Sports Shoulder and Elbow Injuries

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Outline

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

General diagnostic groups

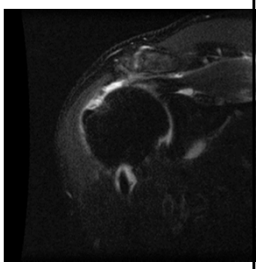
- 13-20 YO
  - Instability
- 20-40 YO
  - Instability
  - Biceps/Labral Complex
  - Frozen Shoulder
- 40-60 YO
  - Rotator cuff
  - Frozen shoulder

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

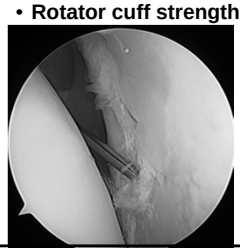
Imaging

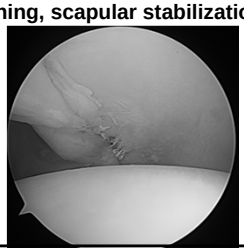
- X-ray (for me: on everyone)
  - Arthritis
  - Fracture
  - Dislocation (axillary view)
- MRI
  - To differentiate partial from full rotator cuff tear
- CT scan
  - To assess fractures, and for bone loss
- Ultrasound
  - Emerging technology



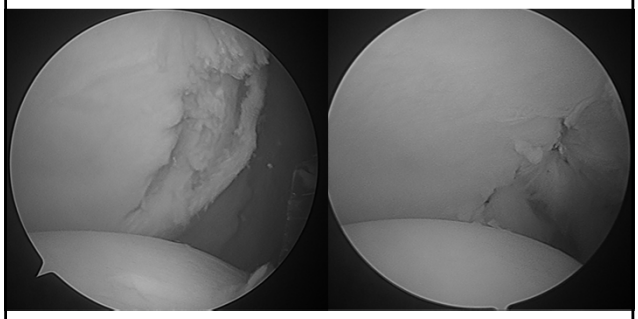
Instability (13-40)

- Predominantly patient reported
- Traumatic vs. Atraumatic
  - Traumatic – surgical referral
  - Atraumatic – attempt a course of physical therapy
    - Rotator cuff strengthening, scapular stabilization





Arthroscopic Techniques



Multiple dislocations

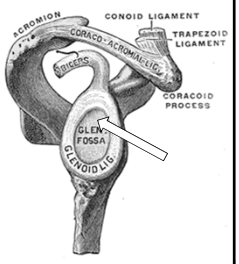
Multiple dislocations

Multiple dislocations

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



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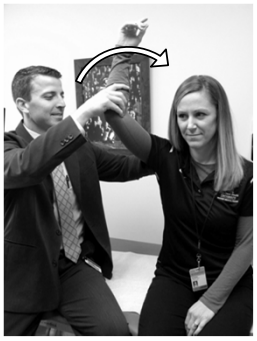

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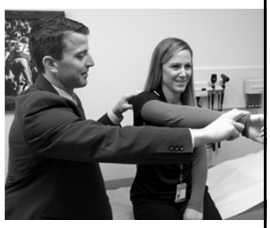


Biceps/Labral Complex (20-40 YO)

- 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

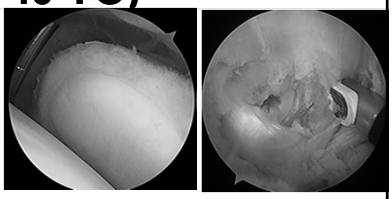
Sara L. Edwards,* MD, Jessica A. Lee,† John-Erik Bell,† MD, Jonathan D. Packer,† MD, Christopher S. Ahmad,† MD, William N. Levine,† MD, Louis U. Bigliani,† MD, and Theodore A. Blaine,‡ MD
*From *Northwestern University, Chicago, Illinois, †Columbia University, Center for Shoulder, Elbow and Sports Medicine, 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)

