

Small Injury, Big Consequence: Subtle Orthopedic Injuries Not to Miss

Samuel Francis, MD

Assistant Professor, Division of Emergency Medicine

Duke University Hospital

Objectives

Recognize 5 commonly missed orthopedic injuries

All with morbidity consequences

Pitfalls in diagnosis

Tricks to catch them









6 year old male

Grabbed Knife “Helping” to
Unload Dishwasher



Cooperative child

Repaired in clinic, LET and local

Follow up 7 days for suture removal

See child 6 months later

“We had to have surgical repair”

Flexor Tendon Injury

Up to 10% of important hand injuries missed on initial evaluation

Late repair? Increased disability

Errors of omission

Flexor Tendon Injury

<25% - Nothing to Do

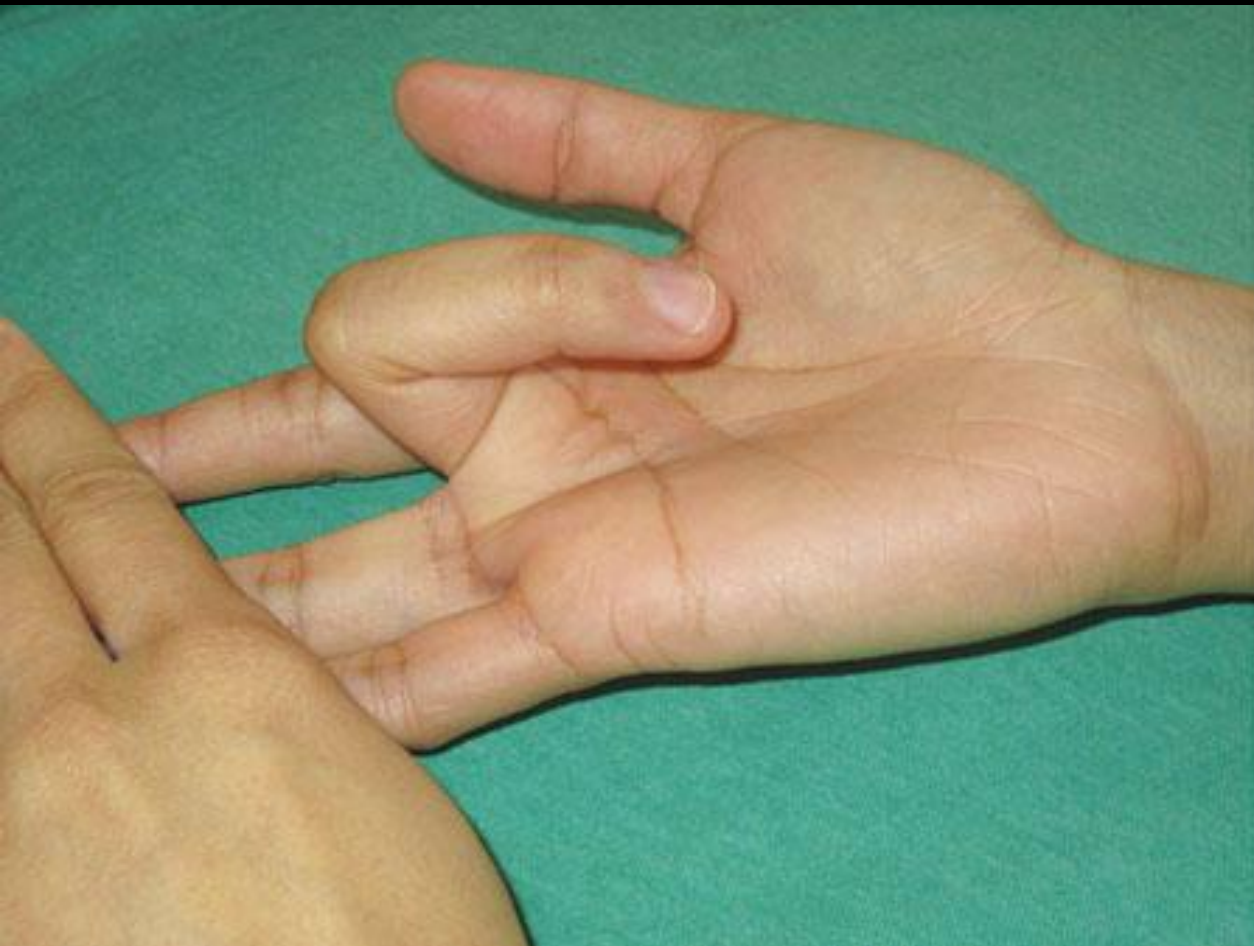
25-50% - Probably don't repair

>50% - Repair

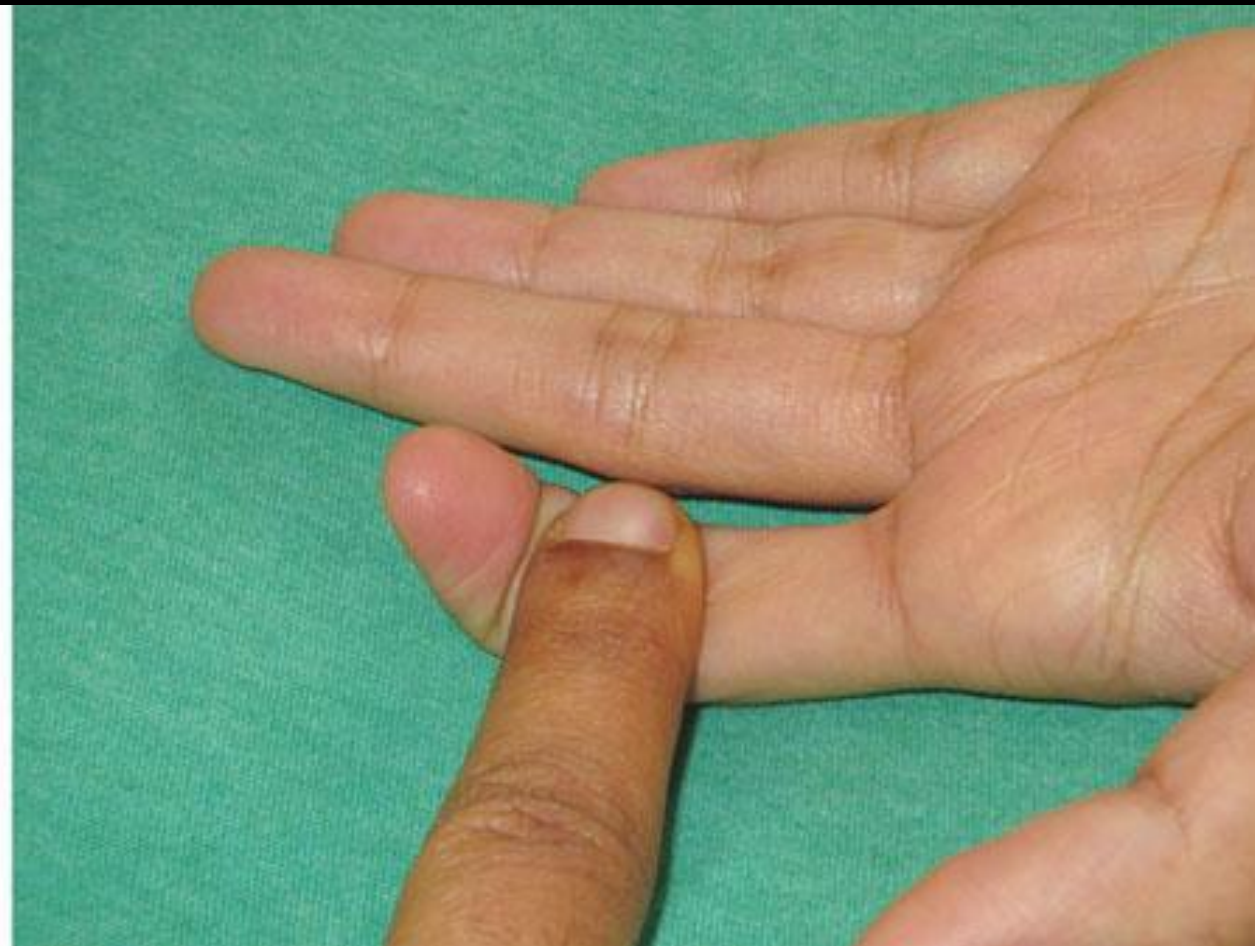




FDS



FDP



Kumil, R; Yao, J. Plastic
and Recon. Surg. 7/17

Triggering

Entrapment

Rupture

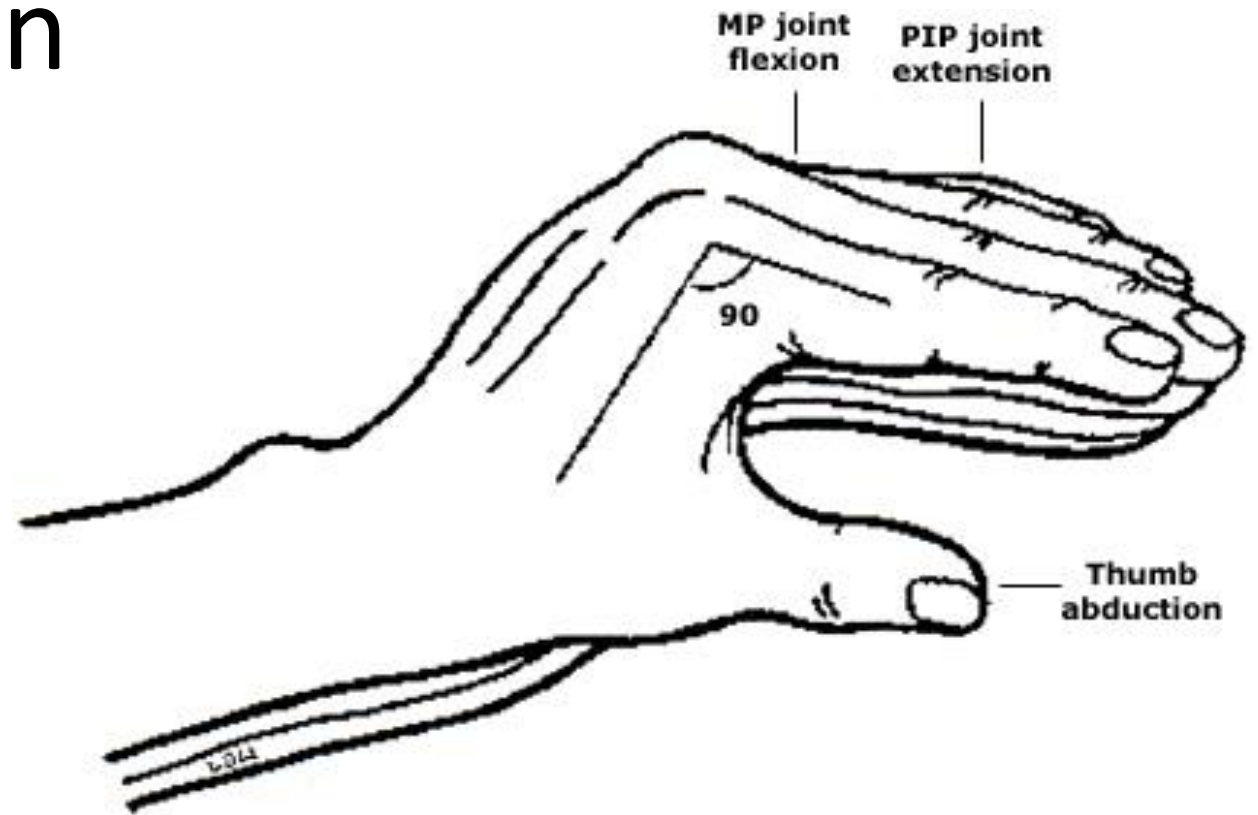
Examine wound through
FULL RANGE OF MOTION

