

# Arthroscopy-Assisted Open Fabella Excision With Medial Meniscus Revision Repair

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**Background:** The fabella is a sesamoid bone that is a normal anatomic variant yet a rare cause of pathology in the posterolateral portion of the knee. The fabella can cause chronic knee pain in patients with knee osteoarthritis and athletes at all levels and in rare cases can cause neuropathy. Initially, treatment for a painful fabella includes conservative measures, with surgical intervention after conservative treatments have failed. This technique describes our arthroscopic-assisted fabella removal technique with a concomitant medial meniscus revision repair.

**Indications:** The goal of treatment is to relieve pain and numbness. Conservative measures (i.e., nonsteroidal anti-inflammatory drugs [NSAIDs], range of motion exercises, heel cord stretching, etc.) are the initial step in treatment. Patients are treated surgically after conservative measures have failed. The surgical approach involves an open incision, arthroscopy, or a combination.

**Technique Description:** With the patient in the supine position, a physical examination is performed under anesthesia to compare to validate clinical findings. An open lateral knee approach helps to locate the fabella which is grasped with an Alice clamp. An arthroscopy is performed, and viewing posterolaterally will confirm that the fabella is within the grips of the Alice clamp. After repair of the meniscus, the surgical bed is repositioned to identify the fabella properly. Excision of the fabella is performed sharply from the lateral gastrocnemius tendon, and palpation is demonstrated to ensure complete removal. Caution is essential to avoid complications including damage to nearby anatomic structures, such as the lateral gastrocnemius tendon, and incomplete fabella removal.

**Results:** A clinical study by Dekker et al reported that 80% of patients were able to return to full activities and postoperative patient-reported outcomes improved from preoperative to postoperative. Fabella excision is recommended for patients with fabella pain who do not respond to conservative treatment.

**Discussion:** We describe a technique for removing the fabella with arthroscopic assistance. Patients who have not responded appropriately to conservative treatment for a painful fabella should consider surgical intervention. With the early initiation of rehabilitation, patients will have an increased likelihood of decreased pain, resolution of symptoms, and reduced knee stiffness.

**Patient Consent Disclosure Statement:** The author(s) attests that consent has been obtained from any patient(s) appearing in this publication. If the individual may be identifiable, the author(s) has included a statement of release or other written form of approval from the patient(s) with this submission for publication.

**Keywords:** fabella excision; posterolateral pain; fabella syndrome; painful fabella; revision meniscus repair

## VIDEO TRANSCRIPT

This is a video presentation demonstrating an arthroscopy assisted open fabella excision with medial meniscus revision repair.

The disclosures for the senior author are listed.

## BACKGROUND

The fabella is a rare sesamoid bone embedded in the muscular fibers of the lateral head of the gastrocnemius.<sup>2,5</sup> The

presence of the fabella varies widely being reported in 20% to 87% of patients and is typically asymptomatic.<sup>1,5</sup> Although a painful fabella is rare, symptoms are typically located posterolaterally and exacerbated in the extension position when the fabella compresses against the lateral femoral condyle.<sup>7</sup> The cause of fabella pain can be due to acute injury or chronic wear against the lateral femoral condyle.<sup>4</sup> Typically, a painful fabella can be treated conservatively via physical therapy or injections.<sup>3,5</sup> If conservative treatment is not effective, fabella excision can be indicated to help reduce patient pain and allow patients to return to full activities.<sup>4,6</sup>

The patient is a 20-year-old male who presented with left knee pain. The patient had a knee injury approximately 1 year ago and reported pain mostly localized to posterolateral aspect of his knee. Magnetic resonance

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imaging (MRI) obtained at the time of the injury demonstrated concern for medial meniscal pathology. He underwent a medial meniscal repair approximately 5 months ago, and while his posterolateral pain is somewhat improved, it is still largely present. His rehabilitation from the medial meniscal repair has been significantly delayed by this pain, and therefore it is delaying his ability to regain muscle strength and function. He has tried non-operative modalities to resolve the pain but does not seem to have obtained much relief.

## INDICATIONS

Our physical examination revealed 4 cm of heel height to 135° of flexion, which was comparable to the contralateral knee. There was notable atrophy of the patient's left thigh compared to his right in terms of thigh circumference. The patient had a very prominent, easily palpable fabella on his left knee that produced pain with manipulation. He also had a similar fabella on his right knee which was non-painful. Lachman's test and posterior draw showed stable endpoints and there was no varus or valgus laxity. Overall, the exam was suggestive of a painful left knee fabella.

