Sports Shoulder and Elbow Injuries

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Outline

• General diagnostic groups
• Physical exam
• Imaging
• Making the diagnosis
• Treatment plans
General diagnostic groups

- 13-20 YO
  - Instability
- 20-40 YO
  - Instability
  - Biceps/Labral Complex
  - Frozen Shoulder
- 40-60 YO
  - Rotator cuff
  - Frozen shoulder

Physical Examination

- Visual Inspection
- Active (passive) ROM
  - Elevation
  - ER
  - IR
  - ER at 90 degrees
  - IR at 90 degrees
- Strength
  - ER at side – infraspinatus
  - Empty can – supraspinatus
  - IR (bear hug) – subscapularis
## Imaging

<p>| | |</p>
<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td><strong>X-ray</strong> (for me: on everyone)</td>
<td>![X-ray Image]</td>
</tr>
<tr>
<td>- Arthritis</td>
<td></td>
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<tr>
<td>- Fracture</td>
<td></td>
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<tr>
<td>- Dislocation (axillary view)</td>
<td></td>
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<tr>
<td><strong>MRI</strong></td>
<td>![MRI Image]</td>
</tr>
<tr>
<td>- To differentiate partial from full rotator cuff tear</td>
<td></td>
</tr>
<tr>
<td><strong>CT scan</strong></td>
<td>![CT Scan Image]</td>
</tr>
<tr>
<td>- To assess fractures, and for bone loss</td>
<td></td>
</tr>
<tr>
<td><strong>Ultrasound</strong></td>
<td>![Ultrasound Image]</td>
</tr>
<tr>
<td>- Emerging technology</td>
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</tbody>
</table>

## Instability (13-40)

<p>| | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td><strong>Predominantly patient reported</strong></td>
<td></td>
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<tr>
<td><strong>Traumatic vs. Atraumatic</strong></td>
<td></td>
</tr>
<tr>
<td>- Traumatic – surgical referral</td>
<td>![Traumatic Image]</td>
</tr>
<tr>
<td>- Atraumatic – attempt a course of physical therapy</td>
<td>![Atraumatic Image]</td>
</tr>
<tr>
<td></td>
<td>Rotator cuff strengthening, scapular stabilization</td>
</tr>
</tbody>
</table>
Arthroscopic Techniques

Multiple dislocations
Multiple dislocations

![Images of multiple dislocations](image)

Multiple dislocations

![Images of multiple dislocations](image)
Latarjet (Coracoid Transfer)

Biceps/Labral Complex
(20-40 YO)

- Most challenging diagnosis to make
- Vague shoulder pain, worse with overhead activity
- Catching, locking, clunking
- Physical exam
  - Dynamic labral shear test
  - O’Brien’s test
Biceps/Labral Complex (20-40 YO)

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  - O’Brien’s test
Biceps/Labral Complex (20-40 YO)

- **Treatment**
  - Physical therapy (6 weeks – 3 months)
    - Rotator cuff strengthening
    - Scapular stabilization
  
  Nonoperative Treatment of Superior Labrum Anterior Posterior Tears
  Improvements in Pain, Function, and Quality of Life
  Sara L. Edwards, MD, Jessica A. Lee, MD, John-Erik Bell, MD, Jonathan D. Packer, MD, Christopher S. Ahmad, MD, William N. Levine, MD, Louis U. Bigliani, MD, and Theodore A. Blaine, MD
  From "Northwestern University, Chicago, Illinois, "Columbia University, Center for Shoulder, Elbow and Sports Medicine, New York, New York, "Dartmouth-Hitchcock Medical Center, Orthopaedic Surgery, Lebanon, New Hampshire, and "Brown University, Rhode Island Shoulder and Elbow Service, Providence, Rhode Island"

  - Roughly 50% successful (didn’t have surgery)

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Biceps/Labral Complex (20-40 YO)

- **Surgical treatment**
  - Biceps tenodesis

  Arthroscopic Suprapectoral and Open Subpectoral Biceps Tenodesis
  A Comparison of Minimum 2-Year Clinical Outcomes
  Brian C. Werner, MD, Cody L. Evans, MD, Russell E. Higginbotham, BS, BBA, Jeffrey M. Tunner, MD, Joseph M. Hed, PhD, Sri M. Gerson, MD, David R. Diluch, MD, Mark D. Miller, MD, and Stephen F. Brockmeier, MD
  Investigation performed at the University of Virginia Health System, Charlottesville, Virginia, USA

  - Outstanding clinical outcomes
  - Low complication rate
Frozen Shoulder (20-60 YO)

- Limited active and passive ROM of the shoulder
- Excludes other diagnoses
  - Fracture
  - Dislocation
  - Arthritis
- Two categories:
  - Atraumatic
  - Posttraumatic (including surgery)
- Risk factors: Diabetes, Thyroid disease
- Most sensitive test: IR at 90 degrees