Positions of Function

20° wrist extension

90° at MCP

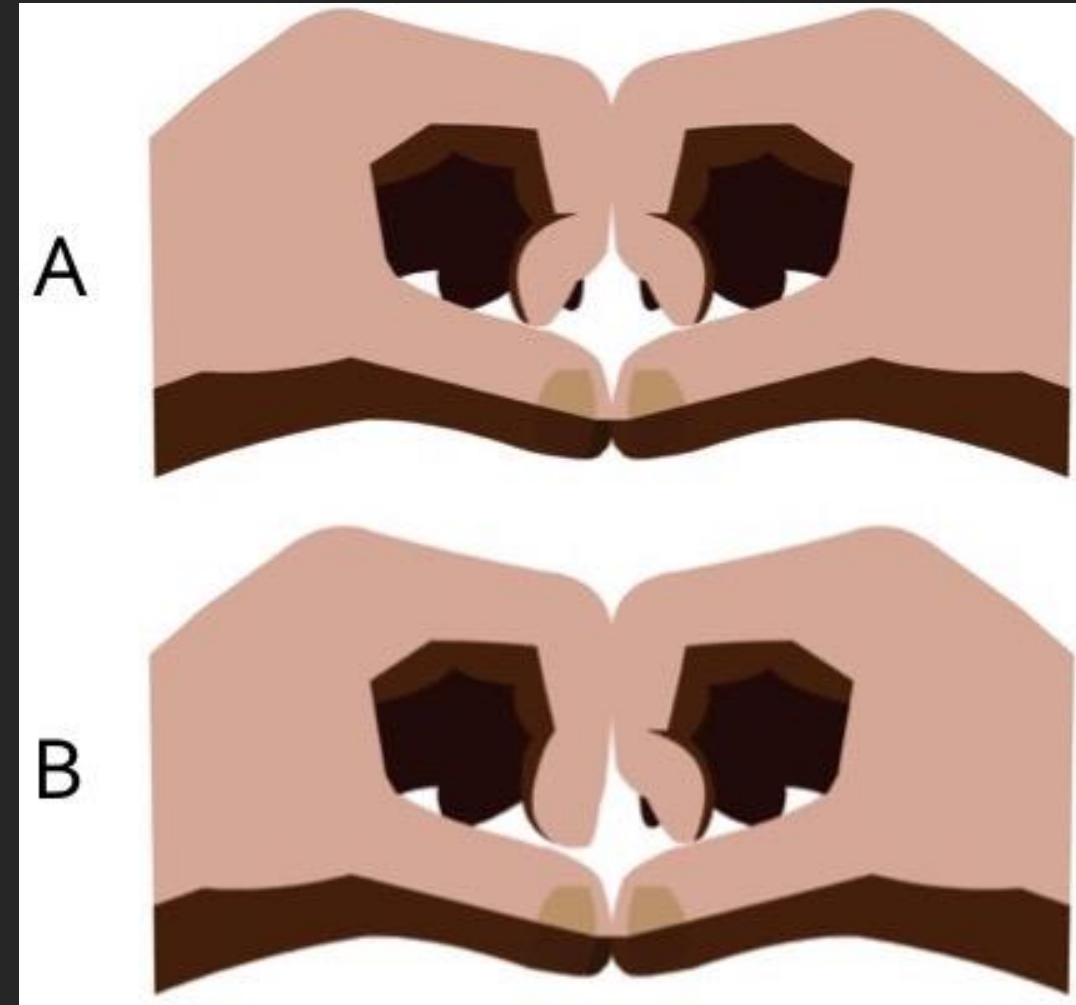
PIP, DIP fully extended



Extensor tendon lacerations

Modified Elson's test

Central slip injury



From ALIEM.com

Flexor (and Extensor) Tendon Lacerations

Failure to fully evaluate the injury through a full ROM

Failure to perform appropriate exam maneuvers

16 year old male

R Shoulder Pain after Weightlifting

R

*



Home with sling, mobility exercises

Seen 6 weeks later, now in post-surgical
brace

R

*





R

*



R

*



Posterior Shoulder Dislocation

