ANS-LHS

OPEN ACCESS

Advanced Natural Sciences: Life and Health Sciences,
ISSN: 3107-636X, Vol-3, Issue-2,
July-Dec, 2026, 385-393
https://www.indjournals.com

Research Article

Functional Outcomes, Pain, and Shoulder Range of Motion Following Arthroscopic Rotator Cuff Repair with and Without Concomitant Biceps Tenotomy or Tenodesis: A Retrospective Comparative Study

Kapil R Ghorpade[1], Jaydeep K Patil[2], Shailesh S Suryawanshi[3], Vaibhav D Khade[4] and Vishwajeet R kadam[5]

[1]Associate professor, Department Of Orthopedics,
Prakash Institute Of Medical Science And Research Uran Islampur, Maharashtra India 415409
[2]Associate Professor, Sau. Vandana N. Tasgaonkar Education Complex Village Diksal,
Post Koshane, Karjat, Bhivpuri Camp, Maharashtra. 410201
[3,4,5] Junior Resident, Department Of Orthopedics,
Prakash Institute Of Medical Science And Research Uran Islampur, Maharashtra India 415409

Article Info:
Corresponding Author
Dr Kapil R Ghorpade
Associate professor Prakash Institute Of Medical Science And Research uran Islampur, Maharashtra India 410201

DOI: 10.68819/anslhs.2026.0043

[Received 20-10-2026,
Accepted 06-11-2026,
Published 17-11-2026]

Publishers Note: Natural Science Association stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.
Copyright: ©2026 by the author(s). This is an Open Access article distributed under the terms of the Creative Commons Attribution 4.0 license (unless stated otherwise) permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.
https://creativecommons.org/licenses/by/4.0//

Abstract

Background: Pain and limited motion can persist after arthroscopic rotator cuff repair. The long head of the biceps tendon may add to these symptoms, but the value of treating it during repair is unclear.

Objectives: To compare function, pain, and shoulder range of motion up to 12 months after arthroscopic rotator cuff repair with and without biceps tenotomy or tenodesis.

Methods: This retrospective comparative study included 60 patients. Group A (n = 25) had isolated repair. Group B (n = 35) had repair with biceps tenotomy (n = 20) or tenodesis (n = 15). The Constant-Murley score (CMS) and its components were recorded before surgery and at 3, 6, and 12 months. Forward flexion, abduction, and external rotation were measured before surgery and at 12 months. Groups were compared with Welch's t-test, the chi-square test, or Fisher's exact test.

Results: The groups were similar in age, sex, risk factors, tear size, and repair technique. At 12 months, the total CMS was 85.0 ± 10.0 in Group B and 76.0 ± 12.0 in Group A ($p = 0.004$). Group B scored higher on the pain (14.0 vs 12.0), daily living (17.0 vs 15.0), and motion (33.0 vs 29.0) components. Strength did not differ ($p = 0.34$). Forward flexion was 165° vs 151° ($p = 0.003$), abduction 161° vs 145° ($p = 0.002$), and external rotation 65° vs 56° ($p = 0.007$). Residual pain (11.4% vs 28.0%), stiffness (5.7% vs 16.0%), and satisfaction (88.6% vs 76.0%) did not differ statistically. Two patients (5.7%) in Group B developed a Popeye deformity.

Conclusion: In this series, adding a biceps procedure to cuff repair went with better function, less pain, and more motion at 12 months. The study was retrospective and non-randomised, so a prospective trial is needed to confirm the finding.

Keywords: rotator cuff repair; long head of biceps; biceps tenotomy; biceps tenodesis; Constant-Murley score; range of motion.

Introduction

Rotator cuff tears are a common cause of shoulder pain and weakness. A population-based ultrasound survey of 683 people found full-thickness tears in 20.7% of shoulders. The prevalence rose with age. A history of trauma, the dominant arm, and older age were the main risk factors.[1] Many tears cause no symptoms. In other patients the tear causes night

Cite this article: Kapil R Ghorpade, Jaydeep K Patil, Shailesh S Suryawanshi, Vaibhav D Khade and Vishwajeet R kadam, 2026. Functional Outcomes, Pain, and Shoulder Range of Motion Following Arthroscopic Rotator Cuff Repair with and Without Concomitant Biceps Tenotomy or Tenodesis: A Retrospective Comparative Study. Advanced Natural Sciences: Life and Health Sciences, 3(2).385- 393. https://doi.org/10.68819/anslhs.2026.0043

pain, loss of overhead movement, and difficulty with daily tasks. A person with persistent symptoms and a repairable tear is usually offered surgery. Arthroscopic repair lets the surgeon see the whole joint through small portals. It also allows other problems to be treated at the same sitting.