Edwards SL. Am J Sports Med 2010 Jul

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, Russel E. Holzgrefe,* BS, BBA, Jeffrey M. Tuman,* MD, Joseph M. Hart,* PhD, Eric W. Carson,* MD, David R. Diduch,* 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

Werner BC. Am J Sports Med. 2014

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

http://orthoinfo.aaos.org/topic.cfm?topic=a00071

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***)

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

Allison Tobola, MD[a,*], Chad Cook, PT, PhD, MBA[b,c], Kyle J. Cassas, MD[d], Richard J. Hawkins, MD[e], Jeffrey R. Wienke, MD[f], Stefan Tolan, MD[e], Michael J. Kissenberth, MD[e]

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

J Shoulder Elbow Surg. 2011 Oct;20(7):1147-54.

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

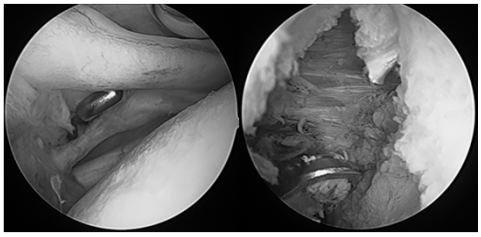
A Randomized, Triple-Blind, Placebo-Controlled Trial

Seung-Hyun Yoon,*† MD, PhD, Hyun Young Lee,† MS, Hyun Jung Lee,† MD, and Kyu-Sung Kwack,§ 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** **Acute (injury)**

Partial thickness **OR** **Full thickness**

Rotator cuff tear (40-?)

Chronic OR Acute (injury)

Partial thickness OR Full thickness

Urgent surgical referral

Rotator cuff tear (40-?)

My algorithm

Rotator cuff tear (40-?)

My algorithm

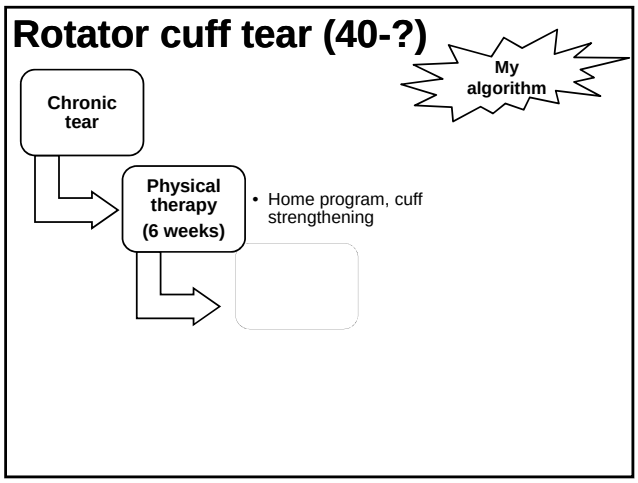
Chronic tear

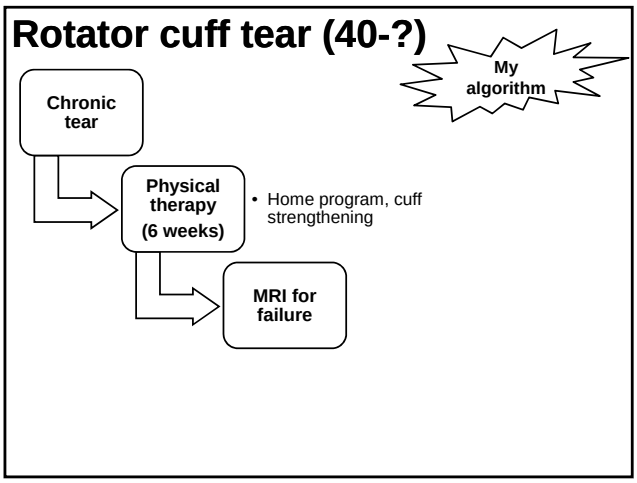
Rotator cuff tear (40-?)

