



Hip Labral Suture Knot Impingement following Primary Hip Arthroscopy Labral Repair. An Unreported Complication

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Abstract

The purpose of this case report was to highlight a previously unreported complication of suture knot impingement following labral repair in primary hip arthroscopy.

Keywords: Hip; Arthroscopy; Labrum; Knot

Introduction

Advancements have recently been made in the treatment of hip pathology which has resulted in an increased volume of hip arthroscopy procedures. Residual bony deformity, recurrent labral tears and acetabular overcorrection are among the more common reasons for primary surgery failure in femoroacetabular impingement. The purpose of this case report was to highlight a previously unreported complication of suture knot impingement following labral repair in primary hip arthroscopy. We report the case of a patient who developed left anterior hip pain soon after his primary arthroscopic hip labral repair. Upon revision hip arthroscopy, we found prominent suture knots and material overlying the inflamed labrum tissue. Following arthroscopic debridement with suture knot removal and labral stabilization, his symptoms resolved, and he regained a painless hip range of motion.

Case Presentation

A 22-year-old male athlete first presented with a 1-year history of left groin pain that disabled him from competitive sports. With further physical examination and advanced imaging, he was evaluated to have a ruptured anterosuperior labrum in his left hip and a femoral CAM deformity with an increased alpha angle and femoral head-neck offset. He underwent primary hip surgery, namely, left hip arthroscopic subspine decompression, labrum repair and femoral osteoplasty. There were no intraoperative complications, and he was initiated on a structured rehabilitation protocol. The

initial phase of rehabilitation went smoothly, but he started to develop left anterior hip pain at the 3-month postoperative period. This pain did not subside and was different from the nature of pain experienced by the patient preoperatively. The pain persisted through the subsequent postoperative months, with pain worsening upon hyperflexion and internal rotation of the left hip. The anterior impingement test was positive. Magnetic resonance imaging (MRI), arthrogram of the left hip was performed and demonstrated postsurgical changes in the left hip, with a residual contrast cleft at the chondro-labral junction at the anterosuperior aspect. The accompanying 3D motion simulation protocol (Clinical Graphics Zimmer Biomet®) showed no bony impingement. In view of his continued pain and above imaging findings, the patient was recommended to undergo revision left hip arthroscopy. Revision left hip arthroscopy was performed in the supine position with standard anterolateral (AL), modified anteromedial (MAP) and distal anterolateral (DALA) portals. Upon entry into the hip joint, regional acetabulo-labral adhesions were observed and debrided. The main finding of the revision surgery was a prominent and bulky suture knot that was partially loosened with surrounding synovitis. The knots were overlying the hip labrum at the 9 o'clock position that was inflamed and frayed, likely from irritation from the overlying sutures and prominent knots. The suture knot was excised with all loose offending suture material retrieved arthroscopically with an arthroscopic grasper and shaver. Healing of the adjacent repaired labrum was confirmed, and adhesions surrounding the knot were

also debrided and cleared. The adjacent psoas tendon was healthy and not affected by the prominent knot sutures (Figure 1). Two additional additional suture anchors were inserted at the 1:00 and 2:00 positions, and labral repair was performed to reinforce the labrum. There was excellent hip joint suction seal provided by the

labrum, and capsular closure was completed prior to the conclusion of the procedure. At the first month postoperative review following revision surgery, complete pain in the left hip had resolved, and the patient's active range of motion fully recovered. One year after surgery, the patient was doing well and had no symptoms.

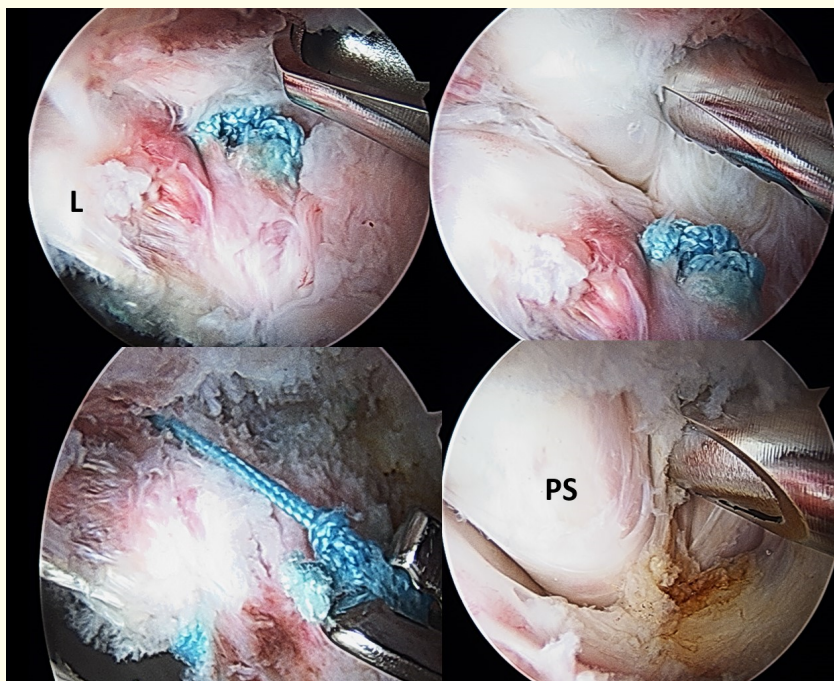


Figure 1: Inflamed labrum at this anteroinferior location with fraying from mechanical impingement and irritation from the overlying sutures and prominent knot. The suture knot was excised with all loose offending suture material retrieved arthroscopically with an arthroscopic grasper and shaver. The psoas tendon was healthy and not affected by the prominent knot sutures. L (Labrum) PS (Psoas).