Repair does not always relieve pain. Some patients still have pain, stiffness, or limited movement months after a sound repair. The long head of the biceps tendon (LHBT) is a leading candidate. It arises from the supraglenoid tubercle and the superior labrum. It then crosses the rotator interval and leaves the joint through the bicipital groove. On this path it lies next to the supraspinatus and subscapularis tendons, so disease of the cuff can involve it. The LHBT has been linked with subscapularis lesions, superior labrum tears, rotator cuff disease, impingement, and pulley lesions of the rotator interval.[2]

The LHBT can be injured in athletes and in non-athletes. The tendon and the superior labrum do not exist in isolation, and disease of one can involve the other. Patients may present with cuff disease, a labral tear, or isolated biceps instability. The work-up and the treatment differ in each case.[3]

The tendon adds little to a healthy shoulder. Its part in elevation and stability is small. When the cuff fails, the picture changes. In shoulders with symptomatic cuff tears the LHBT is recruited early and works harder. This suggests that it compensates for the damaged cuff and helps to hold the humeral head down. A scoping review of 214 articles found that LHBT tendinopathy, cuff disease, and tendon instability tend to occur together. The same review found that clinical tests for biceps pathology have limited accuracy. Magnetic resonance imaging and ultrasound perform better for full-thickness tears and instability, but arthroscopy cannot always show the proximal tendon in full.[4] Biceps disease can therefore be missed before surgery.

The link between the two tendons has been measured. In an MRI study of 243 patients with shoulder pain from a cuff or LHBT tear, the two kinds of tear were associated. LHBT tears were found in 48% of shoulders with at least two completely torn cuff tendons, compared with 10% of shoulders with one. Both types of tears were more common in patients older than 65 years.[5] Larger tears and older age therefore raise the chance that the biceps needs attention at the time of repair.

When the LHBT is diseased, the surgeon has several options. The tendon can be left in place, debrided, released, or fixed to the humerus. Release is called tenotomy. It is quick and needs no implant. The muscle belly may drop, however, and leave a visible bulge known as the Popeye deformity. Some patients also report cramping in the biceps. Fixation is called tenodesis. It keeps the muscle length and contour. It takes more operative time and needs an anchor or other fixation. Both procedures remove the painful tendon from the joint. Surgeons differ in the one they prefer. The choice often depends on the age, activity level, and expectations of the patient.

The question in this study is a different one. It is whether a biceps procedure should be added at all when the cuff is repaired. A biceps procedure adds operative time and, for tenodesis, the cost of an implant. It also removes a structure that may help the shoulder. Against this, an inflamed or torn tendon left in place may keep the shoulder painful and stiff and limit the gain from the repair. Pain, function, and range of motion matter to the patient in different ways, so all three need to be measured together. Data from routine practice are also useful, because the patients in trials are not always like those seen in clinic.

We therefore compared patients who had arthroscopic rotator cuff repair alone with those who had repair plus biceps tenotomy or tenodesis. We looked at functional score, pain, and range of motion. We followed the patients for 12 months and tracked the Constant-Murley score and its components at 3, 6, and 12 months. We also compared complications and patient satisfaction. The aim was to find out whether adding a biceps procedure changes recovery after cuff repair.

Methods

This was a retrospective comparative study of adults who had arthroscopic rotator cuff repair at Prakash Institute of Medical Science And Research Uran Islampur, Maharashtra India. The institutional ethics

