

Revision of Failed Arthroplasty to Reverse Shoulder Arthroplasty: A 20-Year Institutional Experience

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Introduction: Revision of failed shoulder arthroplasty to reverse shoulder arthroplasty (rRSA) for mechanical failure presents complex surgical challenges, yet long-term survivorship and patient-reported outcomes (PROs) remain incompletely defined. This study aimed to evaluate implant survivorship, PROs, and modes of rRSA failure which led to secondary revision in a large, consecutive cohort over a 20-year period.

Methods: We retrospectively reviewed prospectively collected data from 2002-2022 on patients undergoing rRSA for non-infectious, mechanical failure with ≥ 12 months of follow-up or earlier secondary revision. Exclusions included initial revision for infection, inadequate follow-up, and revisions to non-RSA implants. Primary outcome was rRSA implant survivorship, defined as time from index rRSA to any secondary revision. Secondary outcomes included PROs at 12 months and analyzing modes of rRSA failure which led to secondary revision. Kaplan-Meier analysis estimated survivorship and subgroup analyses were stratified by index arthroplasty type prior to rRSA (failed hemiarthroplasty [fHA], failed anatomic total shoulder arthroplasty [fTSA], or failed reverse shoulder arthroplasty [fRSA]).

Results: Of 646 first-time rRSAs, 320 met inclusion criteria (mean follow-up 42.0 ± 46.9 months). Overall survivorship was 86.4% at 2 years, 80.3% at 5 years, and 71.4% at 10 years. Revision from failed primary RSA demonstrated inferior survivorship compared to failed HA or TSA ($p < 0.001$). (Figure 1) At 12 months, fewer than half of patients achieved the Patient Acceptable Symptom State for ASES scores, with worse outcomes in the failed RSA group ($p = 0.008$). (Table 1) Fifty-eight shoulders (18.1%) required secondary revision, with a subsequent tertiary revision rate of 29.3%. Humeral loosening as a cause for secondary revision was associated with the highest hazard of tertiary revision, though not statistically significant.

Conclusion: Revision RSA for mechanical failure yields moderate mid- to long-term implant survivorship, with lower survival and PROs in patients revised from failed RSA compared to HA or TSA. Secondary revisions carry a substantially higher risk of subsequent failure, especially those due to humeral loosening. Lastly, only about half of patients achieved an acceptable symptomatic state at 1-year follow-up, underscoring the need for realistic functional expectations and comprehensive preoperative counseling in this challenging population.

Significance/Clinical Relevance: Revision to reverse shoulder arthroplasty (rRSA) for mechanical failure provides only moderate implant survivorship and functional outcomes, particularly in patients revised from a failed RSA. These patients have a higher risk of re-revision, especially when humeral loosening is involved. The findings highlight the importance of setting realistic expectations and emphasizing thorough preoperative counseling, especially in cases of failed prior RSA.

Figure 1. Survivorship of rRSA shoulders stratified by index shoulder arthroplasty type.

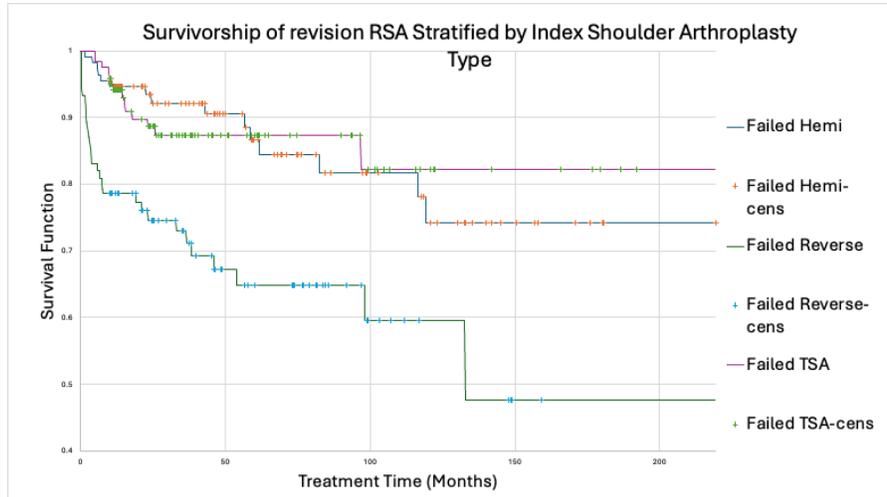


Table 1. Mean American Shoulder and Elbow Surgeons (ASES) score for rRSA shoulders stratified by index shoulder arthroplasty type with percentage of patients who achieved the patient-acceptable symptom state (PASS) threshold at 12-month follow-up.

Group	N	Mean ASES \pm SD	95% CI (Mean)	Achieved PASS (≥ 63.5)	% Achieved PASS
Failed Hemi	106	63.3 \pm 23.1	58.8 – 67.7	56	52.8%
Failed RSA	70	53.3 \pm 26.2	47.1 – 59.6	26	37.1%
Failed TSA	115	64.3 \pm 25.0	59.7 – 69.0	61	53.0%