



Acute versus Chronic repair for Distal Biceps Tendon Ruptures: A Systematic Review and Meta-Analysis

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Disclosures

- Edward S. Chang, MD
 - Avanos – Consultant
 - Arthrex – Education and research support

Background

- Operative treatment is recommended for distal biceps tendon ruptures (DBTR) due to inferior functional outcomes of nonoperative treatment
- Acute repair is favored due to the operative complexity of chronic repairs
- Given the inferior results of nonoperative treatment, some recommend proceeding with repair regardless of chronicity

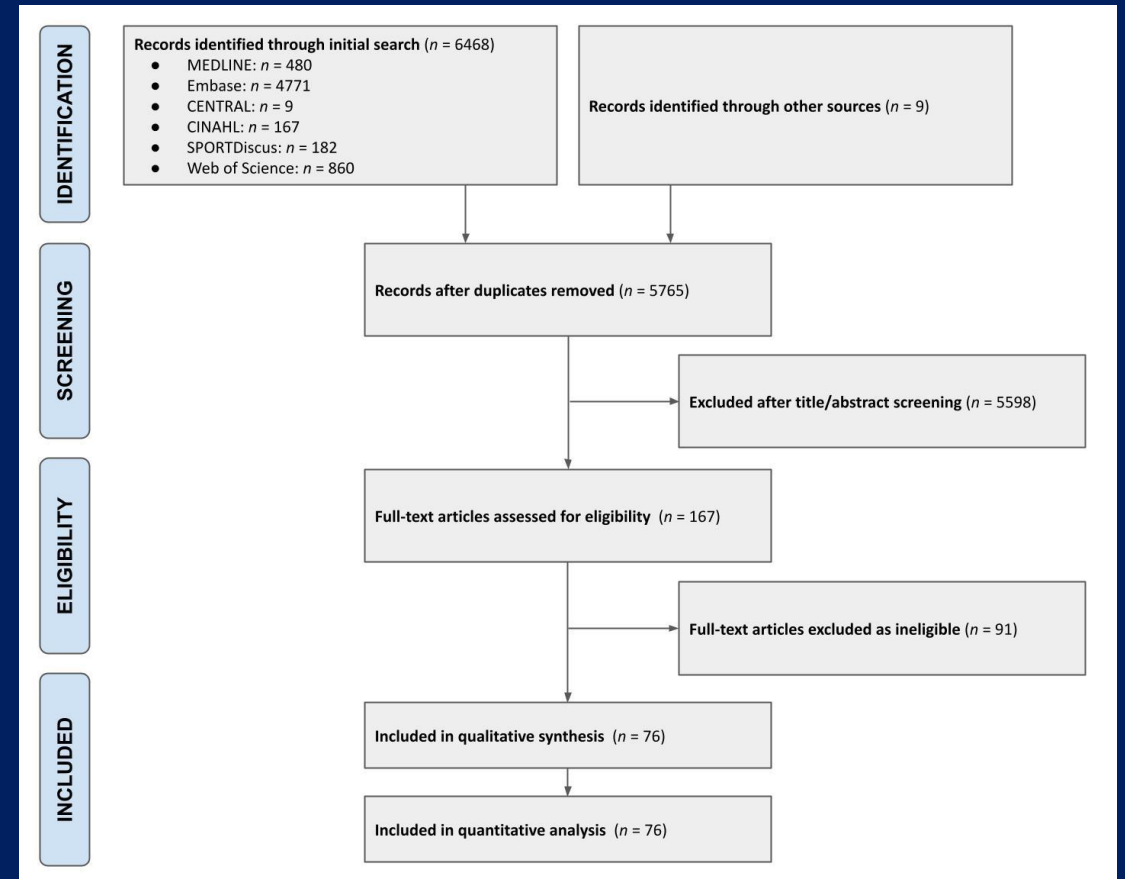


Purpose: To compare function, patient reported outcomes (PROs), and complications after acute and chronic DBTR

Hypothesis: Chronic repair would result in worse outcomes and more complications when compared with acute repairs

