

Common Pediatric Orthopedic Injuries and Management

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Objectives

- Understand the unique anatomy of pediatric fractures
- Identify the most common orthopedic injuries seen in pediatric patients
- Identify at-risk patients that require orthopedic consultation

Describing Injuries 101



Proximal vs Distal

- PROXIMAL - towards trunk
- DISTAL - towards hand/foot

PROXIMAL



DISTAL

Open vs Closed

- OPEN - break at skin at fracture site
- CLOSED - skin intact at fracture site

*the term
"compound" is no
longer used



Displacement

- Describe by distal fragment
- “distal fragment displaced 50% dorsally”

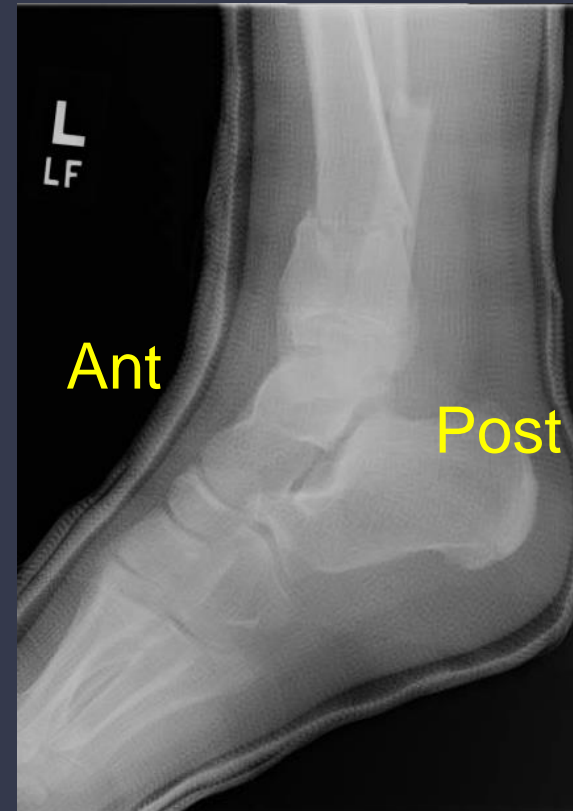


Angulation

What direction does the
distal fragment point?

OR...

What direction does the
apex point?



Volar



Dorsal

Rotation

- Describe clinically by looking at fractured extremity

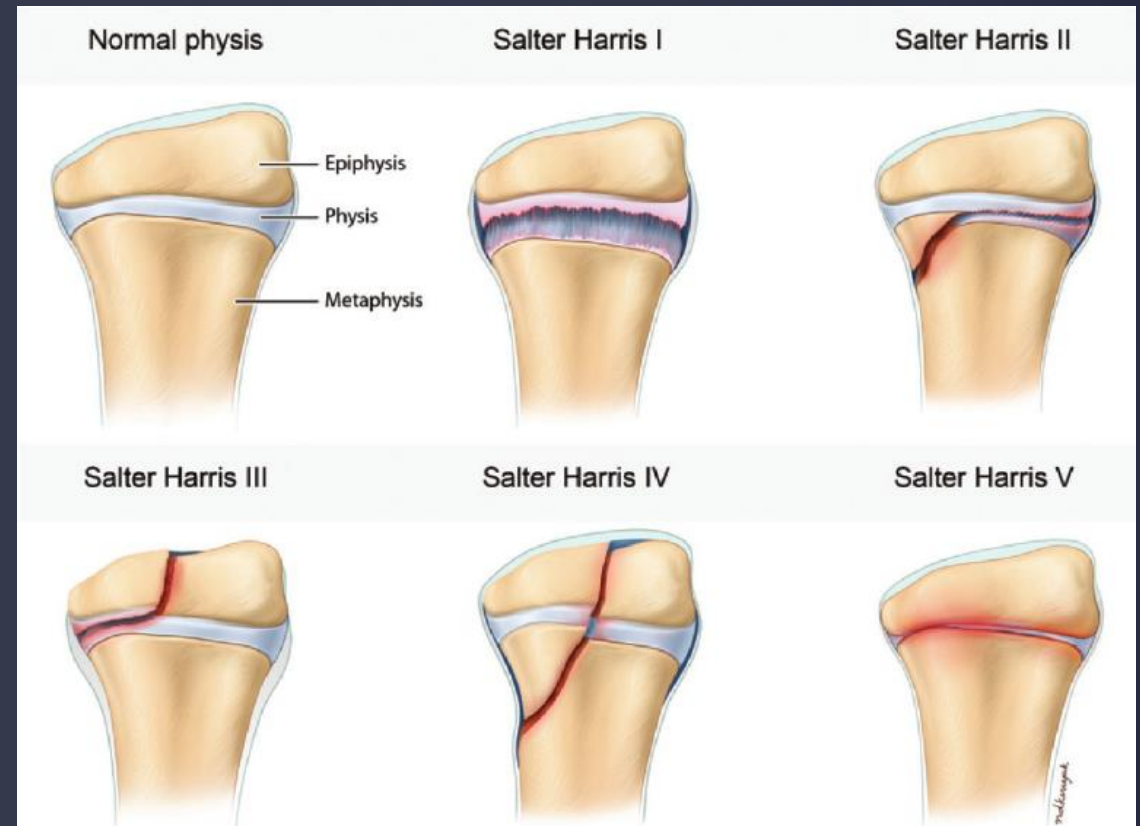


Unique Pediatric Anatomy



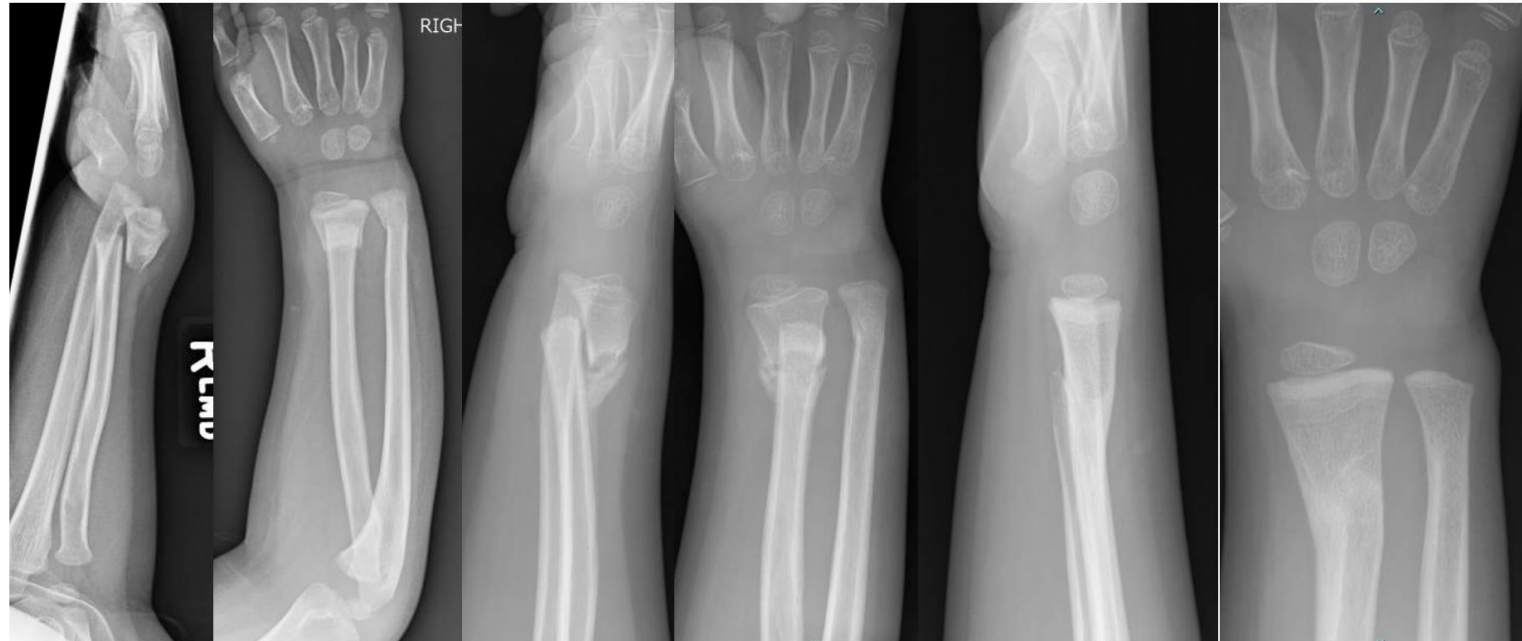
Pediatric Fractures

- Not just small adults!
 - ↓ healing time
 - ↑ immobilization tolerance
- Growth plate (physis)
 - Weak point
- Thicker periosteum
 - Faster healing
 - Less displacement
- Remodeling ability



