

# Knotless Implant for Arthroscopic Hip Capsule Closure



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**Abstract:** The hip joint capsule plays a significant role in maintaining hip stability, including translation and rotation. Hip capsular closure or plication has been shown to increase stability of the joint following capsulotomy in hip arthroscopy for the treatment of femoroacetabular impingement syndrome (FAIS) and/or associated labral tears. This technique article describes a knotless method of closing the hip capsule.

## Introduction

During hip arthroscopy, a capsulotomy (peri-portal, interportal, or T-type) is routinely performed to achieve adequate intra-articular exposure and visualization. Joint instability and poor functional outcome can result after primary hip arthroscopy due to capsular insufficiency, which can be avoided with closure of the hip capsule.<sup>1-5</sup> Several prior biomechanical and technical studies have noted the significant stabilizing function of the hip capsule and the biomechanical importance of hip capsular closure.<sup>6-8</sup> These studies highlight a paradigm shift in the management of the hip capsule in arthroscopic hip surgery. In this article, we present use of a knotless implant for arthroscopic

hip capsular closure or plication. This study was performed at the Department of Orthopaedics and Rehabilitation, Yale School of Medicine.

## Surgical Technique

The patient is placed in the supine position on a post-less distraction table for the arthroscopic procedure. Once all arthroscopic procedures in the central and peripheral compartments are complete, capsular repair, or plication is begun.

The patient's hip was positioned at 45° of flexion with camera (Synergy Arthroscope, Arthrex, Naples, FL) in the anterolateral portal site (Fig 1A) and two cannulas (Trim-IT Cannulas, Arthrex) in the mid-anterolateral and the distal anterolateral accessory portal sites (Fig 1B and C). First, a passing suture from the small cutout labeled (1) on the LoopLoc implant (LoopLoc implant, Arthrex, Naples, FL) is passed through the cannula in the mid-anterolateral portal site and coursed through the acetabular and femoral limbs of the capsular tissue with a suture passer (Slingshot suture passer, Stryker, Kalamazoo, MI) as shown in Figs 2 and 3. The tail of the passing suture is then advanced until the striped LoopLoc implant suture exits the cannula, and the initial passing suture is cut free from the repair loop. Then, the free suture end from the small cutout labeled (2) on the LoopLoc implant card is pulled and fed through the shuttled suture loop and through the suture threader. Once that is done, the tab labeled (3) is pulled until the suture splice is formed. The tensioning sutures of the interlocking loop are then evened and clamped with a hemostat. Next, the interlocking loops are evened, and the center of the interlocking loop is guided into the center of the capsular repair. These

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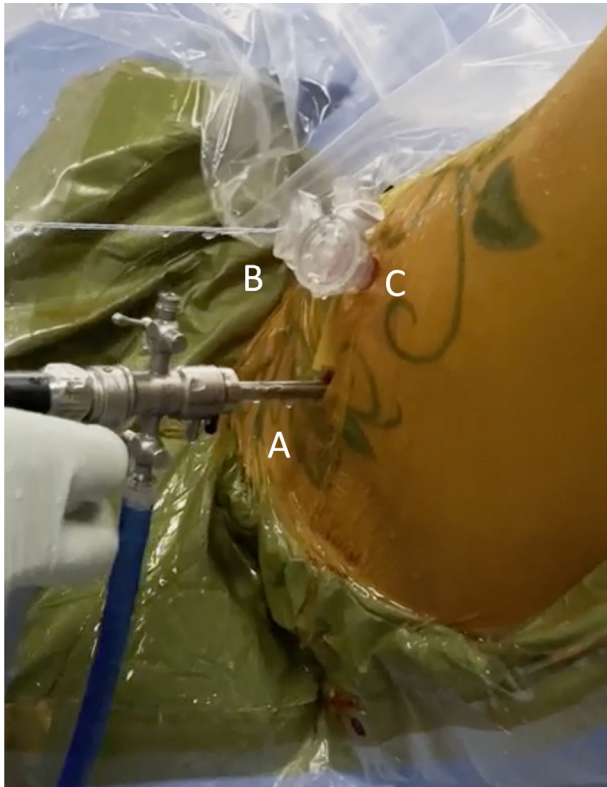
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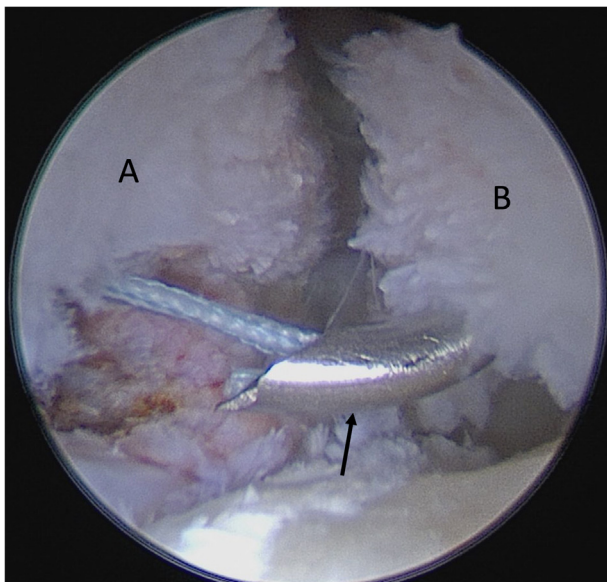
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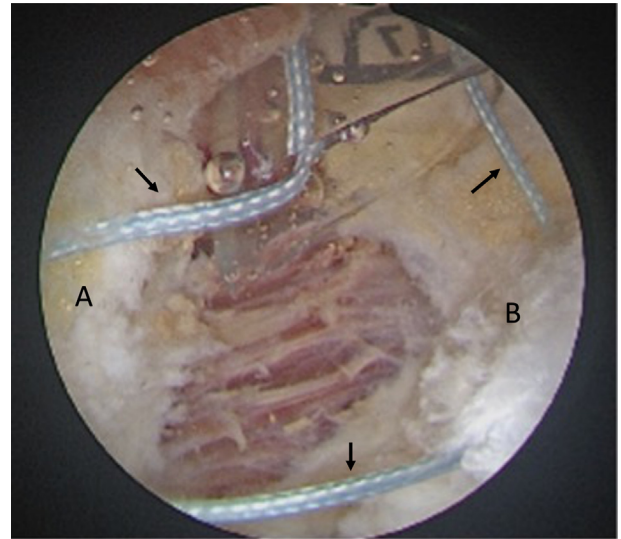


