



# Technical Note: Knotless Suture for Hip Capsule Closure

D. KIM<sup>1</sup>, R. MAHATME<sup>2</sup>, W. ISLAM<sup>1</sup>, M. LEE<sup>3</sup>, S. GILLINOV<sup>1</sup>, A. JIMENEZ<sup>1</sup>

<sup>1</sup>Department of Orthopaedics and Rehabilitation, Yale School of Medicine, New Haven, CT, 06519

<sup>2</sup>University of Connecticut School of Medicine, Farmington, CT, 06032

<sup>3</sup>Medical College of Wisconsin, Milwaukee, WI, 53236



## INTRODUCTION

Hip capsulotomy is routinely performed in arthroscopic procedures to achieve adequate intra-articular exposure and visualization. However, subsequent capsular insufficiency can lead to joint instability and poor function outcomes after primary hip arthroscopy. This can be avoided with effective closure of the hip capsule. Prior literature has recommended 3-suture constructs and the Quebec City Slider (QCS) technique for closure of the hip capsule. Further, a recent article described a technique for periportal capsulotomy closure to repair or plicate the hip capsule in hypermobile patients. These techniques introduce stacks of knots, variability in knot strength among surgeons and overall weak constructs. This technical note describes a new knotless method for closing the hip capsule.

## AIM

To present and recommend a new method for arthroscopic capsular closure or plication using the Arthrex LoopLoc Knotless Implant.

## METHOD

Once all arthroscopic procedures in the central compartment are complete, capsular closure is begun with the hip in 45 degrees of flexion. First, a passing suture is passed through the acetabular and femoral limbs of the capsular tissue. This will later be used to pass the knotless capsular closure device (LoopLoc, Arthrex, Naples, FL, USA). This step should be repeated as many times as necessary as per the surgeon's preference. The lead author prefers to use 2-3 sutures for a standard interportal capsulotomy closure. Passing sutures not in use may be "parked" for later use in the distal anterolateral accessory (DALA) portal. Through the mid-anterior portal both ends of the passing suture can be used to pass the initial interlocking loop of the knotless device. Once this is passed, the free limb of the other interlocking loop is passed through the loop and through a flag which is fed through a knotless mechanism. The tensioning sutures are then evened and clamped, after which the center of the interlocking loop is guided into the center of the capsular repair.

Prior to tensioning, a suture grasper is used to temporarily interlock each loop of the device. 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 approximately 2cm of each limb of suture until the knotless mechanism rests on top of the capsular repair. At this point, the looped grasper may be removed. Then, both tensioning free limbs are passed through a closed suture cutter which is placed on top of the capsule. Each limb may be individually tensioned to the surgeon's preference. Once final tensioning is complete, closed suture cutter is used to cut the suture, leaving a 1-2mm tail. The same step can be applied for additional LoopLoc implants as needed to complete closure of the hip capsule.

