

# Management of common elbow issues

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KAISER PERMANENTE SPORTS MEDICINE

PRIMARY CARE HAWAII CONFERENCE

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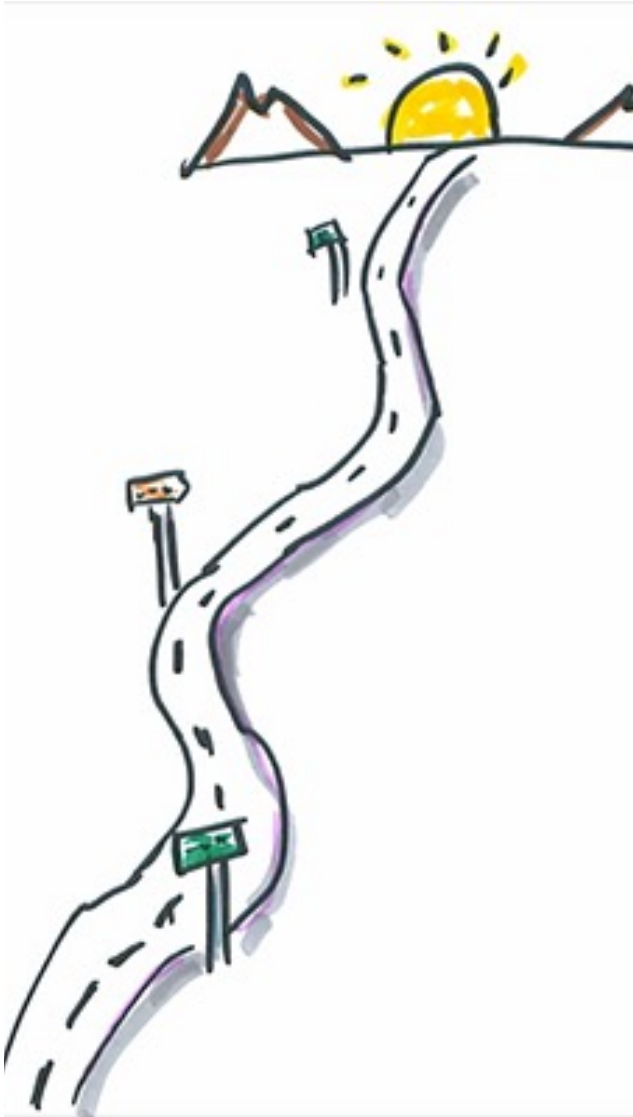


# 2023 Napa Primary Care Conference



Nothing to disclose

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# Roadmap

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Distal biceps tendon

Lateral epicondylitis

Medial epicondylitis

Valgus overload syndrome

UCL

Elbow effusion

Olecranon bursitis

# Case #1

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48 yo M, out walking his dog, felt a pop, cramp like pain in the biceps, swelling in the medial elbow

Distal Biceps Tendon Injury

Incidence 2.55/100k

RISK FACTORS:

Smoker (7.5x)

Dominant arm (86%)

Ave age 47

male (13:1)



Am J Sports Med. 2015;43(8):2012–7

# Is the distal biceps tendon torn?

Pain and weakness with resisted supination.

“hook” test

- Sensitivity 83% for complete tears, 30% partial
- intact lacertus fibrosis (bicipital aponeurosis) can give false negative

TILT test

Flexion initiation test

Biceps provocation



“Reverse Popeye”

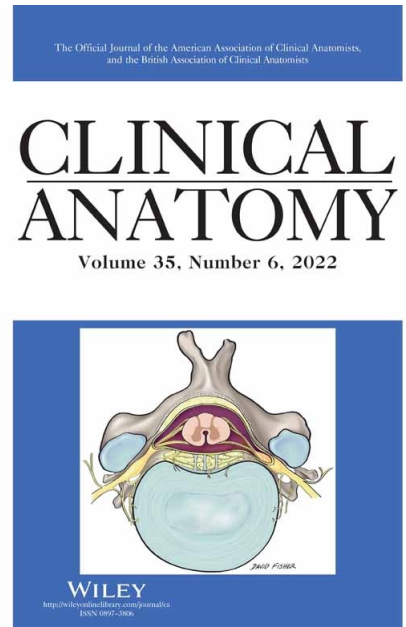
# “TILT” test

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Elbow flexed 90 deg

(+) test = tenderness with palpation over the radial tuberosity with passive supination and pronation

Sensitivity 100% for DBT tears



Shim SS, Clin Anat. 2018;31(2):301



# Flexion Initiation Test

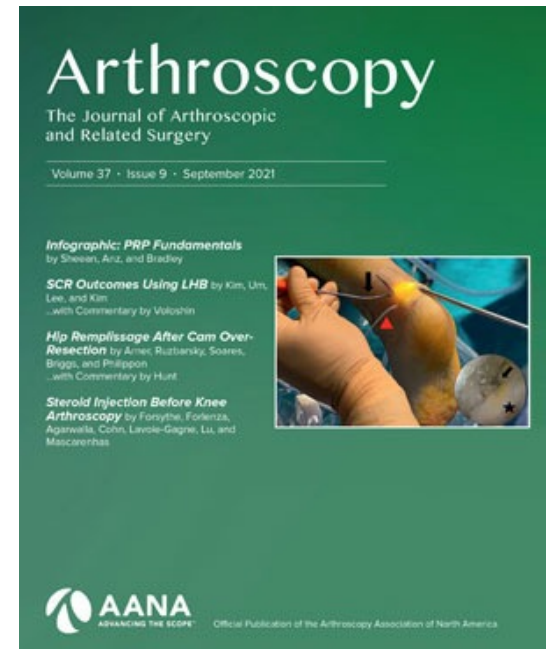
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Retrospective study of 125  
consecutive patients

sensitivity = 93%

specificity = 96%

100% sensitive for complete and  
surgical partial thickness DBT tears  
when combined with positive hook  
test.



