

Biceps Femoris Accessory Tendon Tenodesis: A Case Report

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Introduction:

Snapping at the lateral knee can be caused by a variety of pathologies involving surrounding soft tissue structures such as the popliteus, semitendinosus and/or gracilis tendons, IT Band syndrome, lateral meniscus tears, or rheumatoid nodules.¹⁻⁴snapping In rare instances, lateral knee pain may also be caused by the distal tendon of the biceps femoris long head shifting over the fibular head.⁵⁻⁶ Regardless, the various differential diagnoses should be properly ruled out by a careful history, a detailed physical exam, and advanced imaging.

Few cases of snapping biceps femoris tendons have been recorded in the literature across various case reports. Causes of the snapping biceps femoris tendon have been attributed to anomalous insertions (most prevalent),⁷⁻¹⁶ tendon subluxation,¹⁷⁻¹⁸ abnormalities of the fibular head,¹⁹⁻²³ or secondary to trauma.^{6, 24} Conservative treatment is usually attempted first and consists of physical therapy and anti-inflammatory medications as needed. Surgery, which is usually the last resort and the most effective, consists of resecting the anomalous tendon insertion or correcting any fibular deformities.

In this report, we present a patient with lateral knee pain from an accessory insertion of the snapping biceps femoris tendon and discuss surgical exploration and repair. The patient was informed that his case would be submitted for publication and he provided consent.

Case report:

A 48 year-old male patient presented to our clinic with lateral right knee snapping and pain that had been ongoing for over 2 years without trauma or other known cause. The patient noted the pain and snapping at the fibular head worsened with cycling and deep squats. On examination, no atrophy was noted, however snapping was visible at knee flexion past 90 degrees. The patient had attempted activity modification, a home-exercise program and icing without relief. Radiographs of the knee were unremarkable with no evidence of any osseous abnormalities or bony prominences at the fibular head. MRI imaging of the right knee did not indicate evidence of an anatomical variant or anomalous insertion of the biceps femoris tendon (Figure 1). After 8 weeks of physical therapy focused on knee conditioning and hamstring strengthening, the patient reported worsening of symptoms and elected to proceed with surgery since conservative options had been exhausted.

Operative Findings and Technique

The patient was positioned supine on the operating table with a bump under the thigh. Preoperative antibiotics and general anesthesia with a peripheral nerve block were administered. After all bony landmarks were identified, a 4-cm curvilinear incision was made over the proximal fibula [Figure 1]. Careful dissection was taken down to the level of the biceps femoris tendon using Metzenbaum scissors and electrocautery. The self-retaining retractors were used to better visualize the insertion of the tendon. Care was taken to protect the common peroneal nerve and other neurovascular structures in this case. The tendon was inspected and a

thick band was visualized inserting on the anterolateral tibia [Figure 2]. The knee was then flexed to recreate the snapping and it was apparent that this band was the source of the snapping. [Video 1]. Upon further inspection, the direct band of the biceps femoris tendon was revealed. At this point, it was decided to dissect the anomalous insertion from the tibia [Figure 3] and repair this tendon down to the direct biceps femoris insertion on the posterior head of the fibula. A No. 2 Ethibond suture was used to secure the released tendon down on the direct band of the tendon [Figure 4]. The released anomalous insertion of biceps femoris tendon was successfully repaired down to the direct band of the tendon [Figure 5]. The knee was tested with flexion to ensure that there were no structures snapping at this time [Video 1].

At his first post operative appointment, snapping at the lateral knee was visually confirmed to have been resolved. The patient was non-weight bearing on the operative leg for one month after surgery and was counseled to regularly perform passive range of motion exercises to prevent stiffness. After one month, he transitioned to being full weight bearing and began physical therapy to regain full range of motion. At his two month follow up, the patient's pain had completely resolved and had full range of motion. He was able to resume his normal activities.

