

Surgical Procedure for Osteophyte Impingement of the Quadriceps Tendon: A Case Report

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Learning Point of the Article:

Although osteophyte impingement to quadriceps tendon is a rare condition, it must be considered as a differential diagnosis for causes of superior knee pain. If conservative treatment proves ineffective, surgical intervention may be necessary.

Abstract

Introduction: Osteophytes associated with knee osteoarthritis can irritate surrounding soft tissues and cause pain and mechanical symptoms. Although impingement of the medial collateral ligament and popliteus tendon has been reported, symptomatic osteophyte impingement of the quadriceps tendon is rare, and no reports describe its surgical treatment.

Case Report: An 82-year-old Asian man presented with several years of left knee pain accompanied by a snapping sensation during knee flexion. The pain did not occur during gait. Physical examination revealed tenderness at the superolateral aspect of the patella, and painful snapping occurred between 90° and 120° of knee flexion. Radiographs demonstrated advanced knee osteoarthritis (Kellgren-Lawrence grade 4) with multiple osteophytes. Computed tomography (CT) identified an osteophyte at the lateral femoral trochlea corresponding to the site of tenderness. Magnetic resonance imaging showed signal intensity changes at the site of the osteophyte. Based on the clinical findings and imaging results, the pain was diagnosed as quadriceps tendon impingement caused by the osteophyte. After several months of unsuccessful conservative treatment, including quadriceps exercises and analgesics, arthroscopic osteophyte resection was performed. Arthroscopy revealed a cord-like structure continuous with the quadriceps tendon that contacted the osteophyte during flexion. Both the osteophyte and the contacting soft-tissue structure were resected until the impingement was eliminated. Postoperatively, the snapping and pain resolved immediately. CT confirmed adequate resection of the anterolateral osteophyte. At the 6-month follow-up, the patient remained symptom-free.

Conclusion: Osteophyte Impingement of the Quadriceps Tendon is a rare cause of knee pain. Arthroscopic osteophyte resection can provide effective symptom relief when conservative treatment fails.

Keywords: Osteophyte, osteoarthritis, knee pain, arthroscopic osteophyte resection.

Introduction

Osteoarthritis of the knee is a common disease, with approximately 25 million people estimated to have it in Japan based on domestic epidemiological studies [1]. Osteophyte is osteogenic changes that appear and enlarge as osteoarthritis progresses. Osteophytes may irritate surrounding tissues, causing various symptoms. Typically, they compress the medial

collateral ligament [2] and the posterior joint capsule [3,4], often leading to pain and restricted range of motion. Anterior osteophytes have been reported to cause knee pain by impingement on the quadriceps tendon [5], but this report selected conservative treatment. Regarding surgical treatment for symptomatic osteophytes, while there is a report of favorable outcomes with surgery for popliteus tendon impingement [6],

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Figure 1: The bony prominence is noted on the lateral aspect of the patella (white arrow). There was tenderness in the same area, and a snapping sensation occurred during knee flexion.

there are no reports on surgical treatment for quadriceps tendon impingement. The author experienced a case who had left knee pain with snapping due to interference of an osteophyte with the quadriceps tendon, and the symptoms resolved following arthroscopic osteophyte resection. This is the first report of a surgical procedure of osteophyte impingement to quadriceps tendon.

