

# Rotator cuff repair: what works in 2025

Joe de Beer,<sup>1\*</sup> Deepak N Bhatia<sup>2</sup>

<sup>1</sup> Institute for Orthopedics and Rheumatology, Stellenbosch, Cape Town, South Africa

<sup>2</sup> SportsDocs®, and Sir HN Reliance Foundation Hospital, Mumbai, India

\*Corresponding author: [jodebeer@icloud.com](mailto:jodebeer@icloud.com)



Rotator cuff repair is one of the most frequently performed shoulder surgeries worldwide. Rotator cuff surgery evolved from open to arthroscopic between 1995 and 2005. Significant advances in mechanisms of cuff healing and failure have changed our approach to arthroscopic cuff repairs, and newer basic science studies have added a biological perspective to existing surgical techniques. Massive and retracted tears, previously considered irreparable, are now salvageable, and joint preservation is once again gaining popularity. This editorial presents a summary of 'trending' techniques for management of cuff tears and outlines the preferred technique of the authors.

Rotator cuff tear management has undergone a paradigm shift on several fronts. The repair construct, once thought of as the primary factor for repair integrity in biomechanical studies, now seems less important in clinical outcome analysis. Advances in cellular biologics and biosynthetic scaffolds have resulted in several biological augmentation alternatives. Massive deficiencies are now reconstructable using advanced muscle advancement techniques and by incorporating auto/allografts in the repair construct. Some of these concepts and techniques that appear promising are briefly described as follows:

1. Repair constructs: The evergreen debate between single- and double-row repairs has lasted over two decades. Single-row repairs continue to show equivalent results to double-row, and double-row constructs may be at a disadvantage with unique failure and retear patterns.<sup>1</sup> Suture anchors have evolved from metallic to bioabsorbable. Newer all-suture anchors have shown comparable pull-out strengths, and their smaller size permits more tuberosity bone preservation. Triple-loaded and suture tape options in all-suture anchors may theoretically allow stronger fixation to bone; however, these benefits are yet to be proven conclusively. Transosseous anchorless cuff repair is making an impressive comeback, and newer devices have made this easier for surgeons to perform.
2. Biosynthetic augmentation: Augmentation of rotator cuff repairs is possibly one of the most significant developments in rotator cuff tear management in recent times. Cuff repair augmentation may be biological, structural or biostructural, and is based on the material and presence of regenerative cells within the augmentative tissue. 'Bioinductive' membranes (bovine collagen  $\pm$  poly-L-lactic acid [PLLA]) may help to improve healing rates in degenerative cuff tears and can add structural strength to the repair construct.<sup>2</sup> However, given the high additive cost, these benefits are yet to be conclusively proven to justify routine use.<sup>3,4</sup>
3. Subacromial bursal augmentation: The subacromial bursa has shown tremendous potential as a source of regenerative stem cells in several basic science studies, and good outcomes have been reported in some clinical studies.<sup>5-7</sup> Subacromial bursa is readily available, is easily mobilised with intact vascularity, and does not add to the cost to repair. One of the authors has

described the technique of subacromial bursal augmentation using the bursa in an intact form with preserved vascularity.<sup>8,9</sup> The bursal layer is preserved and mobilised without detachment from its posteromedial and posterolateral vascular attachments, and the entire bursa is incorporated into the repair construct. The intact bursa serves as a 'vascular duvet' that covers the cuff and is stitched using the sutures from the cuff anchors passed through the tendon and bursa. In weak and degenerative cuff tissue, the long biceps tendon can be used to further augment the cuff-bursa repair.<sup>9</sup>

4. Grafts: Autografts and allografts have been recently described and are mainly used when cuff tissue is deficient. The long head of biceps tendon is currently the most preferred graft and has been shown to reduce retear rates and increase acromiohumeral distance when combined with cuff repair.<sup>10</sup> Technical variations include biceps scaffolding, combined biceps-cuff-bursal construct, and biceps rerouting.<sup>9,11</sup>
5. Muscle advancement: An arthroscopic modification of open muscle advancement procedure described by Debeyre et al. has recently been shown to improve repairs of massive, retracted rotator cuff tears.<sup>12,13</sup> The technique involves release of suprascapular nerve and scapular attachments of supraspinatus and infraspinatus.
6. Tendon transfers: Partial repairs can be possibly combined with specific tendon transfers to salvage irreparable cuff deficiencies.<sup>14</sup> The lower trapezius transfer using an Achilles allograft has shown excellent clinical outcomes when combined with repair of subscapularis tear.<sup>15</sup> The latissimus dorsi may also be routed to the footprint of the rotator cuff as a method to deal with irreparable tears.

With the advent of new-age techniques in cuff management, a combined approach incorporating two or more of these seems to be the way ahead. Further studies are needed to develop a more precise algorithmic approach to achieve the best possible outcomes after rotator cuff repairs.

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