Superior capsular reconstruction by Facia Lata versus dermal allograft for massive cuff tears patients: a systematic review

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Background
Massive rotator cuff tears (MRCT) are defined by Cofield and Gerber as injuries with a diameter of five centimeters or greater, involving the complete rupture of two or more tendons. These tears present challenges for shoulder surgeons due to muscle adipose infiltration, tendon retraction, and potential involvement of the teres minor and subscapularis muscles.
Objective
To evaluate the clinical outcomes comparing superior capsular reconstruction (SCR) utilizing Human Dermal Allograft (HDA) versus Tensor Fascia Lata Autograft (TFL) assessing the efficacy and safety of each management modality.
Methods
There was no explicit financial support from private, public, we diligently adhered to the guidelines outlined in the Cochrane Handbook for Systematic Reviews of Interventions while conducting this systematic review. Throughout the research's design process, we additionally ensured compliance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. We utilized PubMed, Scopus, Web of Science, and Cochrane Library to conduct a literature search. scanned for studies published between 2007 and 2021. A literature search was performed to detect researches that compared the safety and effectiveness of SCR utilizing TFL Autograft versus HDA.
Results
Overall, both graft types demonstrated effectiveness in improving clinical outcomes, with patients experiencing enhanced shoulder function and decreased pain after the arthroscopic SCR procedure. The results vary among studies, which different patient populations, surgical techniques, and graft thicknesses might influence. The table provides valuable insights into the outcomes of SCR surgeries using TFL and HDA grafts, helping guide treatment decisions for patients with massive irreparable rotator cuff tears (MIRCTs). Outcomes are assessed using various measures, including external rotation, acromiohumeral distance, graft tear rates, graft survival rate, single-strand vascularization, and subscapularis tendon tears. Our results showed that both TFL and HDA groups have demonstrated effectiveness in improving clinical outcomes for patients with MIRCTs. However, the graft tear rates seem to be advanced in the HDA collection compared with the TFL collection in some studies.
Conclusion
This detailed analysis of studies comparing HDA and TFL for SCR in individuals with MIRCTs reveals several important findings. Both graft types demonstrate efficacy in improving clinical outcomes, including decreased pain, enhanced shoulder function, and increased range of motion.

Keywords:
dermal allograft, fascia lata, patch augmentation graft, patch graft, rotator cuff injury, rotator cuff tear, superior capsular reconstruction

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Introduction

Massive rotator cuff tear (MRCT) has been described as a tear with a diameter of 5 cm or more as defined by Cofield [1–4] or as a complete tear of two or more tendons as described by Gerber [5]. These tears remain challenging for the shoulder surgeon due to muscle fatty infiltration and tendon retraction [6]. MRCT can extend into the subscapularis and teres minor also. A massive tear is unusual in a young patient (under 60 years of age) [1].

Several surgical techniques have been proposed depending on the patients' age and the occurrence of accompanying arthritis [6].

Superior capsular reconstruction (SCR) was introduced by Mihata *et al.* [7] in 2012 in the context of potential treatment for irreparable RC injuries. To restore the superior stabilizing forces and reconstruct the superior capsular defect noted in extensive RC tears, the technique requires the implantation of a dense fascia lata autograft laterally to the greater tuberosity and medially to the superior glenoid rim.

SCR can be used to address these tears in which there is not sufficient rotator cuff to repair [7]. Theoretically, SCR permits the restoration of exceptional shoulder stability and muscle balance, resulting in enhanced shoulder function [7].

Graft augmentation can be one of the management modalities. It is technically demanding and demands patience and organization from the surgeon. The surgical procedure is executed while seated in a beach chair [8]. A 3.0 mm thick acellular dermal matrix allograft is utilized as the graft. In conclusion, numerous strands of high tensile strength sutures of number two are employed [8].

Autografts derived from tensor fascia lata (TFL) are frequently utilized in neurosurgery another surgical specialties [9]. The fascia lata is robust, malleable, and saturable to adjacent tissues. It is homologous tissue with an extremely minimal risk of infection and no foreign body reaction [10]. When irreparable rotator cuff injuries occur, the fascia lata serves as a substantial, resilient graft that is adaptable in size, retains sutures well, and promotes faster healing [11].

Additionally Mihata *et al.* [12] from 2007 to 2009 the author initially proposed the utilization of a TFL autograft in SCR) to eradicate superior translation of the humeral head with respect to the glenoid.