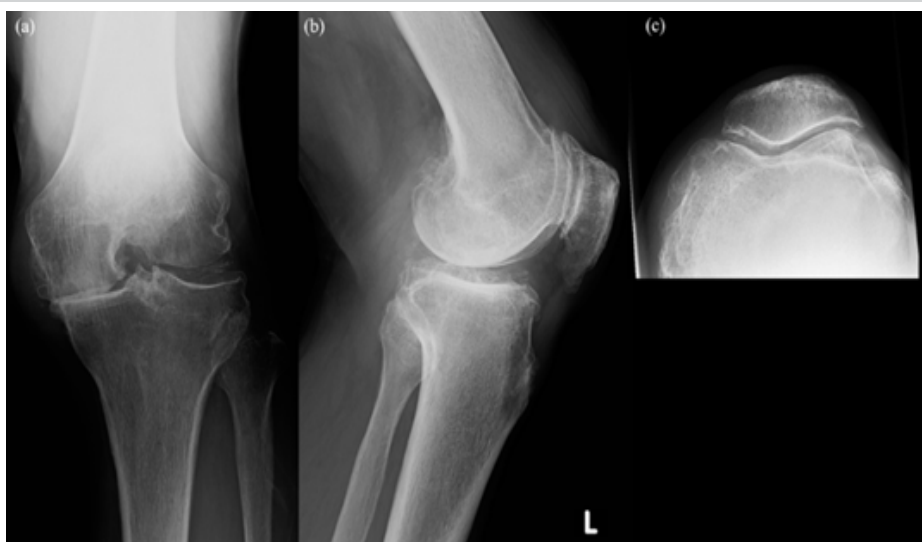


Figure 2: (a) Rosenberg view, (b) lateral view, and (c) skyline view. The medial joint space has disappeared, and a partial bone defect has also occurred; the knee was diagnosed with knee osteoarthritis of Kellgren-Lawrence classification Grade 4. The osteophytes were formed medial, lateral, and patellofemoral joints.

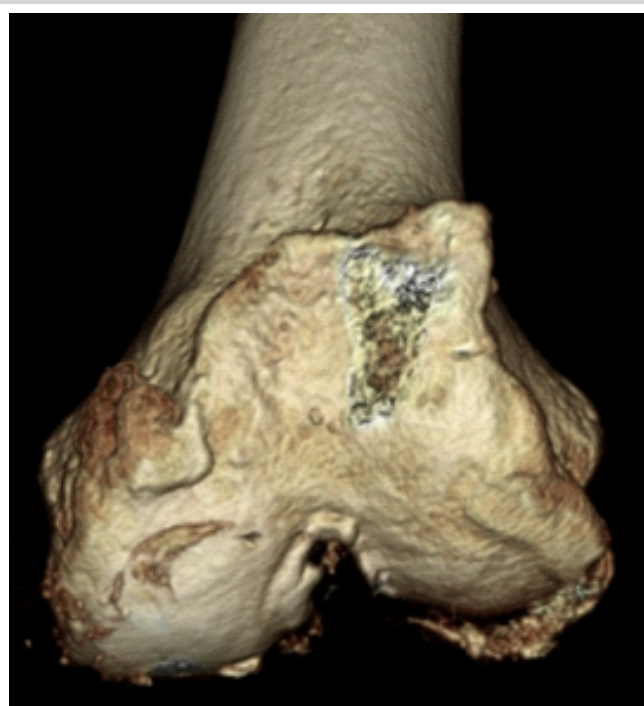


Figure 3: An osteophyte is identified at the location corresponding to the bulging area observed on physical examination in the three-dimensional reconstructed image.

Case Report

An 82-year-old Asian man had become aware of left knee pain with snapping a few years before. The knee pain hadn't arisen during gait. He came to our hospital because the symptom continued. There was previous medial collateral injury which was repaired with surgery and sudden deafness as a history. The range of motion of the left knee was almost full, but the pain and snapping happened at a range of 90–120°. The tenderness

located in superolateral from patella, and the tactile sensation was bone by palpation (Fig. 1). The joint stability was normal in either the anterior, posterior, varus, or valgus. The joint space was narrow at the medial femorotibial joint and patellofemoral joint; osteophytes were formed medial, lateral, and patellofemoral joint in a plain radiography (Fig. 2). The knee was diagnosed with knee osteoarthritis of Kellgren-Lawrence classification grade 4. In a computed tomography (CT), the osteophyte at the lateral femoral trochlea was confirmed at sites corresponding to the areas of tenderness (Fig. 3). Magnetic resonance imaging (MRI) showed a

change of intensity, low signal in T1-weighted image and a high signal in fat-suppressed T2-weighted image, occurred at the osteophyte (Fig. 4).

The primary cause of pain was diagnosed as impingement of the quadriceps tendon by osteophytes, not osteoarthritis. After several months of conservative treatment, including quadriceps exercises and pain reliever, no improvement was achieved, arthroscopic osteophyte resection was planned. Observation from the superomedial portal revealed a cord-like structure continuous with the quadriceps tendon on the lateral part of the superior pouch, which was in contact with the planned osteophyte resection during flexion (Fig. 5). Both of these were excised until no contact confirmed.

After surgery, snapping and pain resolved. CT also showed that the anterolateral osteophytes were adequately resected (Fig. 6).

