

Partial Fibular Head Resection Technique for Snapping Biceps Femoris



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Abstract: Snapping biceps femoris is a rare phenomenon in which the biceps femoris tendon subluxates over the fibular head when the leg is brought into deep flexion. Two primary pathologies have been identified: biceps insertion tears/anatomic variants and/or an enlarged fibular head. Often, it can be treated nonoperatively; however, if symptoms are severe enough and refractory to conservative treatments, the underlying pathology can be corrected surgically to alleviate symptoms. The diagnosis is made clinically; the subluxation should be reproducible with deep flexion and should abate with manual compression of the biceps muscle and internal rotation of the tibia. Radiographs can help to discern the size and shape of the fibular head, and magnetic resonance imaging can often help to determine any abnormal tendon insertions. The surgeon should be comfortable with the anatomy of the lateral knee. It is critical to protect the common peroneal nerve. With the appropriate correction, the subluxation can be eliminated and symptoms dramatically improved.

Several snapping joints have been described. The snapping is often caused by a tendon that subluxates over a bony prominence through an arc of motion. Although commonly associated with the iliopsoas tendon in the hip, this phenomenon has also been described about the knee. In snapping biceps femoris syndrome, the biceps femoris subluxates over the fibular head in deep flexion. It is a rare phenomenon with only a few prior case reports.

Two pathologies have been identified as causative factors in snapping biceps syndrome. The first reported pathology is a prominent fibular head or abnormal fibular head morphology. In the case described, the excess fibular head was resected, with resolution of the symptoms.¹ Other reports have implicated an anomalous biceps femoris insertion. Both partial tearing and anomalous insertions have been identified; in all cases,

anatomic repair leads to the resolution of clinical symptoms.^{2,3}

Snapping biceps femoris is a clinical diagnosis. The subluxation should be reproducible with deep flexion of the affected knee, and compression of the muscle should eliminate the subluxation. Imaging can be helpful to help delineate the underlying etiology, which is often multifactorial. Radiographs demonstrate the size and shape of the fibular head (Fig 1), and magnetic resonance imaging may show an anomalous insertion or tearing of the biceps femoris. Often, snapping biceps can be treated nonoperatively; however, if symptoms are severe enough, the underlying pathology can be corrected surgically to alleviate the symptoms. We describe a surgical technique to eliminate biceps femoris snapping with resection of a prominent fibular head for a patient with recalcitrant, symptomatic biceps femoris snapping.

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Surgical Technique

Patient Positioning and Procedure Setup

The patient should be placed supine with a bump under the hip to help access the lateral aspect of the knee. It is important not to use a tourniquet, because even manual compression of the biceps can artificially eliminate the subluxation and make it impossible to tell if the correction is adequate. Most of the work is done with the knee in the flexed position, so a leg holder or a bump and post can be used to help maintain knee flexion throughout the case. After induction of

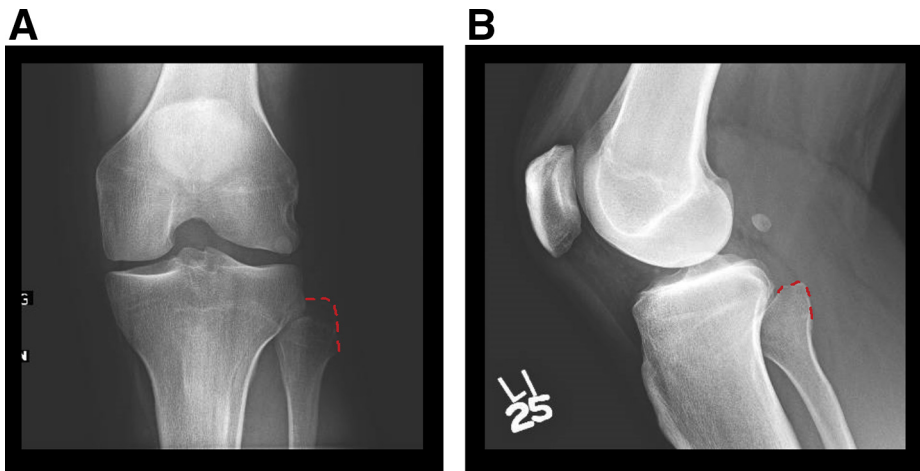


Fig 1. Anteroposterior (A) and lateral (B) radiographs of the left knee showing a prominent fibular head (outlined in red). This is one etiology of snapping biceps syndrome. When the knee goes into deep flexion, the biceps tendon can sublunate over the prominence.

anesthesia, it is important to reassess the knee. The examination under anesthesia should again confirm the biceps femoris sublaxation, to ensure that the surgeon will be able to determine if adequate correction has been obtained intraoperatively.

Resection of the Fibular Head

A standard, although somewhat limited lateral, approach to the knee is performed (Fig 2). It is important to draw the incision in extension so that it is relatively straight and longitudinal. It should be placed slightly posterior, along the posterior border of the iliotibial band. The fibular head can be palpated and should be located in the middle of an approximately 10-cm incision.



Fig 2. Patient is supine with a bump under the operative hip to better position for an approach to the lateral left knee. A limited lateral approach was completed by centering the incision on the fibular head and placing it at the posterior aspect of the iliotibial band. The peroneal nerve has been identified and protected with a Penrose drain (arrow). This step is critical to avoid iatrogenic injury.

