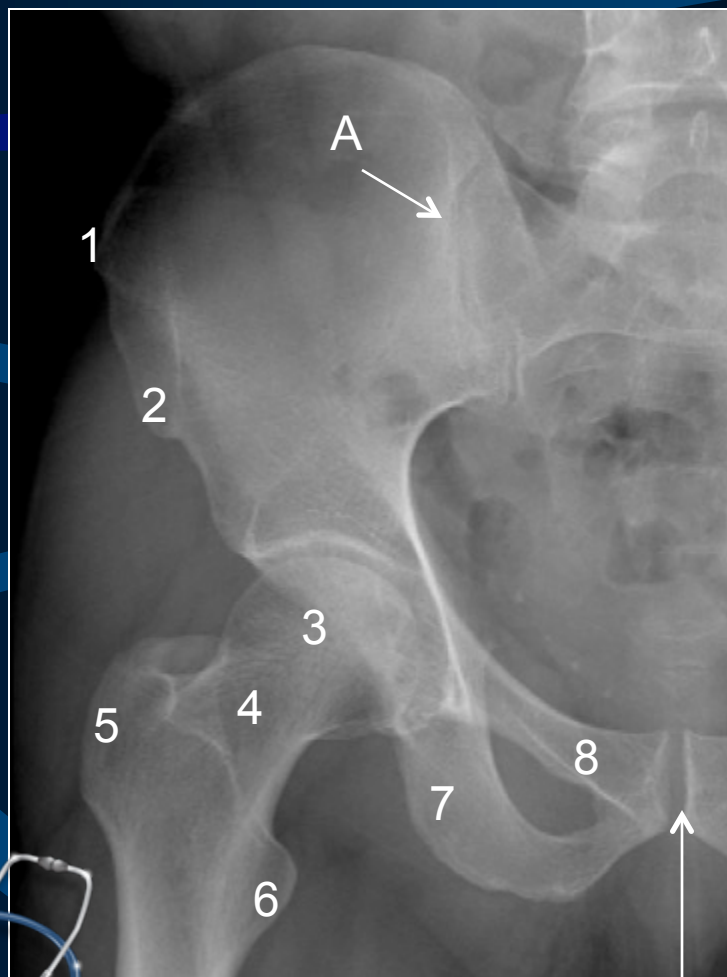
- along the proximal row of carpal bones; proximal aspect.
- along the proximal row of carpal bones; distal aspect.
- along the capitate and hamate proximally.

These three lines should remain unbroken





Musculoskeletal Radiological Anatomy

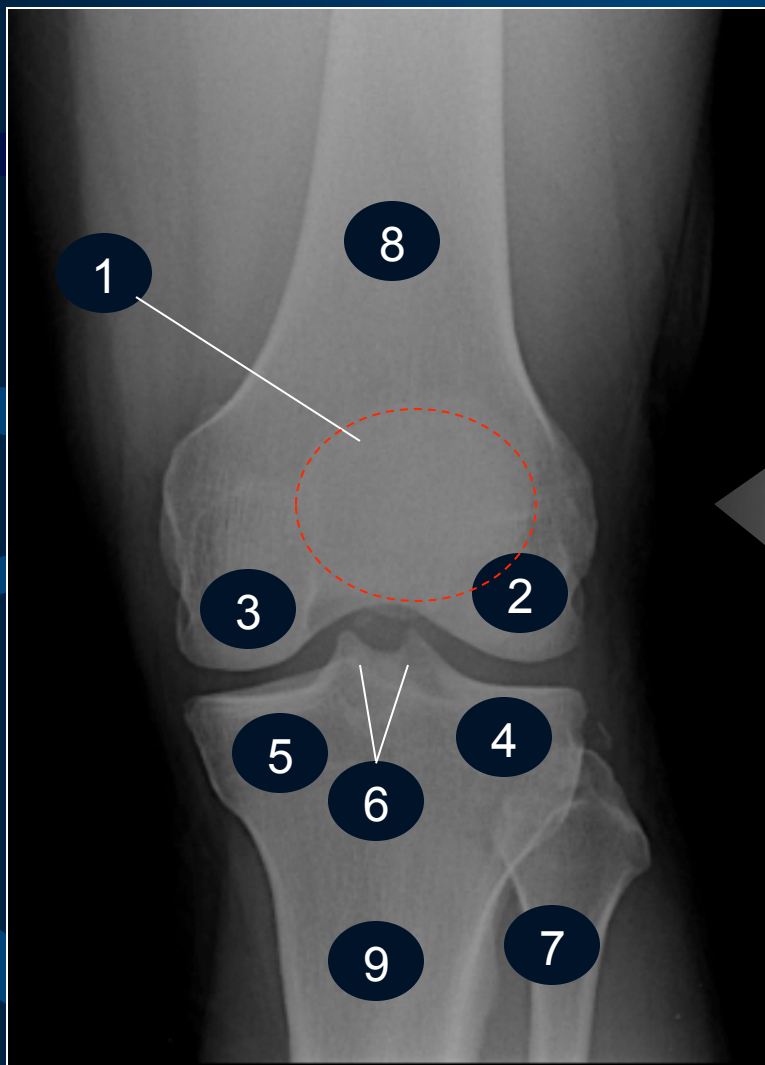


- A- Sacro-iliac Joint
- B- Symphysis Pubis
- 1- Superior Anterior Iliac Spine
- 2- Inferior Anterior Iliac Spine
- 3- Femur Head
- 4- Femur Neck
- 5- Greater Trochantara
- 6- Lesser Trochantara
- 7- Ischium
- 8- Superior Pubic Ramus

