Editorial Commentary: Biceps Tenodesis Location May Not Matter: Go High…Go Low…Go Wherever You Want to Go!

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Abstract: Tenodesis of the long head of the biceps tendon has long been a source of dialogue, discussion, debate, and dogma. In general, the shoulder literature has been exhaustive regarding various biceps tenodesis techniques and outcomes, and studies have shown positive clinical outcomes of tenodesis, regardless of location, along the proximal humerus. Fewer studies have evaluated the outcomes of revision tenodesis; however, those that have looked at this have generally found that a revision to a subpectoral tenodesis site is usually quite successful.

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Oh, that interesting long head of the biceps! What a glorious and controversial subject. The literature is abundant with reports supporting treatment of this structure with a plethora of techniques. And surgeons typically believe very strongly that their preferred technique is the right choice. In some respects, this has similarities to a person's religion because treatment of the biceps becomes a matter of a surgeon's training, background, and experience mixed with supporting literature that justifies his or her decision.[1-3] And perhaps (based on the literature)… everyone is correct!

In their article "Conversion of Failed Proximal Long Head of the Biceps Tenodesis to Distal Subpectoral Tenodesis: Outcomes in an Active Population," Peebles, Midtgaard, Aman, Douglass, Nolte, Millett, and Provencher[4] add a very important nugget to our knowledge base regarding biceps tenodesis. Twelve patients were lucky enough to have Dr. Provencher perform their revision biceps tenodesis surgical procedures. He converted 12 previous proximal tenodesis (suprapectoral or high-in-the-groove) cases to a subpectoral location. Not surprisingly (for such an accomplished surgeon), the outcomes in this young, active, male military population turned out quite excellent. Not only is this really critical to my practice but I believe it is important for every surgeon who typically performs biceps tenodesis at 1 of the 2 "higher" locations. Knowing there is a safe and clinically effective revision surgical procedure is certainly reassuring. Nothing works every time, right? No matter where you perform tenodesis of the biceps, there will be a subset of patients who do not do well, perhaps because of continued pain or postoperative biceps rupture. Some patients may require a revision operation (owing to persistent biceps problems), and these data supporting the clinical effectiveness of revision to a subpectoral biceps tenodesis are quite reassuring.

However, sometimes the difficulty (clinically) is determining the mode of clinical failure. Peebles et al.[4] did a phenomenal job isolating their subset of patients to biceps problems as the index surgeries were just biceps and the revision surgeries were also just biceps. But most of my biceps tenodesis cases have additional pathology that is addressed concomitantly with the biceps tenodesis. It is honestly a rare occasion when I perform an isolated biceps tenodesis with zero additional shoulder pathology. This makes it difficult when the patient continues to have pain. Is the pain due to some biceps tenodesis issue or due to one of the associated pathologies not healing appropriately? Certainly,

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when a postoperative Popeye deformity develops and is symptomatic, it is an easy decision to perform a revision to a subpectoral tenodesis. However, what about those cases in which the patients just continue to hurt? Peebles et al. did an excellent job of isolating the cause of continued symptoms to the biceps, and I encourage every reader to use their technique for the lidocaine challenge test.

So, my approach to the biceps tendon is as follows:

1. I ask myself whether the patient needs a tenodesis. Frequently, this is an operative decision: Does the patient have associated pathology that I believe warrants a tenodesis? This usually includes a subscapularis tear, intra-articular biceps tendinopathy or partial tearing, a type II SLAP tear, an incompetent biceps sling (due to a large superior cuff tear), or biceps tendon subluxation. Sometimes, the decision will be made preoperatively based on magnetic resonance imaging findings or, more likely, the lidocaine challenge test.
2. My preferred biceps tenodesis location is high in the groove (at the articular margin of the humeral head). I base this preference on my training, my personal experience, and my collective (BRASS [Burkhart Research Association of Shoulder Specialists] group) experience of 1,083 patients reported in the literature.[1] This technique has been highly successful. Although I have converted to the onlay "loop 'n' tack" technique,[5] I still perform this technique high in the groove. I frequently use the sutures emanating from this tenodesis site for additional repairs, including upper subscapularis or anterior supraspinatus repairs.
3. I counsel all patients who have undergone a biceps tenodesis (or any shoulder repair procedure for that matter) to be patient and expect a minimum of 6 months of improvement. In my experience, almost all patients have some degree of postoperative anterior-superior shoulder pain for 4 to 6 months postoperatively. Not infrequently, at 6 months, patients are very happy with their shoulder but still point to the anterior-superior region as an area of occasional mild pain. This typically resolves by 12 months. The important point is not to return to the operating room too quickly! We should give patients time to heal and encourage them that they will likely continue to improve.
4. In the rare case requiring a revision tenodesis, I go to a subpectoral technique. Unlike Peebles et al.,[4] I typically perform an onlay technique with a unicortical (3-mm hole) biceps button to minimize the potential postoperative complication of humeral fracture. I am very leery of a 7- to 8-mm hole in the proximal humerus that is filled with tendon because this will likely forever be a stress riser in the patient.

My last argument to support my "religion" of high-in-the-groove biceps tenodesis (as in the article by Peebles et al.[4]) is the issue of revision. No technique is 100% successful. Thankfully, the present article supports a subpectoral revision for proximal tenodesis failures. But what about subpectoral tenodesis failures? What is the bailout for such cases? What is the bailout for the reported complications of subpectoral tenodesis including humeral fracture or, much more worrisome, the dreaded accidental "neurodesis"? This is perhaps my primary reason for sticking with what works for me—biceps tenodesis high in the groove. That's my biceps religion and I'm sticking to it!

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