

IDENTIFICATION AND MANAGEMENT OF UPPER EXTREMITY PEDIATRIC FRACTURES

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OBJECTIVES

- Review long bone anatomy and variations of fracture displacement
- Identify the most common upper extremity pediatric fractures
- Distinguish between common pediatric fracture patterns and develop an appropriate initial closed treatment plan

LONG BONE ANATOMY

- Epiphysis – end of long bones
- Physis – growth centers
- Metaphysis – widened part of the shaft of the long bone
- Diaphysis – shaft of the long bone

FRACTURE DISPLACEMENT

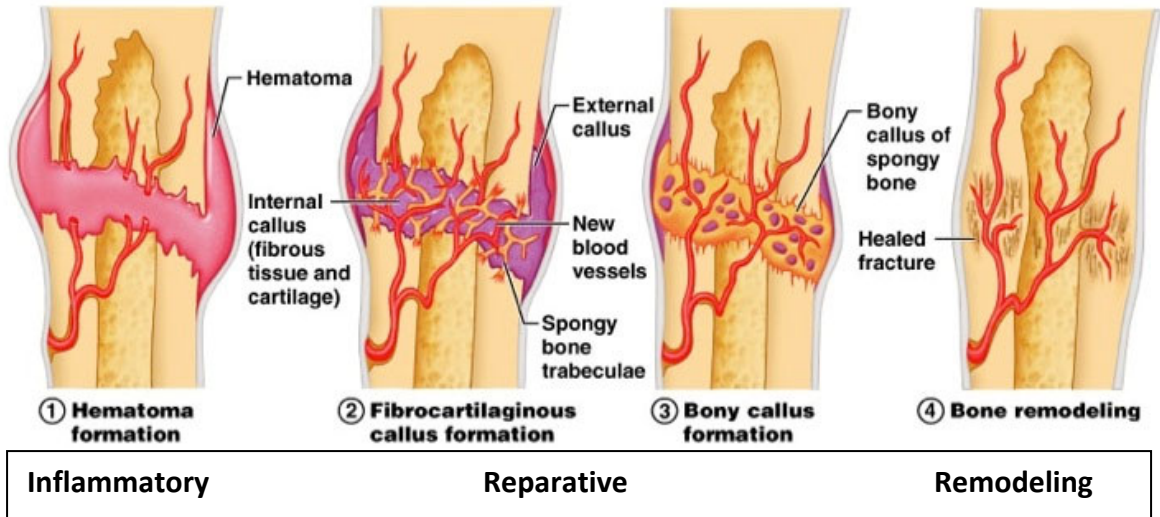
Displaced = abnormal positioning

- Shortened
- Translated
- Angulated
- Rotated

DISPLACEMENT PARAMETERS - RADIUS

AGE	ACCEPTABLE SHORTENING	ACCEPTABLE ANGULATION (SHAFT)	ACCEPTABLE ANGULATION (DISTAL)
<10	<1 CM	15-20 DEGREES	30 DEGREES
>10	NONE	10 DEGREES	20 DEGREES

FRACTURE HEALING



Inflammatory phase: 5-7 days; hematoma forms at the site of the fracture, inflammatory cells migrate to the region

Reparative phase: 4- 40 days; granulation tissue converts into cartilaginous callus that then calcifies; healing bone can be seen on x-ray

Remodeling phase: periosteal callus converts into mature bone, unnecessary callus is resorbed

PHYSEAL FRACTURES

Salter Harris Classification (I-V)

