

## ORTHO REVIEW

Curt Stilp, MS, PA-C  
OHSU PA Program

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### Today's Topics

- ☐ Shoulder
  - Overuse
  - Dislocations
  - Fractures
- ☐ Elbow
  - Dislocation
  - Overuse
- ☐ Wrist/Hand
  - Fractures
  - Overuse
- ☐ Spine
  - Alignment
  - Overuse
- ☐ Hip
  - Fractures
- ☐ Knee
  - Traumatic injury
- ☐ Ankle/Foot
  - Sprain
  - Fracture
- ☐ Infections
  - Osteomyelitis

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### Acromioclavicular (AC) Joint Separation

- ☐ Injury to the ligaments that stabilize the acromion, clavicle and coracoid
- ☐ Fall on the point of the shoulder
- ☐ Exam
  - Tender over AC joint
  - Clavicle may be ballotable (Grade II and III)
  - Increased pain with crossover and pulling down arm
- ☐ Treatment
  - Ice and sling
  - PT



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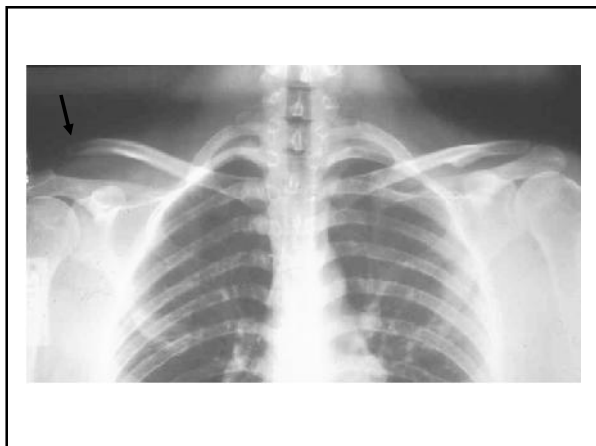
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### Rotator Cuff Injuries

- ▣ Continuum of Impingement - Bursitis - Strain - Partial Tear - Complete Tear
- ▣ History
  - Repetitive overhead motion
- ▣ Symptoms
  - Diffuse anterior pain
  - Pain worse in arc of 60-120°
- ▣ Exam
  - Impingement tests
- ▣ X-ray
  - Shape of Acromion
- ▣ MRI

The diagrams show the rotator cuff muscles (supraspinatus, infraspinatus, teres minor, and subscapularis) and their attachment to the greater and lesser tuberosities of the humerus. One diagram is labeled 'Rotator Cuff Tears'.

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Supraspinatus Test

Neer Test

Hawkins Test

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## Rotator Cuff Injuries

### Treatment

- Rest
- Sub-acromial injection
- Rehab
- Surgical repair



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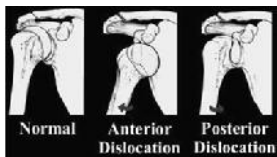
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## Shoulder Dislocations (Gleno-Humeral injuries) 2 Types

- ▣ Anterior - most common
  - ABduction/Ext Rot
  - 98% of all dislocations
  - Sulcus sign
- ▣ Posterior
  - ADduction/Int Rot
  - Seizures, electrocutions
  - Must get a lateral X-ray



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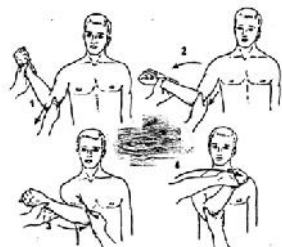
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## Shoulder Dislocations (Gleno-Humeral injuries)

### Treatment

- Reduction - modified Kocher method
  - Must do a pre and post-reduction neuro exam
- Surgery



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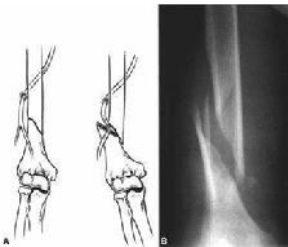
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### Humerus Fracture

- Easy to manage because of large ROM of shoulder
- Hanging traction vs. IM Rod
- Try to prevent stiffness of the elbow
- Injury to the radial nerve



The image contains three parts: two anatomical diagrams of the humerus showing different fixation methods (hanging traction and IM rod) and an X-ray of a humerus with a clear fracture line.