Frozen Shoulder (20-60 YO)

- Treatment:
  - Physical therapy
  - Home stretching program
  - Glenohumeral injection (corticosteroid, US guided)
Frozen Shoulder (20-60 YO)

- Treatment:
  - Physical therapy
  - Home stretching program
  - Glenohumeral injection (corticosteroid, US guided)

Accruity of glenohumeral joint injections: comparing approach and experience of provider

Allison Tobola, MD*, Chad Cook, PT, PhD, MBA*, Kyle J. Cassas, MD*, Richard J. Hawkins, MD*, Jeffrey R. Wienke, MD*, Stefan Tolan, MD*, Michael J. Kissenberth, MD*

- 45-60% accuracy for experienced provider doing blind intraarticular shoulder injection


Frozen Shoulder (20-60 YO)

- Treatment:
  - Physical therapy
  - Home stretching program
  - Glenohumeral injection (corticosteroid, US guided)

Optimal Dose of Intra-articular Corticosteroids for Adhesive Capsulitis

A Randomized, Triple-Blind, Placebo-Controlled Trial

Seung-Hyun Yoon, MD, PhD, Young Lee, MB, Hyun Jung Lee, MD, and Kyu-Sung Kwak MD, PhD

Investigation performed at Ajou University Medical Center, Suwon, South Korea

- Significant improvement in pain, ROM with low or high dose compared to placebo (1 week- 12 weeks)
Frozen Shoulder (20-60 YO)

- Surgery for:
  - Posttraumatic frozen shoulder
  - Failure to resolve with 3-6 months of stretching and U/S guided injection

Rotator cuff tear (40-?)

- Deltoid based shoulder pain
- Pain with overhead activities
- Pain at night

- Testing:
  - Xrays generally normal
  - Empty can testing (supraspinatus)
  - Subscap/infraspinatus testing +/-
  - May have loss of active motion
  - Should have preserved passive ROM
Rotator cuff tear (40-?)

- Chronic
- OR
- Acute (injury)

Rotator cuff tear (40-?)

- Chronic
- OR
- Partial thickness
- OR
- Acute (injury)
- OR
- Full thickness
### Rotator cuff tear (40-?)

<table>
<thead>
<tr>
<th>Chronic</th>
<th>OR</th>
<th>Acute (injury)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Partial thickness</td>
<td>OR</td>
<td>Full thickness</td>
</tr>
</tbody>
</table>

Urgent surgical referral

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### Rotator cuff tear (40-?)

My algorithm
Rotator cuff tear (40-?)

Chronic tear

My algorithm

Rotator cuff tear (40-?)

Chronic tear

Physical therapy (6 weeks)
Rotator cuff tear (40-?)

Chronic tear

Physical therapy (6 weeks)
- Home program, cuff strengthening

MRI for failure

My algorithm
Rotator cuff tear (40-?)

Chronic tear

Physical therapy (6 weeks)
  • Home program, cuff strengthening

MRI for failure
  • Partial vs full tear

My algorithm

Injury

Rotator cuff tear (40-?)

Chronic tear

Physical therapy (6 weeks)
  • Home program, cuff strengthening

MRI for failure
  • Partial vs full tear

Injection

My algorithm
Rotator cuff tear (40-?)

My algorithm

Chronic tear

Physical therapy (6 weeks)
  • Home program, cuff strengthening

MRI for failure
  • Partial vs full tear

Injection
  Partial
  Full

Surgical Referral

Rotator cuff tear (40-?)

My algorithm
Rotator cuff tear (40-?)

Acute tear

MRI

My algorithm
Rotator cuff tear (40-?)

Acute tear

MRI

- Partial vs. full tear

My algorithm

Rotator cuff tear (40-?)

Acute tear

MRI

- Partial vs. full tear

PT (6 weeks)

Partial
Rotator cuff tear (40-?)

Acute tear

MRI

• Partial vs. full tear

Surgical Referral

PT (6 weeks)

Steroids?

The timing of elective shoulder surgery after shoulder injection affects postoperative infection risk in Medicare patients

Brian C. Werner, MD, Jourdan M. Canclenne, MD, M. Tyrrell Burrus, MD, Justin W. Griffin, MD, F. Winston Gwathmey, MD, Stephen F. Brockmeier, MD*

Department of Orthopaedic Surgery, University of Virginia Health System, Charlottesville, VA, USA

J Shoulder Elbow Surg (2016) 25, 390-397

• There was a substantially increased risk of postoperative infection in patients who had an injection within 3 months of surgery
  • OR: 1.6 (arthroscopy), 2.0 (arthroplasty)
Rotator cuff repair

- For acute full thickness tears
- For chronic tears, acute partial tears that fail nonoperative management (PT +/- one injection)