Human Dermal Allograft (HAD) is an extracellular collagen matrix whose exceptional biomechanical properties, tissue integration properties, *in vivo* revascularization capabilities, and cellular incorporation characteristics render it a desirable material for soft tissue augmentation techniques in orthopedics [13].

Patch augmentation may enhance healing rates and results when utilized as an adjunct to the repair of vast and extensive rotator cuff tears, according to some studies [1,8]. In cases involving irreparable rotator cuff injuries, patch interposition may yield better outcomes than partial restoration.

The clinical outcomes of SCR utilizing either HDA otherwise TFL autograft are not fully obvious Thus, this work aims to evaluate the clinical outcomes comparing between SCR utilizing Human Dermal Allograft (HDA) versus TFL autograft assessing the efficacy and safety of each management modality.

Patients and methods

Type of study: We plan to conduct a systematic review to evaluate the clinical and radiological outcomes comparing between SCR using HDA)versus TFL autograft assessing the efficacy and safety of each management modality.

We diligently adhered to the guidelines as it is described in the Cochrane handbook for systematic reviews of interventions, in which this systematic review was carried out. Throughout the research's design process, Furthermore, we took measures to ensure adherence to the Preferred Reporting Items for Systematic Reviews and meta-analysis recommendations.

We utilized PubMed, Scopus, Web of Science, and Cochrane Library to conduct a literature search. A literature search was performed to detect researches that compared the safety and effectiveness of SCR utilizing Tensor Fascia Lata Autograft versus Human Dermal Allograft.

We examined article title, abstract, keywords utilizing the following keywords: Also, we used 'OR' and 'AND' operators during Literature search as following: ('Rotator Cuff Injury' otherwise 'Rotator Cuff Tear') AND ('Superior capsular reconstruction' OR SCR) AND ('Patch graft' OR 'Patch augmentation graft' OR 'Dermal Allograft' OR 'Fascia Lata' OR HDA OR TFL).

By utilizing the 'related articles' feature, the search was broadened for every investigation that was deemed pertinent. Bibliographies of papers that were retrieved were combed for additional eligible studies. An attempt was made to identify articles that had been incorporated in prior systematic reviews that were pertinent to the topic at hand. The cited sources were obtained through the utilization of the Endnote X8 software program (Thompson Reuter, USA).

Eligibility criteria: We included studies that met the following inclusion criteria: i. Population: Individuals with massive cuff tears who underwent SCR. ii. Intervention: Humeral dermal allograft (HDA). iii. Comparator: TFL autograft. iv. Outcome parameters: Efficacy and safety. v. Study design: Clinical trials involving over ten individuals, including case-control, nested case-control, prospective, and retrospective comparative cohort studies, as well as case series.

Animal studies, book chapters, reviews, theses, editorial letters, papers with overlapping datasets, and studies published in a language other than English were omitted from our search. The process of determining eligibility consisted of two distinct stages: screening of titles and abstracts; screening of the full text. Two reviewers performed every step independently in accordance with the predetermined criteria.

No restrictions were imposed regarding ethnicity, gender, or age. Primarily utilizing the Endnote X8 program (Thompson Reuter, USA) and manually scanning titles and abstracts, duplicate articles were eliminated.

Data extraction: Two additional independent authors reviewed the data that had been extracted by one author. Reviews were searched from database published between 2007 till 2021. The following are the characteristics that were extracted for every study: Consistently reported outcomes, year of publication, author name, age, gender, sample size, period of follow-up, and the specific outcome measures in the involved studies are as follows: JOA (Japanese Orthopedic Association), SST (Simple Shoulder Test), VAS (visual analog scale), SSV (Subjective Shoulder Value), CS (Constant score), ASES (American Shoulder and Elbow Surgeons) Fig. 1.

Results

Result of literature search: We acquired the following articles: fifty-nine from PubMed, 147 from Scopus, five from the Cochrane library, and 64 from Web of Science. As shown in (Fig. 15), 86 duplicate articles were eliminated utilizing the Endnote X8 program (Tompson Reuter, USA), 189 articles were manually screened for titles and abstracts, and fifty-eight articles underwent full-text review. In the end, thirteen investigations satisfied our criteria for inclusion.

Characteristics of included studies: in the current review, 13 researchers matched our inclusion criteria with a total of 487 instances. Five researches used fascia lata autograft, three of them were retrospective and two prospective studies seven researchers used human dermal allograft, four of them were retrospective three were prospective studies and one retrospective study used both grafts. The mean age of included cases extended between 60 and 65 years old and they were followed for various durations up to nearly 40 months in some studies. The proportion of patients with recurrent tears was relatively high. The rest of the patient baseline features are shown in Table 1.