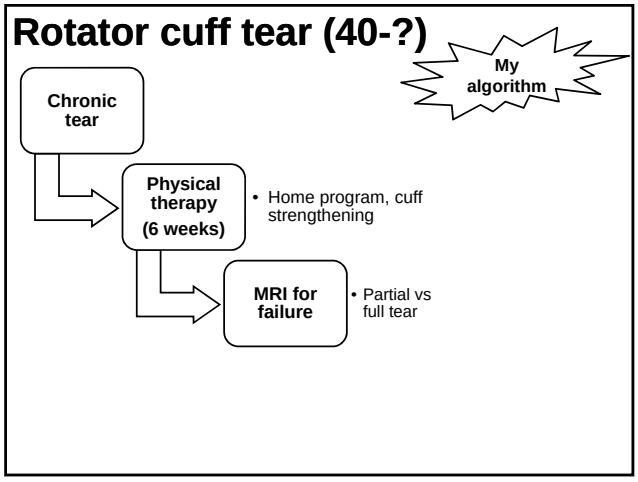
My algorithm

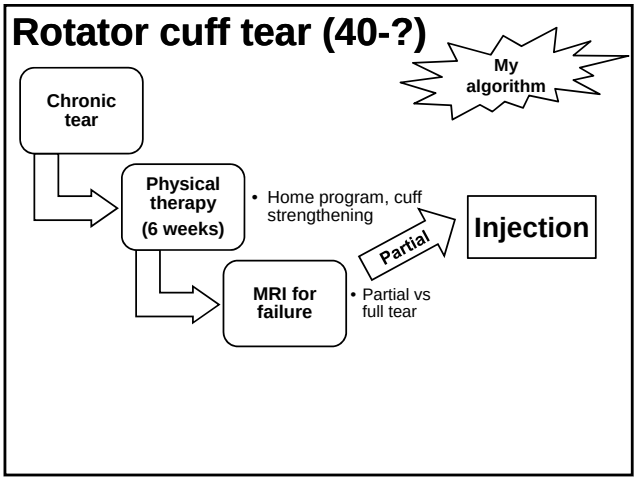
Chronic tear

Physical therapy (6 weeks)

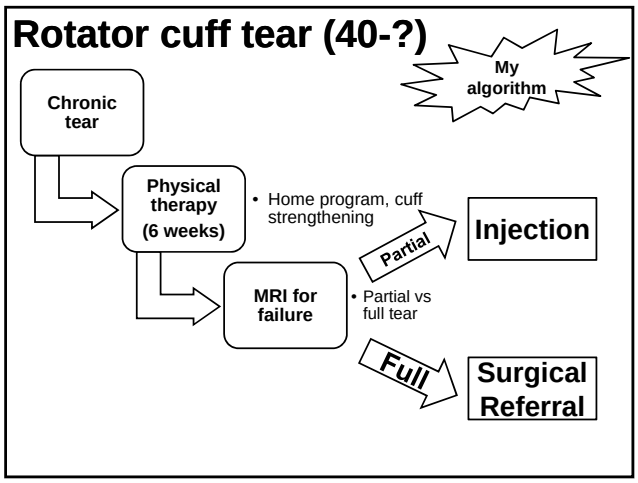

Rotator cuff tear (40-?)
My algorithm
Chronic tear
Physical therapy (6 weeks)
• Home program, cuff strengthening


Rotator cuff tear (40-?)
My algorithm
Chronic tear
Physical therapy (6 weeks)
• Home program, cuff strengthening
MRI for failure


Rotator cuff tear (40-?)
My algorithm
Chronic tear
Physical therapy (6 weeks)
• Home program, cuff strengthening
MRI for failure
• Partial vs full tear


Rotator cuff tear (40-?)
My algorithm
Chronic tear
Physical therapy (6 weeks)
• Home program, cuff strengthening
Partial
Injection
MRI for failure
• Partial vs full tear

Rotator cuff tear (40-?)



