Management of Elbow Injuries: A concise review

Sean Hazzard, PA, MBA

2021 PAOS Annual Conference

HARVARD MEDICAL SCHOOL

MASSACHUSETTS GENERAL HOSPITAL
SPORTS MEDICINE

I have no financial disclosures

Breakdown

Subacute

- Capitellum
  - Osteochondritis Dissecans (OCD)
  - Panners
- Condyles
  - Lateral epicondylitis
  - Medial epicondylitis
  - Traction Epophysitis

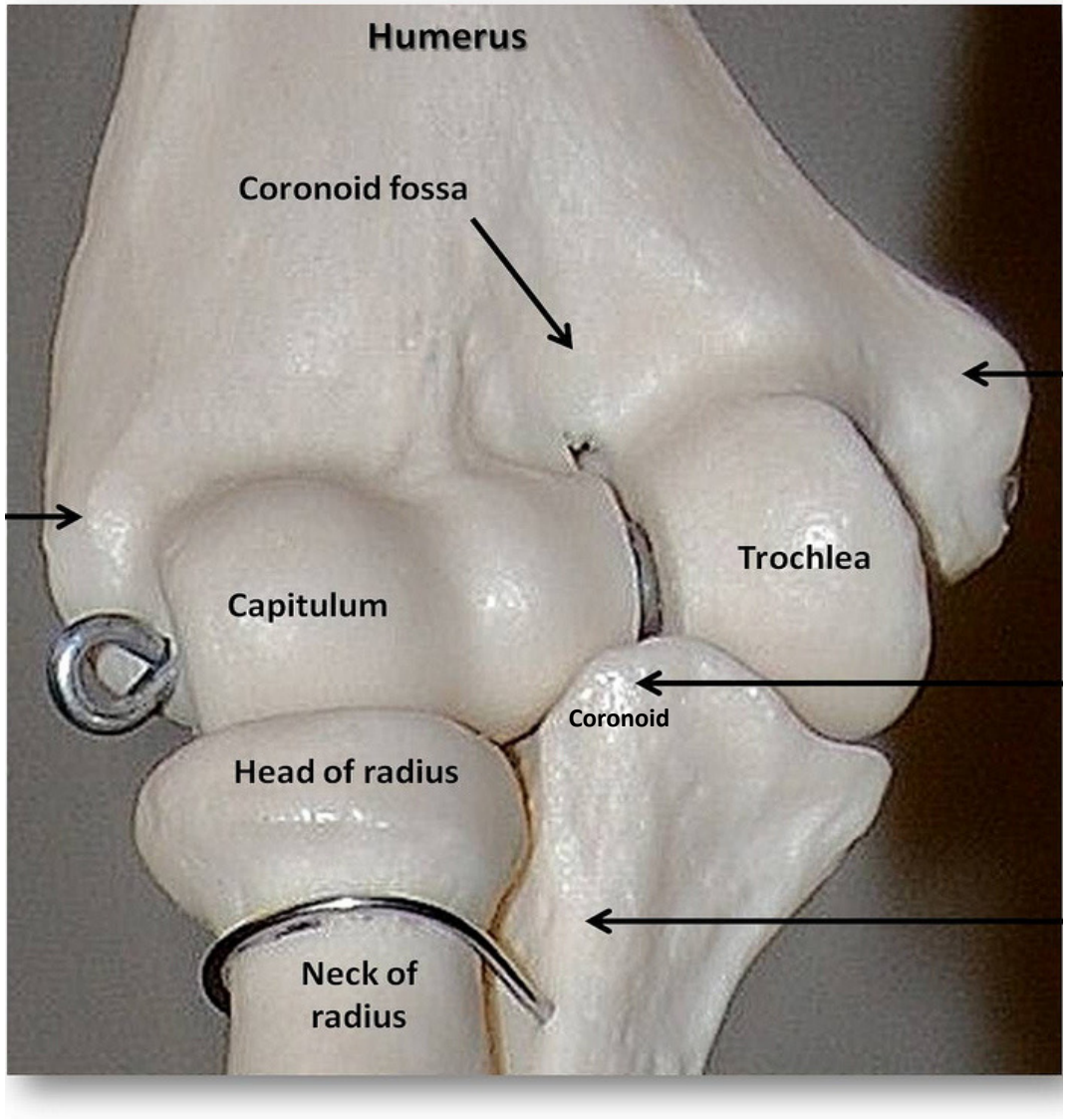
Acute

- Medial Ulnar Collateral Ligament (UCL)
- Radial Ulnar Collateral Ligament (”LCL”)
- Instability

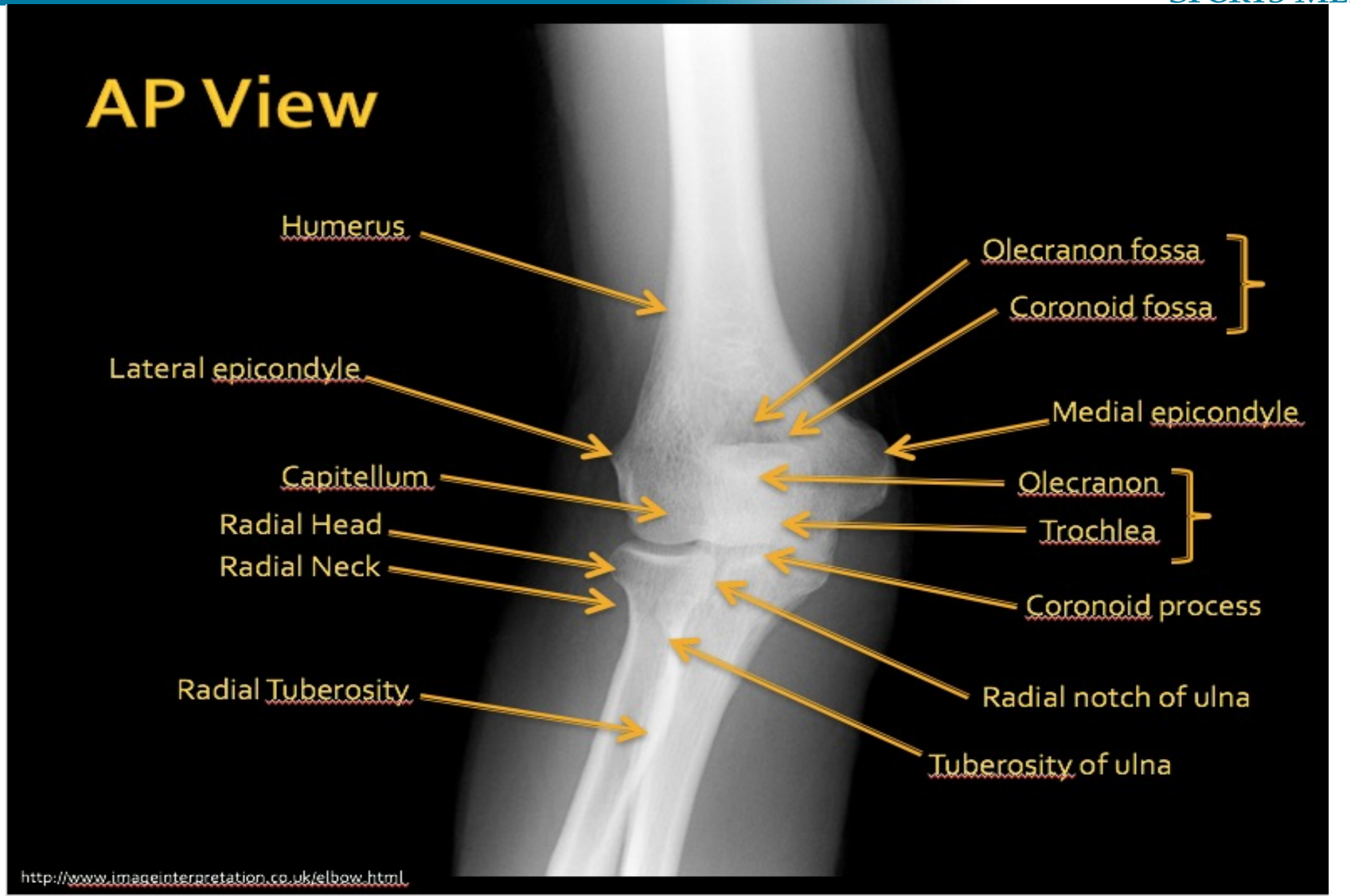
Elbow Bony Anatomy

Complex hinge/pivot joint

- **Capitulum articulates with the radial head** (humeroradial)
- **Trochlea articulates with the trochlear notch of the ulna** (humeroulnar)
- **Radial notch of the ulna articulates with the radial head** (proximal radioulnar)



X-Ray: Elbow


AP View
Humerus
Lateral epicondyle
Capitellum
Radial Head
Radial Neck
Radial Tuberosity
Olecranon fossa
Coronoid fossa
Medial epicondyle
Olecranon
Trochlea
Coronoid process
Radial notch of ulna
Tuberosity of ulna
http://www.imageinterpretation.co.uk/elbow.html

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Osteochondritis Dissecans (OCD)

- >13yo

Panners Disease

- <13yo

Capitellum: OCD

Osteochondritis Dissecans

- Typically >13yo
- Fragmentation of capitellar cartilage
  - Repetitive stress with loss of blood supply
- Often leads to loose body
- MCL laxity can accentuate load

Capitellum: OCD-Symptoms

- Mechanical symptoms
  - Catching/locking
- Pain
  - Poorly localized
- Swelling and flexion contractures common
- MCL laxity?

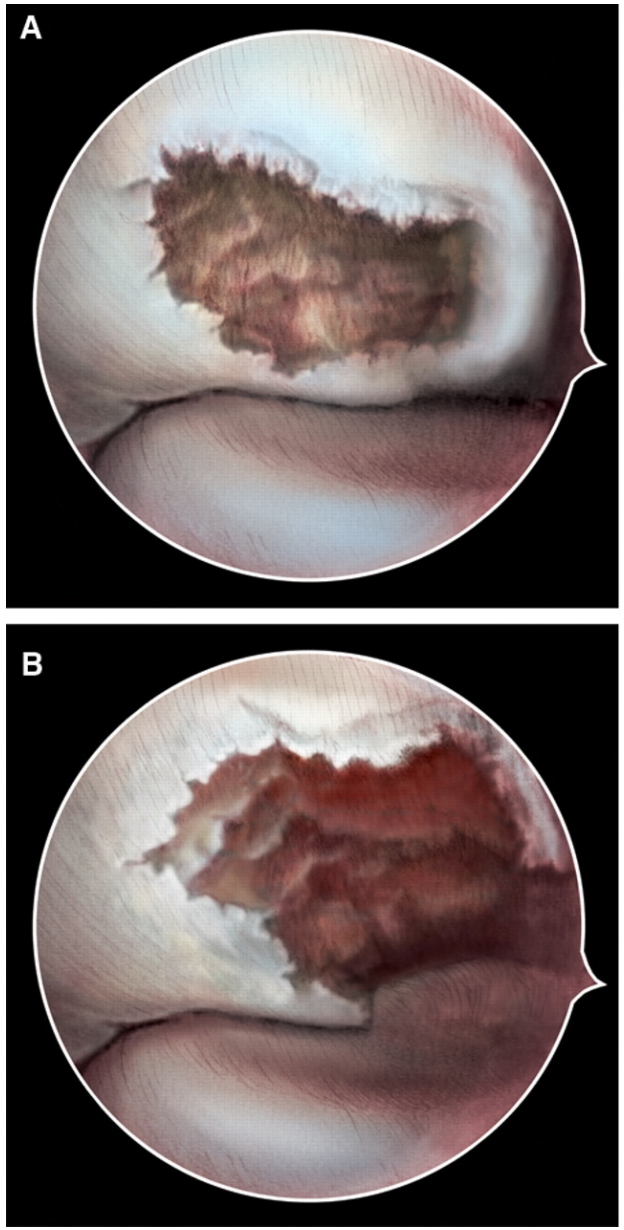
Capitellum: OCD Treatment

Non-displaced

- REST - STOP THROWING
- Gentle range of motion

Displaced

- Arthroscopic debridement
- OATS
- In Situ Fixation
- Microfracture
- Costal Osteochondral Transplant



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Capitellum: Panner's Dease

- Osteonecrosis/chondrosis of capitellum
  - "Legg Calve Perthes of the elbow"
- Boys between 5-12
- Dominant Arm
- "Little League Elbow"
- Treat symptomatically (ie: Stop throwing)

