

Editorial Commentary: Human Dermal Allograft Is Preferable to Fascia Lata Autograft Based on Similar Outcomes Without Donor-Site Morbidity



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Abstract: Superior capsular reconstruction (SCR) is increasingly considered a “game-changer” for young patients with irreparable rotator cuff tears. Popular graft choices include fascia lata autograft (FLA) and human dermal allograft (HDA), with the latter strongly preferred in North America and Europe. Despite that, there seems to be a general perception that FLAs are associated with better healing rates due to better biology. However, critical analysis of the literature demonstrates abundant limitations that preclude strong conclusions about whether one graft type is optimal. Furthermore, recent studies have demonstrated that HDAs used for SCR have good healing potential and are also associated with generally good short-term clinical outcomes. A clinical pearl is that humeral sided repair failures are not uncommon, and double-row repair techniques should be thoughtfully considered. The main downside of FLAs is the associated donor site morbidity. Given the lack of proven advantage of FLAs, the impetus to move away from the current trend to use HDAs is low.

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Alarcón, Uribe-Echevarría, Clares, Apablaza, Vargas, Benavente, and Rivera should be congratulated for their excellent clinical outcomes reported in the article entitled “Superior Capsular Reconstruction With Autologous Fascia Lata Using Single Lateral-Row Technique Is an Effective Option in Massive Irreparable Rotator Cuff Tears: Minimum 2-Year Follow-Up”.¹ The authors reported that 93% and 100% of patients achieved a patient-acceptable symptom state [defined for arthroscopic cuff repair, and not specifically superior capsule reconstruction (SCR)] with respect to pain and Constant scores, respectively, and that the mean range of forward flexion and external rotation improved significantly (and beyond the minimum clinically important difference threshold). No patient underwent revision surgery or reoperation. These are excellent outcomes and compatible with the consistent message across previous studies that SCR (regardless of whether

human dermal allograft [HDA] or fascia lata autograft (FLA) is used) is associated with good pain relief and improved functional scores for patients with irreparable rotator cuff tears, at short-term follow-up².

Alarcón et al. also report a graft healing rate of 84.6%, as determined by magnetic resonance imaging (MRI). This seems impressive, particularly given that a single lateral row technique was used. However, these findings should be interpreted with caution because it is not clear that MRI is capable of determining graft healing rates when artefact from metallic anchors makes detailed evaluation of the bone/graft interface difficult. It appears that the authors have instead determined the graft-intact rate. Furthermore, it should be noted that this aspect of the study was hampered by missing data (only 83.9% of patients underwent postoperative MRI), and more importantly, the time interval between surgery and MRI was too short to reliably determine the rate of graft failures (mean 10.5 months, range 6-22 months). Greater confidence in the value of these findings could have been afforded had the minimum radiological follow-up matched the clinical follow-up at 2 years.

In my own practice, like most surgeons performing SCR in North America and Europe, I use a human dermal allograft and a double-row technique. I have preferred to avoid a single-row technique due to concerns about the risk of failure, and instead, I have sought to take

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advantage of increased contact pressures at the graft/bone interface, increased surface area for graft healing, and superior biomechanics of repair afforded by double-row fixation.³ However, even with a double-row technique, failures on the humeral side are a concern when using HDA. Denard et al. reported that 7/20 patients who underwent postoperative MRI (from an overall series of 59 patients) had a humeral sided failure.⁴ Given the failure to obtain postoperative MRI in all patients (in a majority of studies), true failure rates are not clearly understood, and a comparison with the 15.4% (4/26 patients) rate of failure (all humeral-sided) reported by Alcaron et al. is precluded.¹ Despite these limitations, the rate reported by Alcaron et al. is seemingly low given their use of a single-row technique, and this perhaps adds gravitas to a general belief in the biological superiority of FLA. Furthermore, the high graft-intact rate reported is consistent with other studies using FLA (Mihata et al., 95.5% at a mean follow-up of 60 months,⁵ de Campos Azevedo et al., 90.9% at a mean follow-up of 24 months⁶), although it should be noted that these previous studies used double-row techniques for humeral fixation. However, in considerable contrast, when using FLA and a single lateral row technique, Lim et al. reported a 36% failure rate at 12 months postoperatively with the majority of failures (11/13) occurring on the humeral side, reinforcing concerns that single-row techniques might not be good enough, regardless of whether autograft or allograft are used.⁷