Discussion

Revision hip arthroscopy is often performed as a result of complications, and inadequate resection during the index surgery is the most common [1]. Although there are commonly recognized complications documented for this novel procedure in the literature, we must not ignore the potential for previously unrecognized complications to arise [2]. The findings and images presented in this case report represent one such complication and, to the best of our knowledge, are the first reports of clear suture knot impingement on the labrum following hip arthroscopy. Suture knot impingement is not a new surgical complication and has been described previously in the orthopedic literature [3-5]. Suture knot impingement has been reported in shoulder joints following arthroscopic rotator cuff repair, during which patients subsequently develop gradual shoulder discomfort and pain after surgery. Symptoms were aggravated during shoulder motion, especially

during overhead activities. In these studies, knot impingement was diagnosed through the presence of subacromial effusion on MRI in affected patients [3]. It was proposed that symptomatic knot impingement not only causes inflammation of adjacent tissue but also iatrogenic bone erosion on the undersurface of the acromion [4]. Symptoms in these patients completely resolved following successful management by arthroscopic removal of the suture knot. Suggested causes of knot impingement following arthroscopic rotator cuff repair include the position of the suture knot, the presence of exposed cancellous bone following subacromial decompression, and the recent development of stronger suture material [3-5]. In our patient who developed pain with hip flexion following his index surgery, we sought to rule out other possible causes of pain after arthroscopic hip labral repair with osteoplasty. Residual bony deformity from inadequate resection is the most common reason for continued symptoms following the index surgery [1], but ad-

vanced imaging and the 3D motion simulation protocol ruled out any impingement at this range of motion. Another possible cause is psoas tunnel perforation during placement of the medial anchor, with patients reporting symptoms between 2 months and 2 years following hip arthroscopy [2]. Similarly, these patients had incomplete pain relief following the index surgery or temporary pain relief before developing pain as they progressed through rehabilitation. Pain was experienced with resisted hip flexion, and the presence of anchor material within the psoas tunnel could be identified on the MR images in most of these patients. However, such a finding was absent on the MRI of our own patient. During his revision arthroscopy, we also failed to identify any evidence of psoas irritation or psoas tunnel perforation. Although the theoretical risk of an adverse reaction to surgical suture knots has been documented previously in the no orthopaedic literature [6], we postulate that there might be several other reasons why our patient developed symptoms from this suture knot. First, this prominent suture knot was from the most anteroinferior suture anchor. The location of this suture knot has the most potential for mechanical abrasion against the underlying labrum because simple hip flexion movement alone can easily cause micromovements between the knot and the labrum interface during the early rehabilitative period before labral healing has occurred. The increased number of throws of the arthroscopic knot could also have contributed to a resultant bulky suture knot. Arthroscopic knots are inherently weaker than open surgery methods are, and consequently, many more throws are needed for optimal knot stability [5]. Third, the high strength of recent anchor-associated suture threads also provides an increased opportunity to worsen friction and cause knot impingement [3]. The total load across the joint supported by the labrum also affects the degree of friction and impingement. This load may also vary in hips of differing morphology, with the load increasing up to 11% in dysplastic hips compared to just 2% of the total load in a normal hip [7]. The unique finding presented in our case report highlights the use of a standard suture anchor requiring knots versus knotless suture anchors in the context of labral repair. Although knotless suture anchors are currently routinely used for acetabular labral repair, few studies have compared the short and long-term outcomes between these two types of suture anchors for labral repair. An in vitro study comparing these two anchors showed no consistent superiority of one over the other in terms of pullout strength and stiffness [8]. The absence of a knot, however, intuitively suggests that the likelihood of suture impingement on the underlying labrum will be reduced with knotless anchors. An alternative to anchor use, eliminating the need for anchors and

avoiding anchor-associated complications is the transosseous acetabular labral repair technique [9].

Conclusion

Surgeons need to be aware of the possibility of suture knot impingement on the underlying hip labrum due to the presence of prominent or loose suture knots and material. This report represents the first study to identify and raise awareness of this previously unreported complication and can be considered a possibility for unexplained anterior hip pain following primary hip arthroscopy and labral repair surgery.

Patient Consent Disclosure Statement

The author(s) attests that consent has been obtained from any patient(s) appearing in this publication.

Conflict of Interest Statement

None declared.

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