Outcomes

Operative details: We summarized surgery details of each study such as type of graft thickness, patient positioning, arm positioning, number of arthroscopic portals, type of anchors on glenoid/humeral side, and number of anchors on superior glenoid/humeral head as shown in Table 2.

Clinical scores: We reported in detail the results of each outcome in both grafts as reported in Tables 3 and 4.

In terms of active elevation (AE), fascia lata autograft showed better improvement postoperatively, with the best results reported in Alarcon *et al.* [16] and de Campos Azevedo *et al.* [17]. In the American Shoulder and Elbow Surgeons score, fewer studies reported data about fascia lata autograft. Studies showed improvement after using human dermal allograft; however, Mihata *et al.* [12] reported maximum improvement in ASES score after using fascia lata autograft. In the Constant score (CS), de Campos Azevedo *et al.* [15] and de Campos Azevedo *et al.* [17] reported the best outcomes utilizing fascia lata autograft. While in the Visual Analog Scale (VAS), the best pain relief was reported by Alarcon *et al.* [16] after using fascia lata autograft. Across the studies, better ER was achieved after fascia lata autograft. About AHD, both grafts were performed equally. Graft survival rates were higher in fascia lata autograft.

Discussion

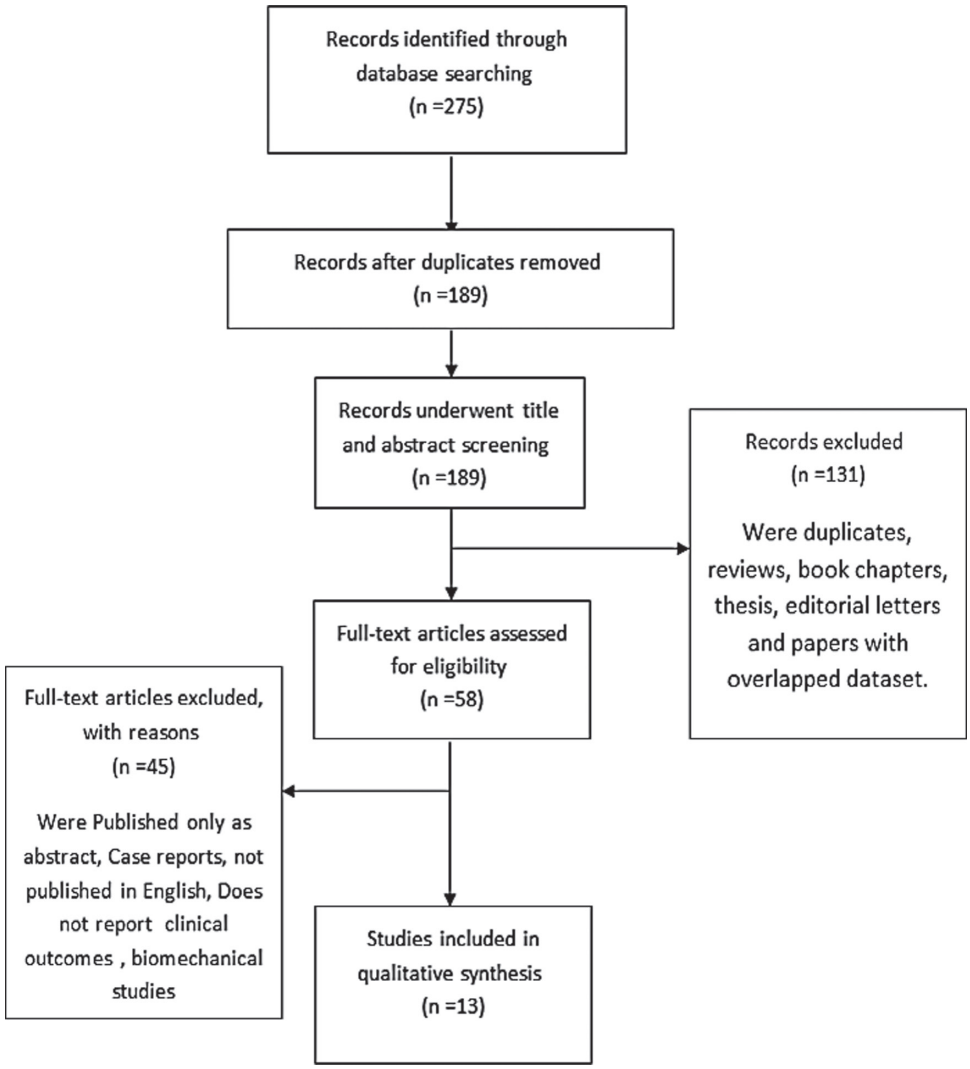
SCR is a surgical technique aimed at addressing MRCT, a challenging condition that can cause significant pain and functional limitations in the shoulder joint [26]. In cases where the superior capsule of the shoulder is extensively damaged, SCR offers a potential solution to reinstate functionality and stability to the joint. Two commonly utilized graft options for SCR are tendon fascia lata autograft and dermal allograft [26].