At the 6-month post-operative follow-up, the patient remains pain-free and is doing well.

Discussion

Osteophytes proliferate as osteoarthritis progresses, interfering with surrounding soft tissues and potentially contributing to pain and functional impairment such as joint contracture. Osteophytes are thought to be an adaptation process arising in response to joint deformity, but their function and mechanism of formation remain largely unclear [7,8].

Dughhbaj had reported a case similar to the present one in which symptomatic osteophytes causing quadriceps impingement. In the report, the diagnosis was based on physical findings and ultrasonography. Treatment consisted of rest and physical therapy, which had been shown to improve symptoms

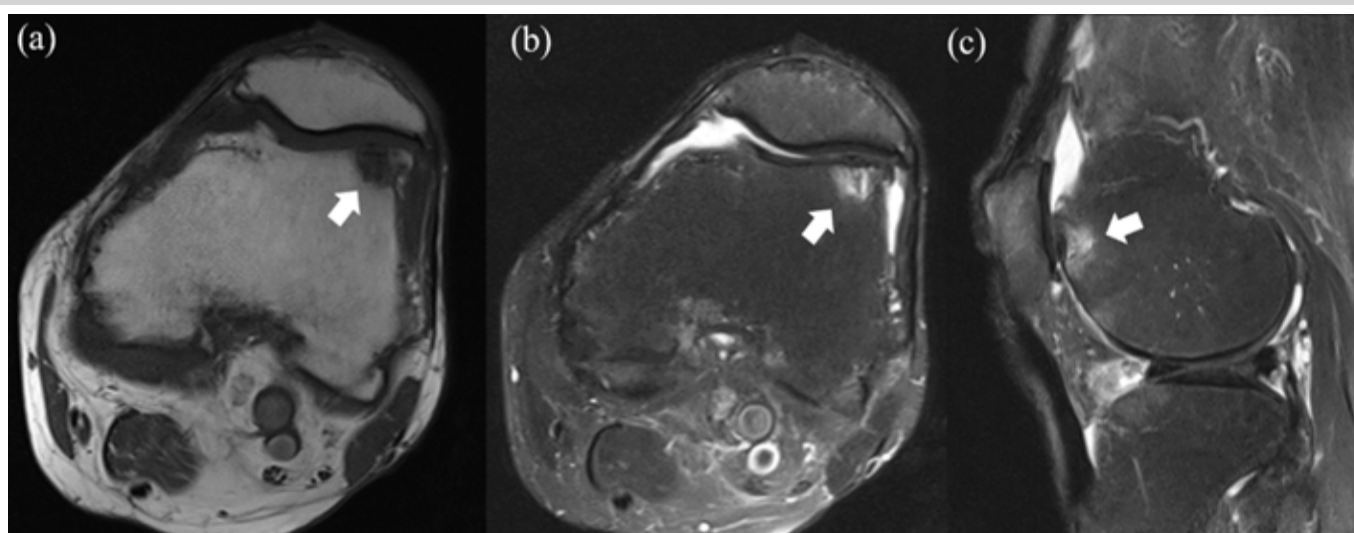


Figure 4: Bone marrow edema is observed in the osteophyte area on the lateral side of the femoral trochlea (white arrow). (a) Axial view of T1-weighted image (b) axial view of fat-suppressed T2-weighted image (c) sagittal view of fat-suppressed T2-weighted image.

