Assessment of Common Orthopedic Injuries in School

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Objectives

- Review common orthopedic concerns in the school setting
  - Wrist/Forearm/Elbow
  - Finger
  - Shoulder
  - Knee
  - Ankle

- Use of the Ottawa Ankle Rules in practice to assist decision-making
  - Doesn't require special tissue testing, can assist with flow of assessment

- Patient management considerations

Orthopedic Assessment Overview

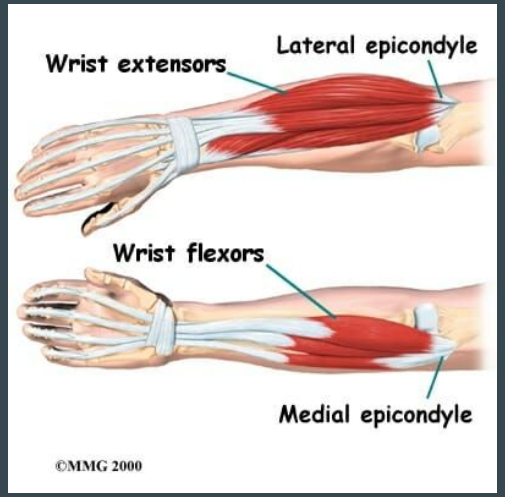
- 4 main tissue types in the orthopedic realm
  - Bone, ligament, muscle/tendon, vascular/nerve
- Goal is to rule in or rule out involvement of different tissues
- I speak about involvement of tissues in terms of “suspicion”
  - low vs moderate vs high
- Mechanism of Injury
  - If accurate, can be used to narrow down involved tissues

Basic Steps in Orthopedic Assessment

- Observation
  - Deformity, Swelling, Discoloration
- Palpation
  - Quality of Tissue, Diffuse vs Point Tender
- Range of Motion
  - Active vs Passive
- Muscle Activation
  - Active vs Resisted
- Neurovascular
  - Numbness/Tingling/Shocks
  - Burning/Cold
  - Capillary Refill, Pulse Assessments
- *Special Tissue Tests
  - Orthopedic-based
  - Joint Mobilizations
  - Nervous, Cranial

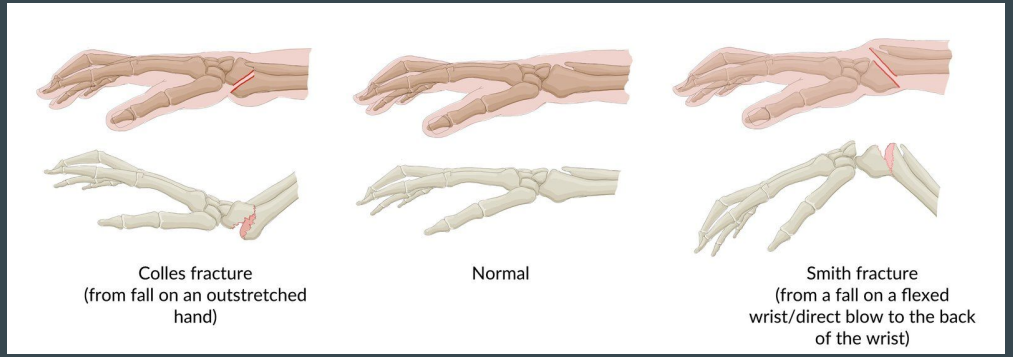
Wrist / Forearm / Elbow Anatomy

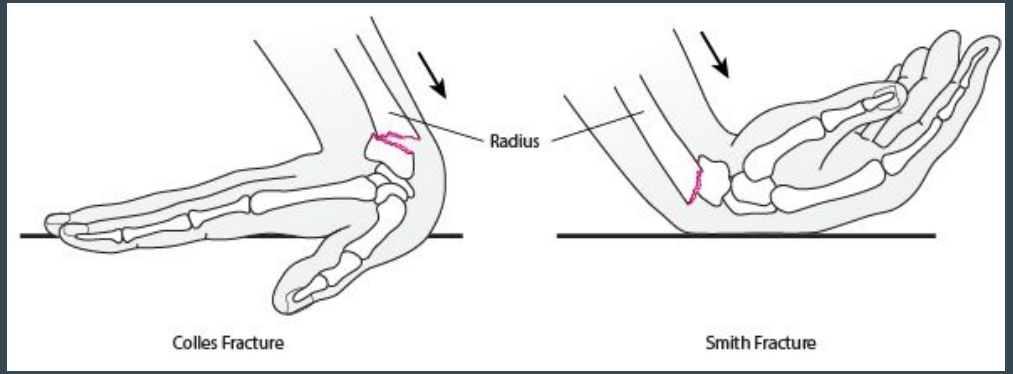
- Bones
  - Humerus
  - Ulna, Radius
  - Carpals, Metacarpals
- Ligaments
  - Elbow: UCL
  - Wrist: Carpal Ligaments
  - Retinaculum
- Muscles
  - Biceps, Triceps
  - Forearm flexor / extensor bundles
  - Supinator, brachioradialis
- Nerves
  - Median, ulnar
- Blood Supply
  - Radial, ulnar



