Evaluation and Treatment of Common Musculoskeletal Complaints

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July 2012

Outline of Session

- Joint Anatomy
- Exam Demonstration: HIT ME NOT
  - History
  - Inspect
  - Touch
  - Move
  - Extra maneuvers
  - Things to NOT miss
- Exam Practice
- Etiology of joint pain (knee and shoulder)

Neuman WR, Cato RK, Fosnocht KM, O’Rorke. SGIM, 2006
Knee Anatomy

- Patella
  - Thickest cartilage in the body
  - Provides fulcrum for the quadriceps
  - Important in any bent-knee activity

- Ligaments
  - Provide stability to the knee

Knee - History

- Mechanism of injury?
- Swelling?
  - Immediate or delayed
- Sounds?
- Unstable?
  - Due to quad weakness/pain or ligament instability
Knee - History

- “Point to the Pain”
  - Medial Knee Pain (most common)
    - Osteoarthritis
    - Anserine Bursitis
    - Medial Meniscal Injury
  - Lateral Knee Pain
    - Lateral Meniscal Injury
    - Osteoarthritis
    - Tendinitis

- Anterior Knee Pain (most common < 45 yrs)
  - Patellofemoral syndrome
  - Patellar tendonopathy
  - Severe OA
  - Prepatellar bursitis

- Posterior Knee Pain
  - Baker’s Cyst
  - Vascular
  - Sciatica
Knee - Inspect

- Symmetry (standing)
  - Alignment
  - Atrophy of muscles
  - Swelling
    - Obvious effusion
    - Prepatellar swelling
    - Posterior swelling
  - Redness

Knee - Touch

- Temperature
  - By compartment

- Test for Effusion
  - TAP the PAT
  - Rapid large effusion = ligament injury or fracture of tibial plateau
  - Slow effusion (24 hrs) = meniscal injury
Knee - Touch

- Lying down with knee slightly flexed…
  - Palpate and move the patella
  - Tendons
    - Quadriceps
    - Patellar
  - Tibia
    - Tuberosity
    - Medial: joint line, MCL, anserine bursa
    - Lateral: joint line, LCL, fibular head, biceps femoris, iliotibial band

Knee - Move

- Passive ROM
  - Extend as far as possible (normal 0 degrees)
  - Flex knee as far as possible (normal 135 degrees)
- Active ROM
  - Resisted flexion and extension at 120 degrees
- “Lock” the Knee
Knee – Extra Maneuvers

- Patellar assessment
  - Patellar apprehension test
    - Knee flexed 45°
    - Fingers at medial patella
    - Try to move patella laterally

Knee – Extra Maneuvers

- Anterior Cruciate Ligament
  - Anterior Drawer
    - Knee flexed 90°
    - Foot fixed slight external rotation
  - Lachman Test
    - Knee flexed 30°
    - Stabilize distal femur with one hand and grasp proximal tibia with the other
    - Compare both sides!
**Knee – Extra Maneuvers**

- **Posterior Cruciate Ligaments**
  - Posterior sag sign
    - Knee flexed 90
    - Look for posterior displacement of the tibia
  - Posterior drawer test
    - Knee flexed 90
    - Foot fixed in neutral position
    - Thumbs at tibial tubercle
      - Push posteriorly

- **Collateral ligaments**
  - MCL
    - Valgus Stress
      - At full extension (0° degrees). Here, PCL and the articulation of femoral condyles/tibial plateau should stabilize knee
      - At 30° flexion
        - Assesses MCL
Knee – Extra Maneuvers

- Collateral ligaments
  - LCL
    - Varus Stress
      - At full extension (0° degrees).
      - At 30° flexion
    - Compare both sides

- Menisci
  - McMurray Test
    - Lateral meniscus
      - Feel lateral joint line
      - Tibia rotated internally
      - Knee extended from maximal flexion to extension
      - Add valgus stress with extension
Knee – Extra Maneuvers

