

Surgical Outcomes for Long Head of the Biceps Surgery: An Updated Chart Review

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Introduction

Long head of the biceps tendon (LHBT) pathology is a common cause of anterior shoulder pain and dysfunction. Pain generating pathologies include tendinitis, instability, tendinopathy, impingement, and rupture of the LHBT¹.

When conservative strategies fail, surgical management includes biceps tenotomy and biceps tenodesis. Biceps tenotomy involves the release of the LHBT from its insertion on the superior glenoid labrum, allowing the distal tendon to retract into the bicipital groove and eventually scar into the distal musculature¹. Biceps tenodesis involves the transection of the LHBT and suturing the remaining distal tendon to the humeral head either just above, within, or below the bicipital groove¹.

Each procedure can be performed via different techniques (variations in the shortening length of the LHBT, location and fixation methods, and an arthroscopic or open approach) with controversy existing between the superiority of each technique. The current study will serve as an updated review of the evaluation (started in 2018) of the seven techniques used in tenodesis and tenotomy.

Objectives

- To better understand which technique provides the best surgical outcomes on the basis of improved function and minimizing re-operation.
- To better inform surgeons in decision making and surgical management of pathology of the LHBT.

Clinical Research Question & Primary Outcome

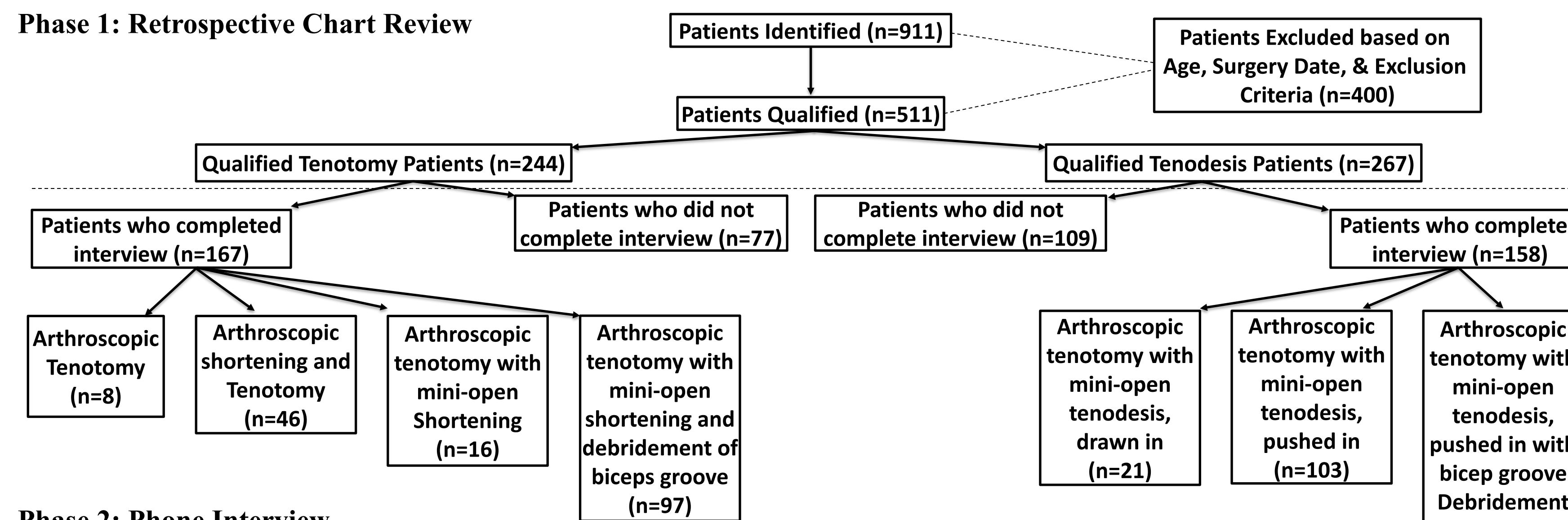
In a cohort of the senior author's Biceps Tenotomy and Tenodesis patients, based on a retrospective chart review and prospective telephone interviews, of the 7 options available for shoulder surgeons to choose from, what brings patients the lowest chance of re-operation?

