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- Abstract No. : F-0010
- Category : Shoulder
- Detail Category : Rotator cuff

Large to Massive Rotator Cuff Tears With Only Partial Repair Possible Treated with Human Dermal Allograft Results In Lower Retear Rates and Improved Function Compared to Matched Group without Augmenta

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Introduction and Background

This propensity score-matched study aimed to compare clinical and radiologic outcomes of incomplete rotator cuff repair with and without human dermal allograft (HDA) patch augmentation in patients with large to massive rotator cuff tears (LMRCTs).

Material and Method

A retrospective review was conducted on patients who underwent arthroscopic rotator cuff repair with footprint medialization between March 2013 and September 2022, with a minimum 2-year follow-up. Inclusion criteria were full-thickness tears ≥ 3.0 cm requiring incomplete repair due to excessive tension after medialization. Propensity score matching (1:1) was performed between the patch augmentation and incomplete repair-only groups based on tear size, chronicity, and tendon quality. Clinical outcomes included pain visual analog scale (pVAS), American Shoulder and Elbow Surgeons (ASES) score, Constant score, Single Assessment Numeric Evaluation (SANE) score, and active range of motion (ROM). Structural integrity was evaluated by magnetic resonance imaging (MRI) at 6 months, ultrasonography at 1 year, and at final follow-up.

Results

Of 1,129 patients, 174 met the criteria (43 HDA patch, 131 incomplete repair). After matching, 36 pairs were analyzed. At final follow-up, the patch group demonstrated significantly better outcomes than the control group: lower pVAS (0.6 ± 0.9 vs. 1.2 ± 1.3 , $p = 0.035$) and higher ASES (93.3 ± 4.5 vs. 89.0 ± 6.6 , $p = 0.002$), Constant (89.8 ± 4.9 vs. 86.6 ± 7.3 , $p = 0.031$), and SANE scores (90.6 ± 6.8 vs. 84.7 ± 8.4 , $p = 0.002$). Both groups showed significant ROM improvement without intergroup differences. MRI at 6 months revealed healing failure in 8.3% of the patch group and 27.8% of controls ($p = 0.063$). At final follow-up, retear rates were 8.3% in the patch group versus 33.3% in controls ($p = 0.009$).

Conclusions

HDA patch augmentation for LMRCTs after incomplete repair significantly reduced retear rates and improved clinical outcomes compared with incomplete repair alone.



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Figure & Table 1.

Table 1. Preoperative patient demographics before propensity score matching

	Patch (n = 43)	Control (n = 131)	P-value
Age, years	66.8 ± 7.7	69.5 ± 8.5	<.060*
Sex (male/female), n	19 / 24	56 / 75	.188
Dominant arm involvement, n (%)	32 (74.4)	75 (57.3)	.068
Average follow-up, mos (range)	26.2 ± 2.2 (24-46)	34.6 ± 7.6 (24-98)	<.001*
BMI	24.6 ± 4.6	23.9 ± 4.0	.371
Diabetes, n (%)	5 (11.6)	18 (13.7)	.924
Smoking, n (%)	8 (18.6)	31 (23.7)	.632
Goutallier classification			
Supraspinatus tendon	2.6 ± 0.6	2.0 ± 0.8	<.001*
Infraspinatus tendon	1.4 ± 0.5	1.2 ± 0.4	.019*
GFDI	1.5 ± 0.3	1.3 ± 0.3	<.001*
Tear size (mm)			
AP direction	28.4 ± 7.0	25.7 ± 7.2	.033*
ML direction	34.8 ± 4.7	30.6 ± 6.1	<.001*

^aValues are reported as mean ± SD (ranges). Patch, incomplete repair and patch augmentation using human dermal allograft; Control, incomplete repair only; BMI, body mass index; GFDI, global fatty degeneration index; AP, anterior to posterior; ML, medial to lateral. *Statistically significant difference between groups ($p < 0.05$).