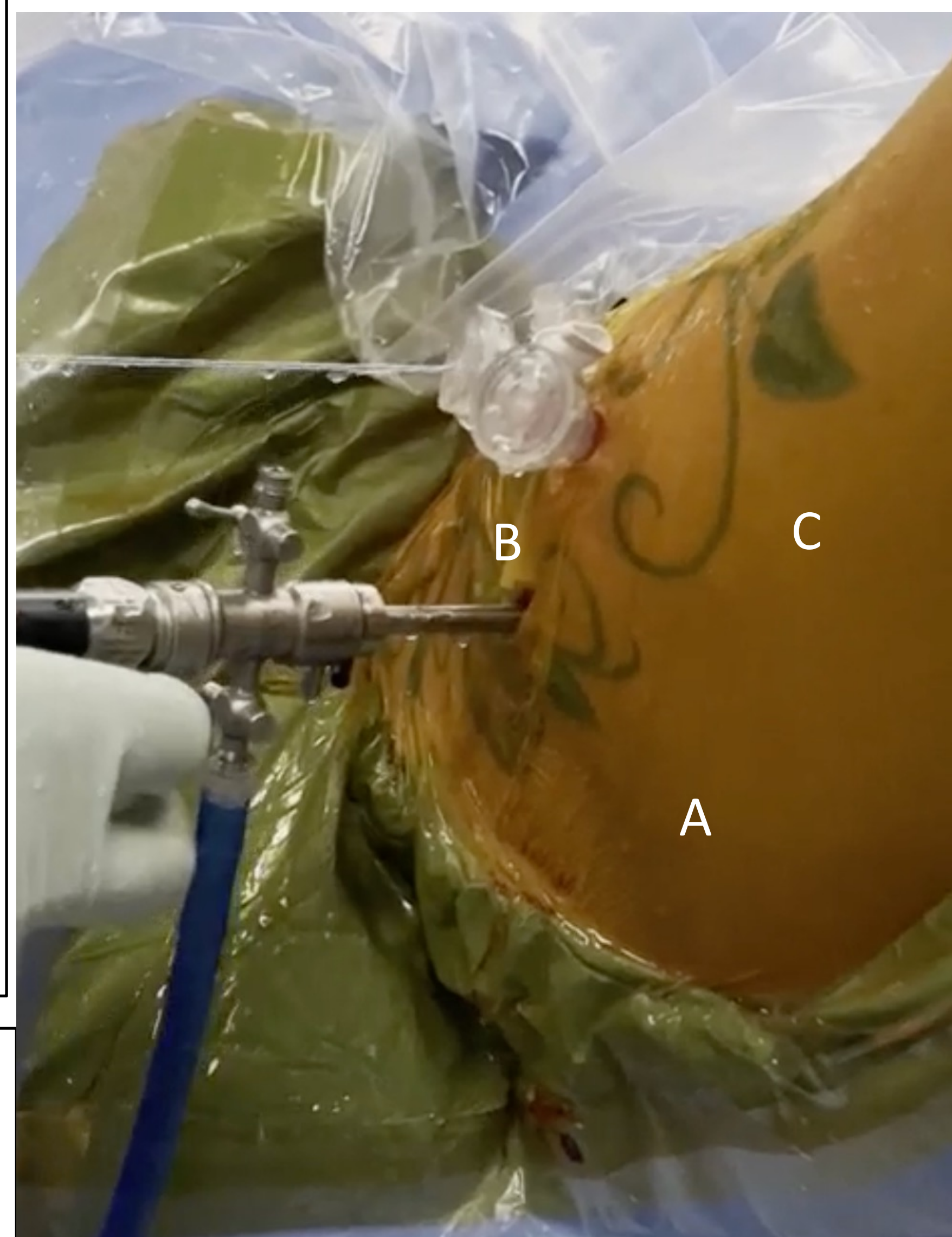


Figure 1. Right hip in 45 degrees flexion with Synergy Arthroscope (Arthrex, Naples, FL, USA) in the anterolateral portal site (A) and two cannulas (Twist-In Cannulas, Arthrex, Naples, FL, 243 USA) in the mid-anterolateral (B) and the distal anterolateral accessory portal sites (C)