In general terms, failure rates after SCR remain imprecisely defined due to typically small series of patients, short durations of follow-up, and inconsistency in obtaining post-operative imaging in all patients. Bearing these limitations in mind, overall failure rates for SCR are reported between 5.5% and 55% for HDA, and between 4.2% and 36.1% for FLA.² Although some authors have attempted to directly compare failure rates between graft types, the validity of doing so is low given the aforementioned limitations, the lack of comparative studies, and heterogeneity in various aspects of study design (particularly duration of follow-up and timing of postoperative imaging). Despite that, there seems to be a general perception that FLA might be the better graft due to potentially higher healing rates. Although this might have a logical basis, given the differences in graft biology, the limitations of the available evidence really do preclude this type of comparative analysis. In addition, concerns about the limited biological potential of HDA have recently been addressed to some extent by a retrieval study from Lederman et al., which demonstrated that it is a "hospitable scaffold" for host cell infiltration and remodeling.⁸ The authors reported that all grafts had evidence of cellular infiltration, neovascularisation, and active remodeling. Furthermore, in a rabbit model of irreparable cuff tear, Yildiz et al. demonstrated no significant

differences between FLA and HDA grafts in terms of macroscopic healing rates, and subsequent biomechanical properties (failure loads, stiffness, and displacement) between FLA and HDA grafts.⁹ The authors also concluded that both groups were histologically similar even though inflammatory cell infiltration and collagen fiber orientation and density were considered qualitatively somewhat better in the FLA group. Although it is not clear how well these findings from the animal study can be extrapolated to clinical use, it does appear that both graft types have acceptable healing potential, and a clear advantage of one over the other has not been demonstrated.

Even if we accept that there may be some biological and also biomechanical advantage (resulting from thickness and more effective recentering of the humeral head¹⁰) of FLA autografts, this must be balanced with the risk of donor site morbidity. Donor site morbidity has not been comprehensively reported in the literature, but it is often discussed as an important concern. Alcaron et al. report a low frequency of donor site morbidity in their study (hematoma, with spontaneous resolution: $n = 1$; donor site pain resolving within one month: $n = 2$).¹ However, such a low rate of complications is not a universal finding. de Campos Azevedo et al. evaluated donor site morbidity after a minimally invasive FLA harvest.⁶ Although the authors concluded that the morbidity was "low-impact" (because 76.2% of patients considered that the end result of shoulder surgery compensated for the morbidity), the fact that more than half of patients stated that their harvested thigh "bothered them," and a large proportion stated that they noticed persistent changes, including pain and numbness at 2 years postoperatively, is of considerable concern.

In my opinion, consideration of a move away from HDA in North America and Europe, in preference of FLA is unwarranted unless significant clinical advantages of FLA are clearly demonstrated and considered to outweigh the morbidity of graft harvest. Furthermore, humeral sided failures are not uncommon, and therefore, I caution against the use of single-row techniques. However, at the same time, I congratulate Alcaron et al. again for their study and its valuable findings.¹ It is clear that the constraints of their health system (lack of reimbursement for grafts and implants) are an important driver for their use of FLA and a single-row technique for humeral fixation. Clearly, they have demonstrated that they can achieve excellent short-term results with this technique. Undoubtedly, future studies will be important to determine whether these initial cost savings are maintained once we understand the true long-term failure rate and the costs associated with revision/reoperation.

Although SCR is increasingly considered as a game-changer for young patients with irreparable tears, we should remember to be mindful of our duty of "primum

non nocere” and avoid the unnecessary donor site morbidity of FLA, particularly when clear advantages of this graft choice are unproven. We should also be particularly careful to avoid unnecessary morbidity when the long-term benefits of SCR have not been precisely defined. Clearly, there is a need for comparative study to better understand the merits of each graft choice and the associated long-term outcomes.

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