Hand & Wrist Injuries in the Young Athlete

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Disclosure

• I have no relevant disclosures or conflicts of interest related to this topic
Facts

Hand and wrist injuries account for ¼ of athletic injuries

I have not been allotted ¼ of the program to cover hand and wrist injuries
Objectives

• Discuss epidemiology of hand fractures
• Understand basics of hand and wrist anatomy – The key to all of Orthopaedics!
• Initial evaluation and treatment
• Principles to guide follow-up care
• When to seek out specialty care
Incidence of Hand Injuries

- Varies with age
- Steep rise in school age (5-8 yrs)
- Peak at adolescence (contact sports)
  - Ages 12-16 comprised 60% all hand referrals
- Boys 3:1 girls overall
- Football > basketball > other sports
  - Hastings & Simmons, CORR 1984
Fracture Patterns in U.S.

- Most common fracture: Small finger proximal phalanx Salter-Harris II
- Fifth ray (30%)
- First ray (20%)
- Central rays protected

Table 3: Distribution by Bone

<table>
<thead>
<tr>
<th>Bone</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metacarpal</td>
<td>20%</td>
</tr>
<tr>
<td>Prox. phalanx</td>
<td>43%</td>
</tr>
<tr>
<td>Middle phalanx</td>
<td>18%</td>
</tr>
<tr>
<td>Distal phalanx</td>
<td>19%</td>
</tr>
</tbody>
</table>
Hand Anatomy

What is needed for a functional hand?

**Stability** = Bones and Ligaments

**Viability** = Vascular supply

**Sensibility** = Nerves

**Mobility** = Functional joints and muscles
Bone & Joint Anatomy

- Metacarpals
- Phalanges
  - Proximal - P1
  - Middle - P2
  - Distal - P3
- Sesamoids
- Joints
  - CMC
  - MP/MCP
  - PIP
  - DIP
  - IP (Thumb)

Ligamentous Anatomy


Green’s Operative Hand Surgery. 6th ed. Fig. 9-1
Flexor Tendon Anatomy

- FDS splits prior to insertion on middle phalanx
- FDP passes through split to insert on distal phalanx

Green’s Operative Hand Surgery. 6th ed. Fig. 7-3
Neurovascular Anatomy

- “Red things and white things”
- Run on either side of each digit
- More elastic than other structures
- Uncommon injury in athletics, but critical to catch
- “Topographical Anticipation”
  – Peter Carter

Wrist Anatomy

Several detailed descriptions of these ligaments exist, but in their admirable and successful attempts to be exhaustive, they can also be exhausting.

-Lister’s *The Hand*
Initial Evaluation and Treatment

The hand at rest is never truly so. For the fit hand constantly moves in gesticulation, nervousness, and personal mannerisms.

-Graham Lister, MD
Initial Evaluation and Treatment

- History
  - Understand mechanism → Anticipate injury
- Inspection
  - No forceful reduction prior to X-ray
- Examination
  - Based on history and inspection
  - Start with “uninjured” area. You won’t miss the obvious injury
- Immobilization
Fingertip/Nailbed Injuries

- Subungual hematoma
  - 50% rule
  - Trephination
  - X-ray indicated
- Tuft fractures
- Seymour fractures
Phalanx Fractures

- Most common fractures in UE
- No such thing as “just a chip fracture”
- Fracture location, orientation
- Mallet
  - Immobilize in extension immediately, get XR
- Jersey finger – finger cascade disrupted
  - Surgical urgency
- PIP Fracture dislocations, near dislocations
  - No forceful reduction
  - Always get an x-ray
  - “V-sign”
Oblique Phalanx Fractures
Not “Just a Chip Fracture”

- Ligaments in children stronger than bone
- “Chip fractures” can represent a tendon/ligament avulsion, or evidence of joint dislocation
Thumb

Ulnar collateral ligament tears

- Need exam under local anesthesia
- Stener lesion
- Surgical vs non-surgical
Wrist

- Radial-sided wrist pain
  - Scaphoid
  - Tendonitis
- Dorsal wrist pain
  - Scapholunate Ligament injuries
  - Gymnast wrist
- Ulnar-sided wrist pain
  - TFCC tear
  - ECU tendonitis
  - Ulnar abutment syndrome
- Hook of Hamate fracture
Radial-sided Wrist Pain

• Scaphoid fracture
  – Not “just a sprain”

• Tendonitis
  – DeQuervain’s Tenosynovitis
  – Intersection Syndrome
Dorsal Wrist Pain

Scapholunate ligament tear
• Can be subtle or no signs on XR
• Persistent dorsal wrist pain, despite rest, negative XR → MRI

Minimal difference in S-L space

Mild DISI
Dorsal Wrist Pain

Gymnast wrist

http://radsouce.us/upper-extremity-sports-injuries/
https://radiopaedia.org/cases/gymnast-wrist-1
Ulnar-sided Wrist Pain

• TFCC tear
  – MRI/Arthroscopic Diagnosis

• ECU tendonitis
  – Pain/snapping with pronosupination
  – Pain with resisted wrist extension

• Ulnar abutment syndrome
  – Can be concurrent with TFCC injury
Hook of Hamate Fracture

- Golf, baseball
  - Lower hand
  - Grounded club, check swing
- TTP over ulnar base of hand
- Pain with resisted RF/SF flexion or power grip
- Difficult diagnosis unless looking for it
- XR usually read as normal
Conclusions

• Pain is not normal
• Immobilize and get the athlete evaluated
  – All dislocation events
  – Any major swelling, ecchymosis
  – All wrist pain not markedly improved or resolved within days
• It’s not “just a sprain”
• It’s not “just a chip fracture”
• Early evaluation and treatment is the fastest (and safest) way back to the field
Thank You