10.5005/jp-journals-10070-0023

CASE REPORT

Peroneus Quartus Muscle: Revisited

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ABSTRACT

The peroneus quartus (PQ), a supernumerary muscle of the ankle is located in the lateral compartment of the leg. Its most common origin is from the peroneus brevis muscle and insertion into the retrotrochlear eminence of the calcaneus. We observed an unusual variant of the muscle arising from the lateral surface of fibula between the two peroneal muscles. The tendons were crowded beneath an overhanging lateral malleolus. The muscle was found to be inserted onto the peroneal trochlea. The presence of this muscle has been the cause of lateral ankle pain and swelling. It has been implicated in tears and subluxation of peroneus brevis and tenosynovitis of peroneal tendons

Keywords: Lateral compartment leg, Peroneal muscles, Peroneus quartus, Peroneal trochlea.

How to cite this article: Jha R, Rustagi SM, Ahuja MS, Kumar T. Peroneus Quartus muscle: Revisited. J Med Acad, 2018;1(2):111-113.

Source of support: Nil

Conflict of interest: None

INTRODUCTION

The PQ muscle is an accessory peroneal muscle in the lateral compartment of the leg. One of the earliest authors to report it was Hecker in 1923 who documented it in 13% of the population. Its occurrence has been reported only in humans.[1] The development of upright posture in man has probably led to its appearance. It plays a role in eversion of the foot, pronation of the foot against the walking surface, and lateral stabilization of the ankle.[2]

This muscle is of clinical interest to orthopedicians as well as to anatomical experts. The peroneus longus and peroneus brevis are the two muscles which make the lateral compartment of the leg. This compartment continues as the superior peroneal tunnel roofed by the superior peroneal retinaculum. The retromalleolar groove of the fibula and posterior intermuscular septum of leg form the base of this tunnel. The tendons of peroneus longus and brevis are the main contents of this tunnel. Additional fibers/tendons of PQ when present cause overcrowding of this tunnel and may cause tearing of the superior peroneal retinaculum.[3,4] PQ has also been implicated in pain in ankle, subluxation, and tenosynovitis of peroneal tendons, symptomatic hypertrophy of the retrotrochlear eminence and peroneal tears.[5-7]

We have observed a rare case of this accessory muscle with an unusual origin in between the two peroneal muscles of the lateral compartment and insertion at the peroneal eminence.

MATERIALS AND METHODS

The case was observed during routine dissection classes of the undergraduate students in the right lower limb of a male cadaver aged 62 years. As the lateral compartment was exposed after removing the skin of the leg on the lateral aspect, and clearing the deep fascia from the muscles of the lateral compartment of the leg, an accessory muscle was seen to arise in between the two peroneal muscles (Fig. 1). This muscle was arising from the superior third of lateral aspect of the shaft of the fibula. After a short belly of 5 cm, it tapered to a thin, flat tendon which traversed on the peroneus brevis tendon adjacent to the thick fleshy tendon of peroneus longus (Fig. 2).

In the lower part of the leg, the tendon was seen to run between the tendon of peroneus brevis above and the peroneus longus below. The lateral malleolus was very prominent and overhanging the tendons. The three tendons crowded beneath the lateral malleolus (Fig. 3). Distal to the lateral malleolus three tendons were observed wherein the topmost tendon was seen inserting

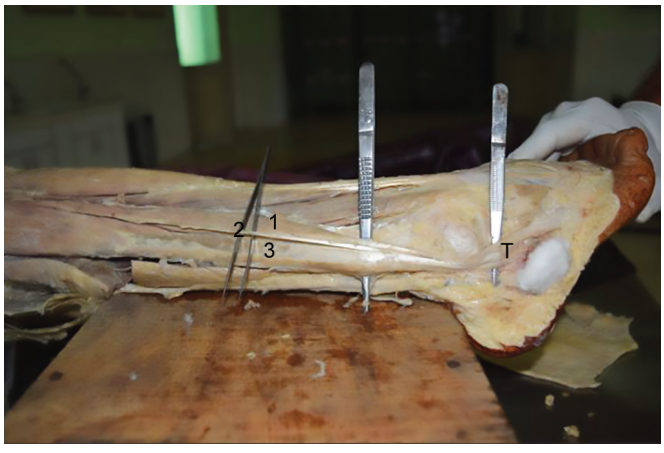

Fig 1: Right leg lateral aspect showing 1–Peroneus brevis, 3–Peroneus longus and 2–Extramuscle in lateral compartment; T–Tendons emerging beneath lateral malleolus

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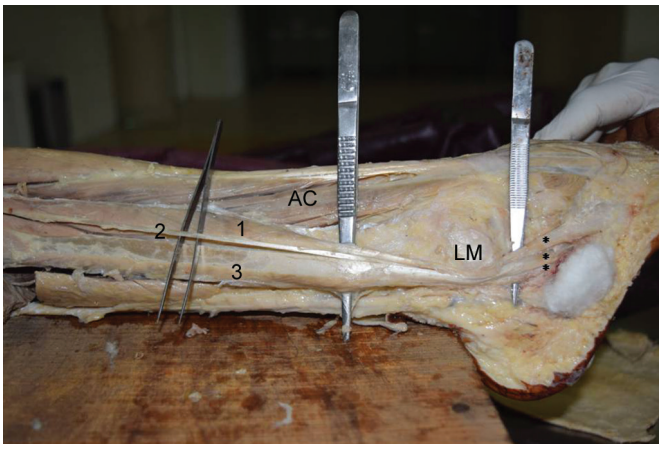

Fig. 2: Right leg lateral aspect showing AC muscles of anterior compartment, LM, Lateral malleolus, 1–Peroneus brevis, 3–Peroneus longus and 2–Extramuscle in lateral compartment, *Tendons emerging beneath lateral malleolus

