

Most Educational Forearm & Hand Workers' Comp Cases of the Year

Chairperson: Karen Mattie PT, DPT

Tuesday, March 24th, 2026

1:15-2:05pm

Dr. Andy Stein, MD

Dr. Hervey Kimball, MD

Dr. Gabriel Merlin, MD

Rosanne Wescott, RN, BSN, MA

Leslie Giroux

Learning Objectives

- 1) To understand the Natural history of united scaphoid fracture and review surgical vs. non-surgical management as reviewed in Case 1.
- 2) To understand the complexities of distal bicep tendon injuries and surgical management
- 3) To identify how ultrasound in hand surgery can get patients back to work faster

Case 1: Scaphoid fracture management

Andrew B. Stein, M.D.

Boston University Medical Center

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None

Disclosures

33M presents with
wrist pain 2 wks
after snapping a
shovel while digging
at work





- POINTING OF RADIAL STYLOID
- NO CARPAL MALALIGNMENT
- NO MRI EVIDENCE OF AVN

SCAPHOID WAIST NON-UNION
EARLY OA, NO COLLAPSE DEFORMITY



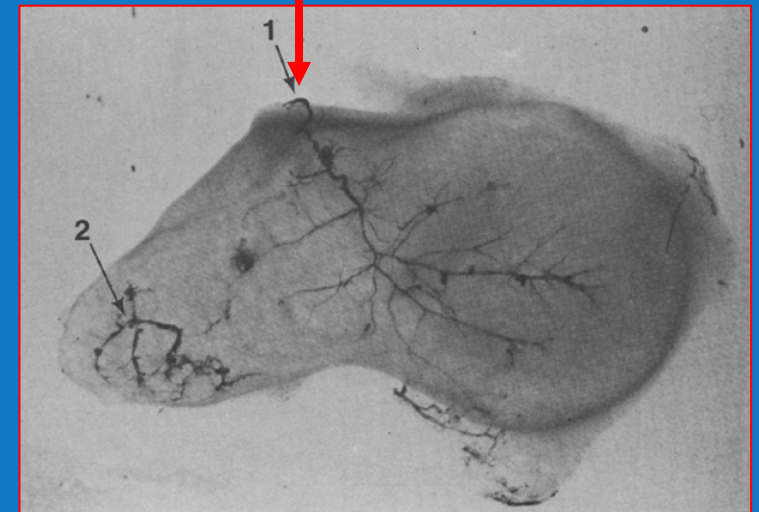
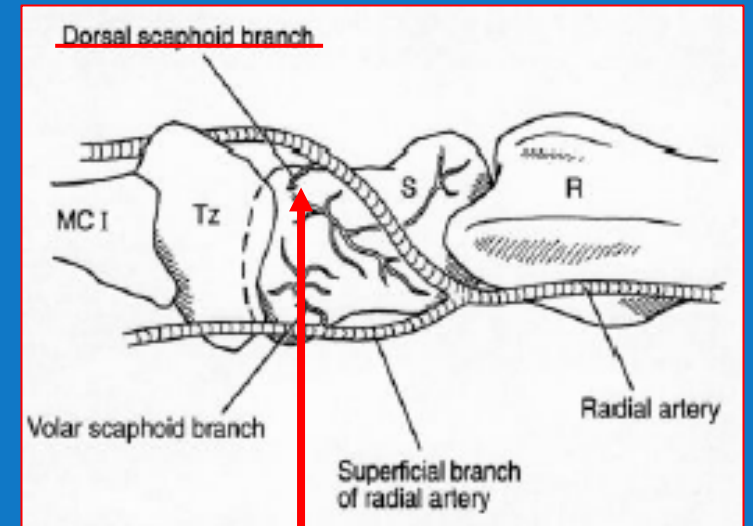
SNAC=SLAC

THE NATURAL HISTORY OF SCAPHOID NON-UNION OR
UNTREATED SCAPHOLUNATE DISSOCIATION IS ARTHRITIS

Scaphoid

- Most common (90%) carpal bone fracture (65% involve waist)
- Fracture of active, young patients
- Overlooked, misdiagnosed
- Potential for significant morbidity
 - Predisposed to non-union & AVN

Limited Blood Supply



Surgery versus cast immobilisation for adults with a bicortical fracture of the scaphoid waist (SWIFFT): a pragmatic, multicentre, open-label, randomised superiority trial

Lancet 2020;396:390-401

- No difference in any outcomes at 52 wks. & 5 yrs
- Non-union rates: 2.1% surg, 3.3% cast
- While earlier surgical fixation *may* allow quicker RTW in short term (5wks vs 6 wks - Dias 2005)
- Comes at higher cost of serious complications (14% surg vs. 1% cast) and direct healthcare costs

Surgery versus cast immobilisation for adults with a bicortical fracture of the scaphoid waist (SWIFFT): a pragmatic, multicentre, open-label, randomised superiority trial

Lancet 2020;396:390-401

Interpretation Adult patients with scaphoid waist fracture displaced by 2mm or less should have initial cast immobilization, and any suspected non-unions should be confirmed and immediately fixed with surgery. This treatment strategy will help avoid the risks of surgery and mostly limit the use of surgery to fixing fractures that fail to unite.

A Cost/Utility Analysis of Open Reduction and Internal Fixation versus Cast Immobilization for Acute Nondisplaced Mid-Waist Scaphoid Fractures

**“There are lies,
damned lies
and statistics”**

Surgical Indications

- Displacement (>2mm)
 - limited high quality evidence
- Pts unable to tolerate a cast
- Delay in diagnosis (>1 mo.)
- Failure to heal in cast
 - No signs healing at 6-8 wks.
- Proximal Pole Fracture





Back to this patient:
ORIF w/local bone graft & styloidectomy



POST-OP X-RAYS

DISCUSSION

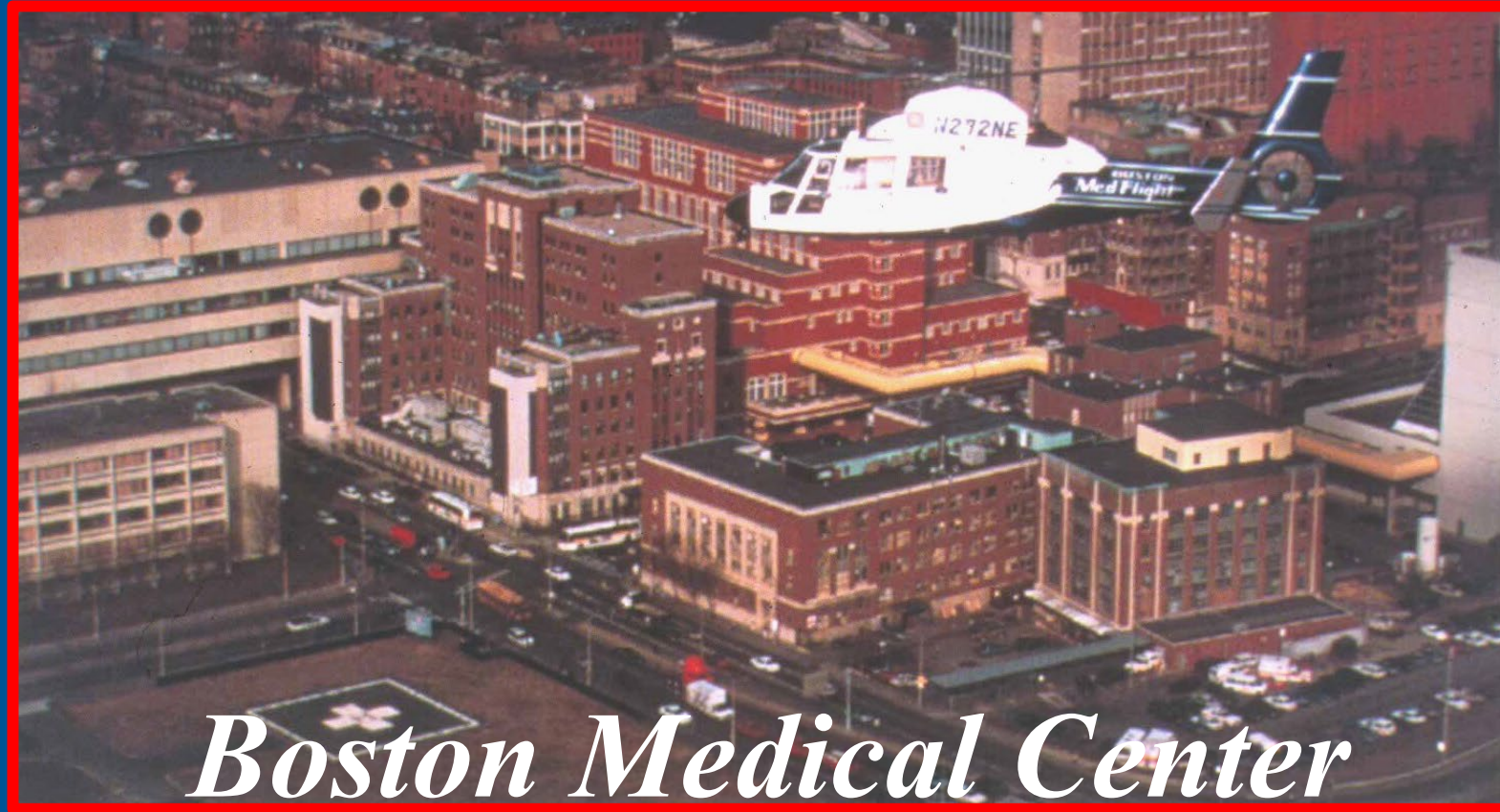
Natural history of united scaphoid fracture is arthritis

Most acute injuries can be managed non-operatively

- Delay in diagnosis or non-union necessitates surgery

2026
WORK RELATED
Injuries Workshop

Thank you!



