The Acute Care of Overuse Upper Extremity Injuries in the Pediatric Patient

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I, Stessie Dort Zimmman, MD, have no financial relationships to disclose or conflicts of interest to resolve.
Today’s Objectives

▪ Provide a differential for overuse upper extremity (UE) injuries in pediatric patients.

▪ Discuss PE maneuvers that will assist in the diagnostic evaluation of pediatric UE injuries.

▪ Review disposition planning for pediatric overuse UE injuries from urgent care.

▪ Offer an approach to providing patient & family-centered care to committed pediatric athletes.
The Pediatric Athlete

- In US, 40 million children participate in structured youth sports.
- 3.5 million injuries per year require medical treatment.
- Trend to sports specialization is increasing.
COVID-19 Return-to-Sport Considerations for Secondary School Athletic Trainers

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The Pediatric MSK System

- Developing bone is structurally weaker than adult bone
- Ligament > bone strength in children
- Avulsion fractures have increased incidence in children
- Less muscle mass means less force/stress on joints
- Children heal faster and better
The Pediatric MSK System

- Growth plate exists
  - Potential for remodeling
- Strong, relatively thick periosteum
  - Less likely to displace a cortical fracture
  - Reduces risk of an open fracture
- Less dense, more vascular than adults
  - Less able to tolerate heavy load (stress fracture)
  - Heals quicker
The Pediatric MSK System

- Children have developing gross motor skills so falls and collisions are more common
Approach to Pediatric MSK Injuries

**History:**
- Mechanism
- Prior injury
- Relative risk

**Physical Exam:**
- Bony landmarks
- Effusion/ no effusion
- Range of motion
- Neurovascular status
Help me! I hurt my... SHOULDER
Case 1

A 14 yo male comes to the UC for evaluation of a shoulder injury. He has noticed a gradual onset of pain of the lateral aspect of the proximal humerus that acutely worsens with throwing baseballs with his cousin in the back yard.
Proximal Humeral Epiphysitis or “Little League Shoulder”

- Common in adolescents males
  - Rapid growth at proximal humeral physis
  - Excellent healing and remodeling

- Other risk factors:
  - Improper biomechanics
  - Overuse
Proximal Humeral Epiphysitis or “Little League Shoulder”

- XR findings:
  - Normal → widening, sclerosis, and/or irregularity of the physis.

- Management
  - No more overhead activities!
  - Sling and/or swathe PRN
  - Usually no need for splint or cast or surgery
  - Pain control
  - Outpatient follow up with sports medicine and/or PT
PE of the pediatric shoulder...

- Special tests:
  - Empty can
  - Lift off
  - Shoulder apprehension test
Help me! I hurt my... ELBOW
Case 2

11 yo right handed baseball catcher who was throwing to 2\textsuperscript{nd} and felt sudden right elbow pain.

Felt a pop.

Pain and swelling of medial elbow.
Ossification Centers

CRITOE

1. **Capitellum** 2y
2. **Radial head** 4y
3. **Internal (medial) epicondyle** 6y
4. **Trochlea** 8y
5. **Olecranon** 10y
6. **External (lateral) epicondyle** 12y
Case 2: Medial Epicondylar Avulsion Fractures

- Peak age: 9-12y
- Fat pad unreliable
- Neurovascular complications are unlikely
- Treatment controversial
  - Posterior arm splint
“Little League” Elbow

- Describes a group of elbow problems related to throwing
- Classically, medial epicondyle apophysitis
- Last ossification center to close
- Treatment
  - ice, rest 4-6 wks, NSAIDs
- Prevention!
PE of the pediatric elbow…

- Palpation of bony landmarks
- Special tests:
  - Varus stress with internal rotation
  - Valgus stress with external rotation
  - Snap extension test
Help me! I hurt my...

WRIST

Seattle Children's®
Case 3

10 year old female gymnast with bilateral wrist pain worse with tumbling and movements on the vault apparatus.
Distal Radial Epiphysiolysis

- PE with tenderness at the distal radial physis
- Physis appears at 12-18 months and fuses at 15-18 years.
- Sclerosis may be present on both sides of the physis depending on stage
Distal Radial Epiphysiolyisis

- Management
  - Rest
    - 3-4 weeks to 3-6 months
  - Immobilization
  - Pain management
  - May require surgical intervention
PE of the pediatric wrist...

- Special tests:
  - Hyperextension
  - Axial loading
  - Ulnar variance
Help me! I hurt my... FINGER
Case 4

- 17 year old outdoor rock climber presents with bilateral pain at the and swelling of the 3\textsuperscript{rd} finger after a recent climbing trip to Southern Utah. No fall or blunt trauma.
Case 4: Climber’s Finger

• Caused by repetitive phalangeal flexion and extension in climbing
• Usually involves the base of the middle phalanx
Case 4: Climber’s Finger

- Management:
  - Immobilization
  - Urgent follow up with ortho
Help me! I hurt my…

Thumb
Case 5

- 12 year old male presents with pain at the proximal thumb after a skiing trip where he fell without letting go of his ski pole.
Case 5: Skier’s Thumb/Gamekeeper’s Thumb

- Injury to the ulnar collateral ligament
- Forcible abduction of the thumb
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Sports Related Injury Resources

- Orthobullets
- Sports Medicine in the Pediatric Office
- https://www.cdc.gov/traumaticbraininjury/PediatricmTBIGuideline.html
Any Questions?

Olivia
Mission
We provide hope, care and cures to help every child live the healthiest and most fulfilling life possible.
Thanks!
Stay Safe!
Move!
Exercise is Medicine.