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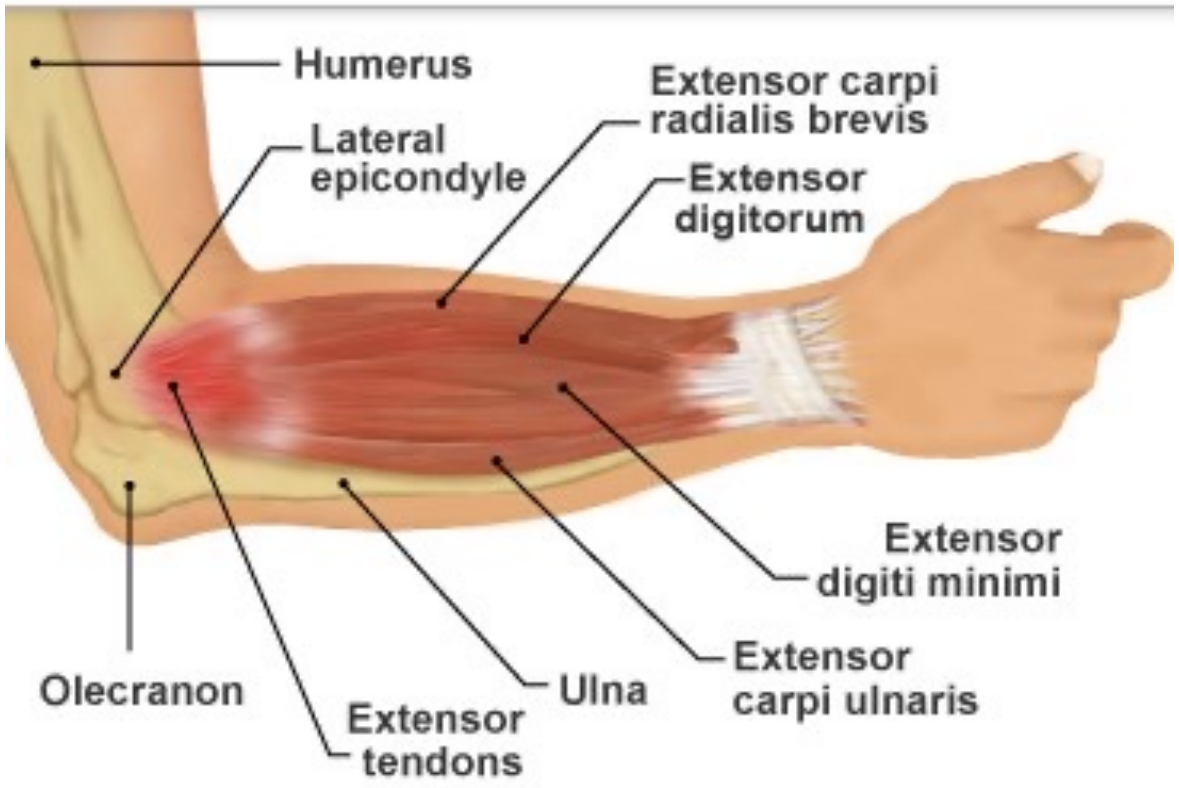
Condyles: Lateral Epicondylitis

"Tennis Elbow"

- Insertional extensor enthesopathy
  - Repetitive stress
  - Typically ECRB
- Common for manual laborers (7% compared to 1-3% general population)
- Typically adults age 40-60
- Not super common in actual tennis players



Condyles: Lateral Epicondylitis

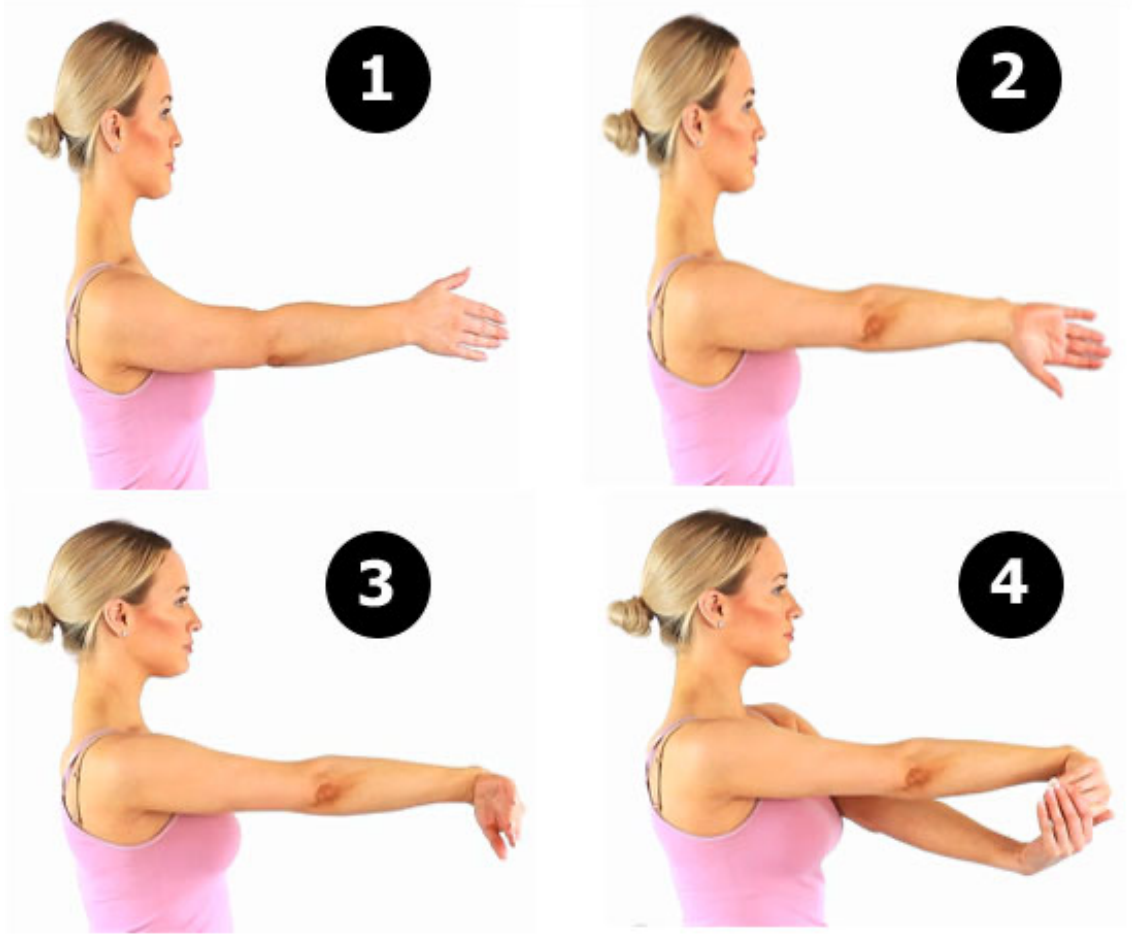
Physical Exam

- Tenderness over lateral epicondyle
- Pain with resisted dorsiflexion of wrist
- Maudsley's Test: Pain with resisted dorsiflexion of middle (3rd) digit
- Chair Lift Test: Patient grips back of standard chair with thumb/index/middle finger while elbow extended

Condyles: Lateral Epicondylitis

Treatment

- Non-op, BUT non-op course is debatable!!
- Most go away on their own!
- Non-operative:
  - REST
  - NSAIDS
  - Injection (Cortisone? PRP?)
  - Stretching/Eccentric exercises
  - Volar/cock up wrist brace with tennis elbow strap



Condyles: Lateral Epicondylitis

BMC Musculoskelet Disord. 2015 May 20;16:122. doi: 10.1186/s12891-015-0582-6.

Corticosteroid or placebo injection combined with deep transverse friction massage, Mills manipulation, stretching and eccentric exercise for acute lateral epicondylitis: a randomised, controlled trial.

Olaussen M[1], Holmedal Ø[2], Mdala I[3], Brage S[4], Lindbæk M[5].

Stretching/massage with or without cortisone, control group (3 total)

- 75% patients had resolution of symptoms with or without treatment at 52 weeks
- Cortisone provided no added benefit at any follow up
  - Increased odds of success with cortisone + PT at 6 weeks, but equal thereafter

Condyles: Lateral Epicondylitis

BMJ Open. 2013 Oct 29;3(10):e003564. doi: 10.1136/bmjopen-2013-003564.

Treating lateral epicondylitis with corticosteroid injections or non-electrotherapeutical physiotherapy: a systematic review.

Olaussen M[1], Holmedal O, Lindbaek M, Brage S, Solvang H.

High quality systematic review

- Over 1,000 patients
- Cortisone may provide short term benefit, but will cause negative intermediate effect
- Long term effect conflicting
- Cortisone vs Lidocaine: No long term difference
- Moderate evidence that eccentric exercise and stretching provides short AND long term benefit

Condyles: ABP for tennis elbow?

PM R. 2016 Mar 9. pii: S1934-1482(16)00158-1. doi: 10.1016/j.pmrj.2016.02.008. [Epub ahead of print]

Efficacy and Safety of Autologous Blood Products Compared With Corticosteroid Injections in the Treatment of Lateral Epicondylitis: A Meta-Analysis of Randomized Controlled Trials.

Qian X[1], Lin Q[1], Wei K[2], Hu B[1], Jing P[1], Wang J[3].

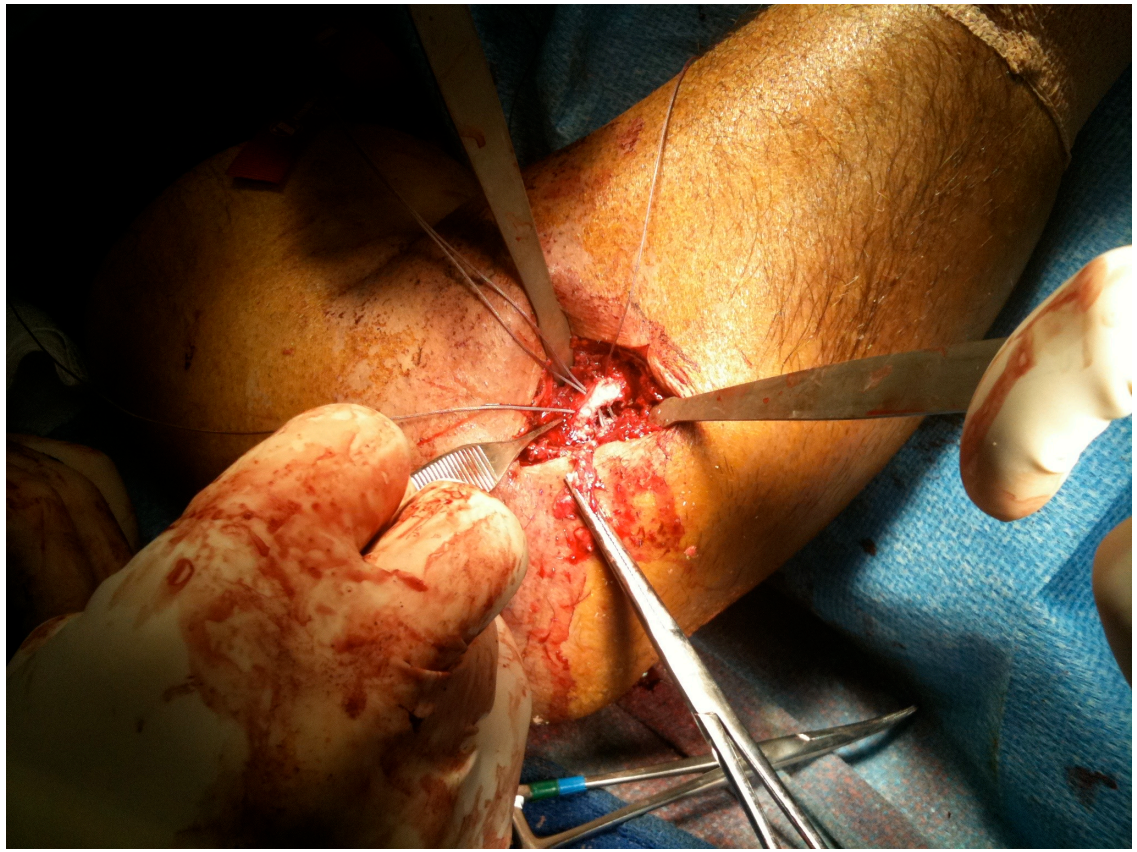
Meta-analysis of randomized controlled trials (thumbs up!)

- Cortisone gave better short term relief
- ABP gave better intermediate and long term relief

Condyles: Tennis elbow operative Tx

Operative treatment

- Open
  - Open ECRB debridement +/- repair
- Arthroscopic
  - Newer
  - Less trauma to other extensor tendons
    - Better grip strength?
  - Can address any additional intraarticular pathology (up to 20%)



Tennis elbow: Surgery

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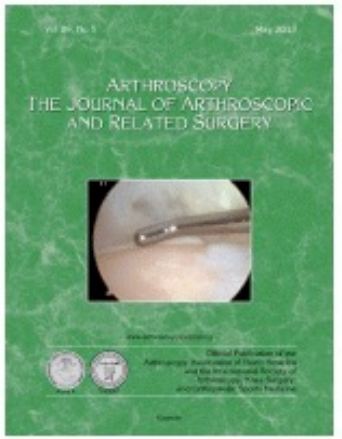
Arthroscopic Versus Open Tennis Elbow Release: 3- to 6-Year Results of a Case-Control Series of 305 Elbows

Eirik Solheim M.D., Ph.D., Janne Hegna M.M. and Jannike Øyen Ph.D.