Methods

- **Study Design:**
 - Systematic review and meta-analysis
- **Inclusion Criteria:**
 - Stated timing of repair
 - Outcomes and/or complications stratified by time (when acute and chronic results reported), or (if not clearly stratified) $\geq 75\%$ of results corresponded to acute or chronic repairs
 - Repairs were classified as "acute" if performed within 6 weeks of known injury and "chronic" if performed outside of that
- **Statistical Plan:**
 - Single-moderator models contained a variable to account for "acute vs chronic"
 - Multiple-moderator models also accounted for variables for approach and fixation
 - Wald-type tests were used to evaluate the effects of acute vs chronic repair for each combination of approach and fixation



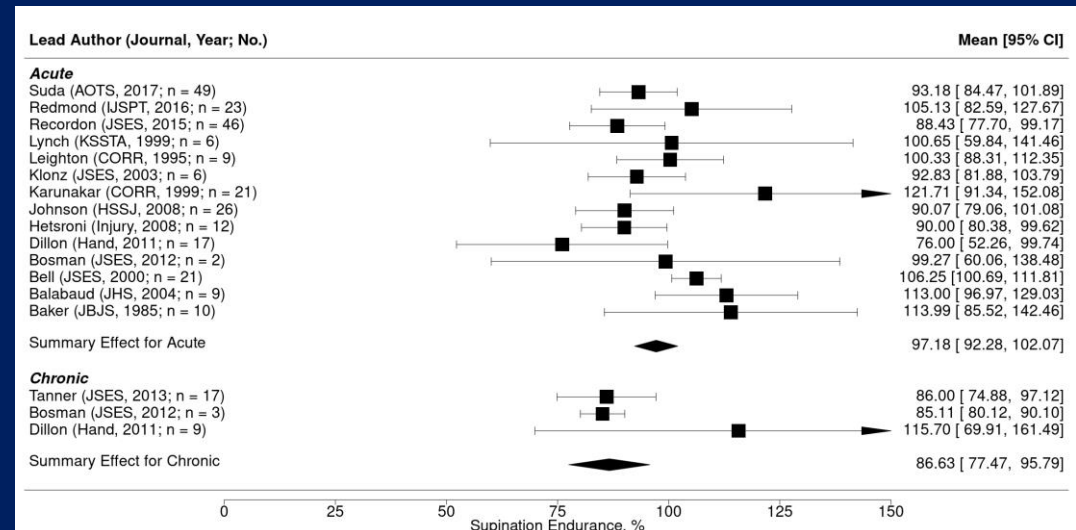
Single-Moderator Results

Acute vs. Chronic Repair: Irrespective of Approach or Fixation

- **Functional Outcomes**
 - Supination endurance was greater with acute repairs (p=.044)
 - No difference between groups with:
 - Flexion-extension arc ROM (p=.486)
 - Supination ROM (p=.463)
 - Pronation (p=.288)
 - Flexion strength (p=.699)
 - Supination strength (p=.413)
 - Flexion endurance (p=.162)
- **Patient Reported Outcome Measures:**
 - No difference in:
 - Disabilities of the Arm, Shoulder and Hand (DASH) score (p=.868)
 - Mayo Elbow Performance Score (MEPS) (p=.741)

Table 1. Acute vs Chronic Distal Biceps Tendon Repair, Irrespective of Fixation or Approach.

Outcome	Est	Acute 95% CI	Est	Chronic 95% CI	P value
Endurance %					
Supination	97.18	92.28 – 102.07	86.63	77.47 – 95.79	.044



Single-Moderator Results (cont.)

Acute vs. Chronic Repair: Irrespective of Approach or Fixation

• **Complications**

- No significant difference in:
 - Any/all complications (% , p=.056)
 - Rate of any/all complications (per 100 person-years, p=.261)
 - Non-nerve complications (% , p=.895)
 - Rate of non-nerve complications (per 100 person-years, p=.389)
 - Heterotopic ossification (% , p=.066)
 - Motor nerve complications (% , p=.086)
 - Sensory nerve complications (% , p=.147)
 - Infection (% , p=.147)
 - Failure (% , p=.407)
 - Subsequent surgeries (% , p=.156)
 - Rate of subsequent surgeries (% , p=.189)