B



Musculoskeletal Radiological Anatomy

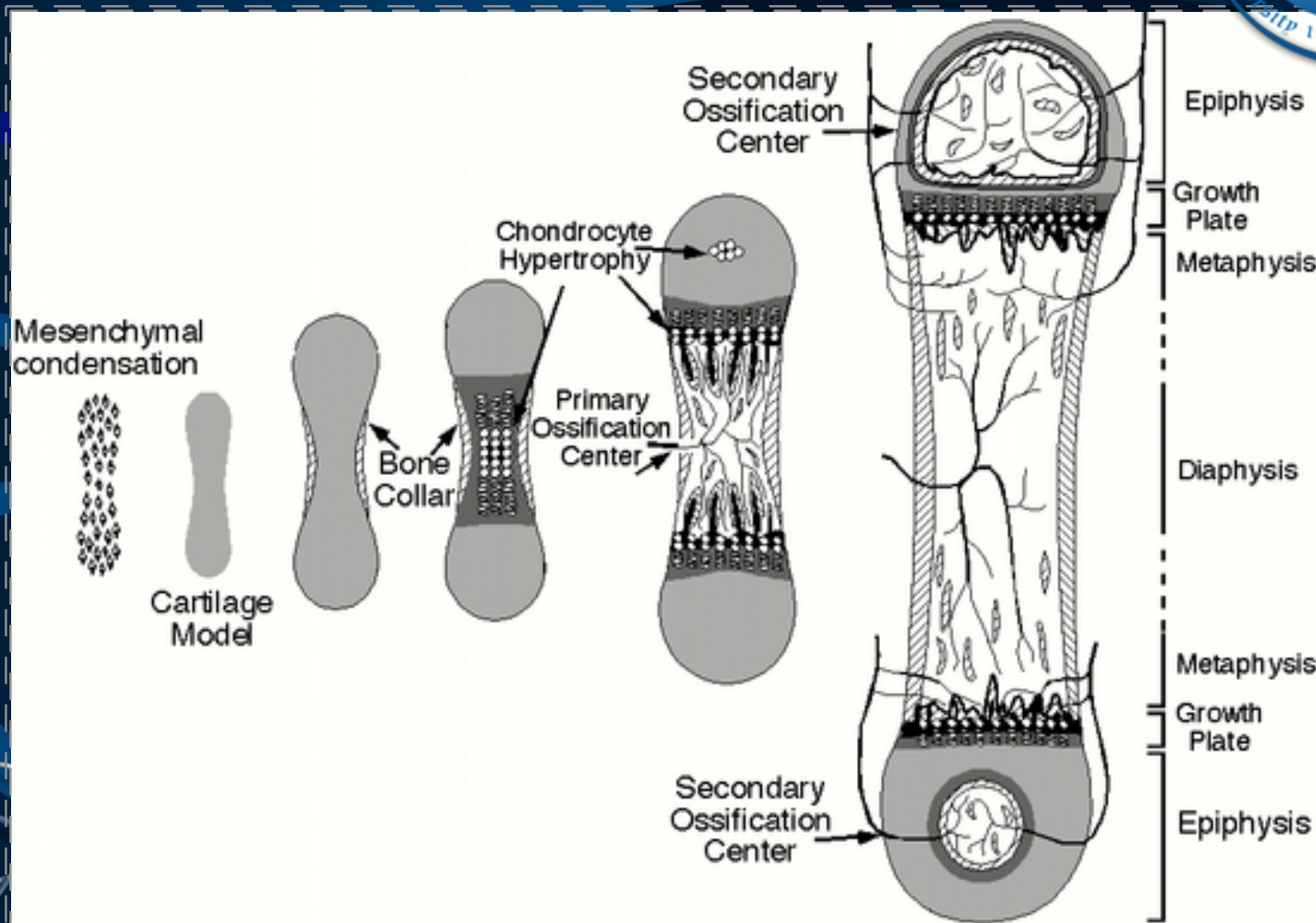


Normal knee

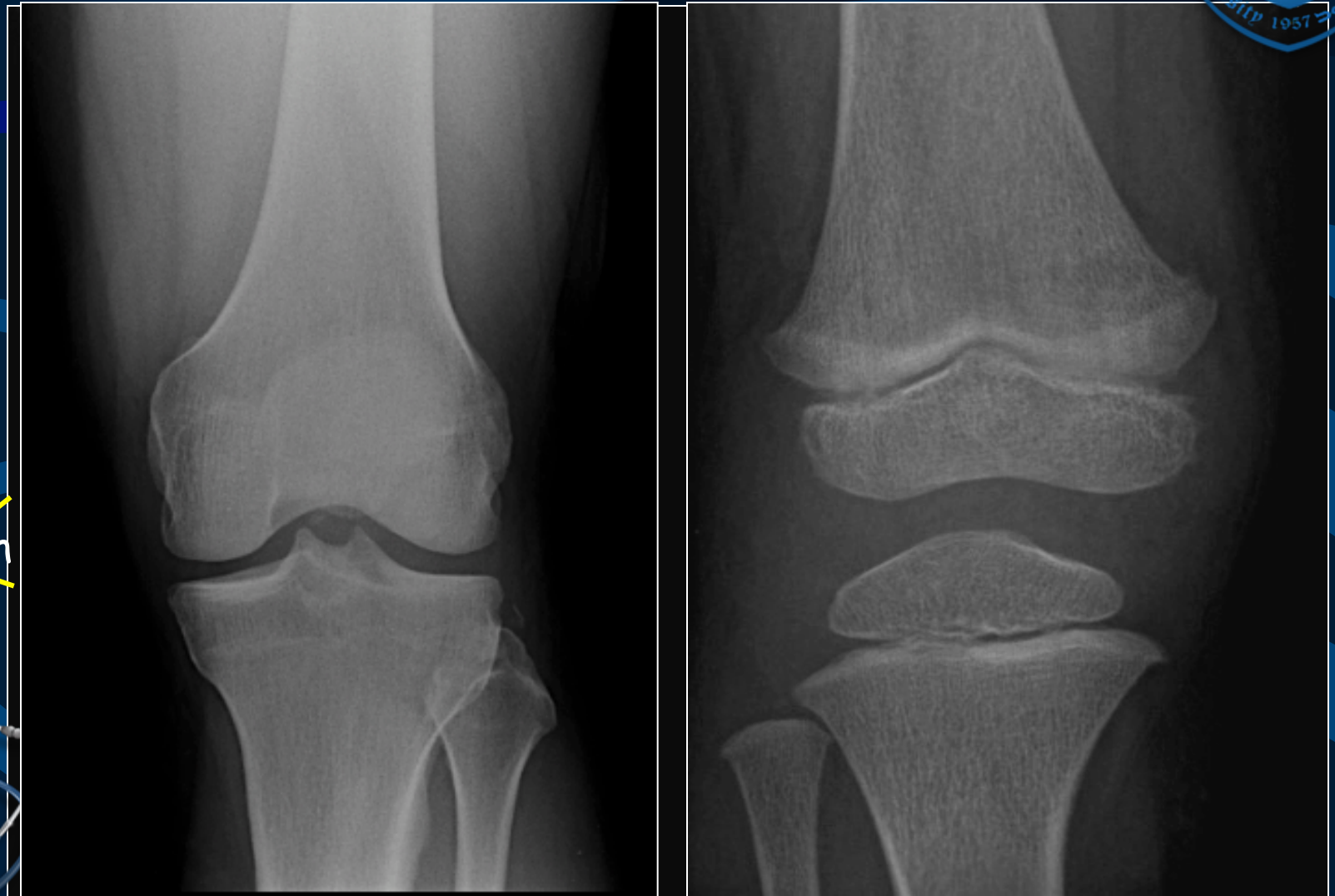
- 
- 1- Patella
 - 2- Lateral condyle
 - 3- Medial condyle
 - 4- Lateral tibial plateau
 - 5- Medial tibial plateau
 - 6- Tibial eminence
 - 7- Fibula
 - 8- Femur
 - 9- Tibia