Rotator cuff tear (40-?)

My algorithm

Rotator cuff tear (40-?)

My algorithm

Acute tear

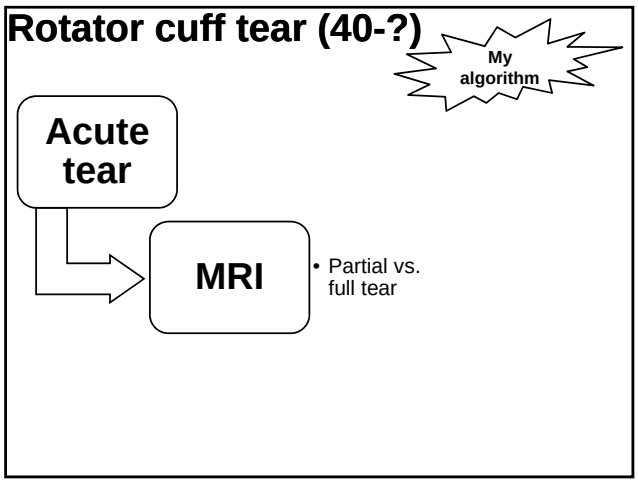
Rotator cuff tear (40-?)

My algorithm

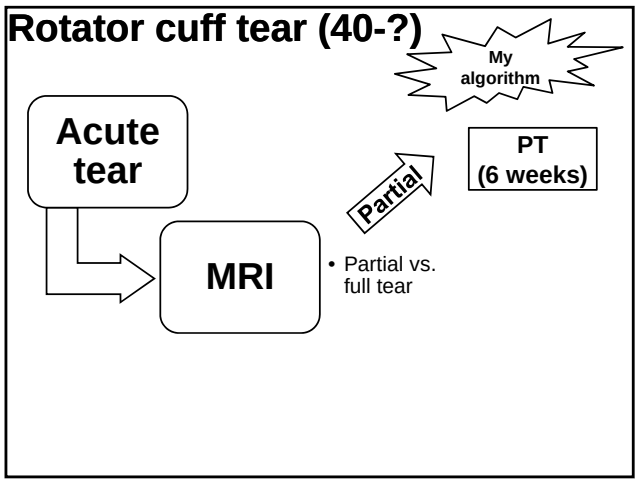
Acute tear

MRI

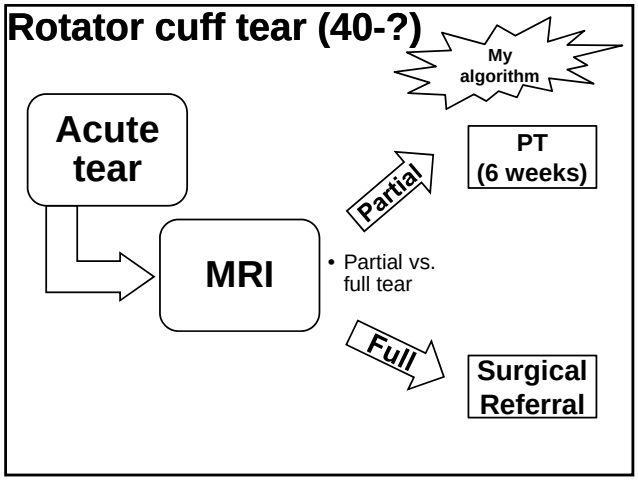
Rotator cuff tear (40-?)



Rotator cuff tear (40-?)



Rotator cuff tear (40-?)



Steroids?