Fascia lata autograft involves using the patient's own connective tissue from the thigh, while dermal allograft entails using donor tissue, typically from a cadaver. Both graft options have their unique advantages and drawbacks, leading to ongoing discussions and research in the field of orthopedic surgery [27].

The objective of this review is to assess the clinical results. comparing between SCR utilizing HDA versus Tensor Fascia Lata Autograft assessing the efficacy and safety of each management modality.

In the current review, 13 studies matched our inclusion criteria with a total of 487 cases. Five studies used

Figure 1



PRISMA flow diagram showing the process of studies selection.

fascia lata autograft while sever researches utilized human dermal allograft and one studies used both grafts. The mean age of included case ranged between 60 to 65 years old and they were followed for various durations up to nearly 40 months in some studies. The proportion of patients with recurrent tears was relatively high.

The current study results demonstrates thirteen studies characteristics for different types of graft TFL autograft, HDA and both grafts).

One systemic review done by Abd Elrahman *et al.* [26] revealed that Six investigations, each consisting of two research teams, met the inclusion criteria. The HDA collection comprised a total of 155 shoulders, whereas the TFL group comprised 140 shoulders. The HDA collection and the TFL collection had mean ages of 60.49 years and 65.8 years, respectively, at the time of surgery. The mean duration of follow-up was 15.2 months for the HDA group and 44.6 months for the TFL collection.

Abd Elrahman *et al.* [26] revealed that In comparison to the HDA team, the TFL collection exhibited a more substantial increase in range of motion. In the HDA collection, active ER improved postoperatively by nine degree±one, whereas in the TFL collection, it improved by 15–17º (range: 30°–43°). Active abduction after surgery improved by 67.5° in the TFL group and 56° in the HDA collection. In the HDA collection, postoperative active elevation improved by 30°–37° (range: 158°–160°), while in the TFL team, it improved by 13°–55.6° (range: 130.4-146).the review showed improvements in clinical findings and scores. However, that review involved only six clinical studies.

The current study results present the clinical outcomes of studies that used either (TFL) or (HDA) for (SCR)

Table 1 Characteristics of included studies (*n*=13)

Study	(Year)	Graft	Journal	Years of Study Enrollment	No. of Patients	(No. Of Shoulders)	Female/ Male Patients	Age, Mean SD (Range), year	Clinical Follow-Up, Mean SD (Range), month	Outcome Measures	% of Patients With Recurrent Tear	(Level of Evidence)
Mihata *et al.* [12]	2018	fascia lata autograft	Am J Sports Med	2007–2014	100	100	–	66.9 (43–82)	48 (24–88)	ASES, JOA, ROM	.....	Retrospective case series (level IV) -Subgroup comparisons between retear (+) and retear (-) -Subgroup comparisons between 1- and 5-y follow-up -No adjustment of confounding variables -No control
Lim *et al.* [14]	2018		Arch Orthop Trauma Surg	2013–2016	31	31	22/9	65.3 (44–85)	15 (12–24)	ASES score, CS, VAS score, ROM, SS	80.6	Retrospective case series (level IV) -Comparison between retear (+) and retear (-) groups -Adjustment of confounding variables included between retear groups -No control group
de Campos Azevedo *et al.* [15]	2018		Orthop J Sports Med	2015–2016	22	22	15–7	64.8 ± 8.6 (47–77)	24	CS, SSV, SST score, ROM, SS, PS	27.3	-Prospective case series (level IV) -Multiple subgroup comparisons included -Power analysis included -No adjustment of confounding variables -No control group
Alarcon [16]	2021		Arthroscopy Association of North America	2016–2019	31	31	22\9	61 (47–76)	35 (24–51)	CS, VAS score,	.....	-Retrospective-case series (level III) -no control group -Comparison between retear (+) and retear (-) groups
de Campos Azevedo *et al.* [17]	2020		The American Journal of Sports Medicine	2015–2016	22	22	13\9	64.81 ± 8.84	36	CS, SST; SSV,ROM,	23.81	-prospective single arm case series (level III) -Power analysis included -No adjustment of confounding variables -No control group
Lee and Min [18]	2018	Fascia lata or human dermal allograft	Knee Surg Sports Traumatol Arthrosc	2015–2016	32	36 Fascia lata(28) dermal allograft (8)	11\25	60.9 ± 6.2	24.8 ± 6.9	ASES score, CS, VAS score, ROM	37.5	-Retrospective-case series (level IV) -Comparison between retear (+) and retear (-) groups -Adjustment of confounding variables included between retear groups -Power analysis and pilot study included
Hirahara *et al.* [19]	2017	human dermal allograft	Am J Orthop (Belle Mead NJ)	2014–2017	8	8	2\6	61.3 (47–78)	32.38 (25–39)	ASES score, VAS score	87.5	-Prospective case series (level IV) -Historical control group underwent primary RTC repair -No adjustment of confounding variables
Denard *et al.* [20]	2018		Arthroscopy	2014–2016	59	59	20/39	62.0 ± 8.7	17.7 (12–29)	ASES score, VAS score, SSV, ROM, PS	42.4	-Prospective case series (level IV) -No control/comparison groups -No adjustment of confounding variables