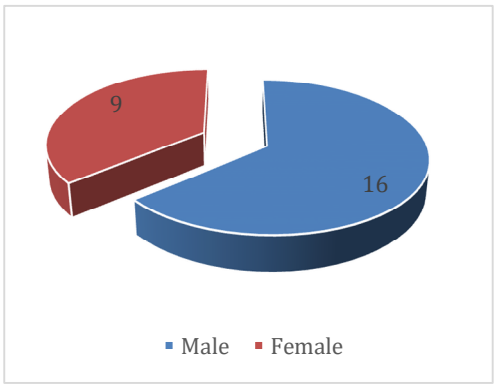
committee approved the study. The patients who were treated for rotator cuff repair between June 2024 to May 2026 were included in this study on the basis of a predefined inclusion and exclusion criteria. Eligible patients were aged 18 years or older and had a full-thickness rotator cuff tear on magnetic resonance imaging, treated by arthroscopic repair. Patients were excluded if they had a previous operation on the same shoulder, inflammatory arthritis, advanced glenohumeral arthritis, or a neurological deficit in the limb. Patients with less than 12 months of follow-up were also excluded.

Sixty patients were included and placed in two groups by the procedure recorded in the operation note. Group A (n = 25) had isolated arthroscopic rotator cuff repair. Group B (n = 35) had repair with biceps tenotomy or tenodesis. The surgeon chose the biceps procedure at arthroscopy, based on the state of the tendon and on the age and activity level of the patient. In tenotomy the tendon was released from its origin. In tenodesis it was fixed to the proximal humerus. Repair was single-row or double-row, and subacromial decompression was added when needed. Rehabilitation was the same in both groups. It began with a sling and passive motion, followed by active motion and strengthening.

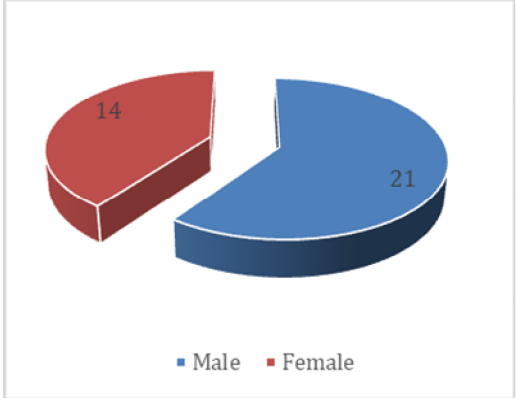
Data were taken from clinical records and de-identified before analysis. They included age, sex, side, risk factors, cause and duration of symptoms, tear size, and details of the operation. Function was scored with the Constant-Murley score (CMS, 0–100). Its components are pain (0–15), activities of daily living (0–20), range of motion (0–40), and strength (0–25). Higher scores mean better function and less pain. Pain was also rated on a 10-point visual analogue scale (VAS). Forward flexion, abduction, and external rotation were measured in degrees. The CMS and its components were recorded before surgery and at 3, 6, and 12 months. Range of motion was compared before surgery and at 12 months. At 12 months we recorded residual pain (VAS 3 or more), persistent stiffness, Popeye deformity, bicipital cramping, revision surgery, and satisfaction. Continuous data are given as mean ± standard deviation and were compared with Welch's unpaired t-test. Categorical data are given as number (percentage) and were compared with the chi-square test or Fisher's exact test, as suitable. Data were analysed with SPSS 23.0 . A p-value below 0.05 was taken as statistically significant.

Results

Sixty patients were included: 25 in Group A (repair alone) and 35 in Group B (repair with biceps tenotomy or tenodesis). Most patients were aged 51–60 years (40.0% in Group A and 42.9% in Group B), and most were men (64.0% and 60.0%). Mean age was 53.2 ± 9.4 years and 54.1 ± 8.8 years (p = 0.71). The groups did not differ in age band (p = 0.98), or side (p = 1.00) (Figure 1 , Table 1).



Group A :- Rotator Cuff Repair Only.



Group B : Rotator Cuff Repair with biceps tenotomy or tenodesis

Figure 1: Gender Distribution of the studied cases.

Characteristic	Group A: RCR alone (n = 25)	Group B: RCR + biceps (n = 35)	p-value
Male, n (%)	16 (64.0%)	21 (60.0%)	0.79
Female, n (%)	9 (36.0%)	14 (40.0%)	
Age 31–40 years, n (%)	3 (12.0%)	3 (8.6%)	0.98
Age 41–50 years, n (%)	7 (28.0%)	10 (28.6%)	
Age 51–60 years, n (%)	10 (40.0%)	15 (42.9%)	
Age ≥61 years, n (%)	5 (20.0%)	7 (20.0%)	
Mean age (years ± SD)	53.2 ± 9.4	54.1 ± 8.8	0.71
Right shoulder, n (%)	17 (68.0%)	23 (65.7%)	1.00
Left shoulder, n (%)	8 (32.0%)	12 (34.3%)	

Table 1: Age, gender, and side distribution of the study population (n = 60)

Repetitive overhead activity was the most common risk factor (36.0% and 40.0%), followed by heavy manual labor (32.0% and 34.3%) and hypertension (28.0% and 31.4%). Diabetes mellitus was present in 24.0% and 28.6% of patients. No risk factor differed between the groups (all p > 0.05) (Table 2).

