Proximal Extremity Injuries in College Health
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Student wrecked his bike and went over his handlebars
Clavicle Fracture

- **Mechanism of Injury**
  - Direct fall onto the shoulder

- **Clinical presentation**
  - Men under 25 years
  - Cycling, contact sports
  - Often present holding arm adducted with opposite hand
Clavicle Fracture - Classification

• **Group I**
  – Middle 3rd

• **Group II**
  – Distal 3rd

• **Group III**
  – Proximal 3rd
Clavicle Fracture - Evaluation

- Deformity, ecchymosis, edema, focal tenderness, crepitation
- Neurovascular exam
- LUNG exam
- X-ray
Clavicle Fracture - Management

• Ortho referral
  – Emergent
    • Open
    • Neurovascular compromise
    • Skin tenting
  – Non-emergent
    • displacement greater than one bone width.
    • Group II (distal) fractures
  – Sling is better option
You’re at a Women’s B-Ball Game
Anterior Shoulder Dislocation

- Mechanism of Injury
  - blow to abducted, externally rotated, and extended arm
Shoulder Dislocation - Evaluation

• Arm slightly abducted and externally rotated; prominent acromion; loss of “roundness”

• Neurovascular Exam
  – Axillary nerve

• X-ray
  – Pre* and Post
Shoulder Dislocation – Reduction

- Self
- Scapular Manipulation
- External Rotation
Shoulder Dislocation – Management

• Ortho referral
  – Within one week*

• Immobilization
  – collar and cuff
  – sling and swathe
  – shoulder immobilizer

• Patient Education
  – Recurrent dislocation in 50-90% of patients younger than 20
  – Self-reduction technique
Looking out your exam room window...
AC Separation

- **Mechanism of injury**
  - direct trauma to superior or lateral aspect of shoulder with arm adducted
    - direct blow or fall

- **Clinical presentation**
  - swelling, focal tenderness, possible AC joint deformity
AC Separation - Grading

- **Normal**
- **Type I**
- **Type II**
- **Type III**
- **Type IV**
- **Type V**
- **Type VI**

- Distal clavicle displaced behind tendons of biceps and coracobrachialis.

*Superior view*
AC Separation - Evaluation

**TYPE I**: partial tear of AC ligaments. Often no abnormality is seen on x-ray, but slight widening of the AC joint may occur.

**TYPE II**: complete tear of AC ligaments; partial tear of CC ligaments. Difference in AC joint position; increase in CC distance.

**TYPE III**: complete rupture of both AC and CC ligaments. Clavicle elevated above the normal plane of the AC joint.
AC Separation - Management

<table>
<thead>
<tr>
<th></th>
<th>I</th>
<th>II</th>
<th>III*</th>
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<tbody>
<tr>
<td>RICE</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Sling</td>
<td>For pain</td>
<td>3-7 days</td>
<td>2-3 weeks</td>
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<tr>
<td>ROM</td>
<td>As soon as pain allows</td>
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<tr>
<td>Return</td>
<td>As soon as pain allows</td>
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<td></td>
<td>≥ 2 weeks</td>
<td>2-4 weeks</td>
<td>6-12 weeks</td>
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<td>IV-VI</td>
<td>REFER TO ORTHO</td>
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Swimmer comes to see you for shoulder pain
Rotator Cuff Impingement and Tendinopathy
Rotator Cuff Impingement

- Compression of rotator cuff tendons and subacromial bursa between the greater tubercle of the humeral head and the lateral edge of the acromion process
Rotator Cuff Tendinopathy

- chronic injury to the supraspinatus and/or infraspinatus tendons
- Repetitive activity at or above shoulder height
  - tendon degeneration
  - microvascular insult
Tendinopathy and Impingement – Clinical Presentation

- Anterolateral shoulder pain worse with:
  - Overhead reaching, pushing, pulling or lifting
  - Positioning arm above shoulder level
  - Lying on the affected side.
- Usually NO injury
Evaluation – Apley Scratch Test

ADduction

ABduction
EXternal Rot.

ADduction
INternal Rot.
Evaluation - Neers Test

- “Passive Painful Arc Maneuver”
- Passive flexion of gleno-humeral joint while preventing shoulder shrugging
- 75-90% sensitive
  - ? specificity
Evaluation – Hawkins Kennedy test

- Stabilize shoulder with one hand
- Internally rotate shoulder with other with elbow flexed at 90°
- Pain = positive test
- 75-90% sensitive
Evaluation – Supraspinatus Testing

- Patient arm abducted to 45 degrees
- Ask patient to raise (abduct) the arm against resistance at elbow
- Note strength and pain
Don’t Forget the Labrum

- Same mechanisms can also cause tears of glenoid labrum
  - baseball pitching, tennis serving, swimming
- deep shoulder pain, catching sensation, instability, crepitus
- MRI if not responding to conservative Rx
Management

- RICE
- NSAID’s
- Physical Therapy
  - Strengthening, stretching, balancing
  - Adjunct therapies?
    - Electrical stim, iontophoresis, ultrasound
Skateboarder puts his hand out to catch himself
Radial Head and Neck Fractures

• Mechanism of Injury
  – FOOSH!

