

# Editorial Commentary: Superior Capsule Reconstruction Using Dermal Allograft in Posterosuperior Rotator Cuff Tears—Do Patients Benefit and Allografts Heal?



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**Abstract:** Irreparable rotator cuff tears are challenging to treat, especially in highly active and young patients. Superior capsule reconstruction is a joint-preserving, anatomic, and arthroscopic option that has shown promising mid-term results. Over time, this procedure has undergone evolution in terms of patient selection and technical aspects, such as graft choices and fixation methods. Initially, superior capsule reconstruction was used for isolated irreparable tears of the supraspinatus tendon; now, the indication has widened to technically irreparable massive posterosuperior rotator cuff tears. The trend in North America and Europe has been toward using human dermal allografts, as opposed to fascia lata autografts, to avoid donor-site morbidity and reduce surgery time. How these modifications affect clinical outcomes and whether dermal allografts heal remains unknown.

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We applaud the efforts of Burkhart, Prankun and Hartzler,<sup>1</sup> who studied the clinical and structural outcomes after superior capsule reconstruction (SCR) using human dermal allograft (DA) for operatively irreparable posterosuperior rotator cuff tears in the short term in the study “Superior Capsular Reconstruction for the Operatively Irreparable Rotator Cuff Tear: Clinical Outcomes Are Maintained 2 Years After Surgery.” Since Mihata et al.<sup>2,3</sup> introduced SCR with fascia lata autograft as an alternative surgical option to treat irreparable superior rotator cuff tears with excellent clinical and structural mid-term outcomes,<sup>4,5</sup> this procedure has become a game changer, especially for a young and high-demand patient population. Advantages of this technique include not only its minimally

invasive, arthroscopic approach but, more importantly, its clinical efficacy, and its joint- and anatomy-preserving character that prevents burning bridges for future operative interventions.

As the SCR technique has developed, a number of authors have reported results of SCR using human DA instead of fascia lata autografts to avoid donor-site morbidity, reduce surgery time, and have an “off-the-shelf” graft.<sup>6-9</sup> The clinical and structural outcomes of SCR using DA in the short term, especially in massive posterosuperior rotator cuff tears, have been anxiously awaited.

Burkhart et al.<sup>1</sup> evaluated the results of their arthroscopic SCRs using 3-mm-thick DAs after 2-year minimum follow-up and compared the results with those seen in a previously studied group of patients at 1 year postoperatively. Of 48 patients who matched the inclusion criteria, 41 patients, with a mean age of 64 years, were available for follow-up at a mean of 34 months postoperatively. Clinical outcomes improved significantly at 1 year postoperatively, with a mean American Shoulder and Elbow Surgeons (ASES) score of 52 preoperatively versus 90 postoperatively, and the results were maintained at final follow-up, with mean ASES scores of 90 and 89 at 1-year and minimum 2-year follow-up, respectively. Similar observations were made for all secondary outcome parameters. However, 8 patients (17%) were considered to have failure: 2

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underwent revision of the SCR and 6 did not achieve the minimal clinically important difference in the ASES score. An interesting finding was that unsatisfactory outcomes were not associated with preoperative de-centration of the humeral head on the Hamada scale.

In the study by Burkhart et al.,<sup>1</sup> 26 patients were followed up with magnetic resonance imaging post-operatively, showing a graft healing rate of 85%, meaning intact grafts in at least 46% (22 of 48 patients) of the entire cohort, taking into account 1 early failure and 5 patients in whom the graft integrity remains unknown (lost to follow-up). In summary, the results of the authors' initial report at 1 year were maintained over time.<sup>1,9</sup>

When we read this study, 2 crucial factors come up: (1) Patients definitely benefit clinically from SCR using DA in massive posterosuperior rotator cuff tears in the short term, and (2) not all grafts healed. In our personal experience of arthroscopic SCRs using DA recently presented at the ESSKA (European Society of Sports Traumatology, Knee Surgery & Arthroscopy) 2019 meeting in Madrid, we followed up 22 patients (mean age, 56 years) who had undergone surgery at least 2 years earlier.<sup>10</sup> We observed very similar findings to those of Burkhart et al.,<sup>1</sup> with a mean ASES score in the mid-50s preoperatively increasing to the mid-80s at 2 years postoperatively. One clinical failure with persistent loss of function presented after 12 months; this patient underwent revision with SCR. However, graft integrity presented slightly different findings compared with the study by Burkhart et al.: With 20 of 21 post-operative magnetic resonance images available, we noted a graft integrity rate at the tuberosity site of 100%; midsubstance, 76%; and glenoid site, 81%.

The question now is, "Why do allografts fail to heal and what can be done to optimize healing?" First, we can expect histologic healing of DAs in SCR with incorporation of cells as recently shown by both Altintas et al.<sup>11</sup> and Hartzler et al.<sup>12</sup> However, we also observed that this happens slowly, is not completed at 4 months postoperatively, and is biomechanically vulnerable.<sup>11</sup> For that reason, biomechanically strong primary stability of the reconstruction is crucial with improved fixation especially at the glenoid site<sup>13</sup> in combination with a more restrictive postoperative rehabilitation protocol compared with primary rotator cuff repairs to protect the graft.<sup>14</sup>

We congratulate Burkhart et al.<sup>1</sup> for highlighting improvement and durability of clinical outcomes with high patient satisfaction after SCR using DA in the short term. If we take into account what we have learned so far, we hope to see positive upward trends in both clinical and structural outcomes when performing SCR with DA in massive posterosuperior rotator cuff tears.

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