Common Orthopedic Injuries and Conditions: From the Playground to the Sports Field

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Disclosures & Objectives

- No financial disclosures
- Objectives
  - The participant will be able to describe common acute and chronic musculoskeletal injuries
  - The participant will feel comfortable describing and managing benign overuse problems versus simple stable injuries versus injuries that are more urgent and unstable

Pediatric Orthopaedics

- Common Acute Injuries
  - Wrist fracture
  - Elbow fracture
  - Acute knee injury
  - Ankle fracture/ sprain

Pediatric Orthopaedics

- Common Overuse Injuries
  - Stress fractures
  - Apophysitis
  - Patello-femoral condition
  - Little League Elbow/Shoulder

History

- Age of patient
  - Young child vs older child vs adolescent
- Onset of Injury
  - Acute vs Chronic
- Mechanism
  - High- vs Low-energy mechanism

Physical Examination

- Inspection
  - Remove splint/bandages
  - Swelling
  - Erythema
  - Abrasion/puncture
- Palpation
  - Identify location of tenderness
  - Effusion

Physical Examination

- Joints
  - Check range of motion (if possible)
  - Check other joints too (esp. the hip)
- Neurovascular exam
  - Check warmth/capillary refill/pulses
  - Strength testing
  - Sensation testing

Radiographs

- X-ray examination
  - Two views (orthogonal)
- CT Scan
  - Unusual
- MRI
  - Occasionally useful (knee injury)

Acute Knee Injury

- Differential Diagnosis
  - Fracture
  - Ligament tear
  - Patella dislocation
  - Meniscus tear
  - Bone contusion
  - SCFE

Acute Knee Injury

- History
  - Mechanism
  - “Pop”?
  - Able to continue play?
  - Timing and severity of swelling
  - Previous knee injury

Acute Knee Injury

- Examination
  - Inspection
  - Palpation
  - Sensation
  - Motor strength
  - Deep tendon reflexes

Acute Knee Injury

- Document if
  - Swelling or effusion is present
  - Able to ambulate
  - Catching or locking is present
  - Instability is present

Acute Knee Injury

- Radiographic exam
  - Minimum: A/P, lateral knee film, especially if swollen and/or unable to walk
  - Consider Merchant and notch views, if concerned for patella dislocation
  - MRI
    - High degree of suspicion for soft tissue injury (“pop”, immediate swelling, unable to ambulate)

Acute Knee Injury

- Initial Treatment
  - RICE
  - Knee immobilizer
  - Crutches
  - Quadriceps exercises
- Return to Sport
  - 4-6 weeks if contusion or uncomplicated patella dislocation

Acute Knee Injury

- Refer for
  - Fracture
  - Ligament injury
  - Meniscus tear
  - Recurrent patella dislocation
  - Unremitting pain

Acute Ankle Injury

- Differential Diagnosis
  - Ankle sprain
  - Ankle fracture
    - Salter-Harris I or II
    - Occult
  - Fifth metatarsal base fracture
  - Talus fracture

Acute Ankle Injury

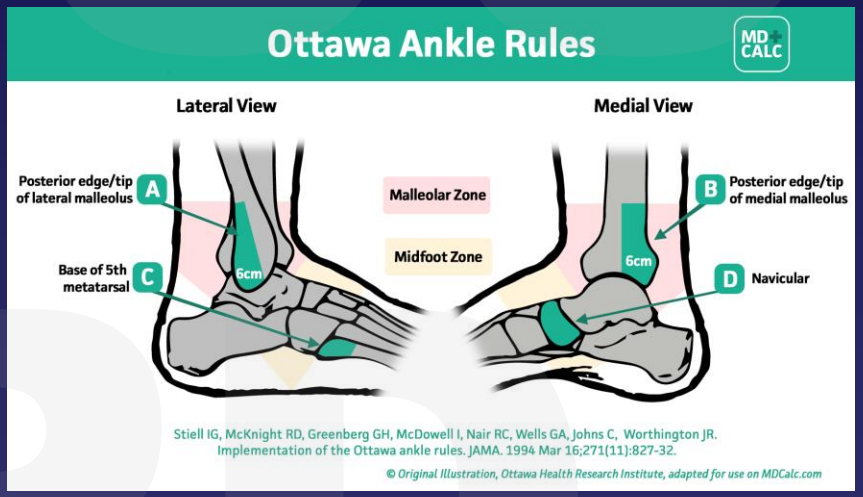
- History
  - Inversion injury running/jumping
  - Acute swelling, tenderness
  - Inability to bear weight fully

Acute Ankle Injury

- Examination
  - Inspection
    - Swelling
  - Tenderness
    - Be specific
  - Neurovascular exam