• Clinical presentation
  – pain, tenderness, or swelling over lateral elbow
  – decreased range of motion
  – deformity or bruising.
Radial Head/Neck Fractures - Evaluation

- Neurovascular Exam
- Palpate radial head while gently pronating and supinating forearm – crepitus and tenderness
- X-ray
  - Fat Pad sign
    - Anterior
    - Posterior*
    - Both = “sail sign”
Radial Head/Neck Fractures - Management

• Type I (non-displaced)
  – Sling/ice for 1-2 days
  – Range of motion ASAP

• Type II (displaced >2mm or III (comminuted)
  – Sling/ice for comfort
  – Ortho referral within a week

• Type IV (dislocated)
  – Emergent referral
Trying to avoid “old lady” arms
Triceps Tendonitis - Evaluation

- Clinical Presentation
  - swelling and pain to palpation over distal triceps and olecranon
  - pain with resisted extension
  - decreased range of motion in extension
  - snapping sensation along the medial border of the elbow
Triceps Tendonitis - Management

- Review proper mechanics
- RICE
- NSAIDs
- Stretching and strengthening program
Grad student teaches a yoga class
Olecranon Bursitis - Evaluation

- **Presentation**
  - Acute trauma vs. repetitive injury
    - wrestling, sitting with elbows on table
  - Past Medical History
    - gout, RA, sepsis

- **Clinical presentation**
  - Focal, boggy swelling
  - Pain with motion
  - Tenderness
Olecranon Bursitis - Management

• Aspirate?
  – Recent infection, fever
  – Break in the skin?

• X-ray?
  – If non-traumatic, NO

• Inject?
  – Prevents recurrences

• Support
  – NSAIDS, RICE, sling
Lateral Epicondylitis

- “Tennis elbow”
- Most common sports-related elbow problem
  - Ergonomic issue as well
Lateral Epicondylitis - Evaluation

- Pain to palpation over the lateral epicondyle
- Pain with resisted wrist extension with the elbow in full extension
- Pain with passive wrist flexion with the elbow in full extension
Medial Epicondylitis

• “Golfer’s elbow”
  – Less common than lateral epicondylitis
Medial Epicondylitis - Evaluation

- Pain at med. Epicondyle
- Tenderness over the medial epicondyle
- Pain with resisted wrist flexion with the elbow in full extension
- Pain with passive terminal wrist extension with the elbow in full extension
Epicondylitis - Management

- Rest, Ice
- NSAIDs
- Stretches/PT
- Avoiding exacerbating activities
- Forearm straps ??
Pitcher feels a pop in his elbow after throwing a curveball
Ulnar Collateral Ligament Tear/Sprain

- **Throwers**
  - 50% with specific event; most with symptoms before event
- **FOOSH on planted hand**
  - Wrestlers, gymnasts, football players
- **Clinical Presentation**
  - Medical elbow pain
    - Chronic, intermittent
UCL Sprain - Management

- Conservative mgmt. for 3-6 months
  - Rest (no throwing)
  - NSAIDs
  - Physical therapy
- Surgery
  - UCL reconstruction
Female cross-country runner with gradually worsening groin pain
Femoral neck stress fracture
Evaluation

• Groin pain
  – Insidious; increases with running, improves with rest

• History is key
  – Menstrual, dietary, prior fractures,
  – Change in training
  – FHx of bone disease
Femoral neck stress fracture Management

- A don’t miss Diagnosis!!
  - MRI*
    - Sensitive and specific
    - X-ray helpful if positive
- Pain control
- Reduction of activities until pain free
- Rehabilitative exercise
- Ortho referral*
Stress Fractures and Female Athlete Triad

- **Amenorrhea**
  - due to caloric deficiency

- **Osteoporosis**
  - ↓ energy --> resorptive state

- **Management**
  - Bone densitometry
  - Increase caloric intake
  - r/o other causes of amenorrhea

- Eating Disorder
  - Osteoporosis
  - Amenorrhea

30%
What if she had gradually worsening *hip* pain?
Trochanteric Bursitis

- Outer thigh pain
  - Vs. “groin” pain of femoral neck stress fx
  - Worse with walking
- Focal pain to palpation
Trochanteric Bursitis - Evaluation

• Palpate for tenderness
  – Hip flexed to 90°
• Evaluate internal and external rotation
• Evaluate gait
Trochanteric Bursitis - Management

- Heat, stretching
- NSAIDs
- Restrict weight bearing and repetitious bending
  - climbing stairs, getting out of a chair
- Avoid direct pressure on bursa
- Refer for injection
What if she complains of her hip “clicking” when she runs?
Snapping Hip Syndrome