Remodeling

5 year old M with R distal radius and ulna fractures



Date of injury

4 weeks post-injury

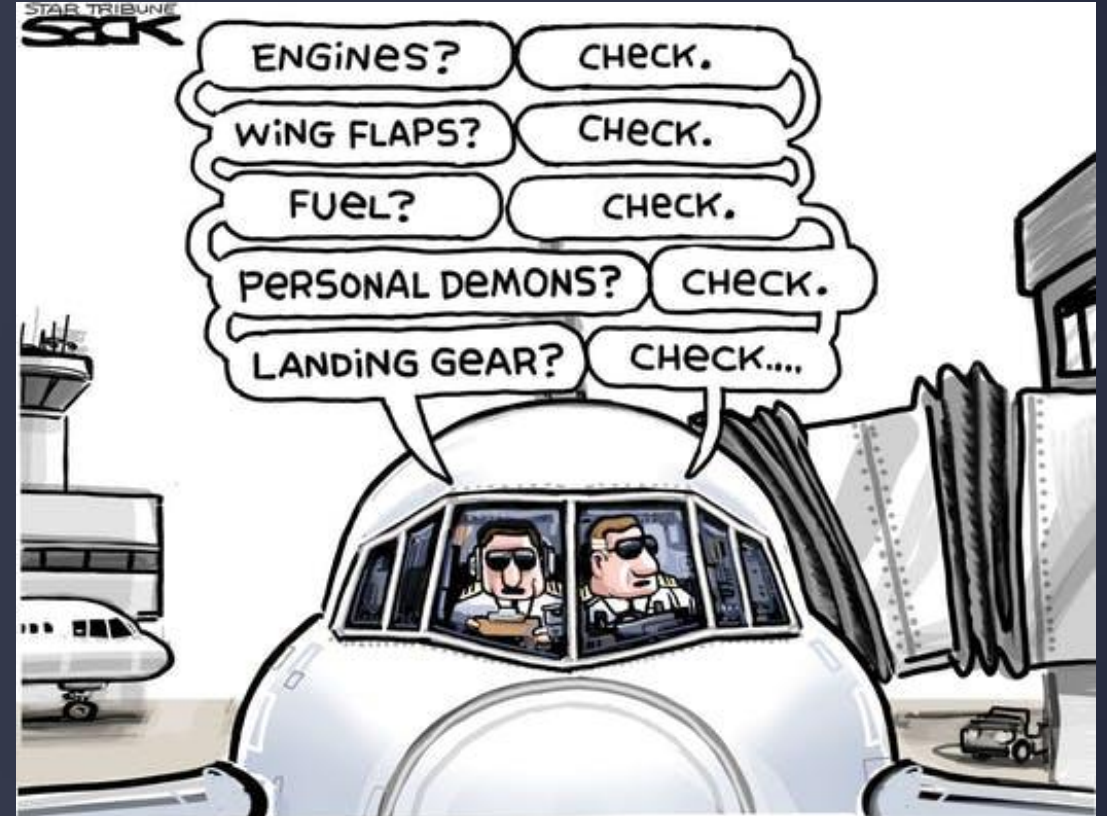
3 months post-injury

Plasticity of Pediatric Bones



Acute Fracture Management

- Systematic approach!
- Assess skin
- X-Rays
- Immobilization
- Pain control
 - Ibuprofen, Acetaminophen
 - Minimize narcotic usage*
- Swelling control

