

# Editorial Commentary: Does a Medialized Repair Allow Single-Row to Outperform Double-Row Rotator Cuff Repair?



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**Abstract:** The optimal surgical technique for arthroscopic rotator cuff repair remains controversial, with advantages and disadvantages to each of the most commonly used methods. The pattern as well as number of suture anchors relative to the footprint has been one of the most common sources of debate, with proponents and arguments for both single- and double-row arrangements. Although double-row techniques have been shown to be biomechanically superior and to improve footprint coverage, evidence has been mixed as to whether they are clinically superior, especially in small- and medium-sized tears. Whereas historically, single-row repairs have aimed to restore pre-tear tendon tension, there recently has been interest in a medialized single-row technique to reduce repair tension. Advantages of this technique include a reduced number of anchors and thus a reduced cost, an efficient technique, and a potential reduction in tension, which could improve healing rates. Disadvantages of this technique include a reduced tendon-to-bone area of contact, which may lead to higher rates of incomplete healing.

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Rotator cuff repair remains an imperfect treatment for a rotator cuff tear, with retears remaining a common issue, especially with large tears.<sup>1-5</sup> To combat this issue, there has been a great deal of research into the repair technique, with much of this effort focused on the placement pattern and number of suture anchors relative to the tendon footprint.<sup>2,4</sup> Specifically, much of this debate has focused on whether 2 rows of anchors provide sufficiently better outcomes or better tendon healing to justify their increased cost and surgical time.<sup>1,4</sup> Despite decades of research and substantial investment by industry into improving tendon fixation, we have made relatively little progress in improving surgical outcomes in the treatment of rotator cuff disease.<sup>6</sup> So, certainly there is a need for new ideas and new developments in this area.

One shared issue among many repairs is excessive tension on the repair. With tendon rupture and retraction, the amount of tension required to reduce the tendon to the footprint rapidly increases.<sup>7,8</sup> Evidence from biomechanical<sup>9</sup> and clinical<sup>10,11</sup> studies suggests that increased tension across the repair reduces healing rates and postoperative outcomes. This evidence contrasts with elsewhere in the body and animal models, in which tension across tendon and ligament repairs has been associated better healing and function.<sup>12-14</sup> Several potential methods have been suggested to reduce tension, including margin convergence<sup>15</sup> and muscular advancement.<sup>16,17</sup>

Most recently, medialized repair has been suggested.<sup>2,18</sup> A retrospective comparative study of 60 patients who underwent double-row repairs, 24 of whom underwent medialization and 36 of whom did not, showed retear rates of 8.3% and 31%, respectively ( $P = .041$ ), although without any significant difference between groups in patient-reported outcome measures.<sup>19</sup> A single-row medialized repair may offer an even lower-tension repair than a double-row repair. These results suggest that tendon medialization may offer a new method to improve healing in rotator cuff repair.

It is in this context that I read, with interest, the study entitled "A Prospective Randomized Trial Comparing

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Suture Bridge and Medially Based Single-Row Rotator Cuff Repair in Medium-Sized Supraspinatus Tears” by Yamakado.<sup>20</sup> The author has performed a randomized clinical trial comparing a single-row medialized repair with a double-row repair for medium-sized full-thickness rotator cuff repairs. There were no differences in patient-reported outcomes or retear rates between groups. The author notes that the only differences observed between groups are in failure mechanisms, with single-row medialized repairs tending to fail through incomplete healing (2 patients) and double-row repairs tending to fail through medial cuff failure (4 patients). These results should be interpreted with caution because failure was uncommon and thus there is substantial fragility in this failure mechanism analysis. However, these results do provide some clinical insight that the medial aspect of the repair may be an important stress concentrator. This has been shown in prior finite element analyses.<sup>21-23</sup> Biomechanically, this site could be considered a focus for improvement because it may provide the best opportunity to improve repair integrity.

Another interesting finding from the study by Yamakado<sup>20</sup> is that within the author’s medialized repairs, there was neo-tendon regeneration in most patients (93%). Traditionally, double-row repair has been thought to provide the best restoration of the tendon footprint. These results suggest that footprint coverage may be less important than previously thought regarding restoration of a full tendon attachment. Anatomic restoration is likely going to be important if our goal is for repair to interrupt the natural history of rotator cuff tears,<sup>3</sup> which is not benign.<sup>24,25</sup>

Yamakado<sup>20</sup> has focused this study on medium-sized tears, which typically have high healing rates.<sup>26,27</sup> It is unclear whether the findings of this study can be translated to large and massive tears. In the setting of a medium-sized tear, it is likely that a wide variety of repair techniques can be successful, and the current study supports the surgeon in choosing either a single-row medialized or double-row approach. To show a larger impact, future studies may want to focus on larger tears in which healing is less predictable. Innovative approaches to improve the underlying biology, such as with patch augmentation, may be necessary in these settings.<sup>28,29</sup>

In my practice, I vary the repair technique depending on the tear size. For small tears, a tension band technique is efficient and inexpensive and has high healing rates.<sup>27,30,31</sup> For large tear, I use a double-row technique because it may provide increased healing rates over a single-row technique in that setting.<sup>4</sup> Within my institution, double-row repair did not result in additional cost over single-row techniques.<sup>1</sup> For tears in which the tendon can only be reduced with difficulty, I use a single-row medialized repair and the study by Yamakado<sup>20</sup> and my institution’s experience<sup>2</sup> suggest

this technique may be as successful as a double-row technique.

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