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

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

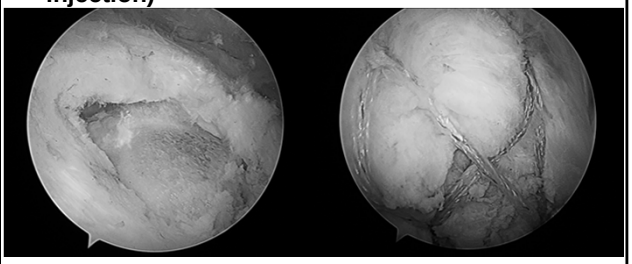
Department of Orthopaedic Surgery, University of Virginia Health System, Charlottesville, VA, USA

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

Tendon	**Lateral Epicondylitis**	**Medial Epicondylitis**	**Biceps Rupture**	**Triceps Rupture**
Nerve	**Ulnar Nerve**	**Radial Tunnel**		
Joint	**Arthritis**	**Loose Body**	**Osteophytes**	
Trauma	**Radial head fracture**	**Olecranon fracture**	**Fracture/ Dislocation**	
Thrower	**UCL Injury (Medial tension)**	**Lateral Compression**	**Extension overload**	

Tendon Lateral epicondylitis

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

PT/OT Counterforce bracing Activity modification

U/S guided PRP Injection Needle Tenotomy Tenex

Surgical debridement/ Repair

Steroid?

ELSEVIER

Physiotherapy

Physiotherapy 95 (2009) 251–265

Systematic review

Effectiveness of corticosteroid injections compared with physiotherapeutic interventions for lateral epicondylitis: A systematic review

Steven Barr [a,*], Frances L. Cerisola [b], Victoria Blanchard [c]

[a] School of Health and Social Care, Teesside University, Middlesbrough TS1 3BA, UK
[b] Physiotherapy Department, South Tyneside District Hospital, South Shields, UK
[c] Physiotherapy Department, University Hospital of North Durham, Durham, UK

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

PRP?

Efficacy of Platelet-Rich Plasma for Chronic Tennis Elbow

A Double-Blind, Prospective, Multicenter, Randomized Controlled Trial of 230 Patients

Allan K. Mishra,*† MD, Nebojsa V. Skrepnik,‡ MD, PhD, Scott G. Edwards,§ MD, Grant L. Jones,‖ MD, Steven Sampson,¶ DO, Doug A. Vermillion,# MD, Matthew L. Ramsey,** MD, David C. Karli,†† MD, MBA, and Arthur C. Rettig,‡‡ MD
Investigation performed at Department of Orthopaedic Surgery, Menlo Medical Clinic, Stanford University Medical Center, Menlo Park, California
The American Journal of Sports Medicine Vol. 42, No. 2, 2014

- **Systematic review of randomized controlled trials**
  - **12 weeks – No difference**
  - **24 weeks – Better with PRP**

Tendon **Lateral epicondylitis**

- **Natural history: self limited**

PT/OT
Counterforce bracing
Activity modification

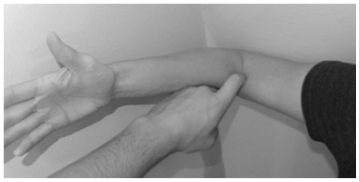
U/S guided PRP Injection
Needle Tenotomy
Tenex

Surgical debridement/ Repair

Tendon **Biceps tendon rupture**

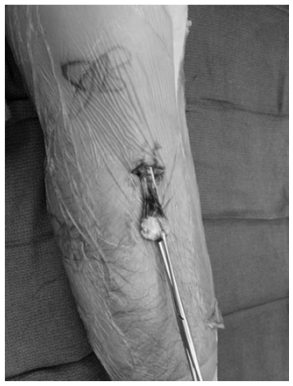
- **Inspection: Deformity and ecchymosis**
- **Palpation: Absent distal biceps tendon**
- **Special testing:**
  - **Hook test**
  - **Resisted supination (weak ± pain)**
- **Natural history:**
  - **40-50% supination strength loss**
  - **30% flexion strength loss**

