Degenerative conditions of the Shoulder Joint

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Director Swedish Sports Medicine Fellowship
Disclosures

• None
Exam

- Practical session this afternoon
Goals

• Identify and Treat common degenerative conditions of the shoulder
  • Glenohumeral Arthritis
  • Adhesive Capsulitis
  • Degenerative Rotator Cuff Disease
    – Rotator Cuff Tendonopathy
    – Calcific Tendonitis
    – Partial Complete RC tears
  • Avascular necrosis
Age is everything

272 consecutive patients in a specialty shoulder clinic. *Matsen et al*

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Age (Mean +/- SD)</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>RCT- Complete</td>
<td>62 +/- 12</td>
<td>58</td>
</tr>
<tr>
<td>Atraumatic Instability</td>
<td>23 +/- 7</td>
<td>51</td>
</tr>
<tr>
<td>Adhesive Capsulitis</td>
<td>53 +/- 10</td>
<td>46</td>
</tr>
<tr>
<td>Shoulder Arthritis</td>
<td>64 +/- 10</td>
<td>46</td>
</tr>
<tr>
<td>Traumatic Anterior Instab</td>
<td>30 +/- 10</td>
<td>32</td>
</tr>
<tr>
<td>RCT incomplete</td>
<td>41 +/- 11</td>
<td>18</td>
</tr>
<tr>
<td>RA</td>
<td>56 +/- 11</td>
<td>13</td>
</tr>
<tr>
<td>Avascular necrosis</td>
<td>39 +/- 12</td>
<td>8</td>
</tr>
</tbody>
</table>
Case “I cannot get my jacket on”

- 65 yo male
- Right shoulder pain
- Years of soreness
  - Uses NSAIDS
- Now difficulty getting jacket/seat belt on
- Exam
  - Limited ROM
  - Pos Shrug Test
What is it likely?

**Likely Diagnoses**
- Glenohumeral Arthritis
- Adhesive Capulitis
- Full thickness RCT

**Clinical Evaluation of the Shoulder Shrug Sign** *Xiaofeng, j., et al*
- PPV 30.4
- PPV 3.6
- PPV 32.1
Symptoms

• Progressive pain
• Stiffness
  – Improves with mild activity
  – Progressive Loss of ROM
• Worsens with sustained / impact activity
  – Night Pain
Exam

- Loss of ROM
- Shrug test
- Joint line tenderness/Swelling
  - Anterior
- Crepitus
- XR
  - Joint Loss
Glenohumeral Arthritis

- Posttraumatic
- Degenerative
- Rotator Cuff arthropathy
- Avascular Necrosis
Arthritis Treatment (Level C Recommendations)

**Treatment**

- PT/Exercise
  - Formal
  - Home
  - Cardio only
- Pain control
  - APAP
  - NSAID
    - CV risk?
    - Bleeding Risk?
  - Corticosteroid Injection
  - Less evidence for HA
- Surgery

*Motion is Lotion*
PT/Home Therapy

- Gentle ROM
  - Maintain

- Rotator Cuff and Scapular stability

- Encourage activity
  - Minimize load in abduction
Prosthesis

- Resurfacing
  - Minimal Prosthesis
- Hemi
  - No glenoid cup
- Total
  - Glenoid and Humeral head
- Reverse
  - Rotator cuff deficiency
Case “I cannot lift my arm”

History

• 55 yo Female
• Insidious onset about 4 weeks
• “Cannot reach behind car seat”
• Med history
  – Hypothyroidism
• Loss of ER and flexion
• XR normal
What is it?