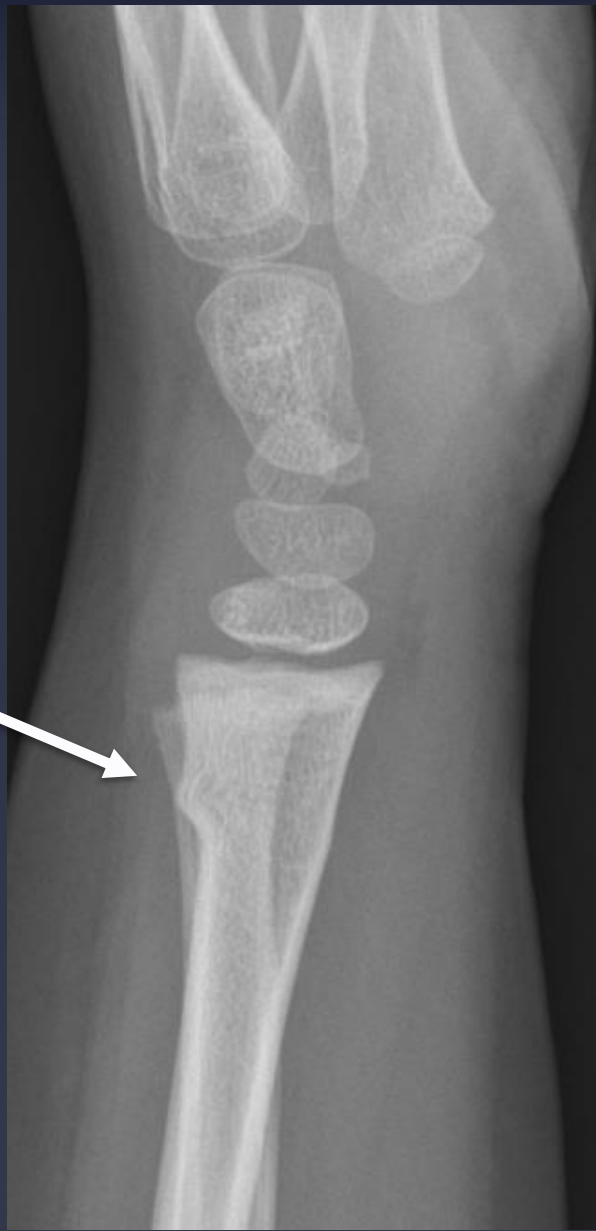


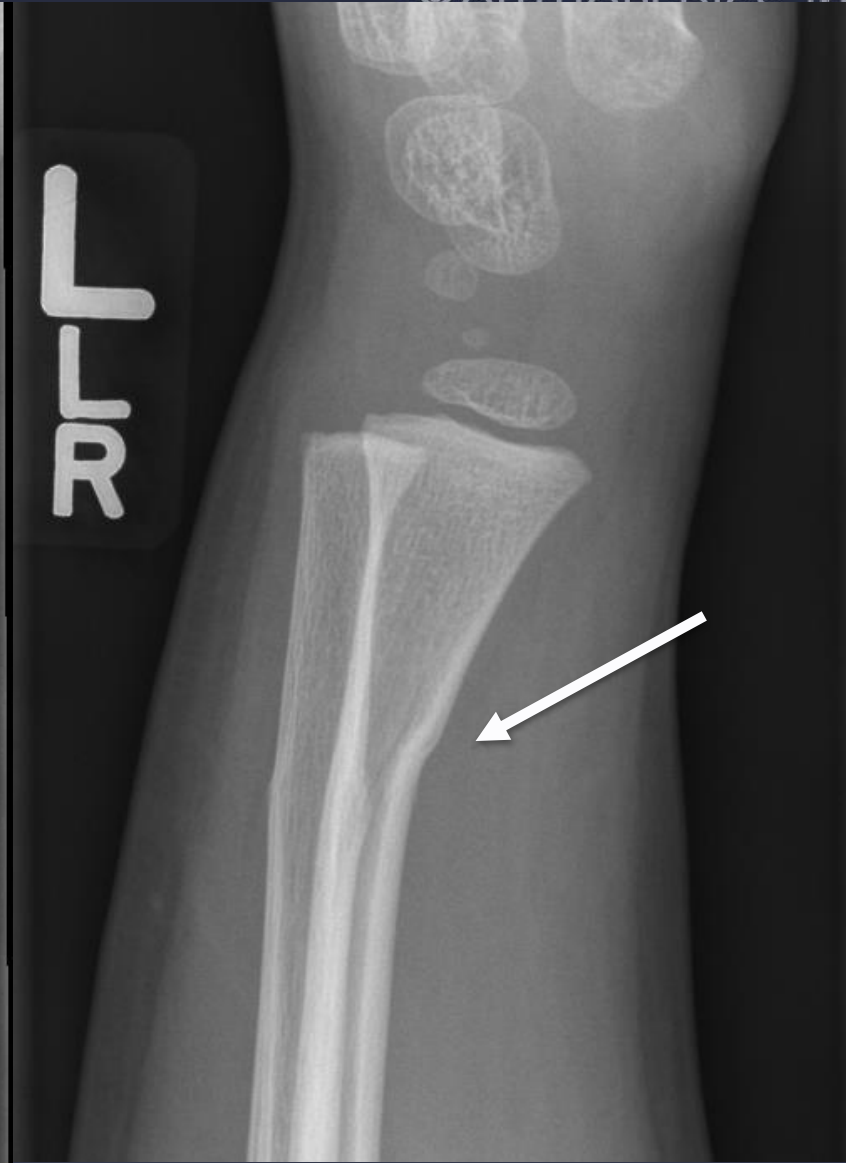
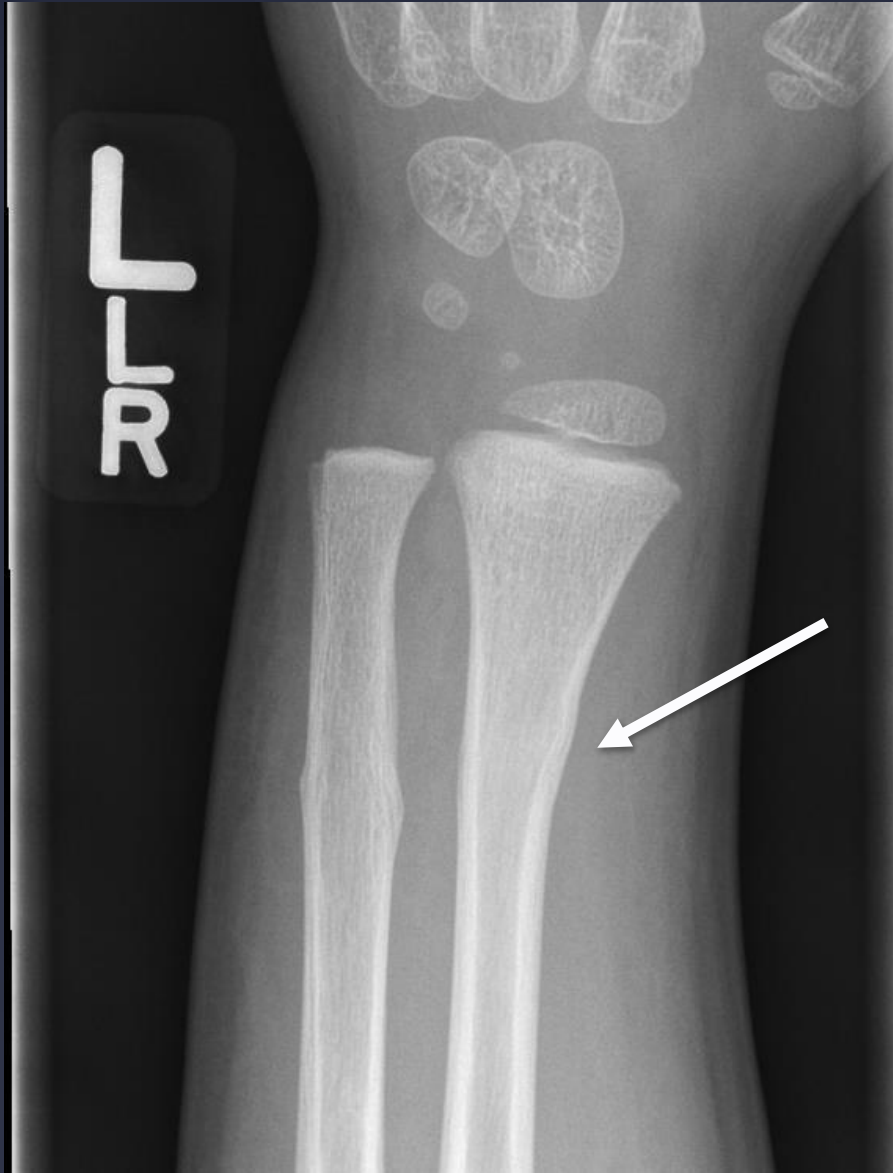
Common Pediatric Injuries



Common Pediatric Fractures

- Most Common:
 - Distal Radius & Forearm
 - Elbow
 - Hand
 - Tibial Shaft
 - Femoral Shaft
- Except for the femur, surgery is rarely required

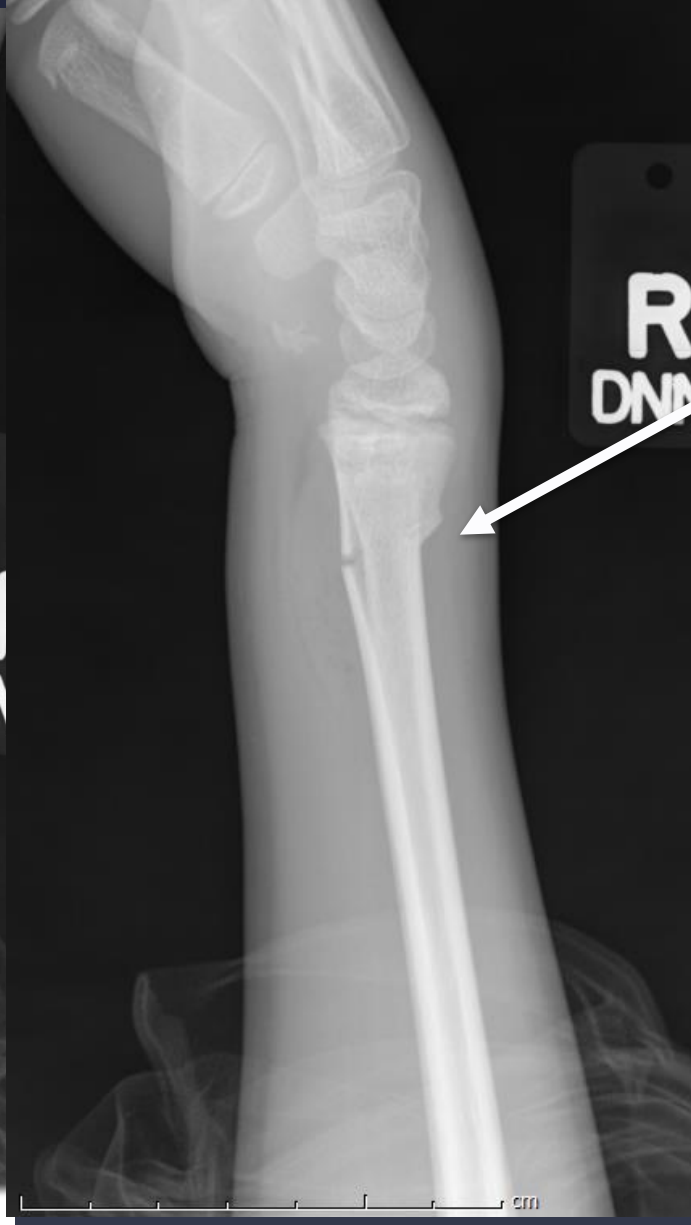




Buckle Fractures

- 2-4 weeks removable brace
 - Age <5 → 2-3 weeks
 - Age >5 → 3-4 weeks
- No pain = No follow up x-ray