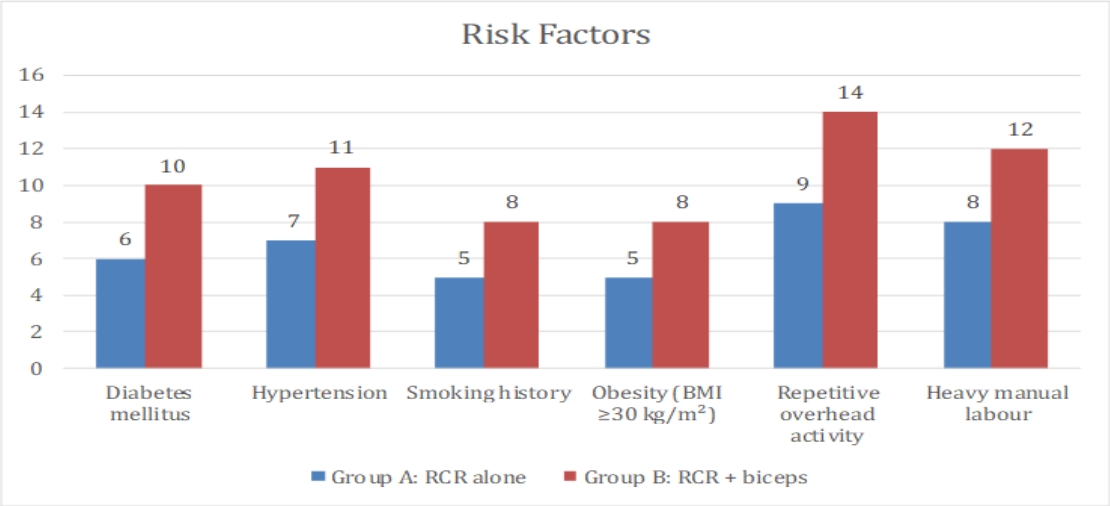


Table 2: Associated risk factors and comorbidities in the two groups (n = 60). Patients could have more than one risk factor.

Most tears were degenerative (68.0% in Group A and 71.4% in Group B; p = 0.78). Symptoms had lasted 6–12 months in 44.0% and 45.7% of patients (p = 0.89). Medium tears of 1–3 cm were the most common (52.0% and 51.4%), and massive tears were uncommon (4.0% and 5.7%). Tear size did not differ between groups (p = 0.94) (Table 3).

Characteristic	Group A: RCR alone (n = 25)	Group B: RCR + biceps (n = 35)	p-value
Degenerative etiology	17 (68.0%)	25 (71.4%)	0.78
Traumatic etiology	8 (32.0%)	10 (28.6%)	
Symptoms <6 months	7 (28.0%)	8 (22.9%)	0.89
Symptoms 6–12 months	11 (44.0%)	16 (45.7%)	
Symptoms >12 months	7 (28.0%)	11 (31.4%)	
Small tear (<1 cm)	5 (20.0%)	5 (14.3%)	0.94
Medium tear (1–3 cm)	13 (52.0%)	18 (51.4%)	
Large tear (3–5 cm)	6 (24.0%)	10 (28.6%)	
Massive tear (>5 cm)	1 (4.0%)	2 (5.7%)	

Table 3: Etiology, symptom duration, and rotator cuff tear size in the two groups (n = 60).

Single-row repair was used in 60.0% of Group A and 57.1% of Group B (p = 1.00). Subacromial decompression was done in 72.0% and 77.1% (p = 0.76). In Group B, 20 patients (57.1%) had biceps

tenotomy and 15 (42.9%) had tenodesis. The indication was tendinopathy in 17 patients (48.6%), partial tear in 11 (31.4%), and instability in 7 (20.0%) (Table 4).

