

# Clinically important variations in the lower limb - A case report

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## SUMMARY

In this paper, three variations in the lower limb are reported and their clinical importance is discussed. The variations reported include a duplication of the piriformis muscle, the tibial nerve being pierced by the tendon of the plantaris and an additional muscle in the peroneal compartment of the leg.

**Key words:** Variations – Tibial nerve – Plantaris – Piriformis muscle

## INTRODUCTION

Variations exist in several structures of the lower limb. Some of them are functionally insignificant but because of their clinical importance none of them should be ignored. The piriformis muscle is a short lateral rotator of the hip. It originates from the pelvic surface of the middle three pieces of the sacrum, passes out of the greater sciatic foramen, and is inserted at the apex of the greater trochanter. The variations of the piriformis have been documented in anatomy textbooks. The most frequent variation is the division of the muscle into two parts (Arifoglu et al., 1997). This is usually associated with a high division of the sciatic nerve, with the peroneal portion of the sciatic emerging between the two parts. The muscle is rarely divided by the tibial division of the sciatic nerve or by the entire sci-

atic nerve. The cleavage generally affects only the muscle belly, although it may involve the entire muscle (Anson, 1966). Variations in the origin and branches of the tibial nerve are rare. One such variation is its high origin, previously described in the literature (Babinski, 2003).

Gruber (1884) found the peroneus quartus muscle to be present in about 13% of cadavers. The muscle arose from the posterior intermuscular septum and inserted in the fibular aspect of the calcaneus.

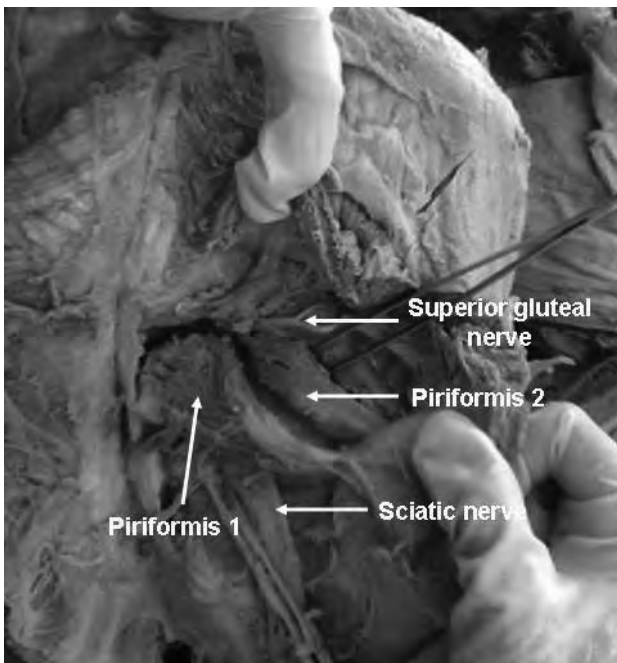
## CASE REPORT

During routine dissections by medical undergraduates, anatomical variations were found in the gluteal region and leg of a male cadaver aged approximately 55 years. The variations were seen in the right limb and were unilateral. In the gluteal region, the piriformis muscle had a duplication of its bellies, which had separate origins and insertions (Fig. 1). Both the heads originated from the border and the inner surface of the greater sciatic notch. The origin from the middle three pieces of the sacrum was missing. Insertion of the upper head was at the apex of the greater trochanter and the insertion of the lower head was on the posterior border of the greater trochanter. Both heads derived their nerve supply from the sacral ventral rami (S1, S2). The superior gluteal nerve and vessels passed between the two heads, coursed superfi-