Musculoskeletal Radiological Anatomy



Musculoskeletal Radiological Anatomy



Growth





INTERPRETATION

Normal

Rickets

"Where to look & What to look for"

- 
- The image shows two X-ray views of a knee joint. The top X-ray is labeled 'Normal' and shows a clear, well-defined joint space and bone structure. The bottom X-ray is labeled 'Rickets' and shows significant bone deformity, including a widened and irregular joint space, and a distorted shape of the femur and tibia, characteristic of rickets.
- IMPORTANT SITES
 - BONE DENSITY
 - BONE TEXTURE
 - DISTORTION / DISPLACEMENT OF NORMAL STRUCTURES

OBJECTIVES

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“Where to look & What to look for”



MUSCULOSKELETAL PATHOLOGY

Congenital

Arthritis

Metabolic

Neoplastic

Trauma

Infectious

Hematological





MUSCULOSKELETAL RADIOLOGICAL TRAUMA





TERMINOLOGY IN BONE TRAUMA

DISLOCATION *vs.* SUBLAXATION

CLOSED *vs.* OPEN FRACTURES

GREENSTICK *vs.* TORUS FRACTURES

PHYSEAL INJURIES

STRESS FRACTURES

PATHOLOGICAL FRACTURES





BASIC PRINCIPLES IN RADIOLOGY OF BONE TRAUMA

- Two perpendicular views.
- Radiograph should include the joint nearest to the trauma.
- The paired bone concept.
- The weakest link concept (Adult vs. Children).
- Comparison films.





BASIC PRINCIPLES IN RADIOLOGY OF BONE TRAUMA

The weakest link

- The soft tissue structures (muscles/ ligaments/ tendons) in **Adults**
- The physeal plate (growth plate) in **Children**







Child with trauma and swelling of the elbow



SALTER-HARRIS INJURIES



I

II

III

VI

V



Salter-Harris 1

Normal



Traumatic Osteolysis of epiphyseal plate
Salter-Harris injury Type1



Salter-Harris 1

Normal



Traumatic Osteolysis of epiphyseal plate
Salter-Harris injury Type 1



11years old boy with swelling of wrist pain



Growth plate injury (Salter-Harris injury type II)