Bono OJ, et al. Arthrosc Sports Med Rehabil.  
2021;3(3):e721.

# Biceps Provocation Test

20 consecutive patients with partial DBT tears

Resisted flexion at 70° with the forearm supinated vs pronated

Sensitivity = 98% when combined with a positive hook test

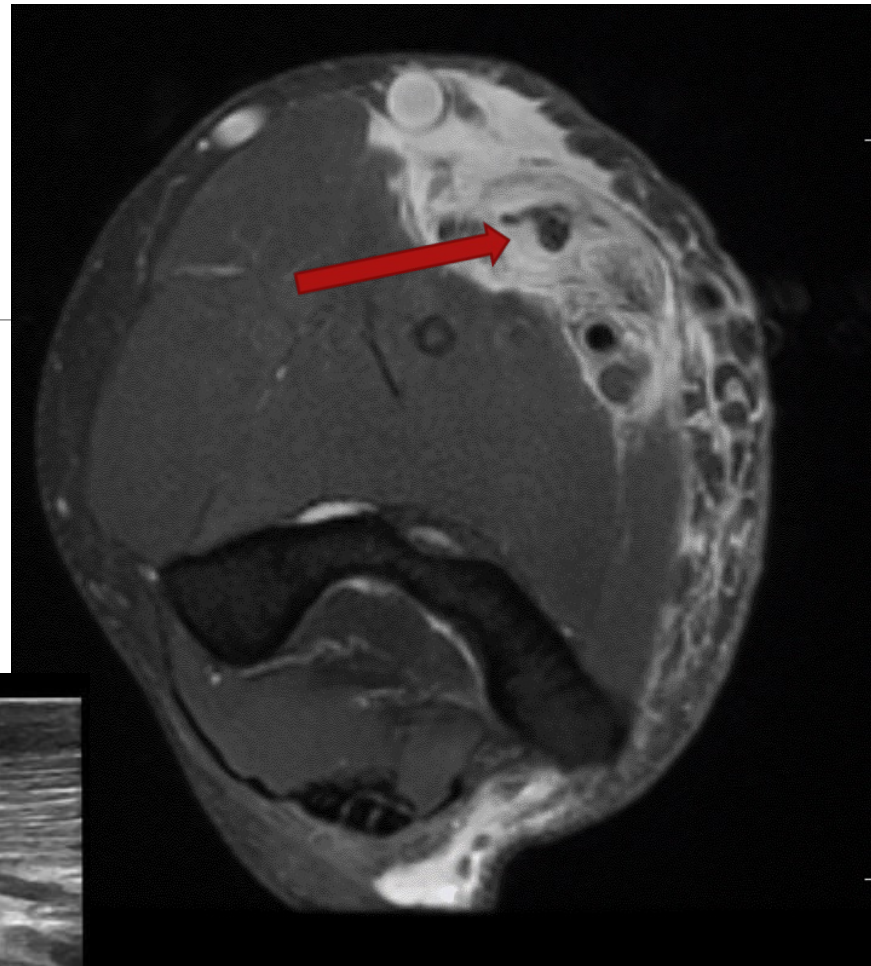


Caekebeke, J Shoulder Elbow Surg. 2022 Mar;31(3):532-536



# Early imaging is warranted

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# Bottom Line:

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## Distal Biceps Tendon tear

- High index of suspicion
- Early imaging
- Early surgical referral



# Does every distal biceps tendon need repair?

- Retrospective review compared to historical control group
- 18 patients, 20 arms
- 16 males, median age 50yo
- 30% reduction in supination and no difference in flexion vs repair group



Freeman CR, J Bone Joint Surg 2009;91(10):2329.