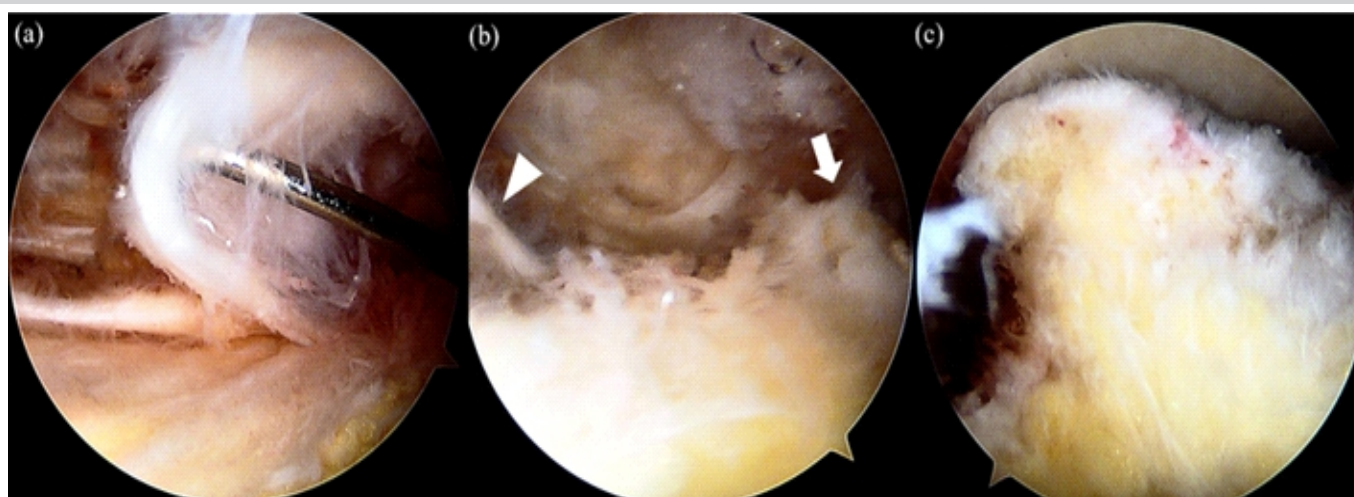


Figure 5: Arthroscopic findings from the superior medial portal reveal the osteophyte (white arrow) and a cord-like structure extending dorsally from the quadriceps tendon (white arrowhead). (a) a cord-like structure (b) osteophyte and cord-like structure (c) osteophyte after removal of surrounding soft tissue.



Figure 6: Post-operative three-dimensional reconstructed computed tomography confirmed that the osteophytes causing symptoms had been adequately resected.

[5]. However, in our case, conservative treatment, such as quadriceps exercises, failed to produce improvement over several months needed to surgery.

A report on popliteal tendon impingement noted that in 2 out of 3 cases, patients complained of symptoms indicative of mechanical irritation, such as a click or locking in the posterolateral region during flexion [6]. Such mechanical symptoms are useful for diagnosis, and in fact, we were able to diagnose this disease based on the snapping sensation complained by the patient. In this case, MRI revealed signal intensity changes at the site of the osteophyte, which supported the diagnosis. However, one report found no association between signal intensity changes within osteophytes and knee pain; therefore, physical findings should be given greater weight than imaging findings in diagnosis. In addition, osteophyte impingement of the popliteus tendon may occur even after total knee arthroplasty; therefore, residual osteophytes should be considered as a possible cause if pain persists after surgery [9].

Quadriceps fat pad impingement syndrome is one of the differential diagnoses for this condition. This condition is characterized by the presence of edematous changes in the suprapatellar fat pad as seen on MRI. However, while the reports on this condition use the term “impingement,” they did

Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given the consent for his/ her images and other clinical information to be reported in the journal. The patient understands that his/ her names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Conflict of interest: Nil **Source of support:** None

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not refer exactly where the impingement occurs [10,11].

Gaine reported three cases in which symptoms improved following surgery for osteophytes causing popliteal tendon impingement [6]. According to their report, osteophyte resection was performed in two cases, and popliteus tendon resection in one case. In our case, pre-operative imaging suggested that the impingement could be resolved by osteophyte resection alone. However, arthroscopic examination revealed a cord-like structure extending from the quadriceps tendon at the contact site. The snapping was presumed to result from interference between this structure and the osteophyte; therefore, the soft-tissue cord was also resected. Although the symptoms may have improved solely due to osteophyte resection, careful assessment of the sites where the osteophytes come into contact is necessary during surgery for this condition to determine whether additional treatment is required.

In this case, surgical treatment resulted in immediate improvement in symptoms, and the patient has remained symptom-free to date.

Conclusion

We experienced a case that an osteophyte formed on the lateral femoral trochlea caused impingement to the quadriceps tendon, resulting in left knee pain. Because the conservative treatment was ineffective, the patient underwent arthroscopic surgery and achieved a favorable result.

Clinical Message

When examining patients presenting with superior knee pain, it is necessary to suspect osteophyte impingement to the quadriceps tendon. Physical examination and medical history are most important for diagnosis, and surgical treatment is considered in cases resistant to conservative therapy.

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