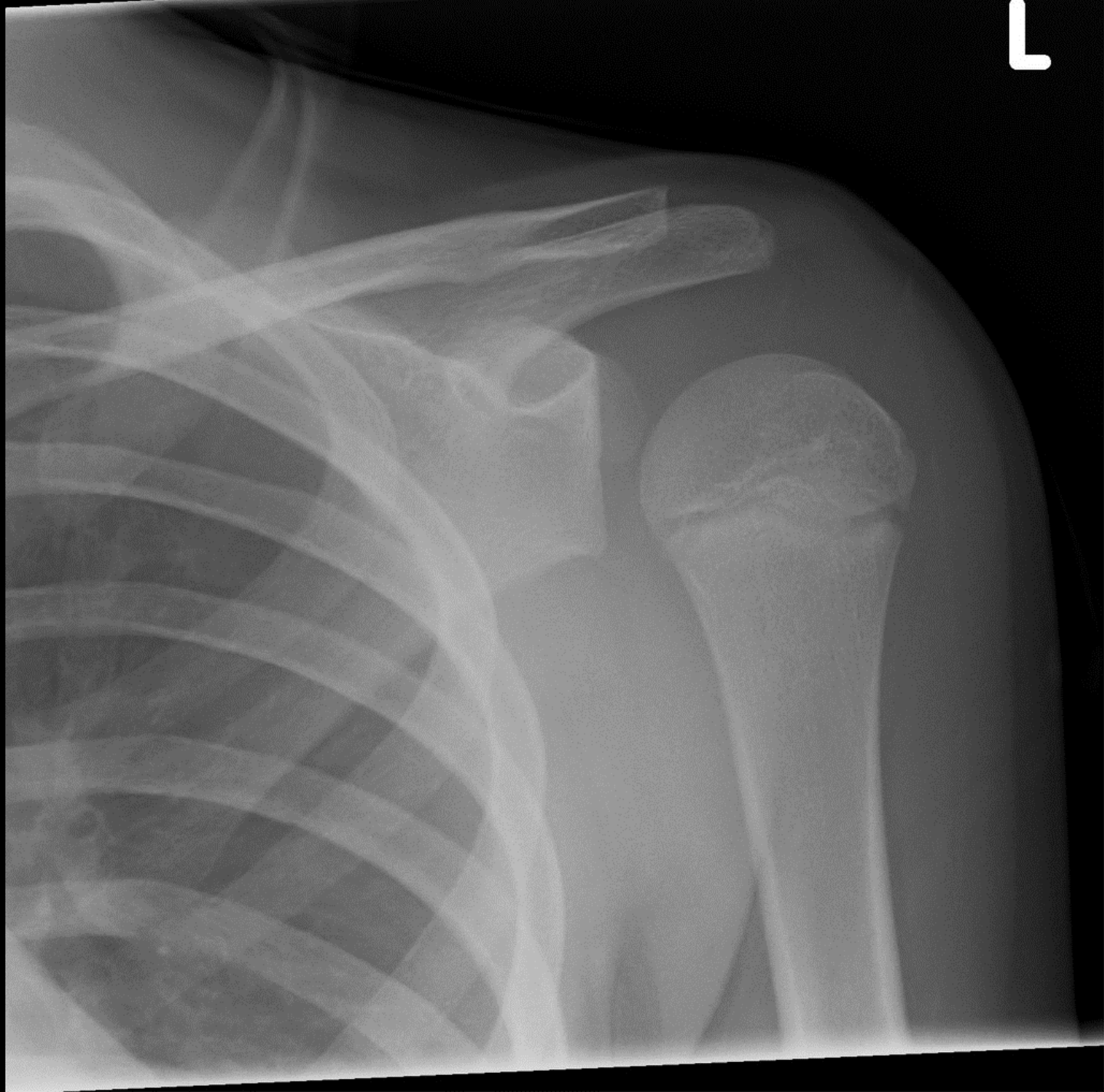
Seizure, Weightlifting, Electrocutation

Persistent Shoulder Pain

AP view misses 50% of cases
"Lightbulb" Sign

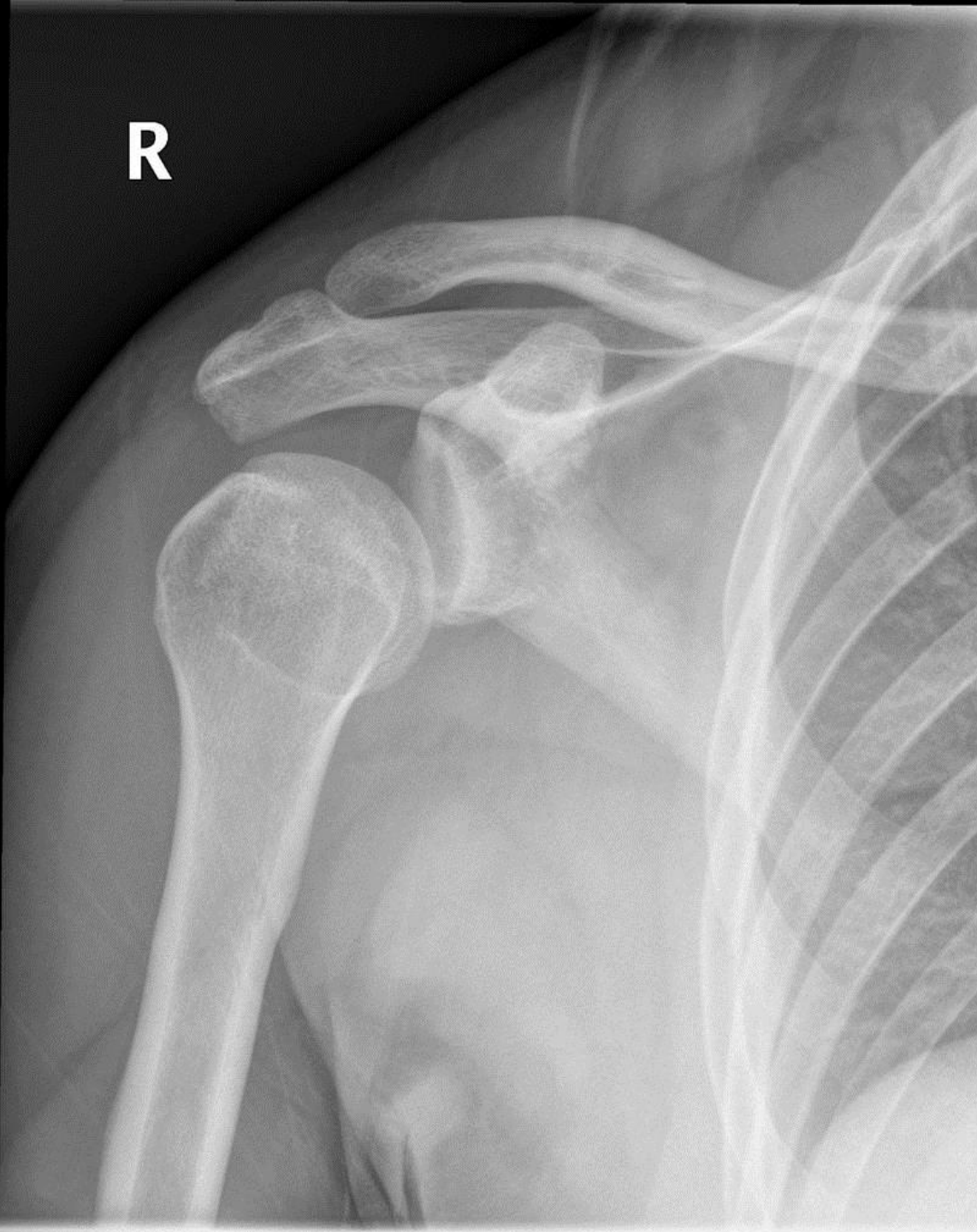
Axillary View



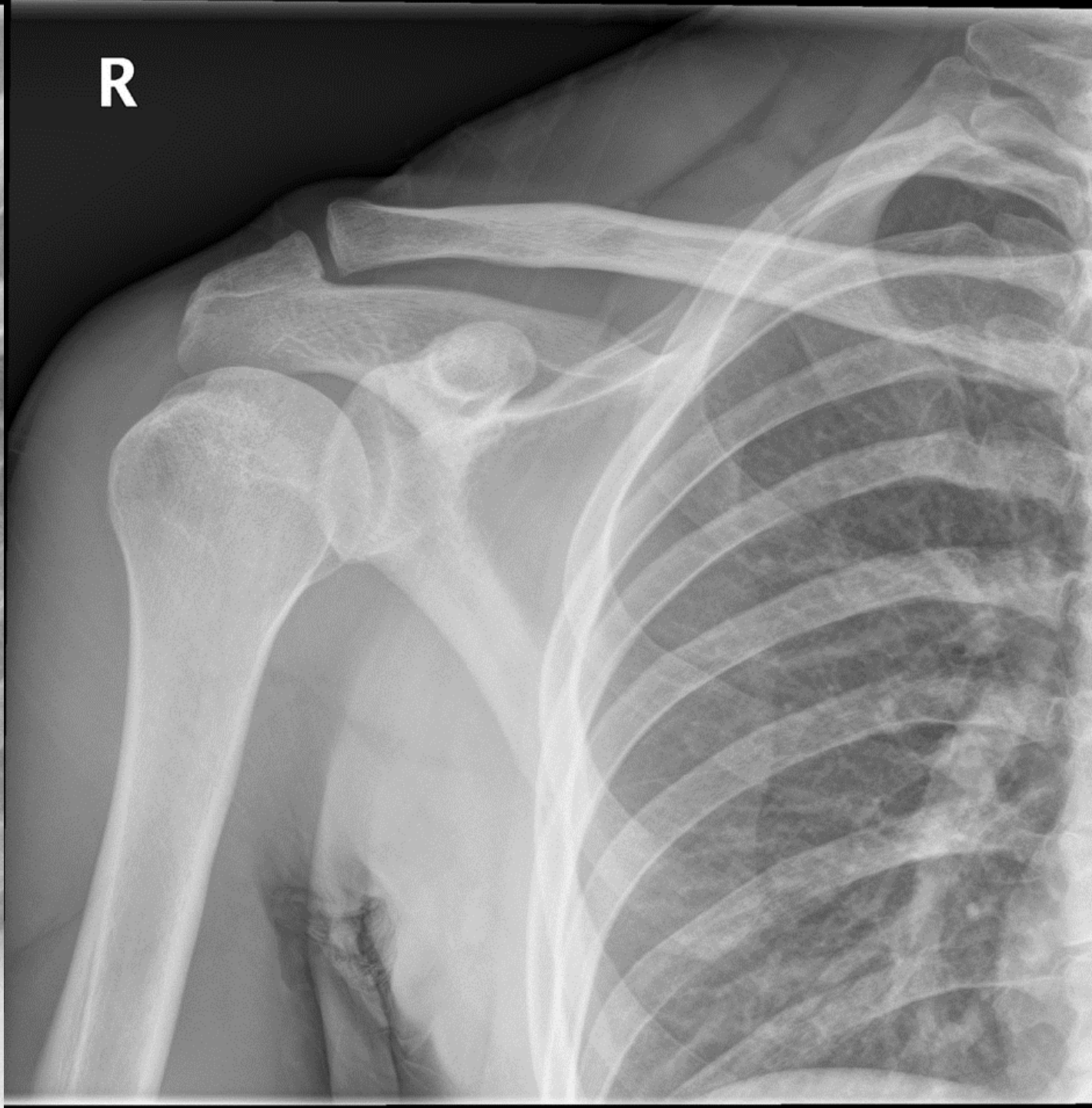




R



R



To Recap:

Shoulder Pain with Mechanism

AP views will miss half!

Don't fail to order appropriate views!

Axillary view clinches

10 year old male

Twisted Ankle Playing Football

Not weight bearing 24h later



X-ray ankle normal

TTP

Ace Bandage, Crutches, WBAT

Ortho f/u 1 wk

FYI email

“Thank you for this consult”

