

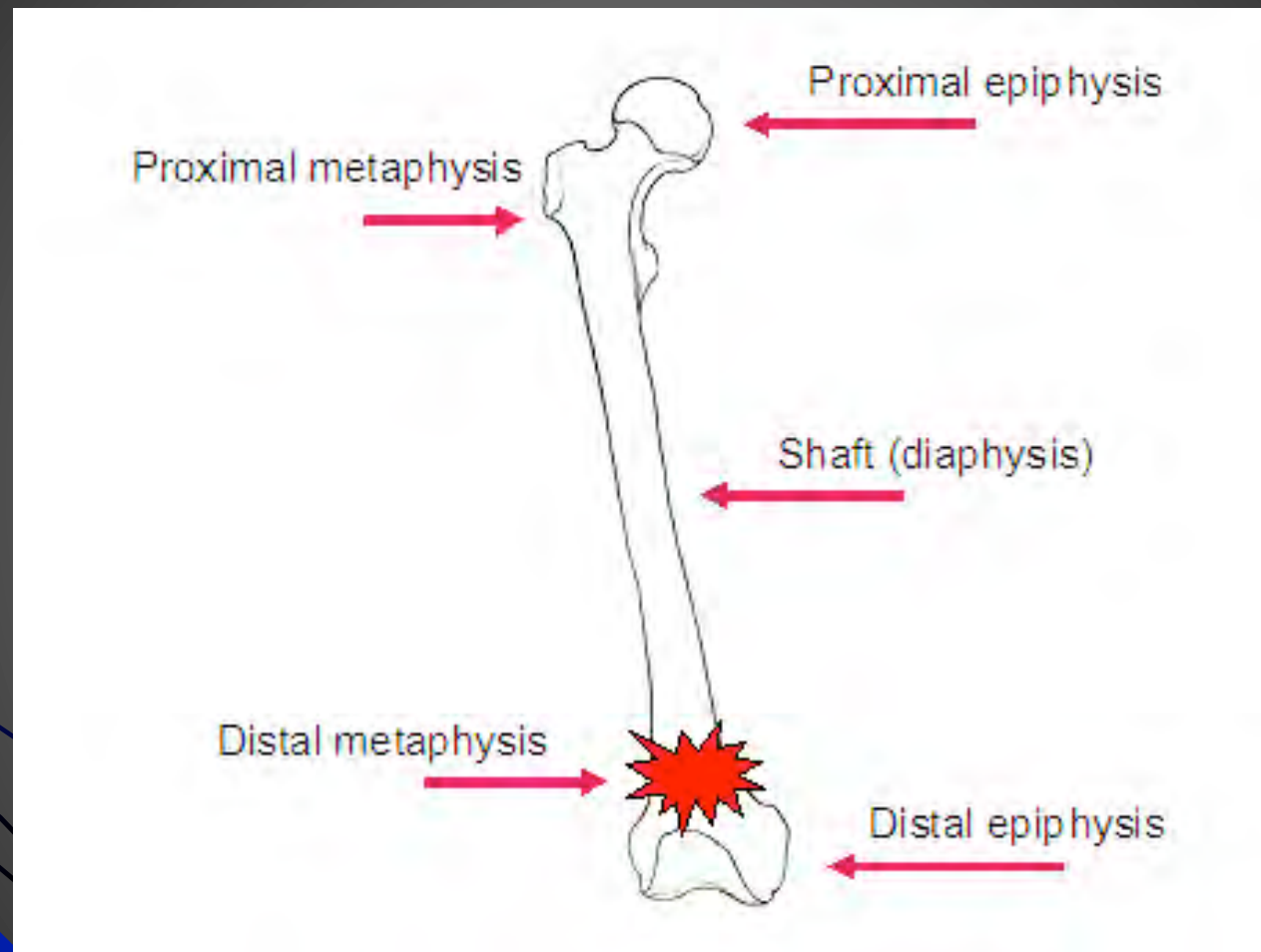
Ordering and Interpreting X-rays

CENNZ Hands On
Emergency Nurses
Forum

- Michael Geraghty







An x-ray is only as good as....

- The clinical assessment – ordering the right views
- The pictures taken – information given to the MRT
- The time taken - e.g. Scaphoid
- The clinician (s) interpreting the xrays

Ordering X-Ray

- Clinical Info: R) FOOSH, Glass wound L) knee,
- Question to be answered: likely fracture, exclude fracture, ? Foreign body. ?
Dislocation
- Request: Soft tissue views L) knee, Scaphoid views R) wrist,

Interpreting Xray

Systematic approach

Name, date, NHI, Is it the correct side?

- A – Adequacy of film, Alignment
- B – Bone integrity
- C – Cartilage
- S – Soft tissues

Rule of twos'

Minimum of:

- 2 views
- 2 sides
- 2 occasions
- Normal x-rays '2' compare with
- 2 heads better than one



When looking at an x-ray what is the most commonly missed fracture ??

The second one,
always check the whole film, and all films
provided



More rules

- Never look at an x-ray and not the patient,
- Re-examine the patient if the x-rays don't show you what you expected.
- Always treat the patient, not the x-ray....more fractures are missed by examining the x-ray, than are missed by examining the patient.

My Interpretation

- Thumb fracture
- Index finger fracture

Radiology Report

- Index finger fracture
- 5th metacarpal fracture



The Pregnant Patient

- Inform MRT of pregnancy status
- Sixth week = crucial period as active organogenesis taking place.
- Absolute minimum views will be performed
- Abdominal shielding used
- Patient consent - Risks will be explained to patient by MRT
 - USS / MRI may well be better alternative

Radiation

Imaging Mode	Approx millisieverts (mSV) – average sized adult.	Comparable background radiation	Additional lifetime risk of fatal cancer
X-ray limb	.0001	3 hours	Negligible
CXR	0.1	10 days	Minimal
CT spine	6	2 years	Low
CT Head	2	8 months	Very low
X-ray Spine	1.5	6 months	Very low
CT Chest	7	2 years	Low

Negligible = less than 1 in 1,000,000

Minimal = 1:1,000,000 to 1:100,000

Very Low = 1:100,000 to 1:10,000

Low = 1:10,000 to 1:1000

Moderate = 1:1000 to 1:500

Source: www.radiologyinfo.org

Should I order an x-ray ?

GOOD IDEA

- History - ? FB
- Loss of function
- Crepitus
- Focal bony tenderness
- Pain
- Swelling/bruising
- Risk factors
- Other...patient request, medico-legal.



MAYBE / MAYBE NOT ...

- It won't alter your management – toes, nose, isolated rib #'s.
- History not convincing
- Has it already been x-rayed?
- Rules: Ottawa ankle, knee, Canadian C spine..
- Can x-ray be delayed?
- “Because everybody gets an x-ray”



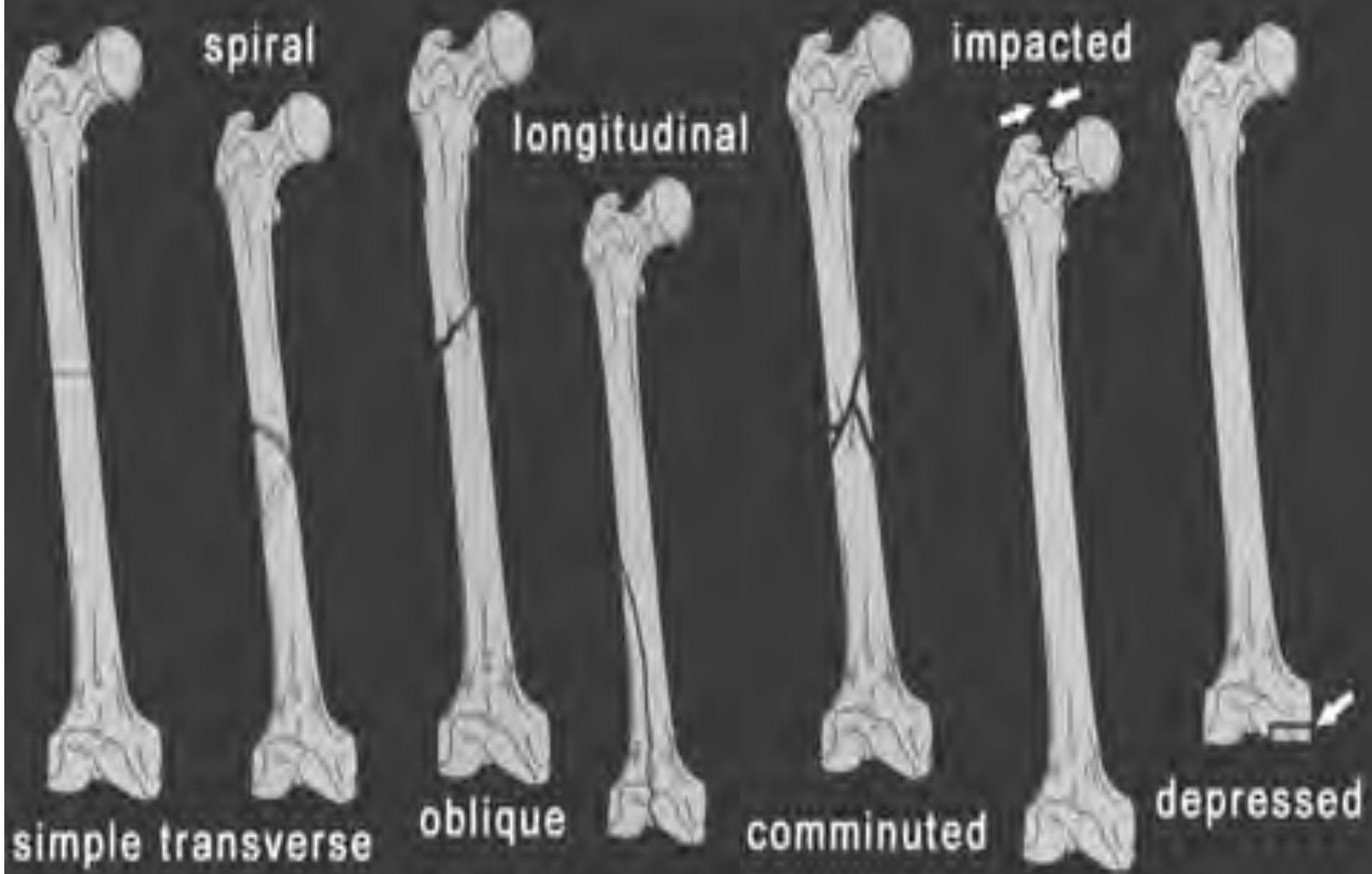
Abnormalities seen on x-ray:

- Fractures,
- Age related changes: OA
- Pathological changes: Osteomyelitis, Tumour.
- Joint Effusion
- Old Injuries.
- Subluxation/ Dislocations
- Foreign Bodies: Glass, metal but generally not wood/plastics/aluminium
- Air
- Surgical / Medical – plates, screws, ETT, NGT, pacemaker etc .