Surgical characteristic	Group A: RCR alone (n = 25)	Group B: RCR + biceps (n = 35)	p-value
Single-row repair	15 (60.0%)	20 (57.1%)	1.00
Double-row repair	10 (40.0%)	15 (42.9%)	
Subacromial decompression	18 (72.0%)	27 (77.1%)	0.76
Biceps tenotomy	0	20 (57.1%)	—
Biceps tenodesis	0	15 (42.9%)	—
Indication: biceps tendinopathy	—	17 (48.6%)	—
Indication: partial biceps tear	—	11 (31.4%)	—
Indication: biceps instability	—	7 (20.0%)	—

Table 4: Surgical characteristics and biceps interventions (n = 60).

Before surgery, the groups had similar function and motion. The total Constant-Murley score was 44.0 ± 12.0 in Group A and 42.0 ± 13.0 in Group B (p = 0.54). The VAS pain score was 6.7 ± 1.4 and 7.1 ± 1.3 (p = 0.27). The Constant-Murley pain component was lower in Group B (5.0 vs 6.0), which means more pain, but the difference was not statistically significant (p = 0.06). Forward flexion, abduction, and external rotation were alike in both groups (Table 5).

Preoperative parameter	Group A (Mean ± SD)	Group B (Mean ± SD)	p-value
Constant-Murley total score	44.0 ± 12.0	42.0 ± 13.0	0.54
CMS pain component	6.0 ± 2.0	5.0 ± 2.0	0.06
CMS activities of daily living	9.0 ± 2.5	9.0 ± 2.7	1.00
CMS range-of-motion component	19.0 ± 6.0	18.0 ± 6.0	0.53
CMS strength component	10.0 ± 3.0	10.0 ± 3.5	1.00
VAS pain score	6.7 ± 1.4	7.1 ± 1.3	0.27
Forward flexion (°)	106 ± 21	101 ± 20	0.36
Abduction (°)	96 ± 20	92 ± 19	0.44
External rotation (°)	38 ± 12	35 ± 11	0.33

Table 5: Baseline comparison of shoulder function, pain, and range of motion (n = 60). p-values by Welch's t-test. CMS, Constant-Murley score; VAS, visual analogue scale.

All 60 patients completed 12 months of follow-up. Residual pain (VAS 3 or more) was present in 28.0% of Group A and 11.4% of Group B (p = 0.17). Persistent stiffness occurred in 16.0% and 5.7% (p = 0.22). Popeye deformity occurred in 2 patients (5.7%) in Group B and in none in Group A (p = 0.51). One patient in Group B had bicipital cramping. One patient in each group needed revision surgery. Satisfaction was 76.0% in Group A and 88.6% in Group B (p = 0.29). None of these differences reached statistical significance (Table 6).

Outcome at 12 months	Group A: RCR alone (n = 25)	Group B: RCR + biceps (n = 35)	p-value
Completed follow-up	25 (100%)	35 (100%)	—
Residual pain (VAS ≥3)	7 (28.0%)	4 (11.4%)	0.17
Persistent shoulder stiffness	4 (16.0%)	2 (5.7%)	0.22
Popeye deformity	0 (0%)	2 (5.7%)	0.51
Bicipital cramping	0 (0%)	1 (2.9%)	1.00
Revision surgery	1 (4.0%)	1 (2.9%)	1.00
Satisfied or very satisfied	19 (76.0%)	31 (88.6%)	0.29

Table 6: Postoperative complications and patient satisfaction at 12 months (n = 60). p-values by Fisher's exact test. VAS, visual analogue scale.

At 12 months, Group B had greater forward flexion (165° ± 15° vs 151° ± 18°; p = 0.003), abduction (161° ± 16° vs 145° ± 20°; p = 0.002), and external rotation (65° ± 11° vs 56° ± 13°; p = 0.007). The gain from baseline was also larger in Group B for flexion (64° vs 45°), abduction (69° vs 49°), and external rotation (30° vs 18°). Each difference in gain had p < 0.001 (Table 7).

