

Two-Year Outcomes of a Novel Conforming Circular Glenoid with Peripheral Ring Fixation in B2 Glenoid Deformity

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INTRODUCTION: Walch B2 glenoid morphology with osteoarthritis presents unique challenges in anatomic total shoulder arthroplasty (aTSA). Varying degrees of posterior glenoid bone loss, in combination with irregular soft tissue tensioning and subsequent posterior humeral head subluxation, has resulted in significantly high rates of glenoid loosening, glenoid failure and inconsistent patient reported outcome measures (PROM).¹ To counter these problems, several design features have been incorporated into modern glenoid components.^{1,2} Glenoid fixation has evolved from keel components to peripheral pegs and now to peripheral ring fixation theoretically decreasing rocking horse loosening.³ Circular implants are capable of correcting deformity via eccentric reaming and recessing the component thus decreasing pathologic retroversion while enhancing fixation. Concentric glenohumeral articulation also inhibits translation and reduces posterior subluxation. The purpose of this study was to evaluate two year clinical and radiographic outcomes in patients with B2 glenoid morphology undergoing aTSA with a conforming circular glenoid with peripheral ring fixation.

METHODS: A retrospective study of a prospectively enrolled database was performed which includes patients undergoing aTSA for B2 glenoid morphology (retroversion $\geq 10^\circ$ on preoperative advanced imaging). Preoperative and postoperative (minimum 24 months) radiographs were assessed for glenoid version, humeral head subluxation, acromiohumeral interval, glenohumeral offset, Moloney's line, Lazarus score, and zones of lucency. Preoperative and postoperative American Shoulder and Elbow Surgeons (ASES) score, visual analog score (VAS) for pain were obtained. Single Assessment Numeric Evaluation (SANE) score and postoperative complications including glenoid failure and revisions were also recorded postoperatively.

RESULTS: In total 28 patients were included, 71% male and 29% female, with a mean age of 66.4 ± 7.20 with a mean follow up time of 26 months. The average retroversion of glenoid morphology was $15.7^\circ \pm 6.4^\circ$ with a mean posterior subluxation percentage of $65.8\% \pm 10.5\%$. PROMs including ASES and VAS scores improved significantly, demonstrating an average postoperative ASES of 88.2 ± 18.0 and an average Δ change of 53.8 ± 18.7 pre- to post- operatively. Overall, 100% of the included cohort achieved minimal clinically important difference (MCID) for ASES and VAS by latest follow up. Average Single Assessment Numeric Evaluation (SANE) score at follow-up was 90.5%. On radiographic analysis there were no cases of glenoid loosening and only one case of slight lucency consistent with a grade 1 Lazarus along the superior aspect of the glenoid implant. There were zero complications and/or revisions over the follow up period of this study.

DISCUSSION AND CONCLUSION:

Patients with B2 glenoid deformities who underwent aTSA with a conforming circular glenoid with peripheral ring fixation had significant improvements in ASES and VAS scores. This novel inset glenoid resulted in negligible occurrence of lucency with the absence of complications or revisions underscoring the durability and stability of this innovative implant.