

Clinical Outcomes of Rotator Cuff Repair with Bovine-Derived Scaffolds vs Decellularized Dermal Allografts: A Comparative Retrospective Cohort Study at a Mean Follow-up of 1-Year

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INTRODUCTION: Rotator Cuff Repair (RCR) failure rates remain high, ranging from 20%-90% depending on tear size and repair technique. To improve healing and reduce retear rates, augmentation strategies have become mainstream, with various biological and synthetic options available. Bovine Derived Collagen Scaffolds (BDS) and Decellularized Dermal Allografts (DDA) are two commonly used augments, however comparative data on their clinical and radiographic outcomes remain limited. The study aims to compare the outcomes of RCR with BDS and DDA. The null hypothesis is that there will no difference in complication and reoperation rates between BDS and DDA cohorts.

METHODS:

This retrospective cohort study was conducted at a single institution from February 2022 to September 2024. Patients \geq 18 years old undergoing rotator cuff augmentation using BDS or DDA were included. One hundred thirty-six patients were included in this study (72 BDS and 64 DDA). The mean patient age was approximately 61 ± 10 years with a preponderance of females (51.5%). The mean follow-up time was 20.3 ± 8.9 months. Primary outcome measures, including retear rate, reoperation rate, need for repeat MRI, and need for a postoperative steroid injection, were assessed. Secondary outcomes included patient-reported outcome measures (PROMs), such as the American Shoulder and Elbow Score (ASES), Single Assessment Numeric Evaluation (SANE), and Visual Analog Scale (VAS) pain score. Demographic, clinical, operative, and radiographic data was collected from the electronic medical record (EMR). An a priori power analysis was performed, and the minimum sample size needed to detect a 10% absolute difference in reoperation rates between groups (alpha 0.05; power at 80%), was 40 patients per group. $P \leq 0.05$ was considered significant.

RESULTS: Retears occurred exclusively in the BDS group as compared to the DDA group (15.3% vs 0%; $p = 0.001$). The reoperation rate was also significantly higher in the BDS group compared to the DDA group (20.8% vs 1.6%; $p = .001$). The need for repeat MRI was significantly greater in the BDS group than in the DDA group (33.3% vs 9.4%; $p = .001$). The need for postoperative steroid injection was not significantly different between the groups ($p = 0.07$). Both postoperative ASES and SANE scores indicated good function with no statistically significant differences between the groups ($p = 0.17$ and $p = 0.08$, respectively). VAS pain scores were reduced postoperatively in both the BDS and DDA cohorts; however, only the BDS group had statistically significant reductions ($p < .001$).

DISCUSSION AND CONCLUSION:

RCR with DDA results in lower complications and reoperation rates compared to BDS at a mean follow-up of 1-year. However, PROMs were not significantly different between the groups (i.e., ASES, SANE, and VAS). Future research should focus on larger cohorts with longer follow-up times and prospectively collected data.

Table 1. Patient Demographics

Characteristic	BDS (n=72)	DDA (n=64)
Mean Age (years)	61.2	60.8
Female (%)	51.5	51.5
Male (%)	48.5	48.5



Table 2. Intraoperative Findings

Parameter	BDS (n=72)	DDA (n=64)
Rotator Cuff Tear Size (cm)	3.2	3.1
Rotator Cuff Tear Type	Partial	Partial
Rotator Cuff Tear Location	Suprascapular	Suprascapular

Table 3. Postoperative Outcomes

Parameter	BDS (n=72)	DDA (n=64)
Reoperation Rate (%)	20.8	1.6
Need for Repeat MRI (%)	33.3	9.4
Need for Postoperative Steroid Injection (%)	15.3	12.5

Table 4. Average Time to Reoperation in the BDS Group

Parameter	Value
Mean Time to Reoperation (months)	1.2
Range (months)	0.5 - 2.5

Table 5. Postoperative PROMs

PROM	BDS (n=72)	DDA (n=64)
ASES	45.2	44.8
SANE	38.5	37.9
VAS	2.1	2.2