# What about partial tear distal biceps tendon?

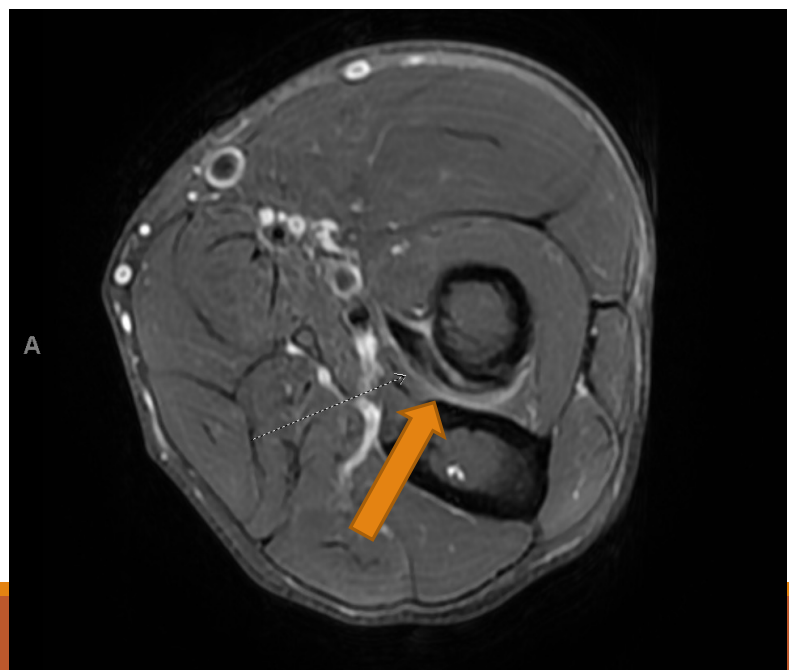
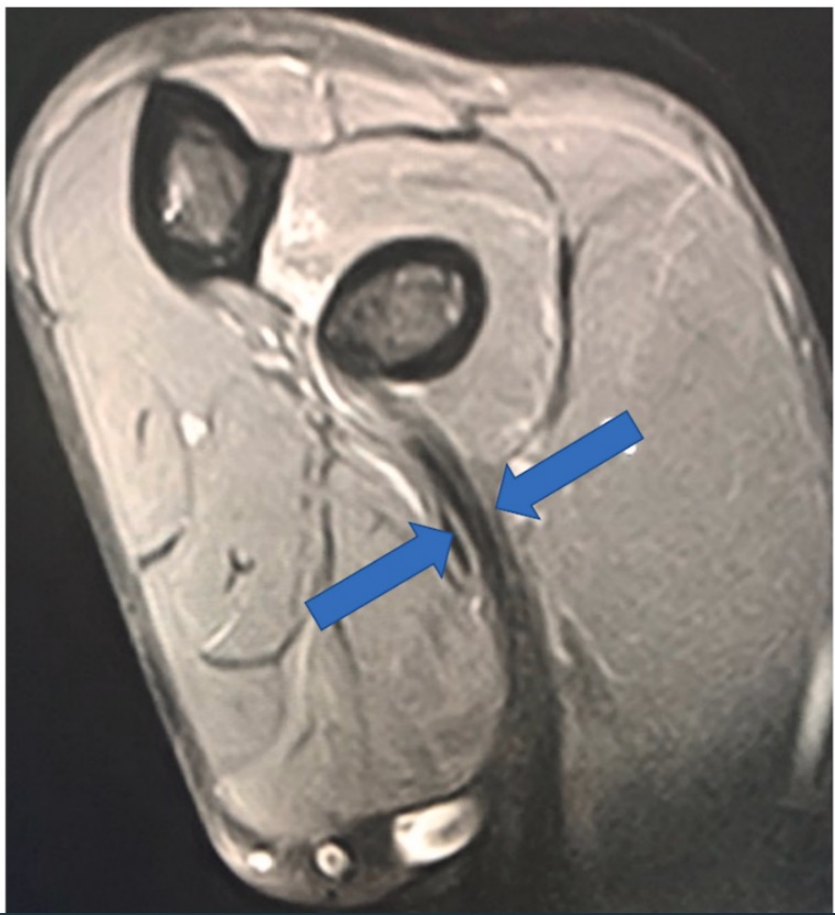
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## >50% tear

- 2/3 fail conservative care (high use patients have better surgical outcomes)
- Early and delayed surgery have same outcomes

## <50% tear

- paucity of literature on rest, load management strategies
- Avoid terminal pronation in an extended arm



Flexion, abduction, supinated position (FABS) MRI protocol

# What about distal biceps tendinopathy?

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- Prevalence, natural history, and the treatment methods are not well studied.
- Gradual onset of similar but less pronounced weakness and disability
- Case Series
  - 21 patients, age 39-69 mean(57), 14 M, 7 F. mean duration 5 mo (0.2-14 mo)
  - 4 improved with splinting, 12 had USG csi. 5 went on to surgery
- PRP? Prolotherapy?

Kelly, Am J Sports Med. 2015;43(8):2012–7)  
Lee, Clin Shoulder Elb. 2018 Dec; 21(4): 213–219  
Acta Ortho Trauma. 2018 Jul;52(4):323-325