Describing Fracture

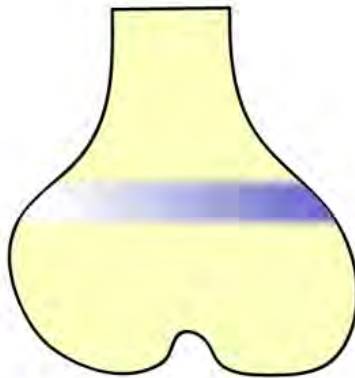
- Bone – takes time !!!
- Level – most long bones divided into 1/3rds
- Type
- Deformity
 - Displacement
 - Angulation
 - Rotation
- Comminution
- Intra or extra-articular.
- (Non traumatic pathology)
- Eponymous names: Colles, Weber, Lis Franc, Salter - Harris

Describing Fracture

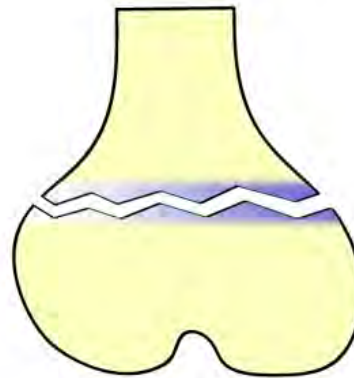


Salter Harris Classification

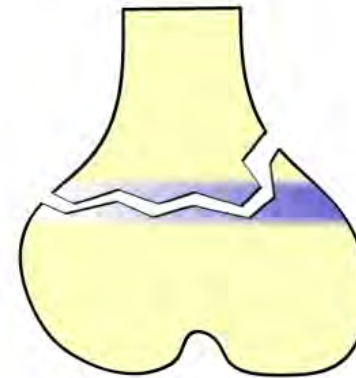
Salter-Harris fracture types



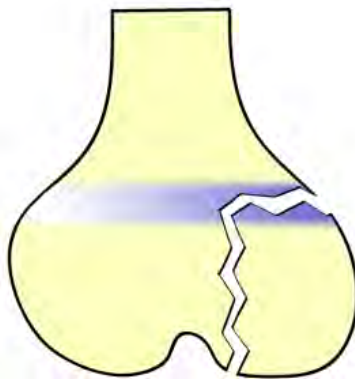
Normal



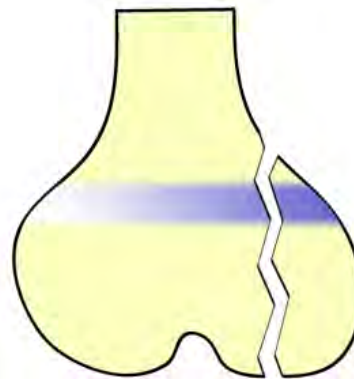
Type 1 - 5%



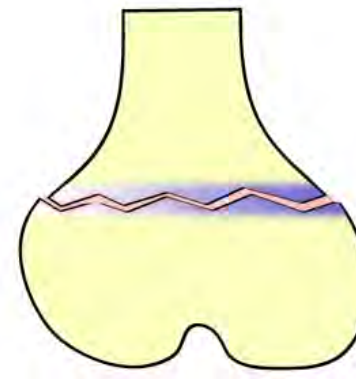
Type 2 - 75%



Type 3 - 10%



Type 4 - 10%



Type 5 - uncommon

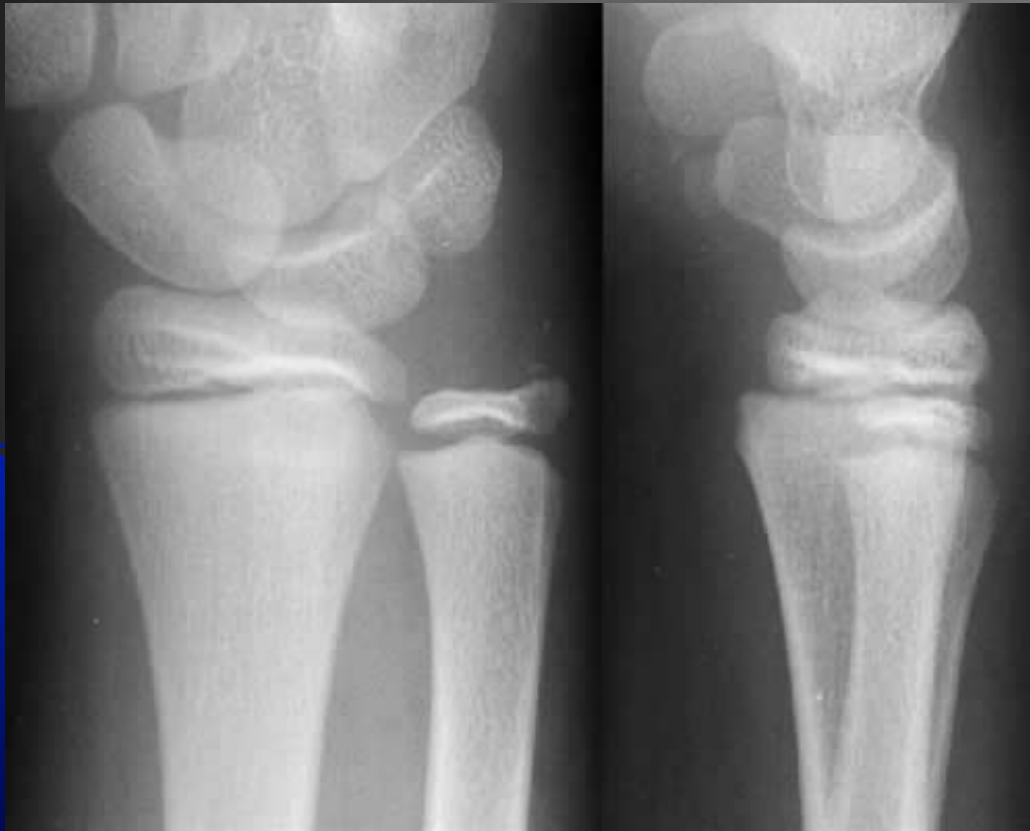
F. Gaillard
2008

Foreign bodies

- History
- Wound
- Pain
- Loss of function
- Xray vs USS ...

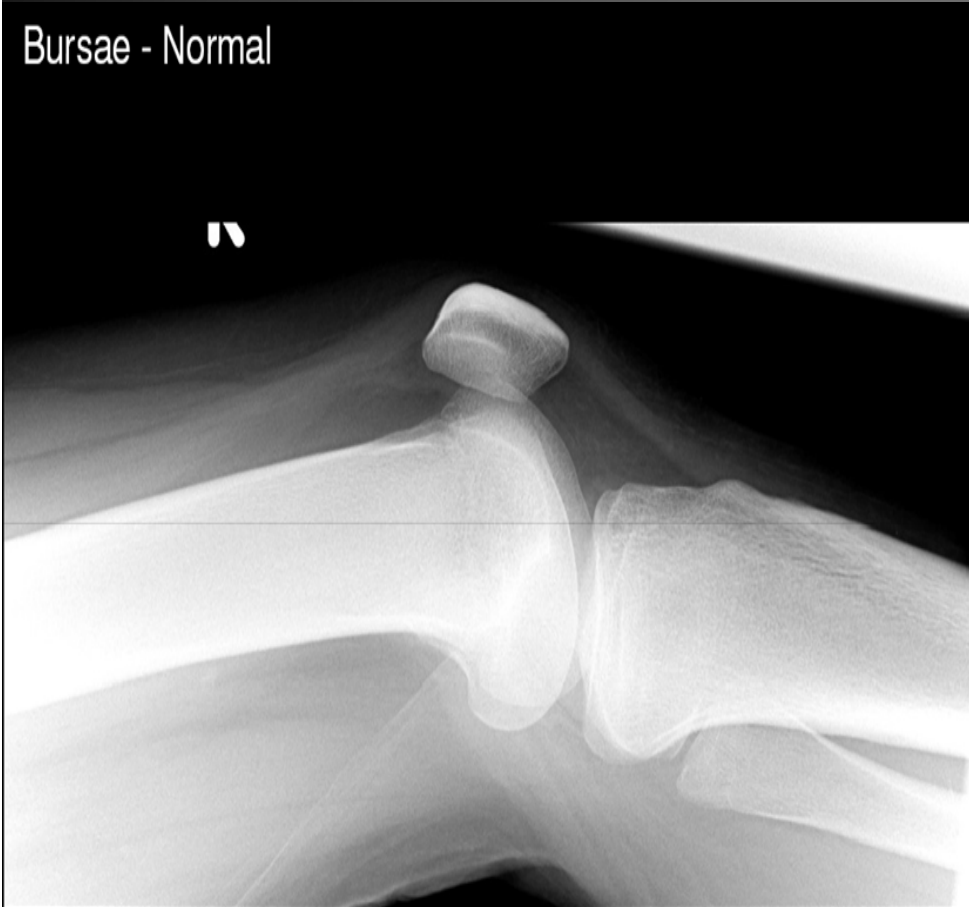


When is a fracture not a fracture ?