- Adhesive capsulitis
  - Calcific Tendonitis
- Rotator cuff tendonitis
- Rotator cuff tear-partial/complete
- Shoulder OA
Adhesive Capsulitis

Clinical features

- Insidious onset pain with loss of ROM
- F>M
- 40-60 YO
- Diabetes
  - Hyper/Hypothyroidism
  - Autoimmune disease
  - Hypoadrenal state

Stages (theoretical)

- Freezing phase
  - 10-36 weeks
  - pain and stiffness around shoulder
  - no history of injury
  - constant pain
  - Minimal response to NSAIDS
- Adhesive/Frozen phase
  - 4-12 months
  - pain gradually subsides
  - stiffness continues
  - Pain at end ROM
  - near total loss of ER
- Resolution phase
  - 12-42 months
  - spontaneous improvement in range of motion
- duration of overall impairment As high as 30 months
What is it?

**Shrink Wrapped Shoulder**

- Capsular inflammation
- Adherence of capsule to anatomic neck of humerus
- Adherence itself at inferior axillary fold
Prevention

Move it or Lose it

• Avoid prolonged immobilization
• Association to non-shoulder surgery
  – Inactivity
  – Inflammation with healing
Initial Treatment

- Pain control
  - NSAIDS (Level 3)
  - Steroid injection (Level 2)
  - Repeat Steroid injection (Level 2)
- PT for ROM
- Preserve and Restore Motion
Procedures

- **US Guided Capsular Distension (Level 2)**
  - US or Arthrogram guided
  - Capsular distention
  - Intra-articular steroids
  - ? Hypertonic Saline?

- **Surgical intervention (Level 2)**
  - Manipulation under anesthesia
  - Arthroscopic lyses of adhesions

- **Limited evidence of similar benefit**
Same Patient but NL ER

History

• 55 yo Female
• Insidious onset about 4 weeks
• Med history
  – Hypothyroidism
• Loss of ABduction due to pain
• **No Loss ER**
What is it?

- Adhesive capsulitis
  - Calcific Tendonitis
- Rotator cuff tendonitis
- Rotator cuff tear—partial/complete
- Shoulder OA
Calcific Tendonitis

Consider if no/minimal loss of ER

- Same patient demographics
- Insidious
  - Possible distant injury
- Last about 9 months

XR helps!
Stages of Calcium Deposition

- Pre-calcification stage
- Calcification stage
  - Formative (Some Pain)
  - Resorptive phases (Most painful)
- Postcalcific stage
- Found in ~6% of presentations of shoulder pain
Treatment

Pain Control and Resolution

• 1st Line
  – Activity Modification
  – NSAIDS (indomethacin)
  – Exercises

• SUB AC Steroid Injection
• Barbotage
• Tenex

Barbotage
Case “Felt a Pop at the Gym”

- 55 yo male
- Felt POP when a weight dropped and he reached to grab it
- Pos impingement signs
- RC weakness
- Pos Lag test
- What is it?
Complete RC tear
Rotator Cuff Tendon Disease

Degenerative
- Impingement
- Tendonopathy
- Partial Thickness Tear
- Full thickness Tears

Spectrum
Chronic Tendinopathy

- Fibroblast Proliferation
- Disorganized collagen deposition
- Neo-vascularization
- Sensory Nerve In-growth
Diagnosis

- Pain
  - Night
- Overhead and reaching behind back
- Impingement sx
- No trauma
- ROM limited by pain
Treatment

• NSAIDS for pain only
• Topical Nitroglycerin
• PT/Rotator cuff exercises
• US for diagnosis
  – Not improving
  – Weakness
• Injection
  – US Guided/Blind
Degenerative tears Partial/Complete

• Common >40
  – >60 are often asx
• May be recent/distant Trauma
• Similar to tendonitis with more weakness
• Normal ROM
  – Inhibited by pain
Terms

• Complete
  – Torn and retracted

• Full-thickness
  – Full depth tear part way across tendon

• Partial-thickness
  – Articular or bursal sided
Chronic Complete RC tears

• Natural History
  – Retraction
  – Atrophy of muscle
  – Rotator cuff arthropathy
Imaging Efficacy RC