Arthroscopy: The Journal of Arthroscopic and Related Surgery, 2013-05-01, Volume 29, Issue 5, Pages 854-859, Copyright © 2013 Arthroscopy Association of North America



Arthroscopy: The Journal of Arthroscopic and Related Surgery
Volume 29, Issue 5

- High quality study
  - Both groups did well
  - Nearly identical ‘failure’ rates
  - Arthroscopic had slightly higher “excellent” scores (78% vs 67%)

Tennis elbow surgery: Open vs Arthroscopic

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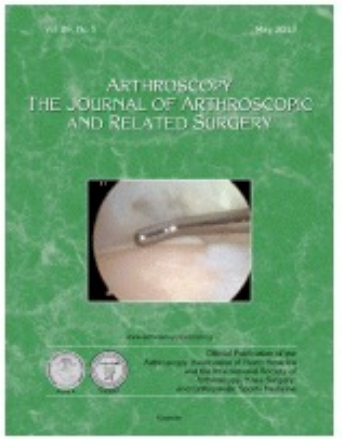
Arthroscopic Versus Open Lateral Release for the Treatment of Lateral Epicondylitis: A Prospective Randomized Controlled Trial

Tod Clark, M.D., F.R.C.S.C., Sheila McRae, Ph.D., Jeff Leiter, Ph.D., Yiyang Zhang, M.D., Jamie Dubberley, M.D., F.R.C.S.C., Peter MacDonald, M.D., F.R.C.S.C.
Pan Am Clinic, Winnipeg, Canada



Arthroscopy: The Journal of Arthroscopic and Related Surgery

December 2018
Volume 34, Issue 12, Pages 3177–3184

- 37 patients, single blinded study (Level 2) into scope vs open
  - No difference between groups in outcomes
  - Slightly shorter OR/setup time with open group

Tennis elbow: Surgery

Am J Orthop (Belle Mead NJ). 2018 Jun;47(6). doi: 10.12788/ajo.2018.0043.

Open vs Percutaneous vs Arthroscopic Surgical Treatment of Lateral Epicondylitis: An Updated Systematic Review.

Riff AJ, Saltzman BM[1], Cvetanovich G, Frank JM, Hemu MR, Wysocki RW.

Author information

1 Midwest Orthopaedics at Rush, Rush University Medical Center, Chicago, IL. bryan.m.saltzman@gmail.com.

Systematic review: Open vs Scope vs Percutaneous

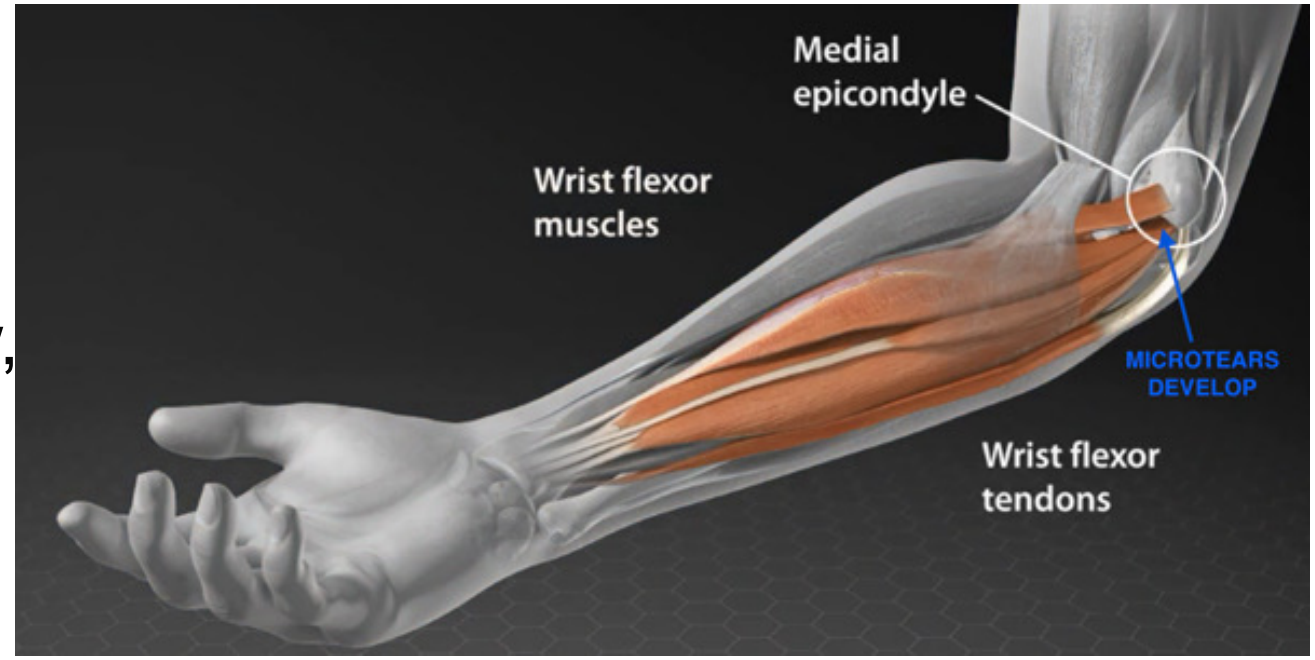
35 Studies

- All groups did well (no difference in patient satisfaction)
- Open had higher proportion ‘pain free’ vs scope 70% v 60%

Condyles: Medial Epicondylitis

"Golfers Elbow"

- Insertional Flexor enthesopathy
- Similar profile to tennis elbow, just medial
- Much less common than lateral epicondylitis

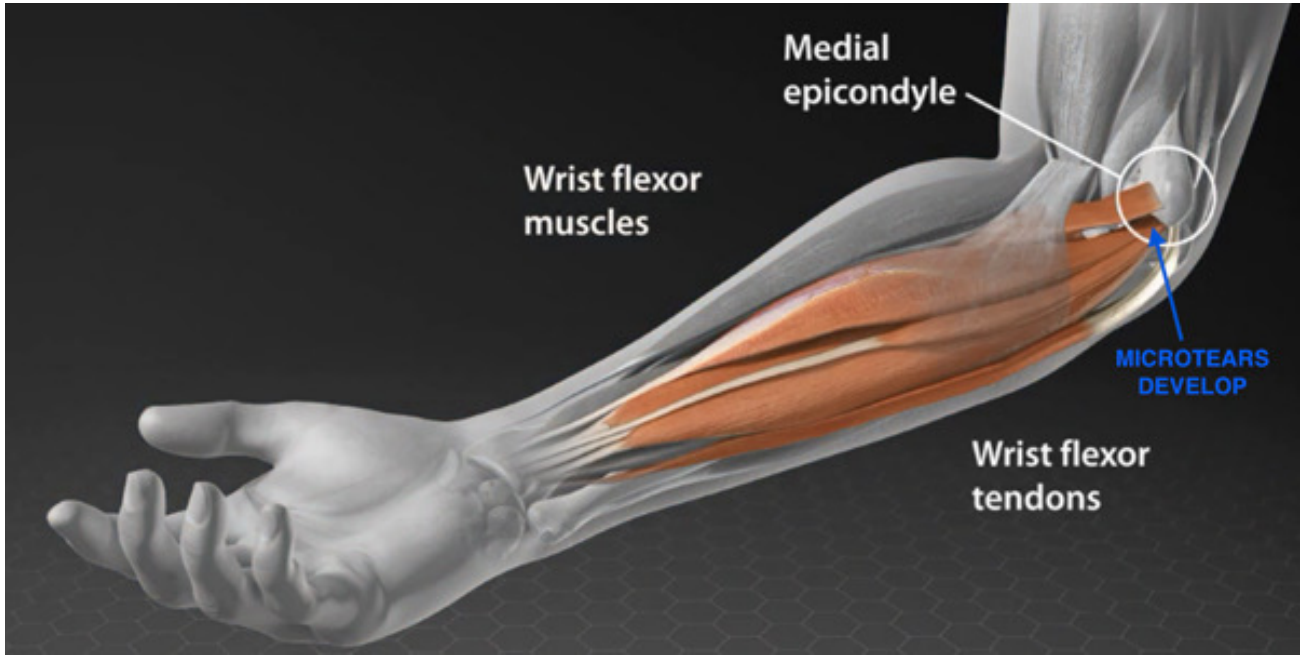


- Note: Get a good history. Don't ignore a bigger issue like UCL injury/cubital tunnel (get

Condyles: Medial Epicondylitis

Treatment

- Non-operative
  - REST
  - Ice/NSAIDS
  - Injections (Cortisone? PRP)



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Elbow: Ossification Centers

C = Capitellum

- 1-2 yrs

R = Radial head

- 2-4 yrs

M = Medial (internal) epicondyle

- 4-6 yrs

T = Trochlea

- 8-11 yrs

O = Olecranon

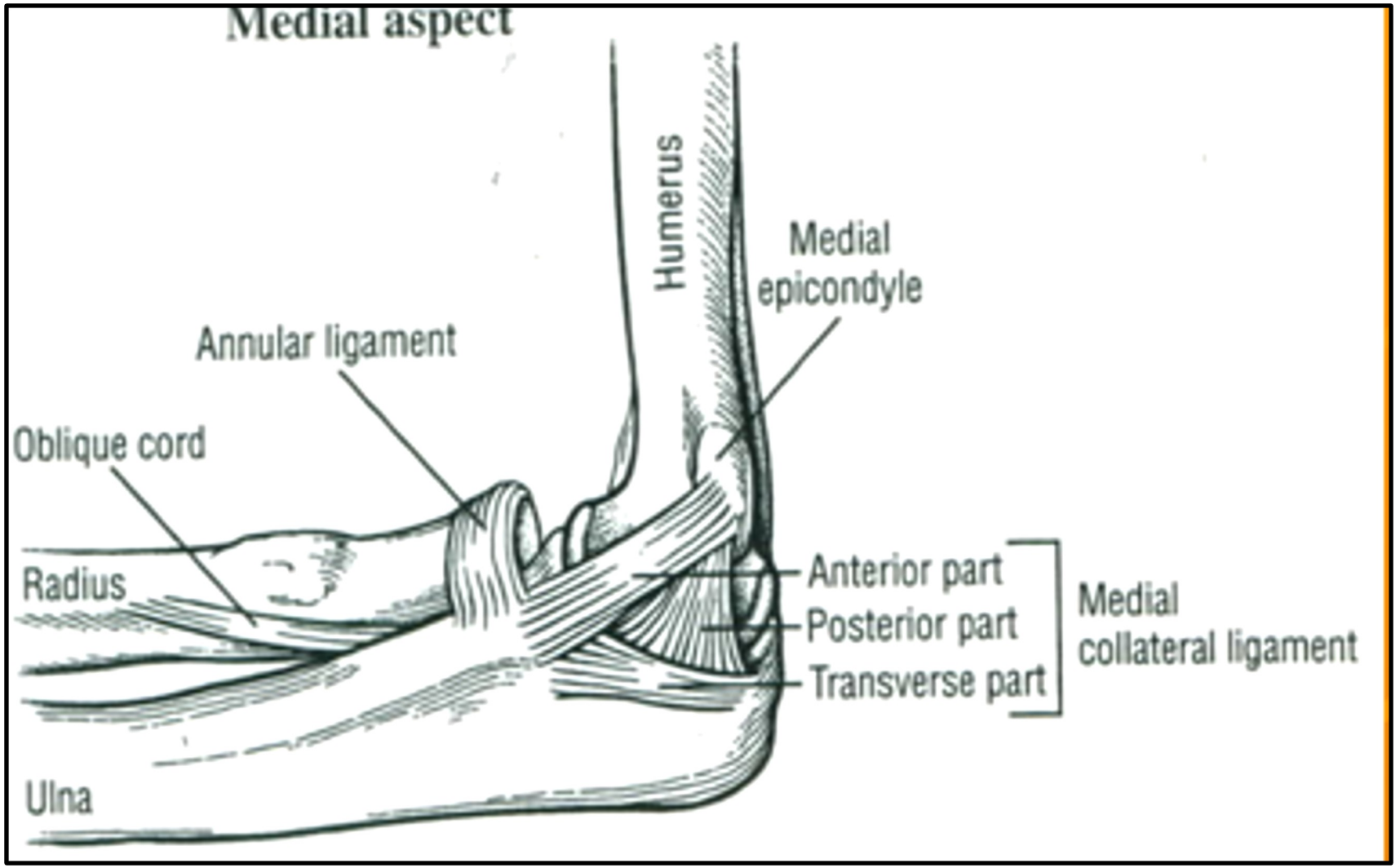
- 9-11 yrs

L = Lateral epicondyle

- 10-11 yrs

Come Rub My Tree Of Love

Medial Elbow: mUCL complex



Traction Apophysitis: AKA – Little League Elbow

Valgus overload syndrome

Young throwers

- Repetitive strain of mUCL
- Medial epicondyle apophysis becomes inflamed and causes pain
- Similar pain as adult, but with bigger issue long term
  - Due to growth plate involvement

Year round sport = Injury

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Benjamin HJ, Briner WW Jr. Little league elbow. *Clin J Sport Med*. 2005 Jan. 15(1):37-40. [Medline].

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Patel DR, Nelson TL. Sports injuries in adolescents. *Med Clin North Am*. 2000 Jul. 84(4):983-1007, viii.[Medline].