9years old boy with pain



RT



Salter-Harris injury Type V





Torus Fracture



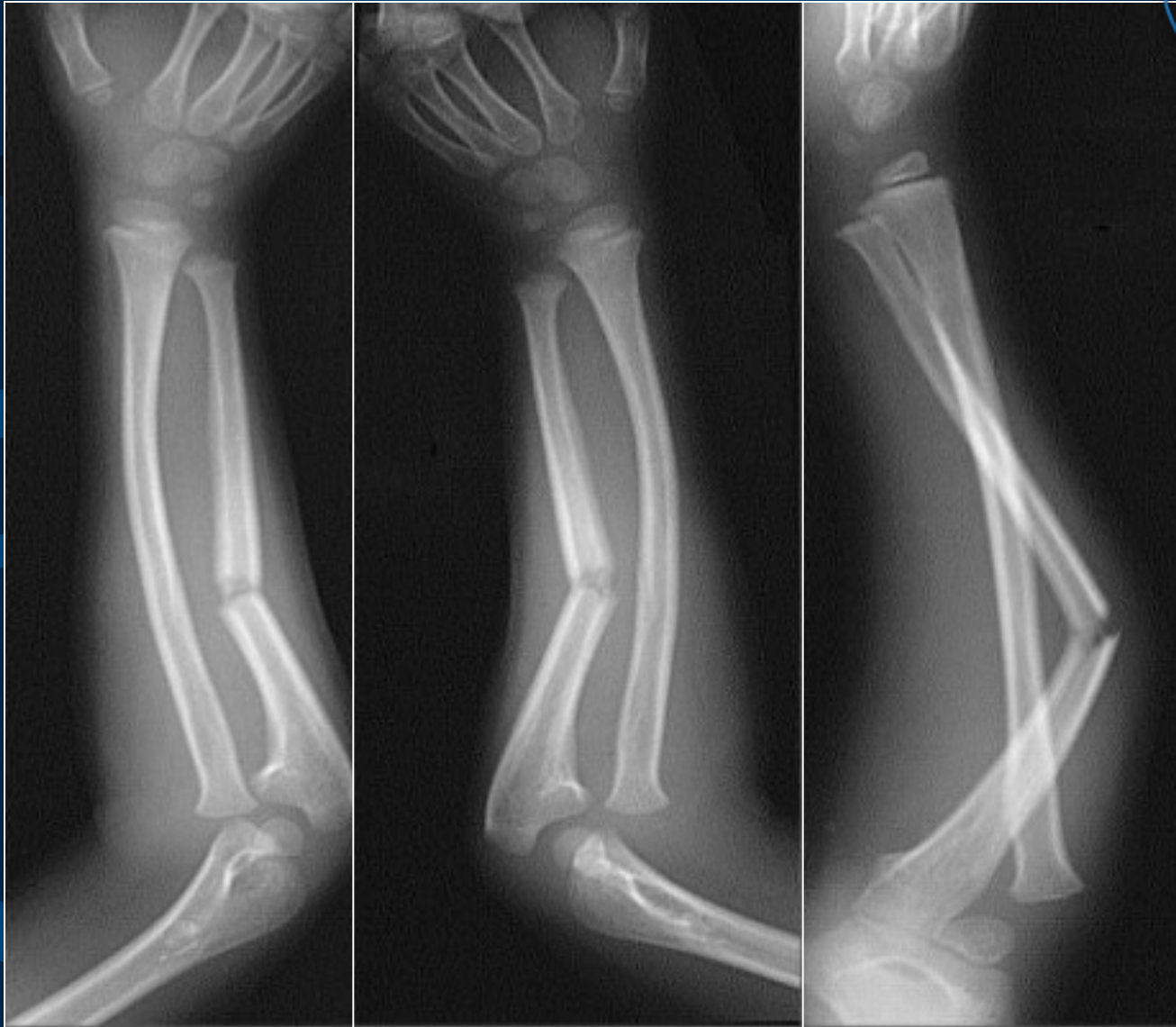
Greenstick fracture





Bowing Fracture





55 years old patient limping with hip pain

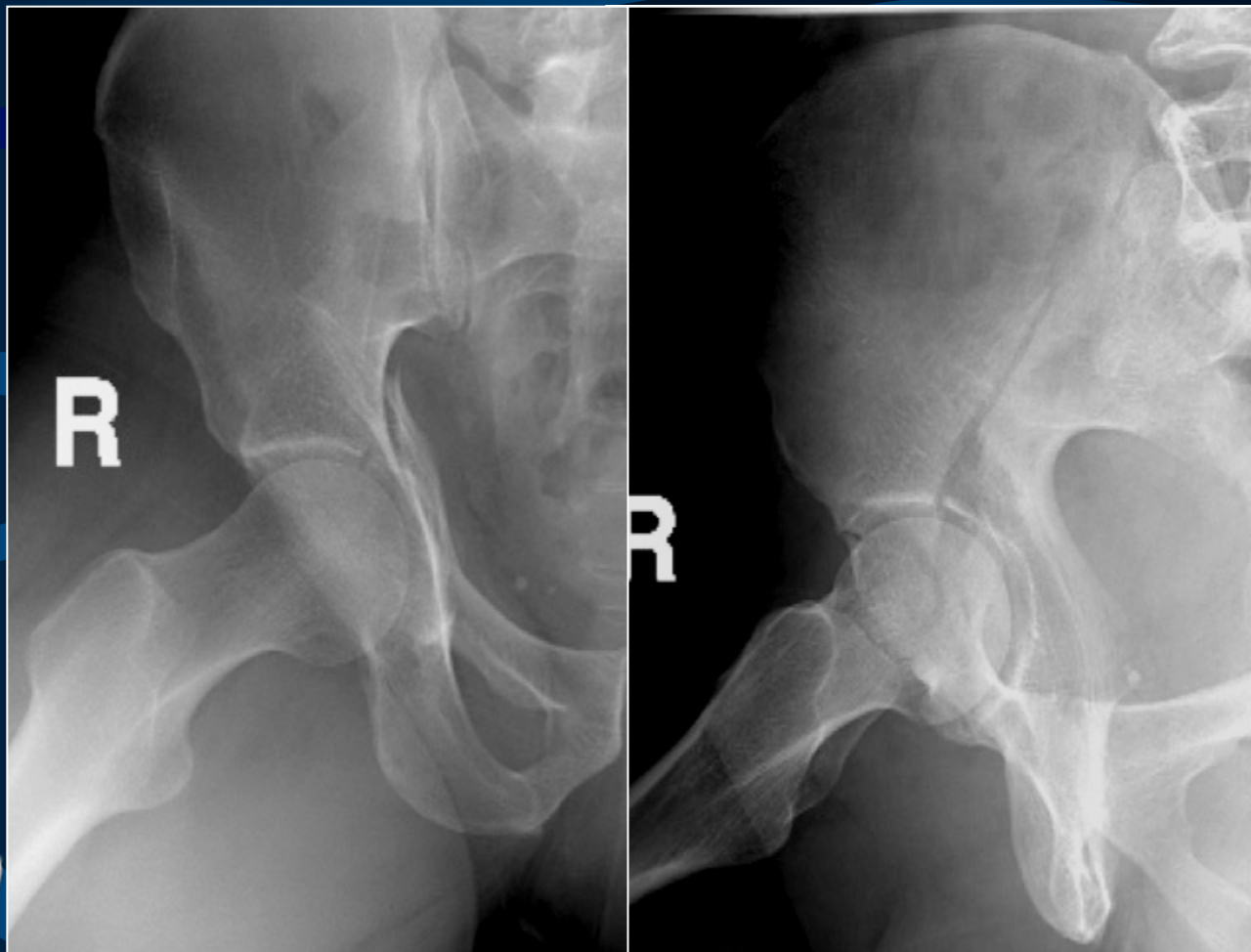


Supra-acetabular fracture





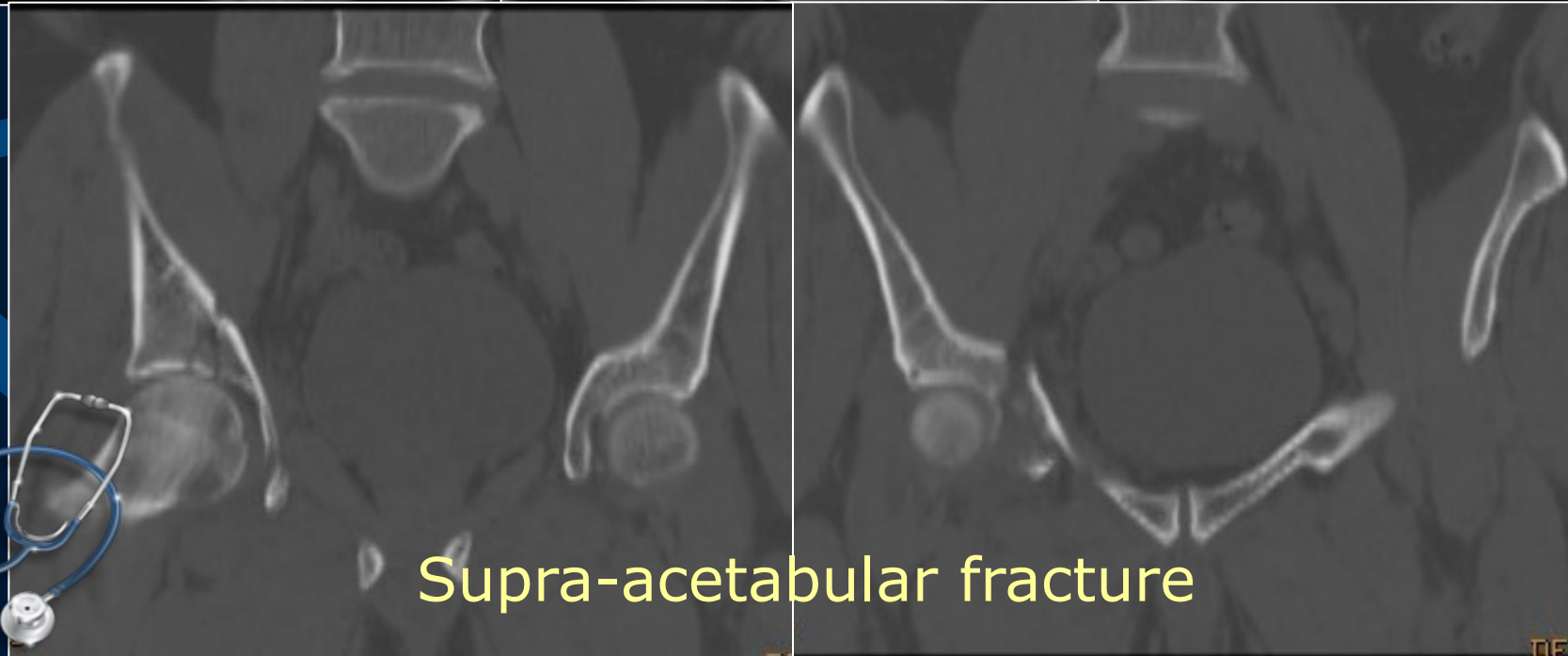
55 years old patient limping with hip pain