Boston Medical Center

Case 2: Distal Biceps Tendon Injuries

Hervey L. Kimball MD, MS

Chief Hand Surgery New England Baptist Hospital

Assistant Clinical Professor Tuft's Medical Center

Boston Bone & Joint Institute

No Disclosures

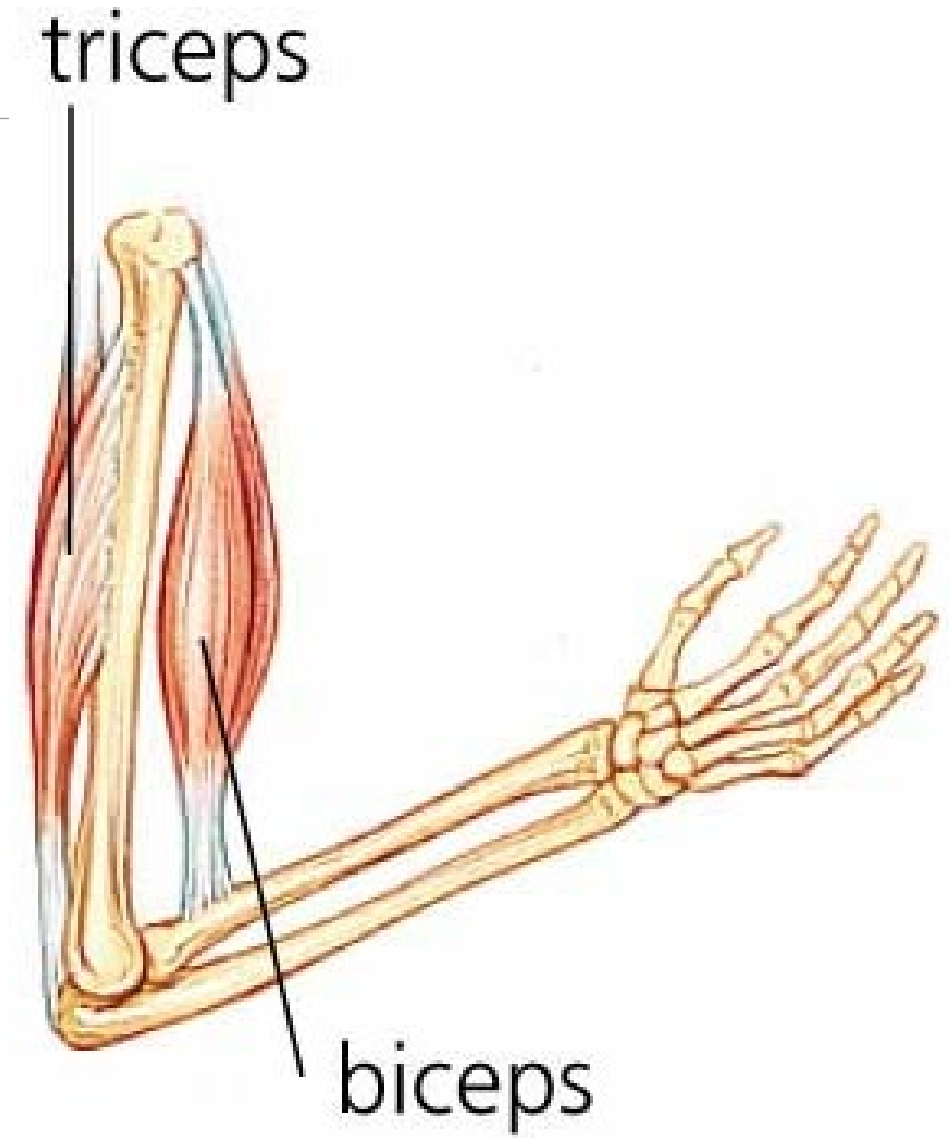
Anatomy

Bipennate muscle

Anterior arm

Proximal:

- Long head - glenoid
- Short head - corocoid



Anatomy

Bipennate muscle

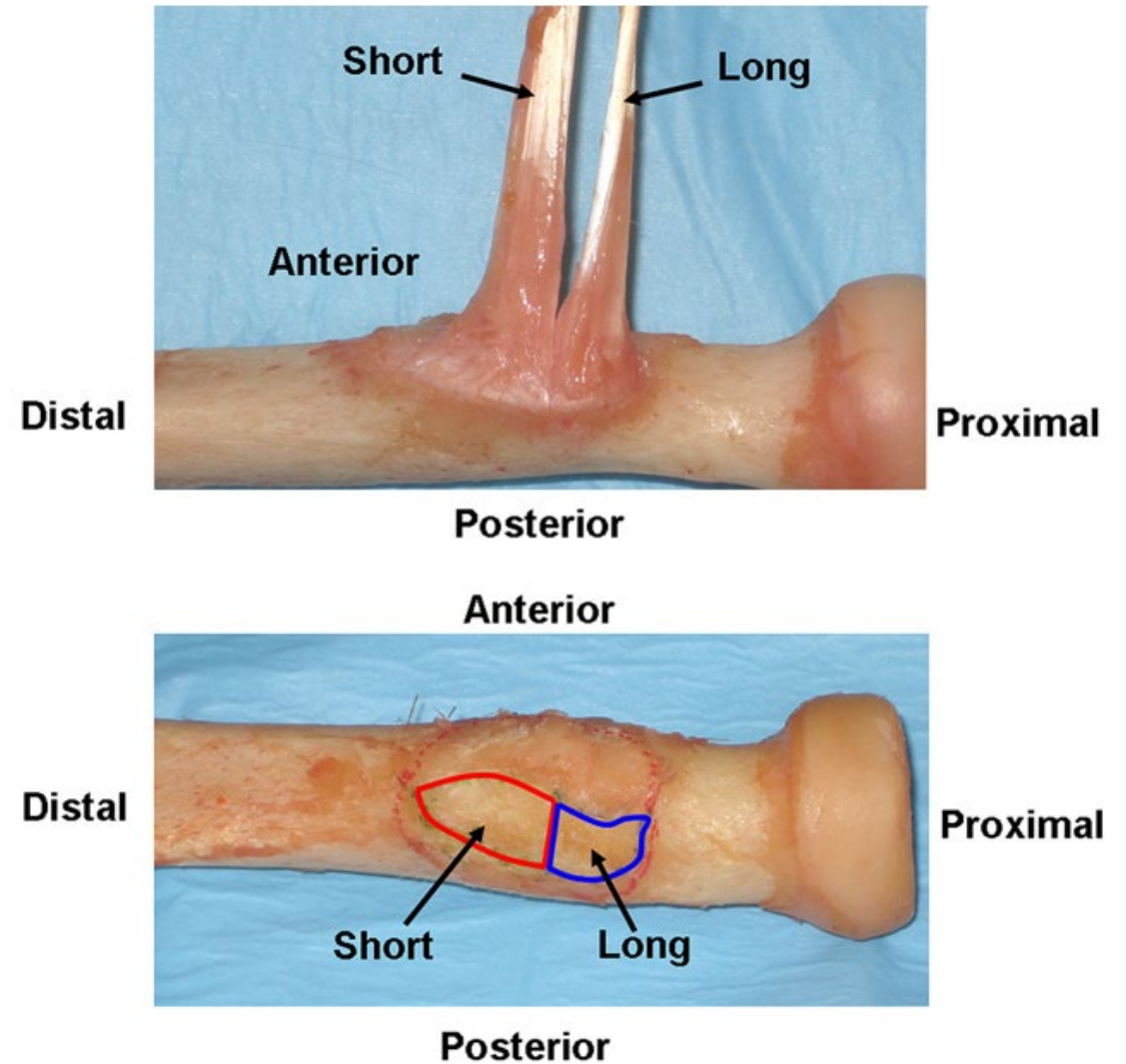
Anterior arm

Proximal:

- Long head - glenoid
- Short head - corocoid

Distal:

- Radial tuberosity



Examination

Muscle retraction with tear

Hook test

Painful resisted motion

- Supination
- Elbow Flexion

Normal hook test:
Biceps tendon is intact



Examination

Muscle retraction with tear

Hook test

Painful resisted motion

- Supination
- Elbow Flexion



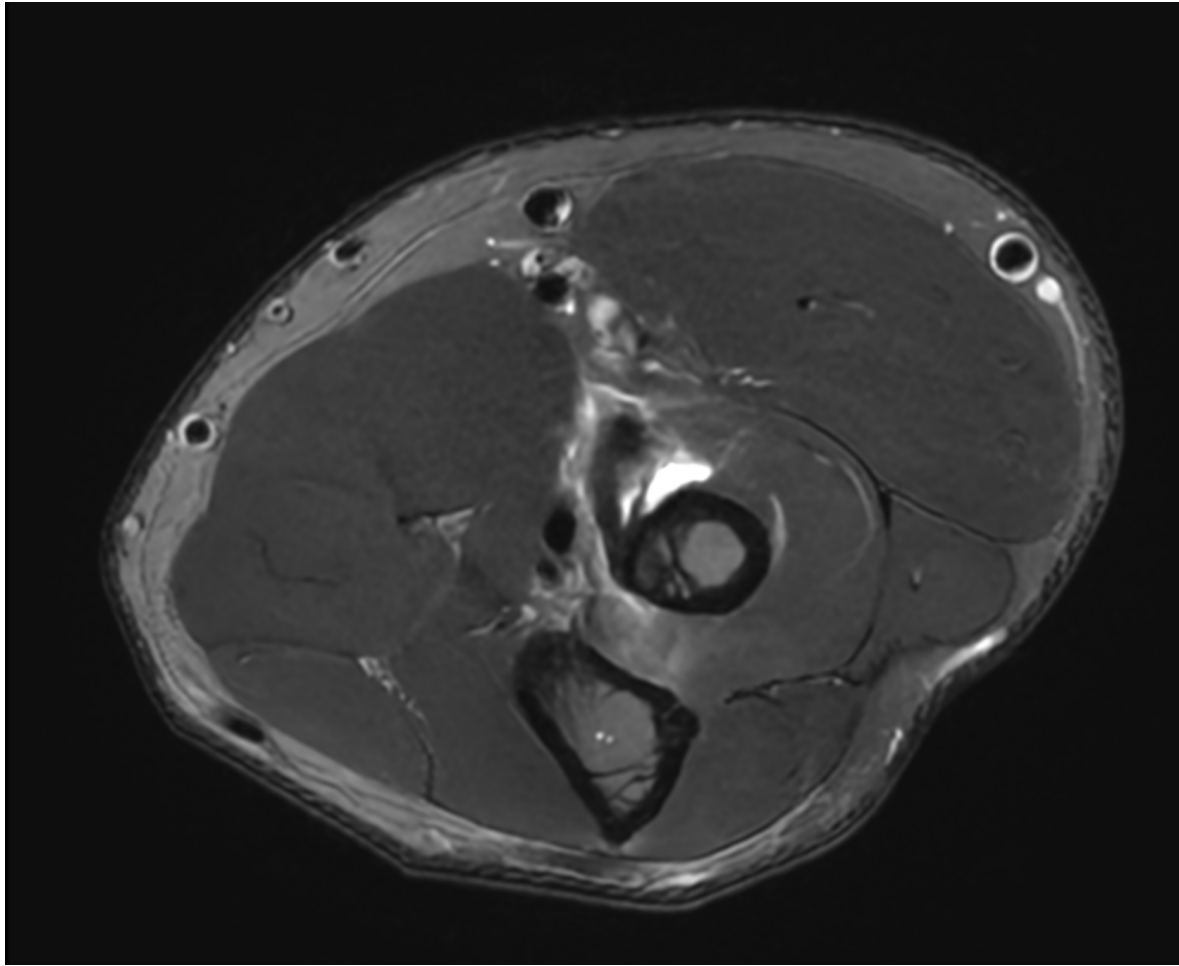
51-year-old painter injury lifting a ladder

