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## Case Report

# A rare case of chronic pain and atraumatic inability to flex the knee: Evidence of a unilateral accessory popliteus muscle <sup>☆</sup>

Roberto Calbi, MD<sup>a</sup>, Nicola Maggioletti, PhD, MD<sup>c</sup>, Angela Daniela Sgobba, MD<sup>b,\*</sup>,  
Nicola Maria Lucarelli, MD<sup>b</sup>, Federico Cofone, MD<sup>b</sup>, Amato Antonio Stabile Ianora, MD<sup>b</sup>

<sup>a</sup>Radiology Unit, Ente Ecclesiastico Ospedale Generale Regionale "F. Miulli", Acquaviva delle Fonti (BA) Italy

<sup>b</sup>Interdisciplinary Department of Medicine, Section of Diagnostic Imaging, University of Bari Medical School, 70124 Bari, Italy

<sup>c</sup>Interdisciplinary Department of Medicine, neuroscience and sense organs, Section of Radiodiagnostic, DSMBNOS, University "Aldo Moro", Bari, Italy

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### ABSTRACT

The literature describes a few case reports of bilateral accessory popliteus muscle, a rare variant of the popliteus muscle. We report a case of a 24-year-old male patient with acute pain and inability to flex the left knee, without a traumatic event. Additionally, the patient reported mild sensitive symptoms in the left calf region and no pain in the right knee. The patient underwent a series of other examinations which culminated in a Magnetic Resonance Imaging (MRI) that showed an accessory popliteus muscle. The comparative study of the contralateral knee showed no evidence of this anatomic variant.

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## Introduction

The popliteal fossa is a diamond-shaped anatomical cavity located posterior to the knee joint and encompasses nerves and vessels that are important for the function of the lower extremity. These include the 2 terminal branches of the sciatic nerve, the popliteal vessels and the short saphenous vein. Several muscles of the thigh and leg form the anatomic bound-

aries of the popliteal fossa. These include the semimembranosus, semitendinosus, biceps femoris, gastrocnemius, and popliteus muscles.

The popliteus muscle originates from the lateral surface of the lateral condyle of the femur its fibers pass downward and medially. It inserts onto the posterior surface of tibia, above the soleal line. The muscle arises within the capsule of knee joint and its tendon separates the lateral meniscus from the lateral ligament of the joint [2]. Its muscular fibers originate from the medial side just posterior to the medial lateral lig-

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\* Corresponding author.

E-mail address: [daniela.sgobba92@gmail.com](mailto:daniela.sgobba92@gmail.com) (A.D. Sgobba).

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**Fig. 1 – Magnetic Resonance (MRI) of the left knee. Axial TSE T1-weighted (w) image (a) and axial TSE T2-w (b) MRI images, demonstrate the accessory popliteus muscle (arrow).**

ament and the semimembranous tendon to which the fibers are strictly connected. These fibers end in a complex aponeurotic structure that we divide here into 3 sections (capsular, meniscal, fibular) and in a strong tendon. The aponeurotic structure is very important, and knowledge about it allows us to understand the original function of the popliteus muscle. The popliteus muscle is supplied by the tibial nerve, from spinal roots L5 and S1.

This muscle plays an important role in the coordinating gait by initiating flexion of the fully extended knee and is the main stabilizer of the dorsal knee region.

## Case report

A 24-year-old male patient presented with an episode of acute pain in the left knee and inability to flex it. His history was significant for the lack of any triggers, including a traumatic event. He underwent an MRI scan (Philips 1.5 T) that demonstrated an accessory popliteus muscle (Figs. 1–3) in addition to the absence of popliteomeniscal fascicules (PMFs) pathology [1].

The clinical examination did not reveal any evidence of a palpable lesion in the popliteal fossa.

An ultrasound with Doppler revealed patent popliteal vessels without any evidence of thrombosis or flow abnormalities; in addition to normal structural muscles lacking evidence of injury.

An electroneurography examination of the posterior tibial, peroneal, and sural nerves was performed and it showed normal latency, amplitude and conduction velocities of the nerves. These findings excluded a painful compressive neuropathy as a probable cause of symptoms.

Furthermore, the patient underwent a lumbar MRI which revealed no pathologic causes for the symptoms such as nerve root compression, masses, spinal cord compression or disc herniations.

The needle examination was also normal in left gastrocnemius, which is the most important muscle innervated by posterior tibial nerve.

T2 TSE sequences in axial and sagittal planes, T1 TSE in axial plane and gradient T2 ECHO in coronal plane of the knee were obtained.

The clinical suspicion of meniscal or cartilaginous lesions was excluded and the analysis of the muscular structures of the popliteal fossa showed the presence of an accessory popliteal muscle.

This extra muscle has origin immediately close the lateral gastrocnemius muscle from the top of lateral condyle and continues, in deep popliteal fossa, towards the medial femorotibial compartment and it inserts at the level of the posteromedial articular capsule.

