Evaluation of the Painful Shoulder

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Objectives

- Review important shoulder anatomy
- Review MSK shoulder pain differential and history taking
- Demonstrate musculoskeletal shoulder exam, including special testing
- Determine what, if any imaging, is needed
- Discuss common MSK causes of shoulder pain, including diagnosis and management
The Shoulder

- Shoulder pain is common in the primary care setting, responsible for 16% of all musculoskeletal complaints.

- Taking a good history, paying special attention to the age of the patient and location of the pain, can help tailor the physical exam and narrow the diagnosis.

- Knowledge of common shoulder disorders is important as they can often be treated with conservative measures and without referral to a surgical subspecialist.
Shoulder Anatomy

[Diagram showing shoulder anatomy with labels for Greater Tuberosity, Acromion, Clavicle, Humeral Head, Lesser Tuberosity, Scapula, Humerus, and Glenoid.]

FRONT VIEW

BACK VIEW
Shoulder Anatomy
Shoulder Anatomy
Shoulder Anatomy
(MSK) Shoulder Pain Differential

- Rotator Cuff & Biceps
  - Tear
  - Strain
  - Tendinopathy
- Other Muscle Tear
- Arthritis
  - Glenohumeral (GH)
  - Acromioclavicular (AC)
  - Referred pain from spine
- Adhesive Capsulitis
- Impingement
- Scapular Dyskinesia
- Glenohumeral Instability
- Labral Tears
- Fracture
  - Humerus
  - Clavicle
  - Scapula
- Nerve Entrapment/Thoracic Outlet/Neuropraxia
Taking Your History

- Age
- Hand dominance
- Occupation
- Sports/physical activities
- Trauma/injury
- Onset
- Location
- Character

- Duration
- Radiation
- Aggravating/relieving factors including position
- Night pain
- Effect on shoulder function
- Stiffness/restriction of movement

- Grinding or clicking
- Weakness
- Numbness/tingling
- Pain
- Position of shoulder at injury
The Physical Exam

• Inspection – from the front and back!
  • Asymmetry
  • Bony deformity or abnormal contour
  • Muscle atrophy or bulge
  • Scapular winging
  • Posture
The Physical Exam

• Range of Motion
  • Active
  • Passive
  • Apley’s “scratch” test
  • Scapular movement

• Strength Testing/Resisted Movements
The Rotator Cuff Muscles

• **SITS**
  - Supraspinatus
    - Abduction
  - Infraspinatus
    - External rotation
  - Teres minor
    - External rotation
  - Subscapularis
    - Internal rotation
The Physical Exam

• Palpation
  • AC, SC, and GH joints
  • Biceps tendon
  • Coracoid process
  • Acromion
  • Scapula
  • Musculature
Special Tests

• Rotator Cuff
  • “Drop-arm”
  • “Empty can,” lift-off, and resistance testing

• Impingement
  • Neer’s
  • Hawkins/Kennedy
Special Tests

- Biceps
  - Speed’s
  - Yergason’s

- AC Joint
  - Cross-arm
Special Tests

- Shoulder Instability
  - Sulcus sign
  - Apprehension, relocation, release
  - Load and shift
Special Tests

- Labrum
  - O’Brien’s
  - Crank test
  - SLAPprehension
Imaging

• Questions to ask myself:
  • Will this provide additional beneficial information?
  • Is the diagnosis unclear?
  • Was there a traumatic injury?
  • Were there concerning findings on exam?
  • Will the result affect my management?

• When ordering the imaging study:
  • Start small
  • Provide all necessary details (ie “left shoulder pain” versus “acute left lateral shoulder pain after fall, eval for fracture)"
  • Decide if special views or instructions are needed
Imaging

• **Xrays**
  • When?
  • UM Routine Views include AP & Axillary Lateral
    • Consider adding internal and external rotation for good views of lesser and greater tubercles

Case courtesy of Dr Craig Hacking, Radiopaedia.org, rID: 37498; Case courtesy of Dr Matt Skalski, Radiopaedia.org, rID: 23096; Case courtesy of Dr Matt A. Morgan, Radiopaedia.org, rID: 37170
Imaging

**Xrays**
- Traumatic Injury?
  - **Scapular Y** (true lateral)
- Arthritis?
  - **Grashey** (glenoid or “true AP”)
- AC joint? UM includes AP and obliques
- Clavicle? UM includes AP, 30 degree cephalad & caudal
Imaging

• **Ultrasound**
  • Evaluate rotator cuff and adjacent muscles, bursa, long head of biceps, fluid collections
  • Diagnose tendinopathy, tears, bursal thickening, impingement
  • However, not great at quantifying large tears
  • Less expensive, non-invasive
  • Static and dynamic evaluation
  • “Upper Extremity US”
Imaging

