

# Which Shoulder Functions Correlate with Patient Satisfaction after Primary Shoulder Arthroplasty?

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**INTRODUCTION:** A principal goal of shoulder arthroplasty is to achieve patient satisfaction. While patient self-assessment of shoulder function is commonly used to assess operative success, it is not known how improvements in shoulder function correlate with patient satisfaction after primary anatomic total shoulder (aTSA), reverse total shoulder arthroplasty (rTSA) and ream-and-run arthroplasty (RnR). The objectives of this study were (1) to determine the pre- to postoperative improvement in the individual functions assessed by the Simple Shoulder Test (SST) for patients having aTSA, rTSA and RnR and (2) to relate these improvements to patient satisfaction after each of these three arthroplasty types.

## METHODS:

We conducted a retrospective cohort study of a longitudinally-maintained arthroplasty database from a single academic center. Patients undergoing aTSA, rTSA and RnR with a minimum of 2-year follow-up data were included for analysis. Patients having arthroplasty for fracture and revision arthroplasty were not included. Preoperative SST scores and patient satisfaction questionnaires were obtained and compared with 2-year postoperative data. Patients who improved from neutral or negative satisfaction scores to positive scores on the questionnaire were determined to be “satisfied,” while others were “unsatisfied.” Individual SST questions were analyzed by arthroplasty type with receiver operator characteristic (ROC) curves to determine their relationship to patient satisfaction.

**RESULTS:** In total, 1,048 patients were included. Of them, 468 (44.7%) underwent aTSA, 164 (15.6%) rTSA, and 416 (39.7%) RnR arthroplasty. Patients undergoing aTSA and RnR arthroplasty had higher rates of overall satisfaction at 2-years compared with rTSA patients (83.5% and 80.5% compared with 68.9%, respectively,  $p < 0.001$ ). Shoulder comfort while sleeping demonstrated the highest or second highest J-value (metric of the best-fit curve based on maximization of sensitivity and specificity) across all three arthroplasty types. Shoulder comfort at rest demonstrated high positive predictive value in all cohorts. The relationship of the other SST functions to patient satisfaction varied among the three arthroplasty types. For aTSA, unique SST functions that were correlated with satisfaction included returning to work and placing a coin on a shelf (Questions 5 and 12, respectively). Satisfaction after rTSA was associated with the ability to reach behind your head in external rotation and abduction (Question 4). Satisfaction after RnR was correlated with ability to toss a soft ball underhand (Question 9).

**DISCUSSION AND CONCLUSION:** For all shoulder arthroplasty types, patient comfort with the arm at rest and the ability to sleep comfortably were strongly related to patient satisfaction at two years after surgery. The relationship between satisfaction and the other shoulder functions varied among the different types of arthroplasties. The results of this study may be useful in setting expectations for patients having shoulder joint replacement.

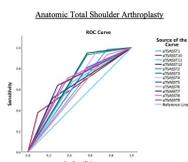


Figure 1. Receiver operator characteristic curve for anatomic total shoulder arthroplasty satisfaction by Simple Shoulder Test questions

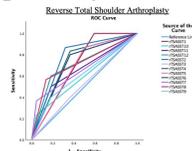


Figure 2. Receiver operator characteristic curve for reverse total shoulder arthroplasty satisfaction by Simple Shoulder Test questions

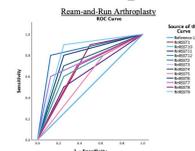


Figure 3. Receiver operator characteristic curve for Ream and Run shoulder arthroplasty satisfaction by Simple Shoulder Test questions