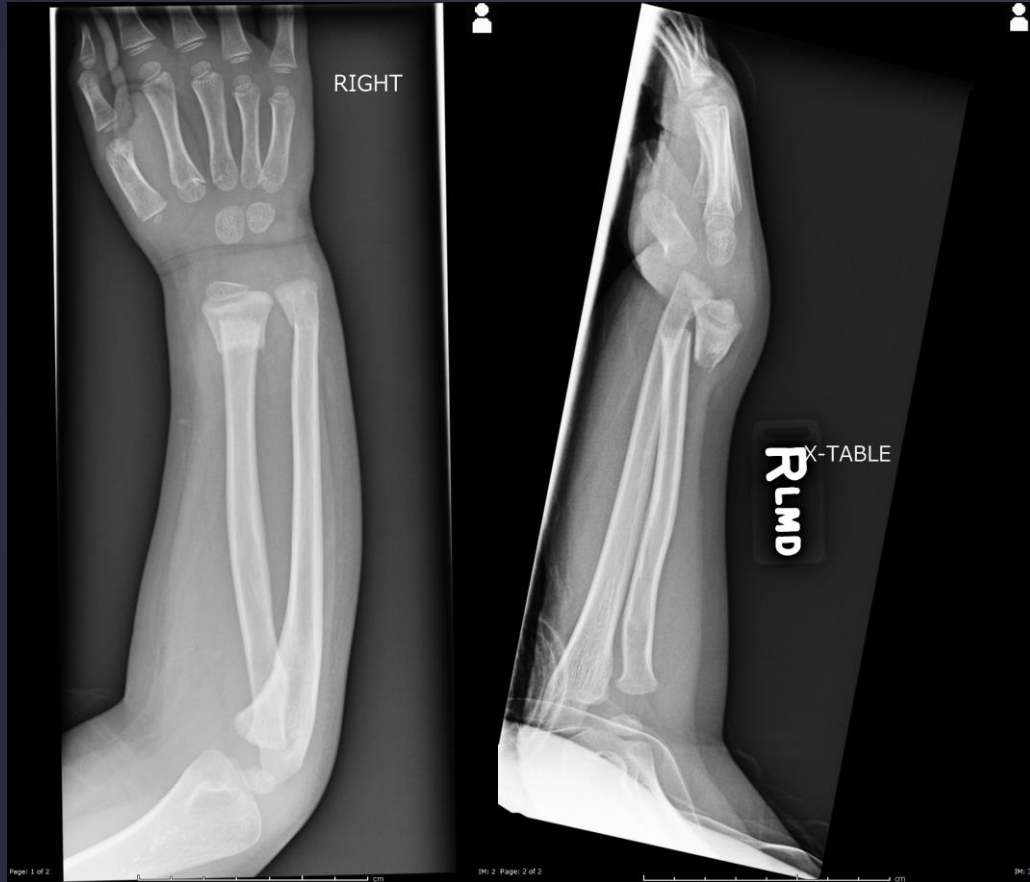
Distal Radius Fractures

- If minimally or non-displaced
- 4-6 weeks removable brace or short arm cast
 - Age <5 → 4 weeks
 - Age >5 → 6 weeks
- No pain = No follow up x-ray

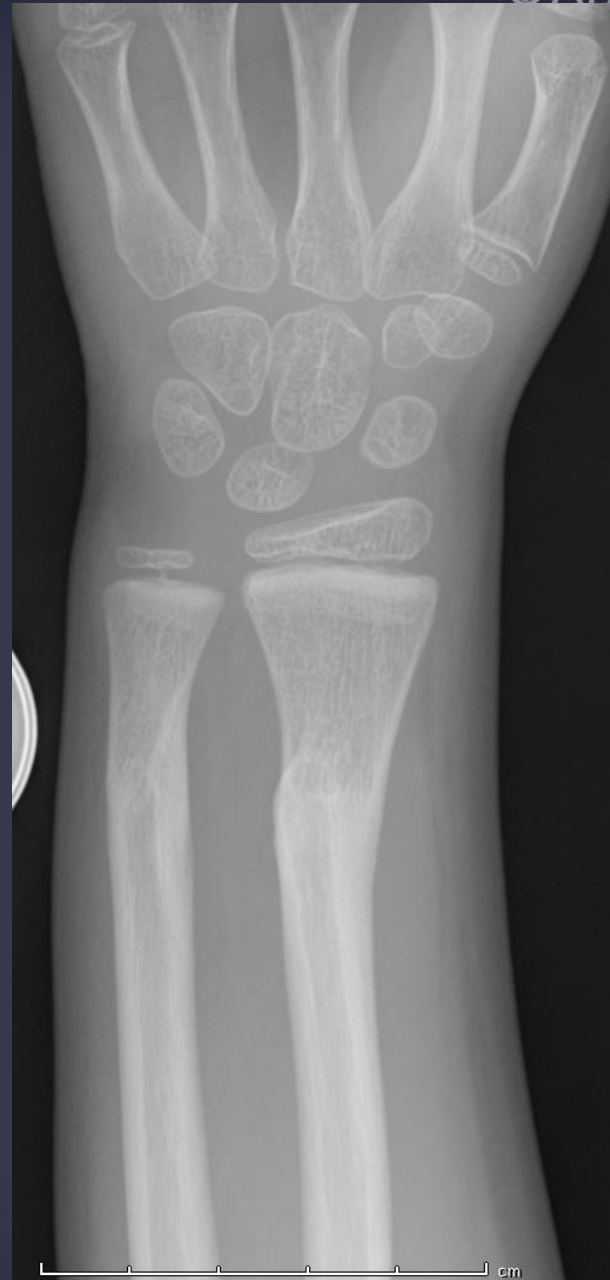
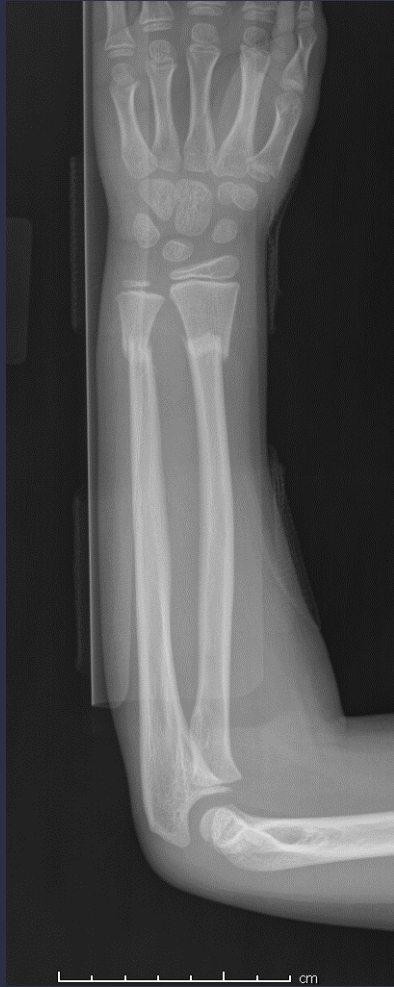
Distal Radius Fractures

- If displaced
- Age <8 have extensive remodeling potential
- Often do not need reduction
- Make arm/hand look straight and splint

Remodeling



Remodeling



Distal Radius Fractures

- If displaced
- Age > 8
- Closed reduction and sugar tong splint or long arm cast
- Check xrays in 1 week to ensure no loss of reduction
- 4-6 weeks in cast and x-rays to confirm healing
- 1-2 months wrist brace after cast removed



Distal Radius Fracture



Forearm Shaft Fractures

- Similar to distal radius fractures but less tolerance for malreduction
- Goal is clinically straight arm and splint
 - Age > 8 have large remodeling potential
 - Age <8 often require closed reduction or surgery to restore alignment