Multiple-Moderator Results

Acute vs. Chronic Repair: Controlling for Approach and Fixation

• Functional Outcomes

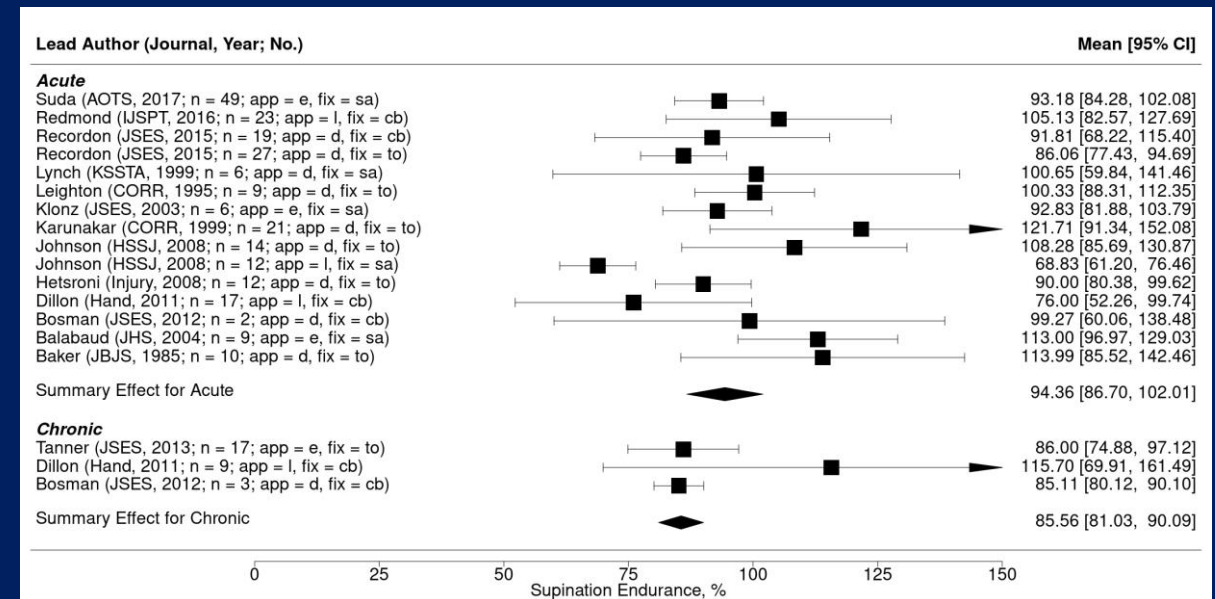
- Supination endurance was greater with acute repairs (p=.029)

• No difference between groups with:

- Flexion-extension arc ROM (p=.510)
- Supination ROM (p=.456)
- Pronation (p=.260)
- Flexion strength (p=.471)
- Supination strength (p=.419)
- Flexion endurance (p=.124)

• Patient Reported Outcome Measures:

- No difference in:
 - DASH score (p=.916)
 - MEPS (p=.742)