**Internal Snapping Hip Syndrome**
- Iliac spine
- Psoas major muscle
- Femoral head
- Greater trochanter
- Iliopsoas tendon
- Ilipectineal eminence

**External Snapping Hip Syndrome**
- Gluteus maximus
- Greater trochanter
- Iliotibial band
- Gluteus maximus tendon
Snapping Hip Syndrome - Evaluation

- Can be painless or painful
- X-rays unnecessary
- MRI?
  - If cause is thought to be due to cartilage tear
Snapping Hip Syndrome - Management

- Heat, stretching
- NSAIDs/Acetaminophen
- Physical Therapy
- Refer for arthroscopy
  - Rarely necessary
  - If concern for labral tear or refractory to conservative measures
What if she now complains of pain on outside of her knee?
Iliotibial Band Syndrome

- Almost only in runners
- Aching/burning pain where IT band crosses lateral femoral condyle
- Risk factors
  - Varus alignment of knee
  - Excessive mileage
  - Worn shoes
  - Running on uneven terrain
Iliotibial Band Syndrome

• Evaluation
  – Focal tenderness +/- clicking over lateral femoral condyle
  – Otherwise **normal** exam

• Treatment
  – Conservative
  – Rest, ice, analgesics
Knee

- Femur
- Iliotibial band
- Anterior cruciate ligament
- Posterior cruciate ligament
- Lateral meniscus
- Lateral collateral ligament
- Medial collateral ligament
- Medial meniscus
- Anserine bursa
- Semitendinosus, Gracilis, Sartorius tendons
- Tibia
- Tibial tuberosity
- Patella
- Posterior cruciate ligament
- Anterior cruciate ligament
- Meniscus
- Meniscal ligament
- Femur
- Tibia
- ADAM
Knee injury - evaluation

- The mechanism is key!
- Where is the pain?
- Mechanical symptoms?
- Swelling?
  - where and when
- Exam
  - Look, palpate
  - Neurovascular status
ACL Injury

- Plant/pivot mechanism
  - Sudden deceleration
  - Knee extended
  - Knee rotated and bent
- Lateral (valgus) blow
ACL Assessment

• Anterior Drawer Test
  – Knee flexed to 90°
  – Foot stabilized
  – Tibia pulled anteriorly
  – Compare pain, abnormal movement and laxity to uninjured side
    • Tear more likely if > 1cm difference in movement
  – 62% sensitive, 67% specific (in good hands)
ACL Assessment

- **Lachman Test**
  - Knee flexed to 20°
  - Patient’s thigh stabilized on examiner's knee
  - Tibia pulled anteriorly
  - Compare pain, laxity to uninjured side
  - Vs. Anterior Drawer
    - More sensitive (84%)
    - Easier in acute injury and swelling
PCL Injury

- direct trauma to the upper anterior tibia in flexed knee
- falling onto the flexed knee with the ankle in plantar flexion
- MCL and LCL provide first line of defense
PCL Assessment

• Posterior Drawer Test
  – Knee flexed to 90°
  – Foot stabilized
  – Tibia pushed posteriorly
  – Compare laxity to uninjured side
MCL Injury

- Plant and pivot
  - Sudden deceleration
  - Knee extended
  - Knee rotated and bent
- Lateral (valgus) blow
MCL Assessment

• Valgus Stress Test
  – Upper hand stabilizes lateral thigh
  – Lower hand places outward pressure on calf
  – Note: pain, movement of joint space, laxity of ligament
LCL Injury

- medial blow that creates a varus load
LCL Assessment

• The Varus Test
  – Upper hand stabilizes medial thigh
  – Lower hand places inward pressure on calf
  – Note: pain, movement of joint space, laxity of ligament
Meniscus Tear

- Plant and pivot
  - Sudden deceleration
  - Knee rotated and bent
- May present weeks after the injury
- Popping, locking, catching, “giving out,” or instability
Meniscus Assessment

- McMurray Test
  - Specific, not sensitive
  - Thumb and index finger on joint lines
  - Knee is flexed and extended while being rotated
  - Positive = pain at joint line +/- “thunk”
Patellar subluxation/dislocation

- lower leg externally rotated
- Quadriceps quickly “fired” to rapidly extend the knee
Patellar Assessment

• Tender in medial joint line
• Pain with valgus testing
• Patellar apprehension test
  – Apprehension when examiner tries to push patellar laterally
  – Negative in MCL sprain*
The PCL can be torn in a valgus or varus injury, but only after the first line of restraint is torn: the MCL in a valgus injury, and the LCL in a varus injury.
Knee injury - Management

- Imaging?
  - X-ray? MRI?
- RICE
- Immobilization?
  - Elastic wrap usually sufficient
  - Crutches/immobilizer
    - PRN pain or instability
- NSAIDs/Acetaminophen
- Physical Therapy
Management of Proximal Extremity Injuries in College Health

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