The peroneal nerve needs to be identified first and protected throughout the case. It is often easier to find toward the proximal aspect of the incision. We neurolysed distally around the fibular head and placed a Penrose drain to protect the nerve. The posterior border of the biceps femoris should be evident by this point. Once the biceps is retracted anteriorly, the fibular head should be clearly seen in the operative field (Fig 3). An osteotome was then used to resect the prominent bone (approximately 1 cm in this case; Fig 4). The bone was then rasped (Depuy Synthes, West Chester, PA) to remove any sharp edges. Bone wax (Ethicon, Summerville, NJ) was used at the site of resection. Attention was paid to avoid the lateral collateral ligament and the popliteal fibular ligament. The insertion of the biceps was then explored. There was a small slip that was



Fig 3. After exposing the left fibular head by retracting the biceps tendon anteriorly, the prominent fibular head is evident (circled). It is critical to re-examine the knee at this point. The best way to determine how much resection is adequate is by completing an initial resection and then retesting the knee.

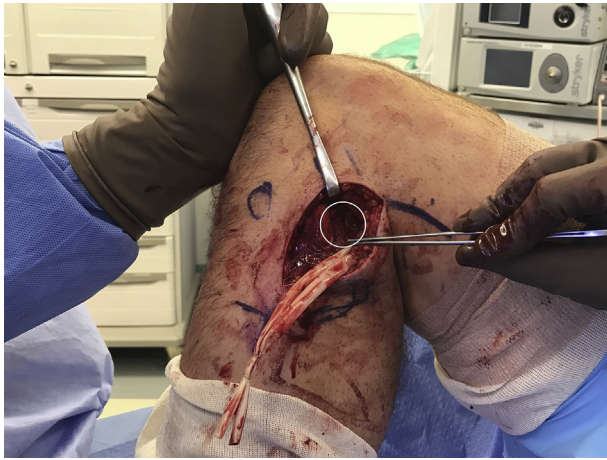


Fig 4. View of the left lateral knee with the patient in the supine position. The fibular head was then resected using an osteotome. The prominence previously seen is now gone (circled). At this point, the knee was re-examined and the biceps tendon subluxation had stopped. Before closure, the bone edges were rasped and bone wax was placed over the resection area.

attached to the anterolateral tibia, which was also released. After the resection, the knee was once again taken through a range of motion. Adequate resection of the fibular head can be confirmed by ensuring complete resolution of the biceps femoris snapping with deep knee flexion. Again, if the tourniquet was elevated during the case at all (not recommended), it should be deflated at this time to confirm that the compression of the biceps femoris muscle is not falsely eliminating the snapping.

Discussion

Snapping biceps femoris is a rare condition that often can be managed conservatively. It is a clinical diagnosis. If symptoms are refractory to nonoperative treatment, the causative factor may be identified with radiographs and magnetic resonance imaging. Once the pathology has been identified, it can be corrected surgically ([Video 1](#), available at www.arthroscopyjournal.org).

There have been several case reports published in the literature. The first report in 2001 postulated that a prominent fibular head was the causative pathology.¹ This report advocated for partial fibular head resection to definitively treat the condition if nonoperative

Table 1. Advantages and Disadvantages of the Procedure to Address Snapping Biceps Femoris

Advantages	Disadvantages
Able to visualize and directly address the pathology.	Places the peroneal nerve at risk
Able to check correction in real time	Opens procedure.
	Unknown long-term results

Table 2. Pearls and Pitfalls of the Procedure to Address Snapping Biceps Femoris

Avoid tourniquet use.
Examine under anesthesia to recreate snapping.
Dissect and protect the peroneal nerve.
Assess both the size/shape of fibular head and insertion of the biceps femoris tendon.
Confirm your correction by repeating the examination throughout the case and after closure to ensure that there is no iatrogenic tethering of the biceps.

treatments fail. This has been corroborated by other reports as a successful treatment option.⁴ Although successful, this is not the only treatment option reported in the literature. Multiple reports have demonstrated resolution of biceps tendon snapping by manipulating the tendon while leaving the fibula alone.^{2,3,5-7} In these reports, treatment consisted of detaching the tendon and repairing it with suture anchors in a position that did not allow for subluxation.^{2,3,5-7} When evaluating and developing a treatment plan for these patients, it is critical to not only make the proper diagnosis but also to understand the underlying pathology.

As with any surgical procedure, there are inherent limitations and risks. If you are unable to reproduce the subluxation after the induction of anesthesia, it makes it difficult to assess the amount of correction needed. In addition to generalized risks with surgery, operating in this anatomic area places the peroneal nerve at risk ([Table 1](#)). Finally, there are no long-term results in the published literature.

Once the pathology has been correctly identified and operative intervention is undertaken, it is important to be able to test the snapping phenomenon throughout the surgery ([Table 2](#)). Only then can the surgeon confirm resolution of the snapping. It is also necessary to protect the peroneal nerve—it is in danger throughout the operation and must be identified at the outset. In this case, the patient had complete resolution of his symptoms after partial fibular head resection.

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