Distal Radius Fracture

Dr. Sameer Desai
Paediatric Orthopaedic Surgeon
KEM, Ruby, Sahyadri Hospital
Baramati-Last Saturday of every month
Distal radius fracture

- Physeal injury
- Incomplete fracture
- Complete fracture
- Paediatric galeazzi fracture
Physeal injuries

Salter Harris Type 1

Salter Harris Type 2
Salter Harris Type 1
Treatment options

• Closed reduction
• Closed reduction and K wire
• Open reduction
Displaced Distal Radius Physeal Fractures - Treatment

- Closed reduction usually not difficult
  - Traction with finger traps (reduce shear)
  - Gentle dorsal push
- Immobilize
  - Well molded cast / splint above or below elbow
  - 3-4 weeks immobilization
Physeal Injury Reduction Maneuver

1. Use finger trap for traction
2. Majority of correction achieved with traction
3. Gentle push to complete reduction
Closed reduction

- 3 point molding with slight wrist flexion
- Close followup is required because of risk of displacement
- **Delayed presentation**
  > 5 days - don’t reduce
Salter harris type 2: Closed reduction

- Distraction and flexion of distal epiphysis, carpus and hand over proximal metaphysis
- Intact dorsal periosteum is used as tension band to aid in reduction and stabilization.
Closed reduction and K wire

- Severely displaced physeal fractures
- Neurovascular compromise
- Volar soft tissue swelling
Technique

• Smooth pin

• 1.8mm K wire

• Hand drill
SH Type 2

Pre operative

Post operative
Open reduction and fixation

- Irreducible fracture due to entrapped periosteum or pronator quadratus
- Open fractures
- SH type 3,4
- Triplane equivalent fracture
- Surgical Approach - Volar
Complications

- Malunion
- Physeal arrest
- Ulnocarpal impaction syndrome
- TFCC tears
- Neuropathy
Metaphyseal fractures

- Torus
- Incomplete or greenstick
- Complete fractures- with or without ulna fracture
Torus fracture

- Axial compression injuries
- Junction of metaphysis and diaphysis
- Stable fractures because of intact periosteum
- Treatment - splint/cast
Incomplete/greenstick fractures

- Controversy exists regarding position of cast
- Apex volar fractures represent supination deformity hence according to some cast must be in pronation
- Apex dorsal fractures are malrotated in pronation hence cast must be in supination
- Above elbow/below elbow
Apex volar-plaster in pronation
Remodeling Potential
Variables to Consider

• Age of child
• Distance from fracture to physis
  – Distal metaphyseal fractures most forgiving
  – Proximal forearm fractures: much less remodeling
• Angular deformities:
  – Physeal growth: correction of 0.8 - 1 degree per month, or ~10 degrees per year
• Rotational deformities will not remodel
Acceptable angular correction

<table>
<thead>
<tr>
<th>AGE</th>
<th>SAGITTAL PLANE</th>
<th>FRONTAL PLANE</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-9</td>
<td>15-20</td>
<td>15</td>
</tr>
<tr>
<td>9-11</td>
<td>10-15</td>
<td>5</td>
</tr>
<tr>
<td>11-13</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>&gt;13</td>
<td>0-5</td>
<td>0</td>
</tr>
</tbody>
</table>
Green stick fracture-radius

Pre operative

Post operative
Radius and ulna

Pre operative

Post operative
Risk factors for loss of reduction

- Poor casting
- Bayoner apposition
- **Translation greater that 50% of diameter of radius**
- Apex volar angulation greater that 30 deg
- Isolated radius fractures
- Radial and ulnar metaphyseal fractures at same level
Distal end Radius fracture

Clinical
Reduction and fixation

Hyper dorsiflexion maneuver
Bayonet apposition
Reduction technique

Distraction

Joystick
K wire
Compound fracture

X ray

Clinical
K wire fixation
Distal Radius Fractures – Potential Complications

- Growth arrest
  - Around 4-5%
- Malunion
  - Will typically remodel
  - Follow for one year prior to any corrective osteotomy
- Shortening
  - Usually not a problem
  - Resolves with growth

Remodeling at 2 years
Growth Arrest following Distal Radius Fracture

Injury films

Injured and uninjured wrists after premature physeal closure
Distal Radius Growth Arrest

- Relatively rare (approx 4%)
- Related To:
  - Severity of trauma
  - Amount of displacement
  - Repeated attempts at reduction
  - Re-manipulation or late manipulation
Complication

Pre operative

Intra-op
After plaster removal

9 months followup

Clinical (at 9 mth)
Remodeling Potential - 12 yo Male

Presented 10 days after fracture – no reduction, splinted in ED and now with early healing – no additional reduction

At 6 months – extensive remodeling of deformity noted
Malunited distal end radius
Fixation
Combined injury
Pediatric Galeazzi fracture

- These fractures are often missed and may be difficult to recognise.

- If there is an isolated radius fracture, always examine the DRUJ on x-ray.
Galeazzi Injury Complex

Fracture of distal radius associated with DRUJ disruption

Dorsal

Volar

Fracture of distal radius with distal ulnar physeal fracture

Equivalent
Treatment

• Most of these fractures can be managed with closed reduction. Fluoroscopy should be used to assess stability of the DRUJ after reduction.
• Adolescents are more likely to need open or percutaneous fixation to stabilise the DRUJ after reduction.
• Risk of ulna growth arrest (50%) in Galeazzi equivalent
Thank you