

# Biceps Tenotomy vs. Tenodesis: a NSQIP Analysis of Postoperative Outcomes

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**INTRODUCTION:** Shoulder pathologies involving the biceps tendon often necessitate surgical intervention, with biceps tenotomy and tenodesis being common treatments for pain arising from the long head of the biceps tendon. These procedures are chosen based on factors such as patient age, activity level, and the nature of the tendon pathology. While studies have assessed comparative rates of restoration of shoulder function and alleviation of symptoms, their comparative postoperative complication rates remain a topic of interest. This study is a comprehensive investigation into these complication rates, providing valuable insights for informed decision-making by clinicians and patients regarding the optimal surgical approach for biceps tendon pathologies.

**METHODS:** The National Surgical Quality Improvement Program database was queried to analyze postoperative complication rates associated with biceps tenotomy and tenodesis procedures. Patient data spanning from 2012–2021 were extracted with relevant variables assessed to identify and compare complication rates between the two surgical approaches. Multivariable logistic regression was used to control for baseline patient demographics and comorbidities.

**RESULTS SECTION:** From 11,527 patients, 264 (2.3%); 6,826 (59.22%); and 4,437 (38.49%) underwent Tenotomy, Tenodesis with open repair, and Tenodesis with arthroscopic repair. Tenotomy operative times (mean  $\pm$  SD): 66.25  $\pm$  44.76 minutes) were shorter than those for Open Tenodesis (78.83  $\pm$  41.82) and Arthroscopic Tenodesis (75.98  $\pm$  40.16). Conversely, tenotomy patients had longer hospital (1.09  $\pm$  4.86) relative to Open Tenodesis (.08  $\pm$  1.55) and Arthroscopic Tenodesis (.12  $\pm$  2.70). Logistic regression models which controlled for demographics and comorbidities revealed patients undergoing Tenotomy were equally likely as patients undergoing Tenodesis procedures to be readmitted (adjusted odds ratio [AOR] 1, P value: .343) or sustain serious (AOR 1, P value: .525) or minor (AOR 1, P value: .452) adverse events than those receiving either Tenodesis approach (P insignificant for all). Lastly, the raw number of Tenotomies performed has remained relatively constant from 2012–2021, while those of both Tenodesis procedures has increased significantly.

**DISCUSSION:** To our knowledge, this is the first NSQIP study investigating post operative rates between the various surgical treatments for pathologic of the long head of the biceps tendon. This study supports the idea that there is no difference in complication rates for any of the three approaches. However, it does note a shorter operative time for tenotomy, which is a notably simpler procedure, as well as, interestingly, longer hospital stays. These findings alone support the increased utilization of Tenodesis, a conclusion which seems to be widespread as utilization of the Tenodesis procedure has increased widely relative to Tenotomy. Additionally, the decision of which approach to use should then largely be based on differences in functional outcomes and rehabilitation time.

**SIGNIFICANCE/CLINICAL RELEVANCE:** In the discussion of whether tenotomy or tenodesis should be performed, this study supports the notion that there is no difference in overall post-operative complication rates following any of the three procedures; thus, the decision lies with the surgical provider and should be informed by research in differences in functional outcome measures.

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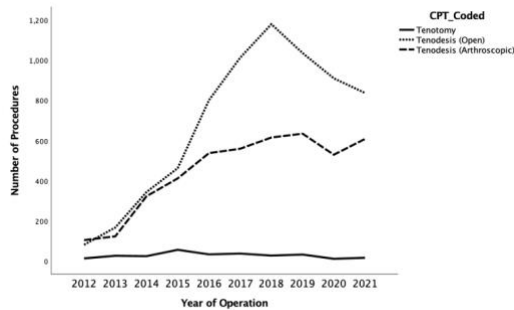
## IMAGES AND TABLES:

**Table II:** Comparison of operation times, lengths of stay, and perioperative outcomes among patients undergoing Tenotomy and Tenodesis (open v arthroscopic)