Wrist / Forearm / Elbow Injuries

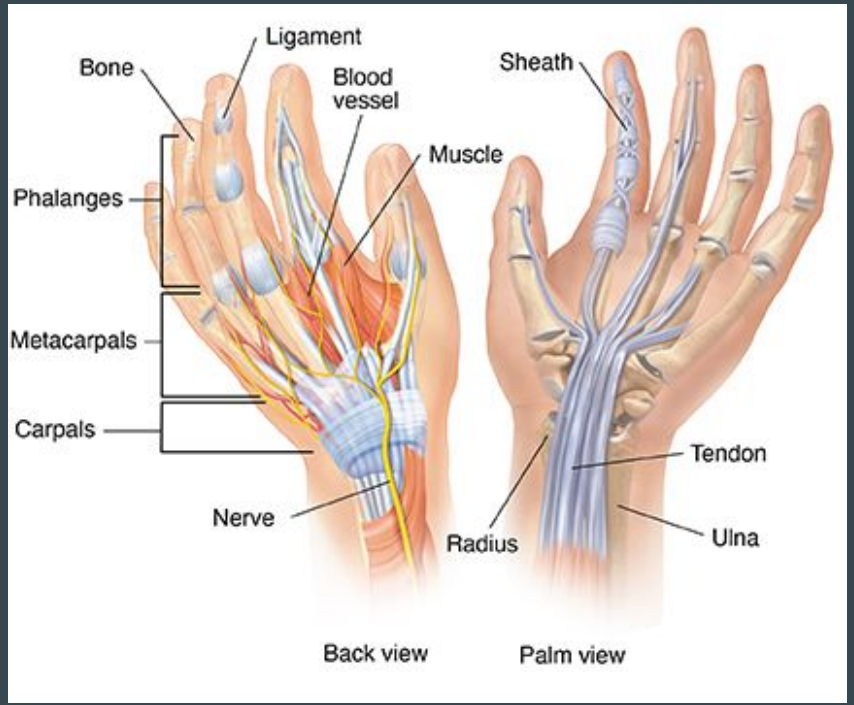
- Joint Dislocations
  - Elbow vs Wrist
- Fractures
  - Distal vs Proximal Forearm
    - Distal: Colles vs Smith
  - Carpal
    - Scaphoid
- Ligamentous Sprains
  - Elbow: UCL
  - Wrist: Radial/Ulnar
- Muscle Strains
  - Flexors, Extensors, Thumb
- Contusions
- Nerve Irritation
  - Ulnar Nerve, Carpal Tunnel