Soft Tissue Signs of injury

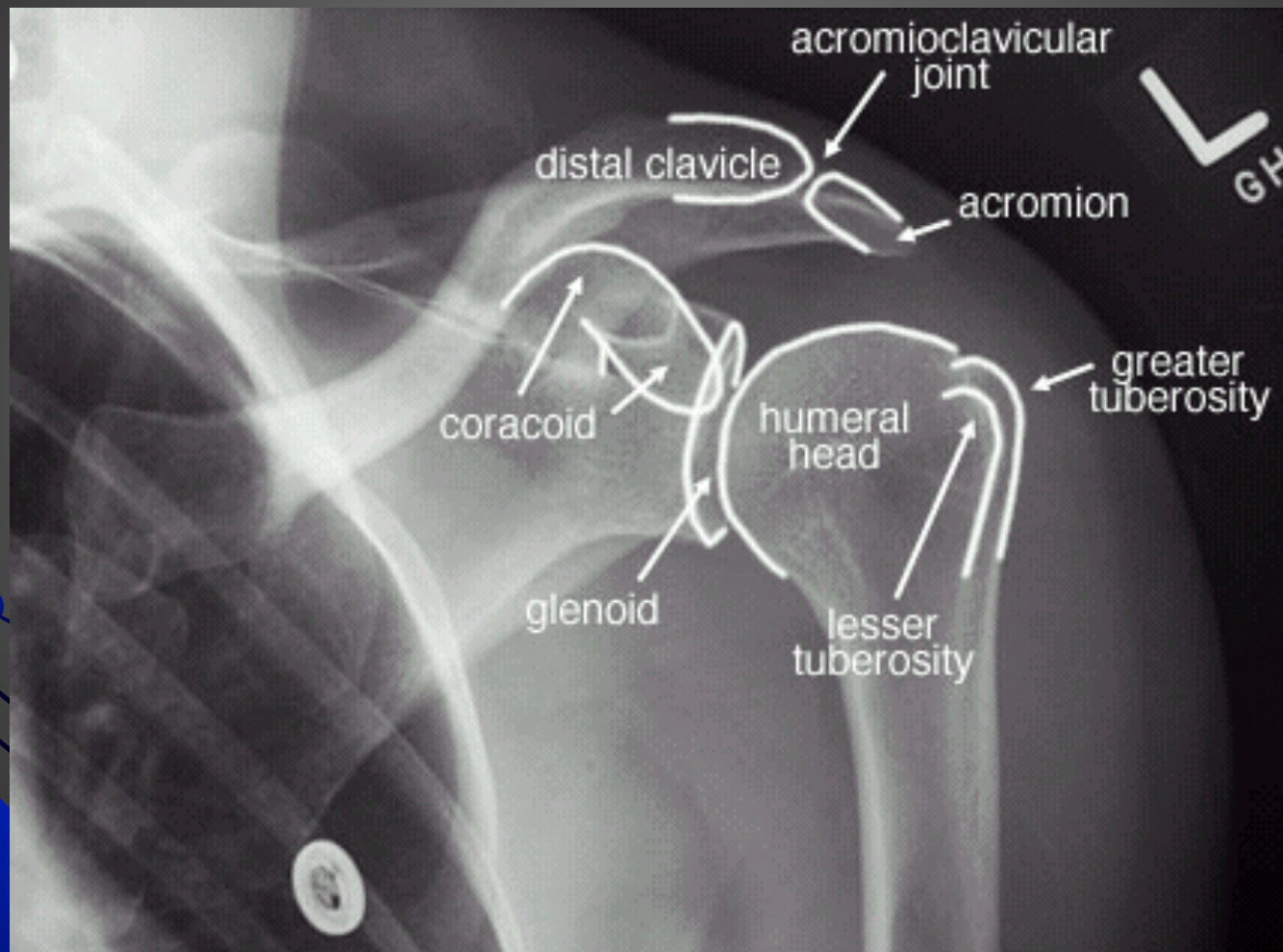
Bursae - Normal



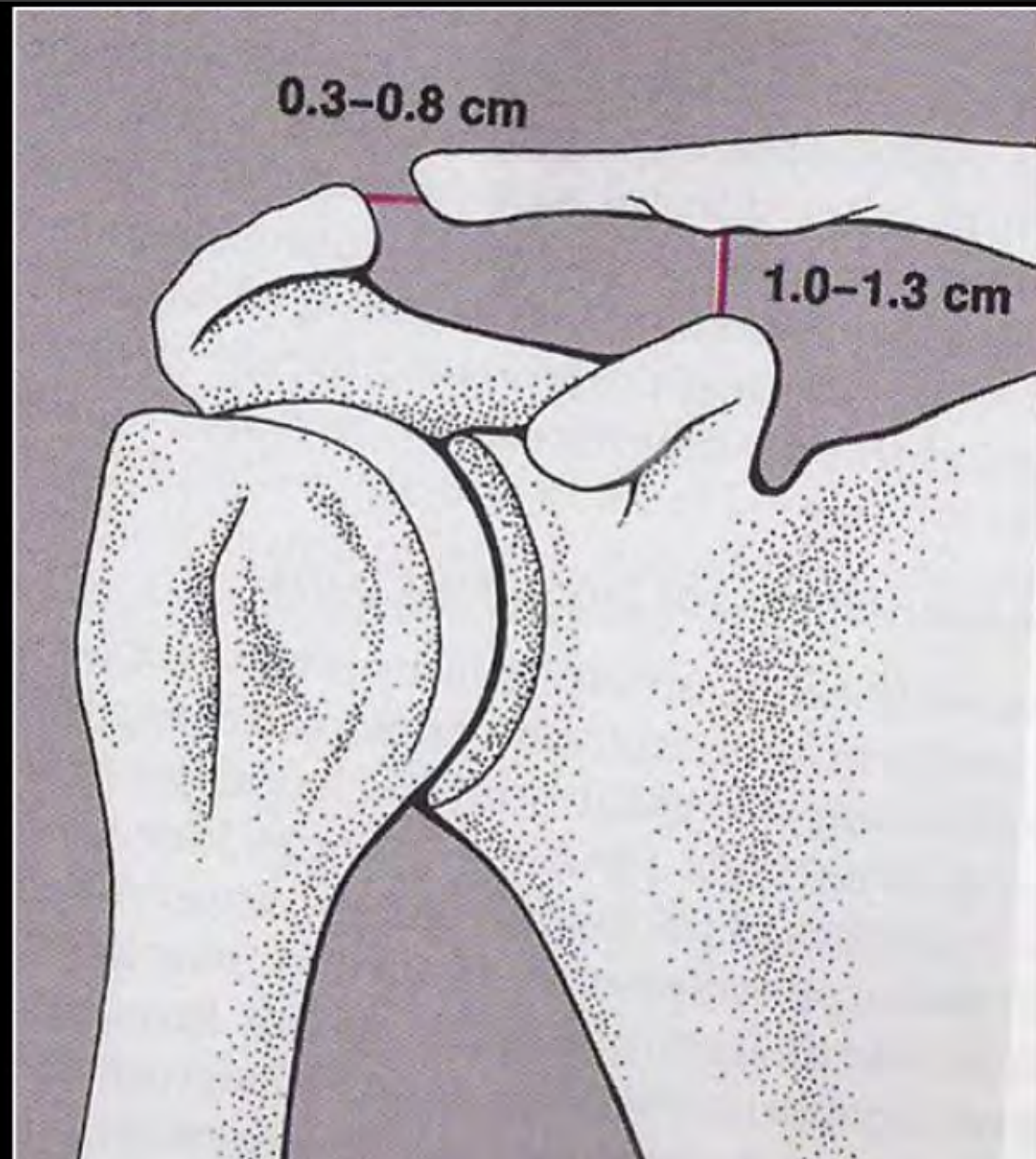
Lipohaemarthrosis



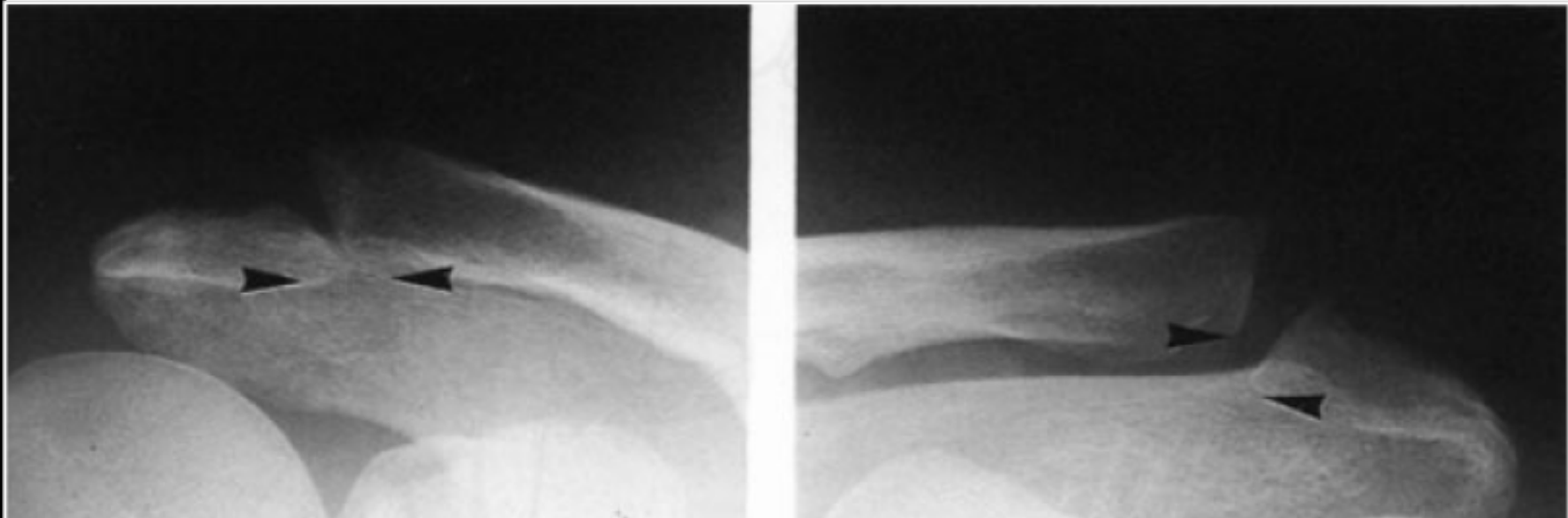
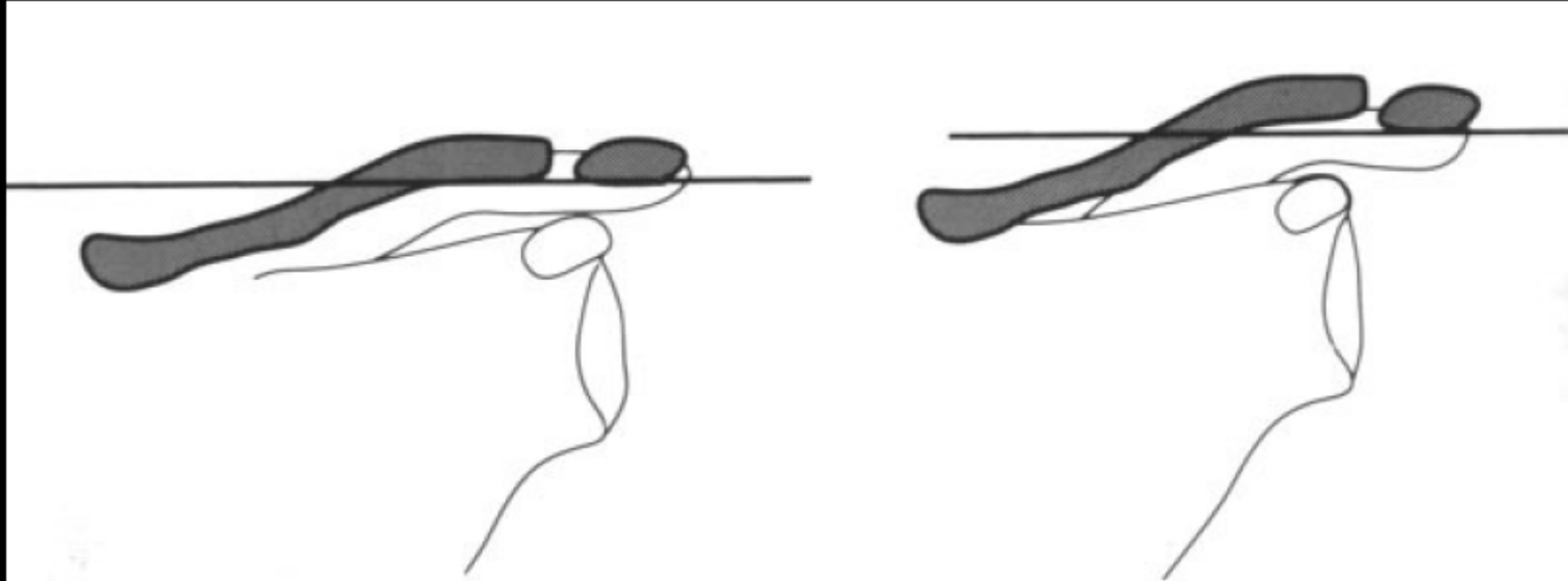
The Shoulder