Table 1. Continued

Study	(Year)	Graft	Journal	Years of Study Enrollment	No. of Patients	(No. Of Shoulders)	Female/ Male Patients	Age, Mean SD (Range), year	Clinical Follow-Up, Mean SD (Range), month	Outcome Measures	% of Patients With Recurrent Tear	(Level of Evidence)
Pennington *et al.* [21]	2018		Arthroscopy	2015–2016	86	88	27/59[x]	59.4 (27–79)	12	ASES score, VAS score, ROM, SS, PS	41	-Retrospective case series (level IV) -No control/comparison groups -No adjustment of confounding variables
Burkhart *et al.* [22]	2019		Arthroscopy Association of North America	2014–2016	41	41	8\33	64 ± 1.4 (39-78)	34 ± 1 (24-50)	ASES score, VAS score, SSV, ROM,	–	-Retrospective case series (level IV) -No control/comparison groups -No adjustment of confounding variables
Eigenschink *et al.* [23]	2019		Obere Extremitt	–	21	–	14/7	65.9 (50–77)	12	CS, ASES, SST	–	-prospective case series study (level III) -short follow-up period -low number of enrolled patients -Comparison between retear (+) and retear (-) groups
Takayama *et al.* [24]	2020		Journal of Shoulder and Elbow Surgery	2014–2018	20	–	9\11	69.1 ± 4.8	…….		…….	-Retrospective-case series (level III) -study was not a randomized controlled study -results are only short- to mid-term
Pashuck *et al.* [25]	2020		The Journal of Arthroscopic and Related Surgery	2015–2017	14	–	2\12	58.9 + 11	…….	CS, ASES score, VAS score, ROM,	…….	-Retrospective case series (level IV) -the experimental design did not permit inclusion of a control group or cohort -small sample size

ASES, American Shoulder and Elbow Surgeons; CS, Constant score; JOA, Japanese Orthopedic Association; MINORS, Methodological Index for Non-randomized Studies; PS, patient satisfaction; ROM, range of motion; SD, standard deviation; SS, shoulder strength; SST, Simple Shoulder Test; SSV, Subjective Shoulder Value; VAS, visual analog scale.

Table 2 Table showed operative details in each study (*n*=12)