Range-of-motion parameter	Group A (Mean ± SD)	Group B (Mean ± SD)	p-value
Preoperative forward flexion (°)	106 ± 21	101 ± 20	0.36
Postoperative forward flexion (°)	151 ± 18	165 ± 15	0.003
Improvement in flexion (°)	45 ± 20	64 ± 19	<0.001
Preoperative abduction (°)	96 ± 20	92 ± 19	0.44
Postoperative abduction (°)	145 ± 20	161 ± 16	0.002
Improvement in abduction (°)	49 ± 21	69 ± 20	<0.001
Preoperative external rotation (°)	38 ± 12	35 ± 11	0.33
Postoperative external rotation (°)	56 ± 13	65 ± 11	0.007
Improvement in external rotation (°)	18 ± 13	30 ± 12	<0.001

Table 7: Comparison of shoulder range of motion before surgery and at 12 months (n = 60). p-values by Welch's t-test.

The total Constant-Murley score was similar at 3 months (55.2 vs 59.8; p = 0.12). It was higher in Group B at 6 months (66.5 vs 74.2; p = 0.012) and at 12 months (76.0 vs 85.0; p = 0.004). The pain component was higher in Group B at 6 and 12 months (both p < 0.001). The daily living component differed at 6 months (p = 0.009) and 12 months (p = 0.006). The motion component differed at 6 months (p = 0.021) and 12 months (p = 0.002). The strength component did not differ at any visit (p = 0.45, 0.45, and 0.34 at 3, 6, and 12 months) (Table 8).

Outcome parameter	Assessment	Group A: RCR alone (n = 25)	Group B: RCR + biceps (n = 35)	p-value
CMS total (0–100)	Preoperative	44.0 ± 12.0	42.0 ± 13.0	0.54
	3 months	55.2 ± 11.4	59.8 ± 10.8	0.12
	6 months	66.5 ± 11.8	74.2 ± 10.5	0.012
	12 months	76.0 ± 12.0	85.0 ± 10.0	0.004
CMS pain (0–15)	Preoperative	6.0 ± 2.0	5.0 ± 2.0	0.06
	3 months	8.0 ± 2.0	9.0 ± 2.0	0.06
	6 months	10.0 ± 2.0	12.0 ± 2.0	<0.001
	12 months	12.0 ± 2.0	14.0 ± 1.0	<0.001
CMS daily living (0–20)	Preoperative	9.0 ± 2.5	9.0 ± 2.7	1.00
	3 months	11.0 ± 2.5	12.0 ± 2.5	0.13
	6 months	13.0 ± 3.0	15.0 ± 2.5	0.009
	12 months	15.0 ± 3.0	17.0 ± 2.0	0.006
CMS range of motion (0–40)	Preoperative	19.0 ± 6.0	18.0 ± 6.0	0.53
	3 months	23.0 ± 5.5	25.0 ± 5.0	0.16
	6 months	27.0 ± 5.0	30.0 ± 4.5	0.021
	12 months	29.0 ± 5.0	33.0 ± 4.0	0.002
CMS strength (0–25)	Preoperative	10.0 ± 3.0	10.0 ± 3.5	1.00
	3 months	13.2 ± 3.0	13.8 ± 3.0	0.45
	6 months	16.5 ± 3.5	17.2 ± 3.5	0.45
	12 months	20.0 ± 4.0	21.0 ± 4.0	0.34

Table 8: Serial comparison of the Constant-Murley score and its components from before surgery to 12 months (n = 60).

Discussion

In this retrospective study of 60 patients, adding a biceps tenotomy or tenodesis to arthroscopic cuff repair went with better results at 12 months. The mean Constant-Murley score was 85.0 in Group B and 76.0 in Group A (p = 0.004). Pain, daily living,

and motion scores were higher in Group B. Forward flexion, abduction, and external rotation were also greater. Strength did not differ. The groups were alike in age, sex, risk factors, tear size, and repair technique before surgery. The design was not randomised, so these results show an association and not a cause.

Earlier work does not show the same benefit. Vigié et al. reviewed nine studies that compared cuff repair alone with repair plus tenotomy or tenodesis in isolated supraspinatus tears.[6] Six found no difference in function. One found better results with the biceps procedure and one found worse results. The authors called the evidence weak, because the studies were few and used different outcome measures. Gumina et al. compared 75 patients whose biceps was kept with 86 who had tenotomy or tenodesis, all with large cuff tears.[7] The mean Constant score at one year was 76 and 78 ($p = 0.16$). They concluded that the tendon need not be sacrificed when degeneration is mild to moderate. Our Group A score of 76.0 matches their preserved group, but our Group B score of 85.0 is higher than either of theirs. Their patients had a mean age near 65 years, while ours were in their early fifties. All their patients had large tears, and about 30% of ours had large or massive tears. These differences may explain part of the gap.

