

## Reverse Shoulder Arthroplasty with a Preserved Rotator Cuff: A Comparison to Reverse Shoulder Arthroplasty with a Deficient Rotator Cuff and Anatomic Total Shoulder Arthroplasty

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Introduction Reverse total shoulder arthroplasty (RSA) has traditionally been utilized with success in the setting of rotator cuff arthropathy. Indications for RSA have expanded beyond the traditional paradigm to include individuals with intact rotator cuffs including elderly patients and those with abnormal glenoid morphology. The purpose of this study was to compare outcomes of RSA with an intact rotator cuff to RSA for cuff arthropathy and anatomic total shoulder arthroplasty (TSA).

Methods: Patients at a single institution that underwent RSA and TSA between 2015 and 2020 were identified. RSA that was performed with an intact rotator cuff (+rcRSA) was compared to RSA performed without an intact rotator cuff (-rcRSA) and an anatomic TSA cohort (TSA). Patients were included with a minimum of 12 month follow up. Baseline demographics were obtained and glenoid version and inclination were calculated. Preoperative and postoperative range of motion and patient reported outcomes including visual analogue scale (VAS), subjective shoulder value (SSV), and American Shoulder and Elbow Surgeons (ASES) scores were obtained. Postoperative complications were recorded. Paired t-tests and Chi-squared and Fisher's exact test were utilized for continuous and binary variables, respectively. Statistical significance was set at  $p < 0.05$ .

Results: There were 24 patients in +rcRSA, 69 in RSA, and 93 in TSA cohorts. There were more women in +rcRSA (75.8%) than -rcRSA (37.7%,  $p=0.001$ ) and TSA (37.6%,  $p=0.001$ ). Average age was similar between +rcRSA (71.1) and -rcRSA (72.4,  $p=0.237$ ) cohorts while the TSA cohort was younger (66.0,  $p=0.21$ ). Preoperative mean glenoid retroversion was significantly higher in the +rcRSA cohort at  $18.2^\circ$  compared to  $10.5^\circ$  in the -rcRSA cohort ( $p=0.011$ ) but was similar to the TSA cohort of  $14.7^\circ$  ( $p=0.244$ ). There was a similar preoperative mean glenoid inclination angle between groups. At final follow up there were no differences in VAS or ASES between -rcRSA vs +rcRSA and -rcRSA vs TSA. SSV was lower in +rcRSA (83.9) compared to -rcRSA (91.8,  $p=0.021$ ), but was similar to TSA (90.5,  $p=0.073$ ). Similar ROM was achieved in forward flexion, external rotation, and internal rotation at final follow up between +rcRSA and -rcRSA. Similar forward flexion was achieved between +rcRSA and TSA, though TSA demonstrated greater external rotation ( $44^\circ$  vs  $38^\circ$ ,  $p=0.041$ ) and internal rotation ( $6.5^\circ$  vs  $5.0^\circ$ ,  $p=0.001$ ) compared to +rcRSA at final follow up (Table 1). There were no differences in complications between +rcRSA and either RSA or TSA cohorts.

Discussion: Preservation of the rotator cuff in RSA demonstrated similar outcomes at a minimum of 12 months compared to RSA with a deficient rotator cuff and TSA with the exception of slightly greater ER and IR with TSA. While indications have expanded for RSA beyond rotator cuff arthropathy, our study demonstrates that RSA with preservation of the rotator cuff demonstrates excellent outcomes without increased risk of complications.

Table 1: Comparison of Minimum 12 Month Outcomes Between Shoulder Arthroplasty Type

	+rcRSA	-rcRSA	Anatomic TSA	P Value (+rcRSA & -rcRSA)	P Value (+rcRSA & TSA)
SSV	83.9 (20.)	91.8	90.5 (14.1)	0.021	0.073
VAS	0.9 (1.7)	0.3 (1.0)	1.2 (2.2)	0.095	0.575
<u>ASES</u>	<u>75.3 (27.5)</u>	<u>79.3 (16.6)</u>	<u>84.1 (21.3)</u>	<u>0.494</u>	<u>0.255</u>
<u>Forward Flexion (°)</u>	148 (18)	149 (19)	148 (22)	0.894	0.972
Internal Rotation (°)	5.0 (1.7)	5.1 (1.4)	6.5 (1.7)	0.949	0.001
External Rotation (°)	38 (13)	38 (11)	44 (13)	0.967	0.041

Data presented as Value (Standard Deviation)