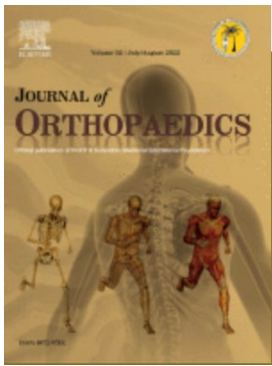
Pain and “pulling sensation” in elbow

Forearm pain and difficulty with lifting

CASE 1

MRI – biceps partial tear





Partial tear of the distal biceps tendon: Current concepts

Zaid Hamoodi ¹, Joanna Winton ², Vijaya Bhalaik ¹

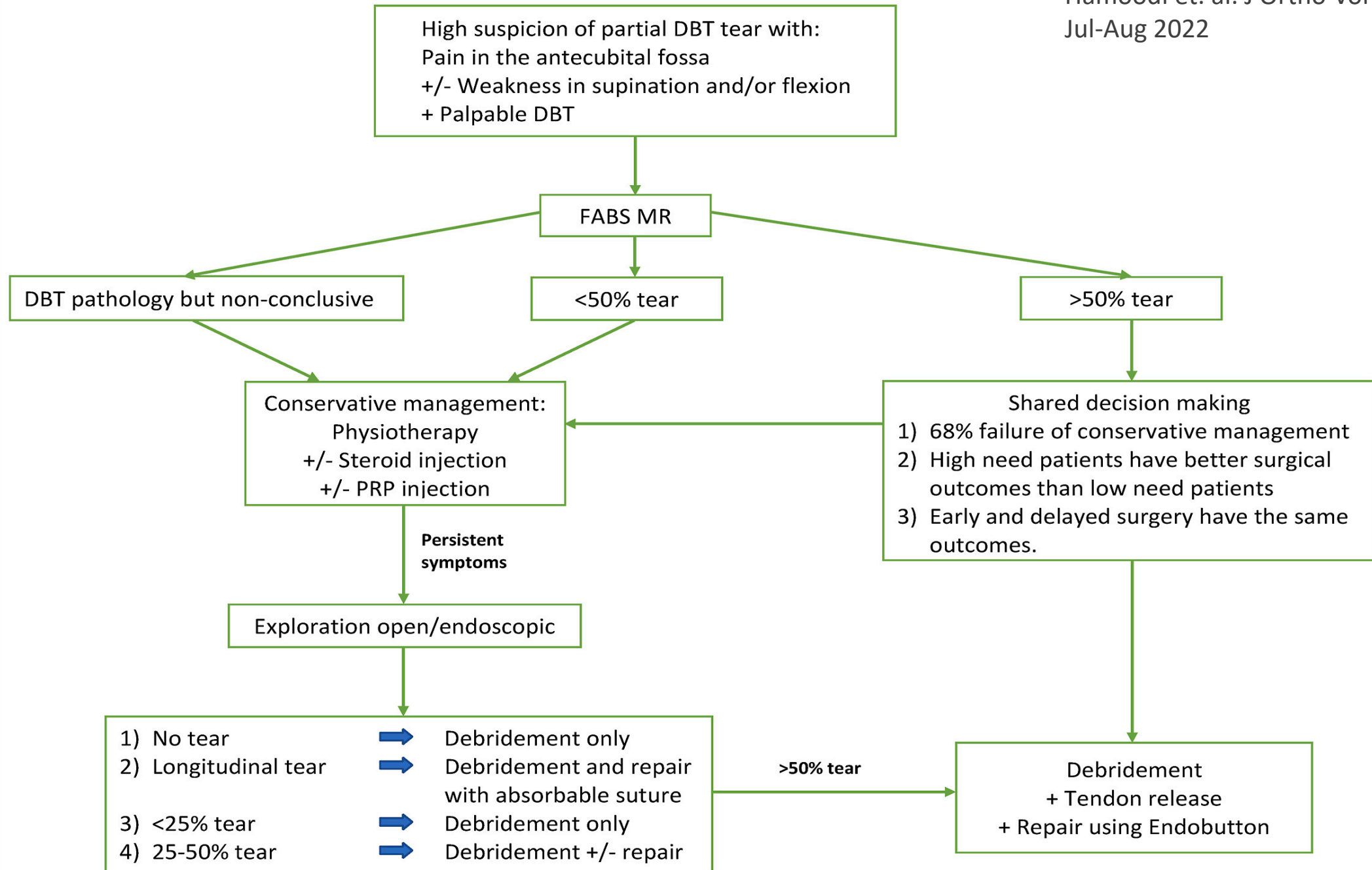
Short head tear more likely with acute injury

Partial tears more likely in older patients

- Ave age 52

MR imaging is gold standard

- Sensitivity is 59% for partial tears



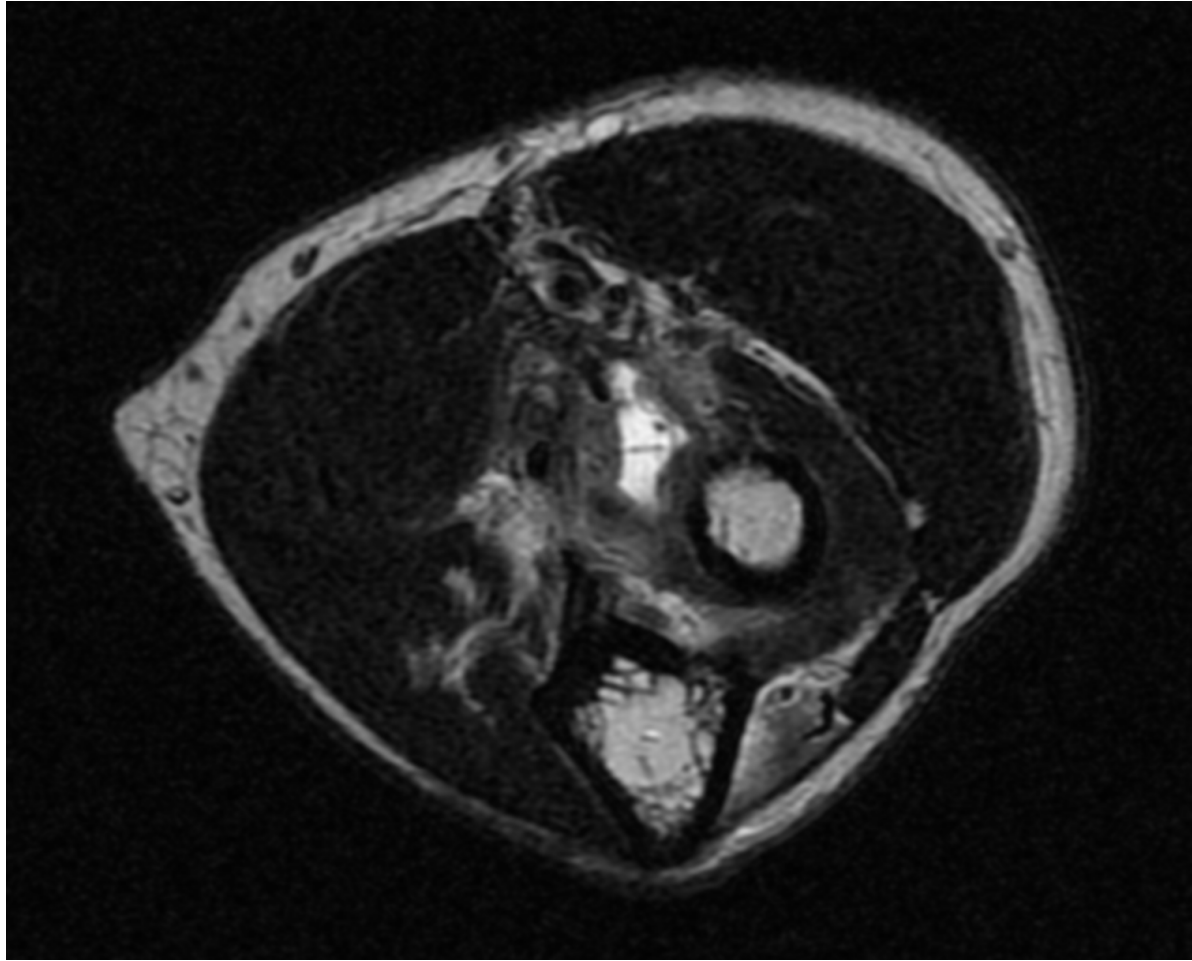
47-year-old Electrician with distal biceps rupture and surgical repair

