Pediatric Hand Fractures

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Background

• Kids tend to have a bimodal distribution of presentation
  – Relatively small peak in toddlers
    • Crush injuries
  – Much larger peak in young teens
    • Fights
    • Sports
• Growth plate is involved in 30-40% of phalangeal fractures
  – >80% are Salter-Harris 2
Why are kids different than adults?
Kids are different from adults

- Incomplete ossification of phalanges
- Thicker periosteum
- Potential for physeal remodeling
Physis

- Zones
- When they close
Salter-Harris classification of physeal fractures

- **Normal**
- **Type I**: Straight across
- **Type II**: Above
- **Type III**: Lower or Below
- **Type IV**: Two or Through
- **Type V**: ERasure of growth plate or CRush
What fractures are easy to miss?
Easy to miss

- Buckle Fractures
- Nondisplaced fractures
Evaluation

• Inspection – Bruising and swelling
  – Laceration – managing open injuries
• Vascular – perfused digit?
  – Crush injuries
• Sensory/Neuro
• Tenderness
• Alignment
When advanced imaging

- **CT scan** -
  - Articular alignment in comminuted interphalangeal joint fractures
- **MRI** -
  - Wrist injuries
  - Ongoing pain despite immobilization
  - Soft tissue injuries/ligamentous
When to reduce

• Three planes of alteration
  – Coronal - >20 deg or when impairments to dexterity based on where the finger lands in space with flexion/extension
  – Malrotation – if crossing of fingers
  – Sagittal plane – if arc of active range of motion is limited, and there is less than one year of growth remaining

• Can the fracture heal
  – At least 50% of the cortical width being in <2 mm contact
When to reduce

• Any of these criteria are met? -> reduce
• What if I can’t numb them up?
  – If distal to the MCPJ – then just buddy tape
How to reduce

• Easiest thing for the digits – buddy tape adjacent fingers together
• Put them in a splint
  – Needs to have a joint above and a joint below - immobilized
Management

- Non-op
- Operative
  - Mostly pins
What is the best way to immobilize a fracture?
• Does it need a reduction, or does it involve the joint?
  – Cast immobilization for at least two weeks
• All others – up to the family
  – Small kids/babies – cast, and oftentimes above the elbow
  – Older
    • Buddy taping/straps
    • Aluminum splints
    • TKO splints
    • Orthoplastic splints
    • Casts
Which injuries need to go to the Emergency Room?
• Open fractures
• Concerns for the neurovascular status to the hand or digit
• Fractures in children that won’t tolerate local anesthetic, and where operative intervention is not possible and they need a simple reduction
• Insurance issues?
When is a fracture considered healed?
• Nontender to percussion
• Negative "shake test"
• Evidence of radiographic healing
• *generally takes 2-3 weeks in the digits, a little longer with more proximal injuries
What protocol to use after fractures are healed?

When should someone be referred to therapy?
• Gradual return to activities as tolerated
  – Sports
• Give them two weeks to get range of motion back
  – Exceptions: complex injuries, intra-articular
Specific Injuries
Boxer’s Fractures
Volar plate avulsion fractures
Extra-octave fractures
Articles to know about
Minimally displaced and nondisplaced fractures did not displace on subsequent x-rays.

The only fractures that displaced were previously reduced fractures where the initial angulation >10 deg +/- malrotation.

- About 7% of these fractures
• Out of ~100 patients, a not significantly greater number of fractures displaced in the splinting group vs the buddy taping group
• The only fractures that displaced, were fractures that were displaced in the first place