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Hutchinson MR, Wynn S. Biomechanics and development of the elbow in the young throwing athlete. *Clin Sports Med*. 2004 Oct. 23(4):531-44, viii. [Medline].

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Wei AS, Khana S, Limpisvasti O, Crues J, Podesta L, Yocum LA. Clinical and magnetic resonance imaging findings associated with Little League elbow. *J Pediatr Orthop*. 2010 Oct-Nov. 30(7):715-9. [Medline].

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Fleisig GS, Andrews JR, Cutter GR, Weber A, Loftice J, McMichael C, et al. Risk of serious injury for young baseball pitchers: a 10-year prospective study. *Am J Sports Med*. 2011 Feb. 39(2):253-7. [Medline].

Traction Apophysitis: AKA – Little League Elbow

Treatment:

Non-operative

- STOP THROWING
- STOP PITCHING
- When asymptomatic, may begin structured light throwing program
- Encourage cross training
- Innings count

Traction Apophysitis: AKA – Little League Elbow

Objective information is available

Still encourage cross sport training

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MAXIMUM PITCH COUNTS

Age	Pitches / Game
7 – 8	50
9 – 10	75
11 – 12	85
13 – 16	95
17 – 18	105

Source: Little League Baseball

REST PERIODS REQUIRED

Ages 7–16	Ages 17–18	Required # of Rest Pitches
61+	76+	3 calendar days
41 – 60	51 – 75	2 calendar days
21 – 40	26 – 50	1 calendar day
1 – 20	1 – 25	None

Source: Little League Baseball

Traction Apophysitis: AKA – Little League Elbow

Ball should be thrown straight until at least 14yo

- Perhaps 16

AGE RECOMMENDED FOR LEARNING VARIOUS PITCHES

Pitch	Age
Fastball	8 ± 2
Slider	16 ± 2
Change-up	10 ±3
Forkball	16 ± 2
Curveball	14 ± 2
Knuckleball	15 ±3
Screwball	17 ± 2

Source: From work by James R. Andrews, MD, and Glenn S. Fleisig, PhD

Traction Apophysitis: AKA – Little League Elbow

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OJSM An Open Access Journal for Orthopaedic Sports Medicine, Arthroscopy and Knee Arthroplasty

Orthop J Sports Med. 2015 Jan 13;3(1):2325967114566788. doi: 10.1177/2325967114566788. eCollection 2015.

A Preseason Checklist for Predicting Elbow Injury in Little League Baseball Players.

Yukutake T[1], Kuwata M[2], Yamada M[3], Aoyama T[1].

389 little leaguers

Checklist before and after season

Can help predict elbow injuries in advance

- 6 main checklist items

Traction Apophysitis: AKA – Little League Elbow

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TABLE 1
Preseason Checklist for Little League Players

	Yes	No
Condition of the elbow of the pitching arm		
1. Is the angle of the elbow in full extension different between your arms?	1	0
2. Do you have pain in the elbow of the pitching arm when it is extended?	1	0
3. Is the angle of the elbow in full flexion different between your arms?	1	0
4. Do you have pain in the elbow of the pitching arm when it is flexed?	1	0
Information about baseball playing		
5. Are you a regular player?	1	0
6. Do you often throw more than 100 pitches per week?	1	0
7. Do you have an off-season (a period when you do not throw anything for at least 1 month)?	0	1
8. Does your pitching arm often feel fatigued while playing baseball?	1	0
9. Do you practice throwing breaking pitches often?	1	0
10. Are you more often satisfied than dissatisfied with your performance?	0	1
11. Do you often play catch or throw a ball in noncompetition settings?	1	0
12. Do you often participate in resistance training?	1	0
Pitching form		
13. Is your elbow in a straight line with your shoulders (horizontal shoulder abduction) when in the cocking stage of a pitch?	0	1
14. Is your elbow at or above shoulder level (abducted $\geq 90^{\circ}$) in the acceleration phase of a pitch?	0	1
15. Is your front foot pointed straight on an extension of the pitcher-catcher line or angled slightly toward third base (for a right-handed pitcher)?	0	1
16. Is your front foot angled straight toward or slightly inward from the catcher?	0	1
Flexibility		
17. When prone with knees flexed at 90°, is there a difference in the internal rotation angle of your hips?	1	0
18. Is there a difference in the height of your thumbs when the dorsum of your hand is placed at maximum height against your back on the line of the spine? (Reflecting range of motion of the shoulders when internally rotated.)	1	0
19. With your knee fully flexed, is the distance between your heel and buttock 0 cm for both legs? (Reflecting flexibility of the quadriceps.)	0	1
20. When you are fully flexed at the waist, is the distance between your fingers and the floor 0 cm? (Reflecting flexibility of the hamstrings.)	0	1

Traction Apophysitis: AKA – Little League Elbow

Factors Associated With Occurrence of Elbow Injury During the Season According to Stepwise Logistic Regression Analysis

	Odds Ratio	95% CI	*P* Value
Has experienced shoulder or elbow pain while throwing in the preceding 12 months	2.64	1.31-5.34	.007
Has ever experienced an elbow or shoulder injury requiring medical attention	4.10	1.96-8.54	<.001
Team training ≥4 days per week	2.58	1.30-5.12	.007
Self-training 7 days per week	3.15	1.23-8.09	.017
Checklist item No. 5 Regular player?	10.29	1.26-84.0	.030
Checklist item No. 8 Does your pitching arm often feel fatigued while playing?	3.01	1.48-6.11	.002

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Acute: Medial ulnar collateral ligament

Not just a “UCL” injury

Anatomy:

- MCL and LCL are not appropriate anatomic references at elbow
- Both connect humerus to ulna, so both are UCL
- mUCL and lUCL

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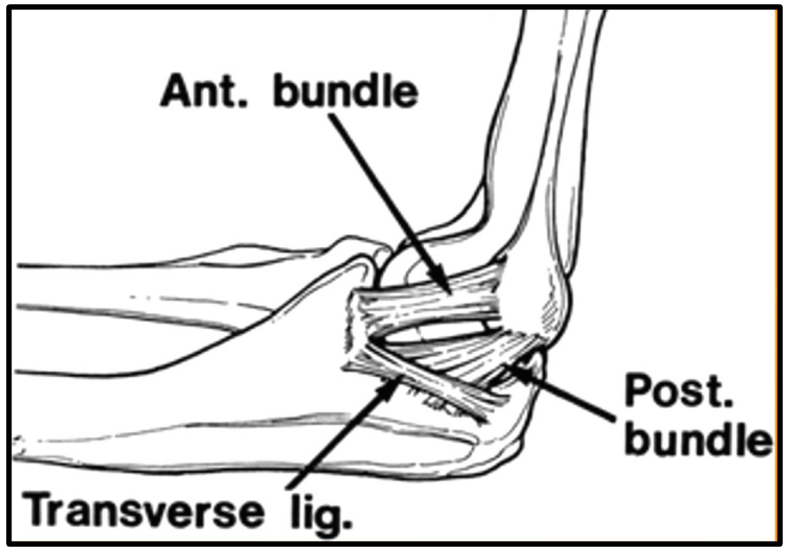

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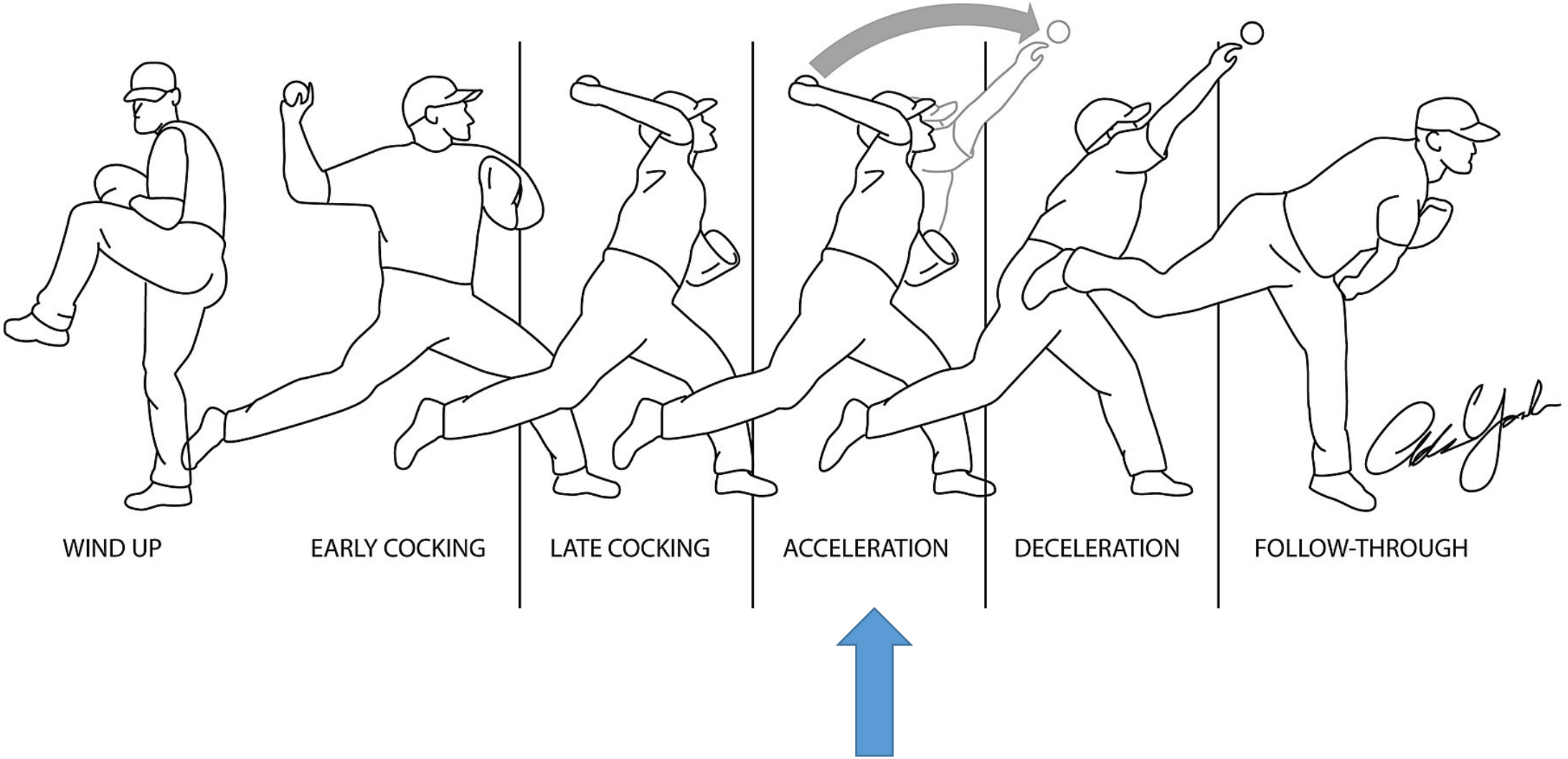
Acute: Medial ulnar collateral ligament

Mechanism:

- Acute vs acute on chronic valgus stress
- Throwing motion
- Anterior bundle of the mUCL is primary restraint to valgus stress (30-120 degrees)

Throwing motion



Pitching Biomechanics

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Acute: Medial ulnar collateral ligament

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Subjective:

- Medial sided elbow pain
  - Acute “pop”?
  - Worsening of chronic issue
- Loss of pitch speed and performance
- Pain during acceleration phase of throwing
- Medial sided ulnar parasthesias?