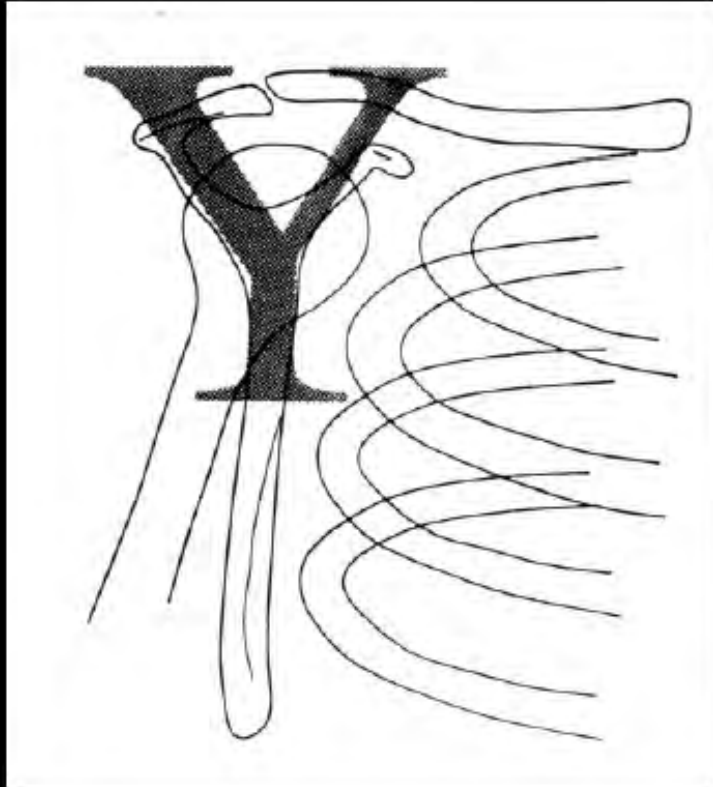


Normal AC measurement



AC Joint Separations

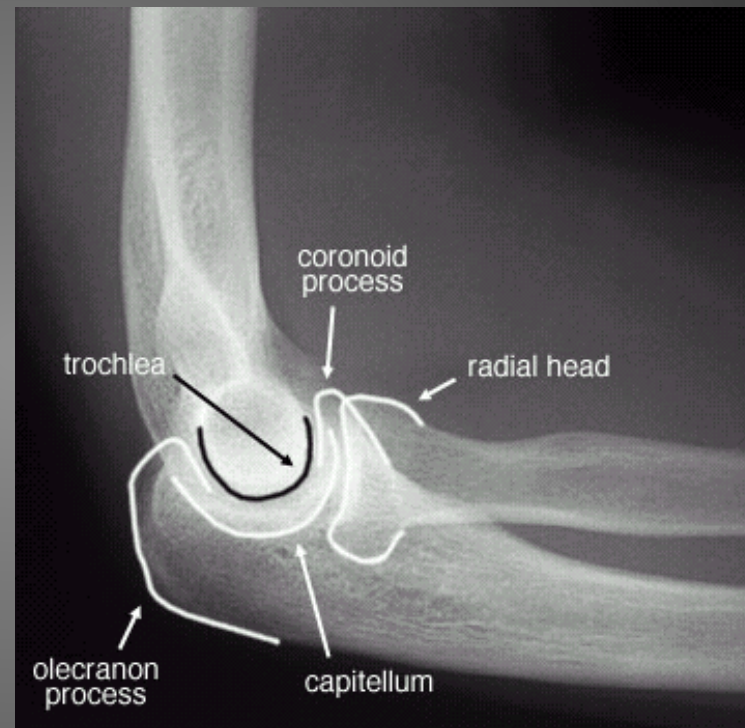
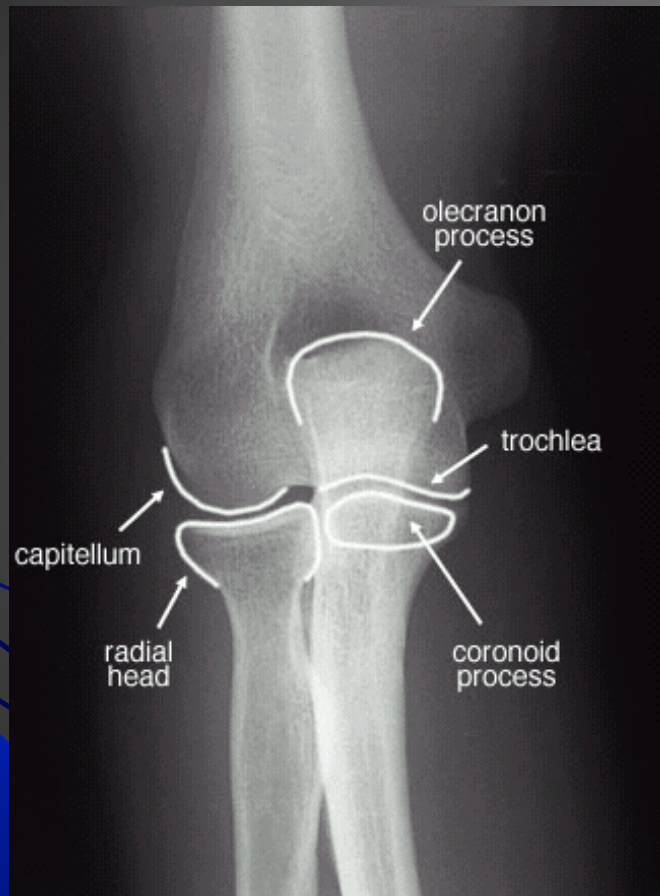




Lateral Scapula

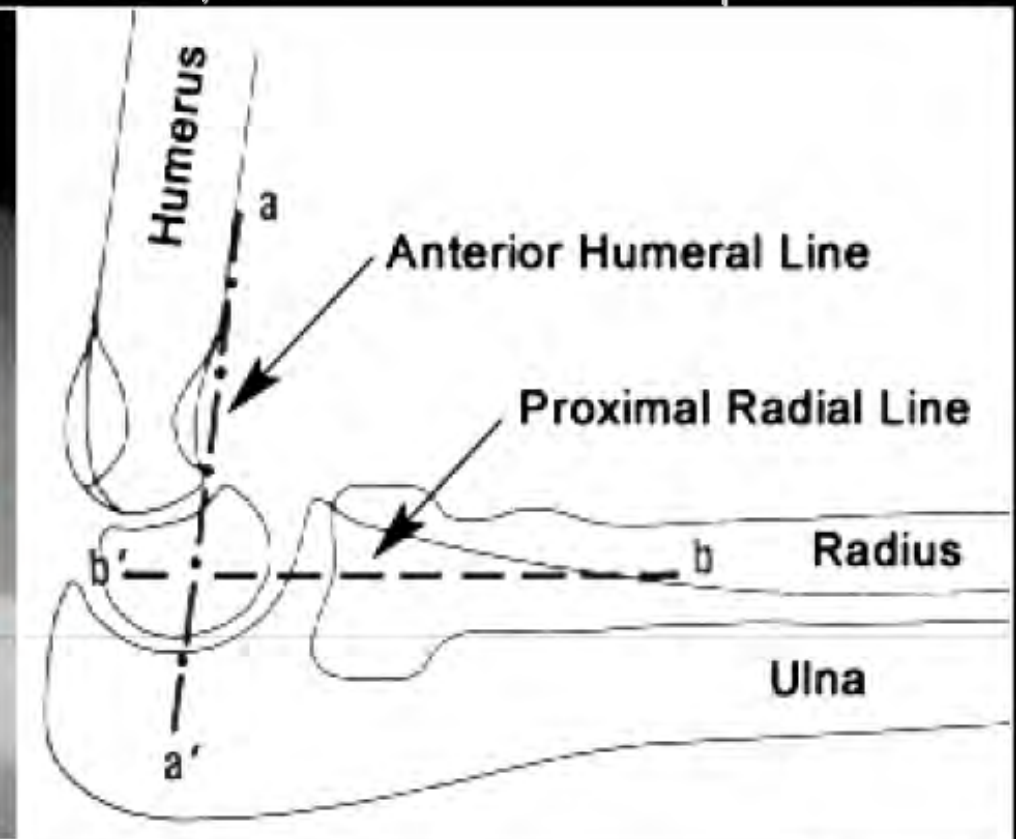
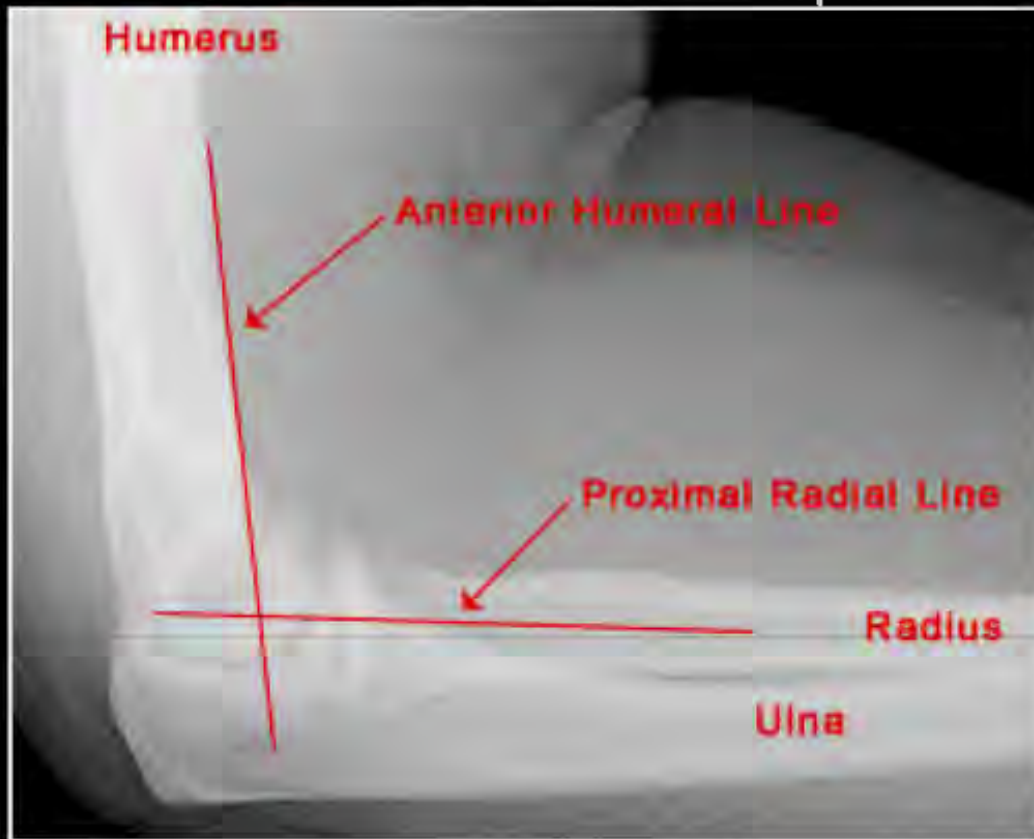


The Elbow



Anterior humeral line divides capitellum. 1/3rd anterior.

Proximal radial line bisects capitellum. If it does not, then radial head is out of position.