Supra-acetabular fracture



55 years old patient limping with hip pain



Supra-acetabular fracture



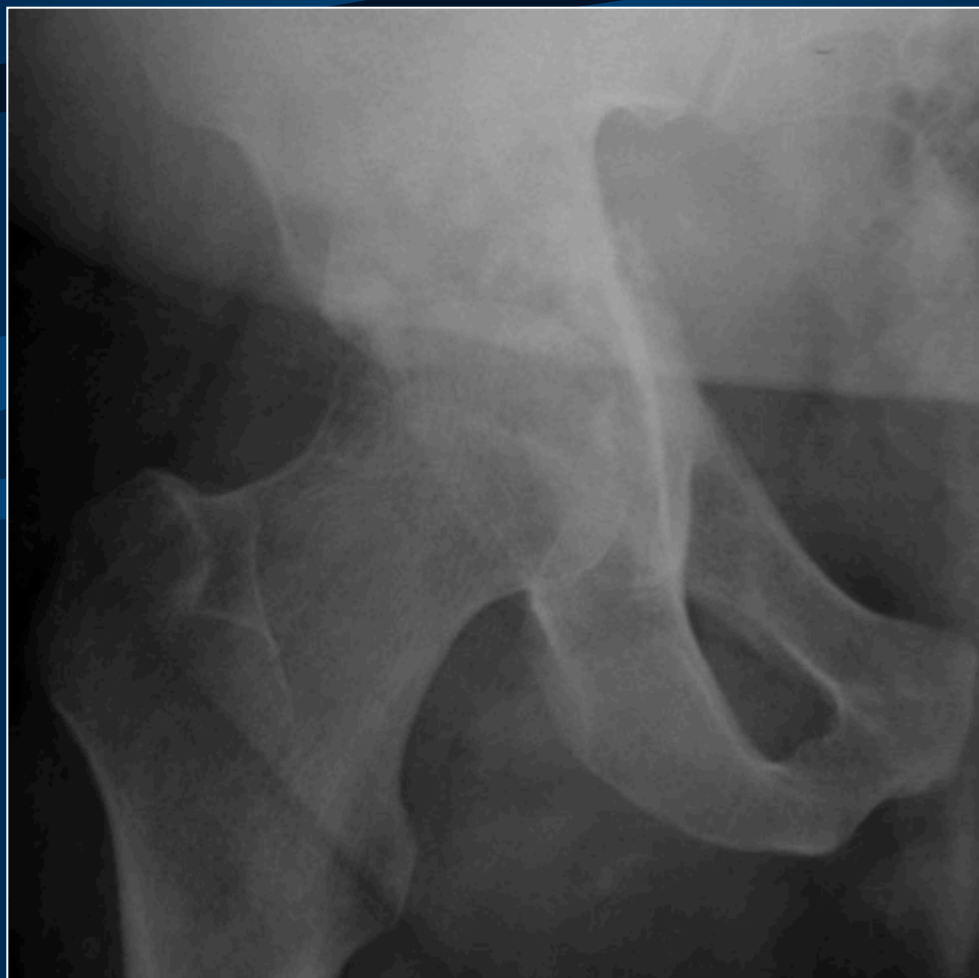
50 years old patient limping with hip pain



Supra-acetabular fracture



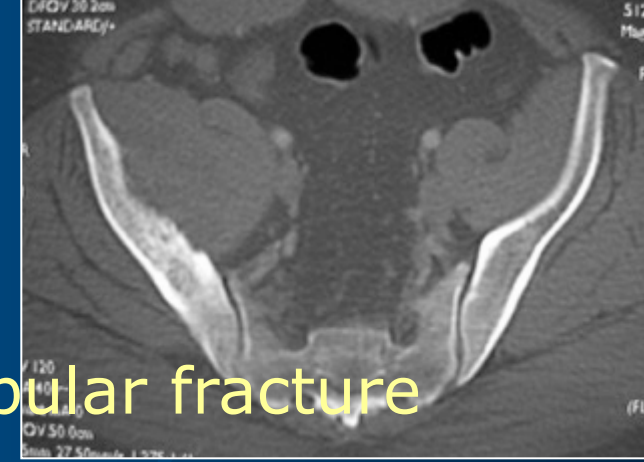
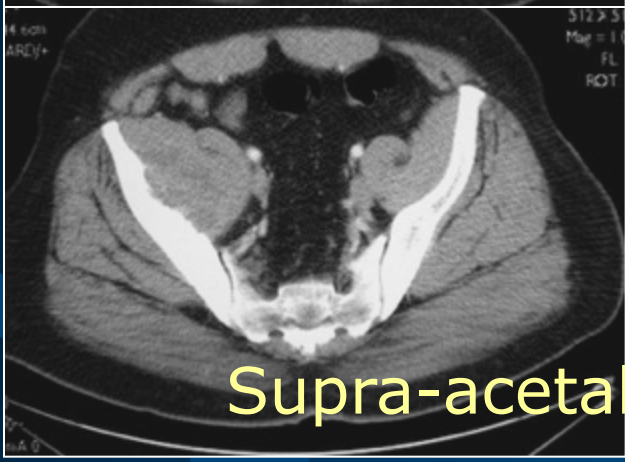
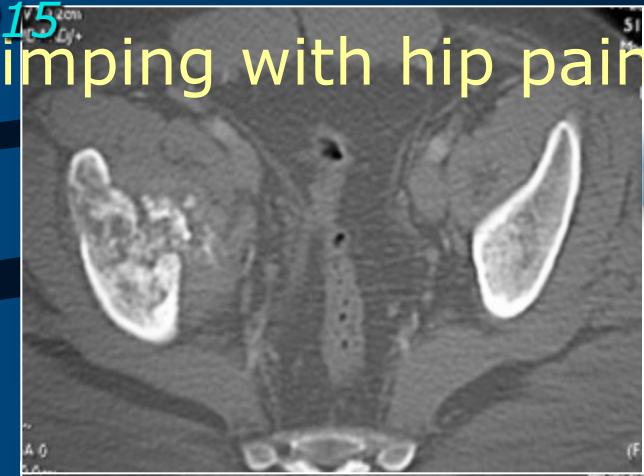
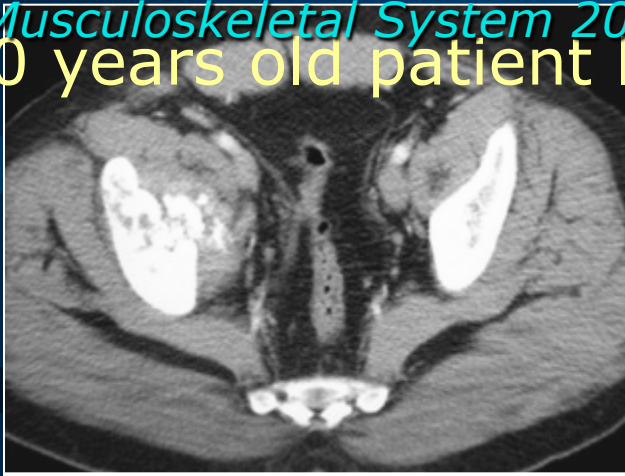
50 years old patient limping with hip pain