Acute Ankle Injury

- Radiographic exam
  - Ottawa rules
    - If malleoli tender
      - A/P, lateral, mortise views of ankle
    - If lateral foot tender
      - A/P, lateral, oblique views of foot
  - CT/MRI
    - Not typically indicated



Acute Ankle Injury

- Initial Treatment
  - RICE
  - Ankle splint/CAM-walker boot
  - Crutches, as needed
- Rehab/Physical Therapy
  - Range of motion
  - Proprioception
  - Strengthening
- Return to Sport
  - 4-6 weeks, when able to hop on leg equal to other side

Acute Ankle Injury

- Refer for
  - Fracture
  - Recurrent, frequent injuries (sprains)
  - Persistent swelling
  - Unremitting pain

Upper Extremity Acute Injury

- Shoulder/Arm fracture
- Elbow fracture
- Wrist/forearm fracture

Upper Extremity Acute Injury

- Sprains and strains are unusual especially in younger patients
- Occult fractures are common

Upper Extremity Acute Injury

- History
  - Age
  - Injury mechanism
    - Fall versus traction
  - Location of pain
  - Swelling
  - Erythema

Upper Extremity Acute Injury

- Examination
  - Inspection
    - Deformity
    - Erythema
  - Palpation
  - Nerve exam
    - Sensory
    - Muscle

Upper Extremity Acute Injury

- Radiographic exam
  - X-rays – almost always required
    - Usually A/P and lateral films are sufficient
  - CT/MRI/Angiogram rarely useful
  - Occult injuries possible
    - Diagnosis based on clinical exam
  - If well-documented traction injury with elbow pain, consider reduction attempt for a “pulled elbow” before x-ray

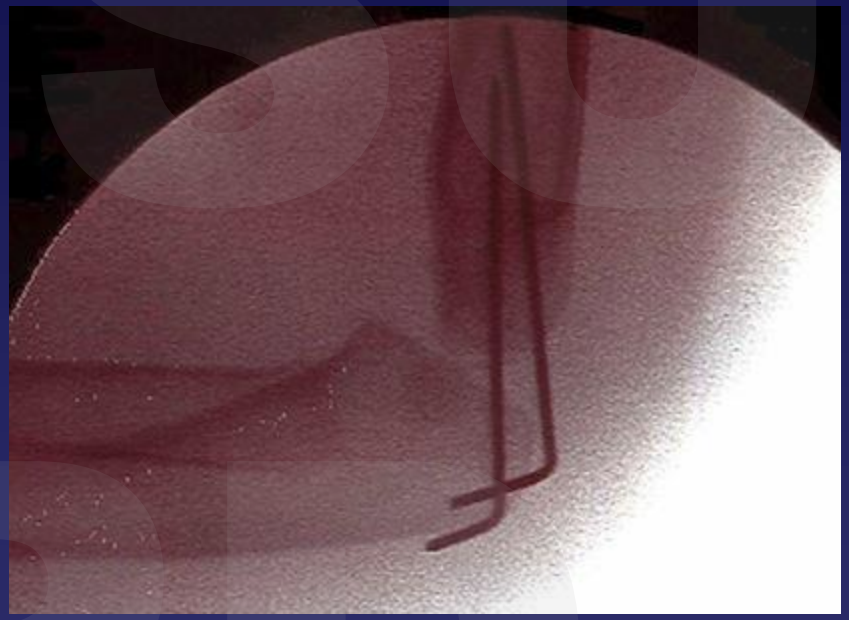
Upper Extremity Acute Injury

Upper Extremity Acute Injury

- Treatment dependent on:
  - Location
  - Displacement
  - Alignment
  - Stability
  - Age
  - Remodeling potential

Upper Extremity Acute Injury

- Treatment
  - Casts
  - Closed reduction – percutaneous pinning
  - Open reducation internal fixation



Upper Extremity Acute Injury

- Referral
  - Most fractures should be referred
  - Exceptions
    - Torus fractures of the distal radius/ulna (wrist guard)
    - Torus fractures of radius neck (sling)