	Total	Tenotomy (23405)	Tenodesis (open) (23405)	Tenodesis (arthroscopic) (29828)	P value
	N = 11,527 (N)	N = 264 (N)	N = 6,826 (N)	N = 4,437 (N)	
Total operative time	77.44 $\pm$ 41.31	66.25 $\pm$ 44.76	78.83 $\pm$ 41.82	75.98 $\pm$ 40.16	<.001 for all comparisons
Length of hospital stay	0.09 $\pm$ 3.57	1.14 $\pm$ 4.86	.07 $\pm$ 2.94	.07 $\pm$ 4.27	<.001 for tenotomy vs. tenodesis (open) & tenotomy vs. tenodesis (arthroscopic); .998 for tenodesis (open) vs. tenodesis (arthroscopic)
Days from operation to discharge	0.12 $\pm$ 2.18	1.09 $\pm$ 4.65	.08 $\pm$ 1.55	.12 $\pm$ 2.70	<.001 for all comparisons
Any readmission	71 (0.6)	7 (2.6)	36 (.6)	26 (.6)	0.979
<b>Serious adverse events</b>					
Death	2 (0)	1 (0.4)	1 (0)	0 (0)	
Return to operating room	35 (0.3)	4 (1.5)	20 (.3)	11 (.2)	0.115
Pulmonary complications	7 (0.1)	4 (1.5)	2 (0)	3 (.1)	0.995
Pneumonia	9 (0.1)	1 (0.4)	2 (0)	6 (.1)	0.835
Cardiac complications	7 (0.1)	2 (0.8)	2 (0)	3 (.1)	0.992
Renal complications	2 (0)	0 (0)	2 (0)	0 (0)	
Thromboembolic complications	22 (.2)	0 (0)	13 (.2)	9 (.2)	1
Deep wound complications	10 (0.1)	1 (0.4)	7 (.1)	2 (0)	0.995
Sepsis	35 (.3)	7 (2.6)	13 (.2)	15 (.3)	0.993
<b>Minor adverse events</b>					
Superficial surgical site infection	45 (0.4)	1 (0.4)	26 (.4)	18 (.4)	0.998
Urinary tract infection	20 (0.2)	1 (0.4)	8 (.1)	11 (.2)	

ASA, body mass index; ASA, American Society of Anesthesiologists; COPD, chronic obstructive pulmonary disease

P values were calculated using the Chi-square test for categorical variables and one-way analysis of variance tests for continuous variables.



**Figure 1**—Utilization trends for Biceps Tenotomy, Tenodesis (Open), Tenodesis (Arthroscopic) from 2012 to 2021.

**Table IV**—Adjusted analysis comparing postoperative complications between procedures, patient demographics, and baseline comorbidities

	Readmission AOR	P value	SAE AOR	P value	MAE AOR	P value
Tenotomy	1		1		1	
Male	1.259	0.365	0.641	0.091	1.392	0.224
Black or African American	0.999	0.992	1.009	0.882	0.913	0.266
Age	0.993	0.532	0.998	0.806	0.986	0.217
Body mass index	0.975	0.133	0.986	0.402	1.033	0.094
Current smoker	0.673	0.258	0.75	0.338	0.773	0.484
Congestive heart failure	3.29	0.299	0	0.999	0	0.999
Hypertension	1.33	0.327	0.95	0.847	1.574	0.143
Diabetes mellitus	2.85	<.001	1.843	0.043	0.56	0.243
Partially or fully dependent	0.666	0.644	0.622	0.598	2.045	0.435

AOR, adjusted odds ratio; SAE, Serious adverse event; MAE, minor adverse event; ASA, American Society of Anesthesiologists.

All P values adjusted for age, sex, race, body mass index, ASA, class, smoking status, congestive heart failure, hypertension, diabetes mellitus, and functional status

Reference: Tenodesis (Combined)

Reference: White

Reference: ASA class 1

Reference: Independent