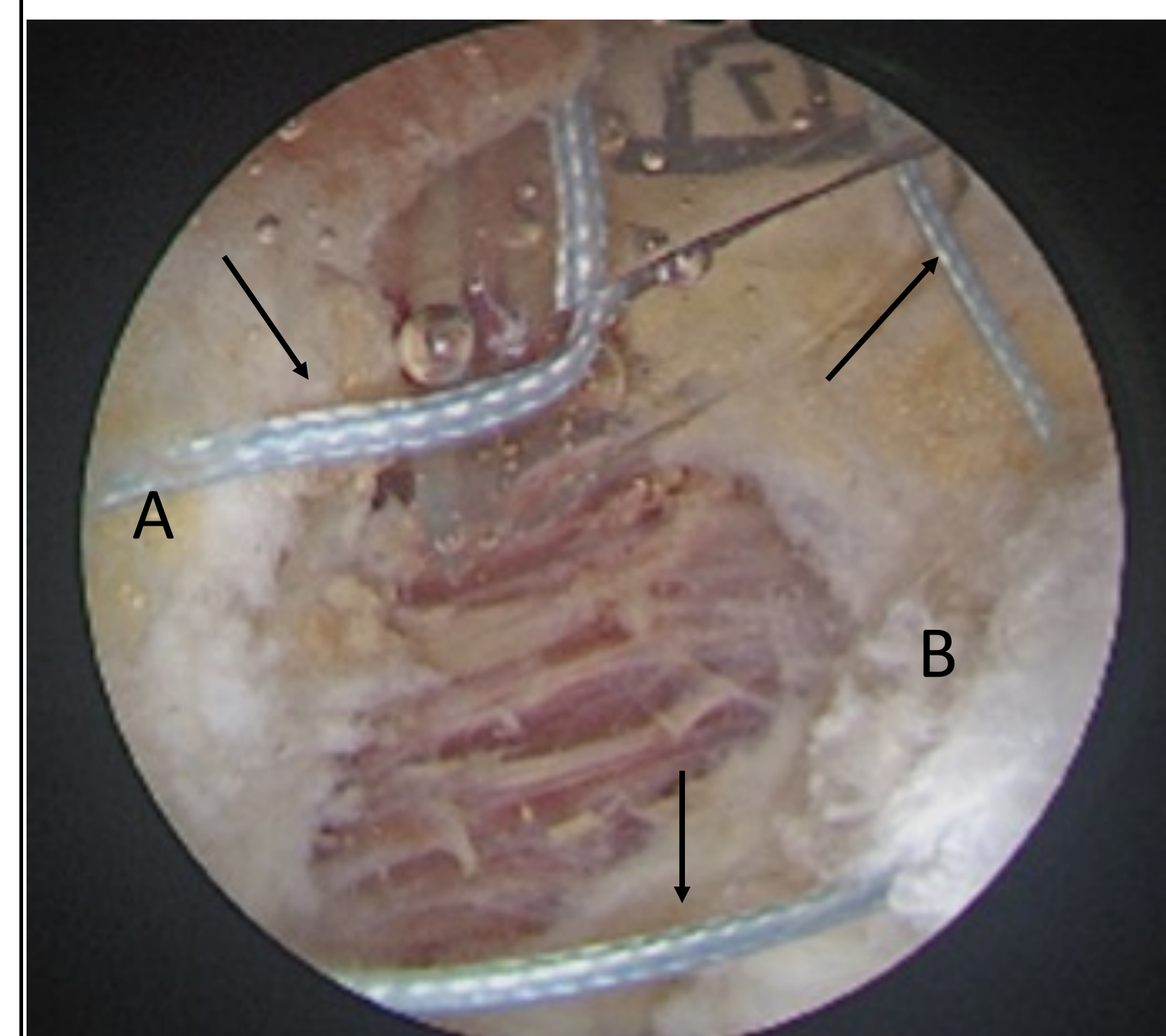


Figure 3. Passing suture through the hip capsule. A) Acetabular B) Femoral limbs of the capsule

