Editorial Commentary: Anterior Cable Reconstruction for the Shoulder Superior Capsule: Time for "Indication Rounds"

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Abstract: Anterior cable reconstruction (ACR) techniques for the superior capsule are multiple and varied. To optimize patient outcomes, technical considerations must be supported by basic science, both anatomically and biomechanically. ACR was designed to treat only partially repairable rotator cuff tendon tears, to provide a static support to a dynamic partial (and therefore "nonanatomic") repair, and to treat tears that could not be treated by transosseous-equivalent footprint-restoring "anatomic" repairs (both capsule and tendon repaired), but were also not so large as to necessitate superior capsule reconstruction. ACR allows restoration of posterosuperior capsular function with side-to-side repair sutures, and much of the biomechanical functionality comes from using whatever inherent native superior capsule is available. Cable reconstructions should be secured to normal attachment sites on the glenoid and greater tuberosity sulcus. Also, graft tension must be accounted for when considering humeral motion such as rotation and adduction. The indications for ACR need to be carefully considered and account for both anatomic and biomechanical rationales. In the face of new ACR techniques, the need to discern what is possible versus what procedure is indicated cannot be overlooked.

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Addressing surgical indications requires answering the question, Does the patient have the symptom profile and pathology the procedure actually treats? And is the procedure technique sufficient to achieve the outcome? Addressing indications was a fundamental practice during residency at Columbia New York Orthopaedic Hospital, as now-Chairman William N. Levine would oversee weekly "Indication Rounds" for the Sports/Shoulder Service rotation. The concept for transosseous-equivalent (TOE) repair came from my interest in a biomechanical footprint pressure study I performed for transosseous tunnel repair[1] (suture anchors allowing for a tunnel-"equivalent" repair). The concept was rapidly applied into practice, the catalyst arising from technical advancements in knotless anchor technology.[2] The early learning curve dealt with overtensioning repairs, perhaps with overreaching indications based on biomechanical performance,[3-5] with many variations of the construct reported.[6-13] My concept of "technical efficiency ratio" was published first in *Arthroscopy*[14]—certain reported repair techniques were arguably not indicated with supraphysiological extraneous suture passes, at least from a biomechanical perspective.[15] Similarly, whereas anterior cable reconstruction (ACR) as a technique has been introduced from a biomechanical standpoint,[16,17] there has been a rapid and varied technical application.[18-28] The indications for ACR need to be carefully considered in the context of the multiple techniques presented,[18-28] accounting for both anatomic and biomechanical rationales.[16,17]

The indications for a new technique such as ACR require acknowledging the basic science behind it and specifying the pathology the ACR treats. The impetus for the conception of ACR arose from the technical challenges with superior capsule reconstruction (SCR). ACR was designed to treat only partially repairable rotator cuff tendon tears, to provide a static support to a dynamic partial (and therefore "nonanatomic") repair, and to treat tears that could not be treated by TOE footprint-restoring "anatomic" repairs (both capsule and tendon repaired), but were also not so large as

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to necessitate SCR.[16] ACR allows for restoring posterosuperior capsular function with side-to-side repair sutures, and much of the biomechanical functionality comes from using whatever inherent native superior capsule is available.[16,17]

In their study, "Biceps Rerouting for Semi-Rigid Large-to-Massive Rotator Cuff Tears,"[27] Rhee, Youn, and Rhee describe a technique that uses the long-head biceps tendon to "act like an anterior cable," underneath a supraspinatus tendon repair. Based on the original biomechanical description, the primary concern with their reconstruction as described is that the "cable" is not secured to the native attachment site where the capsule attaches on the medial footprint.[16] Any capsular reconstruction should technically have an anatomically based rationale. In addition to this concept, Rhee et al.[27] do not account for capsular tensioning and the idea that anterior and posterior graft tension is affected by glenohumeral motion such as rotation and adduction—a biomechanically based rationale.

In the original description, I discussed the concept that ACR could be indicated for partially reparable tendon tears, in which the ACR would provide capsular function (static support) to the dynamic function of the repaired tendon; this would apply to medialized repairs, which by definition are nonanatomic and could stand to benefit from capsular static support as well.[16] Rhee et al.[27] have now clinically tested the concept of medialized repairs that do not restore the entire footprint, where the underlying capsule is compromised and might benefit from a static reconstruction that supports the dynamic tendon component of the repair. They rightly point out that there is less repair footprint contact because the graft occupies the same footprint region. This, and the other considerations discussed such as sulcus fixation and rotational tension, dictate that further study is still required.

As mentioned above, the indication for ACR is for tears that are not fully repairable (not otherwise treated with TOE repair) but not massively irreparable (and amenable to SCR). Technically, as with any procedure (TOE, ACR, and SCR, for example), reconciling basic science (biomechanical and anatomic), with clinical application would only improve patient outcomes and the predictability of such outcomes. Ideally, basic science would validate techniques whenever surgeons are faced with new surgical procedures. Rhee et al.[27] are putting the basic science[16] to the test. Their work[27] and that of others[29-31] are showing clinical success. As with the TOE experience after its introduction, in the face of new ACR techniques, we cannot overlook the need to discern what can be done versus when a procedure is indicated with what specific technique.[15]

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