Plain radiographs of the knee were taken and demonstrated near neutral alignment and no obvious osseous pathology. The fabella was demonstrated on the lateral radiographic view.

A new MRI was obtained to check for other possible causes of posterolateral knee pain. For the fabella, edema around the fabella, thickening of the lateral gastrocnemius tendon, and a groove in the cartilage adjacent to the lateral femoral condyle can sometimes be visualized, typically in chronic cases. The MRI also revealed an irregularity of the medial meniscus, notably involving the meniscocapsular attachment of the posterior horn of the medial meniscus. This finding was suggestive of either a new or chronic ramp tear of the medial meniscus. The fabella was also well visualized on MRI; however, no edema or grooving of the adjacent cartilage to the lateral femoral condyle was visualized.

We explained the findings to the patient of a left painful fabella and irregularity of the posterior horn of the medial meniscus suggestive of previously failed repair. After discussion of the risks and benefits, the patient elected to

undergo an arthroscopically assisted open fabella excision with concomitant arthroscopic examination of the medial meniscus with possible medial meniscus revision repair, and a bone marrow venting procedure.

## TECHNIQUE DESCRIPTION

A high thigh tourniquet was placed on the patient's left thigh. Exam under general anesthesia was performed and his Lachman's test, pivot shift test, varus and valgus stress testing were all normal. In addition, the patient's fabella was well palpated posteriorly to confirm its location. The patient was given 2 grams of Ancef for prophylaxis against infection, and his left lower extremity was prepped and draped under sterile conditions. The location for the incision was marked.

The open approach for the fabella was performed first to avoid dissection through fluid extravasation. An incision was made along the inferior border of his iliotibial band. Dissecting down, the interval anterior to the patient's lateral gastrocnemius tendon and above his biceps tendon attachment on the fibula and his posterolateral capsule was entered. Dissection was continued until the fabella could be identified. The fabella was well palpable within the gastrocnemius tendon. Slow dissection around the fabella was performed to further isolate it. An Allis clamp was placed on the fabella once isolated.

Arthroscopy was then performed. Medial and lateral portals were made, the camera was inserted, and the joint was insufflated with normal saline. The articular cartilage of the patient's patellofemoral joint was essentially normal. His medial compartment showed some mild articular cartilage scuffing. His medial meniscus had not healed posteromedially from his previous repair and 1 of the sutures had broken. This was removed with a combination of a grasper and an arthroscopic shaver. The meniscus was unstable on probing and therefore needed a revision repair.

His anterior cruciate ligament (ACL) and posterior cruciate ligament (PCL) were normal, as was the lateral compartment articular cartilage. In addition, his lateral meniscus including the root attachment was normal.

From a posterolateral view, lateral to his ACL, we were able to manipulate the fabella to localize the areas of

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posterolateral capsule which was immediately anterior to the fabella.

The revision medial meniscus repair was now performed. A probe was placed inside the joint to localize where the medial meniscal repair incision would be made. A medial incision was made and dissection was carried out down to the sartorius fascia. The interval anterior to the medial head of his gastrocnemius above his semi-membranosus tendon was entered. This was very scarred in and took longer than normal to develop, which was anticipated to be due to the previous all-inside repair scarring in these tissues. A spoon was placed in this interval to catch the needles during the inside out repair.

A ball rasp was then used to rasp the margins of the meniscus, where it had recurrent tearing. We then utilized a spinal needle to trephinate the medial collateral ligament (MCL) to improve visualization and working space in the medial compartment.

Slowly and meticulously, 8 inside-out vertical mattress sutures were placed starting anteriorly and moving posteriorly. Once they were all tied, it made for a solid and secure revision medial meniscus repair.

The bed was then raised so that the fabella could be visualized via the open incision while concurrently viewing the posterolateral joint capsule via the anteromedial portal. Performing this excisional step open with arthroscopic assistance allows for precise excision of the fabella which preserves the maximal amount of posterolateral joint capsule and the lateral gastrocnemius tendon. A Metzenbaum scissors and a #15 blade were used to excise the fabella which allowed finite dissection and development of the appropriate plane of resection. The complete excision of the fabella was confirmed on palpation.