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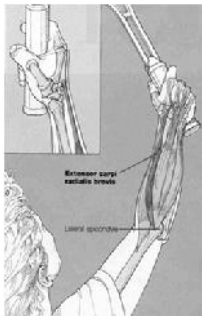
### Lateral Epicondylitis (Tennis Elbow)

Anatomy

- Wrist Extensor attachment

Causes

- Repetitive wrist extension
- Repetitive gripping



The diagram shows the lateral epicondyle of the elbow and the origin of the Extensor carpi radialis brevis muscle. Labels include 'Extensor carpi radialis brevis' and 'Lateral epicondyle'.

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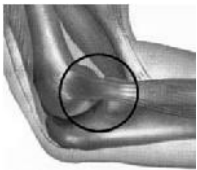
### Lateral Epicondylitis (Tennis Elbow)

Signs and Symptoms

- Pain with wrist extension
  - Shaking hands
  - Extension of middle finger against resistance
- Tender over lateral epicondyle

Treatment

- Rest
- PT
- Compression wraps



The image is a close-up photograph of the lateral epicondyle of the elbow, with a black circle highlighting the area of tenderness.

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### NURSEMAIDS ELBOW Radial Head Subluxation



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### NURSEMAIDS ELBOW Radial Head Subluxation

Treatment

- Reduction by extension, supination, then flexion (can put pressure over radial head to feel for "clunk")
- Child feels relief almost immediately and starts using the arm
- Educate parents about lifting child from under the arms

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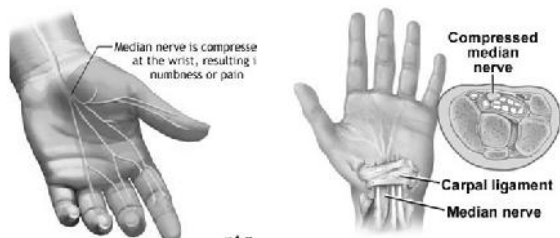
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### Carpal Tunnel Syndrome (CTS)



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## Major Factors Causing CTS

- ☐ Repetitive wrist/finger movement
- ☐ Forceful loading of tendons in carpal tunnel
- ☐ Extreme wrist flexion/extension
- ☐ Vibration
- ☐ Non-occupational factors
  - Diabetes
  - Connective Tissue Dz
  - Pregnancy
  - Mal-union of a wrist fracture
  - Anatomically small carpal tunnel

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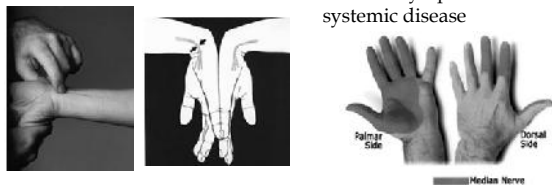
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## Carpal Tunnel Syndrome

- ☐ Signs
  - Positive Phalens test (flexion)
  - Positive Tinel's test (tap)
  - Positive compression test
  - >6mm 2-point discrimination
- ☐ Symptoms
  - Numbness (worse in AM)
  - ↓ Grip
  - ↓ Thumb-finger opposition
  - Thenar atrophy
- ☐ Bilateral symptoms think systemic disease




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## CTS Treatment

- ☐ Conservative Approach
  - Activity Modification
  - NSAIDS
  - Splinting
  - Injection
- ☐ Surgical Decompression
  - Open
  - Endoscopic Technique




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### DeQuervain's Stenosing Tenosynovitis

- Anatomy - First Dorsal Compartment of the Wrist
  - AbPL
  - EPB



- Causes
  - Repetitive gripping or extension of the Thumb

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### DeQuervain's Stenosing Tenosynovitis

- Signs and Symptoms
  - Tenderness
  - Positive Finkelstein test
  - Must differentiate from Scaphoid (navicular) tenderness and CMC arthritis



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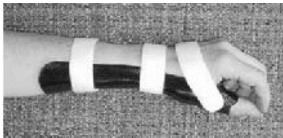
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### DeQuervain's Stenosing Tenosynovitis

- Treatment
  - Splint
  - Ice
  - PT
  - NSAID's
  - Cortisone injection
  - Surgical decompression



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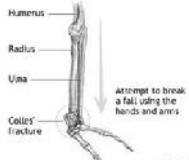
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### Distal Radius Fracture


- ❑ Colles' and Smith's fracture
- ❑ Fall on the outstretched hand
- ❑ Obvious deformity on exam
  - Dinner fork deformity - Colles'
- ❑ Re-establish proper alignment