Brought rapidly to OR

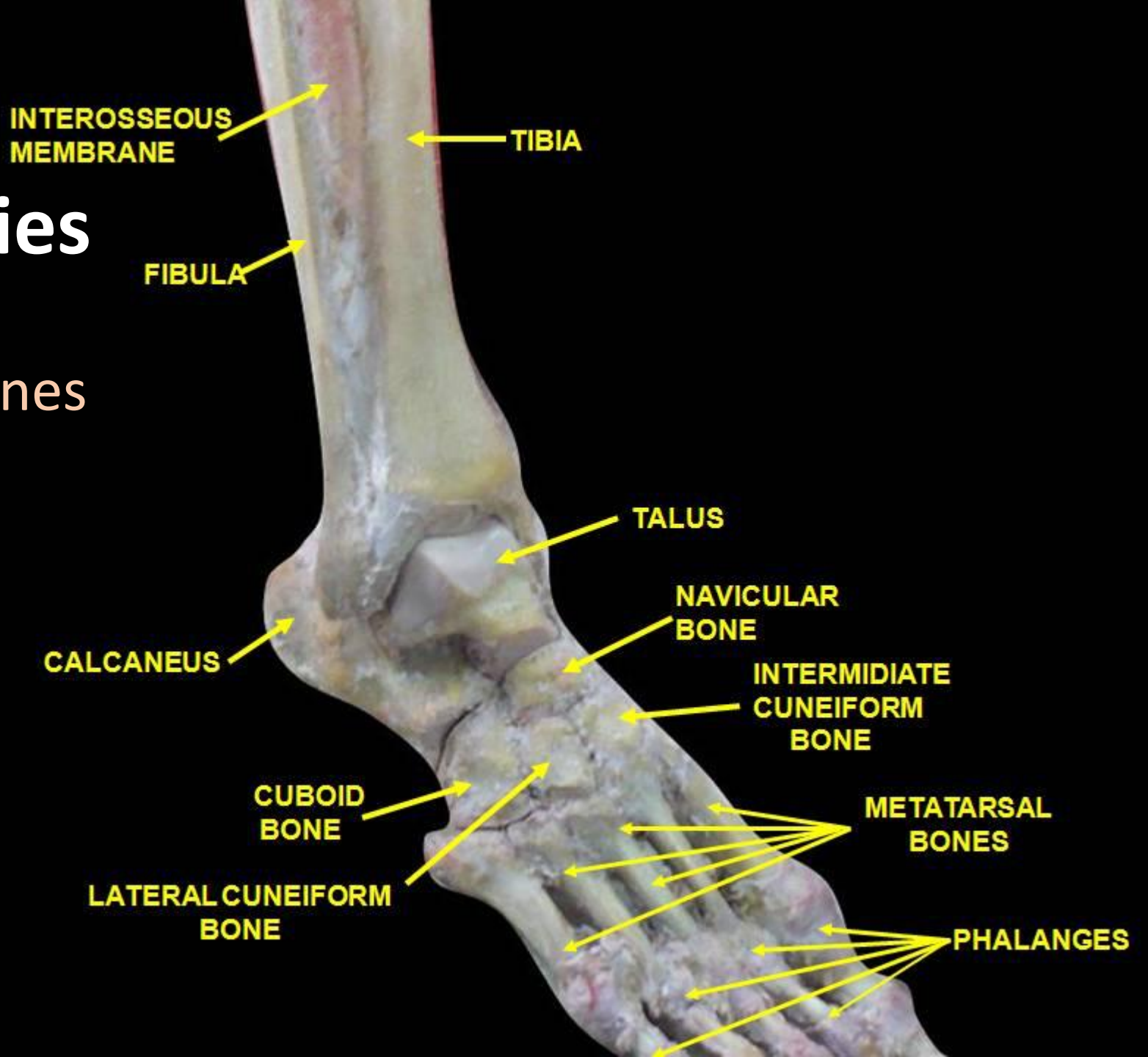


Syndesmosis injuries

Fibrous joint holding 2 bones together

Interosseous membrane

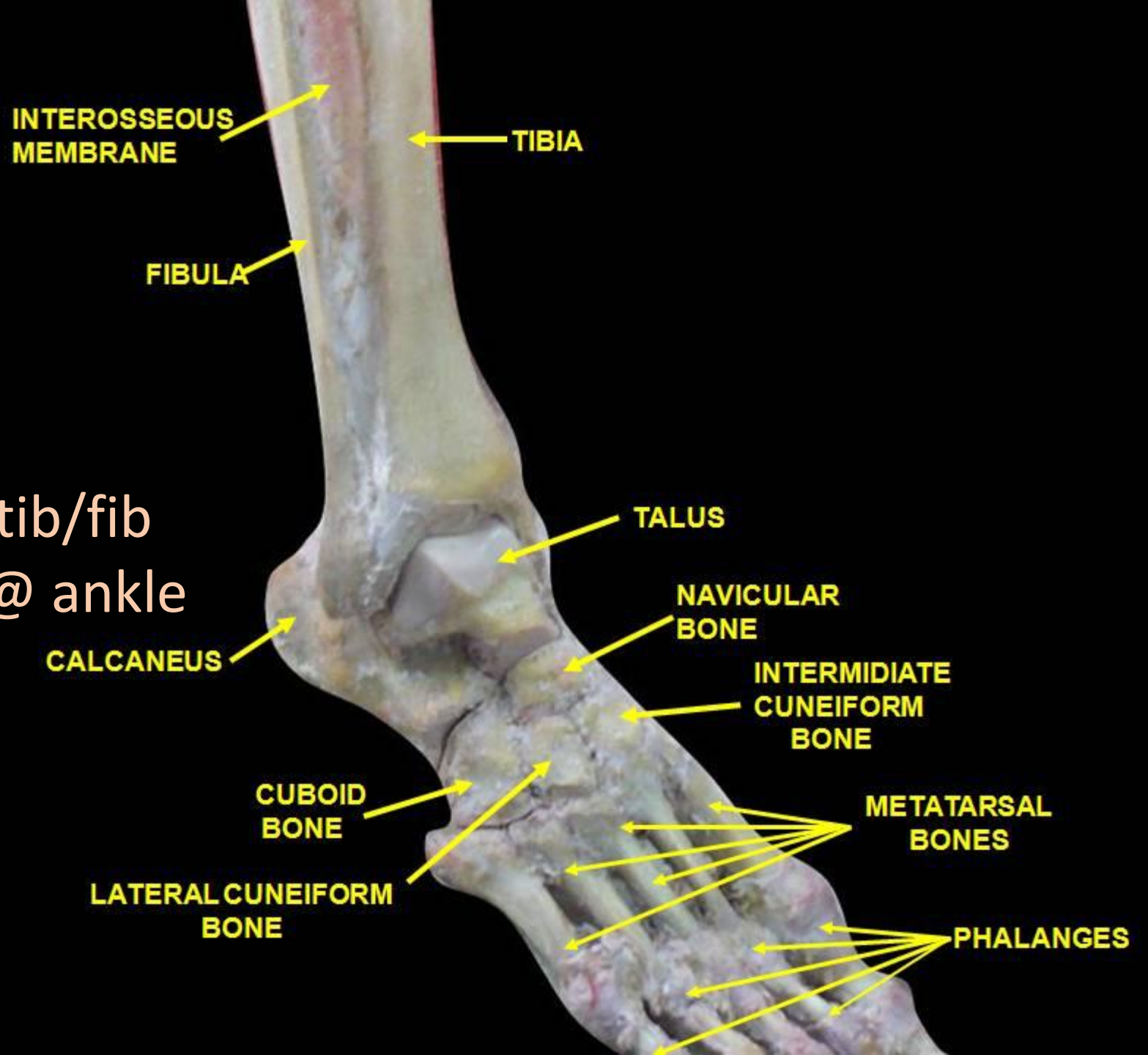
Force transmission



Squeeze test

AP force proximal to mid tib/fib
Positive – Replicate pain @ ankle

“High Ankle Sprain”



Where else can this occur?