**Fig 1.** Right hip in 45° flexion with Synergy Arthroscope (Arthrex, Naples, FL) in the anterolateral portal site (A) and two cannulas (Twist-In Cannulas, Arthrex) in the mid-antrolateral accessory portal site (B) and the distal antrolateral accessory portal site (C).

steps can be visualized in [Video 1](#). This step should be repeated as many times as necessary as per the



**Fig 2.** Suture passer (arrow) from the femoral limb (B) grabbing the passing suture that has been coursed through the acetabular limb (A).



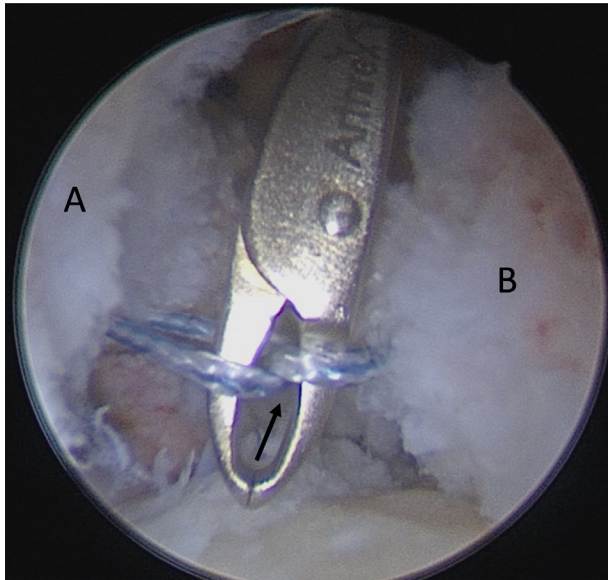
**Fig 3.** Passing suture (arrow) through the hip capsule. (A) Acetabular limbs of the capsule. (B) Femoral limbs of the capsule.

surgeon's preference. The lead author prefers to use 3 sutures for a standard interportal capsulotomy closure.

Once an appropriate number of sutures have been passed through the capsulotomy site, a suture grasper (Suture Retriever, Arthrex, Naples) is used to temporarily hold the interlocking loop in the center of the repair ([Fig 4](#)). This ensures that the center of the interlocking loop will remain in the center of the capsular limbs, while still permitting tensioning. Once this is complete, initial tensioning begins by alternate pulls of ~2 cm of each limb of the tensioning sutures until the knotless mechanism rests on top of the capsular repair. At this point, the looped grasper may be removed. Then, both tensioning limbs are passed through a closed suture cutter (Suture Cutter, Arthrex), which is placed on top of the capsule. Each limb may be individually tensioned to the surgeon's preference. Once final tensioning is complete, the closed suture cutter is used to cut the suture, leaving a 1-2-mm tail ([Fig 5](#)). The same step can be applied for additional LoopLoc implants, as needed, to complete the closure of the hip capsule.