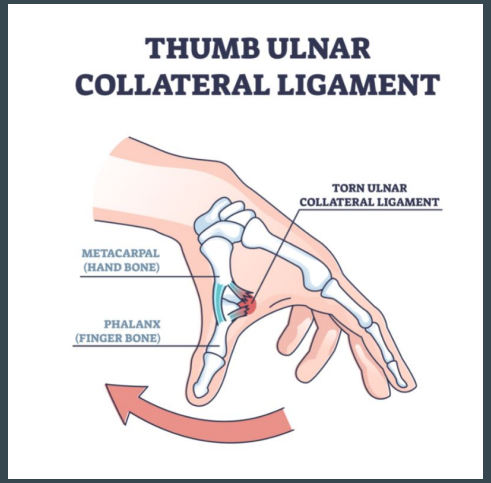
Finger Anatomy

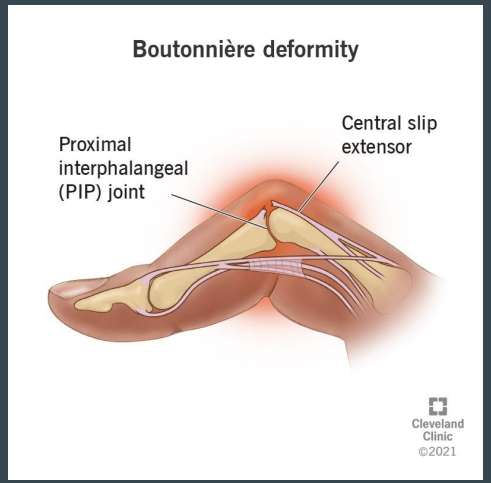
- Bones
  - Phalanges
  - Metacarpals
  - Carpals
- Ligaments
  - Capsular in nature
    - DIP, PIP, and MP/MCP
- Muscles
  - Flexors, extensors
  - Abductors, adductors
  - Tendon sheaths
- Nerves
  - Radial, median, ulnar
- Blood Supply
  - Radial, ulnar



Finger Injuries

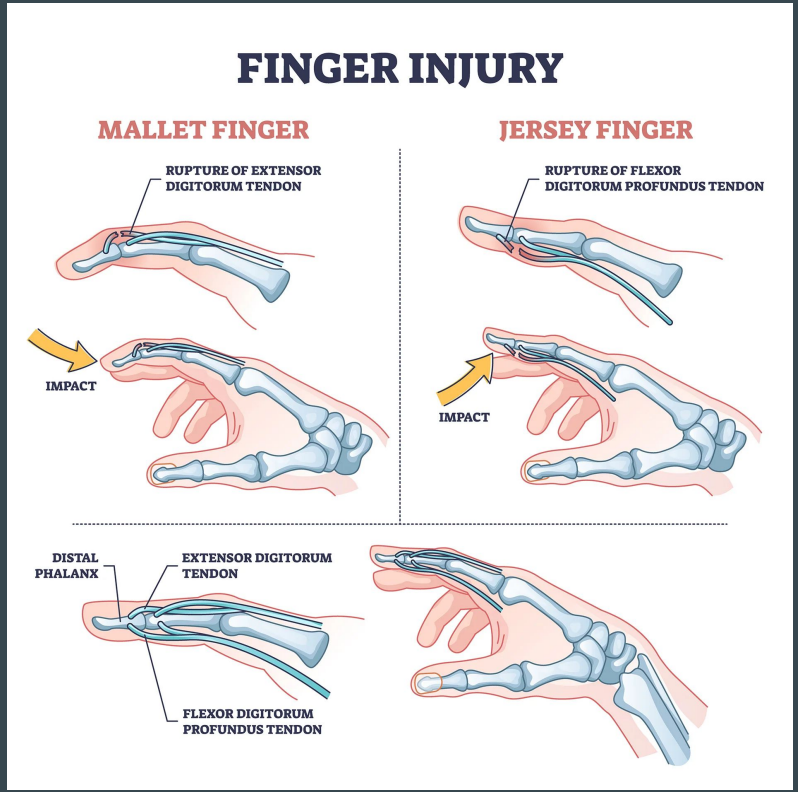
- Joint Dislocations
  - IPs vs MP/MCPs
- Fractures
  - Finger vs Metacarpals
- Ligamentous Sprains
  - Loss of capsule integrity
  - Skiers'/Gamekeepers' thumb
- Muscle Strains
  - Flexors, extensors, thumb-MCP
  - Mallet finger, Jersey finger
- Contusions
- Nerve Irritation
  - Acute vs chronic
- Other
  - Tendon sheath: Boutonniere deformity