Acute: Medial ulnar collateral ligament

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Objective:

Tenderness ~2cm distal to medial epicondyle

Valgus Stress Test (66% sensitive, 60% specific)

Milking Maneuver

Moving Valgus Stress Test

26-82% of experienced elbow surgeons can accurately dx operative mUCL laxity on physical exam

Valgus stress test

Milking maneuver

Moving valgus stress test

-Timmerman 94, Safran 06, Madden 10
-Azar F.M., Andrews J.R., Wilk K.E., et al: Am J Sports Med 2000; 28: pp. 16-23.
-Thompson W.H., Jobe F.W., Yocum L.A., et al:. J Shoulder Elbow Surg 2001; 10: pp. 152-157

mUCL: Special tests

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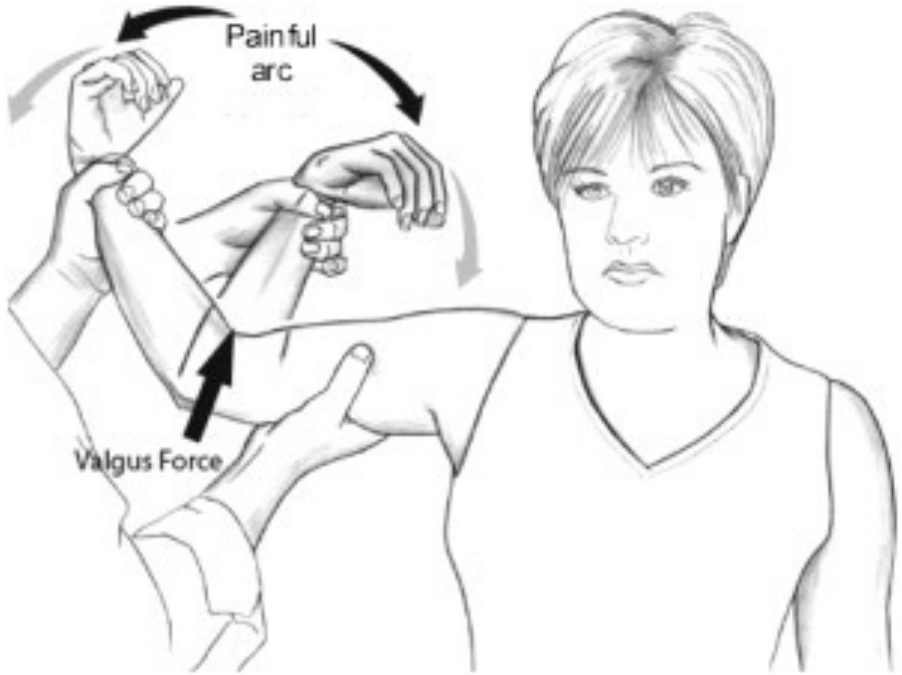
Moving valgus stress test

Shoulder in abduction/ER position

Elbow taken from full flexion to extension. Constant valgus stress applied with sudden movement

Positive when pain reproduced. Typical between 70-120

100% sensitivity, 75% specific

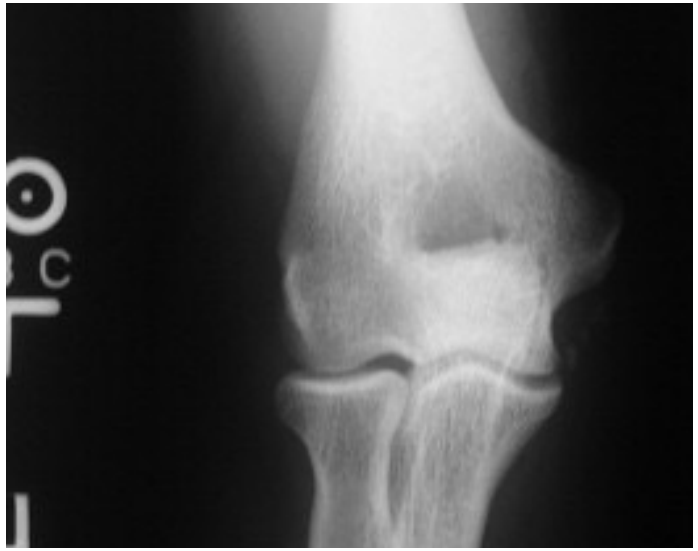


O'Driscoll S.W., Lawton R.L., and Smith A.M.: The "moving valgus stress test" for medial collateral ligament tears of the elbow. Am J Sports Med 2005; 33: pp. 231-239

Acute: Medial ulnar collateral ligament

Imaging

- X-Ray
  - Ossification (chronic?)
- MRI (MRA)
  - MRA = Gold Standard
  - Caution with throwers: Sore for couple days
- MSK Ultrasound



Acute: Medial ulnar collateral ligament

Non-operative Treatment:

First line for any partial tears and first line for non-throwing patients

RICE, NSAID's, Throwing abstinence, PT (?), bracing

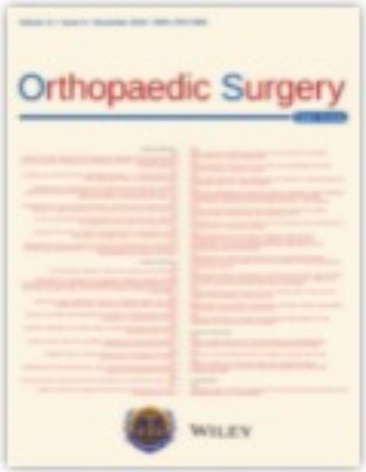
Autologous Blood Product injections (PRP)

mUCL: Non-operative

Orthopaedic Surgery
Open Access

Orthop Surg. 2019 Dec; 11(6): 974–984.
Published online 2019 Nov 26. doi: 10.1111/os.12571

PMCID: PMC6904592
PMID: 31773896



Conservative Versus Surgical Management of Elbow Medial Ulnar Collateral Ligament Injury: A Systematic Review

Carlo Biz, MD,[1] Alberto Crimì, MD, [1] Elisa Belluzzi, PhD, [1,2] Nicola Maschio, MD, [1] Riccardo Baracco, MD, [1] Andrea Volpin, MD, [3] and Pietro Ruggieri, MD, PhD [1]

15 studies of 513 patients

Non-op vs Operative (including high and low demand)

Non-op had higher rate of “excellent” results at 98.8%

mUCL: Non-operative

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0363-5465/101/2929-0015$02.00/0
THE AMERICAN JOURNAL OF SPORTS MEDICINE, Vol. 29, No. 1

Nonoperative Treatment of Ulnar Collateral Ligament Injuries in Throwing Athletes*

Arthur C. Rettig,†‡ MD, Colin Sherrill,§ MD, Dale S. Snead,† MD, J. Chris Mendler,‖ MD, and Paul Mieling,† MS, OTR, ATC/L

From the †Methodist Sports Medicine Center, Thomas A. Brady Clinic, the §Indiana University School of Medicine, Department of Orthopaedic Surgery, Indianapolis, Indiana, and ‖Rutgers University, New Brunswick, New Jersey

31 throwers with mUCL tear or insufficiency, minimum 3 months of rest (no throwing) in addition to brace, ice, nsaids, PT

42% RTP at same level (average was at 24.5 weeks)

No predictive values

mUCL: Non-operative

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J Shoulder Elbow Surg (2010) 19, 1276-1280

ELSEVIER

JOURNAL OF SHOULDER AND ELBOW SURGERY

www.elsevier.com/locate/ymse

Ulnar collateral ligament injuries of the elbow in professional football quarterbacks

Christopher C. Dodson, MD*, Nicholas Slenker, MD, Steven B. Cohen, MD, Michael G. Ciccotti, MD, Peter DeLuca, MD

Department of Orthopaedic Surgery, Sports Medicine Service, Rothman Institute, Thomas Jefferson University, Philadelphia, PA, USA

1994-2008

10 total cases found

All treated non-op

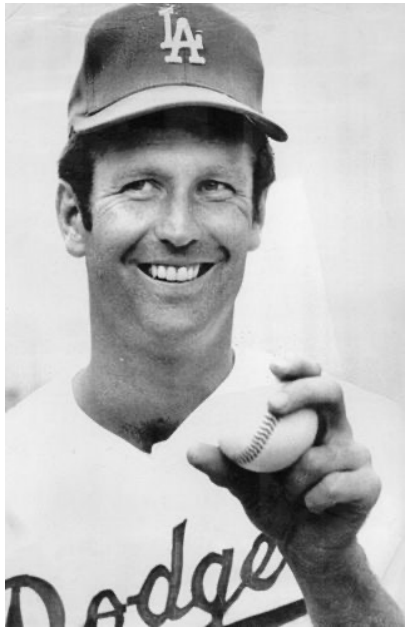
All able to return to same level

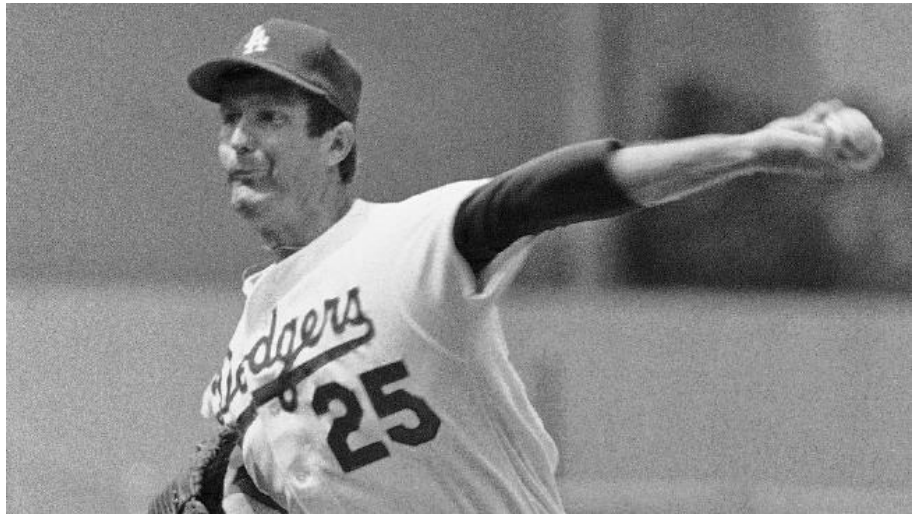
Average: 26.4 days

mUCL: Operative

mUCL reconstruction = "Tommy John" surgery

- 1974 season, 13-3, 2.59 ERA
- Threw a pitch, ball sailed, felt pain
- Next pitch, same result
- Took a month off
- Same result upon return





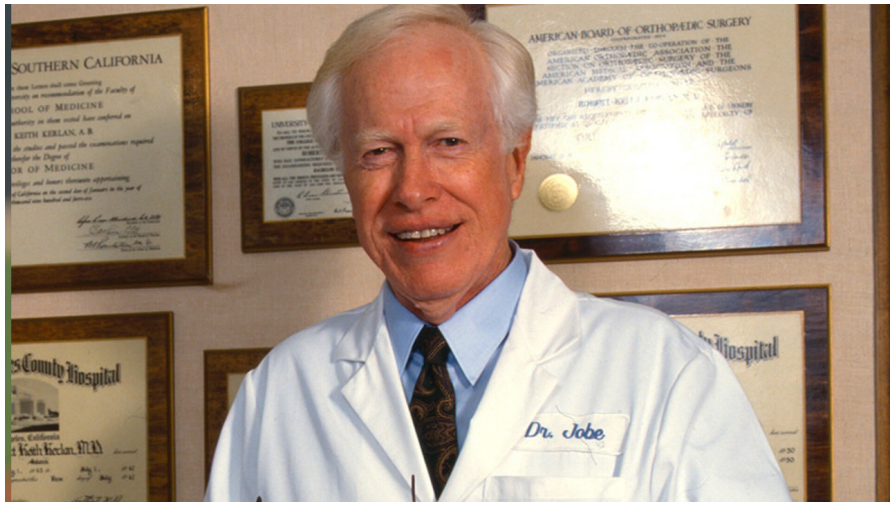
mUCL: Operative

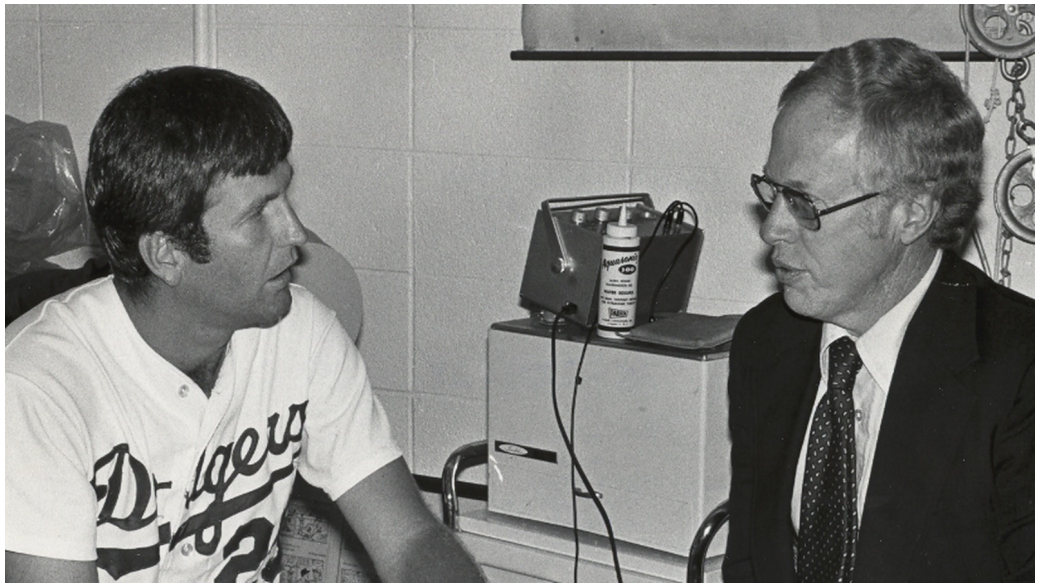
Saw team physician, Dr. Frank Jobe

“Radical” new surgery proposed

Option A: No surgery. Won’t pitch again. Go work in friends jewelry store

Option B: UCL reconstruction. “One in one hundred chance you pitch again”





mUCL: Operative

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Result: 164 additional wins

Over 2,000 career strikeouts

Pitched until age 46

Never missed a start due to elbow pain

mUCL: Operative

Original UCL reconstruction by Jobe described in 1986

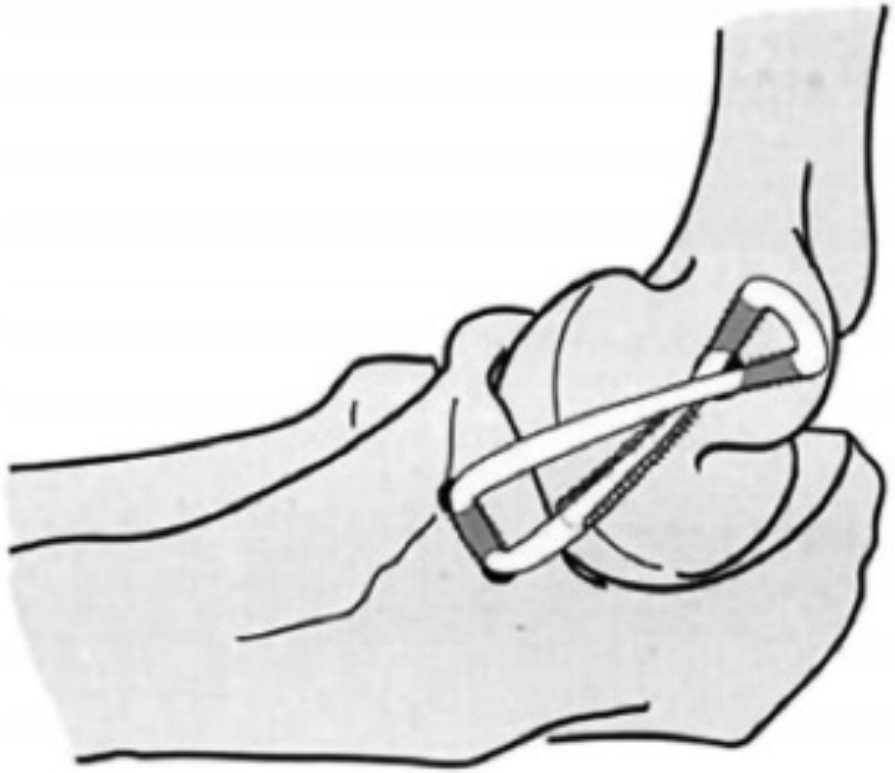
Submuscular ulnar nerve transposition

Flexor/pronator takedown

Bone tunnels in humerus and ulna

Sutured back to itself

Modified (ASMI): Similar but no flexor/pronator takedown.



