Sports Medicine Upper Extremity Case Presentations

AAP Musculoskeletal Bootcamp

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Objectives:

• Improve the recognition of several common pediatric/adolescent sports medicine upper extremity injuries and to review their management
• Review the unique aspects of these conditions in relation to the growing skeleton
• Review complications/pitfalls to watch out for when evaluating pediatric/adolescent upper extremity injuries
Cases:

- Little League Shoulder
- Medial epicondyle fracture
- Little League Elbow (case is with mild avulsion injury)
- Gymnast wrist
- Scaphoid fracture
- Mallet finger
- Extra Octave fracture
Case #1

- An 11 y/o little league pitcher presents with a 3 week history of right upper arm pain with throwing. Pain has gradually worsened.
Physical exam

- Tender to palpation over the proximal humerus
- Full shoulder range-of-motion
- Pain with resisted shoulder external rotation
Diagnosis?

Little League Shoulder/Proximal Humerus Epiphysiolyis
Fleming et al, Skel Radiol, 2004
Treatment/Return to play

- Rest
- Rest
- Rest
- Physical therapy/Biomechanical analysis
Prevention

• Proper pitch progression
  – Fastball: age 8
  – Change-up: age 10
  – Curveball: age 14
• Pitch Counts
• Proper Rest

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Range of motion values & Primary muscles for motion

- **Muscles**
  - ✓ 1° abductors = deltoïd & supraspinatus
  - ✓ 1° adductors = pec major & latissimus
  - ✓ 1° flexors = deltoïd & coracohirachialis
  - ✓ 1° extensors = latissiums, T. major, deltoïd
  - ✓ 1° IR = Subscap, pec major, lat, T. major
  - ✓ 1° ER = Infraspinatus & T. minor

- **Range of motion (°):**
  - ✓ Abduction = 170-180
  - ✓ Adduction = 45
  - ✓ Flexion = 160-180
  - ✓ Extension = 45
  - ✓ IR (at side) = 60-100
  - ✓ ER (at side) = 80-90
Case #2

- 8 yo girl presents after a fall off of the beam in a gymnastics class onto an outstretched arm.
- Immediate pain and swelling along medial aspect of the elbow
Physical Exam:

- Elbow with obvious medial swelling
- ROM 50-95 degrees, limited by pain
- NVI distally
Case #2
Diagnosis?

- Medial epicondyle fracture
Treatment:

- Operative vs Nonoperative (casting)
- Operative indications based on displacement, elbow instability, ulnar nerve symptoms
- Continued controversy in pediatric orthopedics over how much displacement warrants surgery with most agreeing that over 1cm displacement should be given the option for operative management
- More likely to recommend surgery in dominant arm, throwing athletes, and gymnasts
• Similar story with a “Do Not Miss” twist:

• 13 yo high level gymnast fell from the beam during a handspring

• Her coach noted a severe deformity, but when helping her to support the arm, the elbow “popped back into place”
Diagnosis?

- Incarcerated Medial Epicondyle fracture

- Occurs when elbow dislocation with medial epicondyle fracture is reduced (either spontaneously or with manipulation) and the medial epicondyle fragment becomes stuck within the elbow joint
- Requires prompt intervention
- Often causes ulnar nerve symptoms
Case #3

- 13 y/o RHD baseball pitcher presents with right medial elbow pain for 2 months
- Insidious onset
- Occasional mild swelling
- Plays on school and travel baseball teams
Case #3 (cont)

- Physical exam:
  - Elbow extension: R=-10, L=5
  - Pronation, Supination, Elbow flexion symmetric
  - Tender over medial epicondyle
  - Pain with resisted wrist flexion
What DOESN’T he have?

- Medial Epicondylitis/Golfer’s Elbow

**Diagnosis?**

- Little League Elbow: Medial epicondyle apophysitis with mild avulsion injury
Treatment/Return to play

- Rest
- Rest
- Rest
- Physical therapy/Biomechanical analysis
  - Should emphasize thoracic spine, core, hip strengthening
  - Modified interval throwing
    - Shorter distance, fewer throws
Prevention

• Proper pitch progression
  – Fastball: age 8
  – Change-up: age 10
  – Curveball: age 14

• Pitch Counts

• Proper Rest

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Case #4

• 10 y/o gymnast presents with 3 weeks of left wrist pain
• Pain with axial loading
• Radial aspect of wrist
• Past Medical history: previous right wrist pain
Physical exam

- No swelling
- Tender to palpation over the distal radius
- Subtle decrease in ROM with dorsi-and palmar flexion, ulnar/radial deviation
Radiographs

Involved side

Contralateral side
Diagnosis?

- Gymnast’s Wrist (Distal Radius Epiphysitis)
Gymnast Wrist

- Separation of the growth plate of the distal radius
- Due to repetitive loading
- Age 11-12
- Treat with period of rest
  - Longer with radiographic changes
  - Gradual return to gymnastics
- Prevent by limiting loading, cycling activities
Case #5

- 15 yo boy fell onto his right wrist while playing football 3 months ago
- He had pain and mild swelling in the wrist and x-rays at a local convenient care
- X-rays read as negative and he was placed into an ace wrap for a suspected sprain
- He has now started lifting weights to condition for basketball with return of wrist pain
Physical Exam:

- Mild wrist swelling radially
- Pain with palpation over the anatomic snuff box
Diagnosis?

• Scaphoid fracture
Treatment:

- Displaced fractures are treated operatively
- Nondisplaced fractures
  - Conservative management with thumb spica casting (even when subacute)
  - Failure to heal with casting is not uncommon
  - Screw fixation +/- bone grafting when delayed union/nonunion
Case #6

- 14 yo cheerleader (base), “jammed” her finger while catching a flyer
- Now with pain and swelling at the tip of her finger
Physical Exam:

• Swelling and TTP on the dorsum of the finger just distal to the DIP joint

• DIP sitting in 25 degrees of flexion. Patient unable to actively extend the DIP joint. DIP can be full extended passively
Diagnosis?

- Bony Mallet Finger
- Soft Tissue Mallet Finger
Treatment:

- Extension splinting 6-8 weeks full time
  - Less for bony mallet
  - More for soft tissue mallet
- Stack splint holds DIP in full extension while allowing motion at the PIP
- Splint must be worn full time and finger must be physically held in full extension at DIP when splint is removed for hygiene/drying
- If splinting fails or bony portion substantial, surgery may be considered
Case #7

- 12yo boy with injury to small finger when it was twisted while wrestling with immediate pain and deformity.
Physical Exam:

- Small finger with swelling and TTP over the base of the PIP joint
- Finger is abducted and externally rotated
Radiographs:

Failure occurs through physis and because of the relative strength of the collateral ligament.
Treatment:

- Closed reduction and splinting/casting
- If unable to maintain appropriate reduction, proceed to OR for reduction and pinning
Take Home Points:

• The physis/apophysis is often the “weak” spot is both chronic overuse injuries as well as in acute traumatic injuries in pediatric/adolescent athletes.

• The mainstay of treatment of overuse injuries rest. This is then followed by strengthening and improved form/biomechanics to prevent recurrence.

• Be aware of the occult scaphoid fracture and the incarcerated medial epicondyle fracture as rare diagnoses that cause significant morbidity when missed.