Postoperative therapy report of re-injury

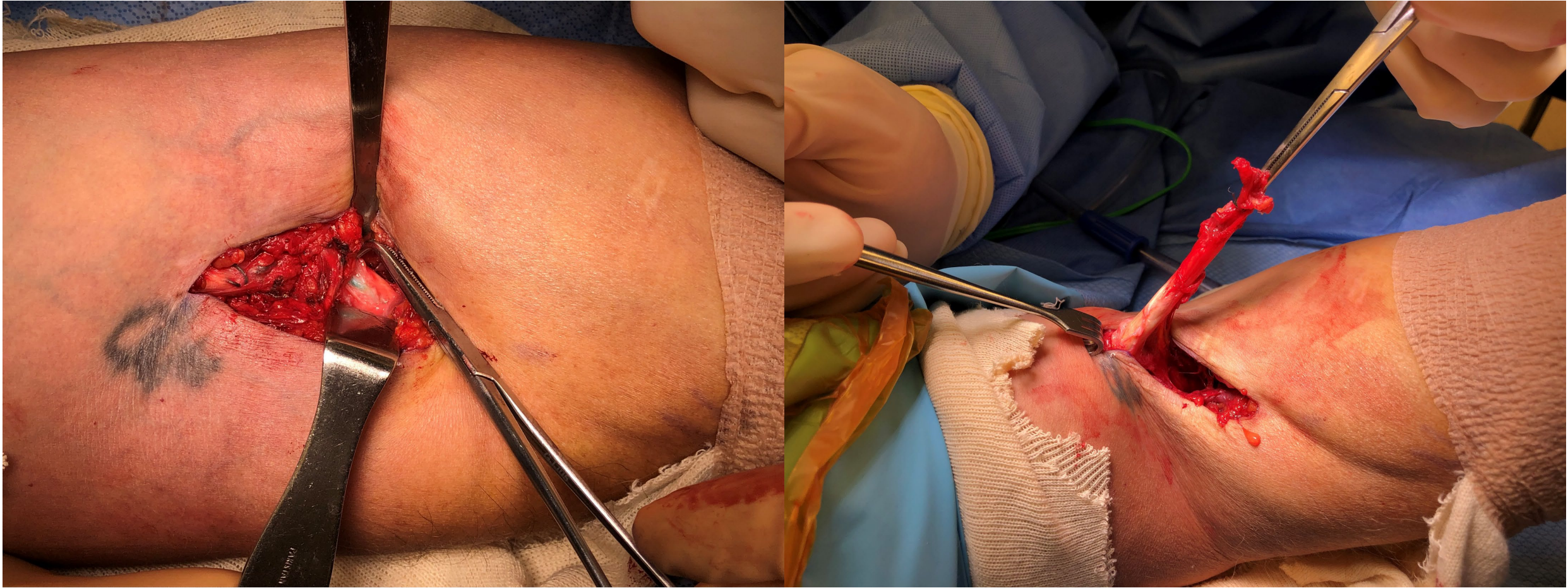
persistent weakness and difficulty with lifting
Unable to return to work

CASE 2

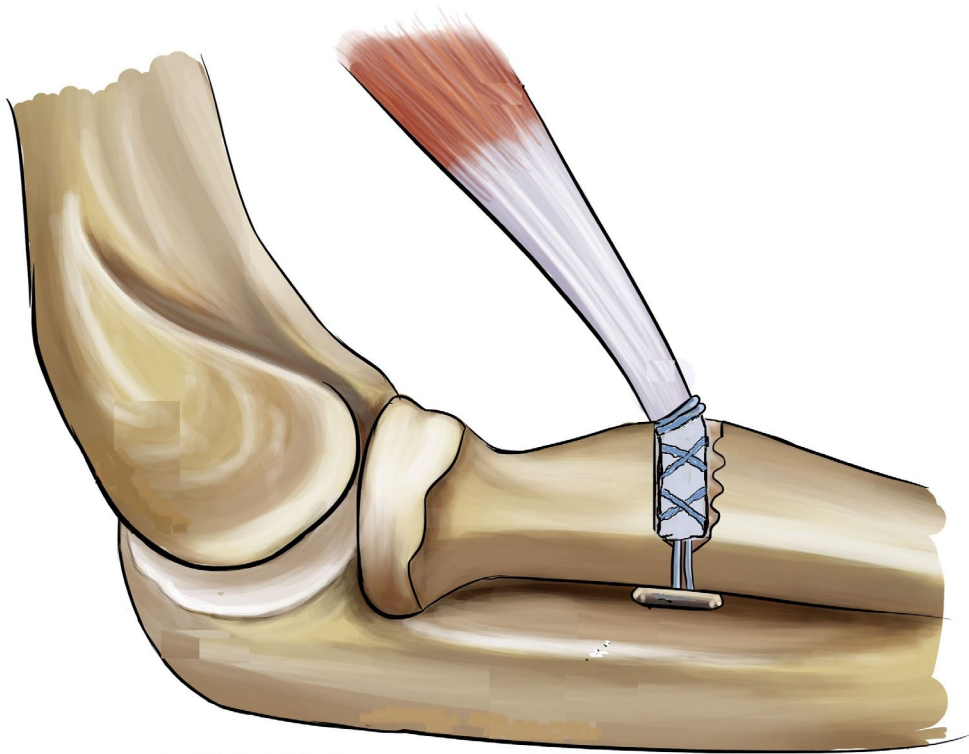
MRI – biceps rupture post repair



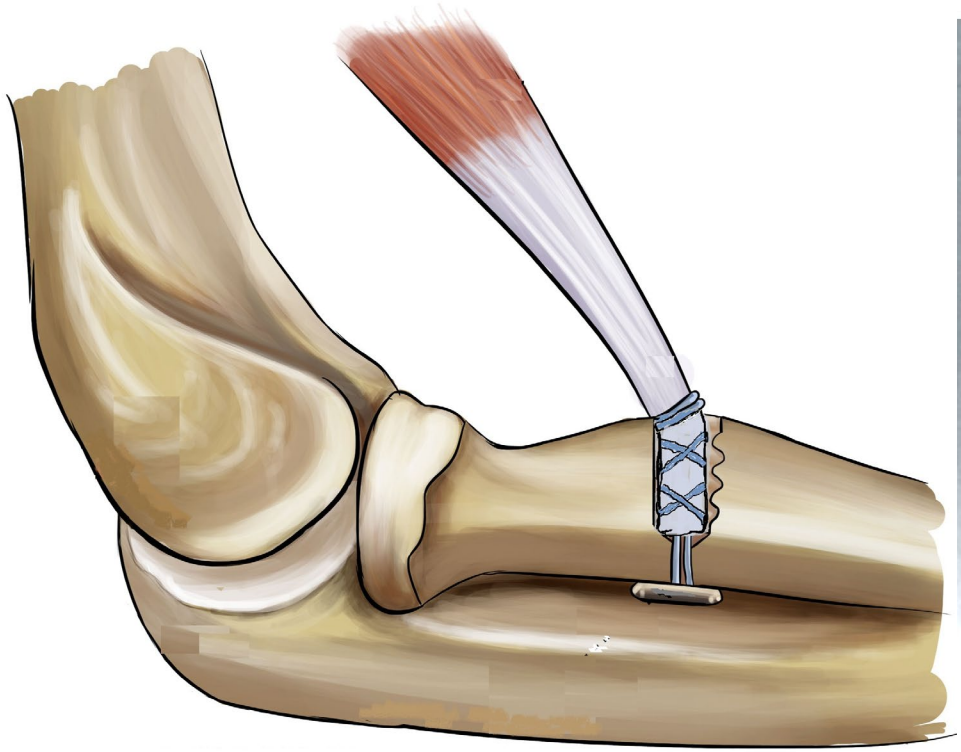
Re-rupture: revision repair



Surgery



Surgery





Return to work following a distal biceps repair: a systematic review of the literature

Journal of Shoulder and Elbow Surgery

Rubinger, Luc; Solow, Max; Johal, Herman; Al-Asiri, Ja...

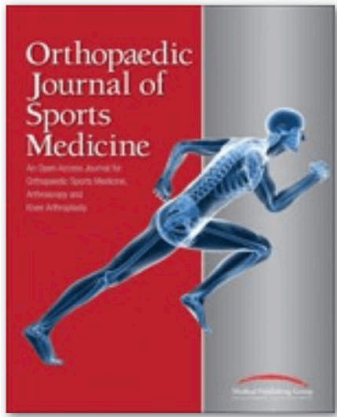
Vol. 29 Issue 5, pp. 1002-1009, 2020.

40 papers reviewed

- 1270 pts with 1280 distal biceps ruptures

89 % Repairs able to return to work

6 % Repairs unable to return to work



Clinical Outcomes After Revision Distal Biceps Tendon Surgery

Orthopaedic Journal of Sports Medicine

Grewal, Gagan; Bernardoni, Eamon D.; Cohen, Mark S....

Vol. 9 Issue 1, 2021.

2011 to 2016:

- 277 pts distal biceps tendon repair.
- 8 pts required revision surgery

Overall revision rate was 2.9%

Revision surgery complication rate of 37.5%

Outcomes inferior to primary repair

Distal Biceps Tendon Partial Tear

Causality

- Degenerative Tendinopathy vs. Acute Injury

Imaging

- MRI gold standard - ? Role of Ultrasound

Treatment

- Physical therapy, ? Role of PRP injection

When is surgery indicated?

Distal Biceps Tendon Revision Repair

Indications?

Imaging

- MRI how often are findings helpful?

Treatment

- Role of nonoperative management?
- Physical therapy and work hardening?

Improve outcomes

- What are important factors?

Thank you!

