

# Popliteus debridement following rapid loss of range of motion and increase in pain in patient status post total knee arthroplasty: A case report

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## Abstract

### Background:

Guidelines for recognition, diagnosis, and treatment of popliteus dysfunction and subsequent debridement following routine total knee arthroplasty (TKA) when persistent posterolateral knee pain is present.

### Case Description:

A 64-year-old female with moderate osteoarthritis of her left knee underwent total knee arthroplasty and initial successful rehabilitation. Three months post-op she began experiencing debilitating posterolateral knee pain and subsequent loss of range of motion (ROM). Popliteus tendon debridement was performed by an orthopedic surgeon resulting in rapid improvement of pain and range of motion with post-operative physical therapy (PT).

### Outcome and Follow-up:

At two months post TKA, the patient's left knee ROM measured 0-130 degrees active ROM. By four months post TKA her ROM had reduced to -6-110 degrees. Following popliteus debridement and four weeks of physical therapy, patient's ROM was -1-131 active ROM. Her lower extremity functional scale (LEFS) score improved from 37/80 at four months post TKA to 71/80 after popliteus debridement and PT. At 1-year follow up patient reports return to golf, pickleball, and recreational exercise without limitations or pain.

### Discussion:

This case received proper diagnosis and care for popliteus dysfunction following TKA and full return to daily and recreational activities.

Key Words: Total Knee Replacement, Popliteus, Debridement, Resection, Release

## Background:

Total knee arthroplasties (TKAs) occur at an estimated rate of 235/100,000 people in the United States, with over 700,000 performed annually.<sup>10</sup> This number is expected to increase by 143% by 2050, and increased by 5% per year from 1995 to 2004.<sup>10,13</sup> Approximately 15-20% of patients are dissatisfied following TKA due to pain or poor function.<sup>4,5</sup> Many factors may contribute to poor outcomes following surgery including pain, dissatisfaction with range of motion, unrealistic patient expectations, and poor functional outcomes.<sup>4,8,14,16,17</sup> An estimated 10-34% of people experience chronic pain following TKA.<sup>9,21</sup>

With the growing number of TKAs performed each year, the incidence of complications increases as well.<sup>19</sup> The most common post-surgical complications include infection,

periprosthetic fracture, symptomatic implant loosening, prosthetic wear, and instability.<sup>18,19</sup> A post-operative work up following persistent pain post TKA often includes radiographic evaluation and blood work to rule out prosthetic issues or underlying infection.<sup>4,9</sup> If these causes are ruled out, some less common contributors to pain may be patellar dysfunction, extra-articular impingement, popliteus tendon dysfunction, or femoral or tibial component overhang.<sup>2,4</sup>

Popliteus tendon dysfunction occurs in 0.2-2.7% of TKAs.<sup>2,3</sup> It is most commonly due to a painful popping/snapping of the popliteus tendon as it subluxates over the lateral femoral condylar prosthesis.<sup>2,3,11</sup> It seems to be more likely in females or those with a greater valgus deformity as these patients require a larger femoral component in the medial compartment, which increases risk of prosthetic overhang.<sup>2,3</sup> A novel test was developed for determining if the popliteus is at fault by firmly pressing on the popliteus tendon insertion at the lateral femoral condyle and ranging the knee into flexion. Abolishment of symptoms and/or popping indicates the popliteus and this can be confirmed through an ultrasound guided injection to the tendon sheath.<sup>11,20</sup> The reliability of this novel test has not been determined. Resection of the popliteus may be indicated in this case and has not been shown to reduce stability of the post-operative knee.<sup>12</sup> The aim of this case study is to broaden the diagnostic capabilities of practitioners treating individuals who have undergone a TKA and are presenting with a persistence in lateral knee pain and reduction in function or ROM.

### **Case Presentation:**

In August 2018, a 64-year-old female underwent a left total knee replacement due to moderate-severe pain with daily activities and a lack of improvement with conservative management.

### **Differential Diagnosis:**

A computed tomography (CT) scan prior to surgery revealed moderate tricompartmental osteoarthritis, mild joint effusion, and a Baker's cyst present in the posterior soft tissue of the patient's left knee. The patient's BMI is 24.3 and she is a non-smoker. The patient underwent TKA and following 6 weeks of traditional rehabilitation the patient had progressed well and was discharged from PT with full ROM, minimal pain, and 56/80 on her LEFS indicating great functional progress. She returned to PT 12 weeks post operatively reporting significant reduction in ROM, increase in pain, and a catching/locking sensation in her posterolateral knee with knee flexion. She was tender to palpation at the popliteus tendon attachment on the lateral femur. She made minimal to no progress in PT, which focused on progressive mobility exercises and manual therapy treatments focused on the patient's biceps femoris and popliteus tendons. She was ultimately referred by her operating surgeon to another orthopedic surgeon for an arthroscopy to be performed.