Jobe FW, Stark H, Lombardo SJ. Reconstruction of the ulnar collateral ligament in athletes. J Bone Joint Surg Am 1986;68:1158-63.

mUCL: Operative

"Docking technique" described in 2002 by David Altchek, MD

Changes vs Jobe technique:

1. Leave ulnar nerve alone

2. Split the FCU rather than take down flexor mass

3. Perform scope

4. "Dock" the humeral side of graft

- (One hole for graft with two small converging for suture)

Rohrbough JT, Altchek DW, Hyman J, Williams RJ III, Botts JD. Medial collateral ligament reconstruction of the elbow using the docking technique. Am J Sports Med 2002;30:541-8.

mUCL: Operative techniques

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Orthopaedic Journal of Sports Medicine | SAGE

Orthop J Sports Med. 2015 Dec; 3(12): 2325967115618914.
Published online 2015 Dec 9. doi: 10.1177/2325967115618914

PMCID: PMC4687831

Ulnar Collateral Ligament Reconstruction of the Elbow

A Systematic Review of the Literature

Brandon J. Erickson, MD,*† Peter N. Chalmers, MD,† Charles A. Bush-Joseph, MD,† Nikhil N. Verma, MD,† and Anthony A. Romeo, MD†

Twenty studies = 2,019 patients/elbows

94.5% were baseball players

Pooled return to play: 89.5%

Collegiate athletes: 95.5%

Docking technique: 97.0% (highest RTP by technique)

mUCL: Operative techniques in Pro's

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SPORTS MEDICINE

Comparison of Outcomes Based on Graft Type and Tunnel Configuration for Primary Ulnar Collateral Ligament Reconstruction in Professional Baseball Pitchers

Timothy B. Griffith,*† MD, Christopher S. Ahmad,‡ MD, Prakash Gorroochurn,‡ PhD, John D'Angelo,§ BA, Michael G. Ciccotti,‖ MD, Joshua S. Dines,¶ MD, David W. Altchek,¶ MD, and Christopher L. Camp,# MD
Investigation performed at Peachtree Orthopedics, Atlanta, Georgia, USA, and the Mayo Clinic, Rochester, Minnesota, USA

The American Journal of Sports Medicine

The American Journal of Sports Medicine
2019;47(5):1103–1110
DOI: 10.1177/0363546519831705

566 professional pitchers (MLB and MiLB) 2010-2014

Return to same level: 71.2%

Rate of subsequent elbow surgery: 10.5% (docking) vs 14.8 (modified Jobe)

Rate of revision surgery: 2.9% (docking) vs 6.2% (modified Jobe)

Orthopaedic Journal of Sports Medicine | SAGE

PMC full text: Orthop J Sports Med. 2015 Dec; 3(12): 2325967115618914.
Published online 2015 Dec 9. doi: 10.1177/2325967115618914

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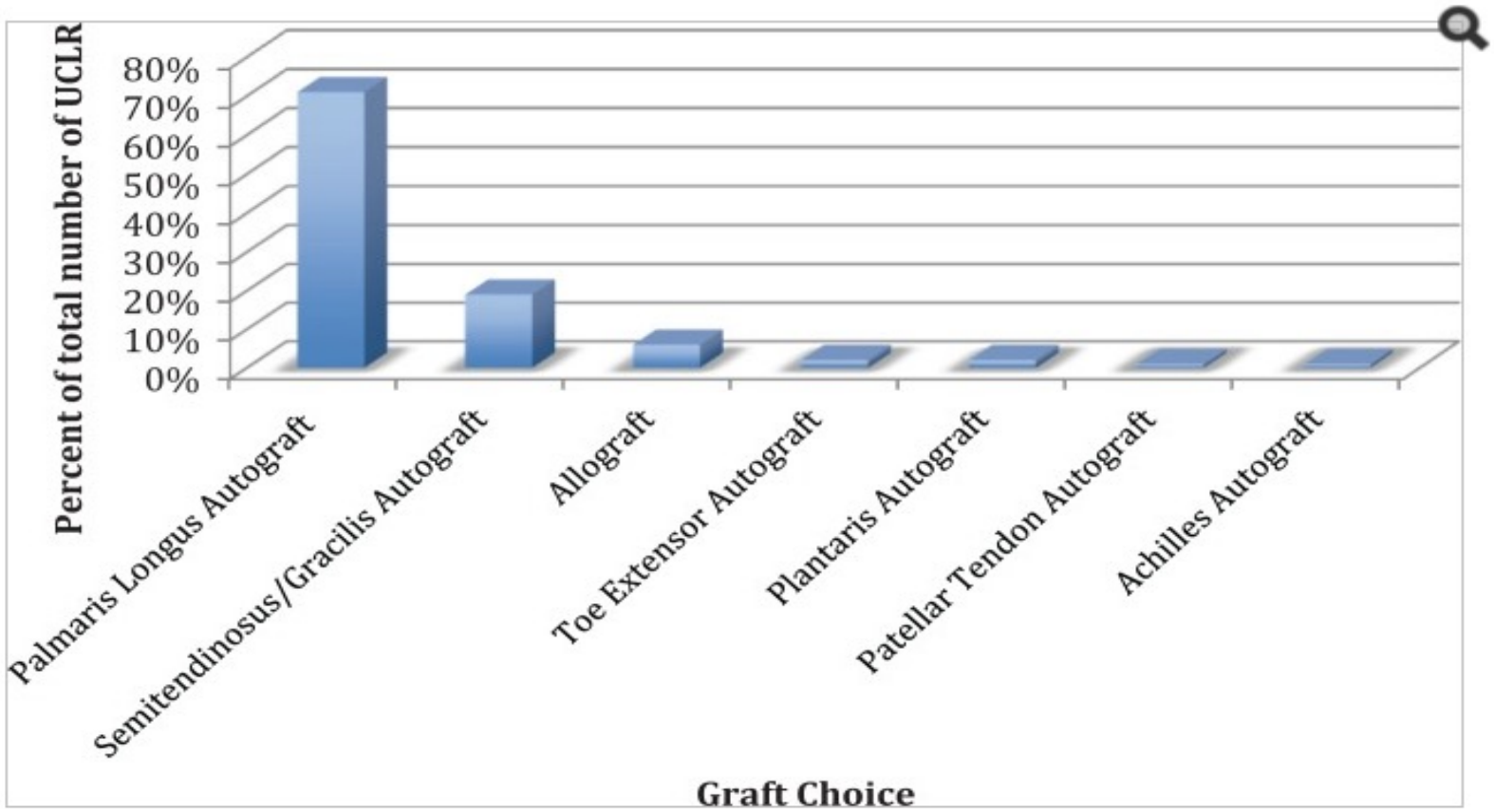
Figure 4.



Percentage of ulnar collateral ligament reconstructions (UCLRs) performed by graft choice.

Autograft

Palmaris

- Most common: 71.2%
- Typically Ipsilateral

mUCL: ASMI Modified Results

Am J Sports Med. 2014 Jun;42(6):1333-42. doi: 10.1177/0363546514528870. Epub 2014 Apr 4.

Long-term Outcomes After Ulnar Collateral Ligament Reconstruction in Competitive Baseball Players: Minimum 10-Year Follow-up.

Osbahr DC[1], Cain EL Jr[2], Raines BT[3], Fortenbaugh D[2], Dugas JR[2], Andrews JR[2].

Single surgeon with minimum 10 year F/U

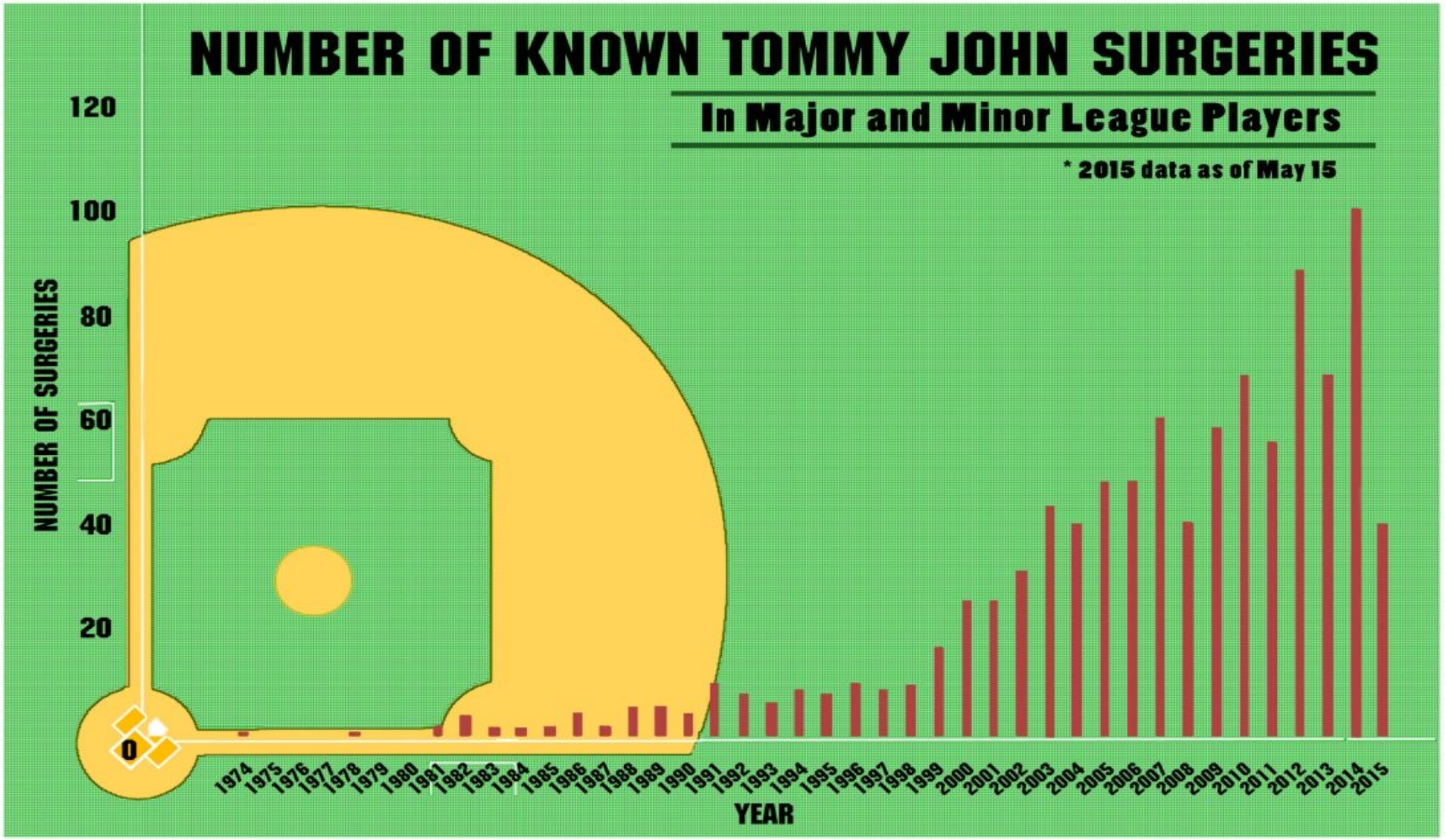
256 tracked….. 83% return to same or higher level