Trials of tenotomy against tenodesis ask a different question, but they show how the biceps procedures behave. Zhang et al. randomised 151 patients older than 55 years to tenotomy or tenodesis.[8] Strength, function, and satisfaction were alike at 24 months. Tenotomy took less operative time (40.4 vs 50.4 minutes) and gave faster pain relief. Castricini et al. found no difference in Constant-Murley score, pain, or strength between the two procedures in 55 patients.[9] Popeye sign was more frequent after tenotomy. Oh et al. randomised 120 patients to debridement, tenotomy, or tenodesis alongside cuff repair.[10] All groups improved, and the groups did not differ. Popeye deformity occurred in 37% after tenotomy and in 7.1% after debridement. Belay et al. studied 34 patients and found earlier pain relief after tenotomy.[11] Popeye deformity occurred in 25% of the tenotomy group and 7% of the tenodesis group. In our series, 2 of 35 patients (5.7%) had this deformity across both procedures. This is below the rates after tenotomy in these trials.

De Carli et al. studied 65 patients and found that adding tenodesis to tenotomy did not improve clinical or functional results, although it prevented visible deformity.[12] Shang et al. analysed ten studies with 903 patients.[13] Tenotomy was linked to a lower Constant score and more Popeye deformity. Pain, strength, range of motion, and satisfaction did not differ. Kooistra et al. pooled 25 studies with 2191 patients and found no benefit of tenodesis over tenotomy for function, pain, or biceps strength.[14] Popeye deformity was less common after tenodesis (9% vs 23%). Song et al. studied 96 patients older than 60 years with medium to massive tears.[15] Tenodesis gave better function and elbow strength at 3 months, and tenotomy gave less pain. Results were similar at the final visit. These reports suggest that the choice between the two procedures changes little at one to two years.

A biceps procedure may help by removing a painful tendon from the joint. In our series the pain score at 12 months was 14.0 in Group B and 12.0 in Group A, and the difference was already clear at 6 months ($p < 0.001$ at both visits). An inflamed or torn tendon left in place may keep the shoulder painful in the early months. Less pain may allow earlier and fuller exercise, and this could explain the greater motion. We did not test this explanation.

Several limits apply. The study was retrospective, and the surgeon chose the biceps procedure at arthroscopy. Patients with a diseased tendon were more likely to receive it, and the state of the tendon in Group A was not recorded. Age and activity level also guided the choice and can affect recovery. The sample was small, with 25 and 35 patients, and the two biceps procedures were pooled, so they could not be compared. Follow-up was 12 months. Cuff healing on imaging and late retears were not assessed. Residual pain, stiffness, and satisfaction favored Group B but did not reach statistical significance, and the study may be too small to detect these differences.

These findings do not show that every cuff repair needs a biceps procedure. They suggest that patients

who have one do not do worse at 12 months and may do better. A prospective randomised trial is needed. It should record tendon condition and tear size at entry and cuff healing at follow-up.

Conclusion

In this series, patients who had a biceps tenotomy or tenodesis with arthroscopic cuff repair had higher Constant-Murley scores, less pain, and greater shoulder motion at 12 months than those who had repair alone. The mean total score was 85.0 in Group B compared with 76.0 in Group A. Strength did not differ, and complications and revisions did not differ statistically. The groups were not formed by chance, so the finding may reflect patient selection. A prospective randomised trial is needed before this can guide practice.

Declarations

Ethical Approval

The study protocol was approved by the Institutional Ethics Committee.

Funding

The authors received no specific financial support from any funding agency in the public, commercial, or not-for-profit sectors for conducting this study.

Conflict of Interest

The authors declare that they have no conflict of interest.

Informed Consent

Not Applicable.

Data Availability Statement

The data supporting the findings of this study are available from the corresponding author upon reasonable request, subject to applicable institutional and ethical requirements.