	Type of graft (No. of shoulders)	Graft thickness, mean SD (range), mm	Patient positioning	Arm positioning	No. of arthroscopic portals (type)	Type of anchors on glenoid side	Type of anchors on humeral side	Mean No. of anchors on superior glenoid (range)	Mean No. of anchors on humeral head (range)
Mihata *et al.* 2018		NR (6.0–8.0)	Lateral decubitus	30–45 abduction	3 (posterior, anterior, lateral)	5.0-mm-diameter titanium suture anchors, double loaded	Suture anchors or push-in anchors	2	4
Lim *et al.* 2018		NR (6.0–NR)	Beach chair	NR	3 (posterior, anterior, lateral)	NR	NR	NR (2-3)	4
De Campos Azevedo *et al.* 2018		NR (5.0–8.0)	Beach chair	10 of abduction, 70 of forward,flexion, neutral rotation, with 3-kg forward traction	3 (posterior, anterior, lateral)	1.8-mm all-suture double-loaded anchors	2.8-mm all-suture double-loaded anchors, 4.5-mm knotless anchors	2	4
Alarcon *et al.* 2021	Fascia lata autograft (153)	6	Lateral decubitus	20 of flexion, 30 of abduction and neutral rotation, and the rest of the sutures were tied	NR	Two single-loaded 3.5 mm titanium corkscrew anchors (Arthrex, Naples, FL)	wo 5.5 mm double-loaded titanium corkscrew anchors	NR	NR
de Campos Azevedo *et al.* 2020		5 to 8	NR	NR	NR	Further, two 1.8-mm all-suture double-loaded anchors (Y-Knot Flex; Conmed)	NR	8	8
Takayama *et al.* 2020		8 ± 1 (8–9)	NR	NR	NR	(Corkscrew FT 4.5 mm; Arthrex, Naples, FL)	(SwiveLock 4.75 mm, or 5.5 mm FiberTape; Arthrex, Naples, FL, USA)	2	4
Lee and Min 2018	Fascia lata autograft (28) or acellular human dermal allograft (8)	–	Beach chair	30 of abduction	NR	3.0-mm-diameter suture anchors, 2.4- mm suture anchors	5.0-mm-diameter suture anchors	2	2
Hirahara *et al.* 2017	Acellular human dermal allograft (155)	3.3 0.7 (1.5–3.5)	Beach chair	Neutral rotation, neutral flexion, neutral abduction (with patient at rest, no traction)	5 (posterior, lateral, Neviaser, superolateral, anterosuperior)	3.0-mm-diameter suture anchors	4.75-mm-diameter suture anchors	NR (2-3)	4
Denard *et al.* 2018		2.8 0.6 (1.0–3.0)	Lateral decubitus	20–30 of abduction, 20 of forward flexion, neutral rotation with 5 to 10 of lateral weight suspended from standard arthroscopic boom	4 (posterior, anterior, lateral, accessory lateral)	3.0-mm-diameter suture anchors	4.75-mm cannulated threaded anchors with braided suture tape	2.3 (2–4)	3.9 (2–5)
Pennington *et al.* 2018		3.0 (2.8–3.3)	Lateral decubitus	45 of abduction, 10 of forward flexion, neutral rotation	4 (posterior, anterior, midlateral, juxtaacromial)	2.9-mm-diameter push-in anchors	4.75-mm-diameter anchors	3	4
Burkhart *et al.* 2019		3	Lateral decubitus	NR	NR	(Knotless SutureTak or Knotless CorkScrew; Arthrex, Naples, FL)	(BioComposite Swive- Lock; Arthrex)	3	2 to 3
Eigenschink *et al.* 2019		NR	NR	NR	NR	NR	NR	NR	NR

NR, Not reported.

Table 3 Table showed operative details in each study (*n*=15)

