Satisfactory Clinical and Radiographic Outcomes Following Anatomic Total Shoulder Arthroplasty Utilizing an Inset Glenoid Component at 5-year Minimum

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INTRODUCTION: Anatomic total shoulder arthroplasty (aTSA) is a successful and reproducible treatment for patients with painful glenohumeral arthritis. However, long-term outcomes using traditional onlay glenoid components have been restricted by glenoid loosening, polyethylene wear, and instability. Inset glenoid components have been proposed to minimize these complications by reducing edge-loading and opposite-edge lift-off forces with humeral translation. The purpose of this study is to evaluate clinical and radiographic outcomes of patients who underwent aTSA with an inset glenoid component at a minimum of 5 years follow-up.

METHODS: A dual center, retrospective review of patients undergoing aTSA using an inset glenoid component between 2016 to 2019 was performed. Minimum follow-up was 5 years. Range of motion and patient-reported outcome measures (PROMs) were recorded at the preoperative visit as well as the 2-year and 5-year postoperative follow-up visits. Radiographic outcomes, including central peg lucency and glenoid loosening, were assessed at final follow-up. Statistical analysis included descriptive analyses and paired t-test for continuous variables. Statistical significance was determined to be a p-value <0.05.

RESULTS: There were 75 patients at the beginning of the study, 18 were lost to follow-up and 8 passed away prior to 5-year follow-up. Therefore, 49 patients were included in final analysis with mean age of 64±11 years, 20 patients (41%) were male, and average follow-up was 5.8±0.9 years. Glenoid morphology was as follows: 19 patients (39%) were A1, four patients (8%) were A2, two patients (4%) were B1, 16 patients (33%) were B2, three patients (6%) were B3, one patient (2%) was D, and one patient (2%) was D2. At 2-year follow-up, range of motion in all planes (forward flexion, external rotation, internal rotation) had significantly improved compared to preoperatively. This improvement was maintained at the 5-year follow-up visit (p<0.001). Similarly, patient-reported outcome measures, including American Shoulder and Elbow Surgeons (ASES) score, Single Assessment Numeric Score (SANE), and Visual Analog Scale (VAS), significantly improved at 2-year follow-up and were maintained at 5-year follow-up (p<0.001). There were 3 cases (6%) of central peg lucency. The 1 patient with glenoid loosening identified at 2-year follow-up did not follow-up at 5-years. There were 2 cases of revision arthroplasty both due to failure of the subscapularis.

DISCUSSION AND CONCLUSION: At a minimum of 5 years postoperatively, there were significant improvements in range of motion and patient-reported outcome measures. There were low rates of central peg lucency and glenoid loosening in patients undergoing aTSA with an inset glenoid component.

Table 1: Cohort Characteristics

	Patients (n=49) *avg. (SD) or n (%)*
Age (years)	64 (11)
Sex	
Male	20 (41)
Female	29 (59)
Glenoid Morphology (Walch)	
A1	19 (39)
A2	4 (8)
B1	2 (4)
B2	16 (33)
B3	3 (6)
D	1 (2)
D2	1 (2)
Follow-Up (years)	5.8 (0.9)

Table 2: Clinical and Patient Reported Outcomes

	Preoperative	**2-Year Post-Op** (n=75)	**5-Year Post-Op** (n=49)	***p*-value**
	avg. (SD) or n (%)			
Range of Motion				
FF°	119 (31)	150 (24)	154 (26)	p < 0.001
ER°	29 (17)	53 (13)	60 (12)	p < 0.001
IR° (*)	19 (4)	14 (3)	13 (4)	p < 0.001
Patient Reported Outcomes				
VAS	4.9 (3.0)	0.9 (1.6)	0.73 (1.7)	p < 0.001
SANE	37.4 (26.6)	91.2 (12.6)	91.5 (17.2)	p < 0.001
ASES	43.5 (18.2)	86.6 (15.2	91.1 (12.0)	p < 0.001
Radiographic Outcomes				
Central peg lucency	---	4 (5)	3 (6)	---
Glenoid loosening	---	1 (1)	---	---

*Internal rotation was measured and recorded as an integer according to the scale of Morwood et al, starting at 1 for T1 and ending at 22 for S5 and below