- **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

Phases of Throwing

- Wind up
- Cocking
- Acceleration
- Deceleration
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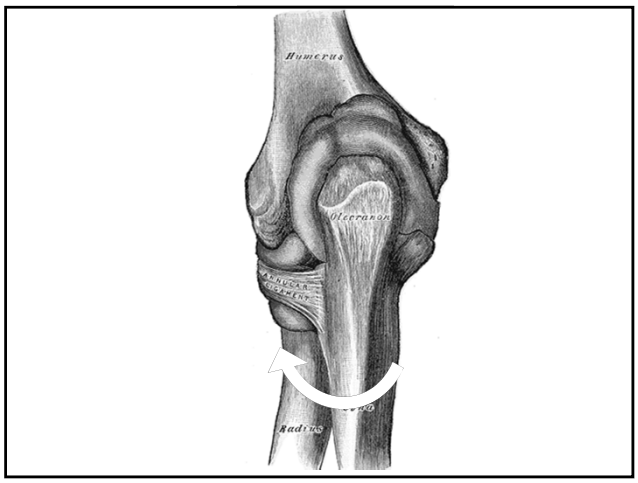
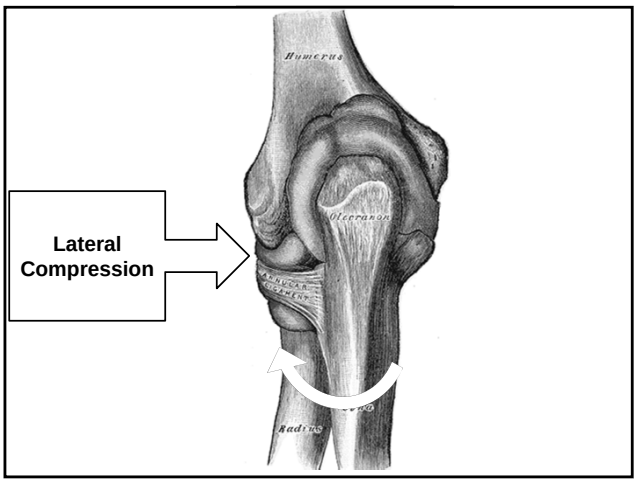
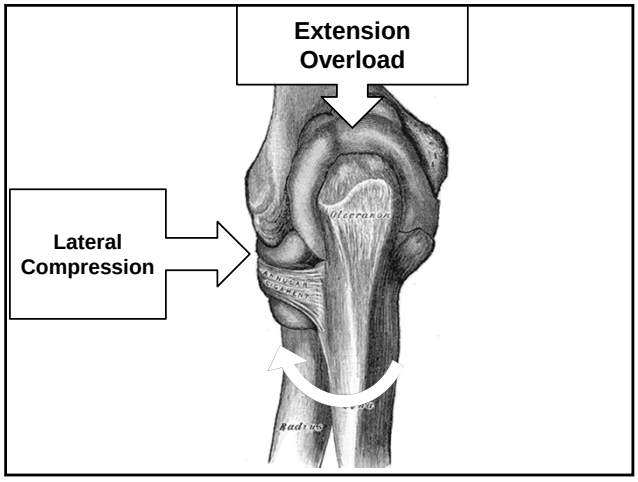
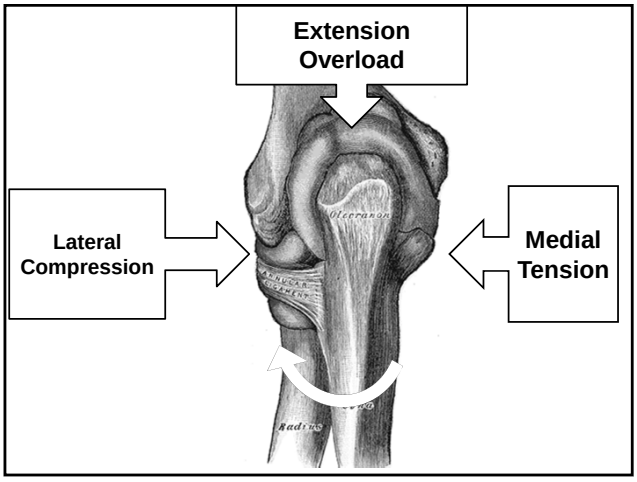