- Menisci
  - McMurray Test
    - Medial meniscus
      - Feel medial joint line
      - Tibia rotated externally
      - Knee extended from maximal flexion to extension
      - Add varus stress with extension
  - Positive test = thud, click or pain

Knee – Not To Miss

- Effusion
- Joint Instability
  - Ligament injury
- Red-flags
  - Night pain
  - Fever
  - Weight Loss
  - Limp
  - Could indicate infection or tumor
Knee Exam

- History
- Inspection
- Touch
  - Effusion
  - Tendons
  - Tibia
- Move
  - Passive ROM (extend, flex)
  - Active ROM at 120 degrees
  - Lock the knee
- Extra Maneuvers
  - Patellar apprehension
  - Anterior drawer/Lachman
  - Posterior drawer
  - Valgus stress
  - Varus stress
  - McMurray
Common Knee Complaints

- Case One
  - 27 yo man with knee pain X 3 months. Started after injury in soccer game.
  - Dx?
    - Meniscal tear

Meniscal Injuries

- Menisci provide cushion between tibia and femur
- History: twisting injury to knee with foot in weight-bearing position.
  - Popping or tearing sensation
  - Pain medial or lateral
  - Locking may occur
  - Slow effusion; if no effusion, consider alternate dx
- Exam: jt line tenderness
  - Long-standing dz, may see quadriceps atrophy
  - May see positive McMurray or Thessaly test
Thessaly Test

- Better sensitivity than McMurray
  - Examine both knees
  - Stand on normal first
  - Flex 5° then 20°
  - Positive test = pain at joint line with possible locking/catching sensation

Karachalios et al. JBJS, 87AL955-962.

Meniscal Injuries

- Treatment
  - RICE X 2-6 weeks
    - Rest→crutches
    - Ice
    - Compression→bulky compression dsg from mid-thigh to mid-calf
    - Elevation
    - Exercise: quad strengthening with gentle ROM in 2-3 days
  - Refer if no better 2-6 weeks
    - May need surgery
Common Knee Complaints

- Case Two
  - 18 yo woman with knee pain X 1 month
  - Pain anterior knee. Hurts to walk and go up stairs. Knee “gives out” due to pain.
  - Dx?

Patellofemoral Pain Syndrome

- Pain over anterior aspect of knee in absence of other pathology
- Any injury/anatomic abnormality that predisposes to irregular movement of the patella can lead to PFS
- Symptoms
  - Pain beneath/near patella
  - Pain with squatting/prolonged sitting
  - Pain with single leg knee dip
Patellofemoral Pain Syndrome

- Treatment
  - Reassurance
  - No or limited bent-knee activities. Avoid stairs.
  - Straight leg raises to prevent atrophy
  - Quad stretching twice/day. One minute.
  - NSAIDS, ice, heat
  - May take 3 months to improve

Common Knee Complaints

- Case Three
  - 60 yo woman with six months of knee pain
  - Pain medial aspect of knee. Relieved by rest with am stiffness.
  - Dx?
  - DJD
Knee DJD

- Are symptoms from meniscus (catching/locking/localized) or arthritis (pain with weight-bearing, diffuse)?
- All patients with arthritis have meniscal tears
- X-ray
  - Standing AP both knees, both laterals and merchant/sunrise view
  - If normal X-ray → meniscal

Common Knee Complaints

- Case Four
  - 37 yo woman with knee injury 2 years ago with knee instability
  - Was playing tag football and was “clipped”. Knee swelled immediately, iced. Didn’t seek medical attention. Couldn’t bear weight immediately, but gradually improved. No pain now, knee unstable.
  - Dx?
  - Ligament tear (likely ACL)
Ligament Injuries

- Mechanism: Forceful stress against knee when weight-bearing
  - Valgus stress: MCL
  - Varus stress: LCL
  - Twisting injury (pop): ACL

Ligament Injuries

- Collateral (except complete LCL)
  - RICE, early rehab
  - Can use functional hinged braces
  - Complete tear of LCL→surgery to prevent instability later