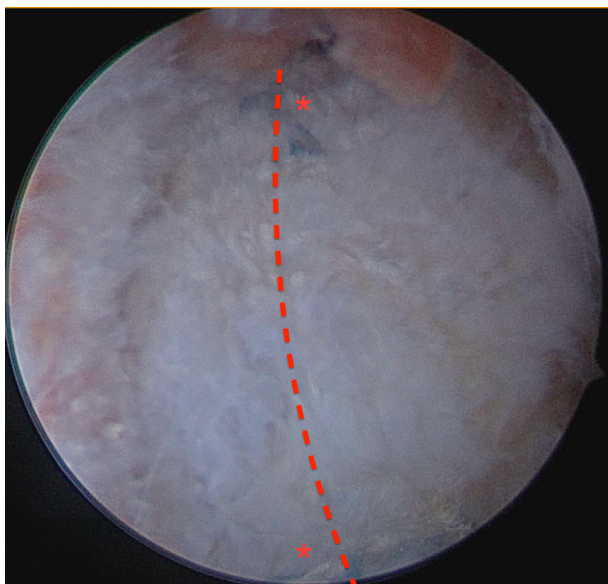
## Discussion

As it relates to reducing the risk of iatrogenic micro-instability, capsular repair has become an increasingly common practice during hip arthroscopy for FAIS. A growing amount of literature has reported biomechanical benefits of capsular closure compared to unrepaired capsulotomies, as it restores hip distraction, torsional stability, and coronal plane range of motion back to the native, intact state.<sup>6,9,10</sup> Similarly, a recent systematic review of 16 comparative studies



**Fig 4.** Suture grasper (arrow) holding the loops of the implant in place at the center of the capsular limbs. (A) acetabular limb of capsule; (B) femoral limb of capsule.

demonstrated that capsular repair results in superior patient-reported outcomes (PROs) at midterm follow-up compared to those with unrepaired periportal, interportal, or T-capsulotomies.<sup>11</sup> Specifically, one study by Domb et al. compared 5-year PRO data among patients who underwent capsular closure and those who underwent capsulotomy without repair.<sup>12</sup> It showed that both groups had significant short-term improvement, but at midterm follow-up, patients



**Fig 5.** Final LoopLoc implant (\*) used for closure of interportal capsulotomy ( - - - ).

**Table 1.** Advantages and Disadvantages of the Arthrex LoopLoc Implant

Advantages	Disadvantages
Stronger closure	Reimbursement
No knot stacks	Slight Learning curve
Improved speed of closure	
Low variability of knot strength and loop security	

without the repair described worse modified Harris Hip Score, as well as a higher rate of conversion to arthroplasty. As a result, hip capsular closure is an important consideration to help improve outcomes in patients undergoing hip arthroscopy.

In this Technical Note, we present a knotless method of closing the hip capsule after arthroscopic hip surgery. To reapproximate the capsular tissue following a capsulotomy, the LoopLoc Knotless implant provides an alternative to hip capsular closure with traditional sutures with resultant knot stacks. Some of the advantages of the knotless implant include elimination of knot stacks, increased strength of the repair construct, elimination of knot and loop security concerns, and finally less intraoperative time required for capsular closure (Table 1). The knotless mechanism presented in this article could help eliminate concerns of knot and loop security present with traditional arthroscopic knot tying techniques.

There are some technical pearls and pitfalls that could be considered for optimal capsular closure with the LoopLoc implant (Table 2). Clamping the LoopLoc implant card to the operative drape allows ease of access, the optional step of using passing stitches prior to passage of the LoopLoc implant to allow for the use of multiple LoopLoc implants prior to capsular closure, and use of the suture grasper to hold the interlocking loops in place during tensioning. On the other hand, pitfalls include not to overtighten the capsule during tensioning, the potential for the LoopLoc implant to

**Table 2.** Technical Pearls and Pitfalls of the Arthrex LoopLoc Implant

Pearls
Clamping the LoopLoc implant card to the drape can improve ease of access
Suture grasper should be used to center the interlocking loops in place in repair site during tensioning.
Pitfalls
Potential for overtightening the capsule during tensioning
The interlocking loop must be identified in the repair site and kept there to allow for proper tensioning.
All passing sutures should be placed before initiating tensioning. Subsequent suture passages can be difficult with the capsule partially closed.

saw through tissue if the interlocking loops are not held in place, and that all passing sutures must be placed prior to tensioning, as subsequent suture passages can be difficult with the capsule partially closed.

In conclusion, capsulotomies followed by quicker and stronger capsular repair and closure are critical for not only restoring biomechanical properties of the hip, but also optimizing high survivorship and improving functional outcomes in primary hip arthroscopy procedures.

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