Supra-acetabular fracture



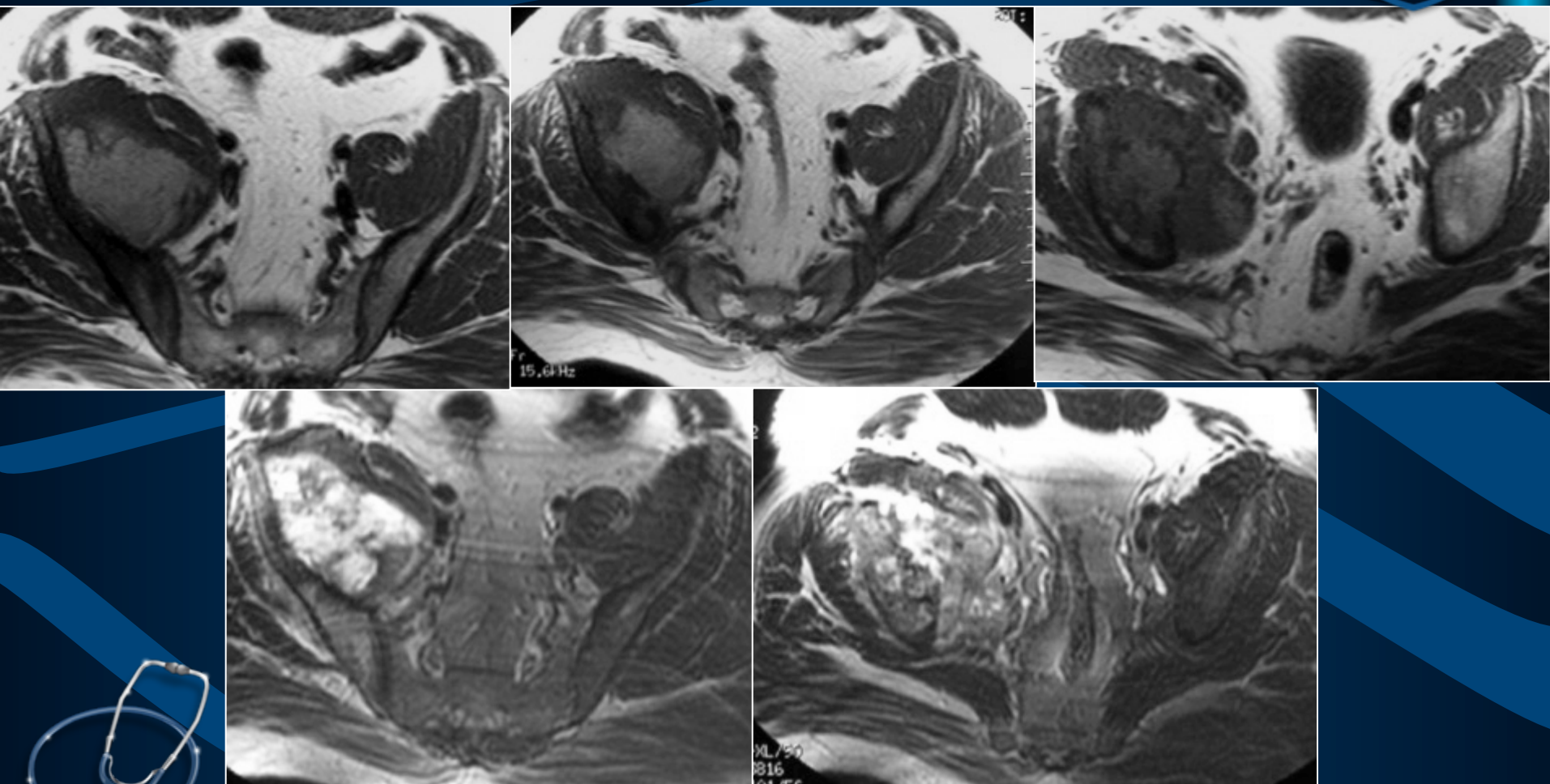
50 years old patient limping with hip pain