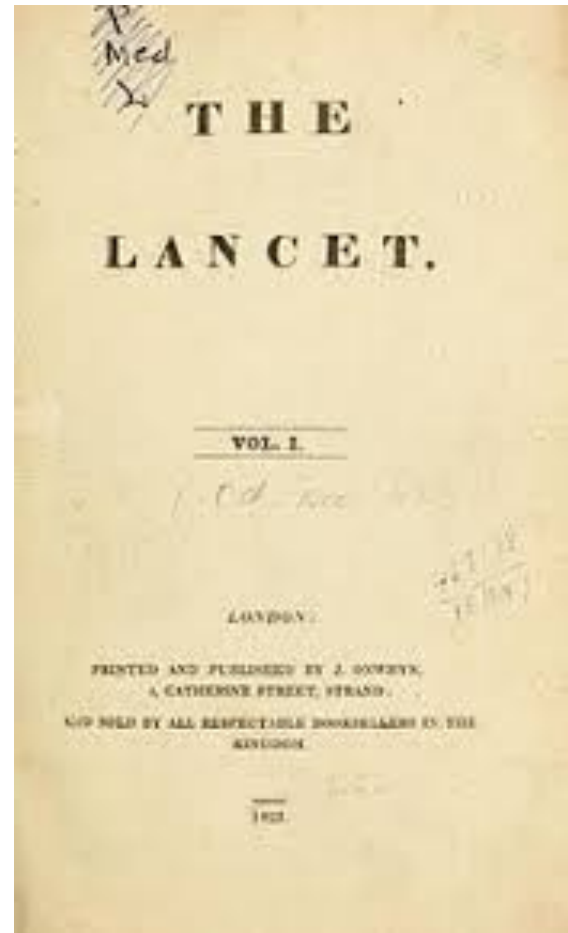


## Case #2

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45 yo F with lateral elbow pain for 3 months. Focally located to lateral epicondyle, tender to palpation, hurts to take milk out of fridge/open jar. She works as an artist with a variety of mediums. Does not play tennis.





# “Lawn Tennis Arm”

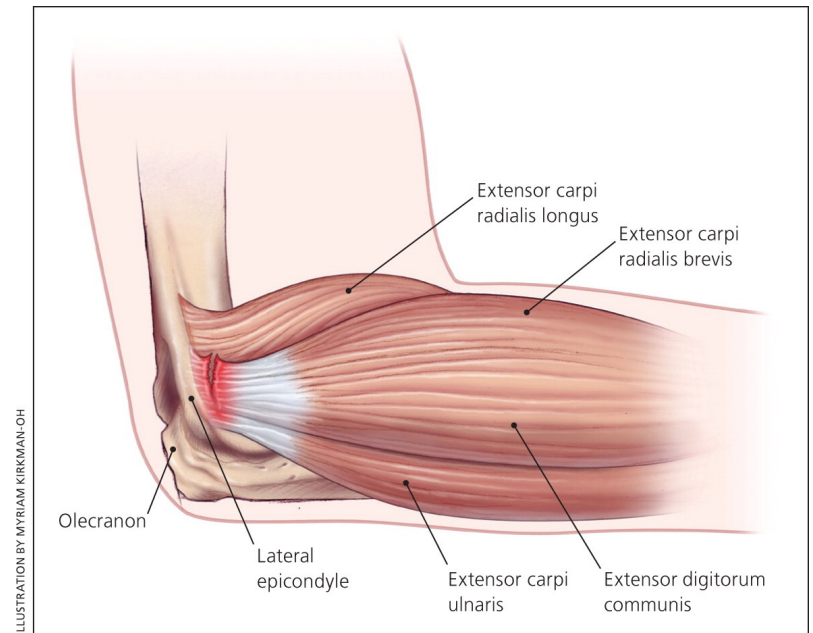
Henry Morris, *The Lancet*, 1883

# Lateral epicondylitis

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Classically the extensor carpi radialis brevis muscle (ECRB)

- occasionally, the extensor digitorum communis muscle (EDC)



# Lateral epicondylitis: “Mid-life crises of a tendon”

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Incidence in general population of 1-3%.

Risk factors:

- Smoking
- age 45-55,
- repetitive movement > 2 hrs/day,
- managing loads over 20kg.



Luk JK. Hong Kong Med J. 2014 Apr;20(2):145-51

# “Tennis” Elbow

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In tennis players,

- 40% have reported current or previous problems with their elbow.
- Women = men incidence but tends to be more disabling/severe

Increased risk with >2hrs/day or >6hrs/week

- 2x increased risk over age 40
- 3.5x risk <40



# “Tennis” elbow

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## Skill level matters-

- There is a 50 percent lifetime incidence of elbow injury among club players 30 years or older
- Only one case in 700 players over 3 years at French Open



Skill level related injuries in Competition Tennis Players. Jayanthi NA, Sallay P, Hunker P. Med Sci Tennis. 2005; 10:12

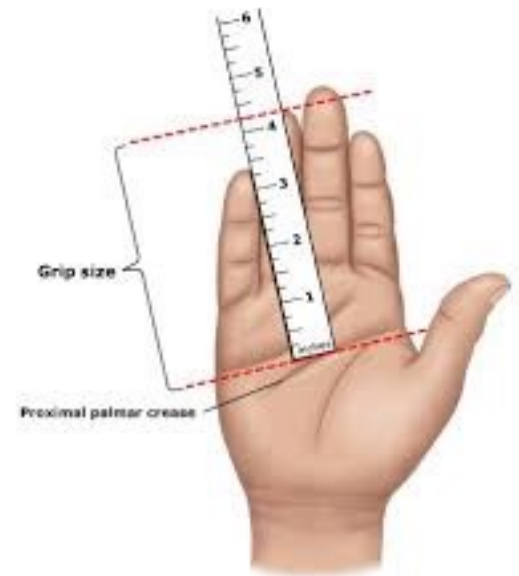
# If skill matters, is there an identifiable biomechanical issue?

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Grip? tension? too big racquet? Technique?

- Dampening “gummies” no help.