Primary Outcome: The need for further intervention following the primary LHBT surgery identified by chart review.

Materials & Methods

The study protocol included a retrospective chart review followed by prospective telephone interviews. Patients were identified through the Electronic Medical Record (EMR), confirmed with the inclusion criteria, and separated by surgical procedure and technique.

Phase 1: Retrospective Chart Review



Phase 2: Phone Interview

The telephone interview protocols included first describing the study in detail to the patient, time for patient questions, verbal consent, and lastly the commencement of the interview questions. Secondary outcome measures included the patient's personal satisfaction with the procedure (determined by SANE score and two "yes" or "no" questions) and the patient's subjective restriction in function following the surgery (assessed using a single ranking question with five possible answers).

VARIABLE:	SCALE:
SANE score: "Rate your shoulder today as a percentage of normal, from 0 to 100% normal"	0-100%
Patient Satisfaction:	
Glad: "Are you glad you had this surgery done?"	Yes or No
Again: "If put in the same circumstances, would you have this done again?"	Yes or No
Subjective Restriction in Functioning:	
Pain: "Thinking of any pain over the front of your shoulder and arm today, can you..."	1) Do nothing because of it 2) Do few things because of it 3) Do many things despite it 4) Do far more than I could do before my surgery 5) Do everything as I could do before my problems started

Results

Patients who underwent tenotomy with tenodesis (12%) were significantly more likely to require subsequent intervention than were patients who underwent tenotomy alone (4.2%), $\chi^2_1=6.687$, $p=0.010$. Differences in outcomes were not significant when examining individual sub-types of procedures. There was also a significant difference between tenotomy and tenodesis patients with regard to functioning following surgery, $\chi^2_4=9.970$, $p=0.041$. Specifically, of the patients who indicated that they were able to do everything as they could before their problems started, nearly two-thirds (62.1%) had undergone tenotomy as opposed to tenodesis.

Tenotomy patients were significantly older (Median=60, IQR=51-67) than tenodesis patients (Median=43, IQR=32-55), Mann-Whitney $U = 6045.5$, $p<0.001$. There was no significant difference in the proportion of male vs. female patients undergoing each type of surgery. Overall, men comprised nearly two-thirds (62.5%) of the overall sample.

There were no significant differences between tenotomy and tenodesis patients with regard to general satisfaction measures. Both tenotomy (90.4%) and tenodesis (93%) patients overwhelmingly reported being glad that the surgery was performed. Similarly, tenotomy (88.6%) and tenodesis (90.4%) indicated that with hindsight, they would have the surgery again. Median SANE scores were high in both tenotomy (Median=85, IQR=73.75-95) and tenodesis (Median=85, IQR=75-90) patients.

Discussion

Compared to biceps tenodesis, the present study appears to demonstrate that biceps tenotomy decreases the rate of re-operation and improves functional outcomes. These results are contrary to past literature which indicates that biceps tenodesis may help to better preserve shoulder strength and functionality compared to tenotomy.^{2,3} This may be influenced by the additional debridement of the biceps groove, which should be analyzed in future research.

As patients are provided the option of which surgical procedure they undergo, the information provided about each procedure, surgeon bias, and the most important factors regarding post-surgical outcomes to patients⁴ need to be considered for how this impacts the patient's decision. Additional research is required to determine unbiased methods of providing patients surgical options.

Conclusions

According to the results, patients who underwent tenotomy were significantly less likely to require further intervention following primary LHBT surgery and were significantly more likely to re-gain pre-injury shoulder function. Both tenotomy and tenodesis patients overwhelmingly acknowledged they were glad that surgery was performed and would have the surgery again. Overall, it appears that patients are satisfied with both procedures, but tenotomy leads to lower rates of re-operation and better functional outcomes.

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