

# Editorial Commentary: Arthroscopic Glenoid Reconstruction With Subscapularis Tenodesis Results in Promising Clinical Outcomes, but Concerns Regarding Graft Resorption Rates Persist: A Long Way Toward a More Perfect Union



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**Abstract:** The pros and cons of open and arthroscopic shoulder stabilization procedures have been studied exhaustively. Yet, in many situations, the rates of recurrent instability and overall complications associated with these techniques remain unacceptably high. Perhaps paradoxically, the refinement of arthroscopic shoulder stabilization techniques has only intensified the debate between proponents of either open or arthroscopic approaches, and although significant (however “significant” is defined), anteroinferior glenoid bone loss has historically been thought to constitute a relatively strong indication for an open bone augmentation procedure, surgeons, to their great credit, continue to push the limits of what can be accomplished arthroscopically. Arthroscopic glenoid reconstruction has emerged as a viable option that may represent “the best of both worlds.” Although modifications to the originally described arthroscopic glenoid reconstruction technique are promising, concerns persist regarding the fate of the graft and the durability of the procedure beyond short-term follow-up.

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The complication profile of the open coracoid transfer procedures is well documented<sup>1,2</sup> and has compelled surgeons to push the envelope of what can be accomplished with an arthroscope. A number of techniques for arthroscopic glenoid augmentation have been described, several of which purport to mitigate the likelihood of the more serious complications associated with open procedures.<sup>3-5</sup> However, the widespread embrace of arthroscopic alternatives to open coracoid transfer procedures has been limited by steep learning curves, relatively short-term clinical follow-up, and concern over high rates of graft malposition and graft resorption/nonunion.

As one can imagine, there have been multiple techniques described for arthroscopic glenoid augmentation, and it is wise to avoid the tendency to group them all together. After all, there are some important variables in techniques to consider: What type of graft was used? How was the graft fixed to the native glenoid? Were the capsulolabral tissues incorporated into the reconstruction? However, although these nuances assuredly obscure direct comparisons between procedures, an awareness of what has been previously published on these techniques provides a broader context within which to consider subsequent innovations. Recently, Wong et al.<sup>6</sup> presented the results of an “anatomic arthroscopic glenoid reconstruction,” which uses a distal tibial allograft that is introduced and fixed arthroscopically with 2 screws, among 73 patients with a mean follow-up of  $4.7 \pm 1.1$  years. These authors observed significant improvements in clinical outcomes, a 1.3% rate of recurrent instability (specified as a “subluxation symptoms”), and a 13.6% rate of graft resorption more than 50%. In the current study, “Arthroscopic Iliac Crest Bone Allograft Combined With Subscapularis Upper Third Tenodesis

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Shows a Low Recurrence Rate in the Treatment of Recurrent Anterior Shoulder Instability Associated With Critical Bone Loss,” Russo, Maiotti, Cozzolino, Della Rotonda, Guastafierro, Massoni, and Viglione<sup>7</sup> report on results of an arthroscopic technique that incorporates tenodesis of the upper third of the subscapularis tendon to the native glenoid into glenoid augmentation with iliac crest allograft fixed with suture buttons among hyperlax patients with an average of 20% anteroinferior glenoid bone loss. Owing to several unique features of this technique (i.e., subscapularis tenodesis, nonrigid fixation of the graft), we were excited to read this study and were particularly interested to learn about: (1) the rate of recurrent instability at final follow-up among “high risk” patients, (2) the effect of upper third tenodesis of the subscapularis on glenohumeral range of motion postoperatively, and (3) the rate of graft resorption in patients with significant preexisting anteroinferior glenoid bone loss.

The current study retrospectively assessed radiographic and clinical outcomes of 19 patients, 12 of whom were described as “high-level contact athletes,” that were  $27.5 \pm 5.8$  years old at a mean of 34.6 months (range, 24-48 months) follow-up. The authors observed significant improvements in all assessed patient-reported outcome measures, recurrent, traumatic dislocation rate of 11%, and some measure of graft resorption in 100% of cases. Of note, complete graft resorption was observed (via postoperative computed tomography scan) in 10 of 19 (53%) cases. There were no reported instances of hardware-related complications. Additionally, a 12° loss of shoulder external rotation was noted compared with preoperative measurements ( $P < .001$ .)

In light of these main findings, there are several points to consider and multiple questions to ask. First, an 11% rate of recurrent traumatic dislocation in this particular patient population is particularly noteworthy (and promising), especially because most were characterized as contact athletes with, on average, 20% glenoid bone loss. Considering that this has historically been a clinical scenario that would make most surgeons think long and hard about the wisdom of an arthroscopic procedure, these results may represent a substantial improvement in the outcomes associated with arthroscopic stabilization procedures performed for “high risk” individuals. Second, tenodesis of the upper third of the subscapularis tendon to the native glenoid did not restrict external rotation to a point that would be expected to jeopardize a patient’s capacity to return to play.<sup>8</sup> However, the authors do point out the fact that these results may not be generalizable to patients without hyperlaxity (defined in this series as greater than 85° of external rotation with the arm fully adducted). Third, there should be cause for concern over the fact that over 50% of the grafts *completely*

resorbed, which is considerably greater than what has been observed with both open and arthroscopic coracoid transfer/glenoid augmentation procedures.<sup>6,9,10</sup> However, do the frequency and extent of graft resorption even matter? Although this did not seem to have an effect on the clinical outcomes, one cannot help but wonder about the long-term implications of this fact given that the patients in this series started with significant anteroinferior glenoid bone loss. Moreover, why might have graft resorption been so prevalent in this series? We are not inclined to attribute this finding to the nonrigid fixation of the graft with suture buttons given a number of previously published reports showing excellent healing rates with nonrigid fixation methods.<sup>11-13</sup> Perhaps then graft resorption is in some way a consequence of the subscapularis tenodesis? Finally, and perhaps most importantly, will these clinical results be durable over the course of longer term follow-up? Only time will tell and based on a number of these issues, we think there is a long way to go until these questions are answered.

We will look forward to reviewing the results of this cohort again in several years. In the meantime, we should continue to encourage innovation and the development of novel arthroscopic techniques that succeed in concomitantly re-tensioning the anterior soft tissues and addressing critical bone defects. Although the available literature would suggest that some degree of graft resorption and incomplete healing are inevitable, any proposed surgical tactic should endeavor to maximize graft integrity for the most durable reconstruction possible.

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