14% retired due to elbow issues

After 10 years, 92% could throw without pain and 98% could play at a recreational level

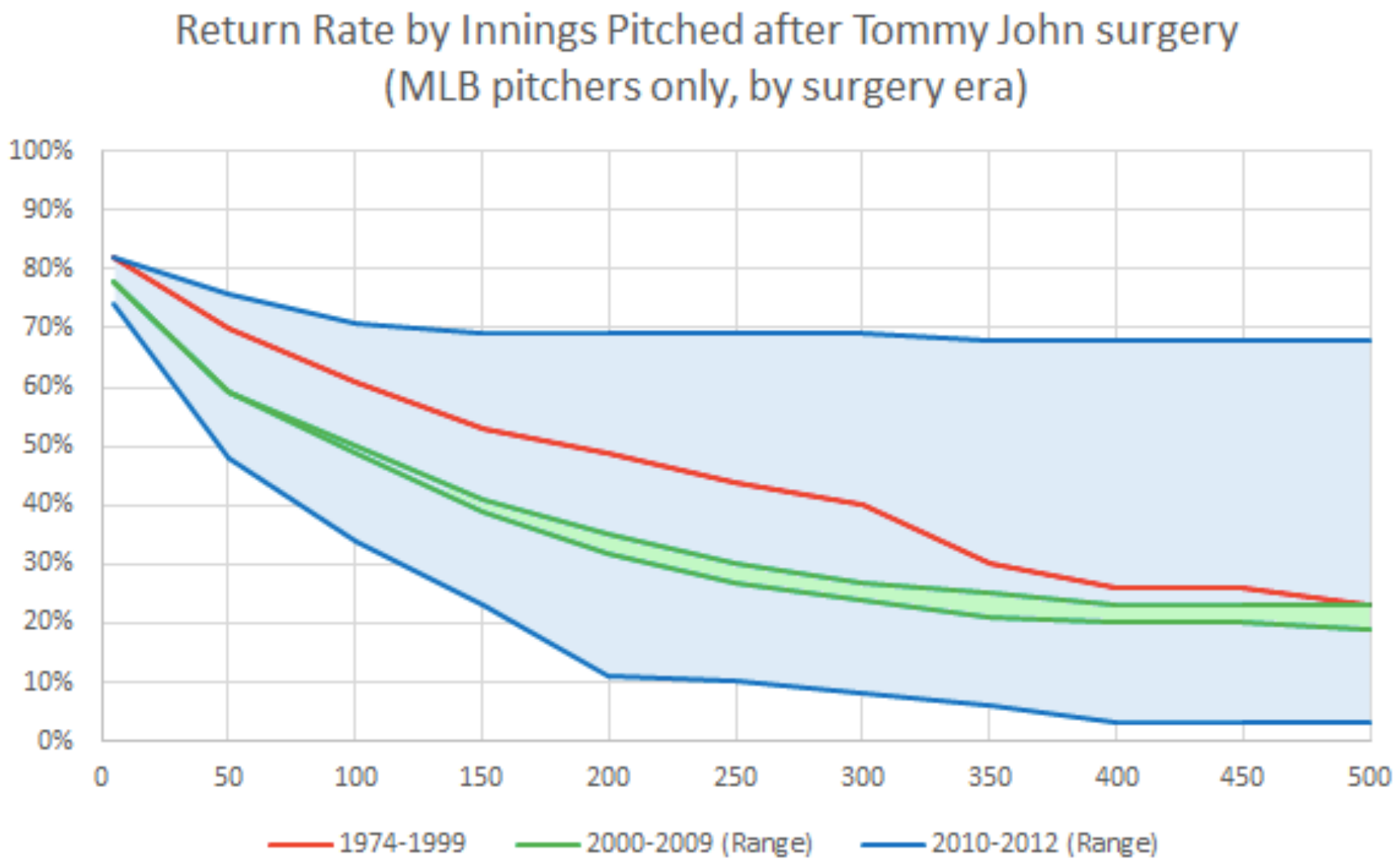
93% satisfied at 10 years

mUCL: Operative frequency



Pollack & Hoerger (June 2015), http://www.dukechronicle.com/article/2015/06/national-epidemic-tommy-john-surgeries-duke-part-broader-trend

mUCL: Operative results



Roegele, J, (March 2015) http://www.hardballtimes.com/tommy-john-surgery-success-rates-in-the-majors/

mUCL: Primary Repair

Controversial in throwers

Traditional repair: 50% success by Jobe

Newer: Direct repair with suture augmentation

Early results promising

- 92% return to throw in 111 patients at avg of 6.7 months (Dugas AJSM 2019)
- Note: RTP for UCLR: 11.6 months

Bodendorfer BM, Looney AM, Lipkin SL, Nolton EC, Li J, Najarian RG, et al. Biomechanical comparison of ulnar collateral ligament reconstruction with the docking technique versus repair with internal bracing. Am J sports med. 2018

Dugas JR, Looze CA, Capogna B, et al. Ulnar collateral ligament repair with collagen-dipped FiberTape augmentation in overhead-throwing athletes. Am J Sports Med. 2019

Breakdown

Subacute

- Capitellum
  - Osteochondritis Dissecans (OCD)
  - Panners
- Condyles
  - Lateral epicondylitis
  - Medial epicondylitis
  - Traction Epophysitis

Acute

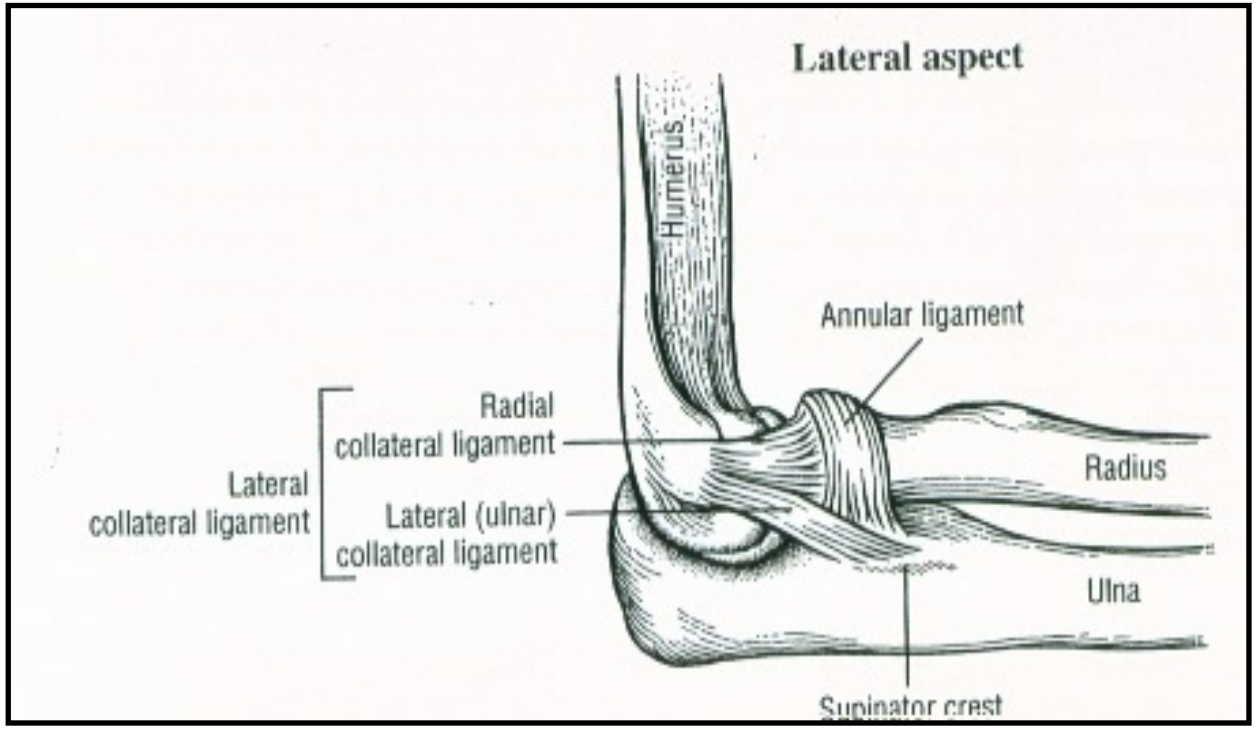
- Medial Ulnar Collateral Ligament (UCL)
- Radial Ulnar Collateral Ligament (”LCL”)
- Instability

Elbow: Posterolateral rotatory instability

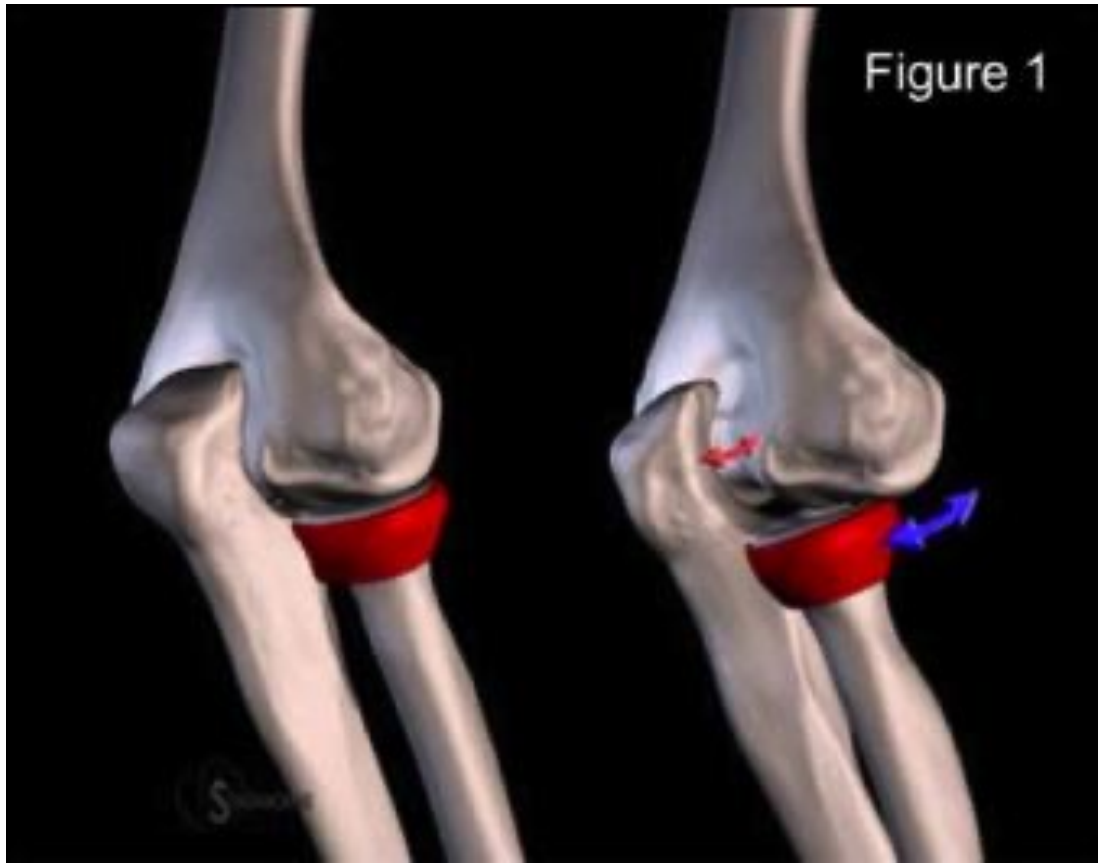
Typically a result of an elbow dislocation