Overuse Injuries

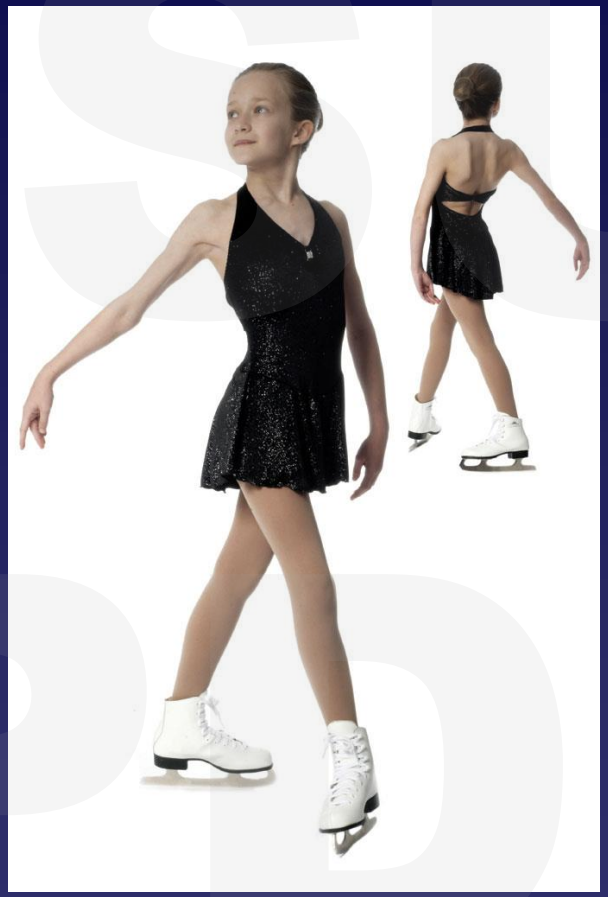
- Common Overuse Injuries
  - Stress fractures
  - Apophysitis
  - Patello-femoral condition
  - Little League Elbow/Shoulder

Stress fractures

- Commonly affected areas
  - Spine (pars interarticularis)
  - Tibia
  - Foot (metatarsals)
  - Femur

Stress fractures

- History
  - Pain profile
    - Where
    - When
    - Timing
    - Duration
    - Exacerbation
    - Alleviation

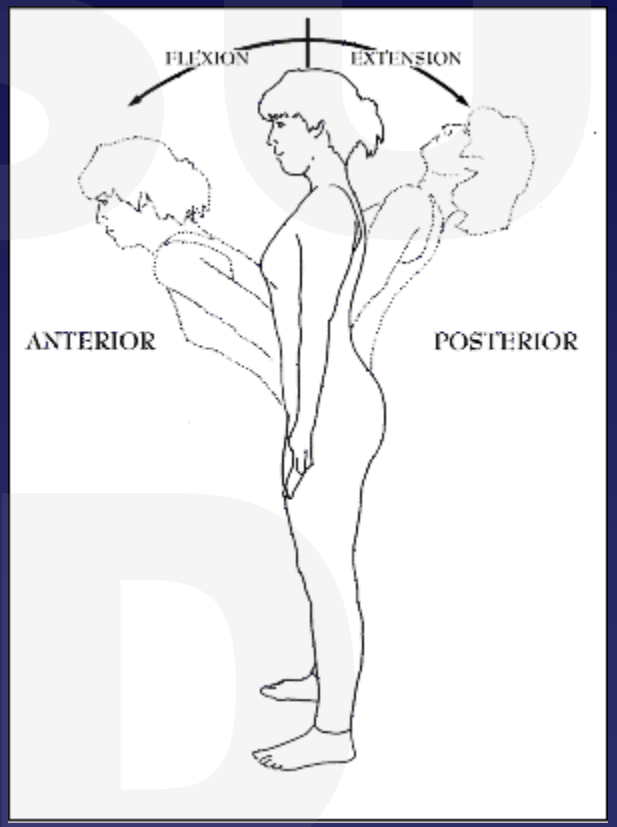


Stress fractures

- History
  - Athletic schedule
    - Duration
    - Frequency
    - Recent change in schedule
  - Other recent injuries
  - Previous injury to area affected

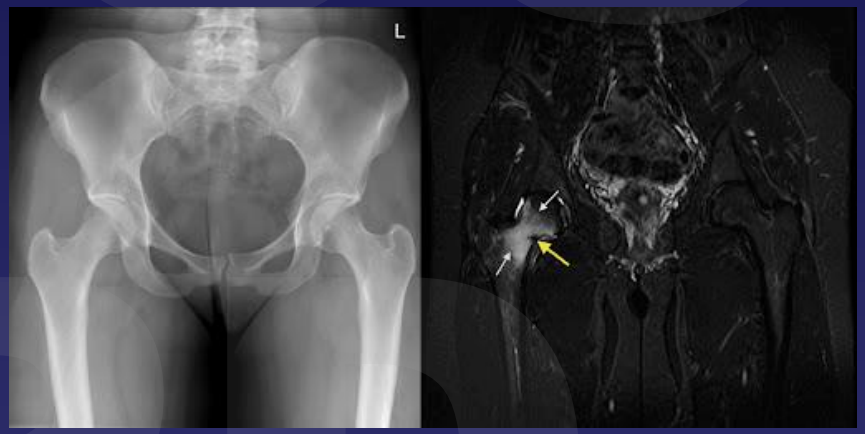
Stress fractures

- Physical examination
  - Inspection
  - Palpation
    - Identify areas of tenderness
  - Neuromuscular exam
  - Stress testing
    - Toe-walking
    - Hopping
    - Spine extension