- Isolated cruciate injuries
  - Attempt at non-surgical treatment unless high demands on joint
Ligament Injuries

- Chronic instability
  - Most often from ACL deficiency
  - Usually not painful (unless torn meniscus)
  - Treatment depends on degree of instability and how much it bothers the patient
- PT
  - Hamstring strengthening

Common Knee Complaints

- Case Five
  - 45 yo man c/o pain in the posterior knee. Now swollen. On exam, posterior knee swollen with mass lateral to the medial hamstrings in the popliteal fossa
  - Dx?
Baker’s Cyst

- Enlargement of popliteal cyst (semimembranous bursa present in medial aspect of popliteal space)
- Typically secondary to intra-articular pathology
  - Chronic effusion communicates from joint to cyst and fluid escapes into bursa

- Treat primary (underlying) abnormality
- Can aspirate and inject with steroids if needed…
Common Knee Complaints

■ Case Six
  ■ 45 yo woman c/o anterior knee pain. Started gardening this spring. Knee is painful and red.
  ■ Dx?
  ■ Prepatellar bursitis

Pre-Patellar Bursitis

■ Pre-patellar bursa lies between the skin and patella
  ■ Acute Trauma→bloody
  ■ Atraumatic (friction, kneeling)
  ■ If red, aspirate it BUT NOT THE JOINT. If not red, leave it alone.
■ Treatment: avoid friction, NSAIDS, time, immobilizer or ace-wrap PRN
Anserine Bursitis

- Bursa deep to insertions of semitendinosus, gracilis and sartorius tendons medially.
- Tender BELOW joint line
- Treatment: heat, rest, NSAIDS, injection

The Shoulder
The Shoulder - Anatomy

- Three bones
  - Scapula
  - Clavicle
  - Humerus

- 4 Articulations
  - Glenohumeral
  - Scapulothoracic
  - Acromioclavicular
  - Sternoclavicular

- Ligaments and muscles provide stability
  - Scapula stabilized
  - Rotator cuff (supraspinatus) steady humeral head in glenoid head (descend).

- Abduction
  - 1/3 from forward/lateral movement of scapula
  - 2/3 from glenohumeral jt (deltoid/supraspinatus muscles)
Shoulder

- Exam Demonstration: HIT ME NOT
  - History
  - Inspect
  - Touch
  - Move
  - Extra maneuvers
  - Things to NOT miss

Shoulder - History

- What hurts? Where does it hurt?
  - Pain that radiates past elbow to hand usually not related to the shoulder
  - Don’t forget conditions that cause radiation of pain into shoulder

- ROM limitation?

- Onset of pain?
  - If acute (<12 weeks), can cure with activity modification.
  - Pain > 12 weeks harder
  - Pain > 6 months…one tough cookie
Shoulder - Inspect

- Examine with both shoulders widely exposed
  - Contour
    - Symmetry
    - Dislocation
    - Fracture
  - Atrophy (anterior AND posterior)
  - Swelling
    - Difficult to assess

Shoulder - Touch

- Temperature
- 3 Places to Touch
  - Acromioclavicular joint
  - Subacromial space
  - Biceps tendon
- Check both sides
  - Some sites tender even if normal shoulder
Shoulder - Move

- Active ROM
  - Forward Flexion
  - Extension
  - Abduction
  - Internal Rotation (reach backwards behind shoulder blade)
  - External Rotation (hands behind head)
  - Compare both sides!

If full ROM actively, no need to test passive ROM

If loss of both active and passive ROM??