Forearm Shaft Fractures

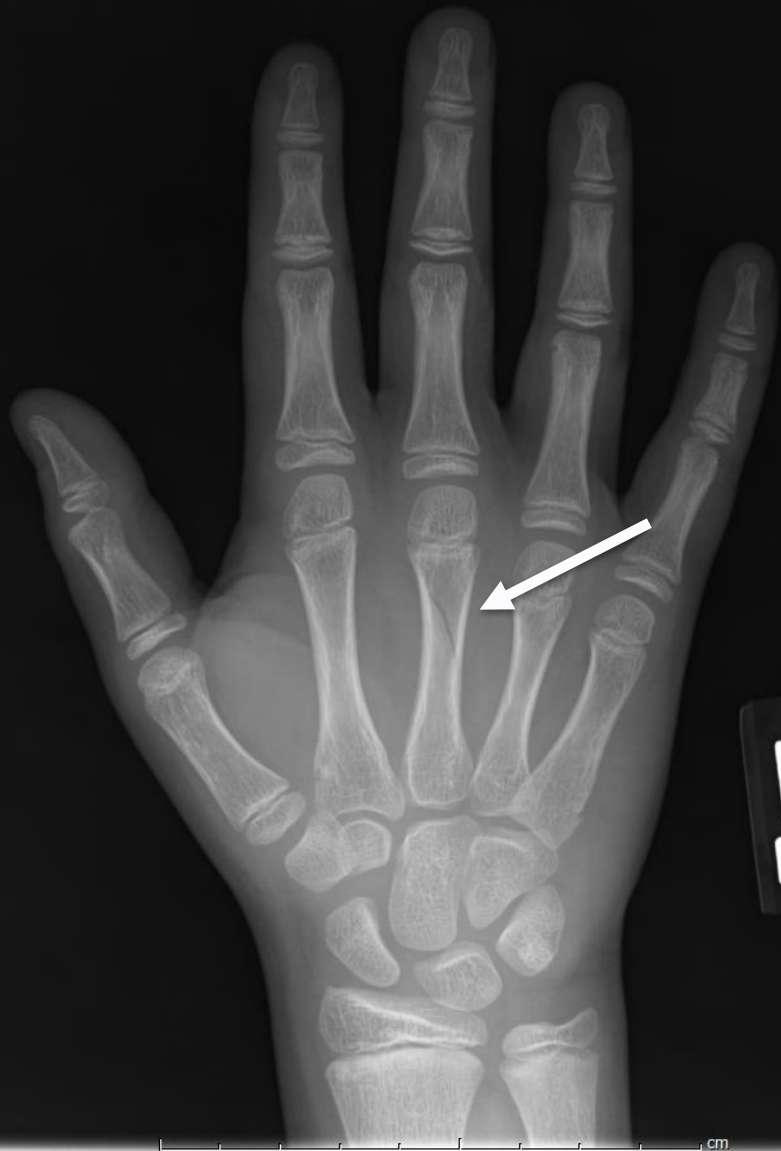


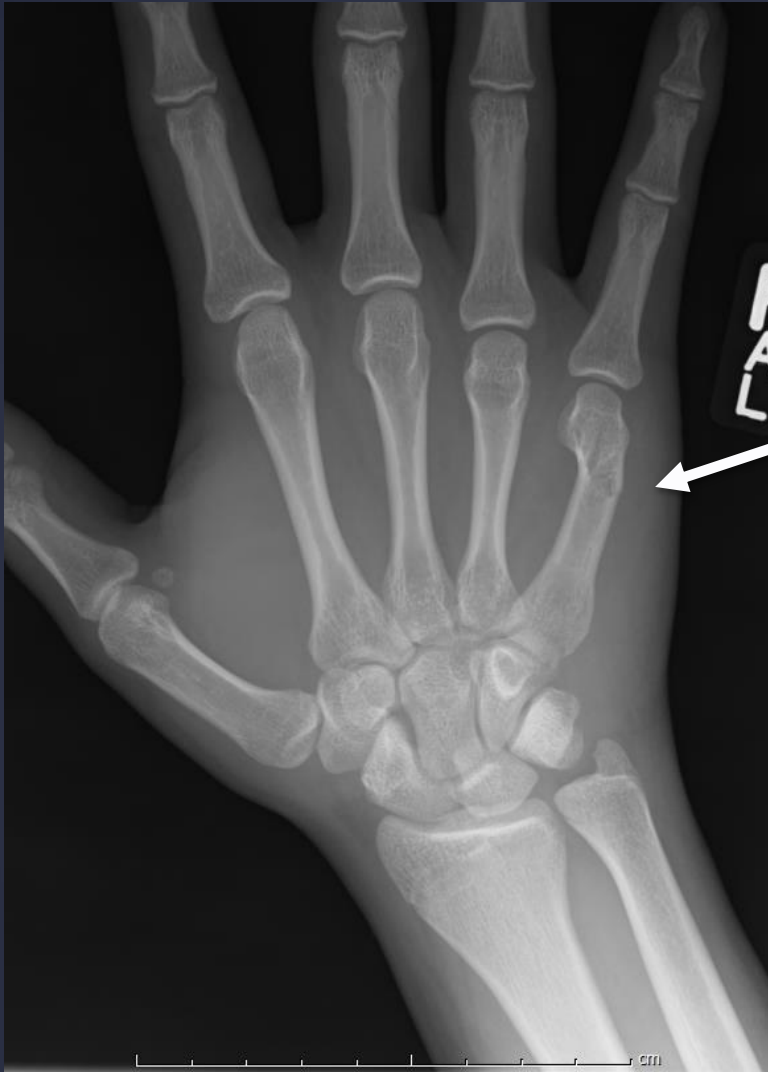
Forearm Shaft Fractures



When to Refer?

- Significant displacement and/or angulation
- Loss of alignment after closed reduction
- Physeal injuries
- Open injuries
- Poor perfusion of hand
- Loss of motor function or sensation





Metacarpal Shaft / Neck

- Check rotation!
- More ulnar digits can tolerate more angulation
- Most can be treated in a hand based splint
- 4-6 weeks