Anterior humeral line: supracondylar fractures

Radiocapitellar line: dislocation of radial head

Fat pad or 'sail boat' sign

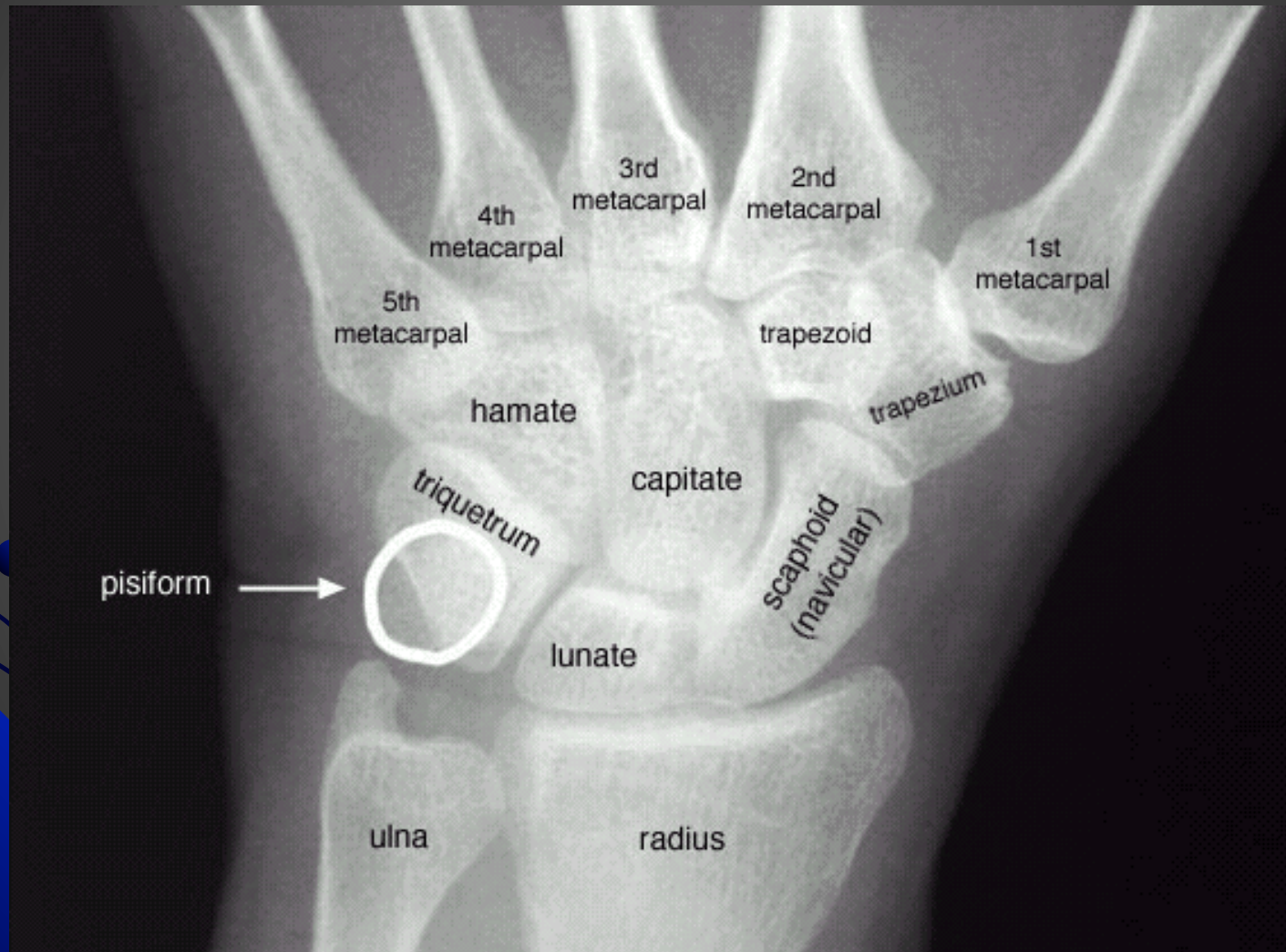


Normal



Raised fat pads
= intra-articular effusion

The Wrist



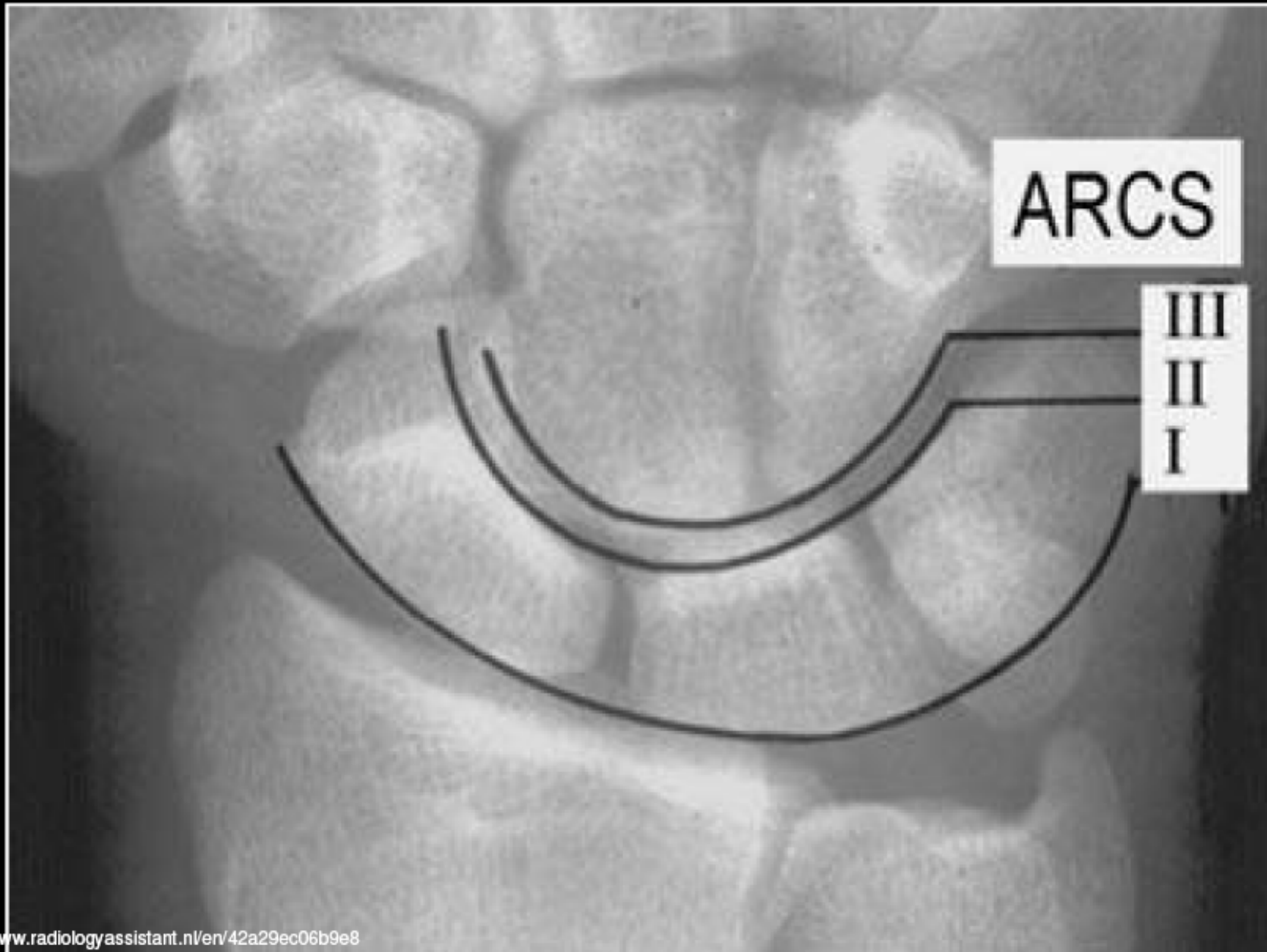
Carpal bones

- S - Scaphoid
- L - Lunate
- T - Triquetrum
- P - Pisiform
- T - Trapezium
- T - Trapezoid
- C - Capitate
- H - Hamate

Some lovers try positions that they
cant handle



Carpal arcs and joint spaces



ARCS

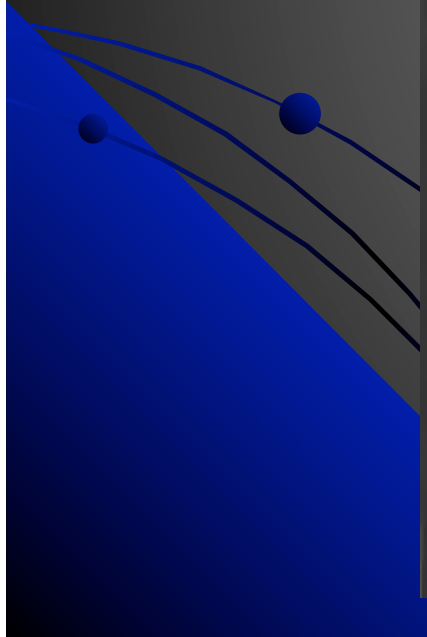
III
II
I

Joint
spaces
2mm or
less

Colles Fracture

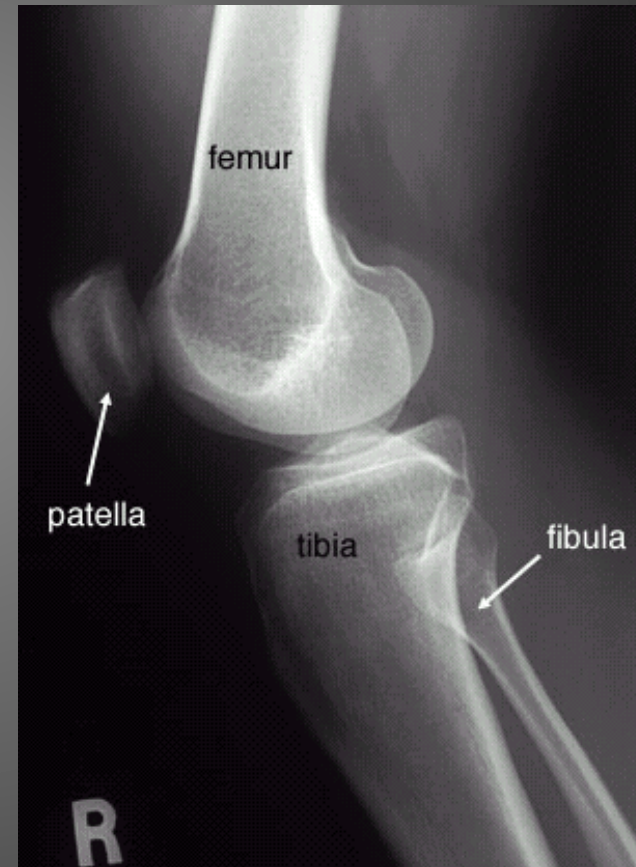
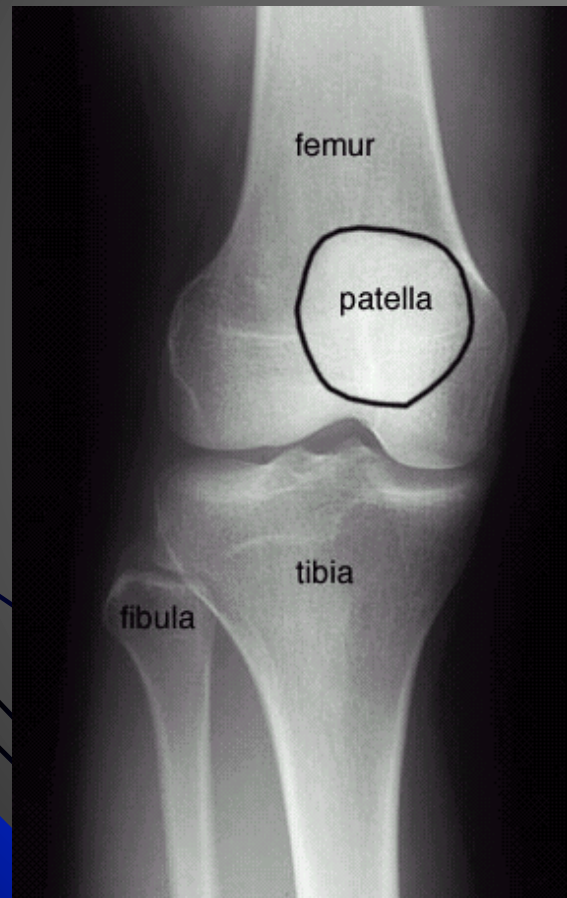


- Dorsal angulation of the distal radial fragment (ulna styloid fracture also present).



