Functional and MRI outcomes of Superior Capsule Reconstruction with Acellular Dermal Matrix

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Objectives: Superior capsular reconstruction (SCR) is an emerging treatment option for irreparable massive rotator cuff tears (MRCT). The initial description utilized fascia lata autograft, but acellular dermal matrix (ADM) has become the graft of choice in the United States. Several reports have demonstrated excellent short-term functional improvement and patient satisfaction, but there is limited data correlating imaging studies of graft integrity to functional outcome. The purpose of this study was to determine if functional outcome after SCR is dependent on dermal allograft integrity on post-operative MRI.

Methods: Inclusion criteria were patients who underwent an SCR by one of 5 fellowship-trained surgeons at a single institution for the indication of pain attributable to irreparable MRCT that failed non-operative treatment. Exclusion criteria included arthritis, prior infection, revision SCR, and less than 6 months follow-up. Pre- operative data including age, gender, prior surgery, Hamada grade, and Goutallier stage were recorded. Intra-operative data including surgical findings and concomitant procedures were recorded. Pre- and post-operative acromiohumeral distance (AHD), American Shoulder and Elbow Surgeons (ASES), Oxford, visual analogue scale (VAS) and post-operative SANE score were recorded. In 90% of cases, a 3 mm ADM was used and in 10% of cases, a 6 mm ADM was used (doubled over 3 mm graft). All grafts were fixed by a double-row, trans-osseous equivalent technique on the tuberosity and with a mean of 3 anchors on the glenoid. Patients were routinely offered to undergo an MRI postoperatively regardless of symptoms.

Results: 53 patients met our inclusion criteria. Mean age was 60.1+7.9 years (range 34 to 77). 68% were male; 34% had at least one prior procedure; 58% had a concomitant procedure; 57% were Hamada 1, 38% Hamada 2, and 5% Hamada 3. Pre-op Goutallier stage was 3.7% grade 0, 17% grade 1, 40% grade 2; 26% grade 3; 13% grade 4. The mean clinical follow-up was 15+7.8 months (range 6-42 months). 81% of patients underwent an MRI post-operatively. The mean time for MRI was 14+7 months (range 6 -40). MRI revealed that 38% had a completely intact graft, 33% had a tear from the glenoid, 12% had a mid-substance tear, 14% tear from the tuberosity, and 2% had complete graft absence. There was a significant improvement in ASES (37.7 to 79.5, $P<0.0001$), Oxford (26.3 to 44, $P<0.0001$), and VAS (7 vs 2.3, $P<0.0001$). There was no difference between pre-op and post-op AHD (7.3 mm vs 6.9mm, $P=0.57$). There was no association between pre-operative AHD ($P=0.9$), Goutallier stage ($P=0.43$), Hamada grade ($P=0.49$) with post-operative ASES scores. There was a significant correlation between graft integrity with final outcome. There was no difference in post-operative ASES score when the graft was completely intact or torn from the glenoid ($P=0.39$), but graft tear from the tuberosity resulted in a significantly lower ASES score ($P=0.013$).

Conclusions:

In patients who undergo SCR for MRCT, there is significant improvement in ASES, Oxford, and VAS. This improvement is seen in patients who have an intact graft, as well as those where the graft is torn from the glenoid, but not those torn from the tuberosity. This supports the concept of the graft functioning as a ”biologic tuberoplasy” preventing bone-to-bone contact between the tuberosity and acromion. Preoperative AHD, Goutallier, Hamada, gender, or age did not have an association with post-operative ASES scores.

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