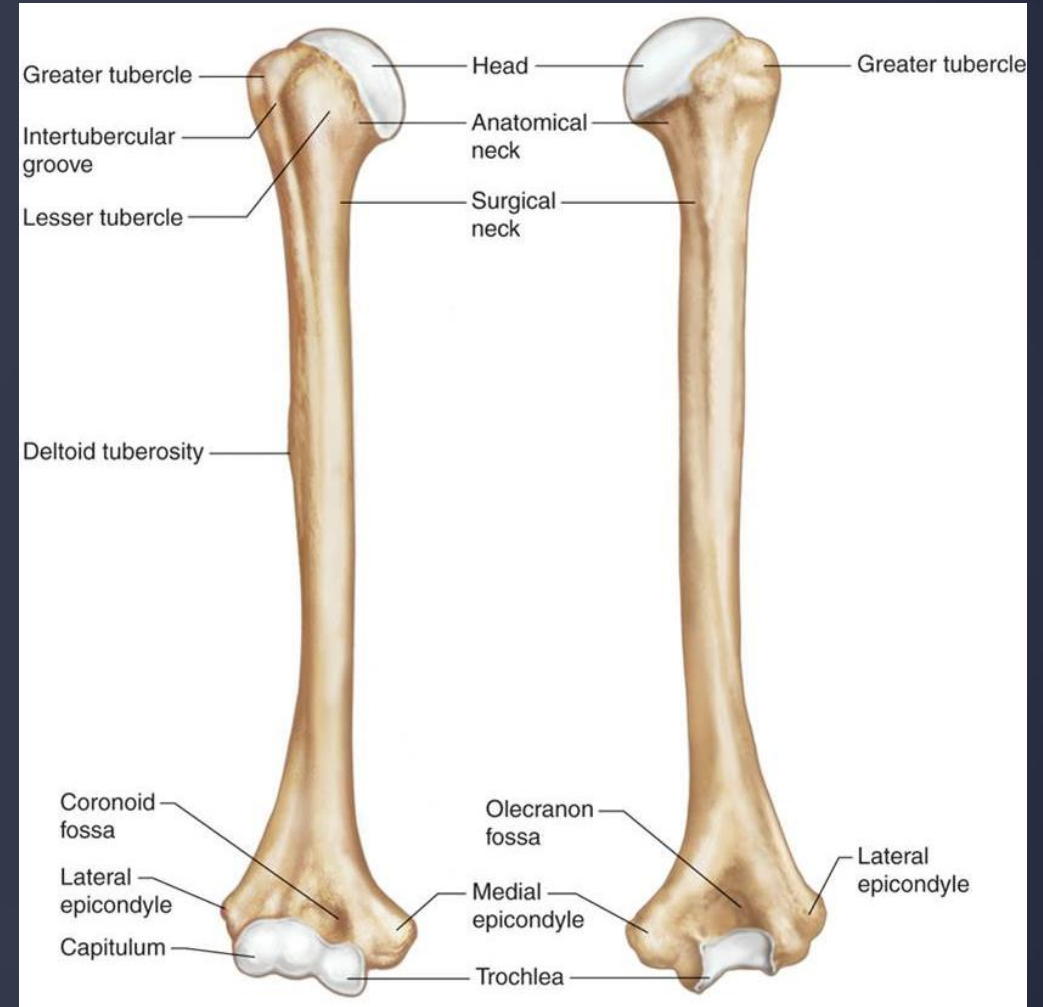


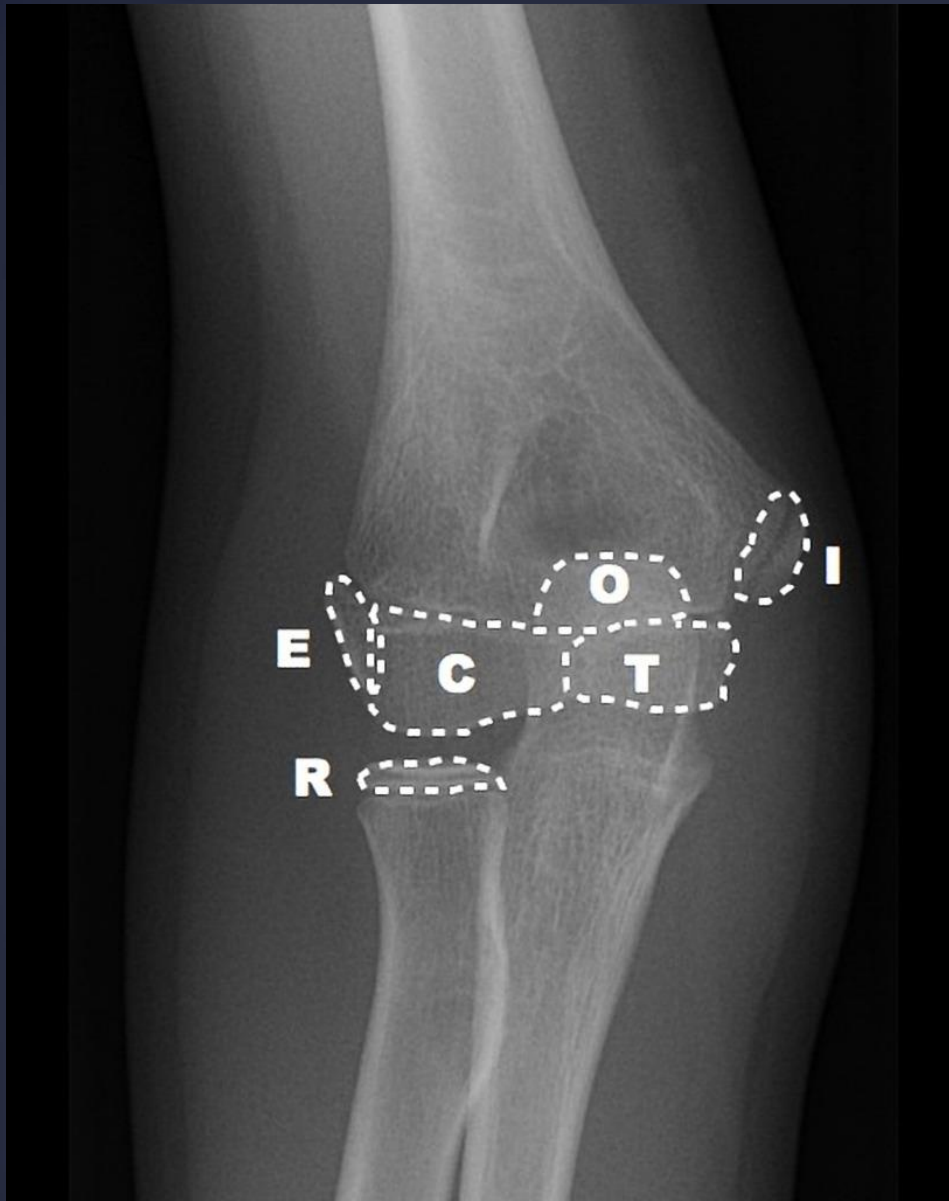
When to Refer?

- Malrotation
- Significant displacement and/or angulation
- Open injuries (including "fight bites")

Elbow Fractures

- Supracondylar humerus
- Lateral condyle humerus
- Less common:
 - Medial condyle
 - Medial epicondyle
 - Olecranon
 - Radial head/neck





Supracondylar Humerus Fractures

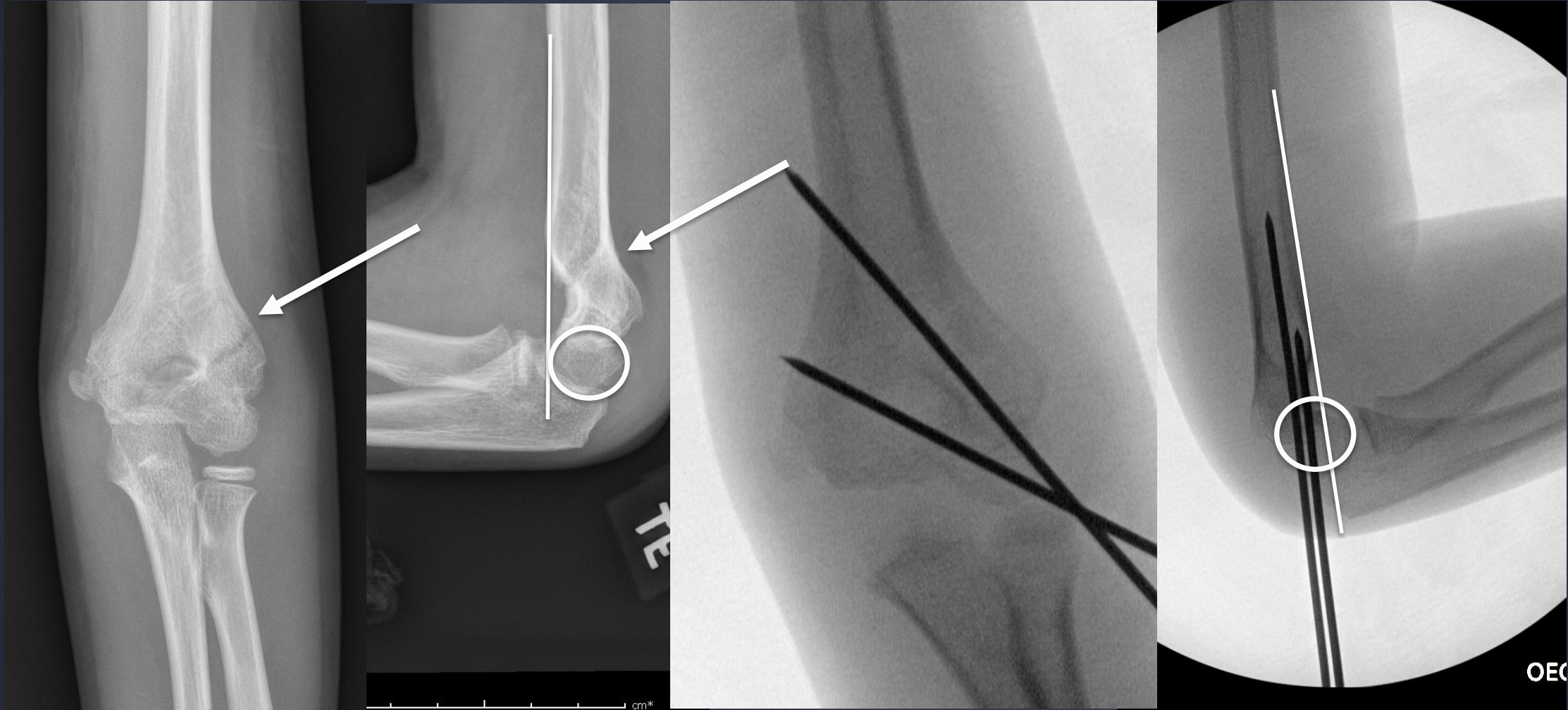
- Most common elbow fracture in children
- Graded on severity of displacement