Humerus  
Radius  
Ulna  
Colles' fracture



Flexion fracture of the radius (Smith's fracture)



Extension fracture of the radius (Colles' fracture)

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### Colles' Fracture




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### Distal Radius Fracture Treatment

- ❑ Short arm cast (4-6 weeks) vs. closed reduction vs. External fixator vs. ORIF
- ❑ ROM of fingers and elbow
- ❑ Consider PT/OT

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### Boxer's Fracture

- ▣ Fracture of the 5<sup>th</sup> MC neck (not base)
- ▣ Can accept 40° of dorsal angulation
- ▣ Treatment
  - Ulnar Gutter Splint
  - MCP flexed at 60°
  - 4-6 weeks



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### Boxer's Fracture



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### Scaphoid Fracture

- ▣ History
  - Fall on outstretched hand
- ▣ Exam
  - Snuffbox tenderness
- ▣ X-ray
  - May be negative at first
- ▣ Complications
  - AVN



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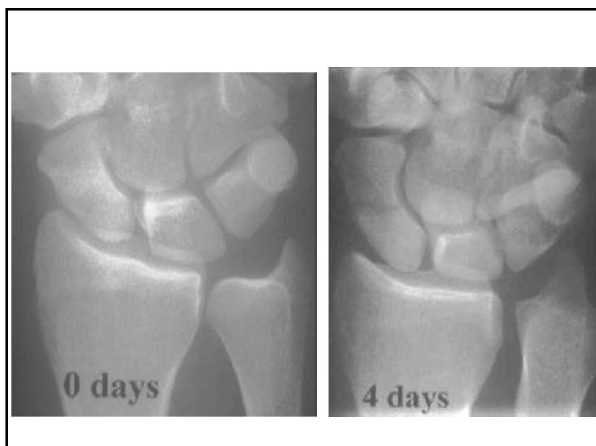
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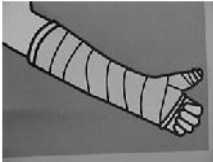
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### Scaphoid Fracture

- ☐ Repeat X-ray in 7-10 days
- ☐ May get CT or MRI
- ☐ Treatment
  - Thumb spica cast or splint for 8-10 weeks



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### Scoliosis

- ☐  $> 10^\circ$  curve as measured by Cobb angle
- ☐ 3-D deformity that includes:
  - Curvature in the coronal plane
  - Kyphosis or lordosis in the sagittal plane
  - Rotation in the axial plane
- ☐ Adolescent Idiopathic Scoliosis (AIS)
  - Most common type
  - 9-10 y/o female
  - Found on school screening
  - Change in appearance
    - Uneven shoulders, hips, skin folds
  - Asymptomatic and painless

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## Scoliosis - Physical Exam

- ☐ Adams forward bend test
  - Look for a rib or muscle prominence
  - Looking at rotation only




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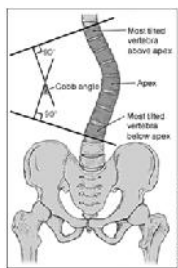
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## Scoliosis X-Rays

- ☐ Full column PA and lateral standing films, shoes removed, on single long cassette
- ☐ Determine type of curve
- ☐ Grade severity
  - Cobb angle
- ☐ Evaluate skeletal maturity
  - Risser sign




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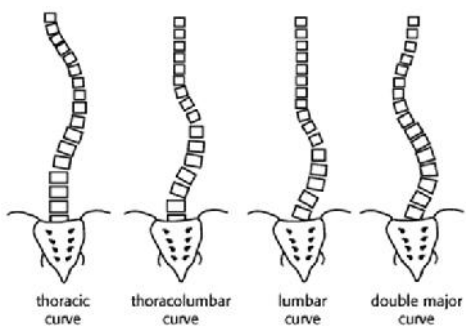
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### Scoliosis - Treatment Options

- ☐ Options are observation, bracing and surgery
- ☐ Treatment generally depends on the age of the patient and the severity and risk for progression of the curve
- ☐ The following table serves as a guideline for treatment based on the spinal curvature:

Curve Degree	Treatment Options
<20 degrees	Observation
20-40 degrees	Bracing
>40 degrees	Surgery

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### Lumbar Spinal Stenosis Syndrome (LSSS)

- ☐ Low back pain when ambulating or extending the lower back (walking downhill)
- ☐ Relieved when lying, sitting or squatting or bending forward
- ☐ Bilateral radicular leg pain
- ☐ Positive "shopping cart" sign
- ☐ Different than vascular claudication pain
  - Symptoms with walking a predictable distance and relieved by stopping and standing