Humerus
Olecranon
Radius


Lateral
Compression
Humerus
Olecranon
Radius


Extension
Overload
Lateral
Compression
Olecranon
Radius


Extension
Overload
Lateral
Compression
Medial
Tension
Olecranon
Radius

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

O'Driscoll SW, Lawton RL, Smith AM. The "moving valgus stress test" for medial collateral ligament tears of the elbow. Am J Sports Med. 2005 Feb;33(2):231-9.

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

Shawn W. M. O'Driscoll,*† PhD, MD, Richard L. Lawton,‡ MD, PhD, and Adam M. Smith,† MD
From the †Department of Orthopaedic Surgery, Mayo Clinic, Rochester, Minnesota, and ‡Durango 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

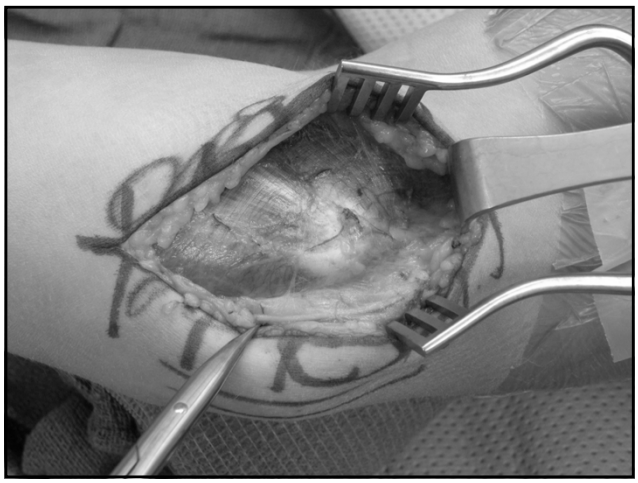
- Nonoperative treatment is first line (42% success)
  - 2-4 weeks of rest with NSAIDS/PT modalities
  - When pain/inflammation improved
  - Throwing program at 6 weeks to 3 months
- Surgical management (Tommy John Ligament Reconstruction) for failure of rehabilitation at 3-6 mo.

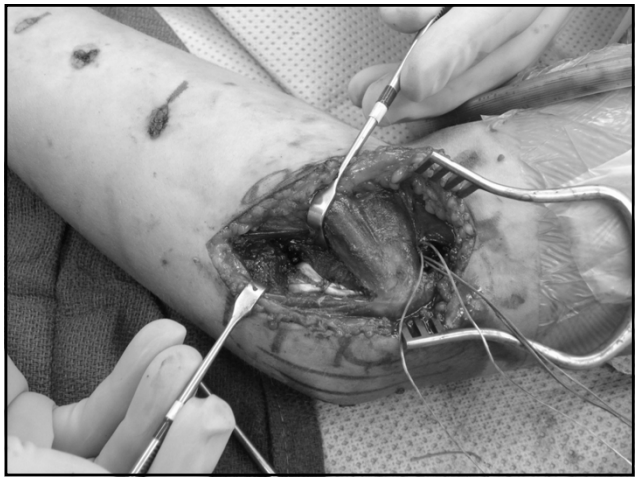
O'Driscoll SW, Lawton RL, Smith AM. The "moving valgus stress test" for medial collateral ligament tears of the elbow. Am J Sports Med. 2005 Feb;33(2):231-9.

UCL Reconstruction - Evolution

Jobe Technique		**63% RTP**
Flexor detachment	Ulnar nerve transposition	
ASMI Technique		**78% RTP**
Flexor retracted	Ulnar nerve transposition	
HSS		**97% RTP**
Muscle splitting	No ulnar nerve work	

Langer P, et al. Br J Sports Med. Jun 2006 40(6): 499-506





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**