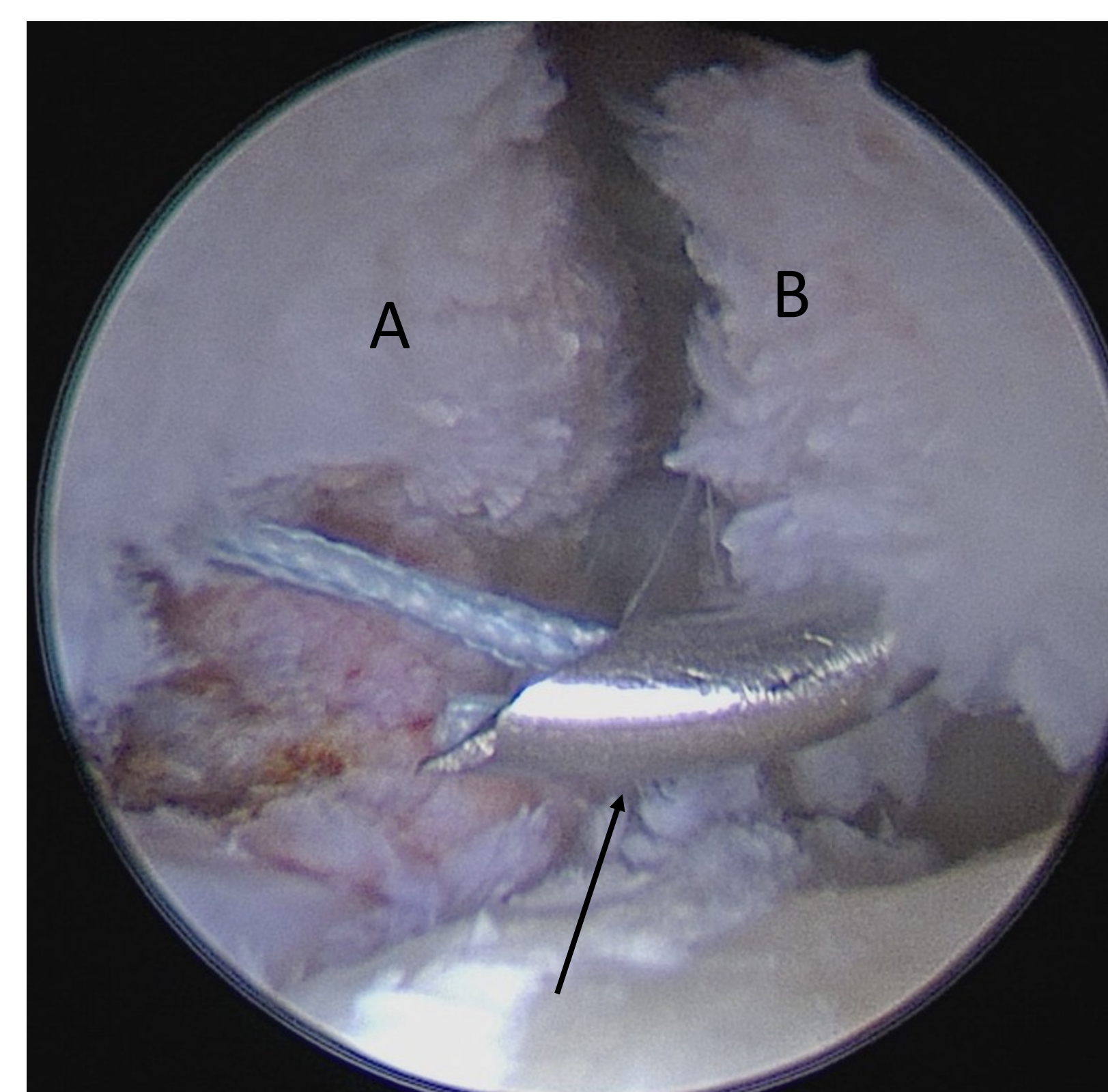


Figure 2. Suture passer (arrow) from the femoral limb (B) grabbing the passing suture that has been coursed through the acetabular limb (A)