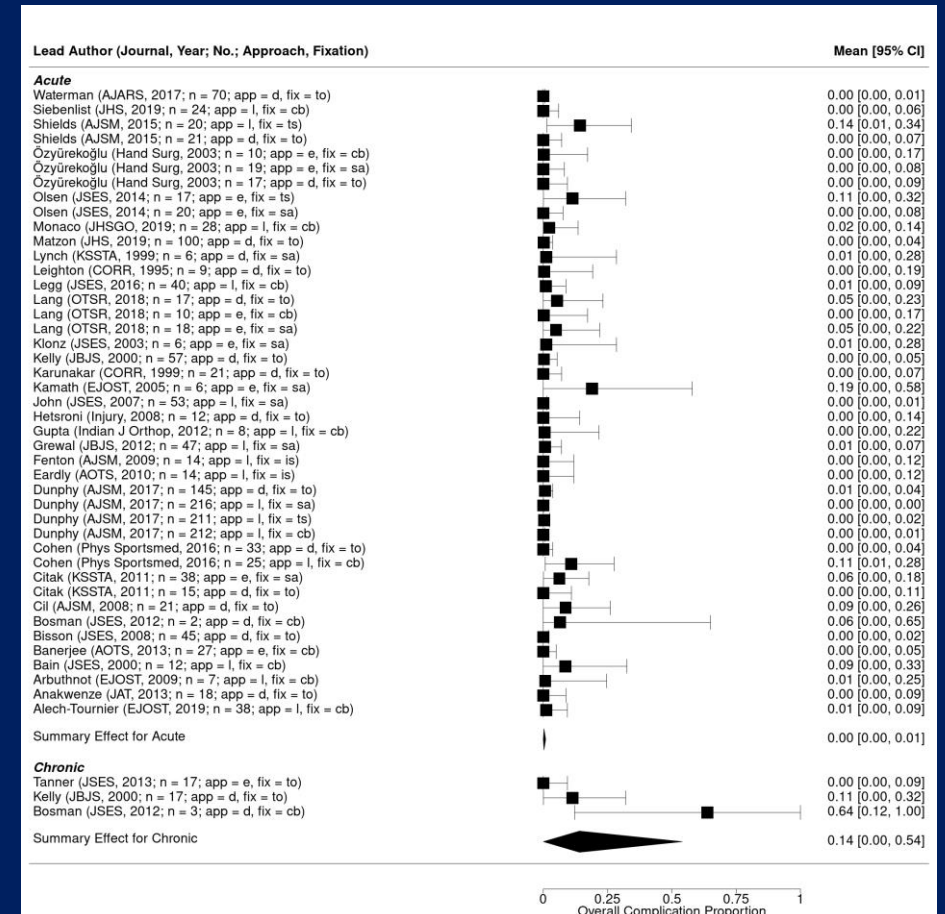


Multiple-Moderator Results (cont.)

Acute vs. Chronic Repair: Controlling for Approach and Fixation

- **Complications**

- Significant difference in:
 - Any/all complications (% , p=.027)
 - Infection (% , p=.011)
- No significant difference in:
 - Rate of any/all complications (per 100 person-years, p=.339)
 - Non-nerve complications (% , p=.188)
 - Rate of non-nerve complications (per 100 person-years, p=.339)
 - Heterotopic ossification (% , p=.308)
 - Motor nerve complications (% , p=.118)
 - Sensory nerve complications (% , p=.134)
 - Failure (% , p=.612)
 - Subsequent surgeries (% , p=.192)
 - Rate of subsequent surgeries (% , p=.117)



Multiple-Moderator Results (cont.)

Acute vs. Chronic Repair: Individual Combinations of Approach and Fixation

- 7 combinations of techniques demonstrated significant differences in infection (%) between acute and chronic repairs (Table 2)
- There were no significant differences in any other outcome of interest

Table 2. Acute vs Chronic Distal Biceps Tendon Repair by Approach and Fixation.

		Acute		Chronic		P value
		Est.	95% CI	Est.	95% CI	
Infection, %						
Approach	Fixation					
Double	Transosseous	0.00	0.00-0.01	0.11	0.01-0.26	0.012
Extensile	Cortical button	0.03	0.00-0.07	0.18	0.05-0.36	0.029
Extensile	Suture anchor	0.01	0.00-0.04	0.15	0.03-0.32	0.025
Extensile	Tension slide	0.05	0.01-0.11	0.23	0.07-0.42	0.040
Limited	Cortical button	0.00	0.00-0.02	0.12	0.01-0.28	0.017
Limited	Suture anchor	0.00	0.00-0.00	0.09	0.00-0.24	0.021
Limited	Tension slide	0.02	0.00-0.05	0.16	0.03-0.34	0.025

CI, confidence interval; Est., estimate.

Discussion/Conclusions

- Acute Repairs demonstrated:
 - Increased supination endurance
 - Lower proportion of complications
 - No difference in failures
- Acute fixation of DBTR is preferred, but chronic repairs can allow for improved function over nonoperative treatment and should be considered

References

- Srinivasan RC, Pederson WC, Morrey BF. Distal Biceps Tendon Repair and Reconstruction. J Hand Surg Am. 2020 Jan;45(1):48-56.
- Dunphy TR, Hudson J, Batech M, Acevedo DC, Mirzayan R. Surgical Treatment of Distal Biceps Tendon Ruptures: An Analysis of Complications in 784 Surgical Repairs. Am J Sports Med. 2017 Nov;45(13):3020-3029