Stress fractures

- Radiographic examination
  - Spine – A/P, lateral
  - Long bones – A/P, lateral
  - Foot – A/P, lateral, external oblique (weight-bearing)
- MRI
  - Sometimes necessary when x-ray results are equivocal



Stress fractures

- Treatment
  - Spine
    - Relative rest
    - Physical therapy
    - Lumbo-sacral orthosis
    - Spine fusion

Stress fractures

- Treatment – long bones
  - Casting till radiographic evidence of healing
  - Will require at least four weeks, usually much more
  - Return to sport after graduated return to sport specific activities

Apophysitis

- Affected areas
  - Tibial tubercle – Osgood-Schlatter's condition
  - Distal patella pole – Sindig-Johannson-Larsen condition
  - Calcaneus – Sever's condition

Apophysitis

- History
  - Pain profile
    - Insidious onset
    - Associated with athletic activity
    - No night pain
    - Moderate relief with NSAIDs
  - Swelling
  - Frequently able to play through discomfort

Apophysitis

- Physical Examination
  - Mild swelling
  - No erythema
  - Tenderness
    - At tibial tubercle
    - At calcaneus body (squeeze)
  - Bony prominence (especially tibia tubercle)

Apophysitis

- Radiographic exam
  - Basic series of x-rays suggested to rule-out other bone pathology (eg. bone cyst)

Apophysitis

- Treatment
  - Activity modification
    - Relative rest
  - NSAIDs
  - Tension-decreasing device
    - Cho-pat strap
    - Heel lift

The Rule

You can play,

or you can complain,

but you can't do both!

Patello-femoral Condition

- Pain profile
  - Long-standing
  - Activity-related
  - Peri-patellar discomfort
  - Remote history of knee injury
  - Usually without previous treatment

Patello-femoral Condition

- History
  - Theater sign
  - Giving-way
  - Intermittent swelling

Patello-femoral Condition

- Physical Examination
  - Quadriceps atrophy
  - Peri-patellar tenderness
  - Patella apprehension
  - Positive Grind test

Patello-femoral Condition

- Radiograhic examination
  - Knee x-rays
    - A/P, lateral, notch, Merchant views
    - Evaluate patella position and tilt
    - Look for osteochondritis dessicans
  - MRI
    - Indicated if confused about possibility

Patello-femoral Condition

- Treatment
  - Quadriceps strengthening exercises
    - Isometric knee hyperextension 10secs x10
    - Isometric straight-leg raise 10secs x10
    - Lateral leg raises
    - Clamshells
  - Relative rest
  - NSAIDs
  - Knee sleeves
    - Comforting but not protective

Little League Arm

- History
  - Throwing athlete
  - Year-round athlete
  - Special training situations
  - Multiple teams
  - Decreasing throwing speed

Little League Arm

- Pain profile
  - Location
    - Shoulder (proximal humeral epiphysitis)
    - Elbow (medial epicondylar apophysitis)
  - Activity-related
  - Increasing severity

Little League Arm

- Physical examination
  - Mild swelling
  - Tenderness
  - Relative weakness to resisted motion
  - Provocative tests
    - Shoulder apprehension exam
    - Elbow valgus stress (30˚ flexion)

Little League Arm

- X-ray examination
  - A/P & lateral **im**ages
  - Signs of stress
    - Widened physis
    - Osteochondritis dissecans
  - MRI
    - Ulnar collateral ligament strain

Little League Arm

- Treatment
  - REST!
  - NSAIDs
  - Physical therapy
    - Balancing muscle groups
  - REST!
  - The “RULE” does not apply here

Prevention

- Pitches
  - **Age** **Pitches per day**
  - 17-18 105
  - 13-16 95
  - 11-12 85
  - 10-under 75
  - **Pitches** **Rest days**
  - 61+ 3
  - 41-60 2
  - 21-40 1
  - 1-20 0

Overuse Injury Prevention

- Avoid
  - Year-round training
  - Single sport participation
  - Every-day training
- Encourage
  - Trying different sports
  - Taking seasons off
  - Play outside of organized adult-led activities

Orthopedic Injury: What to remember

- Overuse injuries are more common than fractures
- Imaging: Start simple, x-ray before MRI
- Reassure v refer
  - Localized pain and improving function v limp, instability, night pain, failure to improve
- “The Rule”
  - Works well except for long bone stress fractures and throwing injuries

Thanks!

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