Points of Focus

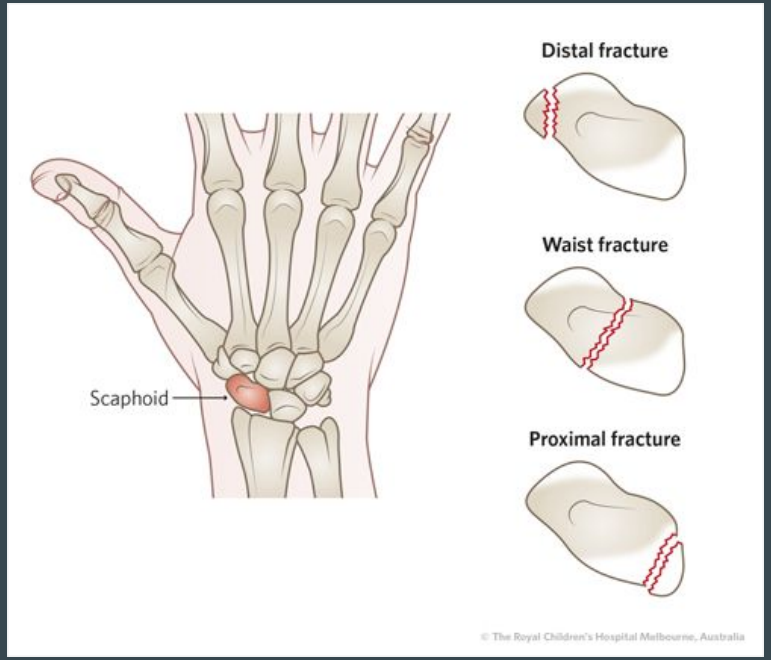
- Alignment
  - Is elbow in place?
  - Is wrist in alignment and stable?
  - Are IP and MP/MCP joints in place?
- Pain
  - Level of pain
  - Point tenderness vs diffused
- Is ROM significantly decreased
  - Secondary to...
    - Pain
    - Mechanical block
    - Change in muscle integrity
- Function
  - Patient's ability to move
  - Patient's willingness to move
- Neurovascular
  - Numbness/tingling, capillary refill



Scaphoid Fractures

- MOI: FOOSH, “thumb jam”
- Pain: base of thumb, anatomical snuffbox
- Symptoms >2-3 weeks
    - Often missed on initial x-ray
- Scaphoid “wrist/neck” fracture can disrupt blood supply to proximal portion of scaphoid, resulting in bone death
- Delayed diagnosis can significantly affect prognosis

DON’T MISS THIS ONE!

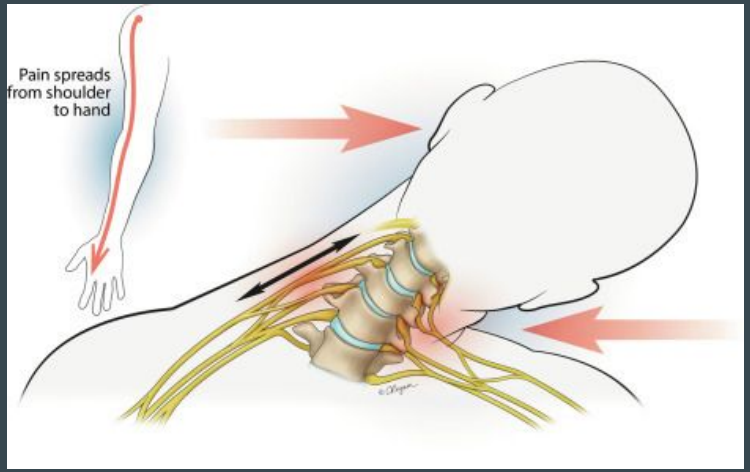


Shoulder Anatomy

- Bones
  - Anterior: clavicle, sternum, humerus
  - Posterior: scapula (acromion, coracoid)
- Ligaments
  - GH joint: glenohumeral (3)
  - AC joint: acromioclavicular
- Muscles
  - Superficial
    - Trapezius, deltoids, biceps, triceps, pectoralis
  - Deep:
    - Rotator cuff
- Nerves
  - Branches of the brachial plexus
- Blood Supply
  - Brachial, subclavian