Workers Comp Meeting Case 3 3/24/26

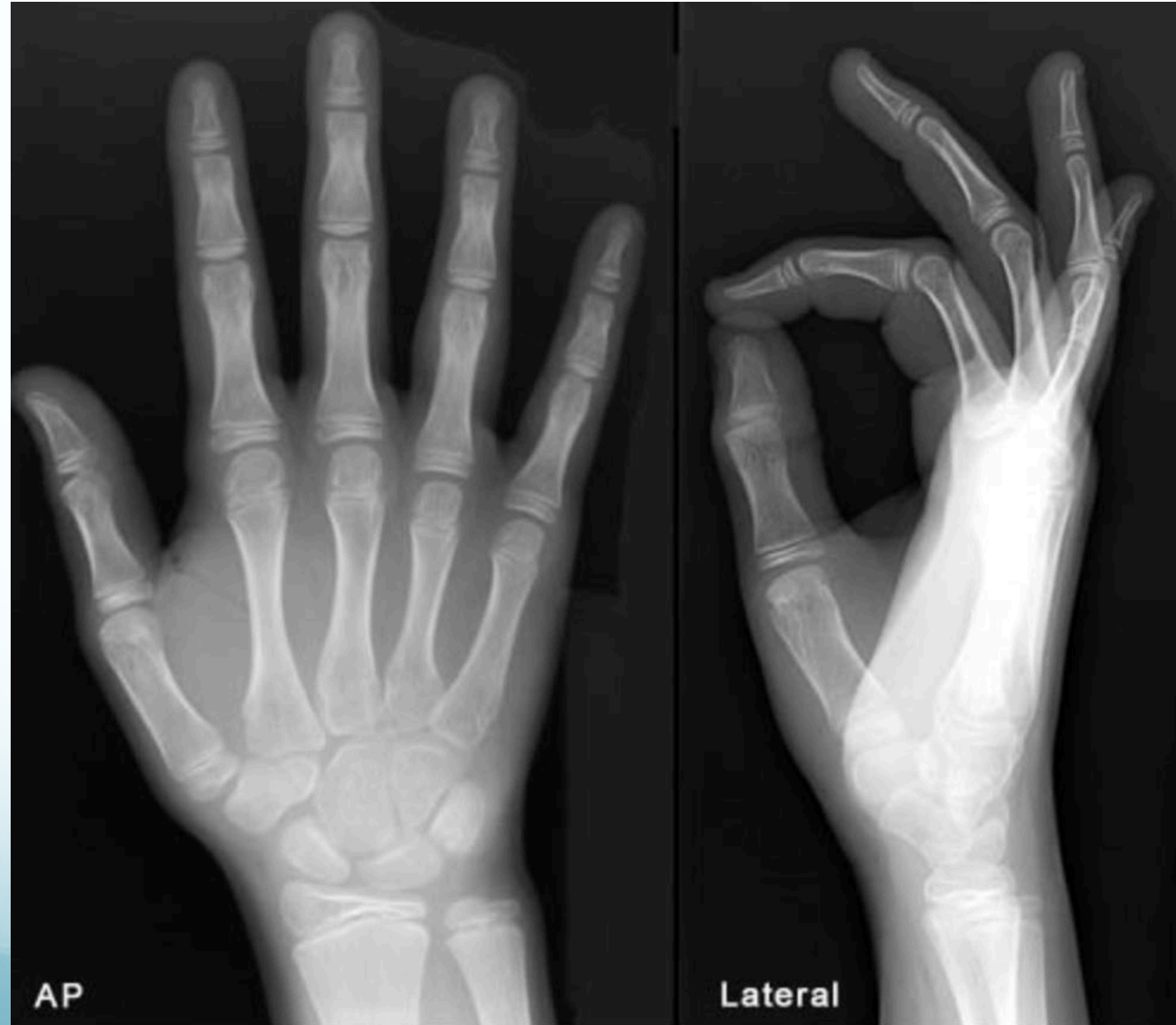
Gabriel Merlin MD



Case 3

- HPI: 46 year old male works in construction. Numbness and tingling in the right median nerve distribution. Right index finger painful and clicking.
- No pertinent PMH, PSH, Meds, All
- Exam: Positive tinels and compression median nerve. Tenderness to palpation index finger a1 pulley

Case 3



Case 3

Sensory NCS

Nerve / Sites	Rec. Site	Onset Lat ms	Peak Lat ms	NP Amp μ V	PP Amp μ V	Segments	Distance cm	Velocity m/s
L Median - Digit II (Antidromic)								
Wrist	Digit II	3.96	4.74	2.5	5.5	Wrist - Digit II	13	33
Ref		≤ 3.40	≥ 15.0	≥ 20.0		Ref		
R Median - Digit II (Antidromic)								
Wrist	Digit II	NR	NR	NR	NR	Wrist - Digit II	13	NR

Ref		≤ 3.40	≥ 15.0	≥ 20.0		Ref		
L Ulnar - Digit V (Antidromic)								
Wrist	Digit V	2.29	2.97	14.8	11.9	Wrist - Digit V	11	48
Ref		≤ 3.10	≥ 10.0	≥ 15.0		Ref		
R Ulnar - Digit V (Antidromic)								
Wrist	Digit V	2.19	2.18	13.9	1.4	Wrist - Digit V	11	50
Ref		≤ 3.10	≥ 10.0	≥ 15.0		Ref		
L Radial - Anatomical snuff box (Forearm)								
Forearm	Wrist	1.72	2.40	17.0	11.5	Forearm - Wrist	10	50
Ref		≤ 2.90	≥ 15.0	≥ 15.0		Ref		
R Radial - Anatomical snuff box (Forearm)								
Forearm	Wrist	1.51	2.03	21.2	24.0	Forearm - Wrist	10	66
Ref		≤ 2.90	≥ 15.0	≥ 15.0		Ref		

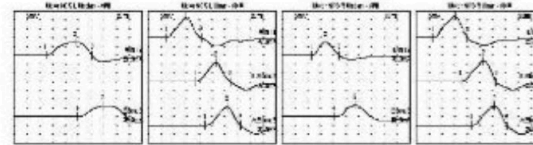
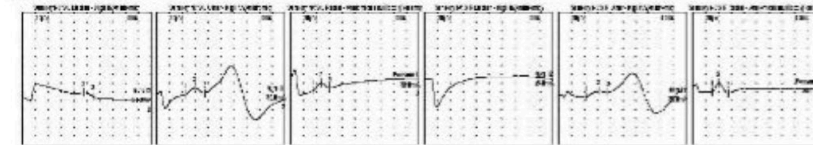
Motor NCS

Nerve / Sites	Muscle	Latency ms	Amplitude mV	Amp %	Duration ms	Segments	Distance cm	Lat Diff ms	Velocity m/s
L Median - APB									
Wrist	APB	4.95	7.3	100	7.18	Wrist - APB	7		
Ref		≤ 4.40	≥ 4.0			Ref			
Elbow	APB	9.95	6.0	82.8	7.60	Elbow - Wrist	27	5.00	54
Ref						Ref			≥ 49
R Median - APB									
Wrist	APB	6.88	7.3	100	6.91	Wrist - APB	7		
Ref		≤ 4.40	≥ 4.0			Ref			
Elbow	APB	12.29	6.7	91.8		Elbow - Wrist	29	5.42	54
Ref						Ref			≥ 49
L Ulnar - ADM									
Wrist	ADM	2.81	11.7	100	5.47	Wrist - ADM	7		
Ref		≤ 3.90	≥ 5.0			Ref			
B Elbow	ADM	7.29	10.9	92.8	5.47	B Elbow - Wrist	23	4.48	51
Ref						Ref			≥ 49
A Elbow	ADM	8.91	10.6	90.1	5.97	A Elbow - B Elbow	9	1.61	56
Ref						Ref			≥ 49
R Ulnar - ADM									
Wrist	ADM	2.80	12.2	100	5.38	Wrist - ADM	7		
Ref		≤ 3.90	≥ 5.0			Ref			
B Elbow	ADM	6.88	11.8	96.8	5.52	B Elbow - Wrist	23	4.38	53
Ref						Ref			≥ 49
A Elbow	ADM	8.55	11.1	91.2	5.57	A Elbow - B Elbow	10	1.67	50

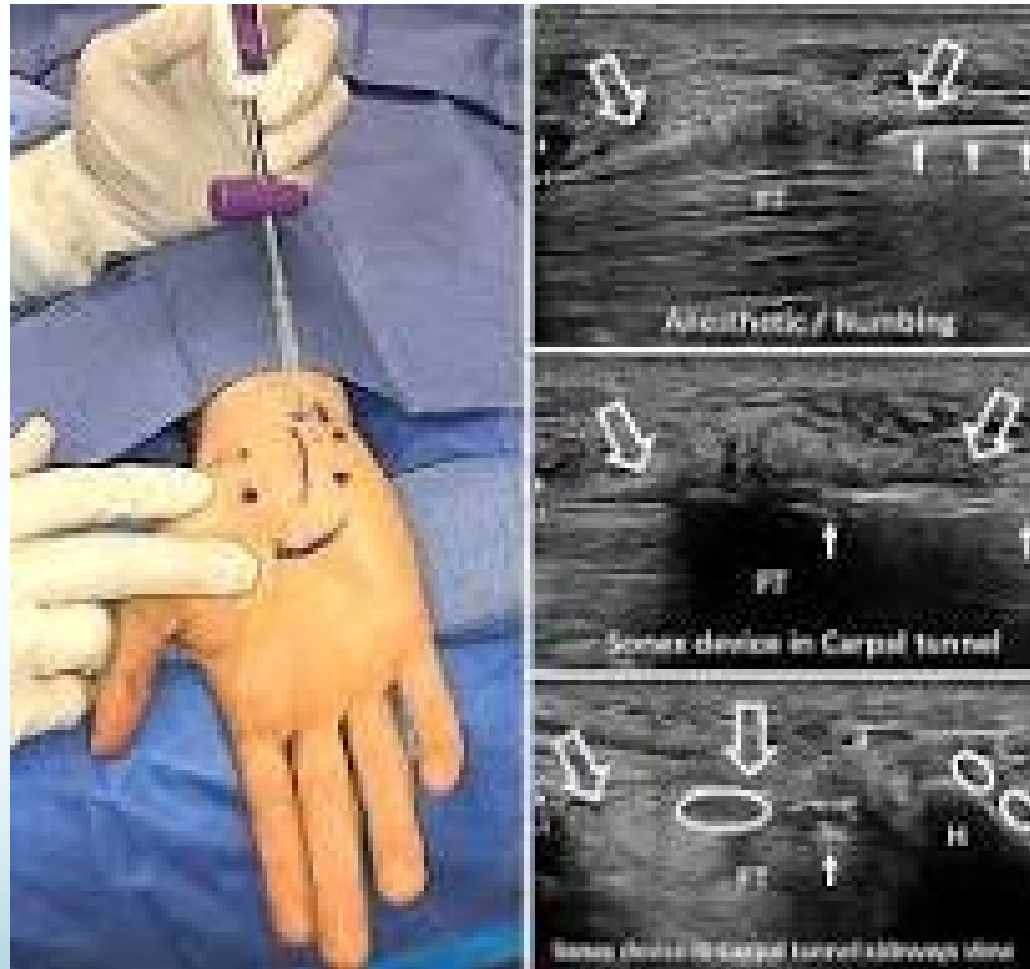
EMG

Muscle	Nerve	Roots	Spontaneous				MUAP			Recruitment	
			IA	Fib	PSW	Fasc	Amp	Dur.	PPP	Recruit	Activation
R. Deltoid	Axillary	C5-C6	N	None	None	None	N	N	N	Normal	Normal
R. Triceps brachii	Radial	C6-C8	N	None	None	None	1+	1+	N	Slight Red	Normal
R. Biceps brachii	Musculocutaneous	C5-C6	N	None	None	None	N	N	N	Normal	Normal
R. Pronator teres	Median	C6-C7	N	None	None	None	1+	1+	N	Slight Red	Normal
R. First dorsal interosseous	Ulnar	C8-T1	N	None	None	None	N	N	N	Normal	Normal
R. Abductor pollicis brevis	Median	C8-T1	N	None	None	None	2+	2+	N	Mod Red	Normal
R. C6	Spinal	C6-	N	None	None	None					