References

1. Yamamoto A, Takagishi K, Osawa T, et al. Prevalence and risk factors of a rotator cuff tear in the general population. *J Shoulder Elbow Surg*. 2010;19(1):116-120. doi:10.1016/j.jse.2009.04.006
2. Hsu SH, Miller SL, Curtis AS. Long head of biceps tendon pathology: management alternatives. *Clin Sports Med*. 2008;27(4):747-762. doi:10.1016/j.csm.2008.07.005
3. Scanaliato JP, Kerzner B, Bach BR Jr, Garrigues GE. Long head of the biceps tendon pathology: from etiology to management. *J Am Acad Orthop Surg*. 2025;33(20):e1191-e1204. doi:10.5435/JAAOS-D-24-00723
4. Diplock B, Hing W, Marks D. The long head of biceps at the shoulder: a scoping review. *BMC Musculoskelet Disord*. 2023;24(1):232. doi:10.1186/s12891-023-06346-5
5. Alraddadi A, Aldebasi B, Alnufaie B, et al. The association between a rotator cuff tendon tear and a tear of the long head of the biceps tendon: chart review study. *PLoS One*. 2024;19(3):e0300265. doi:10.1371/journal.pone.0300265
6. Vigié R, Bonnevialle N, Hao KA, et al. Tenotomy or tenodesis versus conservation of the long head of the biceps tendon in the repair of isolated supraspinatus tears: a systematic review of the literature. *Orthop Traumatol Surg Res*. 2023;109(8S):103673. doi:10.1016/j.otsr.2023.103673
7. Gumina S, Cantore M, Rionero M, Calistri A, Candela V. Preservation of the long head of the biceps tendon is a viable option in rotator cuff repair: a retrospective comparative study using Biceps Inflammation Section Integrity classification. *Clin Shoulder Elb*. 2026;29(3):311-315. doi:10.5397/cise.2025.01319
8. Zhang Q, Zhou J, Ge H, Cheng B. Tenotomy or tenodesis for long head biceps lesions in shoulders with reparable rotator cuff tears: a prospective randomised trial. *Knee Surg Sports Traumatol Arthrosc*. 2015;23(2):464-469. doi:10.1007/s00167-013-2587-8
9. Castricini R, Familiari F, De Gori M, et al. Tenodesis is not superior to tenotomy in the treatment of the long head of biceps tendon lesions. *Knee Surg Sports Traumatol Arthrosc*. 2018;26(1):169-175. doi:10.1007/s00167-017-4609-4
10. Oh JH, Lee YH, Kim SH, et al. Comparison of treatments for superior labrum-biceps complex

lesions with concomitant rotator cuff repair: a prospective, randomized, comparative analysis of debridement, biceps tenotomy, and biceps tenodesis. *Arthroscopy*. 2016;32(6):958-967. doi:10.1016/j.arthro.2015.11.036

11. Belay ES, Wittstein JR, Garrigues GE, et al. Biceps tenotomy has earlier pain relief compared to biceps tenodesis: a randomized prospective study. *Knee Surg Sports Traumatol Arthrosc*. 2019;27(12):4032-4037. doi:10.1007/s00167-019-05682-1
12. De Carli A, Vadalà A, Zanzotto E, et al. Reparable rotator cuff tears with concomitant long-head biceps lesions: tenotomy or tenotomy/tenodesis? *Knee Surg Sports Traumatol Arthrosc*. 2012;20(12):2553-2558. doi:10.1007/s00167-012-1918-5
13. Shang X, Chen J, Chen S. A meta-analysis comparing tenotomy and tenodesis for treating rotator cuff tears combined with long head of the biceps tendon lesions. *PLoS One*. 2017;12(10):e0185788. doi:10.1371/journal.pone.0185788
14. Kooistra B, Gurnani N, Weening A, van Deurzen D, van den Bekerom M. Tenotomy or tenodesis for tendinopathy of the long head of the biceps brachii: an updated systematic review and meta-analysis. *Arthrosc Sports Med Rehabil*. 2021;3(4):e1199-e1209. doi:10.1016/j.asmr.2021.02.010
15. Song K, Lu G, Cai M, Sun Q. The clinical outcomes of arthroscopic tenotomy versus tenodesis with medium-to-massive rotator cuff tear in the elderly: a retrospective study. *Clin Interv Aging*. 2025;20:33-42. doi:10.2147/CIA.S493029