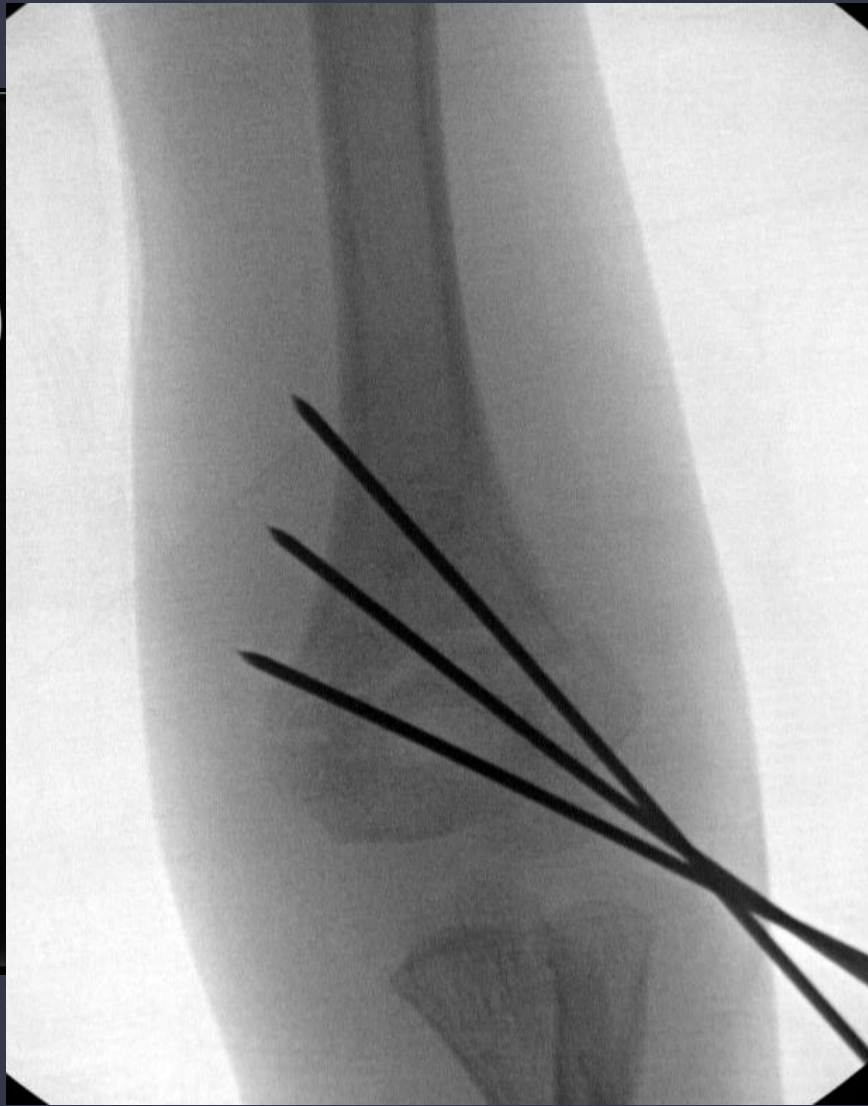
Nondisplaced – Type 1



Displaced – Type 2



Displaced – Type 3



When to Refer?

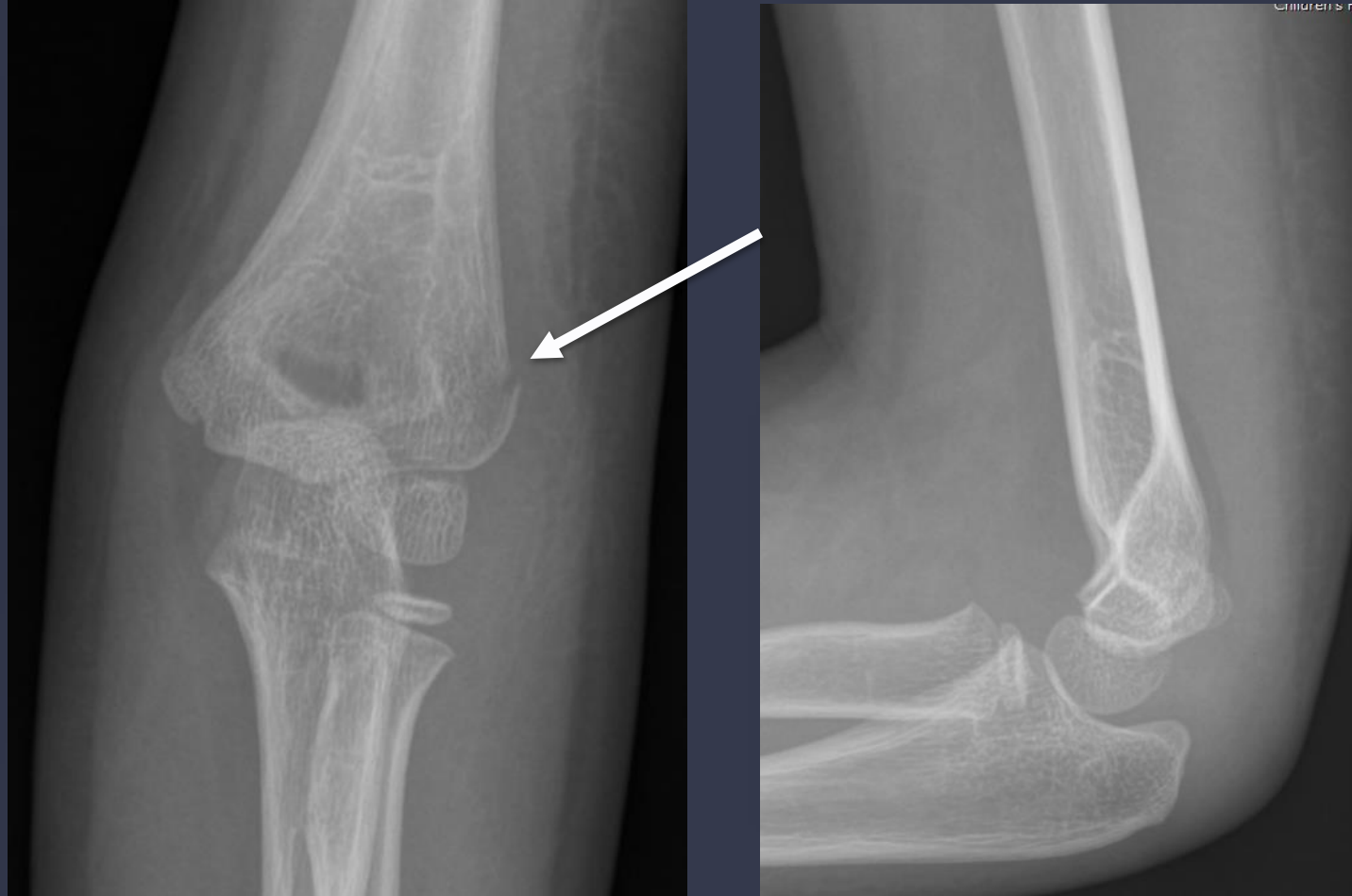
- Any displacement (ie anything other than type 1)
- Open injury
- Poorly perfused hand
- Loss of motor or sensory function