Variations in tennis racket grip size do not alter the forearm muscle firing patterns of one-handed backhands



# Lateral epicondylitis examination

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Localized tenderness over the lateral epicondyle ('one finger sign')

Pain with passive terminal wrist flexion with the elbow in full extension

Pain with resisted wrist extension with the elbow in full extension and/or with elbow in 90 deg flexion.

VIDEO EXAM : The "book test" or "chair test" reproduces pain at the lateral epicondyle

**Clinical pearl** – pure lateral epicondylitis does not cause lost ROM or an effusion



# Treatment: Lateral Epicondylitis

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The natural history of symptoms associated with lateral epicondylitis for most patients is ***resolution in six months to two years.***

Relapse is common (25% to 50%)

# Principles of physical therapy: Eccentric exercise

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slow, controlled, progressive exercise  
using relatively heavy loads(as  
tolerated) focused on eccentric  
motion



Martinez-Silvestrini JA, et al. J Hand Ther. 2005;18(4):411  
Svernlöv B, Adolfsson L. Scand J Med Sci Sports. 2001;11(6):328.

# “I did PT and it didn’t help”

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- Patience and persistence – tendinopathies take a long time to heal
- A little bit regularly is better than a lot infrequently
- Alternate therapy strategies

# Should you prescribe a counter-force brace?

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Bracing may reduce tendon and muscle strain at the origin of the forearm extensor muscles

No significant differences in clinical outcomes at 26 and 52 weeks

**BOTTOM LINE:** Use it if it seems to help.



Van De Streek. Prosthet Orthot Int. 2004;28(2):183  
Dereberv VJ, et al. Arch Phys Med Rehabil.  
2005;86(6):1081

# What about adding a wrist splint?

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Small RCT: splinting less effective than counterforce bracing

Retrospective cohort study

- 243 clinics, 4614 workers diagnosed with epicondylitis
- patients treated with splints had higher rates of limited duty, more medical visits, higher charges, and longer durations of treatment than those managed without splints.



Van De Streek, MD, et al, Prosther Orthot Int. 2004;28(2):183  
Derebrev VJ, et al. Arch Phys Med Rehabil. 2005;86(6):1081

# Still not getting better. What next?

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## **Suggested treatments for lateral epicondylitis**

Topical glycerol trinitrate

Prolotherapy

Dry needling

PRP/whole blood

Acupuncture

Botulinum toxin

ESWT

“cold” Laser therapy



# Should you inject corticosteroids?

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Short term (6 weeks) improvement in outcome measures

High recurrence rate at one year, possible worse long-term outcomes

## Considerations

- Injection = iontophoresis
- 'peppering' technique more effective



Olaussen M, et al. BMJ Open. 2013;3(10)



# Oops....

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Serial saline solution injections can improve lipoatrophy and depigmentation after corticosteroid injection for medial epicondylitis



# Is there something else we can inject?

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## Platelet-Rich Plasma (PRP)

- It works!
  - Arirachakaran A, J Orthop Traumatol. 2016;17(2):101
- Forget about it!
  - Karjalainen TV, Cochrane Database Syst Rev. 2021
- It hurts!
  - For the placebo enthusiasts



# What if I don't have a centrifuge?

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Autologous whole blood vs PRP in treatment of lateral epicondylitis

- comparable improvements in pain scores
- (no studies included placebo arm)



# Can we “turn on” the fibroblasts?

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## Topical glyceryl trinitrate application

- 86 patients, RCT vs PT alone, clinical improvement at 6 mo (80% vs 60%)
- ¼ disc, continuous, can cause headache

## Prolotherapy

- Small RCT suggest may be effective

## Extracorporeal shock wave therapy

- Limited evidence of benefit
- Can be uncomfortable

Bottom Line:

All about 80% effect

Level of Evidence C

Paoloni. Am J Sports Med. 2003;31(6):915.  
Scarpone. Clin J Sport Med. 2008;18(3):248  
Dingemanse. Br J Sports Med. 2014 Jun;48(12):957-965

# Can we mimic surgical debridement?

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## Percutaneous ultrasonic debridement

- 20 patients, 36 mo fu, 100% 'satisfaction', 80% US resolution

Sounds great but I only have this needle....

## Percutaneous needle tenotomy

- fenestrate tendon, calcifications, cause bleeding.
- Typically US guided
- 55 consecutive patients with chronic LE, 80% clinically improved at 2 year f/u. No complications.
- Cochrane LOE III



Seng C, et al. Am J Sports Med. 2016;44(2):504.  
McShane, J Ultrasound Med. 2006;25(10):1281  
Mattie, PMR. 2017;9(6):603.