- **MRI**
  - Multiplanar, non-invasive
  - Can better characterize large RC tears, can diagnose occult fractures, more information on ligaments and nerves
  - More expensive, static
  - Do not need immediately if full ROM and only complains of pain and weakness
  - Add arthrogram (contrast) for labral pathology
Case 1

• History:
  • 54 yo M engineer
  • 4 months of lateral shoulder pain without injury
  • Starting doing cross-fit for weight loss
  • Pain aggravated by overhead and behind back movements

• Exam:
  • Full ROM but painful arc between 70-120 degrees of abduction
  • No significant weakness, but pain with resisted ROM
  • + empty can, Hawkins for pain

• Xrays – mild OA, mild cortical irregularity of greater tubercle
Rotator Cuff Pathology

- Strains/"bursitis"
  - Common in athletes or with increase in physical activity
  - Sudden onset of pain, some functional limitations
  - Exam: ROM limited by pain, some weakness due to pain, musculature ttp
  - +/- Xrays
  - Respond quickly to rest, activity modification, stretching, NSAIDs
Rotator Cuff Pathology

- Tendinopathy
  - Increased load/overuse → apoptosis → disorganization of collagen matrix
  - Chronic progression of pain +/- weakness, more common in older population
  - Worse with abduction, reaching behind, overhead
  - Exam:
    - Pain with AROM and resistance testing, + empty can and lift off for pain, +/- Hawkin’s
    - TTP over proximal humerus
  - Imaging:
    - Xrays often negative
    - US
  - Treatment: Activity modification, PT (up to 12 weeks!), consider subacromial steroid injection if no improvement or plateau in PT due to pain
Rotator Cuff Pathology

- Partial and Full Thickness Tears
  - Typically older population
  - Degenerative tears versus acute traumatic tears
  - Pain +/- weakness, difficulty sleeping
- Exam:
  - Similar to tendinopathy
  - If acute tear, expect + drop arm test, decreased AROM or helping from other arm, more severe weakness with resistance testing
- Xray – may show OA, cortical irregularity, or humeral head migration
- US/MRI for confirmation of diagnosis
- Treatment: acute versus chronic? → conservative versus Ortho referral
Rotator Cuff Pathology

• Impingement
  • Mechanical irritation of RC tendons as result of narrowing of subacromial space
    • Anatomical causes (beaked acromion, osteophytes)
    • Muscular weakness or imbalance (scapula, RC, deltoid)
  • Exam:
    • Inspection – posture, scapular movement
    • Pain with active abduction
    • + Hawkin’s, Neers
  • Xrays – may show anatomical cause
  • US – +/- bursal thickening, dynamic testing
• Treatment: Activity modification/rest, PT, steroid injection, rarely surgical decompression
Case 2

• History:
  • 19yo F college volleyball player
  • Pain with hitting and overhead serving
  • Pain improves during off-season

• Exam:
  • Prominence of medial border of scapula on right with elevation
  • Full AROM with pain above 90 degrees of abduction
  • + Hawkin’s
  • Pain with wind-up phase when demonstrating hitting/serving

• Xrays - normal
“SICK Scapula”

- **Presentation & Symptoms:**
  - Pain
  - Repetitive overhead activity
  - Drooping shoulder on dominant side

- **Physical Exam:**
  - Scapular malposition
  - Inferior medial border prominence
  - Coracoid pain and malposition
  - Kinesis abnormalities of scapula
  - Can result in impingement type symptoms
“SICK Scapula”

• Diagnosis:
  • Clinical

• Management:
  • Physical Therapy & kinetic-chain based rehabilitation
  • Pain free ROM → Strengthening → Proprioception exercises
Shoulder (GH) Instability

• Presentation & symptoms:
  • Pain
  • Instability
  • Age < 40yo
  • Transient neurologic symptoms
  • History of dislocation or subluxation

• Physical exam findings:
  • + sulcus
  • + apprehension & relocation
  • load & shift testing
Shoulder (GH) Instability

• Diagnosis:
  ● Clinical
  ● X-rays often normal, could show Hill Sach’s lesion
  ● MR arthrogram if no improvement

• Management:
  ● Activity modification
  ● PT focused on aggressive strengthening
  ● Refer to Ortho if no improvement with PT or if recurrent dislocation
Case 3

• History:
  • 68 yo F, multiple medical problems including DM
  • 6 months of shoulder pain, decreased ROM, can’t do ADLs
  • No injury, nothing makes it better