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### LSSS Treatment

- ☐ NSAIDS, Lumbar corset
- ☐ Physical Therapy- lumbar flexion program
- ☐ Epidural steroid injections (may have up to 3 per year)

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## Degenerative Disc Disease

- ☐ Low back pain increased with prolonged sitting and activity
- ☐ Pain relieved with extension
- ☐ Radicular leg pain
- ☐ Physical Therapy - lumbar extension program

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## Herniated Disc (HNP)

- ☐ History of lifting something heavy
- ☐ +/- back pain
- ☐ Unilateral radicular leg pain
- ☐ Numbness/tingling



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## Herniated Disc (HNP)

- ☐ Treatment
  - ~80% get better on their own
  - Laminotomy/Discectomy



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## Hip Fractures

- ▣ Presentation
  - Lying on the gurney with a externally rotated and slightly shortened leg
- ▣ Types
  - Subcapital, Femoral Neck, Basilar Neck, Inter-trochanteric, Sub-trochanteric
- ▣ Treatment
  - Pinning vs Hemi-arthroplasty

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## Hip Fractures



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## ACL Tear

### Mechanisms of Injury

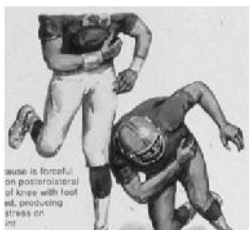
- Valgus Injuries
- Pivoting Injuries

### Diagnosis

- Physical Examination
  - Lachman, Anterior Drawer
  - **Acute** (1-2 hours) Bloody Effusion
- MRI

### Treatment

- Non-surgical vs. Surgical



Associated with medial meniscal tear and MCL rupture - "Bloody Triad"

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Anterior drawer test  
With patient's knee bent 90° and foot 90° flexed, the examiner pulls the tibia forward. A normal knee will move forward only a small amount. Excessive movement indicates a tear of the anterior cruciate ligament.

## Anterior Drawer



Lachman's test  
With patient's knee bent 30°-50°, examiner's hands grasp the tibia and femur. A normal knee will have a firm end-point. A soft end-point indicates a tear of the anterior cruciate ligament.

## Lachman's

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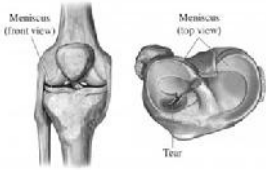
## Meniscal Injuries

**Diagnosis**

- History
  - Twisting injury
  - Effusion over 1-2 days
- Exam
  - Joint line tenderness
  - McMurray's or Apley Grind Test
- MRI

**Treatment**

- Arthroscopic repair vs. meniscectomy




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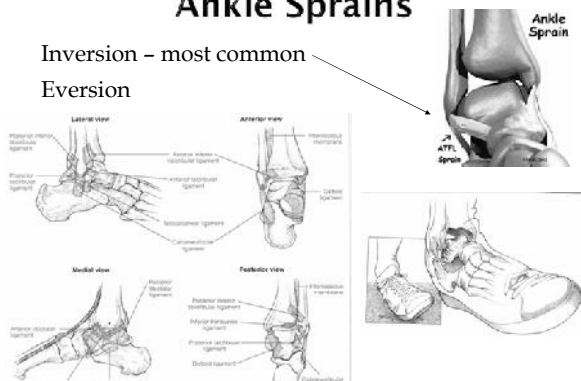
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## Ankle Sprains

Inversion - most common  
Eversion



**Ankle Sprain**

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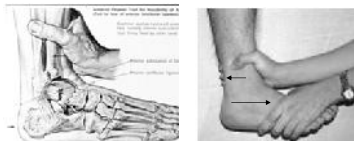
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## Ankle Sprains

### PE Findings

- Drawer test



- Talar tilt test




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## Ankle Sprains

### Diagnosis

- Grades I-III based on severity

Grade	Ligament Injury	Symptoms	Sign
I	Stretch	Pain Swelling	Able to walk Unable to run
II	Partial Tear	Pain Swelling Bruising	Pain with walking
III	Tear	Pain Swelling Bruising	Unable to walk

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## Ankle Sprains

### Treatment

- ▣ - Early Mobilization
- - Use RICE treatment acutely
- - Ankle Rehab
  - ▣ Flexibility
  - ▣ Strength
  - ▣ Proprioception