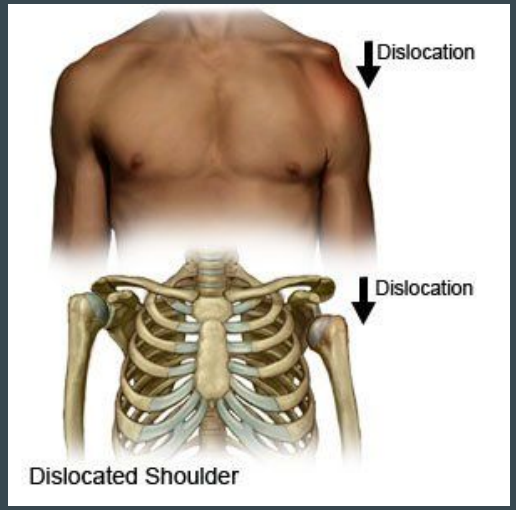
Shoulder Injuries

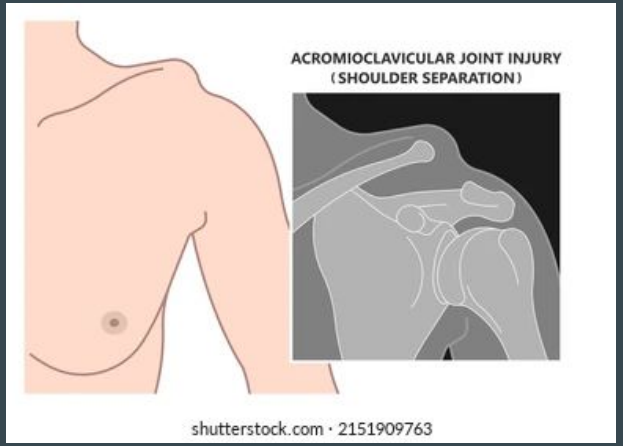
- Joint Dislocations
  - GH joint vs AC joint
- Fractures
  - Clavicle vs humerus vs scapula
- Ligamentous Sprains
  - GH joint vs AC joint
- Muscle Strains
  - Acute vs chronic
  - Rotator cuff tears
  - Frozen shoulder
- Contusions
  - Ribs
- Nerve Irritation
  - Acute vs chronic
  - “Stinger”



Points of Focus

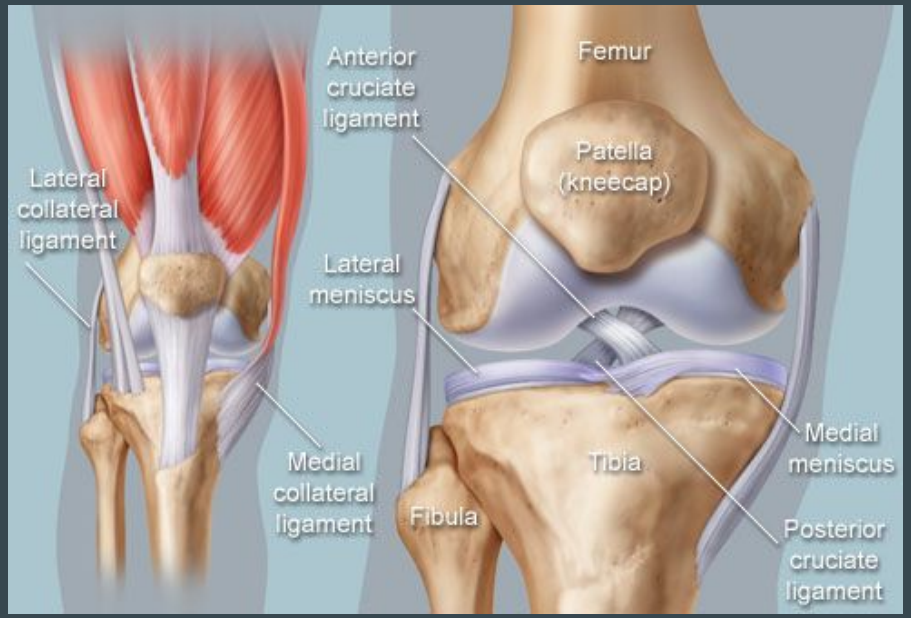
- Alignment
  - Is the shoulder in place?
  - Is there a tent sign over the clavicle?
  - Is there a piano key sign on the AC joint?
- Pain
  - Level of pain, muscle guarding
  - Point tenderness vs diffused
- Is ROM significantly decreased?
  - Secondary to...
    - Pain
    - Mechanical Block
- Function
  - Decreased motion vs sling
  - Patient's willingness to move
- Neurovascular
  - Numbness/tingling, capillary refill