Lateral Condyle Fracture

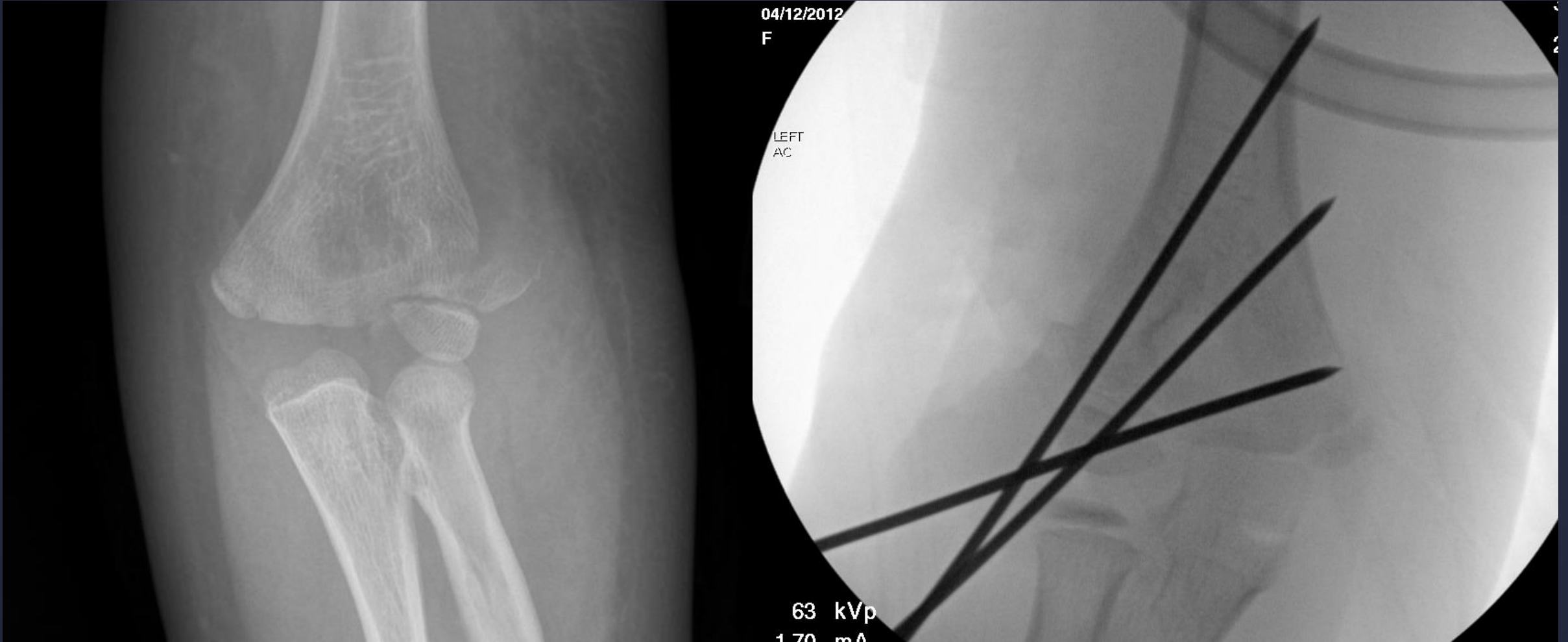
- Intra-articular fracture
- If the fracture line doesn't exit medially then it's not a supracondylar!



Lateral Condyle Fracture – Nondisplaced



Lateral Condyle Fracture - Displaced



When to Refer?

- All cases for close monitoring
- Higher rates of loss of alignment, nonunion than other elbow fracture types!

Toddler Fracture



Adolescent Tibia Fracture



Tibia Fractures

- Age 2-5 “toddler” fractures
 - Boot or short leg walking cast
 - No follow up xrays necessary
- Age 6-8
 - Walking cast 4-6 weeks
 - Fracture boot for 4-6 additional weeks
- Age >8
 - Need a near-perfect reduction with either casting under sedation or surgery

When to Refer?

- Displacement and/or angulation
- Age > 8
- High energy trauma
- Multiple fractures
- Open fracture
- Vascular injury
- Concern for compartment syndrome

Femur Fractures

- Age < 1
 - Non-accidental trauma
 - Pavlik Harness
- Age 1-5
 - Spica casting or bracing
- Age >6
 - Surgical treatment



Spica Casting



Femur Fracture – Remodeling



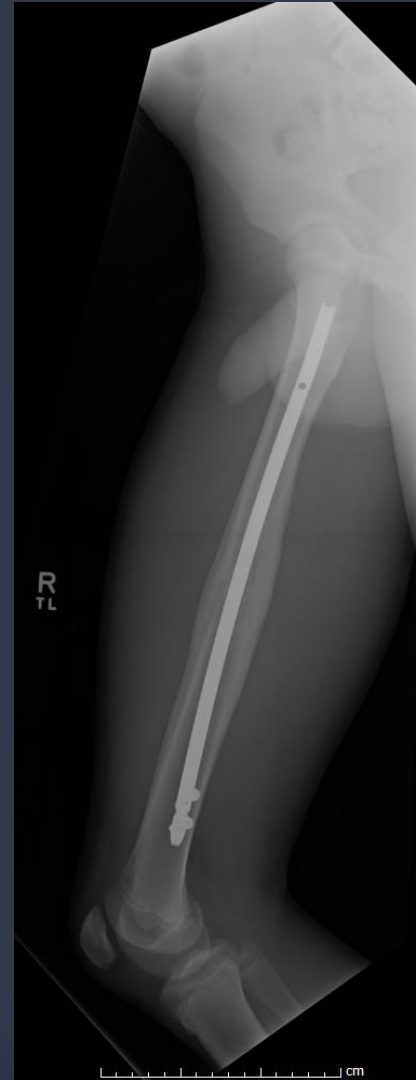
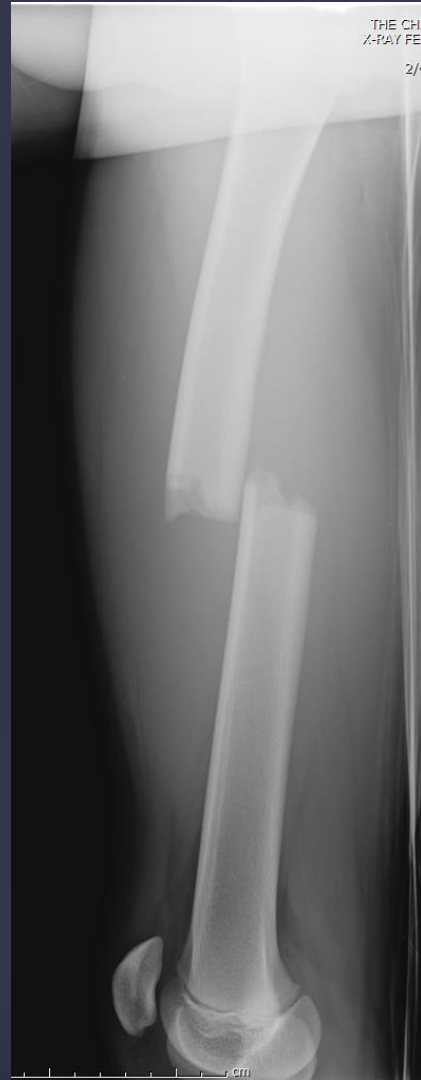
Flexible Nails



Plate Fixation



Rigid Nail



When to Refer?

- ALWAYS!



Questions?

Thank You

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