Discussion:

The anatomy of the biceps femoris tendon is complex and crucial to the biomechanical function of the knee. The muscle, composed of the short and long heads, is involved with hip extension, lateral rotation of the leg, and knee flexion. In addition, the biceps femoris plays an important role as a dynamic stabilizer of the knee and injury has been associated with rotatory instability of the knee.²⁵ A cadaveric study of 56 knees by Salter et al. 2005 found that the biceps femoris tendon is composed of medial and lateral slips and was found to attach to the lateral condyle of the femur, popliteus, and the arcuate popliteal ligament.²⁶

The long head of the biceps femoris originates at the ischial tuberosity and has two tendinous insertions. The first is a direct arm that attaches to the posterolateral fibular head and the second is an anterior arm that attaches to the lateral aspect of the fibular head or the lateral tibial plateau.^{16, 26} In our case, an anomalous attachment of the biceps femoris to the anterolateral tibia was repositioned to the direct arm insertion to resolve painful snapping of the tendon over the fibular head.

Due to the unremarkable findings on imaging, the diagnosis of a snapping knee due to an accessory tendon is difficult. There is some evidence to suggest that use of dynamic ultrasound may aid in making the diagnosis of a snapping biceps femoris tendon.²⁷ Various surgical approaches have been used to treat snapping of the biceps femoris tendon. One approach is resection of the fibular head.^{19,20} McNulty et al. successfully resolved symptoms by removing the prominent ridge on the posterior aspect of the fibular head, which caused snapping.¹⁹ Fung et al. reported a 17-year-old soccer player with bilateral exostoses at the fibular head treated surgically with exostosis excision, biceps tendon debridement, and fibular prominence smoothing with success.²⁰

In other case reports, the anomalous tendon insertions may be resected.^{5,13,16} Fritsch et al., reported an enlarged anterior arm of the biceps femoris tendon which elicited snapping. The thickened anterior arm was then detached and shuttled through a fibular tunnel, which resolved the snapping.⁵ Further, Reid et al. reported painful snapping in a 15 year-old athlete, which was resolved through resection of the accessory biceps femoris attachment and reinsertion into the fibular head with suture anchors and a Krackow suture.¹⁶ In Ernat et al., the anterolateral tibial and thickened fibular accessory bands were released without reattachment, which resolved snapping at the lateral knee.¹³

In Date et al. 2011, an anomalous insertion of the biceps femoris at the anterolateral proximal tibia as well as the anterior arm at the lateral edge of the fibular head were sutured to the direct arm on the posterolateral fibular head using three stitches¹⁰. Similar to Date's case, the accessory band of our patient's biceps femoris tendon was sutured against the direct arm and periosteum with only stitches without the use of suture anchors. In addition, given the crucial role of the biceps femoris to knee function, we felt that re-attachment of the accessory biceps femoris tendon insertion was more appropriate than a tenotomy alone.

Our patient exhausted all conservative treatment options including anti-inflammatory medications and >2 months of physical therapy, which ultimately exacerbated his symptoms. Past cases of snapping biceps femoris tendons at the lateral knee have been treated uniquely depending on their pathophysiological root. In our case, an accessory anterolateral tibial insertion of the biceps femoris tendon was snapping over the fibular head. Symptoms were successfully resolved by the tenodesis of the accessory band to the direct arm insertion at the posterolateral edge of the fibular head. The patient was able to return to an active lifestyle at 2 months follow-up without recurrence of symptoms.

Conclusion:

Snapping of the biceps femoris tendon is a relatively rare occurrence that can cause painful and audible clicking that interferes with a patient's lifestyle. Conservative treatment is usually unable to resolve symptoms. There have been a variety of surgical approaches aimed at treating this anomaly. Accessory tendon tenodesis to the posterior head of the fibula may preserve knee stability and allow for quick recovery times and resolution of symptoms. We present a rare case of an anomalous insertion of the biceps femoris tendon that was resected and re-attached surgically to resolve pain and snapping. Ultimately, further research is needed to evaluate the long-term success of such surgeries and their effects on knee mobility.

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