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### Ankle Xrays

- AP, Lateral, Mortise view
- Follow Ottawa Ankle Rules (OAR)
- ▣ Get an X-ray for:
  - Malleolar pain and tenderness
  - Inability to bear weight for 4 steps
- Swelling is NOT a reliable guide to the presence of a fracture

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### Ankle X-Ray



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### Jones Fracture

- ▣ Stress fracture
- ▣ Transverse fracture through the base of the 5<sup>th</sup> MT
- ▣ 1-2 cm from the proximal tip
- ▣ Short-leg cast vs. ORIF
- ▣ High incidence of nonunion

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### Jones Fracture



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### Osteomyelitis

- ▣ *Bacterial infection of the bone*
- ▣ Pathogens
  - Staph aureus - MOST COMMON
  - Salmonella in children with sickle cell disease
  - Pseudomonas after puncture wounds (animal bites)

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### Osteomyelitis

- Symptoms - Vary by age
- Localized bone pain
  - Fussiness and fever
  - Swelling, warmth and erythema of the overlying tissue
  - Decreased movement of the affected extremity (pseudo paralysis in infants, refusal to walk or limp in older children)

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## Osteomyelitis

Radiographic findings:

- Remember:
  - Radiographic findings lag behind infection by 1-2 weeks
  - Bone scan is most sensitive for detecting early osteomyelitis
- Plain film findings:
  - Blurring or obliteration of soft tissue fat planes (the earliest sign)
  - Elevation of the periosteum (pus) with periosteal reaction
  - Cortical destruction and endosteum scalloping
  - Eventually a sequestrum and involucrum may develop

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## Summary

<ul style="list-style-type: none"> <li>▫ AC joint dislocation                             <ul style="list-style-type: none"> <li>▪ Fall on point of shoulder</li> </ul> </li> <li>▫ Rotator Cuff                             <ul style="list-style-type: none"> <li>▪ Pain with overhead activity</li> </ul> </li> <li>▫ Humerus Fx                             <ul style="list-style-type: none"> <li>▪ Radial N. injury</li> </ul> </li> <li>▫ Tennis Elbow                             <ul style="list-style-type: none"> <li>▪ Pain with wrist extension</li> </ul> </li> <li>▫ Nursemaids                             <ul style="list-style-type: none"> <li>▪ Picture</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▫ CTS                             <ul style="list-style-type: none"> <li>▪ Phalens, Tinels, thenar atrophy</li> </ul> </li> <li>▫ DeQuervain's                             <ul style="list-style-type: none"> <li>▪ + Finkelsteins</li> </ul> </li> <li>▫ Colles' Fx                             <ul style="list-style-type: none"> <li>▪ FOOSH, dinner fork</li> </ul> </li> <li>▫ Boxers Fx                             <ul style="list-style-type: none"> <li>▪ Ulnar gutter splint</li> </ul> </li> <li>▫ Scaphoid Fx                             <ul style="list-style-type: none"> <li>▪ Snuff box tenderness</li> </ul> </li> </ul>
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## Summary

<ul style="list-style-type: none"> <li>▫ Scoliosis                             <ul style="list-style-type: none"> <li>▪ Cobb angle</li> </ul> </li> <li>▫ LSSS                             <ul style="list-style-type: none"> <li>▪ + shopping cart sign</li> </ul> </li> <li>▫ HNP                             <ul style="list-style-type: none"> <li>▪ Unilateral leg pain</li> </ul> </li> <li>▫ Hip Fx                             <ul style="list-style-type: none"> <li>▪ Shortened externally rotated leg</li> </ul> </li> <li>▫ ACL                             <ul style="list-style-type: none"> <li>▪ Acute bloody effusion</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▫ Meniscus                             <ul style="list-style-type: none"> <li>▪ Non-bloody effusion over 1-2 days</li> </ul> </li> <li>▫ Ankle Sprain                             <ul style="list-style-type: none"> <li>▪ Inversion, ATFL</li> </ul> </li> <li>▫ Ankle Fx                             <ul style="list-style-type: none"> <li>▪ Mortise widening</li> </ul> </li> <li>▫ Jones Fx                             <ul style="list-style-type: none"> <li>▪ Non-union</li> </ul> </li> <li>▫ Osteomyelitis                             <ul style="list-style-type: none"> <li>▪ Staph A.</li> </ul> </li> </ul>
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