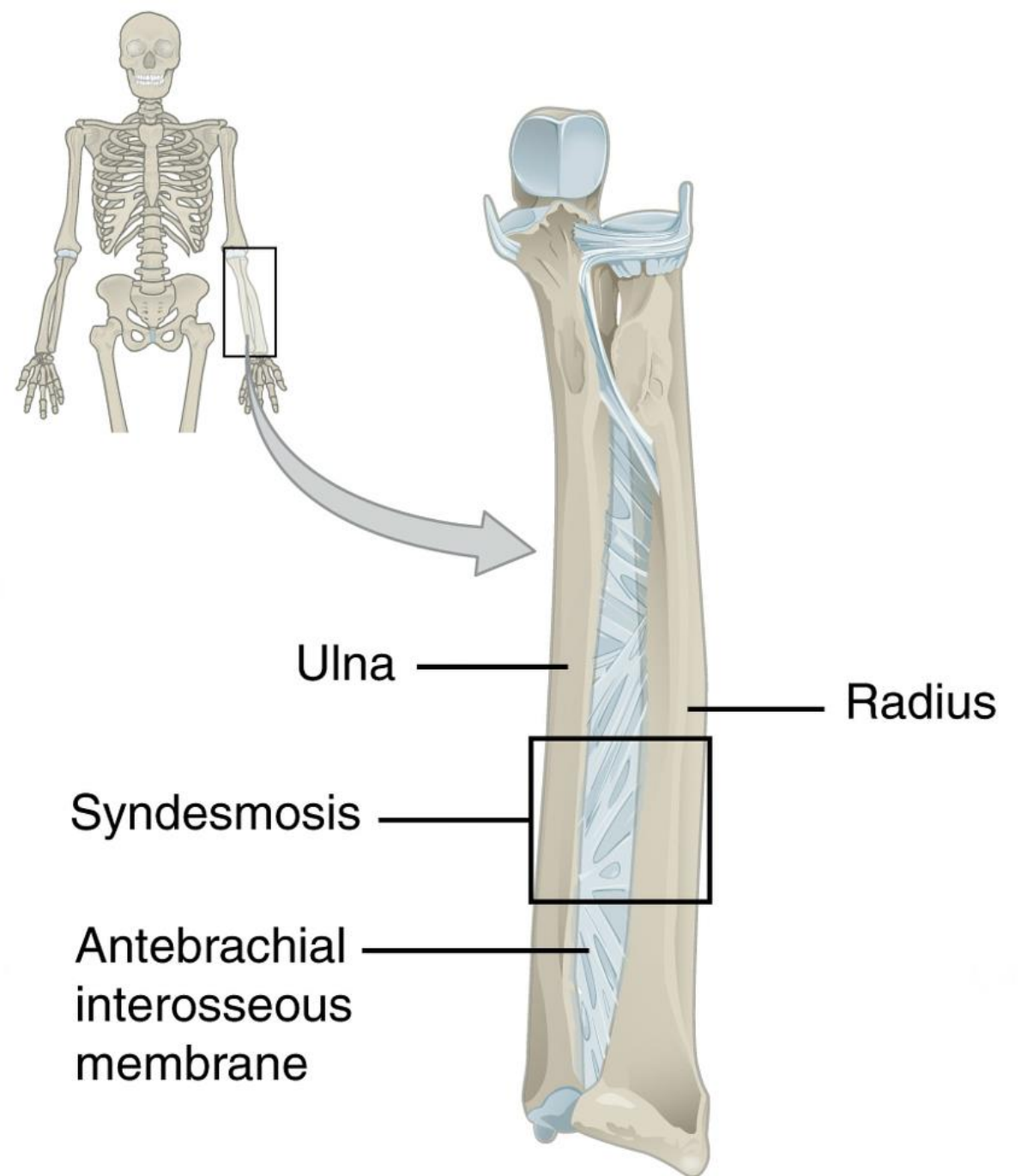
Ulna/Radius Interface

Monteggia fracture/dislocation

Transmitted force along
syndesmosis

~1/3 radial dislocations missed

MINORITY (1/3) have good
functional outcomes if missed





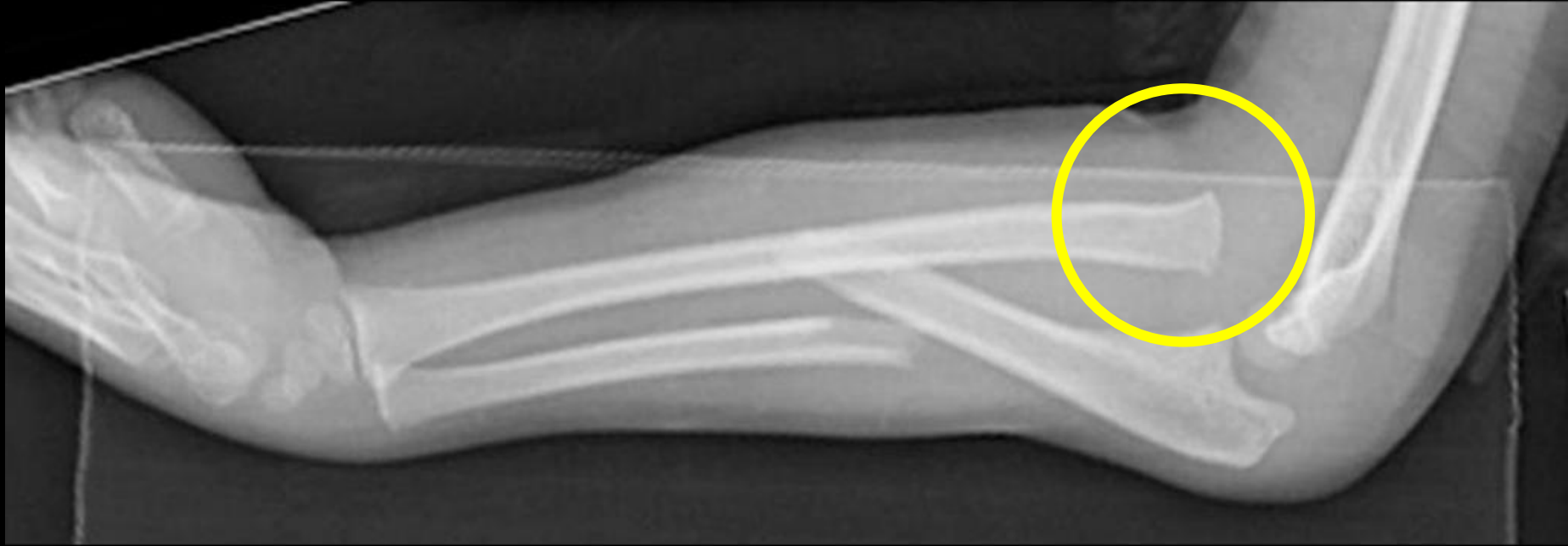
Pitfall

Bowing fracture of ulna/radius

Miss radial dislocation







Syndesmosis injuries

Maisonneuve Fracture
Monteggia, Galeazzi

Failure to image where the
force is transmitted

“Image joint above and below”

