Mismatched Implants Yield Comparable Outcomes in Revision Shoulder Arthroplasty

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INTRODUCTION: Revision shoulder arthroplasty procedures pose unique challenges to shoulder surgeons. Efforts to mitigate bone loss, blood loss, operative time, and intraoperative complications may prompt the surgeon to consider retaining well-fixed components and combine them with components of a different manufacturer. This concept, known as mismatching, represents a viable solution to a dilemma encountered in the revision setting. The purpose of this study is to compare the clinical outcomes between patients treated with matched versus mismatched implants in revision shoulder arthroplasty.

METHODS: All revision shoulder arthroplasty cases by a single surgeon between 2012 and 2022 were reviewed. Using radiographs and operative reports, 44 patients were identified as mismatches, defined by humeral and glenoid components made by two different manufacturers. Demographic data, pre- and postoperative range of motion, and patient-reported outcome measures (ASES, VAS, SST, Stability) were collected. A larger cohort of all revision arthroplasty patients by the same surgeon (n=859) was then used to perform a matched cohort analysis based on indication for revision. Rate of re-revision rate and patient-reported outcomes were then compared using simple statistics.

RESULTS: Twenty five of the 44 total mismatches had 1-year or greater follow up. Indications for revision included 13 for failed reverse shoulder arthroplasty (RSA), 9 for failed anatomic total shoulder arthroplasty (TSA) and 3 for failed hemiarthroplasty (HA). All were revised to RSA. In the matched cohort analysis (n=25 mismatches, n=281 matches), there was no difference in mean ASES Score, VAS Pain Score or SST at 1 year postoperatively (Table 1). However, Stability differed significantly; 5.9 for mismatches versus 3.5 for matches (p = 0.039), on a 0-10 scale with 10 being most stable. When subcategorized into indication for revision (HA, TSA or RSA), all matches and mismatches demonstrated a minimum clinically important difference in mean ASES Score from preoperative to final follow up, with the exception of mismatch for failed TSA (Table 2). Of the 44 total manufacturer-mismatched cases, 11 were also size-mismatched (differing glenosphere and socket size), and none required re-revision within the available follow up period. Finally, there was an 11% (n=5) re-revision rate amongst mismatches, compared to 15% amongst matches in the total revision cohort.

DISCUSSION AND CONCLUSION:

Patients treated with mismatched components demonstrate similar clinical outcomes to those treated with matched components in revision shoulder arthroplasty. Therefore, surgeons have the flexibility to retain well-fixed implants and mismatch components of different manufacturers without increasing the risk of revision or compromising clinical outcomes.

Table 1. Comparison of 1-Year Mean Outcomes Between Mismatches and Matches.

Outcome Measure	Mismatch	Match	p-value
ASES Total	62.7	60.6	0.785
VAS Pain	3.1	2.8	0.774
SST	4.6	5.4	0.432
Stability	5.9	3.5	**0.039**

Table 2. Increase in Mean ASES Score from Preoperative to Final Follow-Up by Indication for Revision.

	Hemi		TSA		RSA	
Outcome Measure	Mismatch	Match	Mismatch	Match	Mismatch	Match
ASES Total	23.6	24.7	8.4	28.1	23.5	18.7