Study	AE		ASES Score		CS		VAS Score	
	Pre	Post	Pre	Postop	Pre	Postop	Pre	**Postop**
Studies using fascia lata autograft								
Mihata *et al.* 2018	91	147	36 ± 19	92 ± 12	–	–	–	–
Lim *et al.* 2018	133 ± 35	146 ± 18	54.4 ± 17.9	73.7 ± 10.8	51.7 ± 13.9	63.7 ± 8.1	6 ± 1.2	2.5 ± 1.2
de Campos Azevedo *et al.*2018	74.8 ± 55.5 (0–180)	143.8 ± 31.7 (80–180)	–	–	17.6 ± 13.4 (0–55)	64.9 ± 18 (29–100)	–	–
Lee and Min 2018	153.9 ± 27.2	–	51 ± 9.7	84.1 ± 5.1	56.7 ± 8.9	83.1 ± 5.9	1.1 ± 0.9	.....
Alarcon *et al.* 2021	115 (45 –170)	171 (135 –180)	–	–	36.0 (18–60)	78.7 (56–93)	7.7 (5–10)	0.7 (0 to 5)
de Campos Azevedo *et al.*2020	77.63	151.32	–	–	18.84	69.63		
Takayama *et al.* 2020	–	–	–	–	–	–	–	–
Studies using human dermal allograft								
Lee and Min 2018	133.8 ± 44.7	–	47.8 ± 6.4	83.4 ± 4.9	54.8 ± 9.8	81.9 ± 4.8	1.1 ± 1.3	–
Hirahara *et al.* 2017	–	–	41.8 ± 12.7	86.5 ± 12.7	–	–	6.3 ± 1.6 (4–8.5)	0.4 ± 1.1 (0–3)
Denard *et al.* 2018	130 ± 48	158 ± 32	43.6 ± 18.6	77.5 ± 22	–	–	5.8 ± 2.2	1.7 ± 2.1
Pennington *et al.* 2018	121 (10–180)	160 (70–180)	52.2 ± 19.3	81.6 ± 10.2	–	–	4 ± 2.5	1.5 ± 1.2
Burkhart *et al.* 2019	140 [120–159]	167 [159–176]	52 [46–57]	89 [86–92]	–	–	4.6 [3.8–5.4]	0.7 [0.4–1]
Eigenschink *et al.* 2019	100 (45–170)	165 (120–170)	34.0 ± 12.6	82.0 ± 16.7	30.3 ± 15.3	77.3 ± 15.2	–	–
Takayama *et al.* 2020	101 ± 45	146 ± 35	52.4 ± 12.6	86.1 ± 13.8	–	–	–	–
Pashuck *et al.* 2020	128 + 36	172 + 4	12.8 + 4	23.7 + 4	–	–	3.3 + 2	0.6 + 1

AE, active elevation; ASES, American Shoulder and Elbow Surgeons score; CS, constant score; ER, external rotation; ER, external rotation; ROM, range of motion; SST, supraspinatus; **SSV**, subjective shoulder value; VAS, Visual Analog Scale.

in patients with (MIRCTs). The outcomes are assessed using various scores, including (ASES), (CS), and (VAS). Each study reports preoperative and postoperative scores, reflecting the improvements in shoulder function and pain reduction after the SCR procedure.

For the TFL group, Mihata *et al.* [12] showed a significant increase in ASES Score from 36 ± 19 preoperatively to 92 ± 12 postoperatively. Lim *et al.* [14] reported improvements in ASES Score from 54.4 ± 17.9 to 73.7 ± 10.8 and in VAS Score from 6 ± 1.2 to 2.5 ± 1.2 after the surgery. Alarcon *et al.* [16] demonstrated enhanced ASES Score from 115 (range 45–170) to 171 (range 135–180) postoperatively. Improvement in TFL group scores supports its value.

Studies using HDA also showed positive results. Lee and Min [18] reported an increase in ASES Score from 47.8 ± 6.4 to 83.4 ± 4.9, while Hirahara *et al.* [19] observed an development in ASES Score from 41.8 ± 12.7 to 86.5 ± 12.7. Pennington *et al.* [21] showed a rise in ASES Score from 121 (range 10–180) to 160 (range 70–180) and in the VAS Score from 4 ± 2.5 to 1.5 ± 1.2. Also improvement in HDA group scores supports its value.

The reductions in VAS scores postoperatively across these studies suggest effective pain relief following SCR with both graft types. Therefore, the findings from these studies support the positive outcomes observed in our study regarding improvements in shoulder function and pain relief following SCR using either TFL or HDA.

Another, systemic review done by Smith *et al.* [28] Align with previous results, indicating significant improvements in various outcome measures after SCR surgery. Specifically, the VAS pain scores reduced from preoperative levels to postoperative levels, indicating reduced pain. The American Shoulder and Elbow Surgeons score increased, indicating developed shoulder function, and forward flexion and ER also showed positive improvements. However, no studies involved a control group or randomization.

Along the same line, a study done by Lee *et al.* [29] demonstrate positive postoperative improvements in ASES scores and VAS scores, indicating improved shoulder function and reduced pain after the SCR procedure using various graft types.

Regarding the outcomes assessed using various measures, including ER, AHD, graft tear rates, graft survival rate, single-strand vascularization (SSV), and subscapularis tendon (SST) tears.