• Exam:
  • Active ROM quite limited, particularly with external rotation (15 degrees)
  • No improvement with passive ROM
  • Pan positive exam, difficult to get in position for special maneuvers

• Xrays – mild/moderate OA
“Frozen Shoulder” (Adhesive Capsulitis)

• Presentation & symptoms:
  • Pain, often >3 months
  • Progressive loss of ROM
  • Age >40yo
  • Risk factors: immobility, DM, thyroid disorders

• Physical exam findings:
  • Limited active ROM, external rotation often 50% normal
  • **Endpoint with passive ROM**
“Frozen Shoulder” (Adhesive Capsulitis)

• Diagnosis:
  • **CLINICAL!**
  • Xray if need to rule-out fracture or OA
  • US if concerned for RC pathology

• Management:
  • Set expectations – recovery can take 18+ months!
  • Pain control, gentle ROM exercises/PT
    • If severe, intra-articular CS injection with capsular distention followed by PT session within 24-36 hrs
    • If recalcitrant, consider surgical manipulation (Ortho)
Case 4

• History:
  • 72 yo M upset with his golfing game
  • Progressively worsening right shoulder pain and range of motion
  • Feels crepitus with movement
  • Multiple small injuries over the years

• Exam:
  • Active ROM limited in all directions, including external rotation
  • Decent strength with resistance testing, 4+/5
  • TTP around shoulder joint

Xrays...
Shoulder Arthritis

• Presentation & symptoms:
  • Age >50
  • Progressive pain with activity
  • Decreased ROM
  • Impingement symptoms
  • History of rotator cuff injury, previous trauma, or shoulder surgery

• Physical exam findings:
  • AC joint: tenderness over AC joint, pain at extreme internal rotation, + cross-arm test
  • GH joint: decreased ROM, pain and crepitus at extremes of motion, can have + labral testing
Shoulder Arthritis

• Diagnosis:
  • Clinical +
  • Xray

• Management:
  • AC joint:
    • Activity modification, NSAIDs, GC injection
  • GH joint:
    • Goal = maintain function with adequate pain control
    • PT, intra-articular GC injection
    • Referral to Ortho for arthroplasty if conservative treatment fails – for PAIN not ROM
Case 5

• History:
  • 38 yo M assembly line worker
  • 1 week of anterior right shoulder pain after lifting injury at work
  • Noticed a bulge in his upper arm

• Exam:
  • Popeye deformity
  • Some pain with active ROM
  • TTP bicipital groove, distal biceps intact
  • + Speeds test

• Xrays - normal
Biceps Pathology

- Similar to RC, can have strains, tendinopathy and tears
- Chronic issues often associated with RC pathology/impingement
- Pain is usually anterior in location, worse with lifting
- Tears usually in >40yo, initial sharp pain/snap $\rightarrow$ pain soon subsides

**Exam:**
- Possible swelling or deformity, bruising on exam if tear
- TTP at bicipital groove, + Speed’s test, Yergason’s

**Imaging**
- Xray – typically normal
- US/MRI - diagnostic
Biceps Pathology

- **Treatment**
  - **Strains/Tendinopathy/Partial Tears:**
    - Activity modification, PT, consideration of steroid injection (not for strains)
  - **Complete Tears (Proximal)**
    - Still typically conservative, PT
    - Short head still attached so strength not severely affected
    - Tenodesis more likely to be done if young, more for cosmetic reasons

- **Distal Biceps Rupture**
  - Urgent Ortho referral → surgery
  - Diagnose clinically (+ hook test), can use US
Physical Therapy

• A Good Prescription for Formal PT
  • Include your diagnosis AND any local biomechanical deficits
    • Examples could include poor posture, inflexibility
  • Duration and frequency (ex: 2x/week for 6 weeks), goals, restrictions, modalities
  • With rotator cuff injuries, request deltoid retraining
  • Don’t forget about the scapula!!

• Set reasonable expectations with patients

• Stress importance of homework (HEP) during and after formal PT (3-5x/week)

• If unable to do formal PT, give patient a good HEP
Extra Sports Medicine Pearls

• Clavicle Fracture
  • Midshaft are most common
  • Usually from fall onto shoulder
  • Diagnose by xray
  • Sling (ortho if shortening, complete, open)
  • Typically heal in 4-6 weeks

• Proximal Humerus Fracture
  • Fall on outstretched hand
  • >60yo, osteoporotic women
  • Usually nondisplaced, at greater tubercle
  • Xray for diagnosis
  • Sling 2-4 weeks, early mobilization, PT
YouTube!

“Complete Musculoskeletal Exam of the Shoulder”
by University of Michigan Family Medicine
Questions?
Thank You!
References


