Pediatric Forearm Fractures: Cast, ORIF, What Bone, and How?

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Results of Closed Management

- Thomas, et.al, 1975 93%
- Daruwalla, 1979 97%
- Creasman, et.al., 1984 95%
- Carey, Betz, et.al., 1992 94%
- Price, et.al.(non-anatomic)1990 92%
Diaphyseal Forearm Fractures

Principles

1. “The ulna shows you the angulation, the radius shows you the rotation”
2. Diaphyseal fractures heal more slowly
3. Malunion is a problem

Analyze the rotation

- Demand good AP and lateral radiographs
- Compare the width of the cortices

Cross-sectional incongruence
Lucky or good?

Why would anyone operate?

• Closed management is difficult
  • Precise understanding of acceptable alignment
  • More explanation to parents
  • Frequent return visits
  • Difficult to change and mold casts in a busy clinic
Diaphyseal Forearm Fractures

WHAT TO ACCEPT

• Up to 10-20° angulation in kids < 10 y/o
• No more than 10° angulation >10 y/o
• Complete displacement
• 30° malrotation
• Stabilize floating elbow
• Open Fractures
• Monteggia ??

Don't accept a crooked arm
• Straight ulnar border
• Correct rotation /angulation
• Oval long arm cast
• Make a good cast
  • Cast Index < 0.81
• Avoid re-fracture: splint or cast a few extra weeks if unsure

IM Fixation

• Minimally invasive
• Easy
• Avoid multiple passes
  • 2-3
  • Increase risk of Compartment syndrome
• Near anatomic alignment
  • Loss of radial bow ??
Radial Fixation

- Small flexible nail
  - Usually 2.0
- Proximal to Lister’s Tubercle
  - Beware of EPL rupture due to buried wire
- Radial insertion
  - Between 1st and 2nd Dorsal compartment
    - APL, EPB, and ECRL, ECRB
  - Radial sensory nerve

Ulna fixation

- Proximal and lateral
  - Flexible nail
  - Smaller diameter
- Proximal
  - Flexible nail
  - K wire
  - Rush Rod
  - Locking nail
  - Beware of FDP Entrapment

Single Bone Fixation

- BBFA with distal 1/3 fx radius
  - Avoid proximal radius fx
  - Acceptable reduction
  - Enough time to remodel
    - 8 to 12 year olds
    - At least 2 years of growth
  - Older patients treat as adults
Plate Fixation

- Advantage
  - Rigid Fixation
  - Complete correction of malrotation
  - Useful within 1-2 years of skeletal maturity

- Disadvantage
  - Larger incisions
  - Cost
  - Increase tourniquet time

Evaluation/Monteggia

- Forearm views
- Dedicated elbow views

Management

Time from initial injury
Fracture stability
Age of patient
Pattern of injury
Management

Scenario #1
Acute fracture
Usually < 12 y/o
Greenstick ulna

Management

Scenario #2
Acute fracture
Unstable ulna
(often >10-12 y/o)
Management

Scenario #2
Acute fracture
Unstable ulna
(often >10-12 y/o)

Management

Scenario #3
Acute fracture
Irreducible radiocapitellar joint

Forearm Fractures – Final Thoughts
- Malunion-most common
  - Loss pronation/supination
- Monteggia
  - Straight ulna/stability
- Refracture
  - 5% within 6 months
- Compartment syndrome -10%
  - Multiple passes
- Tethering of FDP
  - Ulna fx
  - Check rom of fingers intraop