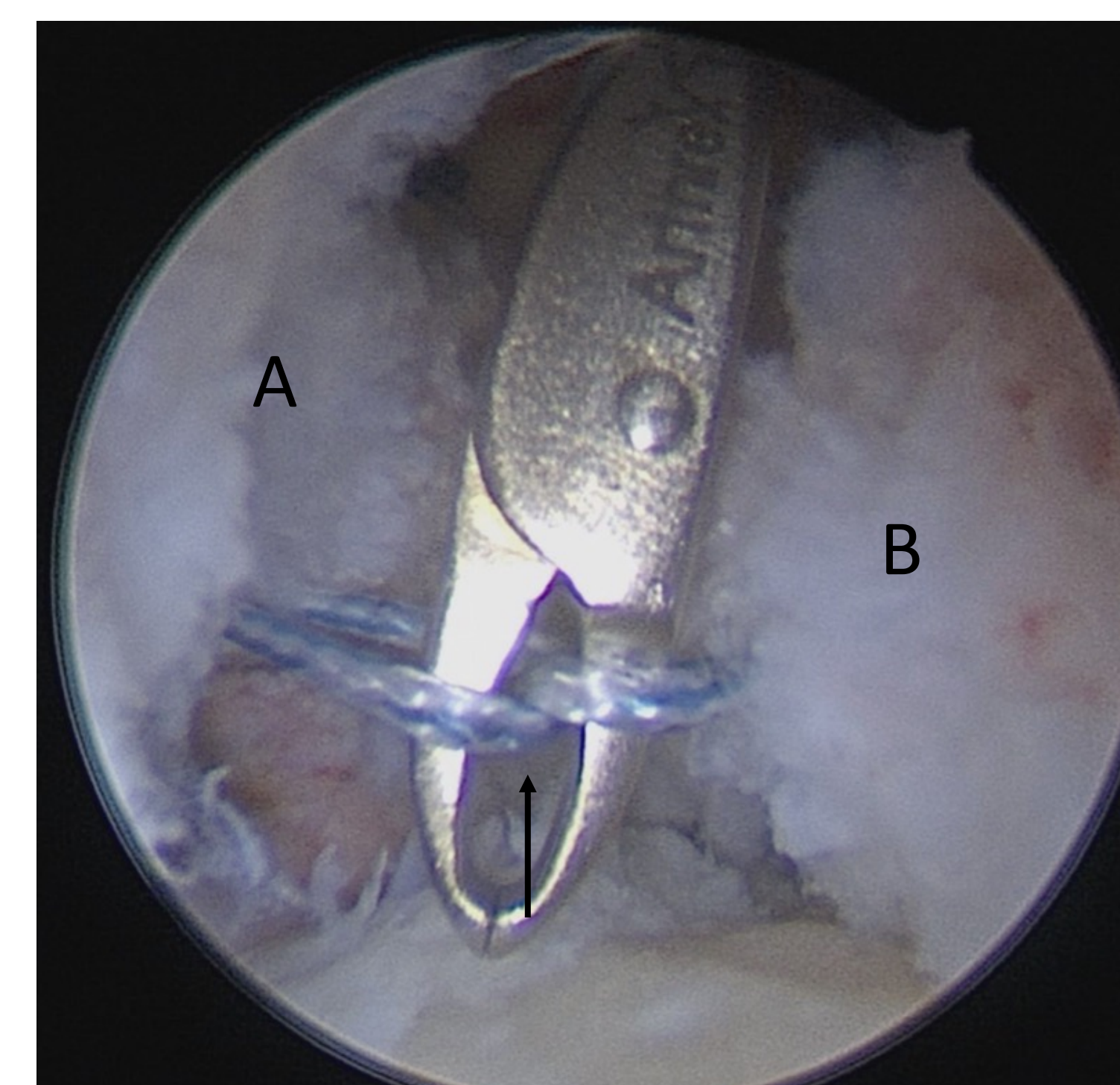


Figure 4. Suture grasper holding the loops of the implant in place at the center of the capsular limbs