Table 4 Table showed operative details in each study (*n*=15)

Study	ER		AHD (mm)		No. of shoulders with graft tears at last follow-up MRI (%)		Graft survival	SSV, %		SST	
	Pre	Post	Pre	Post			Rate %	Pre	Post	Pre	Post
Studies using fascia lata autograft											
Mihata *et al.* 2018	26	41	–	–	5	(5)	95	–	–	–	–
Lim *et al.* 2018	28±16	30 15	5.3±2.2	6.4±2.3	9	(29)	71	–	–	–	–
de Campos Azevedo *et al.* 2018	13.2±18.4 (0–70)	35.6 17.3 (0–60)	6.4±3.3	7.1±2.5	2	(9)	91	33.0±17.4	70.0±23.0	2.1±2.9	8.6±3.5
Lee and Min 2018	58 (0–60)	–			9	(32)	68	–	–	–	–
Alarcon *et al.* 2021	33	55	6.1 (2-11)	8.6 (2-12)	(4/26).	(15.4)	84.6	–	–	–	–
de Campos Azevedo *et al.* 2020	13.95	38.68			4\19	(21)	79	35.53	71.58	2.26	9.74
Takayama *et al.* 2020	.....	–	–	–	–		–	–	–	–	–
Studies using human dermal allograft											
Lee and Min 2018	49.4 19.2	–	–	–	4	(50)	50	–	–	–	–
Hirahara *et al.* 2017	–	–	4.5	7.6	1	(20)	80	–	–	–	–
Denard *et al.* 2018	36 18	45 17	6.6	6.7	11	(55)	45	–	–	–	–
Pennington *et al.* 2018	–	–	7.1	9.7	3	(75)	25				
Burkhart *et al.* 2019	37 [29–44]	59 [51–67]	7 0.4 [6–8]	8 0.4 [7–9]	–			39 [33–44]	83 [79–87]		
Eigenschink *et al.* 2019	–	–	–	–	–		71.40	–	–	2.4±2.4	8.5±3.3
Takayama *et al.* 2020	45±24	47±20	–	–	–			–	–	–	–
Pashuck *et al.* 2020	–	–	6+2	6.7+2	–		100	–	–	–	–

AHD, acromiohumeral distance; ER, external rotation; ER, external rotation; FE, forward elevation; SST, supraspinatus; SSV, subjective shoulder value.

For the TFL group, several studies by Mihata *et al.* [12] Lim *et al.* [14] de Campos Azevedo *et al.* [15] Alarcon *et al.* [16] have reported postoperative improvements in ER, AHD, and clinical scores, such as SSV and SST. The graft survival rate for TFL ranged from 68% to 95%, and the graft tear rate varied between 5 and 29%.

Similarly, for the HDA group, studies Lee and Min [18], Hirahara *et al.* [19] Denard *et al.* [20] Pennington *et al.* [21] Burkhart *et al.* [22] Eigenschink *et al.* [23] Takayama *et al.* [24] and Pashuck *et al.* [25] have reported developments in ER, AHD, and clinical scores. The graft survival rate for HDA ranged from 25 to 100%, and the graft tear rate varied between 20 and 75%.

The results of the current review revealed that both TFL and HDA groups have demonstrated effectiveness in improving clinical outcomes for patients with MIRCTs. However, the graft tear rates seem to be greater in the HDA collection compared with the TFL collection in some studies.

In similar manner study by Smith *et al.* [28] revealed that before and following the operation, ER rose from 13.2˚ to 41.0˚; it then rose from 30.0˚ to 59.0˚.

Moreover, a systemic review done by Abd Elrahman *et al.* [26] revealed that An improvement in SSV scores was significant in both the HDA collection (59 shoulders) and the TFL group (22 out shoulders): from 76 to 35 and from 70 to33, respectively. Furthermore, the HDA group exhibited a greater range of graft retear rate percent values, spanning from 3.4 to55%, whereas the TFL collection reported a range of 4.5–29%.

Limitations

This study was limited by the quality of evidence available for assessing the improvements in function, pain, and retear rates after SCR when using fascia lata

allograft or dermal allograft. It was also limited by the small number of patients. Most studies did not have a minimum of 24 months of follow-up and lacked sufficient follow-up data to allow accurate comparison of results between the two groups.

Conclusion

This detailed analysis of studies comparing HDA and TFL for SCR in individuals with MIRCTs reveals several important findings. Both graft types demonstrate efficacy in improving clinical outcomes, including decreased pain, enhanced shoulder function, and increased range of motion. However, differences emerge in terms of graft tear rates and graft survival rates, with some studies reporting greater retear rates in the HDA group compared with the TFL group. Notably, the TFL group exhibits superior gains in the range of movement, particularly in active ER and abduction. These findings highlight the importance of carefully considering graft selection and tailoring the choice to individual patient factors and surgeon preferences.

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Conflicts of interest

There are no conflicts of interest.

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