Table 2. Preoperative patient demographics after propensity score matching

	Patch (n = 36)	Control (n = 36)	SMD	P-value
Age, years [†]	67.9 ± 7.8	68.3 ± 8.8	0.043	.534
Sex (male/female), n	16 / 20	15 / 21	0.055	.346
Dominant arm involvement, n	28 (77.8)	24 (66.7)	0.249	.430
Average follow-up, months (range)	26.4 ± 2.3 (24-46)	34.4 ± 6.6 (24-84)	1.631	<.001*
BMI	24.8 ± 4.4	24.4 ± 3.9	0.086	.715
Diabetes, n (%)	5 (13.9)	7 (19.4)	0.148	.752
Smoking, n (%)	8 (22.2)	9 (25.0)	0.066	>.999
Goutallier classification				
Supraspinatus tendon	2.4 ± 0.6	2.3 ± 0.4	0.217	.359
Infraspinatus tendon	1.36 ± 0.5	1.25 ± 0.5	0.225	.343
GFDI [†]	1.5 ± 0.3	1.5 ± 0.3	0.018	.936
Tear size (mm)				
AP direction [†]	27.9 ± 7.1	27.5 ± 6.5	0.056	.858
ML direction [†]	34.5 ± 4.8	34.0 ± 5.7	0.084	.677

^aValues are reported as mean ± SD (ranges). Patch, incomplete repair and patch augmentation using human dermal allograft; Control, incomplete repair only; SMD, standardized mean difference; BMI, body mass index; GFDI, global fatty degeneration index; AP, anterior to posterior; ML, medial to lateral. *Statistically significant difference between groups ($p < 0.05$). [†]Variable used for propensity score matching.



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Figure & Table 2.

Table 3. Preoperative and postoperative clinical comparisons between patch and control groups

	Patch (n = 36)	Control (n = 36)	P-value
pVAS			
Preoperative	4.6 ± 1.3	4.9 ± 2.0	.529
Postoperative	0.6 ± 0.9	1.2 ± 1.3	.035*
P-value	<.001*	<.001*	
ASES score			
Preoperative	64.9 ± 16.6	65.8 ± 16.5	.826
Postoperative	93.3 ± 4.5	89.0 ± 6.6	.002*
P-value	<.001*	<.001*	
Constant score			
Preoperative	58.4 ± 15.6	60.2 ± 17.6	.652
Postoperative	89.8 ± 4.9	86.6 ± 7.3	.031*
P-value	<.001*	<.001*	
SANE score			
Preoperative	32.3 ± 16.4	35.9 ± 16.9	.360
Postoperative	90.6 ± 6.8	84.7 ± 8.4	.002*
P-value	<.001*	<.001*	

^aValues are reported as mean ± SD (range). Patch, incomplete repair and patch augmentation using human dermal allograft; Control, incomplete repair only; VAS, visual analog scale; ASES, American Shoulder and Elbow Surgeons; SANE, Single Assessment Numeric Evaluation.

*Statistically significant difference between groups ($p < 0.05$).

Table 4. Preoperative and postoperative active range of motion between patch and control groups

	Patch (n = 36)	Control (n = 36)	P-value
Forward flexion (°)			
Preoperative	140.2 ± 32.6	142.3 ± 28.8	.772
Postoperative	171.6 ± 8.7	170.1 ± 10.5	.527
P-value	<.001*	<.001*	
External rotation (°)			
Preoperative	56.2 ± 18.4	55.4 ± 16.5	.846
Postoperative	65.7 ± 13.2	63.4 ± 14.2	.477
P-value	.031*	.026*	
Internal rotation[†]			
Preoperative	12.3 ± 3.0	13.6 ± 3.3	.086
Postoperative	9.6 ± 2.9	10.6 ± 2.7	.111*
P-value	.001*	.001*	

^aValues are reported as mean ± SD (range). Patch, incomplete repair, and patch augmentation using human dermal allograft; Control, incomplete repair only.

*Statistically significant difference between groups ($p < 0.05$).