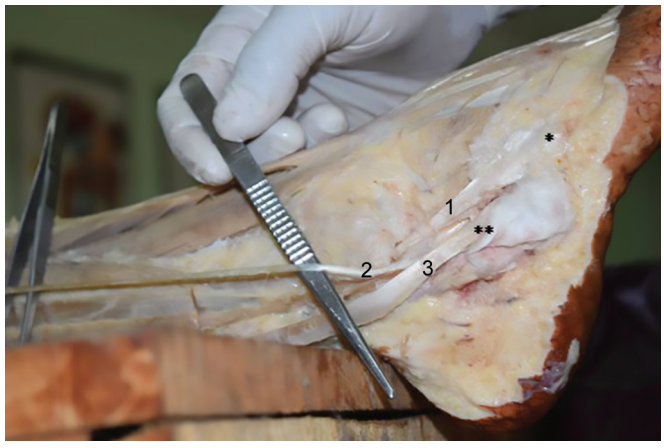

Fig. 3 : Right leg lateral aspect showing 1–Peroneus brevis insertion on *Fifth metatarsal, 3–Peroneus longus tendon **entering sole of Foot, 2–Peroneus quartus whose insertion is obscured by peroneus longus tendon

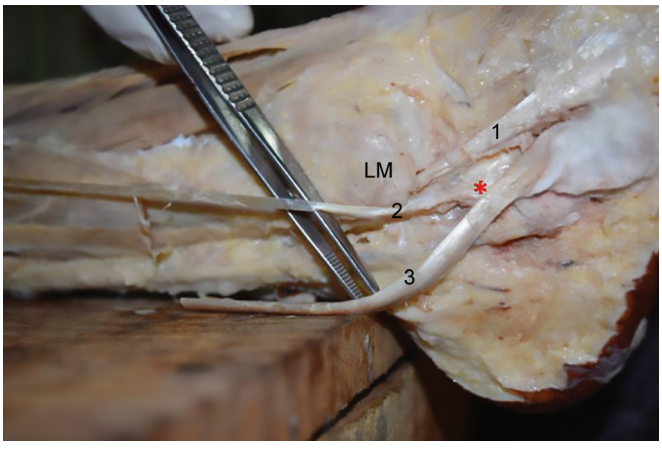

Fig 4: Right leg lateral aspect showing insertion of 2–Peroneus quartus on *Peroneal trochlea, 1–Peroneus brevis ,3–Peroneus longus, LM, Lateral malleolus

into the fifth metatarsal, middle one into the peroneal trochlea and the lower one entering into the foot deep to the cuboid. The tendon of peroneus longus was severed in the distal part of the leg to reveal that this accessory muscle was the one inserting into the elevation on the lateral surface of calcaneum, i.e. the peroneal trochlea (Fig. 4).

DISCUSSION

Peroneus quartus muscle is an accessory muscle of the of the leg situated in the lateral compartment. This accessory muscle of the peroneal compartment have been given various names—Peroneus quartus by Otto, Peroneus calcaneum externum by Hecker[1] peroneus accessories by White[7] and peroneus digiti quinti by Testut.

However, this terminology was simplified by the definition of a peroneus quartus muscle as a muscle taking origin from the lateral aspect of the leg and inserting onto the lateral side of the foot.

White et al. has documented that Otto in 1816 first described peroneus quartus–"the muscle originated from the external surface of the lower third of fibula and continues as a very thin tendon up to the external surface of the calcaneus.[7]

Hecker observed the occurrence of the muscle in 13% in the general population.[1] However, Sobel et al. found an incidence of 21.7% in the cases observed by them.[6] In variance to this, Zammit and Singh reported an incidence of 6.6% in their cadaveric and MRI study of the muscle.[8]

Sobel et al. found the peroneus quartus muscle to arise from the distal third of the leg from the peroneus brevis itself in 63% of cases.[6] Biligili et al. found have observed that in most of the cases the muscle has an origin from the peroneus brevis. Further, they found the presence of peroneus quartus in those cases where the peroneus brevis was less developed.[9]

Similar to Sobel et al. Zammit and Singh also observed the muscle to arise from the peroneus brevis muscle. They found that it could arise from the peroneus longus also.[6,8] However, we found the origin of the muscle from the proximal third of leg in between the origins of peroneus longus and brevis which has not been reported in accessible literature.

The peroneus quartus has exhibited various sites of insertion, the most common being at the peroneal tubercle of the calcaneum. Zammit and Singh found the most common site as the retocochlear eminence- 50% of dissections and 83% of magnetic resonance imaging examinations. Sobel et al. have reported that in 63% of cases the muscle inserted at the peroneal tubercle of the calcaneus.[6] Zammit and Singh also noted that at insertion the peroneal tubercle was raised by 4 mm.[8] It was a palpable structure, and the findings are in concurrence with this most common insertion observed. The peroneus quartus has been described

to insert at peroneus brevis and peroneus longus just distal to fibular groove. It was even reported to have been inserted into the cuboid by Zammit and Singh.

The mere presence of peroneus quartus muscle is not known to cause any symptoms.[5] Occasionally, however, it can congest the space in the retromalleolar groove, predisposing to lateral ankle pain and swelling in athletes. The tendon of peroneus brevis can weaken, show longitudinal tearing and displace in position.[9]

Apart from the anatomical interest, orthopedicians and radiologists need to know of its existence and involvement in pathological conditions. Moreover, it can be used in reconstructive surgeries to fix peroneal tendons. The malleolar groove was restructured, and the peroneal tendons were repaired in a patient with recurrent peroneal dislocation using the peroneus quartus.[10]

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