# Still not getting better? Broaden the differential

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Cervical radiculopathy

Compressive neuropathy

Seronegative spondyloarthritides

Myofascial pain

Intra-articular source



# Radial nerve entrapment

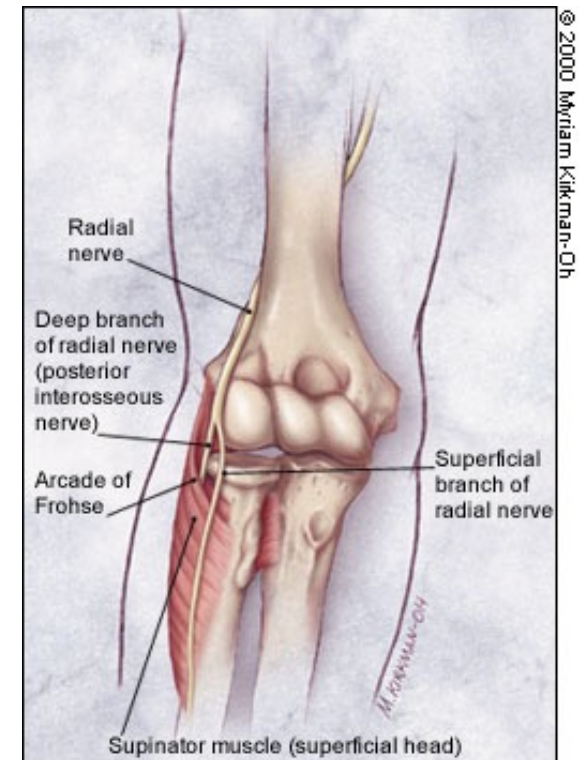
posterior interosseous nerve as passes under supinator

- Repetitive forearm supination and pronation
- Ganglion cyst

point of maximal tenderness usually distal to lateral epicondyle

Piano key or middle finger test

Often need diagnostic injection



# When to refer to surgery?

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Indications for surgical referral:

- Failure of conservative management after six months
- Severe pain or dysfunction (acute tear)





# My Approach

Acute or chronic? Modifiable risk factor?

Severity or Morbidity/effect on IADLs? (coffee cup or milk jug?)

Tendon appearance?

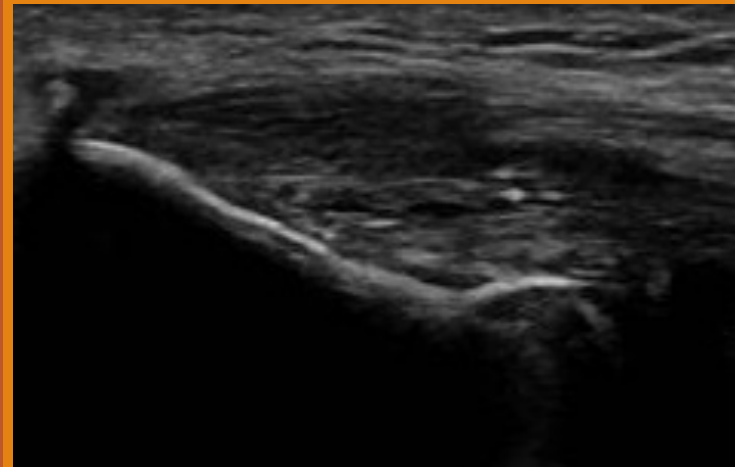
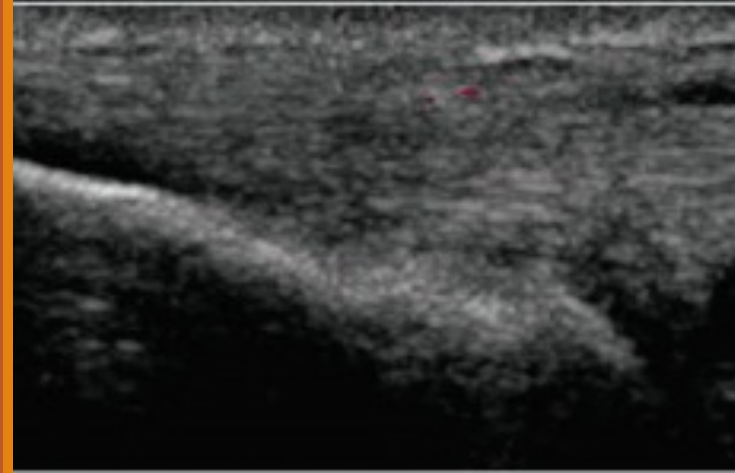
Everyone gets PT x 8 weeks.

“palm up”

Inject corticosteroid? If needed for IADLs or to do PT  
+/- on bracing

Mechanical stimulate? If degenerative (acupuncture, NTG)

“Biologics”? If advanced degenerative or FTI



# “Golfer’s” elbow

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## Medial epicondylitis

- 1/3 as common as LE
- 90 percent non-sports related (usually occupational)
- Incidence 3.8-8.2% of manual labor workers
- 45- to 64yo, F>M, 75% dominant arm.

## Among golfers,

- 3x more common in amateur than pro
- LE > ME (ratio of 5:1)



# Medial Epicondylitis

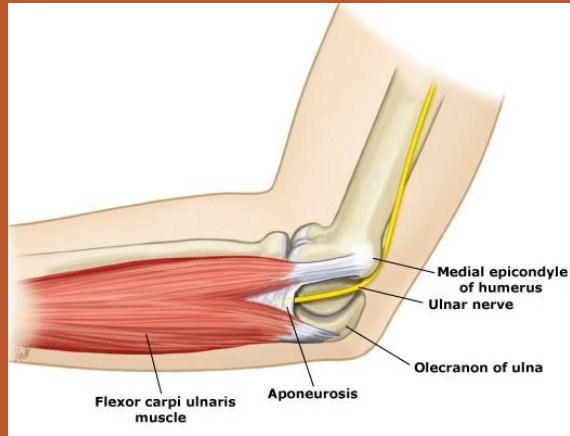
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Injury to the pronator teres and flexor carpi radialis muscles

## Exam

- Localized tenderness over the medial epicondyle
- Pain with resisted wrist flexion with the elbow in full extension
- Pain with passive terminal wrist extension with the elbow in full extension.
- **May see lost ROM or ulnar neuropathy**

Treatment algorithm similar to lateral epicondylitis



What if they  
are having  
ulnar nerve  
symptoms?