### **Treatment:**

The patient underwent left knee arthroscopy in February 2019. The orthopedic surgeon noted significant tightness of the patient's popliteus tendon and performed a 0.5 cm debridement as well as a lateral retinacular release. The patient was seen in PT 5 days later for her evaluation. Initial treatment focused on reduction of edema and modulation of pain with

open kinetic chain strengthening and range of motion exercises. The patient was hesitant with knee flexion due to fear of her knee locking as it had prior to her arthroscopy. Patient made rapid improvements in ROM and pain, and was progressed to eccentric quad strengthening, dynamic balance, proprioception activities, and plyometric training. Exercises included eccentric quad step downs, BOSU ball lunges and step overs, hopping, and dynamic walking at metronome paced speed to encourage faster cadence. She was discharged from PT after 5 weeks post arthroscopy.

**Outcome and Follow-up:**

Outcome data from initial PT following TKA as well as data following arthroscopy can be found in Table 1. Outcome measures were selected based on standard protocol following knee joint replacement therapy. The patient was ambulating without analgia and had returned to pickleball and light jogging at the time of her discharge from PT. She reported mild hesitancy with planting and cutting off her left leg and started using a personal trainer to continue progression of strength training. At the 1-year follow up the patient reported that she had returned to pickleball, golf, and other recreational activities without pain or limitations related to her left knee.

	August 2018 – post TKA	October 2018 – initial DC from PT	November 2018 – return to PT	February 2019 – prior to arthroscopy	February 2019 – post arthroscopy	March 2019 – PT progress report	March 2019 – PT discharge
Knee AROM (extension-flexion)	-20-88	0-130	-6-110	0-114	-1-91	-1-122	-1-131
Lower Extremity Functional Scale (LEFS)	12/80	56/80	52/80	37/80	15/80	48/80	71/80
Numeric Pain Rating Scale (NPRS)	9/10	0/10	9/10	7/10	3/10	1/10	0/10

Table 1. ROM, LEFS, and NPRS scores

**Discussion:**

There is limited research on the topic of popliteal dysfunction following TKA, and what little research is present is outdated. Several authors agree that the popliteus tendon can be a source of pain following TKA as the tendon snaps over the lateral femoral condyle.<sup>2,3,11,12</sup> There are conflicting opinions on the role of the popliteus after TKA. However, one study noted no difference in knee stability in patients whose popliteus tendons were left intact or resected during TKA.<sup>12</sup>

With the rates of total knee arthroplasties rising annually and the high percentage of dissatisfied patients following this surgery, it is important to understand potential causes and patterns which may be limiting progress in rehab after surgery. In this case, the patient initially

made great progress in both her range of motion and pain levels and was discharged to a home exercise program after 6 weeks. In many patients, this timeline is normal, and many can return to recreational activities in this timeframe or sooner, depending on their pre-operative status. However, when pain persists or returns and leads to moderate to severe limitations in range of motion and pain, we must be able to identify potential sources of this pain and either treat or refer to the operating surgeon with our suspicions. As this patient said, "Recovery went well, but at the 3–4-month period my knee was having serious issues." In this case, the location of pain at the posterolateral knee, local tenderness to the popliteus, pain and clicking/popping with knee flexion, and the severe decline in motion and function were all signs to refer this patient for another opinion.

Fortunately, this patient was referred by her operating surgeon and the subsequent arthroscopy led to abolishment of her symptoms. The patient stated, "surgery went very well and had almost immediate positive results. The searing pain was gone and had no more buckling of my knee." With guided rehabilitation she returned to her prior level of function and beyond. It has been nearly 18 months since this patient's discharge from PT and she has reported no return in symptoms and ability to perform all daily functional activities along with several recreational activities, which require rotational and lateral movements of the knee.

#### **Limitations:**

The patient was initially seen at another location for physical therapy services following initial TKA and some of the information provided in this case study are based on the documentation and patient reports from those treatment sessions. Due to the retrospective nature of this study, timeliness of the objective data collection and patient follow-ups were limited and not formalized.

#### **Learning Points:**

- There are a variety of potential complications that may lead to negative outcomes following TKA.
- Do not ignore pain location and presentation following joint replacement or other surgery.
- Musculoskeletal dysfunctions may still be at fault and masked by surgical pain and side effects.
- Negative outcomes following TKA are all too common and providing clinicians with the knowledge and skills to recognize some of the causes of these outcomes is vital.

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