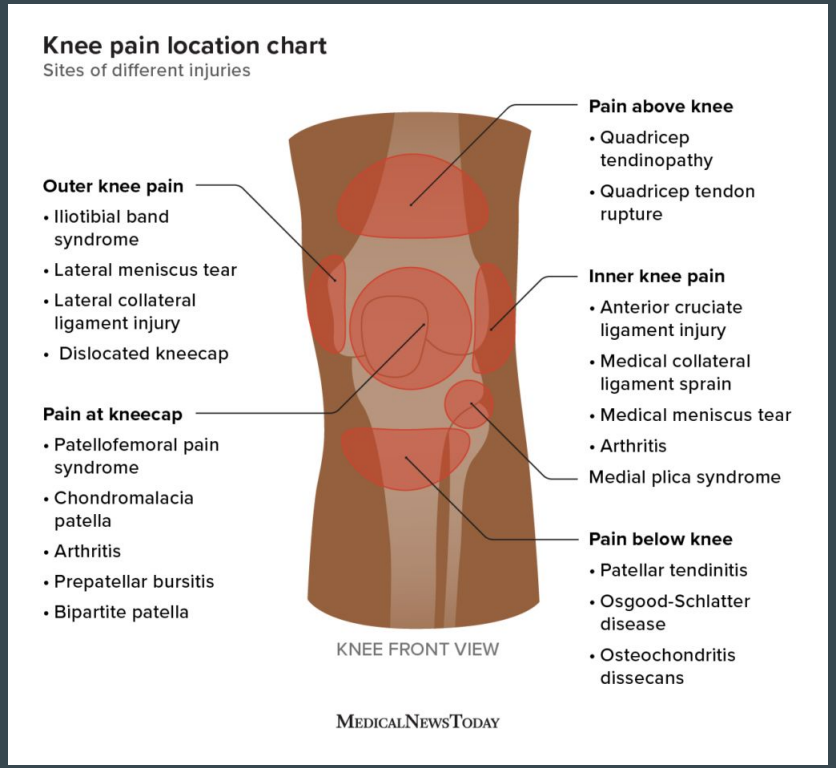
Knee Anatomy

- Bones
  - Femur, tibia, fibula, patella
- Ligaments
  - ACL/PCL, MCL/LCL, patellar
- Muscles
  - Anterior: Quadriceps, Quad/Patellar Tendon
  - Posterior: Hamstring, Gastrocnemius
  - Medial: Adductors
  - Lateral: Iliotibial Band
- Nerves
  - femoral, sciatic, tibial, peroneal
- Blood Supply
  - femoral, popliteal
- Other:
  - Meniscus, Cartilage



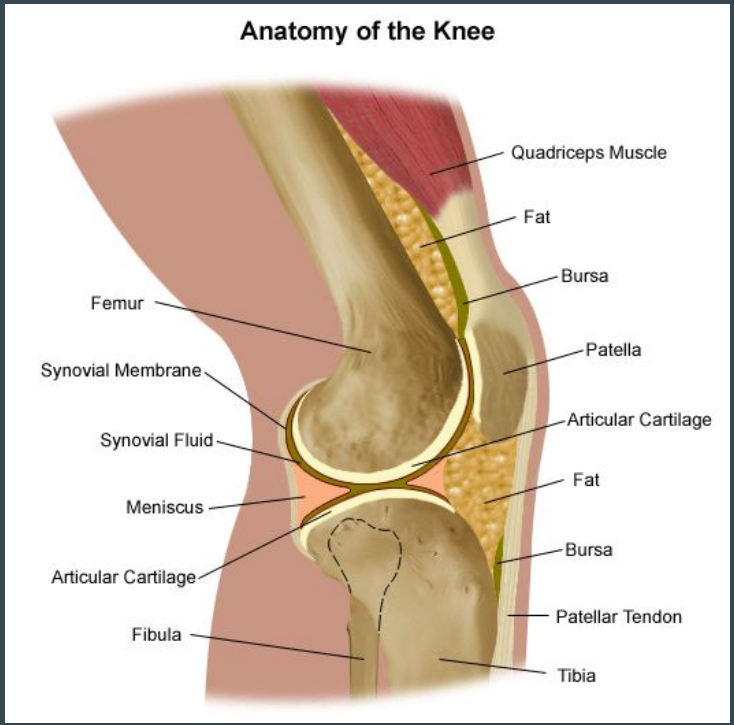
Knee Injuries

- Joint Dislocations
  - patellofemoral, tibiofemoral
- Fractures
  - femur, head of fibula, patella
- Ligamentous Sprains
  - collateral vs cruciate
- Muscle Strains
  - ant vs post, lat vs medial, patellar tendon
- Contusions
- Nerve Irritation
  - acute vs chronic
- Other
  - bursitis, meniscus tears