- 2 things to consider
  - Adhesive capsulitis
  - Severe OA of glenohumeral joint
Shoulder – Extra Maneuvers

- Hawkin’s Impingement Test
- Rotator cuff tests
  - Drop Arm
  - Empty can
  - External rotation
  - Lift-off
- Crossover maneuver

Shoulder – Hawkin’s Test

- Forward flex arm to 90° with elbow bent 90°
- Arm then internally rotated
- Positive test = subacromial impingement
Shoulder – Drop Arm Test

- Arm passively raised to $160^\circ$
- Pt asked to slowly lower arm to the side
- Positive test = inability to control lowering and dropping of the arm
- Dx = large rotator cuff tear

Shoulder – Empty Can

- Tests supraspinatus
- Arms abducted $90^\circ$ and forward flexed $30^\circ$
- Thumbs downward
- Resist downward force
- Positive = rotator cuff (supraspinatus) pathology
Shoulder – External Rotation

- Tests infraspinatus and teres minor
- Pts arms held at their sides with elbow flexed 90°
- Patient pushes externally against resistance
- Positive test = weakness (tear in muscle/tendon)

Shoulder – Lift Off

- Tests subscapularis
- Arm internally rotated behind back
- “Pushes off” against examiner’s hand
- Positive test = inability to lift hand off back
- Dx: subscapularis tendinopathy/tear
Shoulder – Crossover Maneuver

- Patient touches behind the opposite shoulder
- Tests for acromioclavicular pain and sternoclavicular pain

Shoulder – NOT to Miss

- Referred pain!
  - Cardiac
  - Abdomen (subdiaphragmatic)
  - Pulmonary (Pancoast tumor)
  - Radicular
- Biceps tendonitis
More Practice…

- Inspect
- Touch
  - AC joint
  - Subacromial space
  - Biceps tendon
- Move
  - Active (flexion, extension, abduction, internal/ext rotation)
  - Passive if needed
- Extra maneuvers
  - Hawkin's Impingement
  - Rotator cuff tests
    - Drop arm
    - Empty can
    - External rotation
    - Lift off
    - Crossover maneuver

Shoulder “Pearls”

- Most shoulder problems will have pain in the shoulder
- Most “impingement syndrome” diagnoses have pain aggravated by direct pressure and reaching
- Most shoulder pain includes tendinopathy/tendinosis
- Most rotator cuff tendinopathy involves the supraspinatus tendon
- Most rotator cuff tears occur in patients > 40 yrs
Shoulder – Diagnostic Imaging

- Who Needs an X-Ray?
  - Chronic shoulder pain
  - No improvement after treatment
  - Odd hx or PE, history of trauma

- Standard plain radiographic series for the shoulder...
  - Anteriorposterior
  - Axillary (i.e. lateral)
  - Scapular Y view
    - Assesses shape of acromion
    - Helps to determine humeral head dislocation

Shoulder – Diagnostic Imaging

- Why get X-rays?
  - Can determine DJD of AC and glenohumeral joint
  - Large rotator cuff tear = superior migration of humeral head
  - Calcific tendinitis

- MRI
  - Rotator cuff tears
Common Shoulder Diagnoses

- Impingement
- Rotator cuff tear
- AC joint disease
- Frozen shoulder
- Biceps tendonitis
- Rare: glenohumeral arthritis

Common Shoulder Complaints

- Case One
  - 65 yo woman with h/o overuse shoulder injury after painting. This was 4 months ago. Now with painful shoulder and limitation of motion
  - Dx?
Adhesive Capsulitis

- Insidious onset of pain and restriction of motion
  - Pain usually AFTER significant loss of motion
  - Pain usually localized to rotator cuff; may radiate down deltoid and anterior aspect of arm
  - Interferes with sleep
- More common in women and diabetics
- Cause unknown, but can be post-traumatic

Adhesive Capsulitis

- Examination
  - Deltoid and/or supraspinatus atrophy
  - Tenderness around rotator cuff and biceps tendon
  - Active and passive ROM restricted
  - Best Dx test: no passive external rotation
  - DDx: glenohumeral joint infection vs. DJD
- Treatment
  - Prevention
  - Injection
  - ROM exercises (hourly!)
Shoulder Joint Infection

- Red, angry-looking shoulder = septic arthritis of AC joint
  - Aspirate, labs, X-Ray, refer
- Glenohumeral joint infection
  - Rare
  - Shoulder looks normal, just bigger
  - SEVERE pain with any motion
  - Often a fever
  - More in diabetics, immunocompromised

Glenohumeral Arthritis

- Rare
  - Seen as secondary process
    - RA, avascular necrosis, chronic rotator cuff disease
    - Overuse of shoulder (ex: baseball pitchers)
- Age > 50 yrs
- Chronic pain, limited motion
- May see atrophy and crepitus
- Dx: X-ray
- Treatment: injection, NSAIDS, stretching
Common Shoulder Complaints

Case Two

- DDx?