Muscle	Nerve	Roots	IA	Fib	PSW	Fasc	Amp	Dur.	PPP	Recruit	Activation
paraspinal											
R. C7 paraspinal	Spinal	C7-	N	None	None	None					
L. Deltoid	Axillary	C5-C6	N	None	None	None	N	N	N	Normal	Normal
L. Triceps brachii	Radial	C6-C8	N	None	None	None	N	N	N	Normal	Normal
L. Biceps brachii	Musculocutaneous	C5-C6	N	None	None	None	N	N	N	Normal	Normal
L. Pronator teres	Median	C6-C7	N	None	None	None	N	N	N	Normal	Normal
L. First dorsal interosseous	Ulnar	C8-T1	N	None	None	None	N	N	N	Normal	Normal



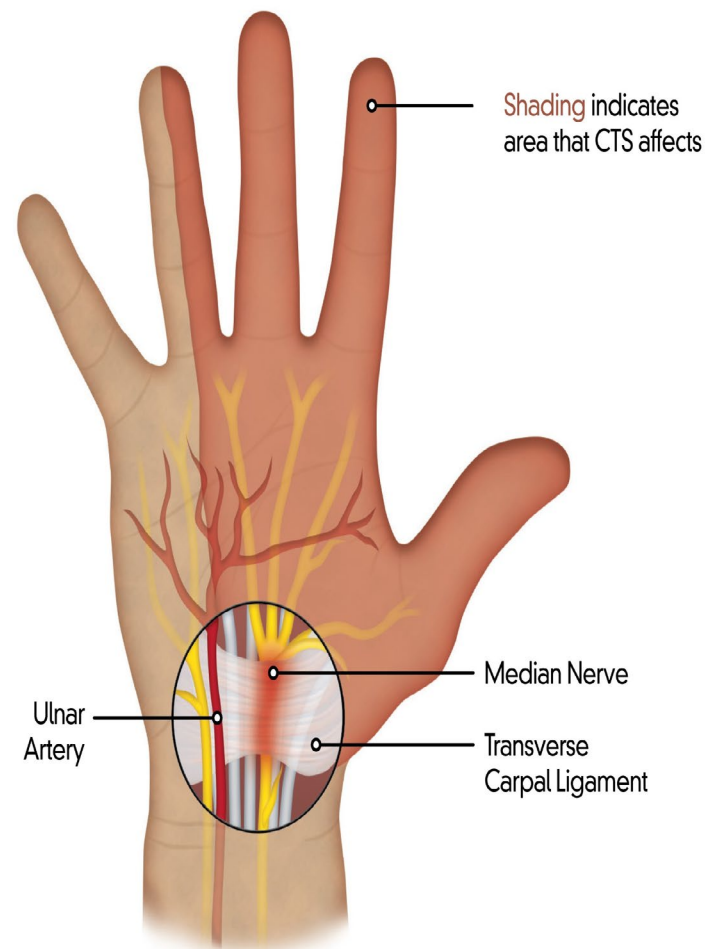
Carpal Tunnel Syndrome



WHAT CAUSES CARPAL TUNNEL SYNDROME?

CARPAL TUNNEL SYNDROME (CTS) IS ONE OF THE MOST COMMON HAND CONDITIONS THAT AFFECTS MORE THAN **13 MILLION** PEOPLE IN THE U.S.

It develops when a major nerve in the hand, called the median nerve, gets squeezed as it travels through the carpal tunnel in the wrist.



WHAT CAUSES CARPAL TUNNEL SYNDROME?

SEVERAL FACTORS MAY CAUSE CARPAL TUNNEL SYNDROME. IT MAY BE RELATED TO REPETITIVE USE OF THE HANDS OR RESULT FROM TRAUMA, SUCH AS WRIST FRACTURE.



Other conditions associated with carpal tunnel syndrome include obesity, pregnancy, diabetes, hypothyroidism, alcoholism, severe infections, and arthritic diseases.

WHAT ARE THE SYMPTOMS?

CTS predominately affects the thumb, index and middle fingers and is characterized by:

- ▶ LOSS OF STRENGTH
- ▶ SENSATION OF PINS AND NEEDLES IN THE HAND
- ▶ FOREARM TENDERNESS
- ▶ PAIN UP THE ARM
- ▶ WEAK GRIP STRENGTH
- ▶ PAIN DURING THE NIGHT, STARTING GRADUALLY



WHAT ARE THE TREATMENT OPTIONS?

Less
Invasive

- ▶ BEHAVIORAL MODIFICATIONS
- ▶ STRETCHING
- ▶ BRACING

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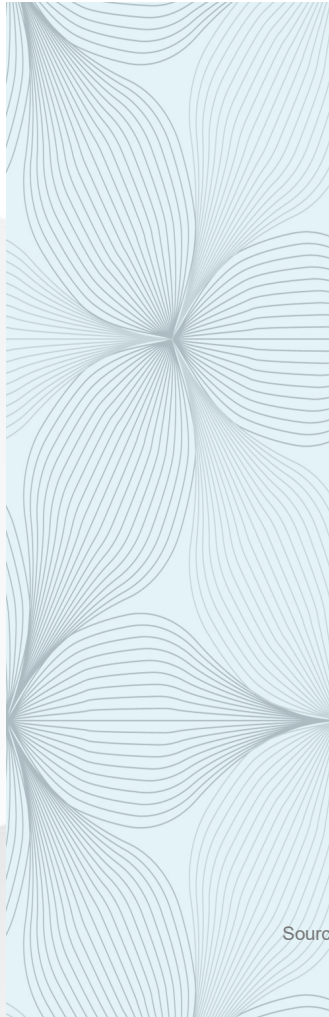


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More
Invasive

- ▶ OTC ANTI-INFLAMMATORIES
- ▶ STEROID INJECTIONS
- ▶ CARPAL TUNNEL RELEASE WITH ULTRASOUND GUIDANCE
- ▶ ENDOSCOPIC CARPAL TUNNEL RELEASE
- ▶ OPEN CARPAL TUNNEL RELEASE



Source: American Society for Surgery of the Hand. Carpal Tunnel Syndrome. <https://handcare.assh.org/Anatomy/Details-Page/Article/02/08/07/Carpal-Tunnel-Syndrome>. Accessed July 2024.

WHAT IS THE DIFFERENCE IN RELEASE PROCEDURES?

Traditional Open Carpal Tunnel Release



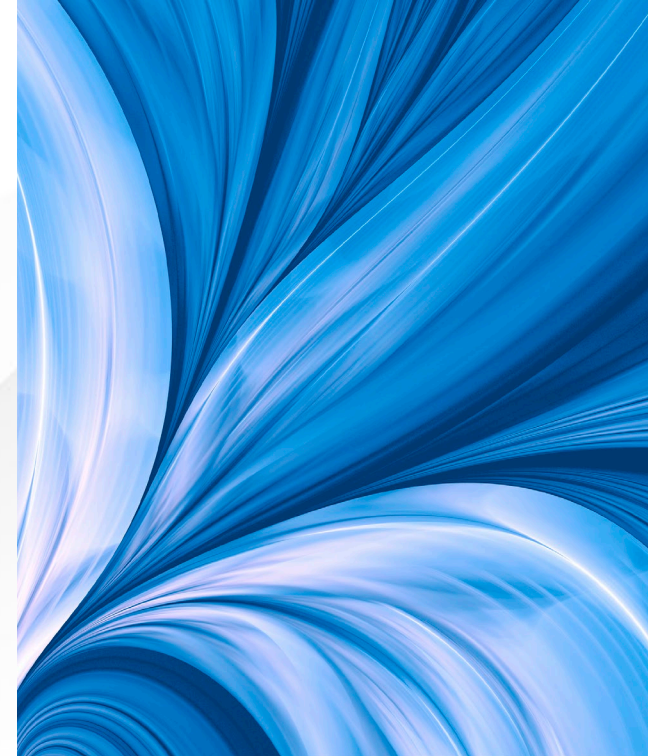
Carpal Tunnel Release with Ultrasound Guidance



- ▶ Traditional open and endoscopic carpal tunnel release (CTR) procedures are effective but may result in a lengthy recovery period and a large, sometimes painful scar.
- ▶ Carpal tunnel release **with real-time ultrasound guidance** allows the physician to see and protect all the critical anatomy, while only transecting the desired region.

WHAT ARE THE BENEFITS OF CTR WITH ULTRASOUND GUIDANCE?

- ▶ Most patients can return to work and normal activity in 3-6 days.
- ▶ Procedure can be performed in an office setting.
- ▶ Typically performed using local anesthesia.
- ▶ Most patients have immediate hand motion.
- ▶ Physical therapy post-procedure is typically not needed
– saving time and money.
- ▶ Aspirin or Ibuprofen is typically all that is needed for pain management.
- ▶ Small wrist incision typically closed without sutures.
- ▶ Does not typically require pre-procedure medical clearance.



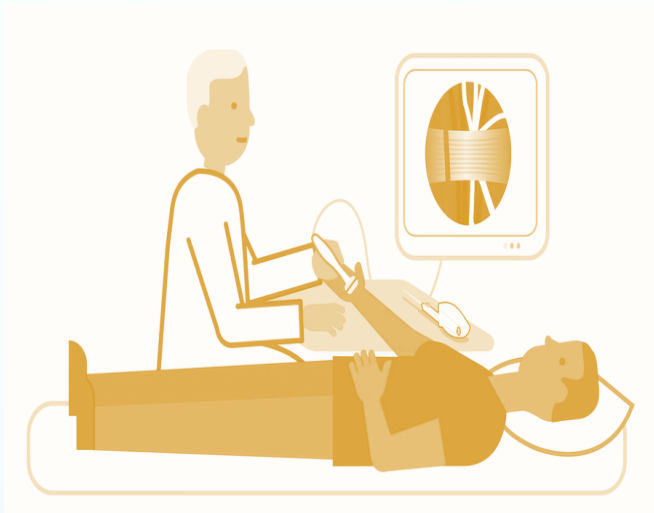
Sources: Eberlin KR, Amis BP, Berkgigler TP, Dy CJ, Fischer MD, Gluck JL, Kaplan FTD, McDonald TJ, Miller LE, Palmer A, Perry PE, Walker ME, Watt JF. Final 1-Year Results of the TUTOR Randomized Trial Comparing Carpal Tunnel Release with Ultrasound Guidance to Mini-open Technique. *Plast Reconstr Surg Glob Open*. 2024 Mar 4;12(3):e5665. doi: 10.1097/GOX.0000000000005665. PMID: 38440365; PMCID: PMC10911521.

