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# Clinical and structural outcomes after superior capsular reconstruction and augmentation for massive rotator cuff tears using the long head biceps tendon as a graft

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## INTRODUCTION

Massive lesions represent between 10% and 40% of rotator cuff lesions, with an unacceptable percentage of post-operative failures or re-tears reaching up to 90 percent[1]. Our previous series showed 40% re-tears with 1-year follow-up[2]. The primary factors associated with re-ruptures are size of lesions, chronicity, fat infiltration, muscle degeneration and patient age. However, a common variable underlying all massive lesions and re-tear is the poor quality of remnant tissues, with varying degrees of fat infiltration and muscle atrophy.

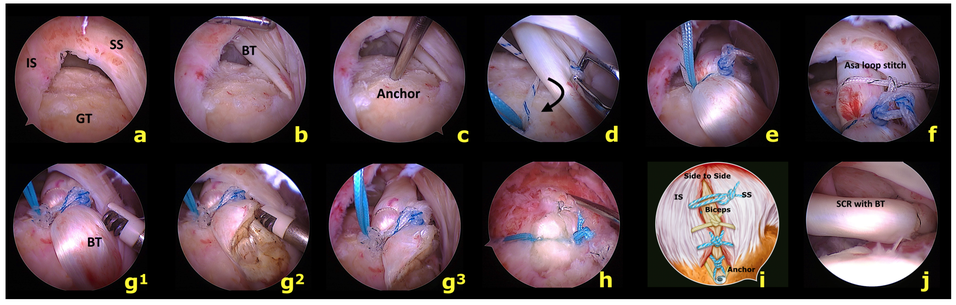
## SURGICAL TECHNIQUE

Step 1: **Diagnostic arthroscopy:** Conventional arthroscopy is done to evaluate the pathology and estimate the biceps and rotator cuff tears. The configuration of the rotator cuff lesion is reassessed through the lateral portal. Shaver is used to prepare the footprint in the greater tuberosity (GT), to remove fibrous tissue, cuff tendon remnants and gently debride the bone leaving cortical bone until satisfactory scarifying and bleeding are achieved.

Step 2. **Preparation of the biceps tendon** The anterior subacromial space is debrided with a shaver and the transverse humeral ligament is released with radiofrequency, identifying the biceps tendon (BT) and exposing the bicipital groove (a,b).

Step 3: **Superior Capsular Reconstruction (SCR) with biceps:** A all-suture double or triple loaded (Iconix 2.3 mm, Stryker®, USA) anchor is now placed on the medial side of the footprint (c). With the help of a grasper forcep, the BT is recovered through the rotator cuff lesion and displaced from its original anterior position towards the GT. One of the sutures is used to transfer and fix the BT to the GT, thus reconstructing the superior capsule (d,e). The second suture passes through the BT using the Lasso loop technique (f). In order to ensure the correct tension of the tendon for SCR, the biceps tenotomy is done (g[1], g[2], g[3]) after biceps tenodesis.

Step 4. **Suture and augmentation of the rotator cuff lesion** A side to side suture of the rotator cuff tear, incorporating the BT into the tear, is carried out using the lasso loop technique with a suture passing device. One or two additional anchors are used to complete reinsertion of the rotator cuff to the footprint with side to side (horizontal mattress), single or double row configuration (h). Figure (i) shows the configuration of the surgical technique. The intra-articular vision shows the correct position of the BT by reconstructing the superior capsule and integrating the rotator cuff repair (j).




## RESULTS

Table 1: General characteristics

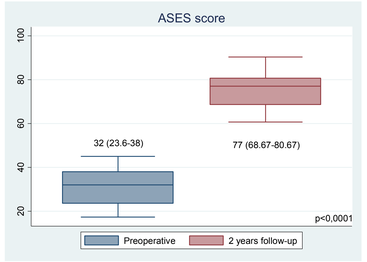
| Variable | n = 46 |
|---|---|
| Age* | 62.4 ± 9.21 |
| Sex, n (%) | |
| Women | 17 (36.96) |
| Men | 29 (63.04) |
| Laterality, n (%) | |
| Left | 19 (41.3) |
| Right | 27 (58.7) |
| MRI, n (%) | |
| Complete healing | 38 (82.6) |
| Partial re-tear | 4 (8.7) |
| Complete re-tear | 4 (8.7) |

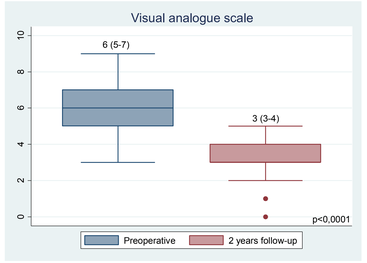
*Average ± SD.

Table 2. Functional characteristics

| Variable | Preoperative | 2 years POP | *p* |
|---|---|---|---|
| ASES score** | 32 (23.6-38) | 77 (68.67-80.67) | <0,0001 |
| Visual analogue scale** | 6 (5-7) | 3 (3-4) | <0,0001 |
| Elevation** | 85 (70-90) | 155 (150-155) | <0,0001 |
| External rotation** | 25 (20-35) | 49.5 (45-58) | <0,0001 |

** Median (IQR)
** Wilcoxon signed-rank test




## CONCLUSIONS

The BT has been dismissed as a source of autologous tenocytes. This technique preserves the native intra-articular portion of the biceps, including the glenoid insertion, and uses it as an autologous tendon for the benefit of incorporating it into the rotator cuff repair for healing and reinforcement in order to prevent the progression of arthropathy by the SCR.

Our experience leads us to conclude that patients have good results at 24-month post-operative control with low rate of re-rupture/ failure in the medium term. These results on a novel technique suggests the BT may be a viable, in situ, cost-effective graft for use in difficult cases of repairable massive RCT. Frequency of re-tear or healing failure and prevention of arthropathy must be confirmed in long term follow-up.

Surgery Video

## REFERENCES

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