Rotator Cuff Pathology

- Rotator cuff disorders affect function of rotator cuff (supraspinatus, infraspinatus, teres minor, subscapularis)
- All of these muscle tendons fuse together near their insertions into humeral tuberosities to form musculotendinous cuff
Rotator Cuff Pathology

- Rotator Cuff Pathology can include:
  - Partial or complete tear
  - Tendinitis or tendinosis
  - Calcific tendinitis
- More important to differentiate this group of disorders from the other groups than to specify exact dx

Rotator Cuff Pathology

- Degeneration of the rotator cuff
  - Age
  - Impairment of cuff vascularity
  - Repetitive microtrauma
  - External abnormalities that narrow the subacromial space
    - Osteophytes
    - Shape of acromion
- With time, overlying bursa and tendons affected
Rotator Cuff Pathology

- Impingement
  - Friction
  - Overuse
  - Bursitis → tendonitis → rotator cuff tear
    - Bursitis = pain but not when testing cuff
    - Tendonitis = hurts when cuff muscles are tested
    - Rotator cuff tear = weakness (often without pain)

Rotator Cuff Pathology

- Impingement/Bursitis
  - History: pain with overhead activity
    - Lateral shoulder (may radiate to deltoid)
    - Often night pain
    - Can’t lie on shoulder
  - May have tenderness over supraspinatus insertion
Rotator Cuff Pathology

- Impingement/Bursitis
  - When abducting the shoulder, pt may turn palm upward (externally rotating shoulder)
    - Gives rotator cuff more room beneath coracoacromial arch
  - DDx: AC joint pathology
    - Tenderness over joint
    - Treat like arthritis anywhere else
  - What tests will you do to differentiate between AC joint disease and impingement?

Rotator Cuff Pathology

- Impingement Treatment
  - Activity modification
    - No activity with elbow away from side
  - Once daily, fully stretch overhead
  - NSAID, ice
  - Injection 3-6 weeks PRN
  - PT AFTER pain subsides
    - Regain ROM and strengthen rotator cuff
Rotator Cuff Pathology

- How do you know it’s a rotator cuff tear?
  - Can’t assess rotator cuff when there is pain
    - Treat pain first
      - NSAIDS, PT, ice, rest, injections
  - Re-assess cuff

Rotator Cuff Tear

- History
  - Rare < 50 yrs
  - Occasionally, fall onto outstretched hand or attempt to lift heavy object
  - Pain and weakness
- If partial tear, clinical findings similar to tendonitis
- Remember extra-maneuvers for rotator cuff
- Shoulder films, MRI
Rotator Cuff Tear

- Treatment
  - Partial/small tears
    - Treat like tendonitis
  - Some will require surgical treatment
    - Based on pain, age, activity level, degree of tear

Common Shoulder Complaints

- Case Three
  - 40 yo man playing flag football over the last year (he’s the quarterback). Now with pain over anterior-lateral shoulder
  - DDx?
Biceps Tendonitis

- Inflammation of biceps tendon and its sheath in the bicipital groove
- May be primary disorder or secondary to rotator cuff pathology
  - Can be difficult to differentiate from rotator cuff disorders

Clinical Features
- Pain anterolateral aspect of arm
- TTP over bicipital groove
- Pain with supination of wrist and abduction against resistance
Special Case: Rupture of Long Head of Biceps

- Usually occurs without much trauma
- Result of advanced degeneration
- Sudden onset
- Sharp snap, pain, arm weakness (minimal, usually some supination lost)
- Usually, no treatment needed