Outcomes Of Revision Reverse Shoulder Arthroplasty Utilizing Femoral Head Allograft For Constrained Glenoid Defects

John M. Abdelshaheed[1], Todd Phillips[1], Albert Mousad[1], Casey Beleckas[1], Jonathan C. Levy[1]
[1]Levy Shoulder to Hand Center at the Paley Orthopedic and Spine Institute, Boca Raton, FL
Jo567788@ucf.edu

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INTRODUCTION: Revision shoulder arthroplasty in the setting of severe glenoid bone loss presents significant reconstructive challenges. The use of femoral head allograft has emerged as a potential solution to restore glenoid bone stock and provide a stable foundation for component fixation. This study evaluates the outcomes and viability of femoral head allograft in managing severe glenoid defects during revision procedures.

METHODS: A retrospective review of data collected from 2008 to 2023 from a single surgeon at a single institution utilizing a single reverse total shoulder implant system with a monoblock central screw baseplate. There were 29 patients with a minimum clinical and radiographic follow-up of 2 year. All included patients underwent revision to a reverse shoulder arthroplasty with the use of bulk femoral head allograft to fill large glenoid defects. Indications for revision included failure of reverse total shoulder arthroplasty (n=3), failure of shoulder hemiarthroplasty (n=5), and failure of anatomic total shoulder arthroplasty (n=21). Patient-specific variables, radiographic parameters, and both pre- and post-operative patient outcomes (American Shoulder and Elbow Surgeons (ASES) Score, Simple Shoulder Test (SST), Visual Analog Scale (VAS) - Pain, VAS - Function, and Single Assessment Numeric Evaluation (SANE) were collected. Descriptive statistics were utilized to analyzes significant differences in the data based upon rate of secondary procedure for glenoid sided failure. Secondary outcomes included changes in patient reported outcome measures.

RESULTS SECTION: 29 patients met inclusion criteria with a mean follow-up of 5.57 years. The average baseplate contact to native bone was 47.3% (10% - 100%) There were 3 patients (3/29, 10.3%) who observed with glenoid-sided complications. One patient had early radiographic detection of glenoid sided loosening without mechanical symptoms (13.5 months), while the other two patients had baseplate failures (15.0 and 146.5 months) requiring a subsequent revision surgery. All-cause two-year implant survival was 93.1% (27/29), five-year implant survival was 90.9% (20/22), and ten-year implant survival was 87.5% (14/16). There were significant improvements in all patient-reported outcome measures between pre-operative and post-operative states ($p < .001$). There were significant increases in patient forward elevation ($p < .001$) and abduction ($p < .001$).

DISCUSSION: Use of femoral head allograft in management of severe glenoid defects during revision reverse shoulder arthroplasty results in significant increases in patient-reported outcomes and range of motion with a low percentage (10.3%) of glenoid-sided complications. All-cause two- and five-year implant survival is greater than 90% with most failures occurring within 15 months of the initial surgery.

SIGNIFICANCE/CLINICAL RELEVANCE: Bulk femoral head allograft provides structurally reliable reconstruction for severe glenoid defects in revision rTSA, with favorable survivorship and clinically meaningful PROM gains. This supports its role as a practical, widely available solution when bone stock is compromised.

	Pre-Operative	Post-Operative	p-value
Patient-Reported Outcomes Measure			
ASES Score	31.51	68.29	**<.001**
SST Score	2.78	7.09	**<.001**
VAS - Pain	6.37	2.29	**<.001**
VAS - Function	3.41	7.16	**<.001**
SANE	32.25	70.97	**<.001**
Range of Motion			
Forward Elevation	77.10	121.91	**<.001**
Abduction	62.17	87.94	**<.001**
External Rotation	30.17	32.06	0.374
Internal Rotation (Converted)	4.80	5.47	0.059

Table 1 – Patient-reported outcome measures and functional assessment of patient pre-operatively versus post-operatively