Direct trauma

Repetitive traction

- Exaggerated valgus from medial instability of the elbow

Prolonged elbow hyperflexion

External compression

- Anconeus or triceps muscle

Friction from ulnar nerve subluxation

- Normal finding in 16 percent of the general population)

C8 nerve root radiculopathy

# Cubital tunnel syndrome: “ulnar neuropathy at the elbow”

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Annual incidence 25 cases/100k person years, M>F 2:1

No provocative tests have good sensitivity or specificity

Ulnar nerve sensory deficit

Loss of dexterity due to ulnar neuropathy is usually indicative of weakness of the intrinsic hand muscles (median nerve injury loss of dexterity is most often related to sensory loss).

- Froment sign, key pinch manometry
- Index finger abduction

# Treatment for ulnar neuropathy at the elbow

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Activity modification

Avoid sitting with flexed elbow

Padding on armrest

Night splint



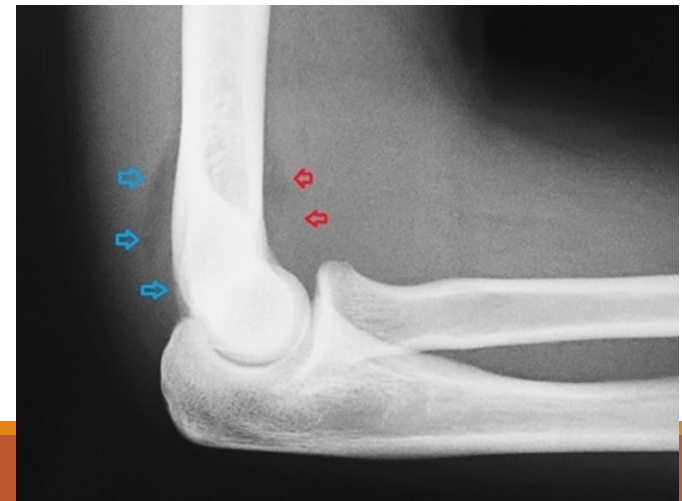
# What if there is an effusion?

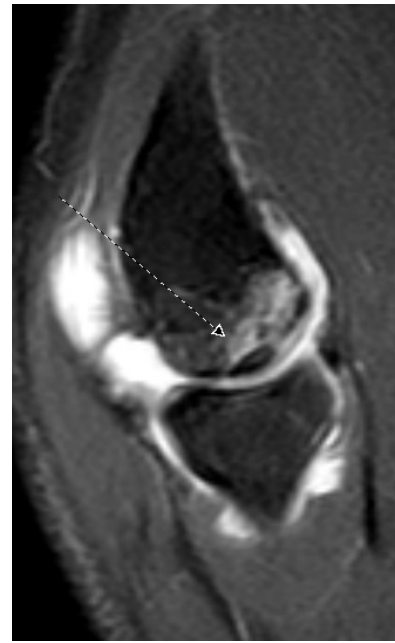
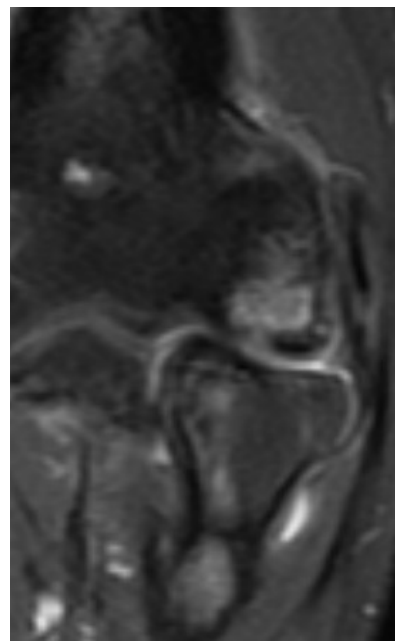
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## Think Intra-articular pathology

- osteoarthritis
- osteochondral defect
- loose body
- fracture
- Rheumatologic
- septic

VIDEO EXAM PEARL: A full ROM generally excludes an intra-articular process as the cause of the elbow pain





15 yo baseball player with elbow effusion



# Elbow aspiration/injection

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# Olecranon bursitis

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**Video pearl** – retained elbow ROM (vs effusion)

Value in ultrasound for staging/triage



# Olecranon bursitis: To drain or not to drain?

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## Diagnosis:

### Concern for septic bursitis

- Physical exam findings alone = 77% sensitivity
- >3-10k WBC (> 50% PMNs). No predictive value for glucose, protein, complement levels
- Most commonly transcutaneous *s.aureus*

### Dx crystal arthropathy

- Most common bursa affected
- > 1k WBC

## Treatment:

### Acute traumatic

Corticosteroid injection may help but relative high risk of complications

- Consider lateral approach

### Sclerotherapy

Kennedy. Clinical Orthopedics and Related Research, 2016, 474(3): 784-786  
Weinstein. Annals Rheum Dis, 1984, 43: 44-46  
Orr. Am Soc Inter Pain Phys. 2021 Aug, 5(6):301-4  
Blackwell, Shoulder Elbow. 2014 Jul; 6(3): 182–190.Olecranon bursitis: a systematic overview



## Case #3

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20 yo collegiate baseball player with medial elbow pain. Has lost his velocity and location. Pain is maximally at cocking phase.