Elbow
### Diagnostic Groups

<table>
<thead>
<tr>
<th>Tendon</th>
<th>Lateral Epicondylitis</th>
<th>Medial Epicondylitis</th>
<th>Biceps Rupture</th>
<th>Triceps Rupture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nerve</td>
<td>Ulnar Nerve</td>
<td>Radial Tunnel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Joint</td>
<td>Arthritis</td>
<td>Loose Body</td>
<td>Osteophytes</td>
<td></td>
</tr>
<tr>
<td>Trauma</td>
<td>Radial head fracture</td>
<td>Olecranon fracture</td>
<td>Fracture/Dislocation</td>
<td></td>
</tr>
<tr>
<td>Thrower</td>
<td>UCL Injury (Medial tension)</td>
<td>Lateral Compression</td>
<td>Extension overload</td>
<td></td>
</tr>
</tbody>
</table>

**Tendon**
- **Lateral epicondylitis**

- **Natural history:** self limited
- **Pain with resisted wrist/middle finger extension**

**Treatment Options**
- PT/OT Counterforce bracing
- Activity modification
- U/S guided PRP injection
- Needle Tenotomy
- Tenex
- Surgical debridement/Repair
Steroid?

Systematic review of randomized controlled trials
- 6 weeks – Better with steroid injection
- 1 year – Better with physical therapy

PRP?

Systematic review of randomized controlled trials
- 12 weeks – No difference
- 24 weeks – Better with PRP
• Natural history: self limited

PT/OT
Counterforce bracing
Activity modification

U/S guided
PRP Injection
Needle Tenotomy Tenex

Surgical debridement/ Repair

• Natural history:
  • 40-50% supination strength loss
  • 30% flexion strength loss

• Inspection: Deformity and ecchymosis
• Palpation: Absent distal biceps tendon
• Special testing:
  • Hook test
  • Resisted supination (weak ± pain)

• Urgent referral
  • Best if repaired within about 4 weeks

http://ajs.sagepub.com/content/35/11/1865/F3.expansion
Tendon

Biceps tendon rupture

Throwing Elbow Injuries
Phases of Throwing

- Wind up
- Cocking
- Acceleration
- Deceleration
- Follow-through
Lateral Compression
Lateral Compression

Extension Overload

Lateral Compression

Medial Tension
Medial Tension – UCL Injury

- Uncommon in skeletally immature, much more common in older athletes
- Acute or chronic attritional rupture
- Moving valgus stress test is best test to evaluate


The “Moving Valgus Stress Test” for Medial Collateral Ligament Tears of the Elbow

Shawn W. M. O’Driscoll,1 PhD, MD, Richard L. Lawton,3 MD, PhD, and Adam M. Smith,1 MD
From the 1Department of Orthopaedic Surgery, Mayo Clinic, Rochester, Minnesota, and
2Durango Orthopedics, Durango, Colorado

Results: The moving valgus stress test was highly sensitive (100%, 17 of 17 patients) and specific (75%, 3 of 4 patients) when compared to assessment of the medial collateral ligament by surgical exploration or arthroscopic valgus stress testing. The mean shear range (ie, the arc within which pain was produced with the moving valgus stress test) was 120° to 70°. The mean angle at which pain was at a maximum was 90° of elbow flexion.
## Medial Tension – UCL Injury

- Nonoperative treatment is first line (42% success)
  - 2-4 weeks of rest with NSAIDS/PT modalities
  - When pain/inflammation improved
  - Throwing program at 6 weeks to 3 months
- Surgical management (Tommy John Ligament Reconstruction) for failure of rehabilitation at 3-6 mo.


## UCL Reconstruction - Evolution

<table>
<thead>
<tr>
<th>Technique</th>
<th>Flexor Movement</th>
<th>Nerve Movement</th>
<th>RTP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jobe</td>
<td>Detachment</td>
<td>Transposition</td>
<td>63%</td>
</tr>
<tr>
<td>ASMI Technique</td>
<td>Retracted</td>
<td>Transposition</td>
<td>78%</td>
</tr>
<tr>
<td>HSS</td>
<td>Muscle Splitting</td>
<td>No Work</td>
<td>97%</td>
</tr>
</tbody>
</table>

Medial Tension – UCL Injury

• Rehab:
  • Immobilization x 7-10 days
  • Hinged elbow brace – AROM shoulder/elbow
  • Gentle strengthening exercises when pain subsides
  • Valgus stress avoided until 4 months
  • At 4 months, begin throwing program
  • Return to play at approximately 10-12 months

Conclusion

• Most shoulder and elbow pathology falls into a small group of diagnoses
• Evaluation of patient age, history, and exam will help effectively guide patients to appropriate management
• Shoulder and elbow surgery have evolved rapidly, including with arthroscopic techniques, leading to excellent outcomes