Supra-acetabular fracture



50 years old patient limping with hip pain



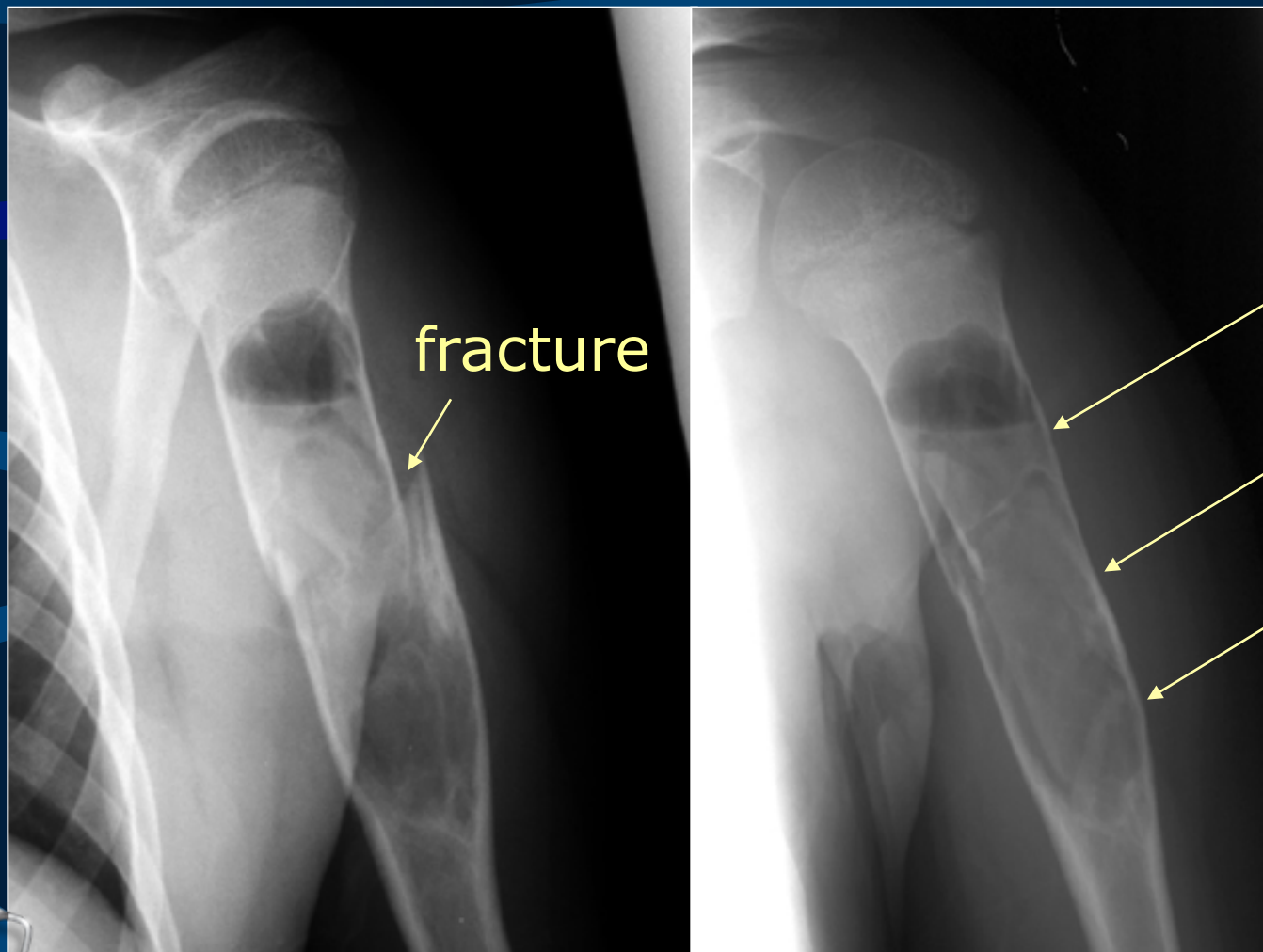
Supra-acetabular fracture !!

50 years old patient limping with hip pain



Pathological fracture secondary to sarcoma





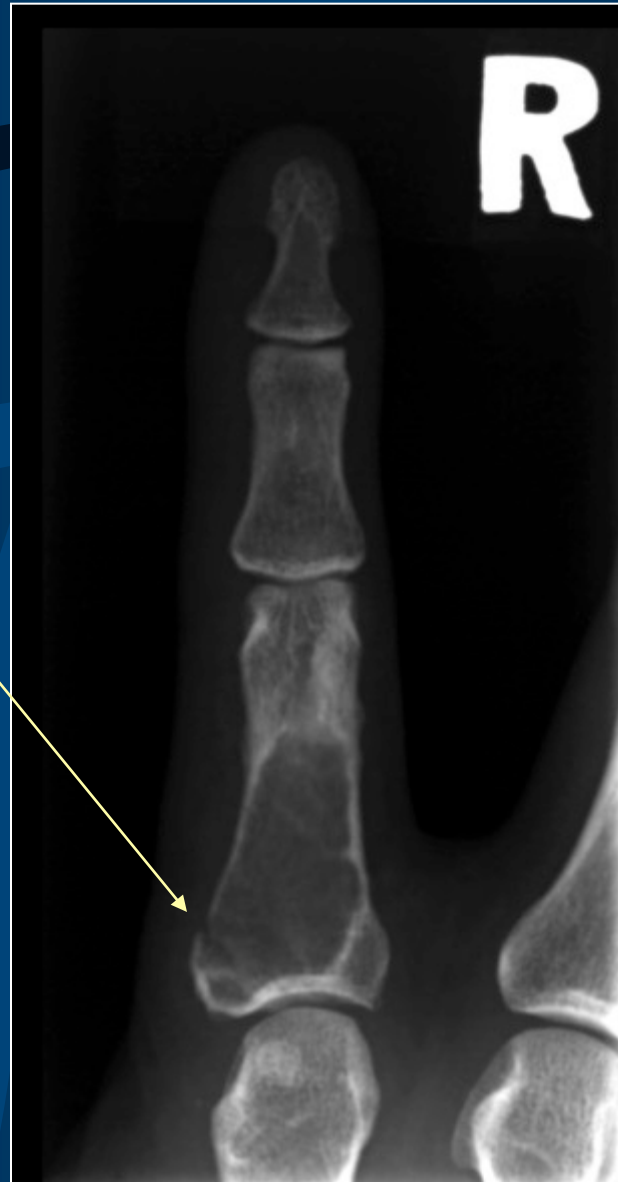
Pathological fracture secondary to bone cyst