- Partial thickness rotator cuff tear
  - MRI: SN 98, SP 79, LR+ 4.7, LR- 0.03
  - U/S: SN 91, SP 85, LR+ 6.1, LR- 0.11
- Full thickness rotator cuff tear
  - MRI: SN 94, SP 93, LR+ 13.4, LR- 0.09
  - U/S: SN 92, SP 93, LR+ 13.1, LR- 0.09
  - MRA: SN 94, SP 92, LR+ 11.8, LR- 0.07
- No statistically significant differences in performance, all perform well
- Lenza et al ‘13
Treatment

• Acute or Chronic?
• Complete or incomplete?
• Age, activity and surgical risk?
• Co-morbidities
  – Diabetes
  – Smoking
  – Cervical disease
Evidence of Best Treatment
Inconclusive

• Heterogenous studies
  – Diagnosis
  – Patient demographics

• Surgery
  – Decompression
  – Repair

• Non-surgical treatment
  – PT for chronic full thickness tears
Non-Surgical

- **PT**
  - Compensation of deltoid and other RC muscles
- **Glucocorticoid injection**
Patient “My Shoulder Hurts A Lot!”

- 45 YO Woman
- Smoker
- COPD
- Drinks bottle of wine a night
- Insidious onset of severe shoulder pain
- Strength decrease 2nd to pain
- Pan-Painful Exam
- XR normal
Differential

• Trauma
  – Fracture
• Inflammatory Arthritis
• Septic Joint
• Adhesive capsulitis/Calcific tendonitis
• Rotator Cuff tendonopathy
• Malignancy
• And...
Osteonecrosis Humeral Head

- Rare condition in shoulder
- Compromise of bone vasculature
- Edema->Necrosis->Bone Collapse
- Multiple risk factors
- Found in late stages
# Etiologic factors associated with osteonecrosis

<table>
<thead>
<tr>
<th>Traumatic</th>
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<tbody>
<tr>
<td>Femoral neck fracture</td>
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<tr>
<td>Dislocation or fracture-dislocation</td>
</tr>
<tr>
<td>Minor trauma</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nontraumatic</th>
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<tbody>
<tr>
<td>Corticosteroid administration, rarely hypersecretion of cortisol</td>
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<tr>
<td>Alcohol use</td>
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<tr>
<td>Sickle cell hemoglobinopathies</td>
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<tr>
<td>Caisson (dysbarism) disease</td>
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<tr>
<td>Systemic lupus erythematosus</td>
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<tr>
<td>Gaucher's disease</td>
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<tr>
<td>Chronic renal failure or hemodialysis</td>
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<td>Pancreatitis</td>
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<tr>
<td>Pregnancy</td>
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<td>Hyperlipidemia</td>
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<td>Radiation</td>
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<tr>
<td>Organ transplantation</td>
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<tr>
<td>Intravascular coagulation</td>
</tr>
<tr>
<td>Thrombophlebitis</td>
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<tr>
<td>Cigarette smoking</td>
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<tr>
<td>Hyperuricemia/gout</td>
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<tr>
<td>Human immunodeficiency virus infection</td>
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<tr>
<td>Idiopathic</td>
</tr>
</tbody>
</table>
Cruess Classification (Cruess RL, CORR 1978;130:86)

- Stage 1
  - Preradiographic
- Stage 2
  - Mottled sclerosis-
- Stage 3
  - Subchondral fracturing / crescent sign
- Stage 4
  - Collapse of subchondral bone and loss of sphericity
- Stage 5
  - Degenerative changes of the glenoid
Treatment

• Conservative management
  – Stage 3 and under
  – Protection
  – ? Medication
    • Bisphosphonates
    • Statins
    • Anticoagulants

• Surgery
  – Core decompression
  – Arthroplasty Stage 4 and over
Figure 1

The Evidenced-Based Shoulder Evaluation. OKane, John; Toresdahl, Brett
DOI: 10.1249/JSR.0000000000000090

Figure 1. Flow diagram outlining evidenced-based shoulder examination.