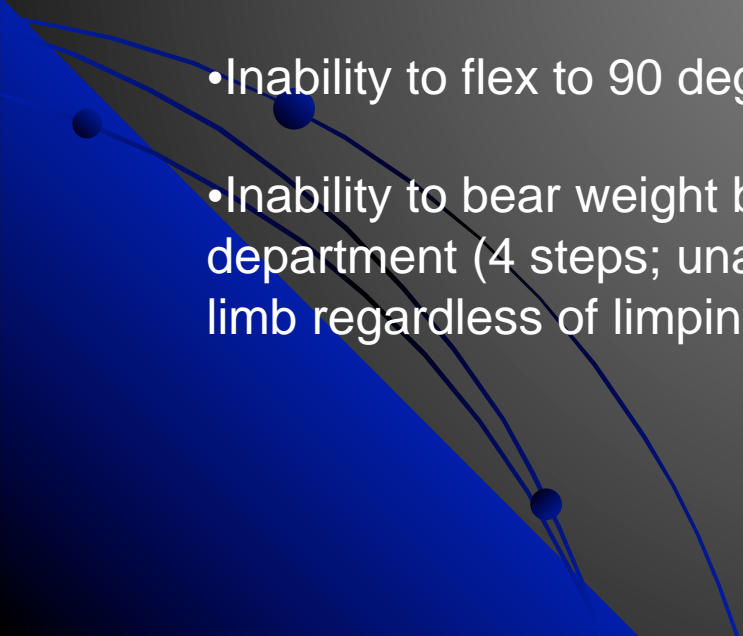


The Knee

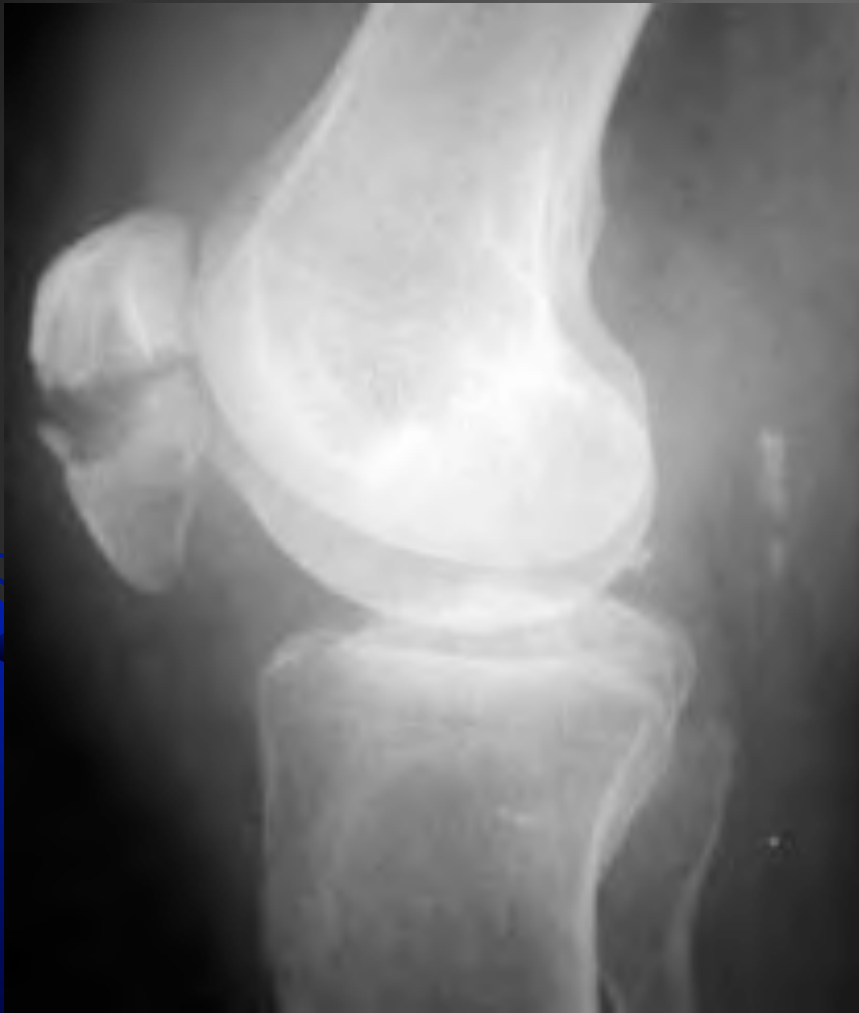


Ottawa Knee Rules

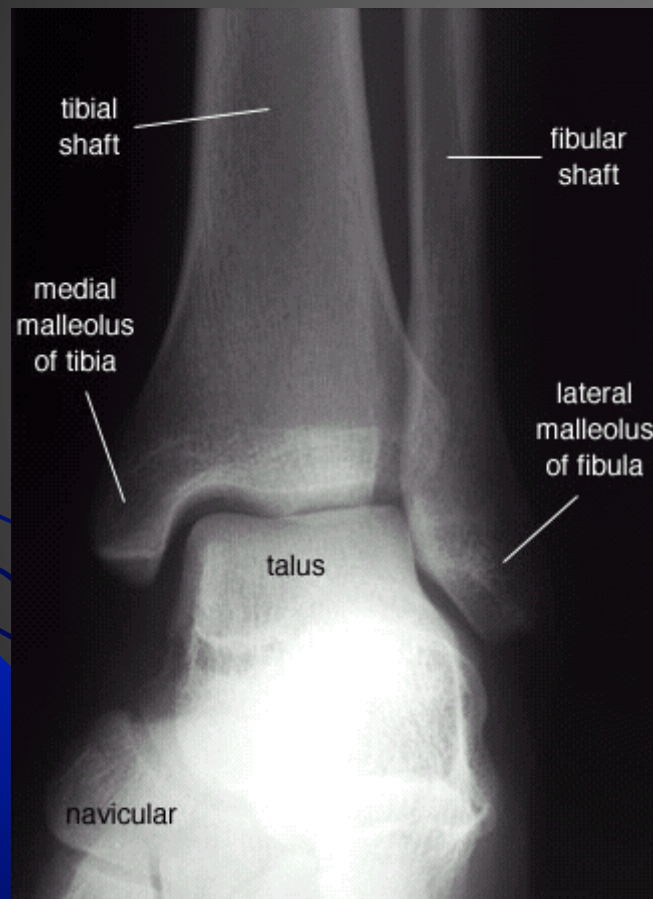
A knee X-ray series is only required for knee injury patients with **any** of these findings:

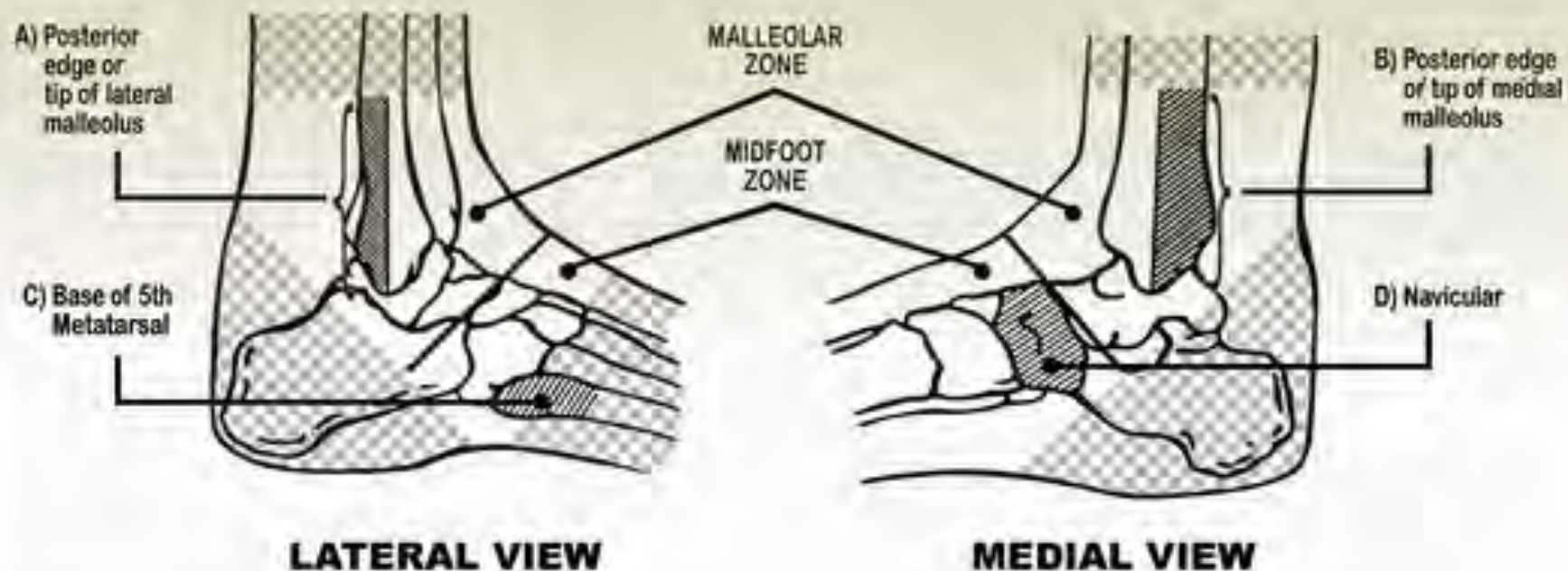
- Age 55 or older
 - Isolated tenderness of the patella (that is, no bone tenderness of the knee other than the patella).
 - Tenderness at the head of the fibula.
 - Inability to flex to 90 degrees.
 - Inability to bear weight both immediately and in the emergency department (4 steps; unable to transfer weight twice onto each lower limb regardless of limping).
- 

Patella fracture



The Ankle





a) An ankle x-ray series is only required if there is any pain in malleolar zone and any of these findings:

1. Bone tenderness at A

OR

2. Bone tenderness at B

OR

3. Inability to bear weight both immediately and in ED

b) A foot x-ray series is only required if there is any pain in midfoot zone and any of these findings