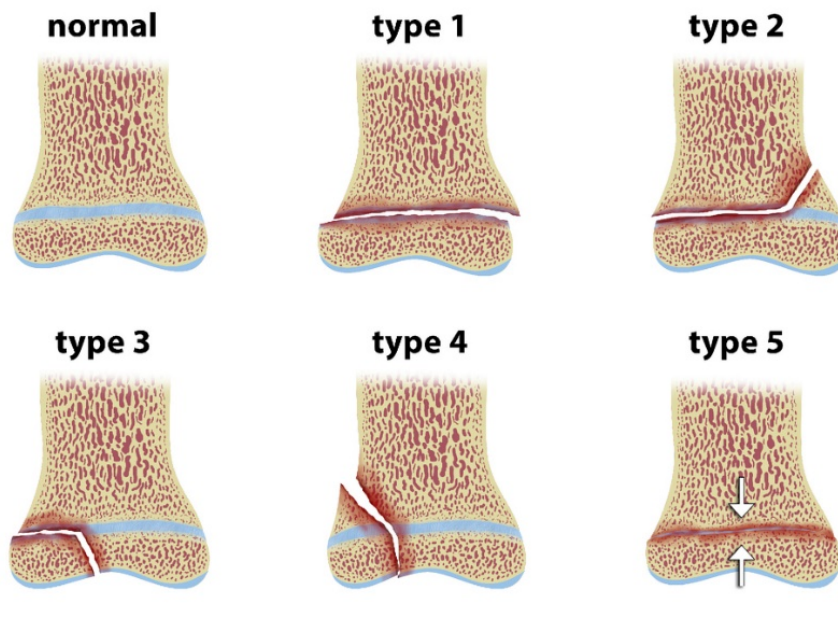
I – Separation

II – Above and extending into the physis

III – Below and extending into the physis

IV – Through the physis

V – Physis is rammed/ruined/erased



The physis is made of cartilage = weakened portion of the bone

Fractures in this location heal very quickly and require a short course of immobilization

RADIUS AND ULNA FRACTURES

Occur in the metaphysis and/or diaphysis

Classified as:

- Buckle – only one cortex is damaged, no displacement
- Greenstick – one cortex breaks and the other is bent
- Bowing/plastic deformity – bone is bent but does not “break”; no fracture line
- Complete – fracture line visible all the way through the bone

SUPRACONDYLAR HUMERUS FRACTURES

Fracture of the distal humerus

Common between 5-7 years of age

- Type I - anterior humeral line touches the capitulum
 - Treated with cast immobilization for 3-4 weeks
- Type II – anterior humeral line does not dissect capitulum
 - CRPP vs ORIF
- Type III – full disruption of the distal humerus
 - CRPP vs ORIF



Anterior humeral line should pass through the middle third of the capitulum in a normal elbow

Posterior fat pad = posterior joint effusion

- Radiographically indicates a fracture even if not visualized



INITIAL TREATMENT

- Check neurovascular status
- Obtain plain films
 - Include joint above and below
- Determine need for orthopedic consultation for fracture reduction
- Apply a sugar tong splint versus long arm posterior
 - *Distal radius and/or ulna = sugar tong splint*
 - *Proximal radius and/or ulna = long arm posterior splint*

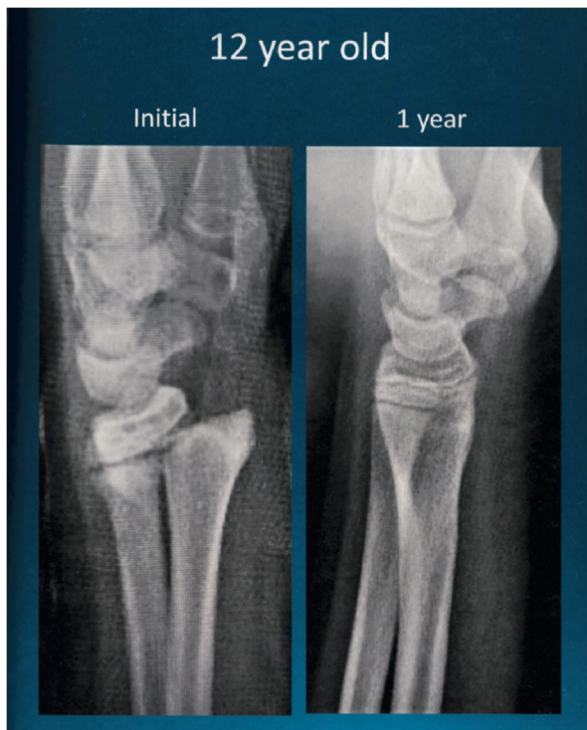
MONTEGGIA FRACTURE

- Radial head dislocation with a proximal third ulna fracture
- Should get elbow x-rays in all suspected forearm fractures to rule out *this* fracture pattern
- Requires orthopedic consultation for reduction





KIDS ARE MAGIC





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