Following the excision of the fabella, a microfracture awl was used to place 4 awl holes on the lateral aspect of his intercondylar notch for a marrow venting procedure. This was performed to release biologic agents to assist with the healing of the revision medial meniscal repair.

The tourniquet was then let down. The deep and superficial tissues were closed with suture.

Postoperative rehabilitation recommendations for this procedure, due to the revision meniscus repair, include 6 weeks of nonweightbearing followed by partial protected weightbearing with crutches until the patient can ambulate without a limp. Range of motion is restricted from 0° to 90° of knee flexion for 2 weeks, at which point range of motion may be increased as tolerated. Patients should avoid any significant squatting, lifting, and sitting cross-legged for 4 months to protect the revision ramp repair. For the fabella excision, frequent calf motion is encouraged to ensure that the gastrocnemius tendon does not stiffen while the patient is nonweightbearing. If the fabella excision was isolated, the patient would be full weightbearing with crutches for 4 weeks, after which they can stop using the crutches once they can ambulate without a limp. There would be no restriction on range of motion.

## RESULTS AND DISCUSSION

Care must be taken to avoid potential complications during the open fabella excision. The first potential complication to consider is iatrogenic damage to the musculature, tendons, and ligaments of the lateral aspect of the knee. Intricate understanding of the anatomy of the lateral knee must be known to properly dissect around the tissues. Care must be taken to avoid iatrogenic damage to the lateral gastrocnemius tendon, in which the fabella is located. This can be avoided by slowly and meticulously dissecting out the fabella, ensuring the preservation of as much of the surrounding lateral gastrocnemius tendon as possible. In addition, using arthroscopy to verify the location of the fabella and the dissection of the fabella can help ensure a minimal amount of the lateral gastrocnemius tendon is removed during the fabella excision. A #15 blade can be used to develop the correct plane by cutting down to the fabella, and then the fabella can be shelled out using a combination of Metzenbaum scissors and an Alice clamp to manipulate the fabella.

A second complication to avoid is an incomplete removal of the fabella. An attempt should be made to remove the fabella in 1 piece using the technique previously described. The use of a Rongeur to remove the fabella should be avoided, as it introduces the risk of fragmenting the fabella making its complete removal more difficult. The Alice clamp and use of arthroscopy to assist during the surgery can help to properly identify the margins of the fabella and aid in dissection and excision.

A study by Dekker et al<sup>4</sup> reported on patient outcomes of 10 patients with 11 fabella excisions. Eighty percent of the patients were able to return to full activities and postoperative patient outcomes reported improvements from preoperative to postoperative values in both Western Ontario and McMaster Universities Osteoarthritis (WOMAC) and Lysholm scores from 28.5 to 11.6 and 66.6 to 80.2, respectively.

Postoperative plain films reveal that the fabella has been completely removed.

## REFERENCES

1. Asghar A, Naaz S, Chaudhary B. The ethnic and geographical distribution of fabella: a systematic review and meta-analysis of 34,733 knees. *Cureus*. 2021;13(4):e14743.
2. Berthaume MA, Bull AMJ. Human biological variation in sesamoid bone prevalence: the curious case of the fabella. *J Anat*. 2020;236(2):228-242.
3. Dalip D, Iwanaga J, Oskouian RJ, Tubbs RS. A comprehensive review of the fabella bone. *Cureus*. 2018;10(6):e2736.
4. Dekker TJ, Crawford MD, DePhillipo NN, et al. Clinical presentation and outcomes associated with fabellectomy in the setting of fabella syndrome. *Orthop J Sports Med*. 2020;8(2):2325967120903722.
5. Driessen A, Balke M, Offerhaus C, et al. The fabella syndrome—a rare cause of posterolateral knee pain: a review of the literature and two case reports. *BMC Musculoskelet Disord*. 2014;15:100.
6. Ernat JJ, Peebles AM, Provencher MT. Open excision of a painful fabella. *Arthrosc Tech*. 2022;11(4):e577-e581.
7. Provencher MT, Sanchez G, Ferrari MB, et al. Arthroscopy-assisted fabella excision: surgical technique. *Arthrosc Tech*. 2017;6(2):e369-e374.