1. Bone tenderness at C

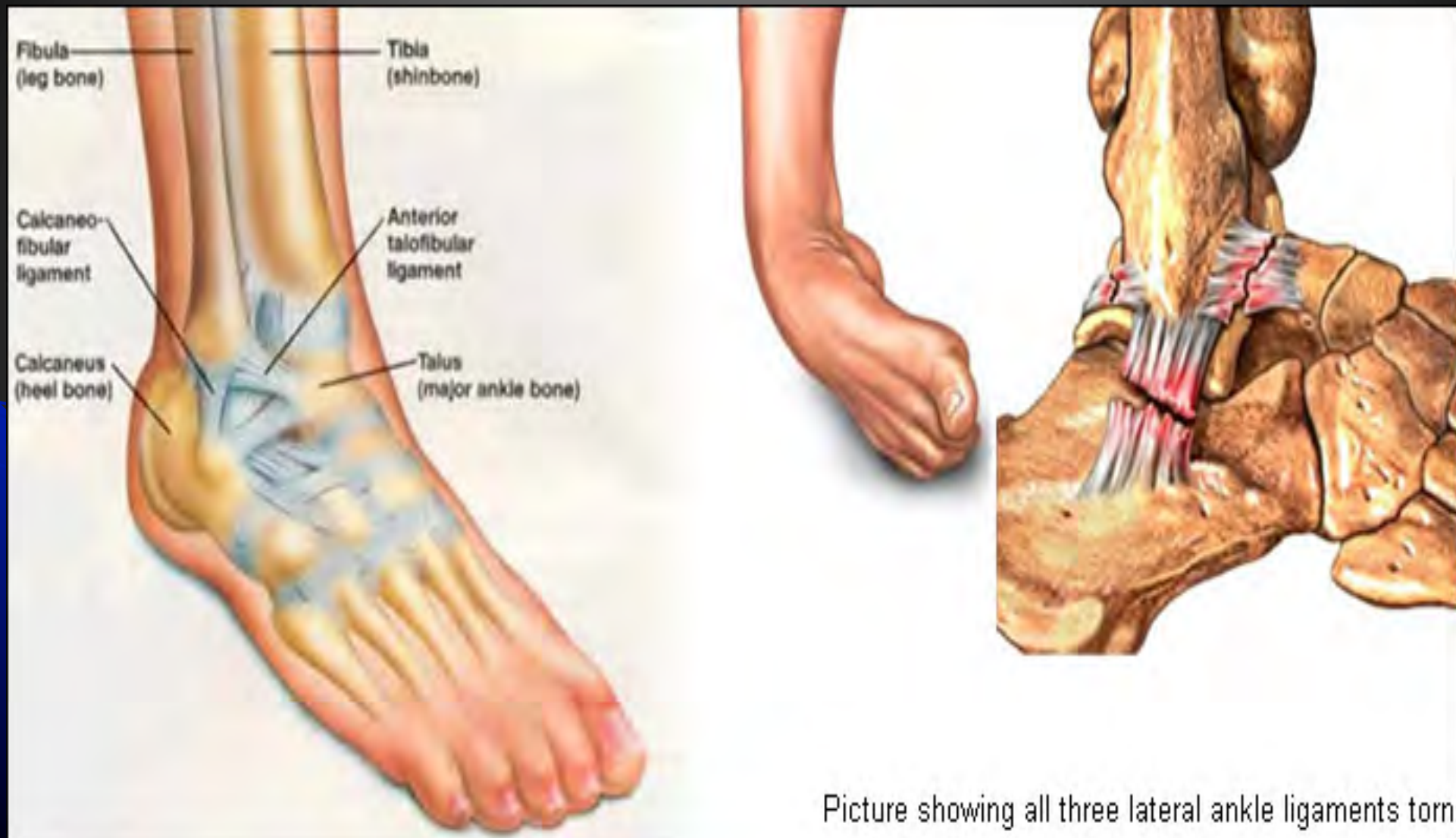
OR

2. Bone tenderness at D

OR

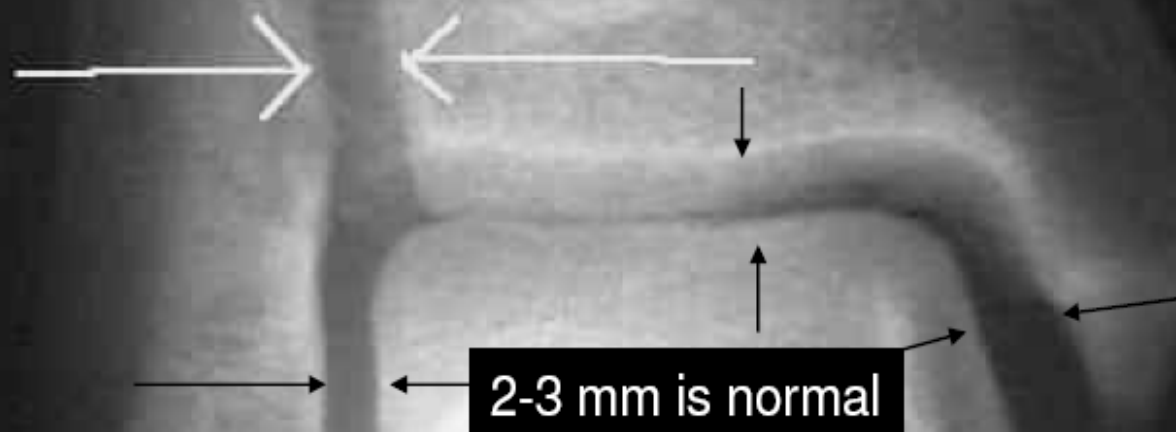
3. Inability to bear weight both immediately and in ED

Ankle Sprain



Picture showing all three lateral ankle ligaments torn

Tib-Fib Clear Space
($< 5\text{mm}$ is Normal)



1. Type B - fibular fracture at the level of the syndesmosis
2. Type C - fibular fracture above the syndesmosis



Maisonneuve Fracture: Proximal fibula fracture resulting from external rotation



The Foot



What's wrong with this picture.....?





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Michael Geraghty



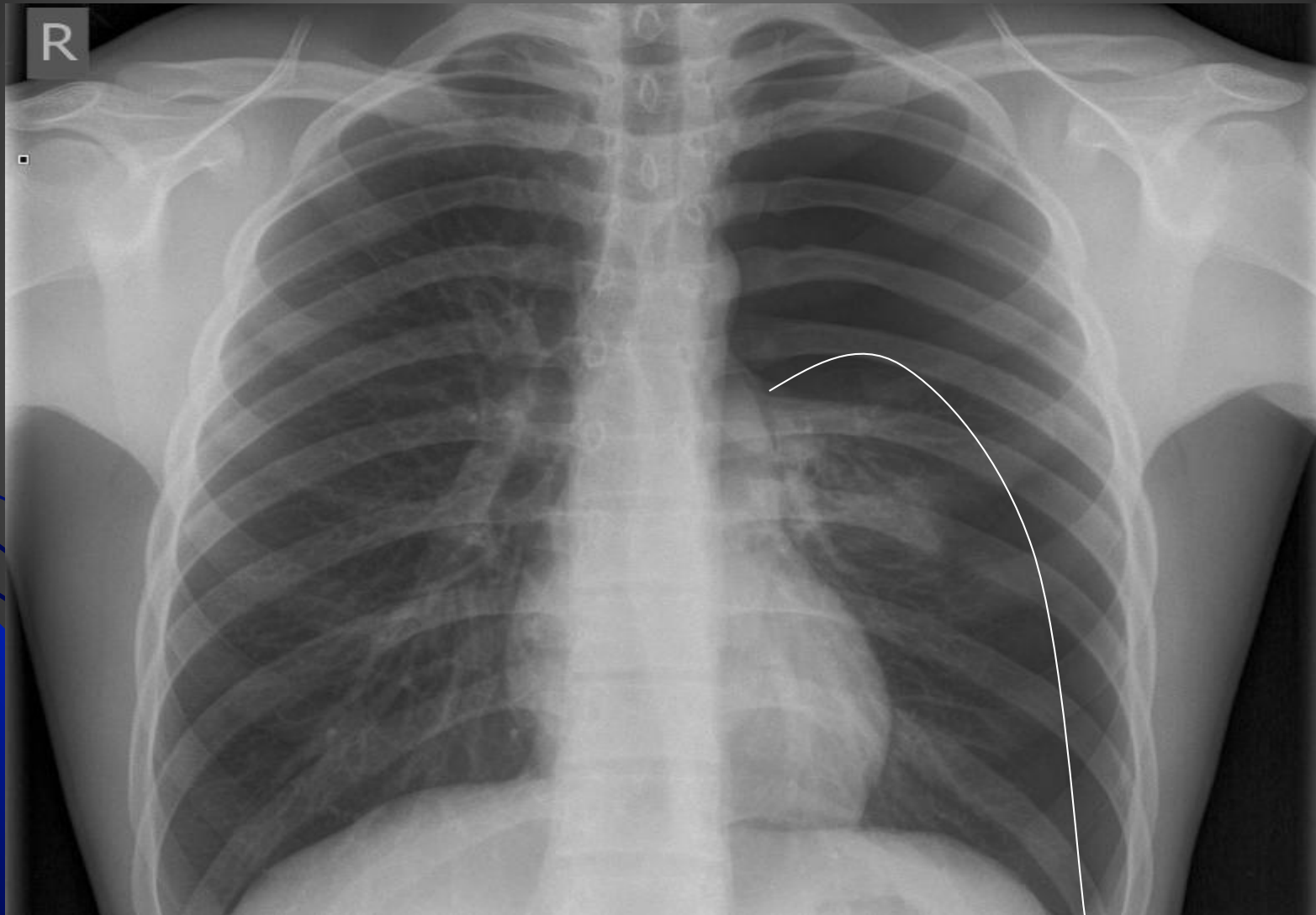
Hand Alignment

With the hand flexed, all
finger tips point toward
the scaphoid.



fpnotebook.com

Blunt trauma – shoulder to anterior chest playing rugby. No SOB.