16 Year Old Male

Ankle Pain After Tackle

Moderate midfoot ttp

Hard soled shoe

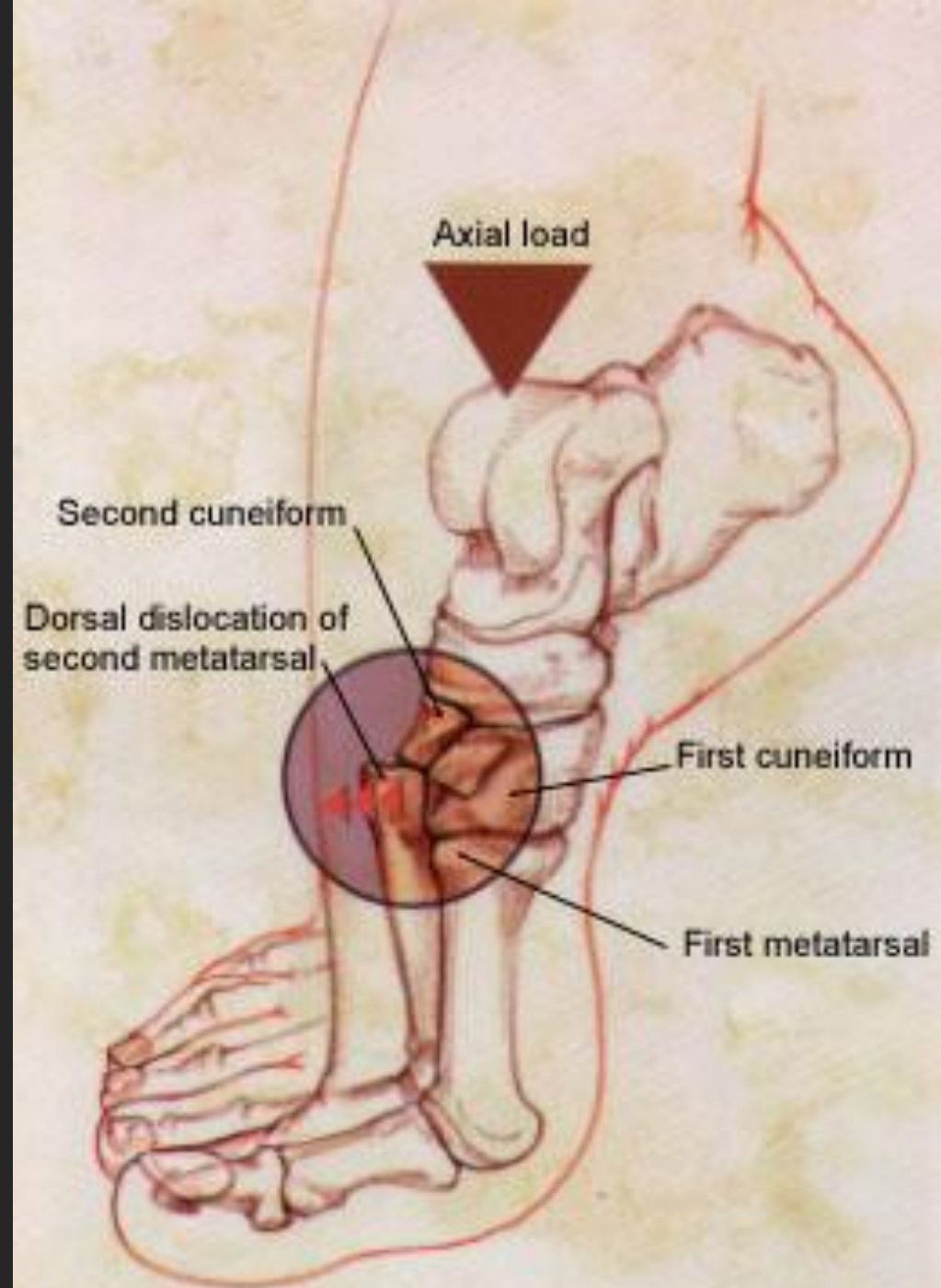


Lisfranc Injury

Axial load on plantar flexed foot

Jumping off bunk bed

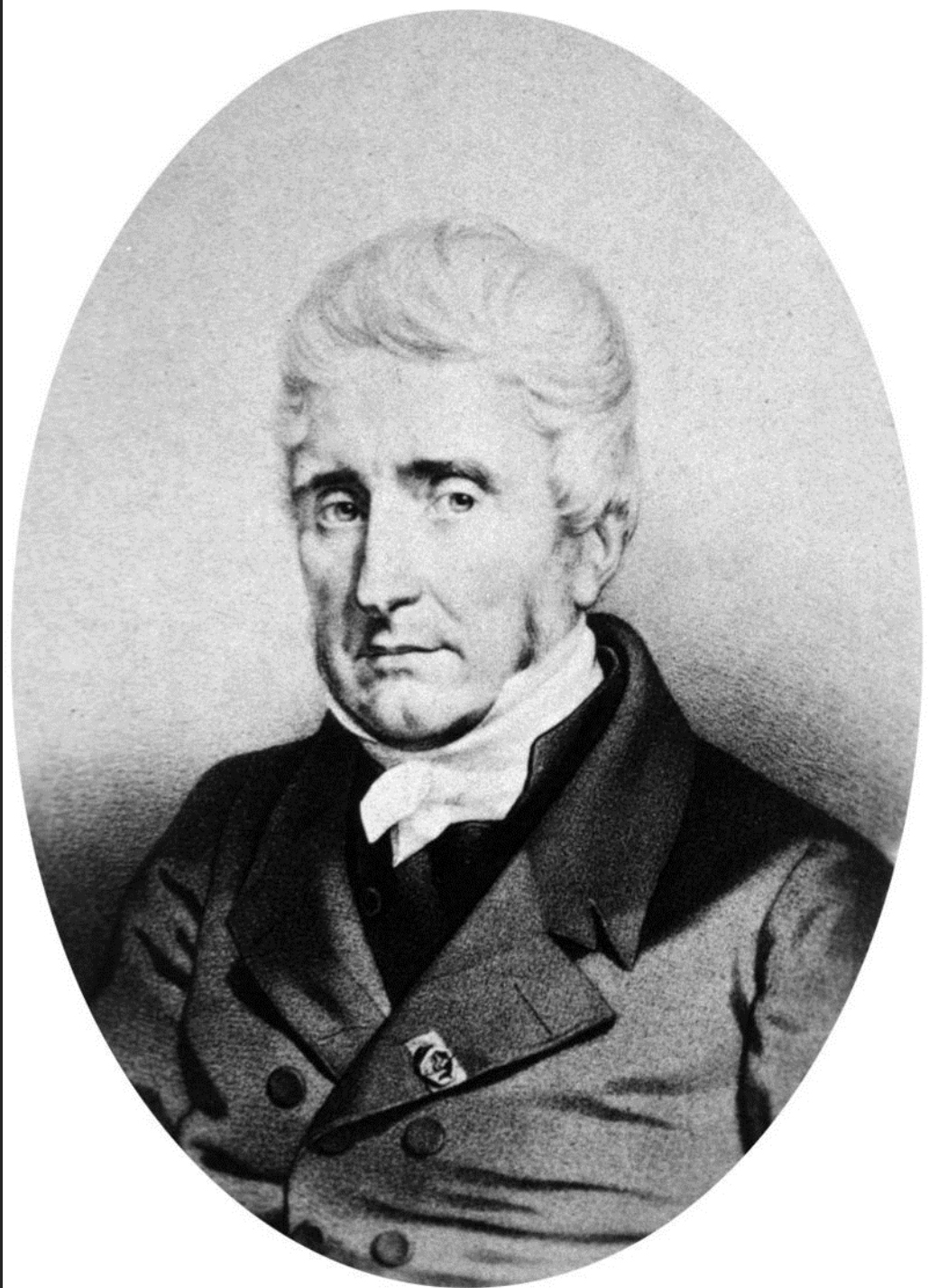
Football



Lisfranc Injury

Fracture Dislocation

Surgical Repair Common





Exam predictors

Mechanism

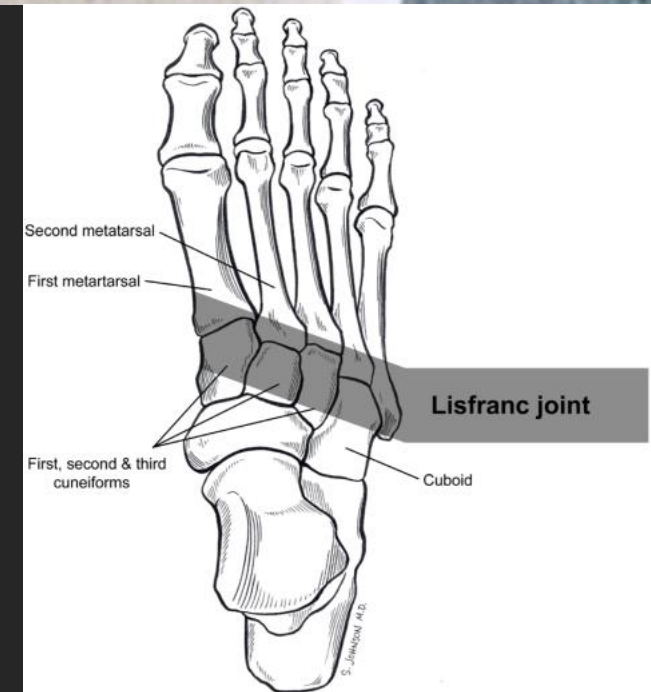
Plantar flexion w external rotation

TTP midfoot

Midfoot plantar bruising

Pain with rotation of midfoot

Piano key test



X-Ray Findings

Widening of 1st, 2nd or 3rd
metatarsal bases
>2mm requires urgent
surgical referral

Fleck sign

Sometimes subtle





Orthobullets.com



Orthobullets.com

If in doubt, image both feet weight bearing



L



L

Weight Bearing



CT more sensitive, but rarely needed

Suspected without widening?

Posterior back slab, NWB, and ortho follow up

Lisfranc Injury

Failure to localize pain

Can't diagnose what you don't suspect

Not obtaining weight bearing view with clinical suspicion

12 year old female

Right hip pain for 2 weeks

Right hip x ray normal

