

## Regarding “Acute Proximal Anterior Cruciate Ligament Tears: Outcomes After Arthroscopic Suture Anchor Repair Versus Anatomic Single-Bundle Reconstruction”

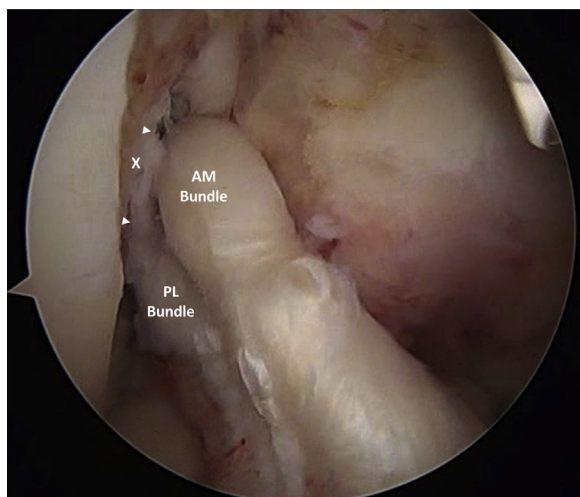


We would like to applaud Achtnich et al.<sup>1</sup> on their recent work in *Arthroscopy*. The authors reported their 2-year outcomes of arthroscopic primary repair and compared this to the gold standard of single-bundle anterior cruciate ligament (ACL) reconstruction. We could not agree more that the concept of arthroscopic primary ACL repair of proximal avulsion type tears is ripe for further investigation.

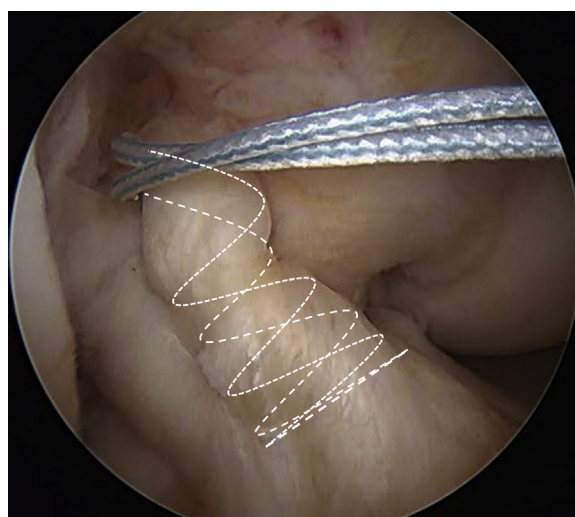
In their study, Achtnich et al.<sup>1</sup> used a single locking stitch with one anchor to refixate the ACL to the femoral wall with additional microfracturing to improve healing. Previously, we described our early results in the first 11 patients treated with arthroscopic suture anchor primary repair for proximal avulsion tears.<sup>2</sup> Our approach used 2 sutures that were placed into each bundle, after which these bundle sutures were tensioned and fixed to the femoral wall using two 4.75-mm vented BioComposite SwiveLock anchors.<sup>3</sup> Our reasoning is to create an anatomic reapproximation of both native ACL bundles (Fig 1) to their respective femoral footprints, as this maximizes the ligament-bone contact area and creates a more

anatomic and theoretically more biomechanical construct because both bundles have unique biomechanical contributions to knee stability.<sup>4</sup> In a recent biomechanical study, this 2-anchor construct was indeed shown to be strong enough to allow early motion without fear of gap formation.<sup>5</sup> In addition, the vented nature of the suture anchors accomplishes the same goal as microfracturing, that is enhancing ligament healing.

Furthermore, the described technique uses a single locking stitch placed at the midsubstance of the ligament, whereas with our technique, suturing begins distally and creates an alternating, interlocking Bunnell-type stitch that exits the proximal end (Fig 2). This provides increased stiffness to the repair construct and also restores the femoral attachment more anatomically. Having now performed proximal repairs in more than 75 patients, it has been noted that starting suturing distally provides more secure purchase into the ligament remnant, and also allows the repair of proximal tears with suboptimal tissue quality. Finally, the reported concern of ligament strangulation has not been found to be an issue with our technique. Attention should be paid not to wrap the sutures around the



**Fig 1.** Arthroscopic image of a right knee. This patient underwent arthroscopic primary repair with 2 suture anchors for both the anteromedial (AM) and posterolateral (PL) bundle to more anatomically restore the function of the anterior cruciate ligament. The arrowheads indicate the locations of suture anchors with our technique, and the X indicates the location of the suture anchor with the technique by Achtnich et al.<sup>1</sup>



**Fig 2.** Arthroscopic image of a right knee. The tract of the alternating, interlocking Bunnell-type pattern stitch is displayed on the anteromedial bundle with the sutures exiting at the proximal avulsed end of the ligament.

ligament, but to crisscross them to minimize strangulation risk and suture bulk.

In an editorial in *Arthroscopy*, Hohmann<sup>6</sup> rightfully pointed out that the reported 15% failure rate is notable. However, it is important to also consider the morbidity of both procedures. In our experience, repair patients have a dramatically faster and easier recovery with fewer complications compared with reconstruction patients. Moreover, the 15% failed repair patients can undergo a “revision” that is more like a primary reconstruction, while revision of ACL reconstruction has several limitations.<sup>7-9</sup> We believe these factors, in addition to the failure rate, should be taken into account when evaluating the outcomes of primary repair versus reconstruction.<sup>10,11</sup>

We agree with the authors that arthroscopic primary ACL repair is an excellent treatment option for selected patients. Although further research into this exciting topic is clearly warranted, it is obvious that this is only the beginning of the conversation.

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## Authors' Reply



We thank van der List and DiFelice for their valuable comments regarding our article on the outcome of anterior cruciate ligament (ACL) repair surgery published in *Arthroscopy*.<sup>1</sup> We agree with them and we are convinced that with the right indications, primary ACL repair can be performed in a subset of patients, and, therefore, the aim of our study was to draw the clinician's awareness to this important topic.

When critically analyzing historical studies and results on ACL repair, it should be mentioned that a vast majority of these articles lack a clear description of indications, diagnosis, rupture pattern, and rehabilitation protocol. Initial promising short-term outcomes were followed by poor mid- and long-term results. Therefore, such ACL repair techniques have mostly been abandoned and replaced by (a more reliable) ACL reconstruction. Nevertheless, current advancements in diagnostics and imaging combined with new fixation devices and arthroscopic surgery techniques might provide a reasonable basis to revalue the approach of ACL repair. Therefore we decided to re-establish a full arthroscopic ACL repair technique, simple and repeatable, with a minimum of fixation material to avoid potential ligament strangulation or suture cutout and to preserve perfusion.<sup>2</sup>

Regarding the proposed approach of DiFelice and van der List,<sup>3</sup> we do not agree that it is necessary to start with the sutures distally to increase the stiffness of the repair and to ensure its anatomical position. Furthermore, we do not support the suggested use of 2 separate anchors (one for each bundle of the ACL), to reapproximate the stump to the native footprint. Based on the consideration of the double-bundle concept, however, both our and the DiFelice and van der List<sup>3</sup> techniques might have eligibility.<sup>4</sup> However, it should be the surgeon's decision which technique should be applied, and this