Right ankle injury – tender over lateral malleolus

R



Fall from bicycle –



weighted ACJ views

M

R) FOOSH: 27 y o male





D

Closed fist punch to jaw



R





38 year old – rugby tackle, NWB



38 year old – rugby tackle, NWB

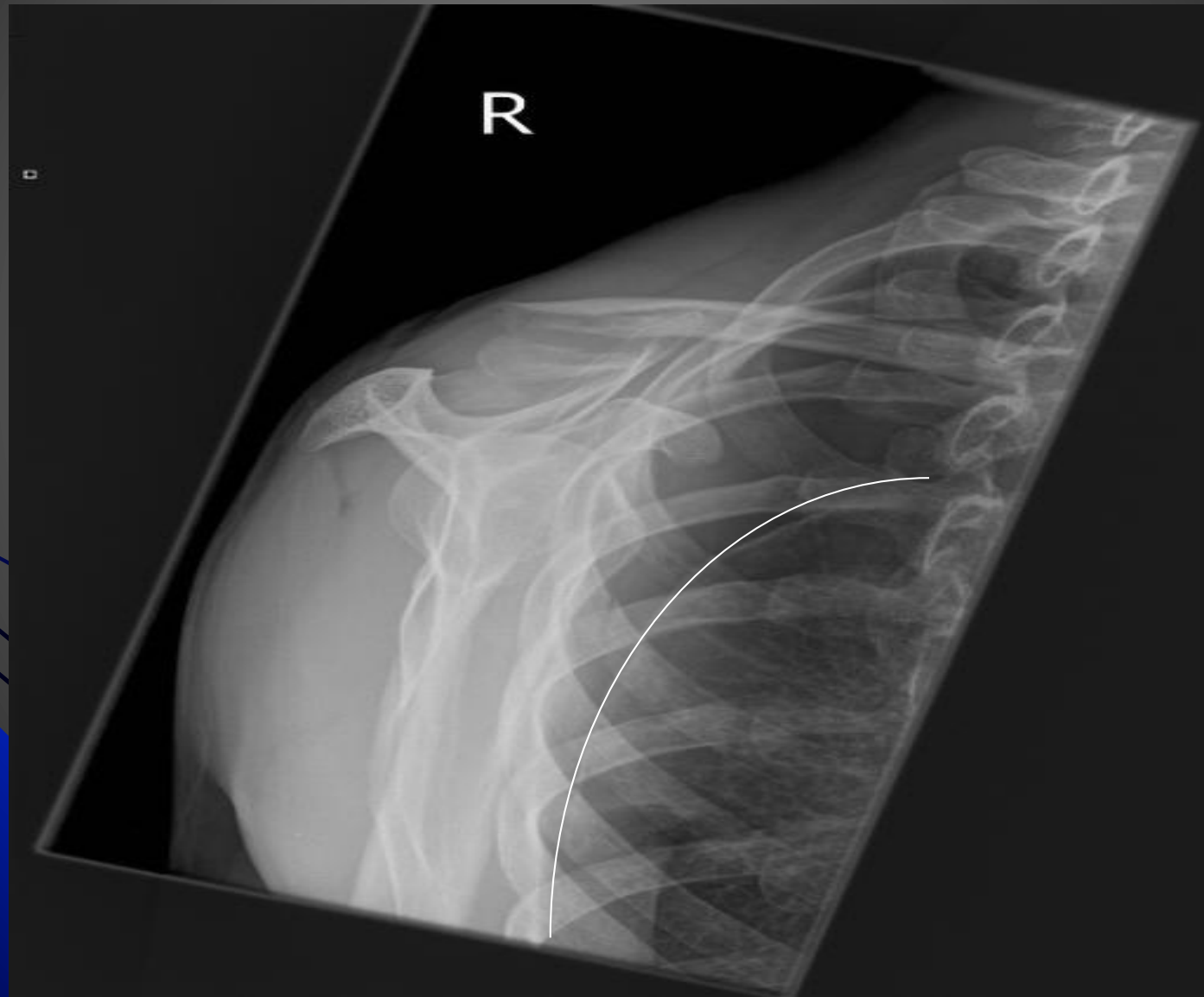


55 year old with fall mountain
biking, R) shoulder pain

R



55 year old with fall mountain biking, R) shoulder pain



44 y.o. Slipped twisting ankle



44 y.o. Slipped twisting ankle



Rugby player – R) shoulder injury ?

Clavicle fracture



R

L



THUR BED

R



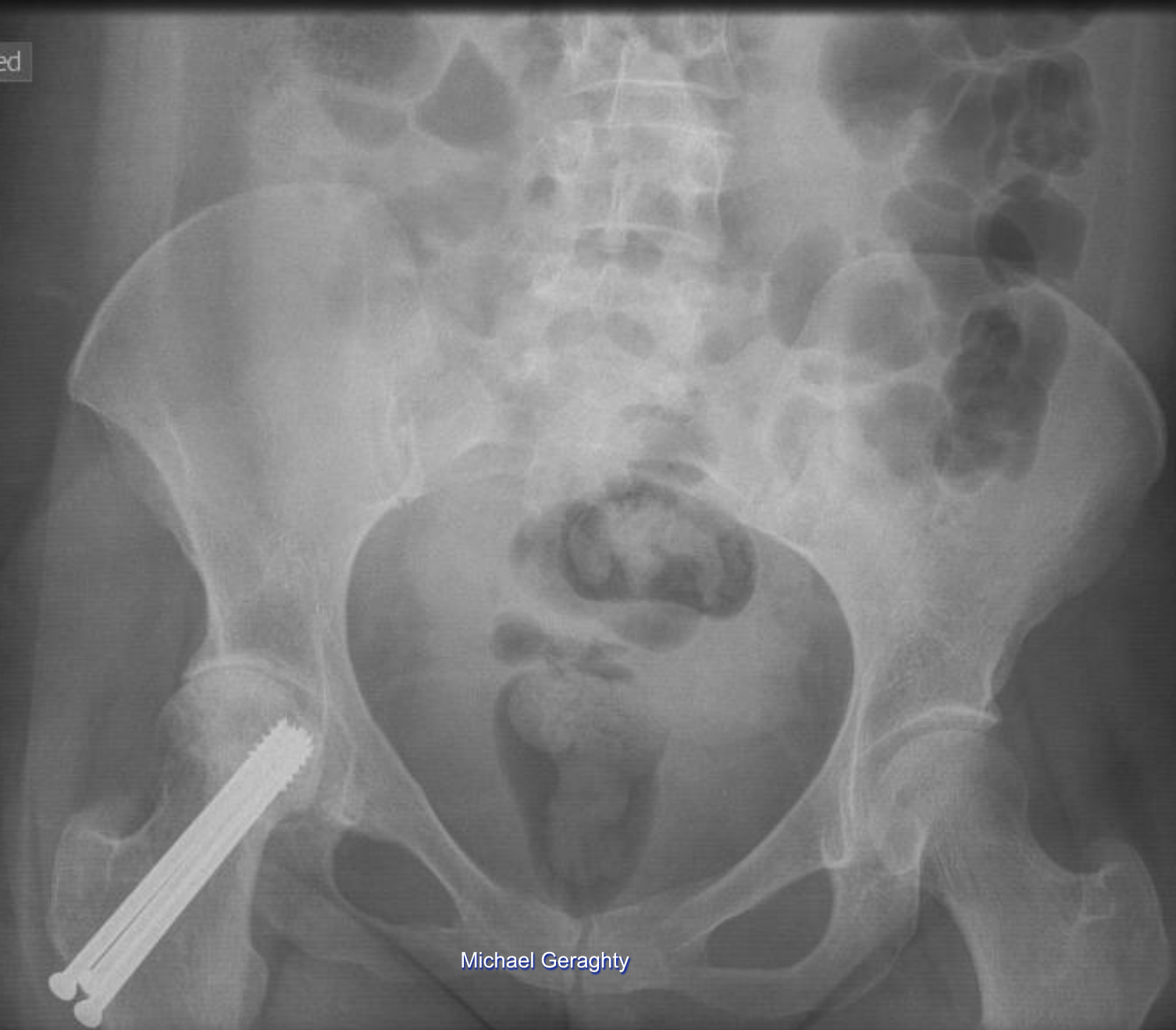
Michael Geraghty

□ Through Bed

R

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65



L) Lateral knee pain from rugby tackle.

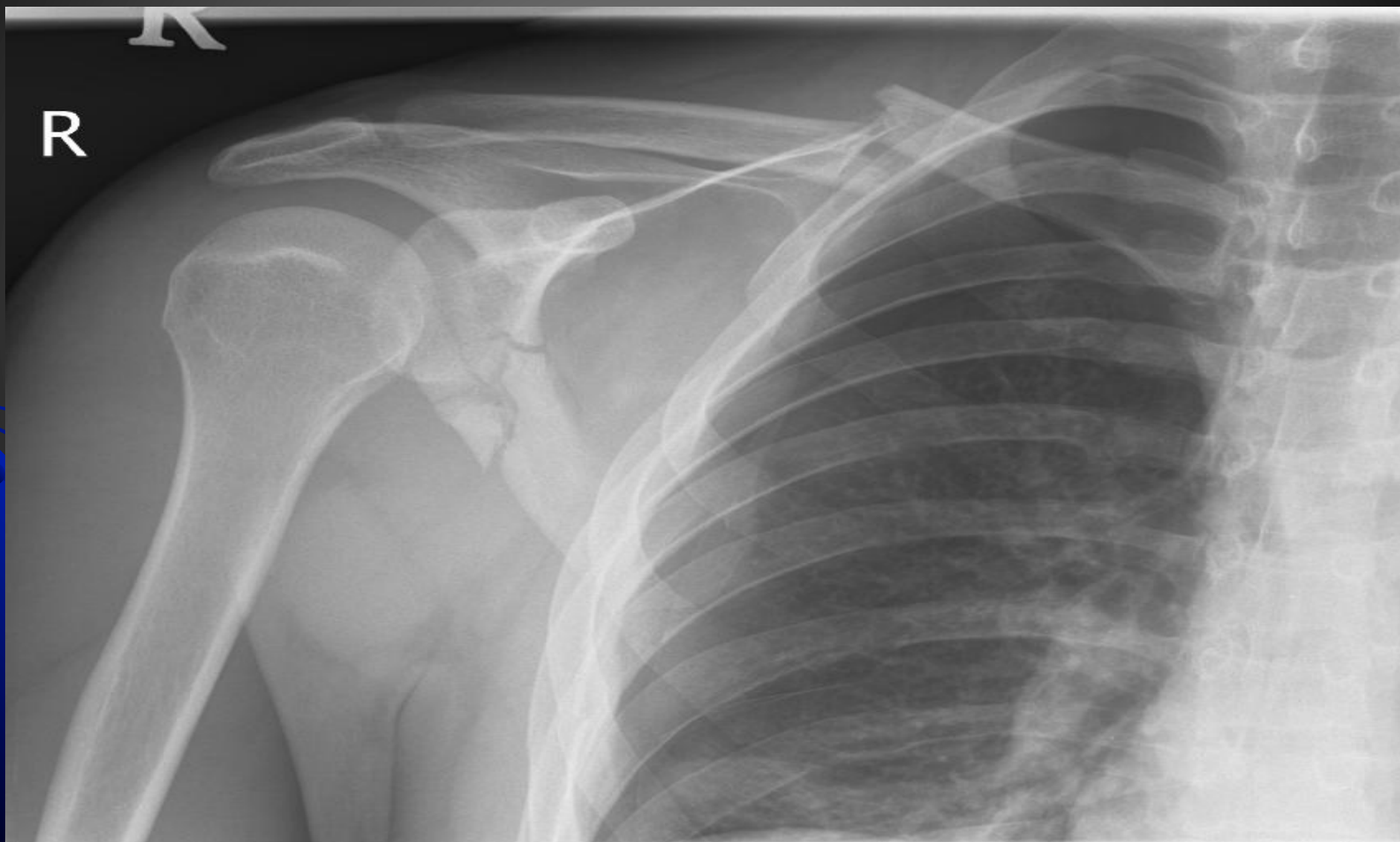


L

Horizontal Ray



Horse rider with fall on R) shoulder
– No LOC. No C Spine pain



27 ♀, Obese, twisted leg getting out of bed.



Useful Stuff

- <http://www.wikiradiography.com/>

