Abstract: Large and massive rotator cuff tears continue to be challenging for shoulder surgeons. Given the high percentage of retears after repair of these tears, several surgical technical advancements have been proposed. The use of grafts (xenograft, synthetic, and allograft) as an augmentation of the repair has been growing over the last several years in an attempt to improve structural integrity and postoperative outcomes. Patch augmentation with dermal allografts is the most commonly used, showing promising biomechanical, structural, and functional outcomes. Several factors have been associated with healing outcomes, including age, tear size, and fatty degeneration. The rotator cuff healing index can be used to assess for patients with Hamada grades 1 and 2 with elevated retear risk and potential indications for repair with graft augmentation. A score of 7 points represents a reasonable threshold for the addition of a dermal allograft due to a significant reduction in healing rates when comparing patients with a score of 6 points (66%) to 7 points (only 38%) without augmentation of the repair. Biomechanical studies have demonstrated a greater maximum failure load compared with standard repair. The healing rates of rotator cuff repairs using scaffolds range between 60% and 85%, compared with 40% with non-augmented repairs. Moreover, the use of repair augmentation has been associated with improved range of motion and functional scores compared with nonaugmented repairs, with allografts showing the best visual analog scale pain score and postoperative external rotation results. Given these favorable healing rates, functional outcomes, and low complication rates, augmenting rotator cuff repairs with a dermal allograft may be a suitable option in active patients with a diminished chance of postoperative healing.

Bibliography

From the Oregon Shoulder Institute, Medford, Oregon (I.P., M.E.M., J.A., P.J.D.), U.S.A.
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Dermal Allograft Augmentation for Rotator Cuff Tears

BACKGROUND

- The Rotator Cuff Healing Index (RoHI) is the sum of points assigned to certain prognostic factors that negatively influence healing.
- The RoHI can guide treatment planning.
- Large (3-5 cm) and massive (>5 cm) rotator cuff tears are at risk for incomplete healing or recurrent tearing.
- Rotator cuff repair (RCR) augmentation with synthetic, xenograft, and allograft (most frequent) may improve healing rate.

RoHI CALCULATION

<table>
<thead>
<tr>
<th>Prognostic factor</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age &gt;70 y</td>
<td>2</td>
</tr>
<tr>
<td>Anteroposterior tear size &gt;2.5 cm</td>
<td>2</td>
</tr>
<tr>
<td>Retraction, cm</td>
<td>0, 1, 2, 4</td>
</tr>
<tr>
<td>&lt;1, 1 to &lt;2, 2 to &lt;3, ≥3</td>
<td>2</td>
</tr>
<tr>
<td>Infraspinatus fatty infiltration, grade ≥2</td>
<td>3</td>
</tr>
<tr>
<td>Bone mineral density, ≤-2.5</td>
<td>2</td>
</tr>
<tr>
<td>Level of work activity, high</td>
<td>2</td>
</tr>
</tbody>
</table>

AUGMENTATION DECISION-MAKING

- Repairable tear (Hamada 1 & 2)
- Calculate RoHI
- RoHI <7
  - RCR alone
- RoHI >7
  - RCR with augmentation

AUGMENTATION BIOMECHANICS AND HEALING

- Improved time-zero load to failure compared to non-augmented repair
- High-risk tear healing rates from 60–85% with RCR augmentation compared to 40% in non-augmented RCR

CLINICAL OUTCOMES

- Overall improvement in functional outcome scores and mobility
- Allografts are associated with better pain scores and external rotation compared to other grafts in some studies

RIGHT SHOULDER RCR ALLOGRAFT AUGMENTATION

- Allograft overlay incorporated into repair
- Long head biceps tendon

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Abstract and disclosure of potential author conflicts of interest are available at https://www.arthroscopyjournal.org/infographiclibrary