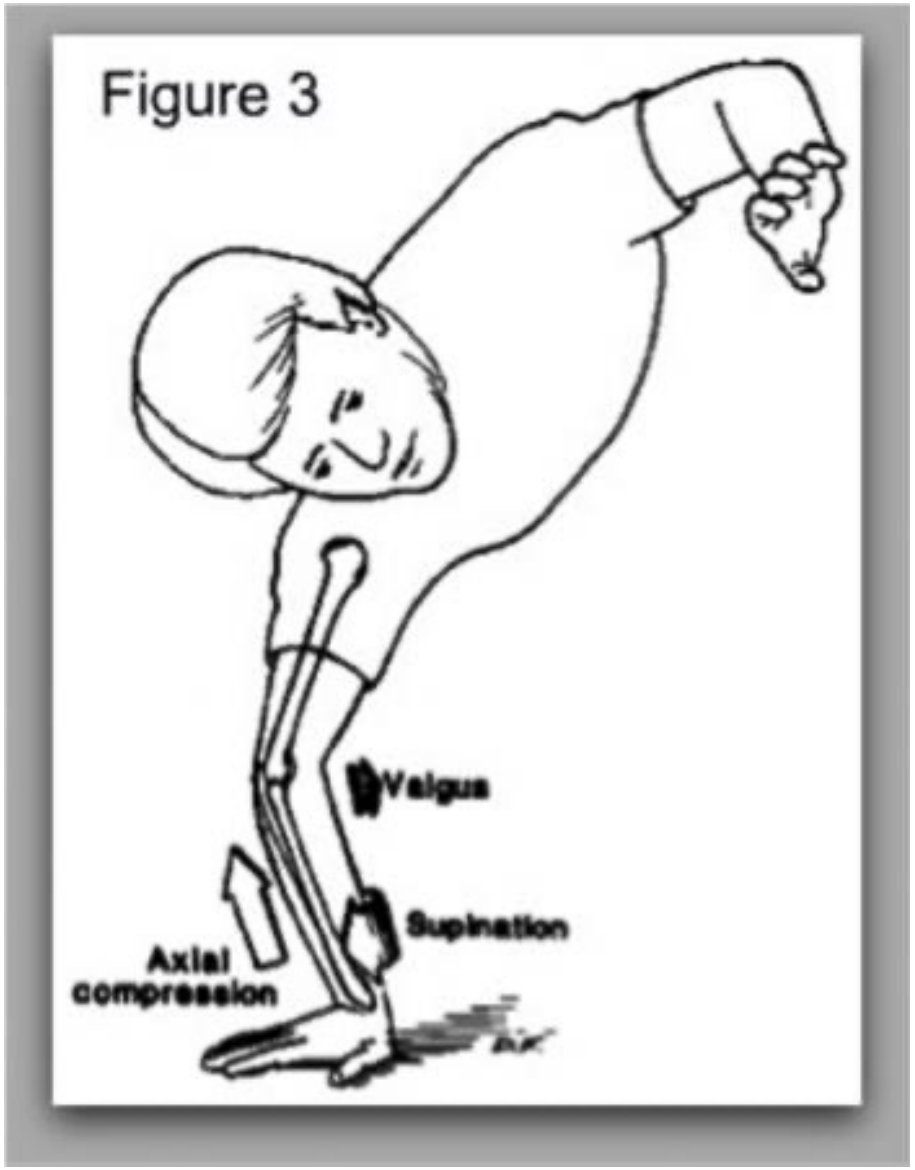
Mechanism: Forearm supination, axial loading, and valgus stress

Sequence: LCL gives way, radial head posterior subluxes (poss fx) + semilunar aspect of olecranon displaces



Elbow: Posterolateral rotatory instability





http://www.orthobullets.com/sports/3129/posterolateral-elbow-rotatory-instability-plri

Elbow: Posterolateral rotatory instability

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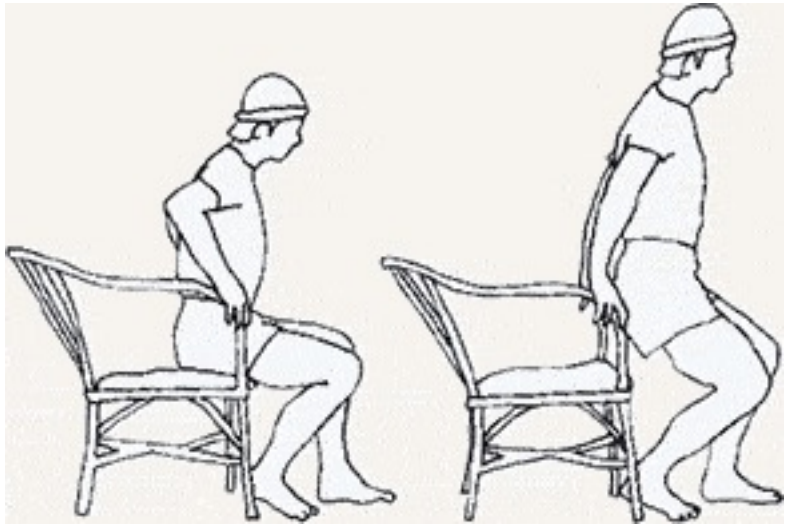
Symptom: Pain

Often pushing off (rising up from a chair)

Clicking and popping sensation



Elbow: Posterolateral rotatory instability

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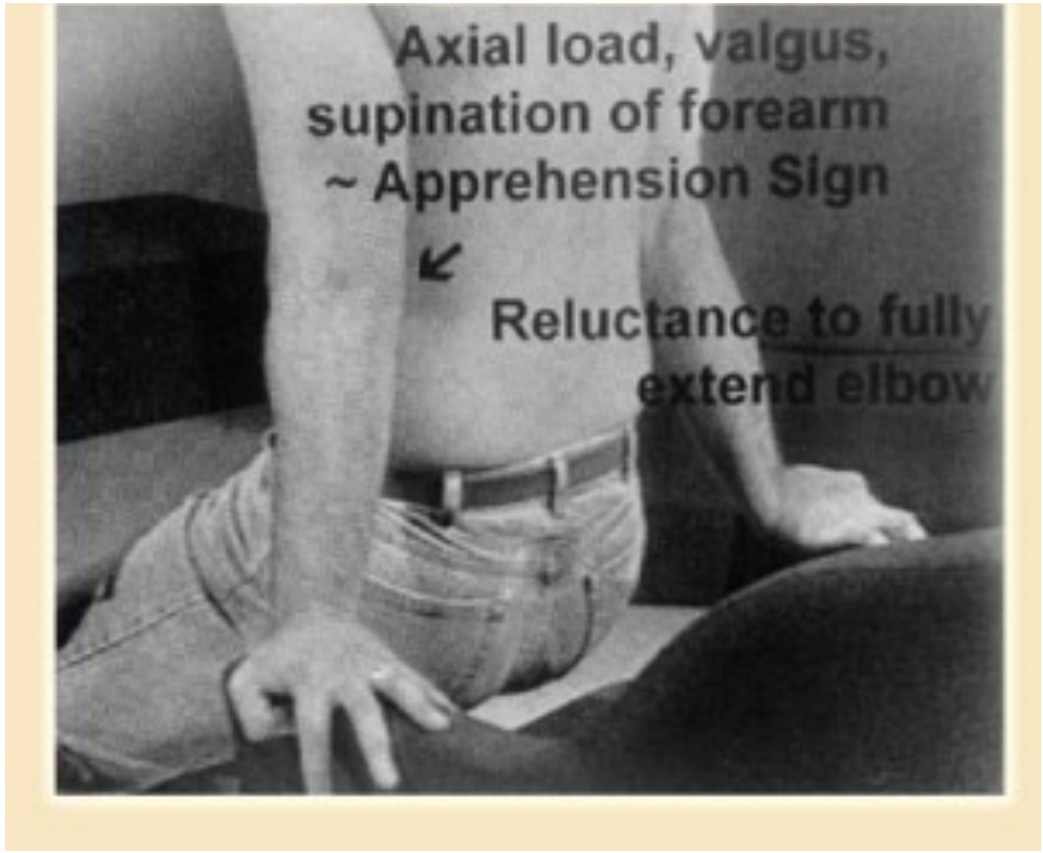
Exam:

- Apprehension sign
  - Pushing up/rising up from a chair with forearm in supination



https://orthopaedicsports.com/2015/04/21/the-popping-elbow-unstable-elbow-elbow-posterolateral-instability/

Elbow: Posterolateral rotatory instability

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Exam:

- Lateral pivot shift
  - Think ACL

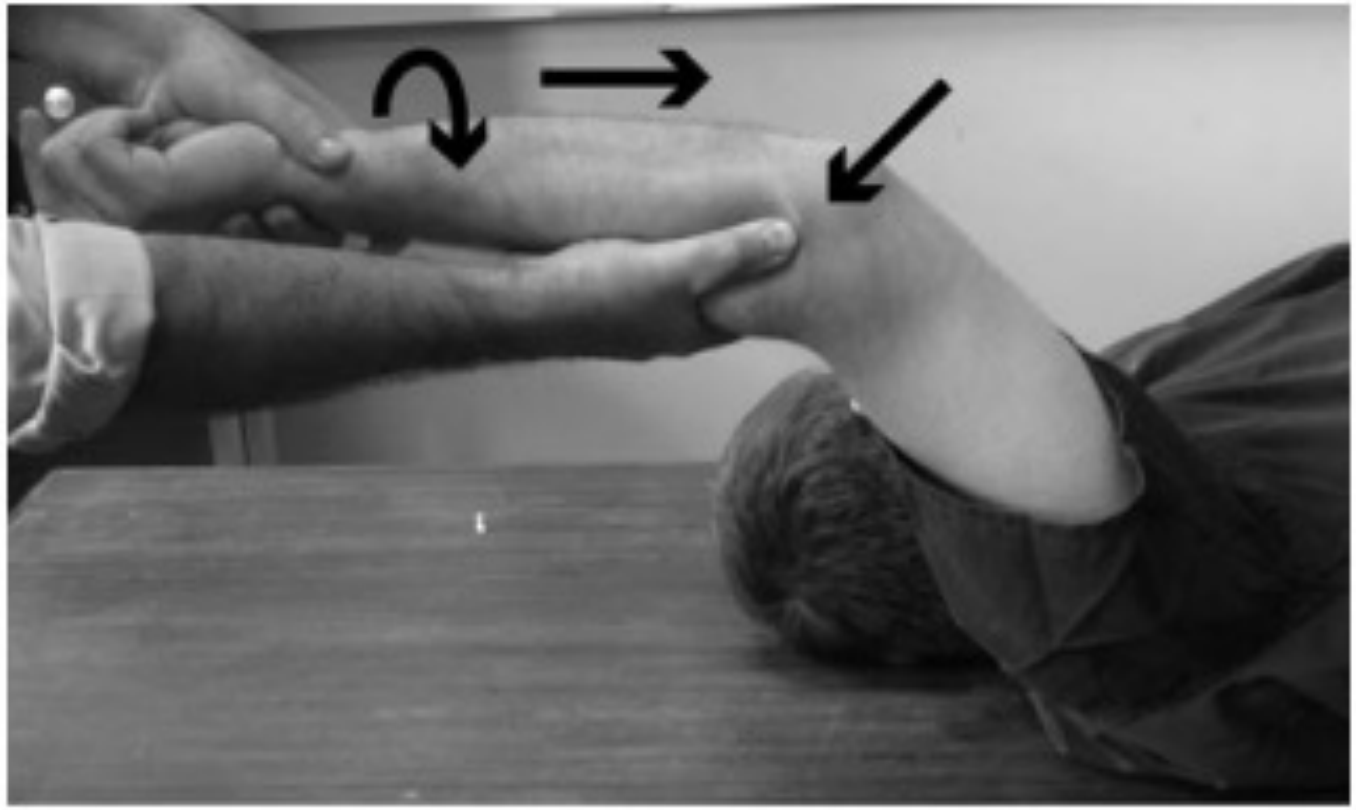

Fig. 2

Photograph showing the lateral pivot-shift test.[1] Application of external rotation, valgus and axial loading to the elbow causes apprehension or radial head subluxation/dislocation.

Charalambous, Stanley, *Posterolateral rotatory instability of the elbow,* JBJS (Br) 2010

Elbow: Posterolateral rotatory instability

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Exam:

- Table top relocation test
  - Think ‘relocation sign’ for a shoulder

Fig. 3a

Fig. 3b

Photographs showing the table-top relocation test.[35] a) A press-up on the edge of a table with the forearm in supination causes apprehension if instability is present. b) The examiner’s thumb pressing on the radial head prevents displacement and relieves apprehension.

Charalambous, Stanley, *Posterolateral rotatory instability of the elbow,* JBJS (Br) 2010

Elbow: Posterolateral rotatory instability

Treatment:

- Symptom severity dependent
- Initial: Avoid provocative maneuvers
- Surgery: LCL reconstruction
  - Overall successful outcomes

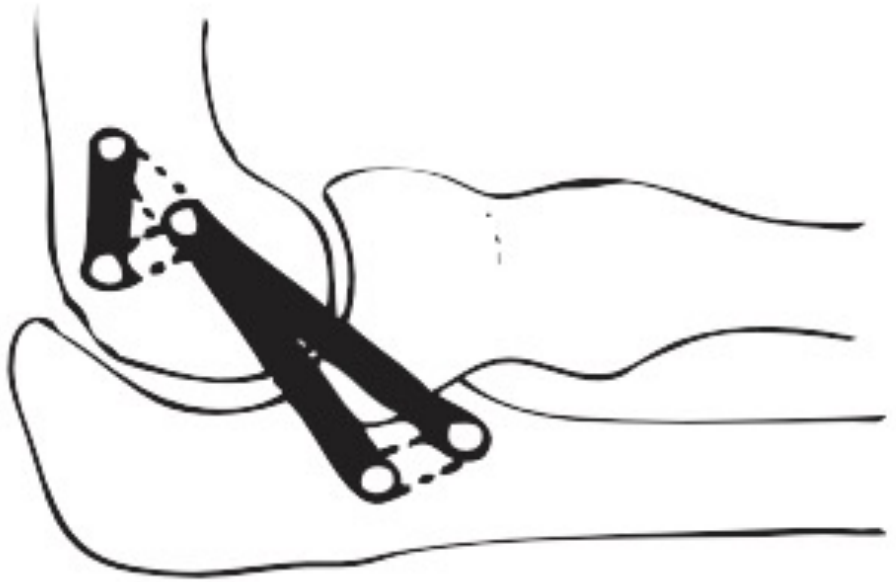

Fig. 6

Diagram showing lateral ligament reconstruction using ulnar and humeral drill holes and bone tunnels.

Charalambous, Stanley, *Posterolateral rotatory instability of the elbow,* JBJS (Br) 2010

Thank you!

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