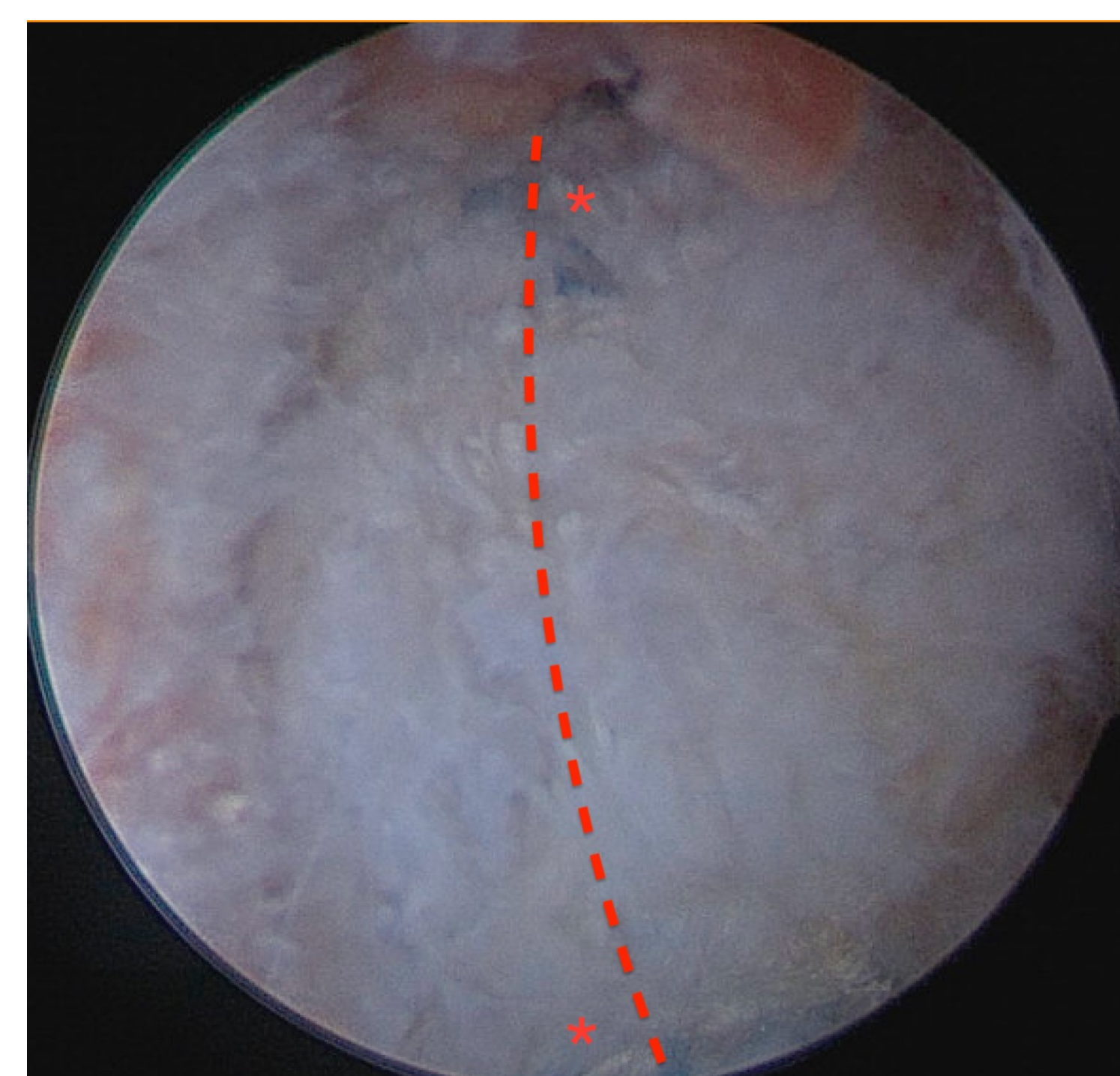


Figure 5. Final LoopLoc implant

Advantages	Disadvantages
Stronger Closure	Cost
No Knot Stacks	Slight Learning Curve
Improved Speed of Closure	
Low Variability of Knot Strength and Loop Security	

## RESULTS

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 excellent alternative to hip capsular closure with traditional suture 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.

An Arthrex Orthopedic Research Department biomechanical evaluation showed that the LoopLoc Knotless Implant allowed a mean ultimate load of  $214 \pm 27$  N, compared to  $153 \pm 25$  N for #2 Vicryl suture constructs.

## CONCLUSIONS

Capsulotomy followed by appropriate capsular repair and closure is critical for restoring biomechanical properties of the hip, ensuring high survivorship and improving functional outcomes. We recommend the new Arthrex LoopLoc Knotless Implant which could further ease and strengthen the hip capsular closure following hip arthroscopy to reduce post-operative instability and complications.