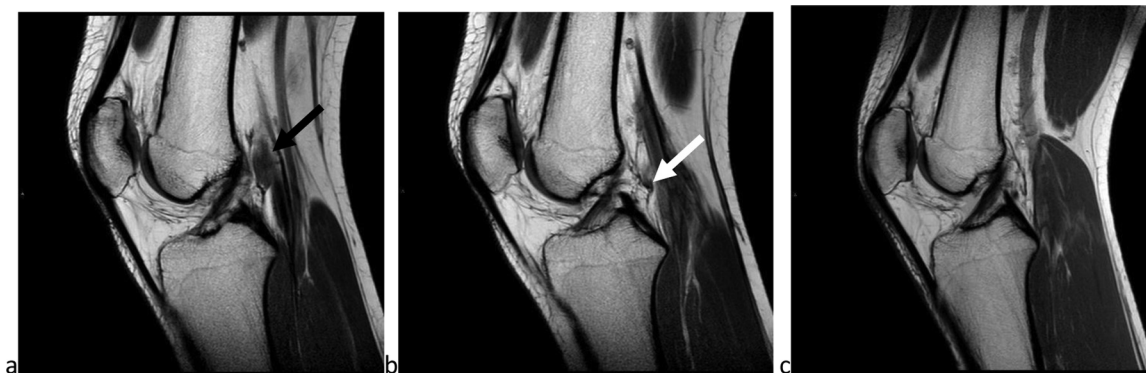
An additional MRI examination of the contralateral knee revealed no accessory popliteal muscle in the right knee (Fig.2c).

## Discussion

Over the years, the radiologic presence of accessory muscles in various parts of the body was described. In most cases these findings were incidental in patients lacking clinical symptoms.

More specifically, at the level of the popliteal fossa, accessory slips of the medial and lateral heads of the gastrocnemius muscle, as well as the tensor fasciae suralis muscle, and the accessory semimembranosus muscle may rarely occur.

Reports in the literature have shown that abnormal origins and accessory slips of the medial or lateral heads of the gastrocnemius may cause entrapment of the popliteal artery [2] and, rarely, the 3rd head of the gastrocnemius and can be associated with nerve entrapment causing severe knee pain [4].



**Fig. 2 – MRI of the left knee. Sagittal TSE T2w images at 2 different level lateral (a) and more medial (b) demonstrate the accessory popliteus muscle (black arrow) with course in the deep popliteal fossa and its insertion (white arrow) at the level of the posteromedial articular capsule. (c)MRI of the right knee. Sagittal TSE T2w image of the controlateral side shows no evidence of accessory popliteus muscle.**



**Fig. 3 – MRI of the left knee. Coronal Gradient Echo T2-w image, demonstrates the accessory popliteus muscle (arrow) originating from the medial side of the lateral head of the gastrocnemius muscle. Note its similar inferomedial course of the normal popliteus muscle (black circle).**

In our case the accessory popliteus has a common origin with the lateral head of the gastrocnemius, courses anterior to the popliteal vessels, and inserts on the posteromedial knee joint capsule [3].

An accessory muscle termed the accessory popliteus has also been described in the radiology literature. The authors postulated that the proximity of the muscle to the neurovascular bundle might result in compressive symptoms [5].

However, no direct evidence linking its presence of the development of knee pain has been described to our knowledge.

In most cases the patient has no symptoms, and the diagnosis is purely casual and concomitant with a different knee pathology with various non-specific symptoms. For this reason, we studied the VC (Velocity conduction) and the muscular responses of the most important nerves of the leg, to evaluate paresthesia-like and pain symptoms.

The results of the electromyographic and electroneurographic examination did not identify nerve abnormalities and the echo color doppler examination excluded compression of the popliteal artery.

Given all the normal vascular, muscular, and nerve findings, the cause of the left knee pain was attributed to the presence of the accessory popliteus muscle and the patient was sent to the attention of the orthopedic surgeon.

Finally, reports have described the presence of bilateral accessory popliteal muscle in the same patient with an identical proximal and distal insertion and course in the popliteal fossa [5]. As such, an additional MR examination of the contralateral knee was performed and the exam revealed the absence of the accessory popliteus muscle in the contralateral knee, demonstrating that in our patient, this was a unilateral finding.

Taken together, this case report describes the presence of a unilateral accessory popliteal muscle which can present as an acute symptomatic knee pain and limit its range. This should be considered on the differential diagnosis of patients presenting with acute knee pain after the common causes are ruled out.

### Author Contributions

Conceptualization, R.C. and A.D.S.; methodology, R.C. N.M.L., and F.C.; validation R.C., N.M. and A.A.S.I.; formal analysis, A.D.S.; resources A.A.S.I.; data curation R.C. N.M.L., and F.C.;

writing-original draft preparation R.C.; writing-review and editing A.D.S. and N.M.; supervision, A.A.S.I and N.M.; All authors have read and agreed to the published version of the manuscript.

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### Institutional Review Board Statement

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### Informed Consent Statement

Informed consent was obtained from all subjects involved in this case report.

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### Data Availability Statement

The authors confirm that the data supporting the findings of this case report are available within the article and its references list.

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