Pistorio AL, Marwin VM, Paterson PD, Alexander RD, Nelson JT, Miller LE. Office-based carpal tunnel release with ultrasound guidance: 6-month outcomes from the multicenter ROBUST trial. *J Hand Surg Glob Online* 2024. DOI: <https://doi.org/10.1016/j.jhsg.2023.12.005>.

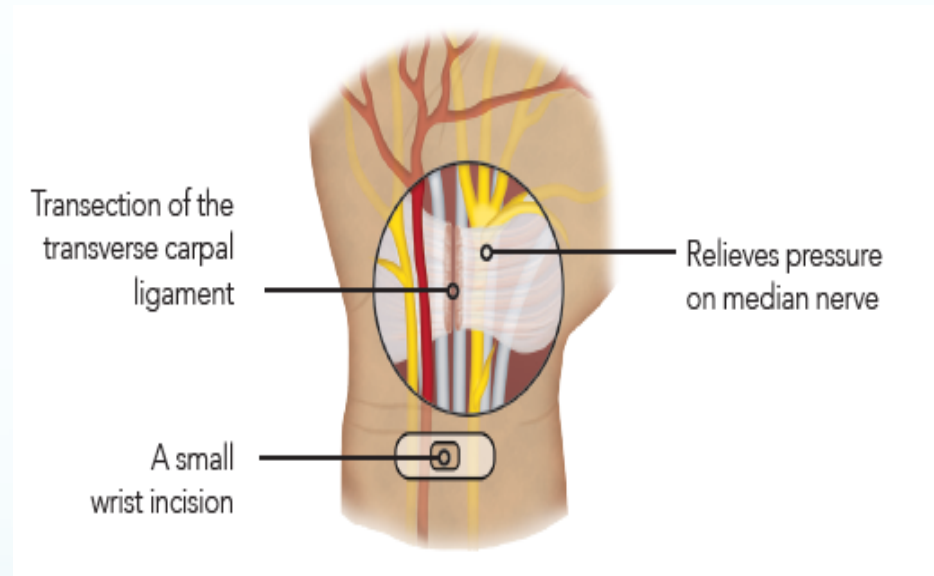
Paterson PD, Kirsch MJ, Miller LE, Aguila DJ 3rd. Early return to work after carpal tunnel release with ultrasound guidance. *Plast Reconstr Surg Glob Open*. 2024 Feb 27;12(2):e5647. doi: 10.1097/GOX.0000000000005647. PMID: 38415102; PMCID: PMC10898665.

Aguila D, Kirsch M, Kindle B, Paterson P. Long-Term clinical results of carpal tunnel release using ultrasound guidance: a multicenter pragmatic study. *J Hand Surg Glob Online*. 2023 Nov 22;6(1):79-84. doi: 10.1016/j.jhsg.2023.10.001. PMID: 38313613; PMCID: PMC10837292.

HOW DOES CARPAL TUNNEL RELEASE WITH ULTRASOUND GUIDANCE WORK?



The physician uses real-time ultrasound guidance to visualize the anatomy in the wrist during the entire procedure. A small wrist incision is created to gain access to the ligament.



Using a device specifically designed for carpal tunnel release under ultrasound guidance, the physician transects the ligament to relieve pressure on the nerve.

WHAT TO EXPECT FROM THE PROCEDURE?

BEFORE

- ▶ Continue your normal routine
- ▶ You can typically drive to the clinic
- ▶ Except to spend 1-2 hours at the clinic, with a portion of that being the procedure itself

DURING

- ▶ Patients are typically wide awake during the procedure
- ▶ Your hand and wrist will be cleaned
- ▶ Expect slight discomfort from initial poke for local anesthesia, which most describe as the worst part of the procedure

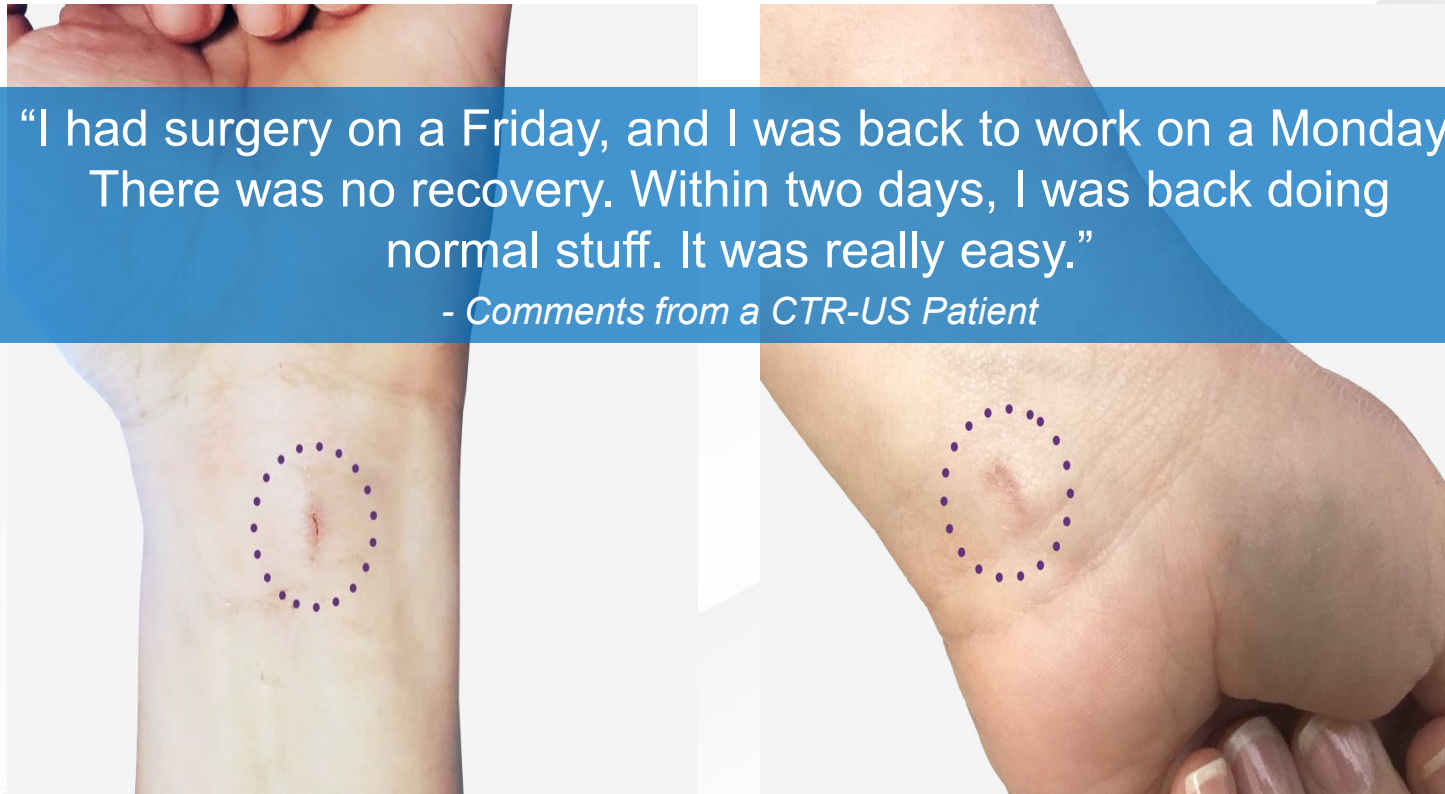
AFTER

- ▶ A light dressing/bandage is typically used to close the incision
- ▶ Recovery from the soreness of procedure typically takes 3-6 days
- ▶ Resolution of nerve symptoms will vary by patient



[PRESENT
ER: Feel
free to
replace the
patient
testimonial
below with
one from
your own
patients.]

WHAT TO EXPECT POST-PROCEDURE?



“I had surgery on a Friday, and I was back to work on a Monday. There was no recovery. Within two days, I was back doing normal stuff. It was really easy.”
- Comments from a CTR-US Patient

3 Days Post-Procedure

1 Week Post-Procedure

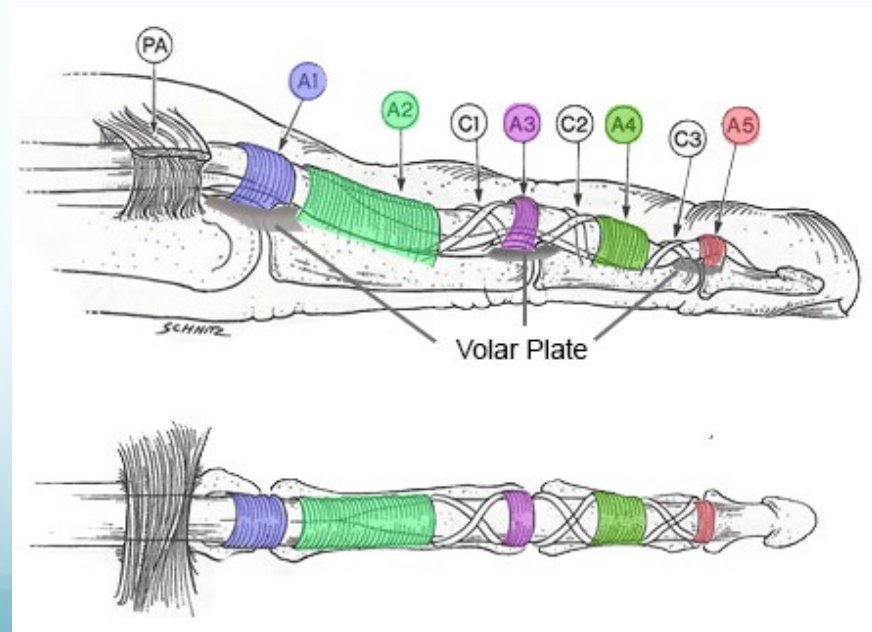
Source: Our patients! Thank you to those that have been willing to share a photo post-procedure! (Sonex Health Data on File)