# Ulnar collateral ligament injury

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## Moving stress test

- Pain between 70-120 deg

## “Milk” test

- **Video Pearl:** Can be self-preformed

## Valgus extension overload (“bounce”) test

## MRI +/- contrast

## Dynamic MSK ultrasound

**Treatment:** recognize early (pre-injury?), institute early relative rest for weeks to months.



*Ulnar collateral ligament injury in the elbow: current trends for treatment*

Smith, Bernholt. AOJ. Volume 5 (April 2020)

# Who ends up with Tommy John surgery?

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Risk factors for injury requiring surgery in young pitchers (<18yo):

- Throwing frequently when arm was fatigued (odds ratio = 36)
- Throwing more than 80 pitches per appearance (OR = 4.0)
- Pitching for more than eight months per year (OR = 5.0)
- Fast ball faster than 85 mph (OR = 3)

**Don't throw when you're tired**

**Take 3 months off a year**

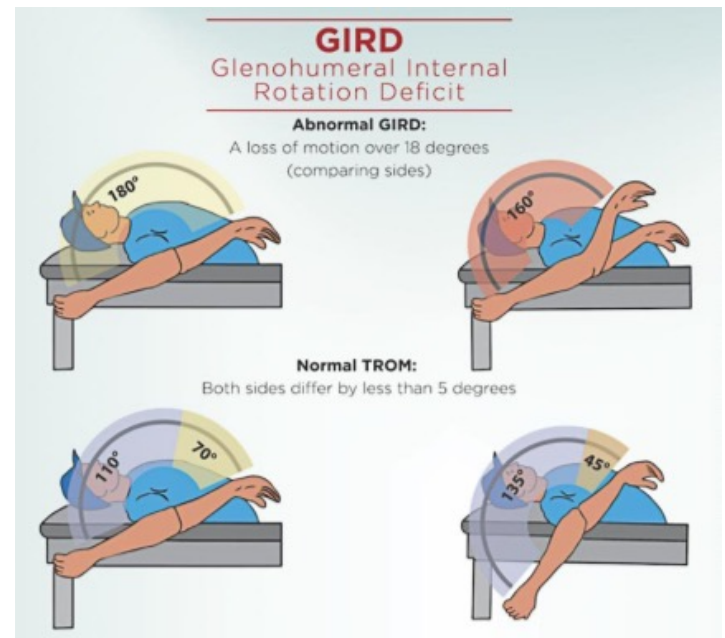
**NO SPEED GUN**



# Is the problem really the elbow?

Don't forget to look at rest of the kinetic chain

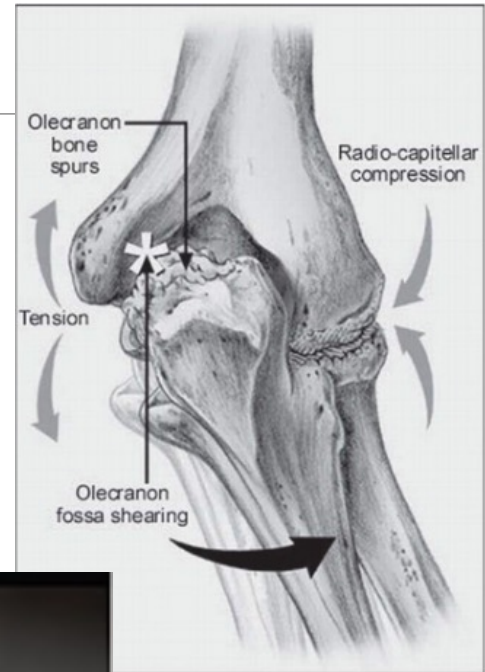
- GIRD
- Lower extremity weakness/imbalance



# Posterior elbow pain in an older overhead athlete?

Valgus extension overload (VEO) syndrome —

- SX: pain in the posterior elbow when the ball is released.
- Cause: excessive valgus force, eg  $\frac{3}{4}$  slot or UCL laxity
- Exam:
  - “Bounce test”
  - There may be some loss of terminal extension.
- Plain radiographs may show osteophytes or loose bodies





# Summary

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- High index of suspicion and prompt referral for distal bicep tendon FT and high grade PT tears
- Lateral epicondylitis natural history resolution in 1-2 years but can improve with eccentric PT and other treatment modalities
- Acquired flexion contracture and ulnar neuritis can occur with medial elbow strain but an effusion should prompt evaluation for intra-articular pathology
- Aspiration of joint or olecranon bursitis may be part of evaluation and treatment
- Institute early and prolonged relative rest for medial elbow pain in overhead athletes

# TSUNAMI

## EVACUATION INSTRUCTIONS



**GRAB THE BEER**  
**RUN LIKE HELL**  
PUAKO, HAWAII

Questions?

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