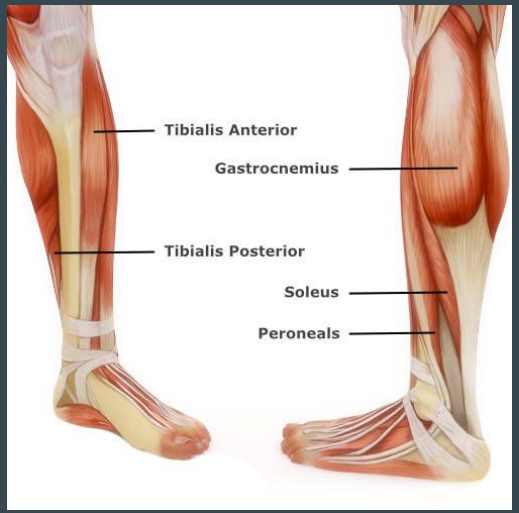
Points of Focus

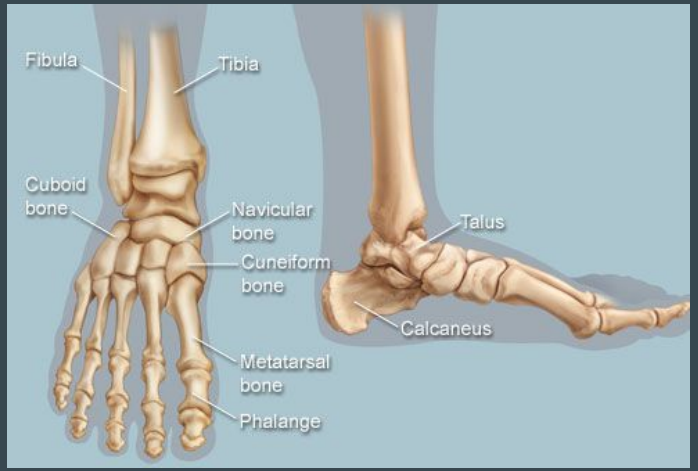
- Alignment
  - Is the patella in place?
- Pain
  - Level of pain
  - Point tenderness vs diffused
- Is ROM significantly decreased?
  - Secondary to...
    - Pain
    - Mechanical block
- Ambulation
  - Walk vs assistance
  - Patient's willingness to move



Ankle / Lower Leg Anatomy

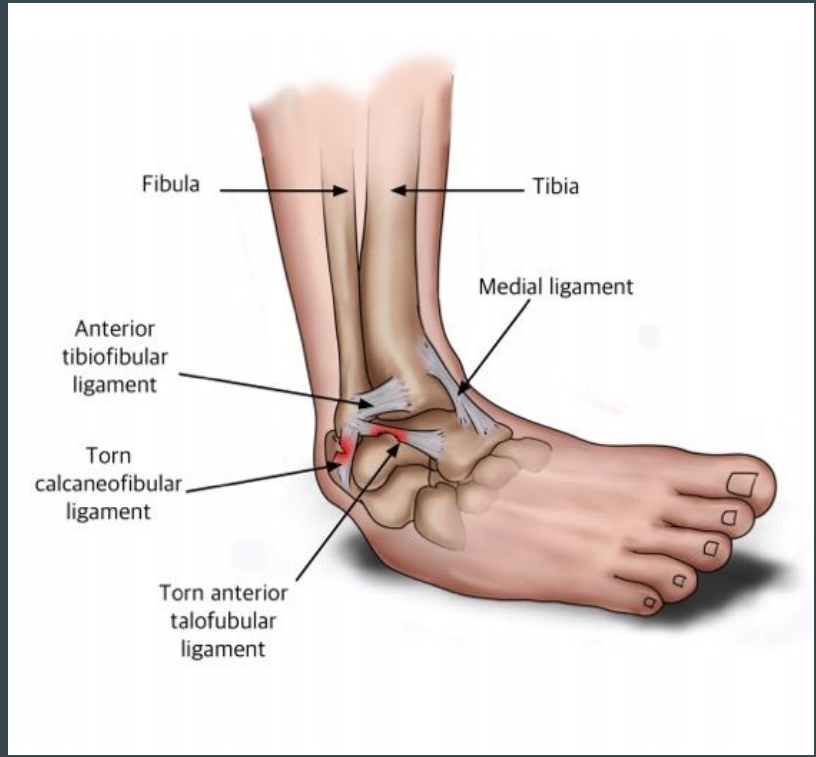
- Bones
  - Lower Leg: tibia, fibula
  - Foot: calcaneus, talus, tarsals, metatarsals
- Ligaments
  - Lateral: ATF, CF, PTF, tib-fib
  - Medial: Deltoid
- Muscles
  - Lower leg: gastrocnemius, soleus
  - Ankle / Foot: Tibial/Peroneal Bundles, Digitorum/Hallucis Bundles
- Nerves
  - Tibial, Super/Deep Peroneal
- Blood Supply
  - Ant/Post Tibial, Peroneal





