

# Editorial Commentary: Dermal Allograft: A Viable Allograft for Salvage Procedures in Treating Irreparable Rotator Cuff Tears



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**Abstract:** Our experience with superior capsule reconstruction (SCR) has been successful in patients with isolated, irreparable, supraspinatus tears; however, we have found that bridging reconstruction may have a better role in treating patients with some cuff remnant. Our results are promising, and, although there is new evidence to show that dermal allografts can heal in the setting of rotator cuff deficiency, the basic principle of restoring anatomy should not be ignored. SCR has been accepted as a salvage procedure for irreparable cuff tears, with the precise indications being elucidated. Reconnecting viable cuff muscle to tuberosity directly or through a graft should be considered before SCR.

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The management of patients with irreparable rotator cuff tears remains challenging. Failure rates of massive cuff tears treated with partial repair range from 50% to 90%.<sup>1-3</sup> Several alternative surgical treatment options have been reported with reliable improvements in shoulder function and shoulder pain. Superior capsule reconstruction (SCR) has widespread use despite having little long-term data to show success, especially as compared with other treatments.

To our knowledge, "Ultrasound Assessment of the Superior Capsular Reconstruction With Dermal Allograft: An Evaluation of Graft Thickness and Vascularity" by Hirahara, Andersen, and Panero<sup>4</sup> is the first study to assess postoperative changes in the thickness of the dermal allograft of the SCR and to evaluate the graft for the presence of intrasubstance pulsatile vessels using ultrasound scanning after surgery. The most important result shows that there was an increase in the thickness of the graft in all of the

measured sites, with the maximum increase seen at the insertion on the tuberosity, with a mean measurement at final follow-up being  $4.4 \pm 0.2$  mm. Ten constructs (56%) showed signs of pulsatile vessels in the first 12 months, and all constructs were intact. Further findings include improvement in American Shoulder and Elbow Surgeons scores from  $49.3 \pm 4.0$  (95% confidence interval [CI] 41.6-57.1) before surgery to  $85.1 \pm 2.9$  (95% CI 79.4-90.8) ( $P < .001$ ), and decrease in Visual Analogue Scale scores from  $5.3 \pm 0.6$  (95% CI 4.2-6.5) before surgery to  $0.9 \pm 0.3$  (95% CI 0.3-1.5) at final follow-up ( $P < .001$ ).

Mihata et al.<sup>5</sup> pioneered the technique of SCR using a fascia lata autograft and was able to obtain healing in 83.3% of the patients. Most surgeons in North America have modified this technique using dermal grafts to decrease donor site morbidity, but the combined reported healing rate has been poor. We agree with the authors that healing of acellular dermal allograft can occur and that tuberosity failure is more likely<sup>6</sup>; however, their reported SCR healing rate of 100% seems too good to be true. We also agree with the authors that ultrasonography is limited in assessing the glenoid aspect of the graft, and we believe that ultrasonography is user dependent. For these reasons, it is our belief that ultrasonography may not be as good as magnetic resonance imaging in diagnosing graft re-tears, especially off of the glenoid. In our experience, magnetic

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resonance imaging—diagnosed SCR healing rates are similar to those reported by Denard et al.<sup>6</sup> (~50%), with most failures occurring at the tuberosity.

As we gain more experience with SCR, the indications seem to be narrower than was previously believed. SCR is most successful in patients with isolated, irreparable, supraspinatus tears instead of multiple cuff tendons.<sup>7-9</sup> Perhaps that is because cuff function is an important factor for improving outcomes. Our algorithm for the management and treatment of massive cuff tears is as follows: (1) Attempt rotator cuff repair using the Southern California Orthopedic Institute row technique triple-loaded suture anchors at the articular margin with rip stop sutures<sup>10</sup>; (2) augment with dermal matrix if the repair is tenuous<sup>11</sup> and systematic review<sup>12</sup>; (3) bridge the defect using dermal matrix for segments that are irreparable<sup>11,12</sup>; and (4) SCR for cases where there is no cuff remnant to bridge.

We reported an arthroscopic technique and outcomes of bridging irreparable cuff tears using a dermal allograft in 2010.<sup>11</sup> In 2015, Johns and Snyder<sup>13</sup> also reported bridging the gap using acellular human dermal allograft as a viable solution for massive irreparable rotator cuff tears. We recently completed a prospective randomized controlled trial comparing bridging reconstruction with maximal repair<sup>14</sup> and found that the re-tear rate in the bridging reconstruction group was significantly lower than for the repair group at the 1-year postoperative timepoint. Furthermore, we did note that progression of cuff arthropathy was more prevalent in the repair group as compared to the reconstruction group. The change in acromiohumeral distance (before vs after surgery) was significantly higher in the repair than in the reconstruction group.

Our experience with SCR has been successful in patients with isolated, irreparable, supraspinatus tears; however, we have found that bridging reconstruction may have a better role in treating patients with some cuff remnant, as mentioned above. Our results are promising, and, although the above study by Hirahara et al.<sup>4</sup> contributes new evidence to show that dermal allografts can heal in the setting of rotator cuff deficiency, the basic principle of restoring anatomy should not be ignored. SCR has been accepted as a salvage procedure for irreparable cuff tears, with the precise indications being elucidated. Reconnecting viable cuff muscle to tuberosity directly or through a graft should be considered before SCR.

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