

# Short-Term Outcomes after Anatomic Total Shoulder Arthroplasty Utilizing a Subscapularis-Sparing Approach: A Consecutive Case Series

Rishi Chatterji, Michael Fry, Shannon Manno, Sean Francis Bak<sup>1</sup>

<sup>1</sup>Motor City Orthopedics and Sports Medicine

## INTRODUCTION:

The standard deltopectoral approach for anatomic total shoulder arthroplasty (TSA) involves detachment of the subscapularis, and the risk of failure of the repaired tendon can adversely affect patient function and outcome.

Recently, multiple subscapularis-sparing techniques have been developed, which avoid complete detachment of the subscapularis tendon and may lower the risk of this potentially harmful complication. One such approach involves releasing only the inferior third of the tendon and has demonstrated good outcomes after hemiarthroplasty. In this study, the same approach was employed to evaluate short-term clinical outcomes after anatomic TSA. We hypothesized patients would have significant improvements in functional outcomes and range of motion (ROM) at 6 months postoperatively.

## METHODS:

Thirty-four consecutive patients underwent anatomic TSA using a subscapularis-sparing approach performed by the senior author at a single institution. Six patients were excluded due to failure to complete outcomes measures.

In this approach, only the inferior third of the tendon was released, preserving the more critical superior portion and the rotator interval (Figure 1). Following component implantation, the lower third window was repaired with suture anchors (Figure 2). Patients were immobilized in a sling for 2 weeks postoperatively and then began an accelerated shoulder arthroplasty physical therapy protocol. Outcome measures included Simple Shoulder Test (SST), American Shoulder and Elbow Surgeons (ASES), Disabilities of Arm, Shoulder, and Hand (DASH), and ROM. These were assessed at 3 months and 6 months postoperatively and compared to preoperative values.

Statistical analysis was performed and included descriptive statistics (means, frequencies, and percentages), as well as repeated measures ANOVA to analyze data over time. Statistical significance was set at  $p < 0.05$ .

## RESULTS:

Twenty-eight patients had complete 6 month patient-reported outcome measure data and were included in the study for analysis. There were 16 female and 12 male patients, with mean age of 68.2 years. Sixteen procedures were performed on left shoulders and 12 on right shoulders. Compared to preoperative scores, there was statistically significant improvement at 6 months in SST (28.6 vs. 69.3,  $p < 0.001$ ), ASES (34.3 vs. 76.6,  $p < 0.001$ ), and DASH (43.8 vs. 21.6,  $p < 0.001$ ). ASES and SST also demonstrated statistically significant improvement from 3 months to 6 months, while DASH improved between 3 and 6 months but without statistical significance.

Eighteen patients had complete range of motion data through 6 months postoperatively. Mean forward flexion improved by  $9.2^\circ$  ( $138.9^\circ$  vs.  $148.1^\circ$ ,  $p = 0.418$ ), abduction by  $8.6^\circ$  ( $82.8^\circ$  vs.  $91.4^\circ$ ,  $p = 0.155$ ), and external rotation at  $0^\circ$  of abduction by  $10.0^\circ$  ( $39.7^\circ$  vs.  $49.7^\circ$ ,  $p = 0.011$ ). There were three complications related to subscapularis insufficiency postoperatively found on ultrasound. One underwent successful postoperative repair of the subscapularis, while the remaining two required revision to a reverse TSA due to an irreparable subscapularis tear. Another patient sustained two falls, and subsequent ultrasound revealed attenuation of the subscapularis. This patient did not require revision nor subscapularis repair. When excluding these patients, there was further improvement from preoperative to 6 months postoperative for all outcome scores: SST (29.3 vs. 78.1,  $p < 0.001$ ), ASES (35.3 vs. 82.6,  $p < 0.001$ ), and DASH (43.3 vs. 14.4,  $p < 0.001$ ).

## DISCUSSION AND CONCLUSION:

Rates of subscapularis insufficiency after TSA have been reported to be as high as 40%, and various subscapularis handling techniques have been described to mitigate this issue. There are several series reported using a 2-window subscapularis-sparing approach, utilizing both the rotator interval and the lower third of the subscapularis. To the authors' knowledge, the current series is the first to report total shoulder arthroplasty using solely the single inferior third window. At short-term follow up, this technique resulted in significant improvements in SST, ASES, and DASH scores, as well as improvements in all ROM, with a statistically significant improvement in external rotation.

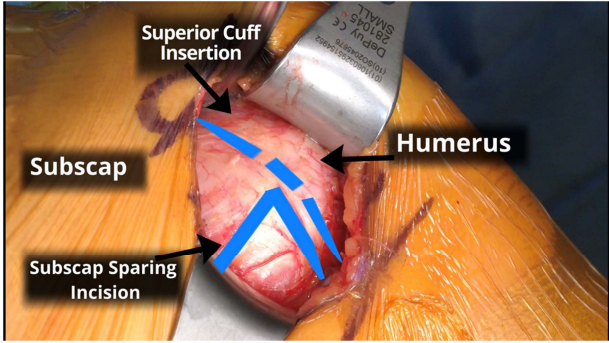


Figure 1: Illustration of subscapularis-sparing incision with the inferior third of the tendon detached in an L-shape, while preserving the majority of subscapularis tendon strength.

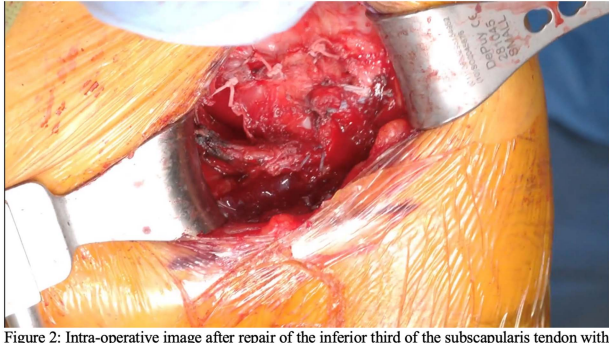


Figure 2: Intra-operative image after repair of the inferior third of the subscapularis tendon with two suture anchors into the humeral insertion.