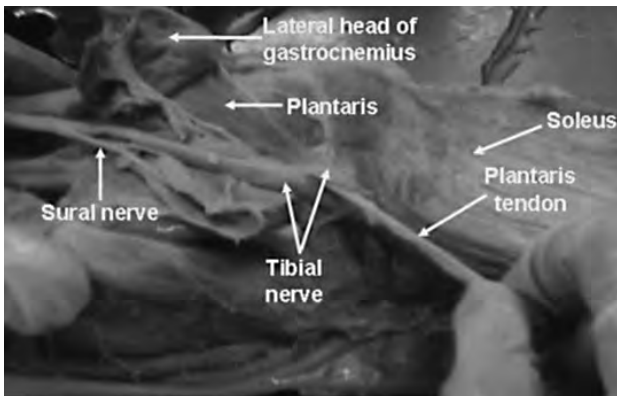
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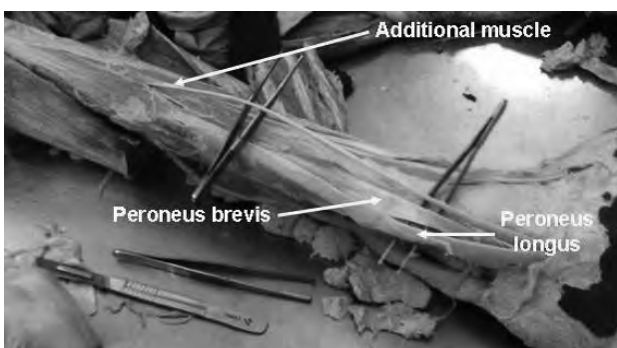
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**Fig. 1.-** Dissection of the gluteal region showing a duplication of the piriformis muscle.



**Fig. 2.-** Dissection of the popliteal fossa showing the tibial nerve pierced by the tendon of the plantaris muscle.



**Fig. 3.-** Dissection of the lateral compartment of the leg showing the additional muscle.

cial to the upper head and entered the gluteus medius muscle. The sciatic nerve, inferior gluteal nerve and vessels, and posterior cutaneous nerve of the thigh passed below the lower head.

In the posterior compartment of the leg, the tibial nerve had a normal origin from the sciatic nerve, at the upper angle of the popliteal fossa, but along its course it was pierced by the tendon of the plantaris muscle (Fig. 2). The nerve then passed through the soleus muscle instead of passing deep into the soleal arch. The nerve exited the soleus and coursed normally in the lower half of the leg. The additional muscle found in the peroneal compartment (Fig. 3) took its origin from the posterior surface of the head of the fibula. This muscle had a very short fleshy belly and a long tendon. The tendon passed down with the tendons of the peroneus longus and brevis muscles and became inserted in the head of the 5<sup>th</sup> metatarsal bone. This additional muscle was innervated by a branch of the superficial peroneal nerve.

#### DISCUSSION

A duplication of the piriformis muscle has been reported (Anson, 1966). Such duplications are usually associated with a high division of the sciatic nerve, the peroneal portion passing between the two heads (Kirici and Ozan, 1999; Arifoglu et al., 1997). The superior gluteal nerve and vessels passing between the two heads may become compressed if the muscle hypertrophies. Diop et al. (2002) have reported a case of superior gluteal nerve entrapment in the suprapiriformis foramen.

Peripheral nerve entrapment syndromes of the tibial nerve have been reported previously (Lau and Stavrou, 2004; Oh and Meyer, 1999), but no cases of the tibial nerve being pierced by the tendon of the plantaris muscle have been reported. This variation would be of interest for the surgeons who perform tendon transplants because this tendon might compress the nerve or might pull the nerve during plantaris contraction. The tibial nerve passing through the soleus is also of interest. Hypertrophy of the soleus might compress the tibial nerve and the symptoms could mimic tarsal tunnel syndrome.

A duplication of the tendons of the peroneal muscles has been reported. An additional muscle, the peroneus quartus has been reported (Donley and Leyes, 2001; Zammit and Singh, 2003). Such an additional muscle is reported to cause chronic lateral ankle pain. The additional muscle arising from the head of the fibula, in the peroneal compartment of the leg, has not been reported hitherto. The muscle might not be of much functional importance, but the long ten-

don of this muscle could be used in tendon transplants without causing any functional disturbance in the compartment.

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