20 Years old lady finger pain



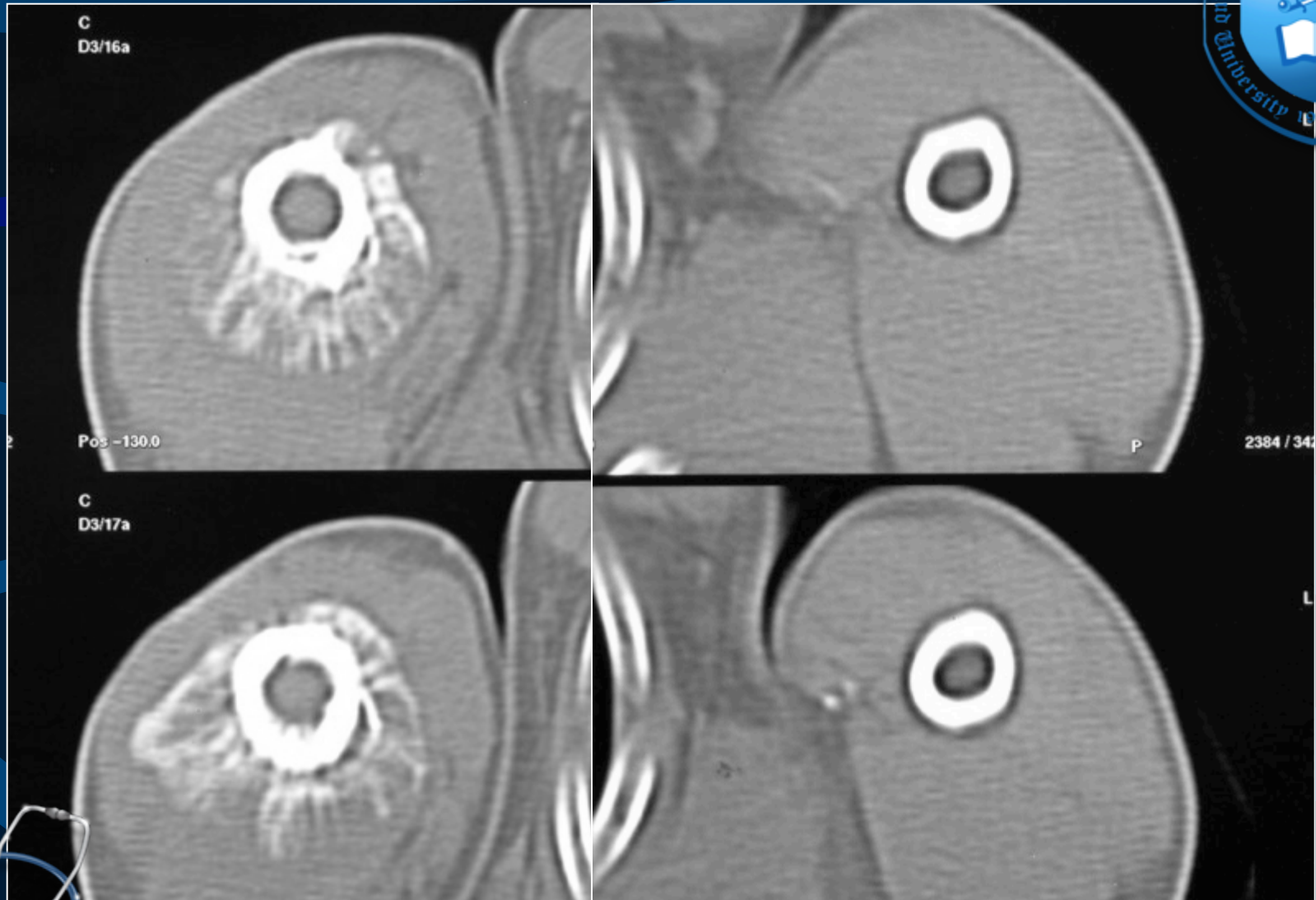
fracture





Pathological fracture secondary to sarcoma





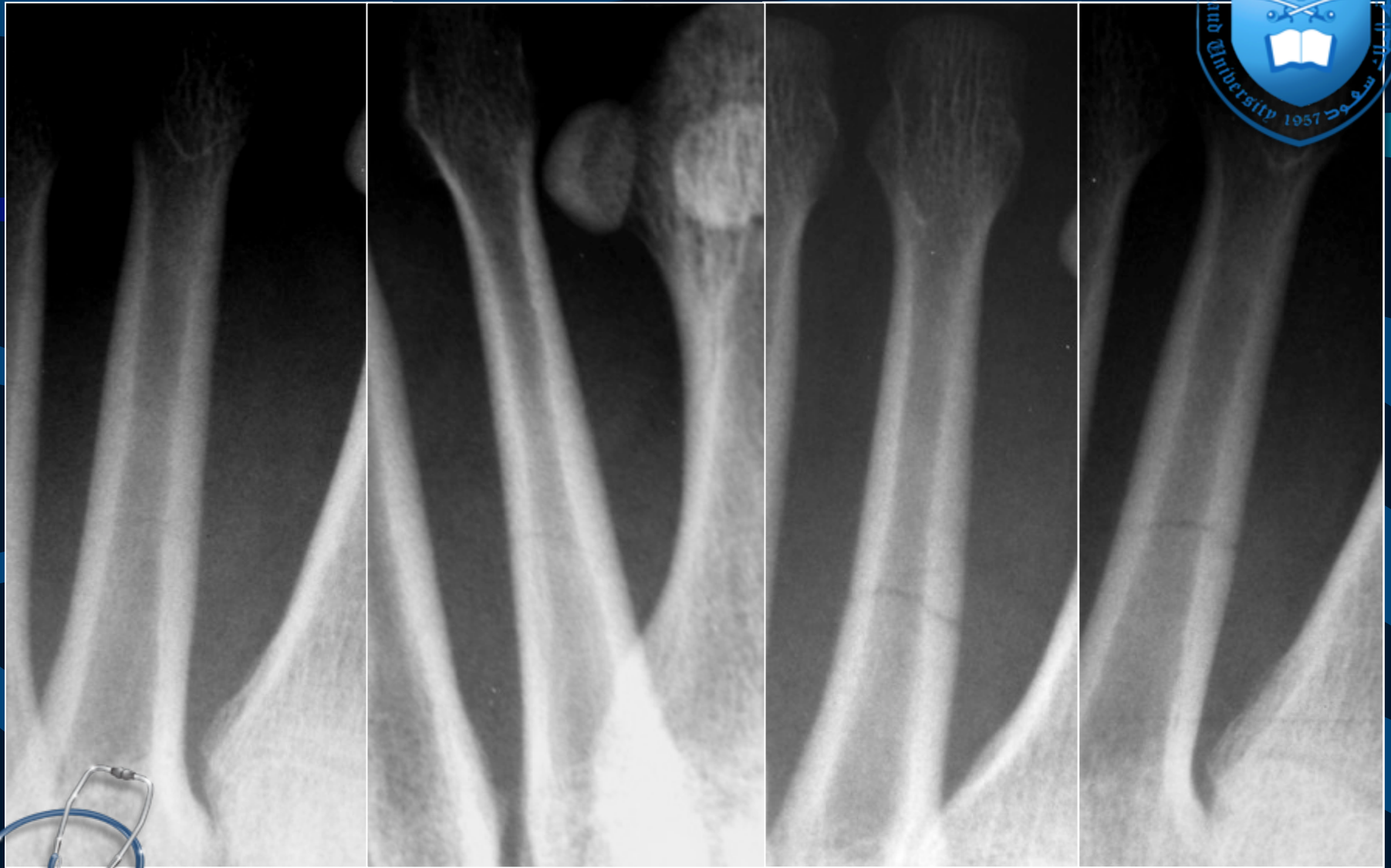
Stress fracture



Stress fracture



Stress fracture after one week





SUMMARY

- Imaging Modalities
- Musculoskeletal Anatomy
- Image Interpretation
- Musculoskeletal Trauma & Fractures





MORE IMAGES

- <http://radiopaedia.org/encyclopaedia/cases/musculoskeletal>
- <http://radiopaedia.org/articles/musculoskeletal-curriculum>