Recent viral uri

Dx: Transient Synovitis

Follow up

Ortho pinning!

Slipped Capital Femoral Epiphysis

Special Salter I Variant

Mean age: 12-13

Obesity the only significant risk factor

R

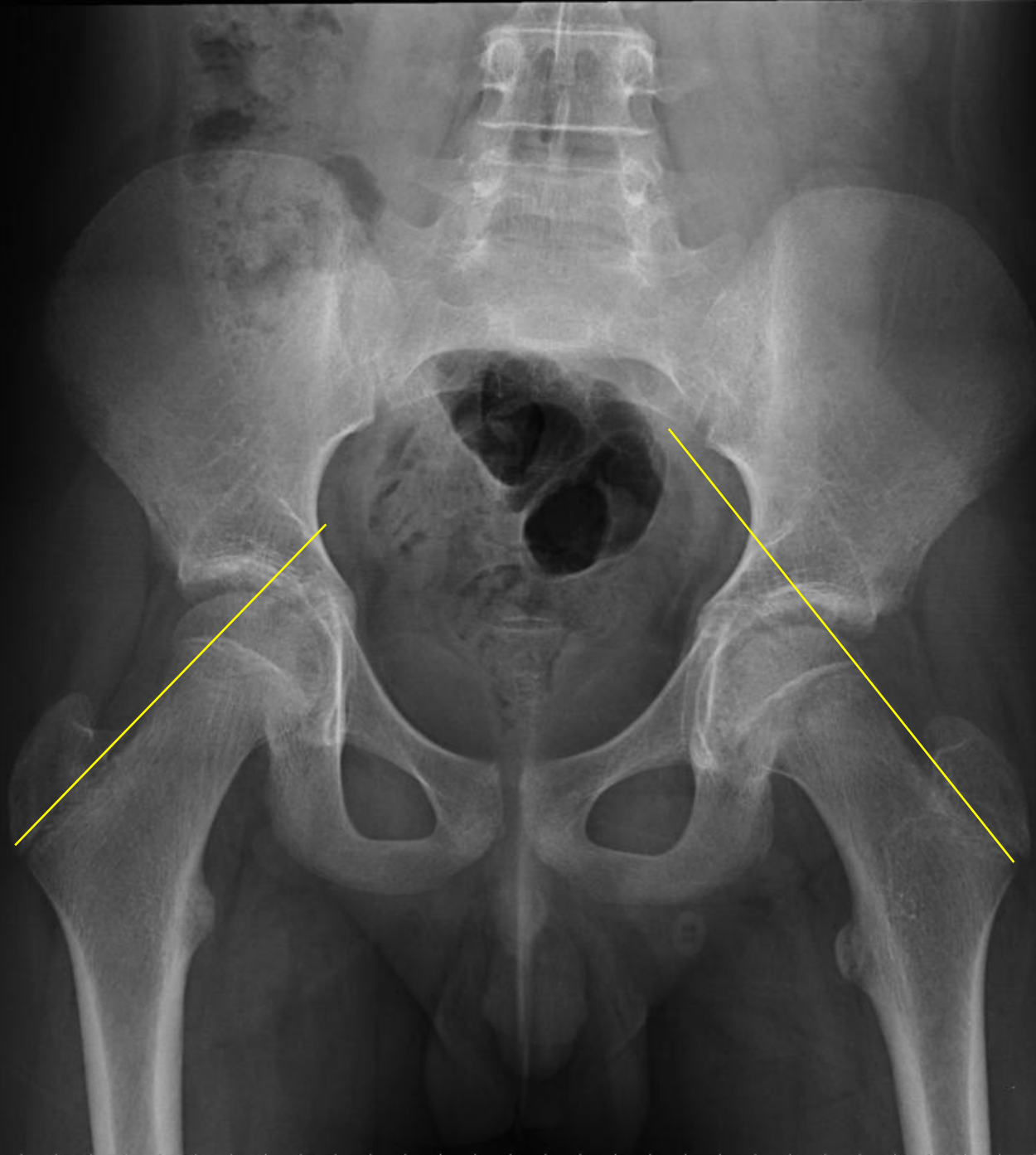


Klein Lines

(L)



R



Klein Lines

Frog Leg view

Line along external part of femoral neck

Should intersect part of femoral head

Symmetry can mislead!

20-40% bilateral

If suspecting SCFE, obtain pelvis views

Visualize both femoroacetabular joints

Acute & Chronic types

Miss the diagnosis?

Leg length discrepancy

Permanent gait abnormality

Avascular necrosis

SCFE

Consider in the 8-18yo with limp and hip pain

Obtain B hip views

Klein lines

To Review

Flexor tendon lacerations – know how to assess FDP, FDS. Put through full ROM.

If in doubt, splint and refer to hand

Posterior Shoulder dislocation – Axillary view best, light bulb sign on AP

Syndesmosis injuries – Force transmitted to proximal joints
Squeeze test

Lisfranc injury – Weight bearing can clinch, suspicious injuries

SCFE – Klein lines on frog view

Know the age range