Source: Bluegrass Orthopaedics' patient testimonial: Mark: Victor Marwin, MD, MBA (2022) YouTube. Available at:

<https://www.youtube.com/watch?v=ppd4s1t8n&v=MhGCDh1S> (Accessed July, 2024). 04%

Trigger Finger/Thumb

- Inhibition of Smooth Tendon Gliding due to mechanical impingement at A1 pulley
- Progressive pain, clicking, catching, locking, worse morning
- Physical Exam: Active triggering, tender A1 pulley



OVERVIEW: TRIGGER FINGER

YOU ARE NOT ALONE

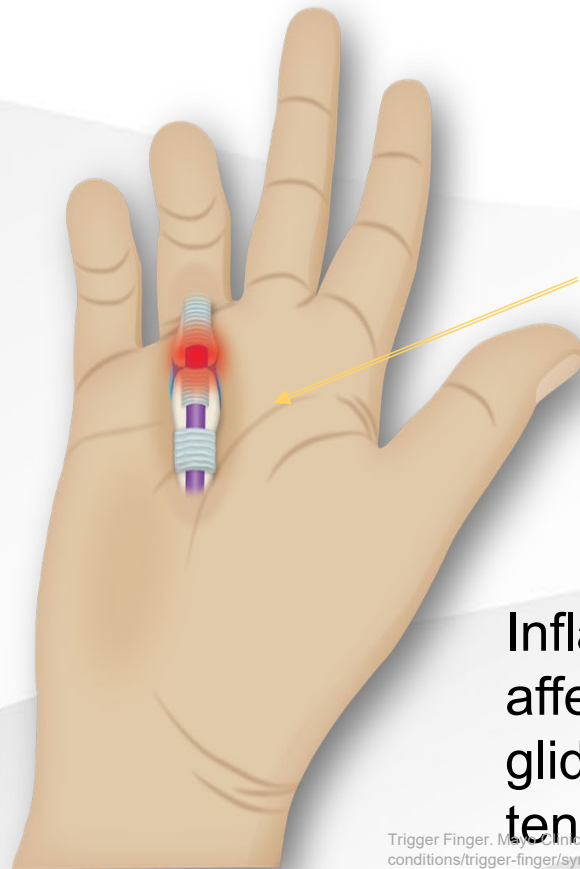
TRIGGER FINGER IS A COMMON
CONDITION
THAT AFFECTS APPROXIMATELY
9 MILLION PEOPLE IN THE UNITED
STATES.

WHO GETS TRIGGER FINGER?

- ▶ PEOPLE WHO HAVE JOBS OR HOBBIES THAT REQUIRE STRENUOUS REPETITIVE MOTIONS
- ▶ PEOPLE BETWEEN THE AGES OF 40 AND 60
- ▶ PEOPLE WHO HAVE OSTEOARTHRITIS, RHEUMATOID ARTHRITIS OR DIABETES

WHAT CAUSES TRIGGER FINGER?

FINGER UNABLE TO SMOOTHLY BEND
AND STRAIGHTEN



Tendon sheath surrounding finger's tendon becomes inflamed or irritated

Inflammation affects normal gliding motion of tendon sheath



SYMPTOMS OF TRIGGER FINGER MAY AFFECT ONE OR MORE FINGERS

- ▶ PAIN AT THE BASE OF THE AFFECTED FINGER, WHERE THE FINGER JOINS WITH THE PALM
- ▶ SWELLING WITHIN THE AFFECTED TENDON OR DEVELOPMENT OF A CYST
- ▶ STIFFNESS OR LOSS OF MOTION, DIFFICULTY IN BENDING THE FINGER
- ▶ MECHANICAL SYMPTOMS: POPPING, CATCHING OR LOCKING



TREATMENT OPTIONS

Less
Invasive

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0

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More
Invasive

- ▶ BEHAVIORAL MODIFICATIONS
- ▶ STRETCHING
- ▶ SPLINTING
- ▶ OTC ANTI-INFLAMMATORIES
- ▶ STEROID INJECTIONS
- ▶ TRIGGER FINGER RELEASE WITH ULTRASOUND GUIDANCE
- ▶ ENDOSCOPIC TRIGGER FINGER RELEASE
- ▶ OPEN TRIGGER FINGER RELEASE

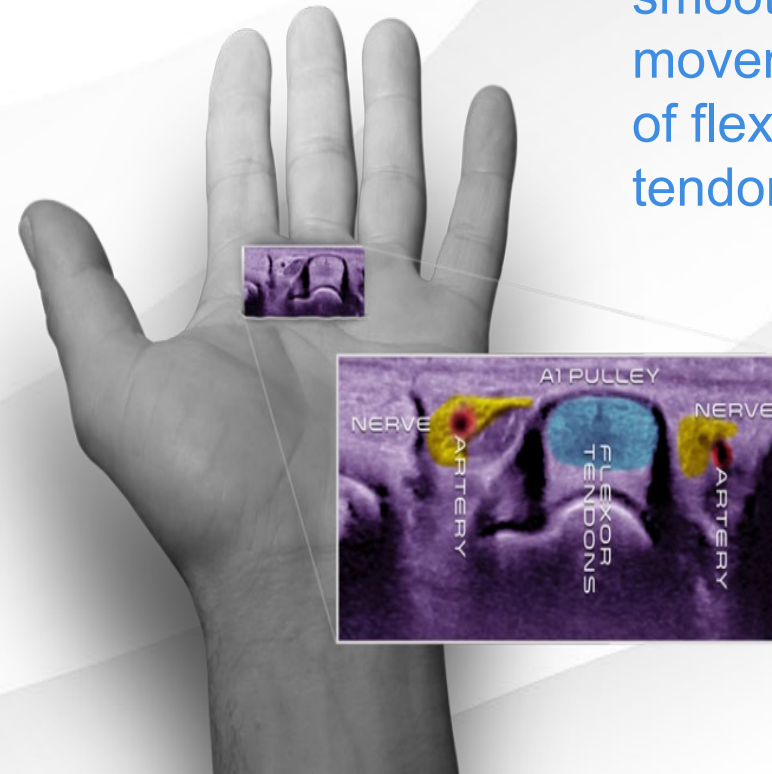
TRIGGER FINGER RELEASE WITH REAL-TIME ULTRASOUND GUIDANCE

Using
UltraGuideTFR™
and real-time
ultrasound
guidance, trigger
finger release can
be performed in a
matter of minutes

A small
(3-4mm)
incision

Transection
of the A1
pulley

Allows
smooth
movement
of flexor
tendon





PROCEDURE ROOM OR
OFFICE SETTING



CLOSED WITHOUT
SUTURES



LOCAL ANESTHESIA



SMALL INCISION
TYPICALLY



REDUCE OR ELIMINATE NEED FOR OPIOIDS

RETURN TO NORMAL ACTIVITY
IN DAYS NOT WEEKS

OPPORTUNITY FOR FEWER
FOLLOW-UP APPOINTMENTS

Sources:

Schaefer R, Hoffman D, Kindle B. Trigger finger release using ultrasound guidance: Initial experience from multiple sites. Eposter – SPP1988. ASSH 2022 Annual Meeting, Boston, MA.

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Hines B, Riley D. Clinical results of trigger finger release using real-time ultrasound guidance in a single surgeon practice. Podium presentation. NEHS 2023 Annual Meeting, Hanover, NH.

WHAT TO EXPECT FROM THE PROCEDURE?

BEFORE

- ▶ Continue your normal routine
- ▶ You can typically drive to the clinic
- ▶ Expect to spend 1-2 hours at the clinic, with a fraction of that being the procedure itself

DURING

- ▶ Procedure will be performed in a procedure room or office setting
- ▶ Patients are typically wide-awake during procedure, with only local anesthesia needed
- ▶ Procedure will be performed through a small incision, 3-4 mm

AFTER

- ▶ Incision can be closed without sutures
- ▶ Most patients return to work and normal activities within 3 days
- ▶ Post-operative therapy typically not needed
- ▶ Most patients only require acetaminophen or NSAIDS for pain management

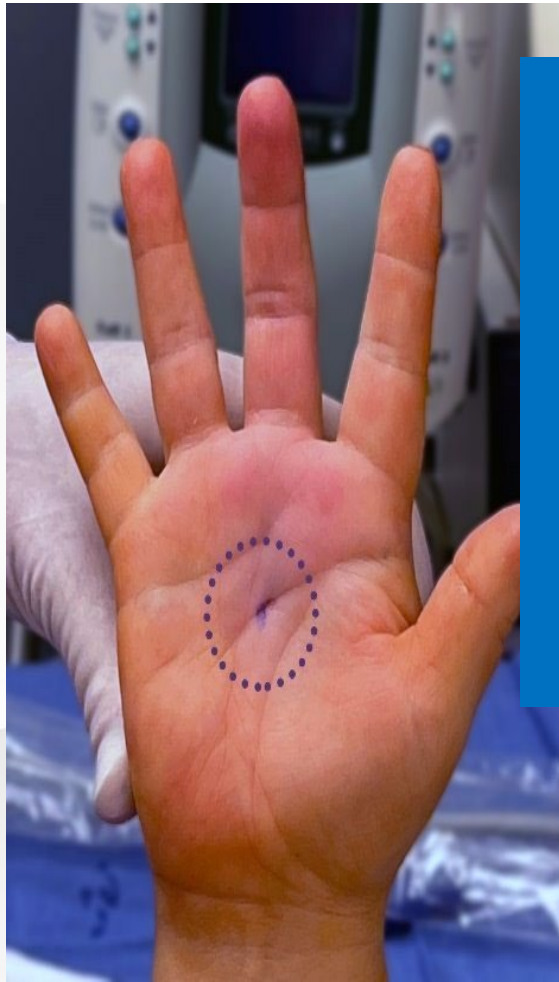
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WHAT TO EXPECT POST-PROCEDURE?



POST TFR
PROCEDURE
INCISION WITH
ULTRAGUIDE TFR
AND REAL-TIME
ULTRASOUND
GUIDANCE.

Case 3

- Ultrasound guided right carpal tunnel release
- Ultrasound guided right index trigger finger release
- Return to work 7 days post op



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Discussion



Case Synthesis and Panel Discussion