Ankle / Lower Leg Injuries

- Joint Dislocation
  - talocrural joint
- Fractures
  - tib-fib, base of 5th, navicular
- Ligamentous Sprains
  - lateral vs medial
- Muscle Strains
  - lateral vs medial
  - achilles tendon
- Contusions
- Nerve Irritation
  - acute vs chronic
  - drop-foot



Clinical Prediction Rules (CPRs)

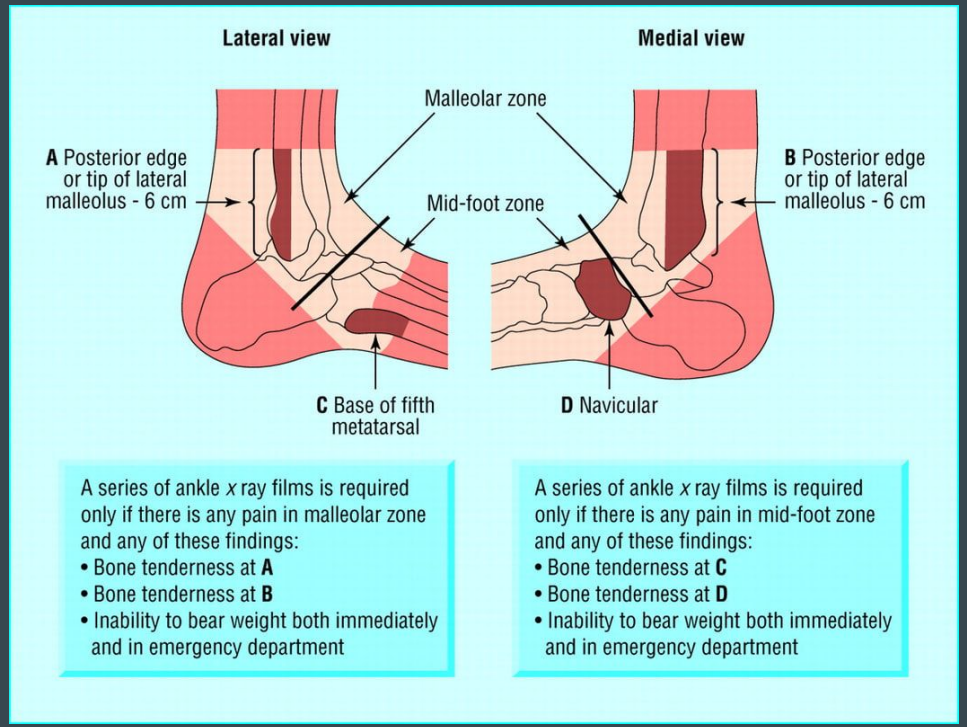
- Definition: A research-based combination of medical signs, symptoms, and other clinical findings used to predict the probability of a specific pathology
- The Goal: Aid the clinician in diagnosing and/or selecting the most appropriate intervention for a given pathology

- Can be a great addition to your existing assessment strategy

Ottawa Ankle Rules

- Estimated that approximately 25,000 ankle sprains occur per day
  - Females > Males, Pediatric > Adult
  - Healthcare $$
- OAR determines the need for radiographs following acute ankle injuries
  - Developed in the hospital setting to address the need for a rapid and accurate way to avoid unnecessary imaging
    - 0 symptoms = <1% chance of fx

USE THIS!



Actionable Next Steps

- 1. Consider an orthopedic assessment outline that makes sense to you
  - Fits your knowledge, your setting / practice, the flow of your office / visits

- 2. Research and **print** CPRs that are the most applicable to your practice
  - #1 Pick: Ottawa Ankle Rules

- 3. Add an orthopedic outline or a CPR as a template in your documentation

Final Thoughts

- Common Sayings:
  - “I have (low/mod/high) suspicion...”
  - “I do not have x-ray vision...”
  - “When in doubt, be seen at clinic for further assessment.”

- Palpate!
  - Orthopedic assessments are rooted in palpation
  - Explain to the patient **why** you are palpating

- Input from the nurses I work with:
  - “Assess with an end-plan or goal in mind - how is this patient going to be managed?”
    - 1. Stay in-house; 2. Urgent pick-up; 3. Emergency Send
    - Do you have the resources available to manage the patient in-house

Questions?

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