Original article:

Observational study of muscular pattern variations on the dorsum of the foot

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Abstract:

Introduction: Peroneus tertiu is most of times appears to be part of extensor digitorum longus, and might be described as its 'fifth tendon'. The muscle fibres operating on this tendon arise from the distal third or more of the medial surface of the fibula, the adjoining anterior surface of the interosseous membrane, and the anterior crural intermuscular septum.

Methodology and results : During in our routine dissection, we observed that the peroneus tertius was absent on the dorsum of the left lower limb of a 62 years old and same in only 3 cadavers during last 3 years. The absence of the peroneus tertius is very rare and not found in literature.

Conclusion : The absent peroneus tertius is an interesting finding, which could be clinically important for Anatomists, Anthropologists, Surgeons and Orthopedic surgeons.

Keywords: Peroneus Tertius, Extensor Digitorum Longus, Dorsiflexion

Introduction:

The peroneus muscles (also called fibularis muscles or peroneals or peronæus) are a group of muscles in the leg. While the muscle group exists in many variations, it is normally composed of three muscles: peroneus longus, brevis and tertius. The peroneus muscles all originate from the fibula and insert onto the metatarsals.(1,2)

The peroneus longus and brevis are much more similar to each other than they are to the peroneus tertius. The longus and brevis are both located in the lateral compartment of the leg, supplied by the fibular artery and innervated by the superficial fibular nerve, while the tertius in located in the anterior compartment, supplied by the anterior tibial artery and innervated by the deep fibular nerve.(3) Another difference between the longus, brevis and tertius is that while they all evert the foot; the peroneus longus and brevisplantarflex the foot, while the peroneus tertius dorsiflexes it.. Although closely associated with the extensor digitorum longus, the peroneus tertius has been considered the migrated part of the extensor digitorum brevis of the little toe (**4, 5**). Foot surgeons might use the peroneus tertius muscle flap for transposition and also for correcting any laxity in the ankle joint (**6,7**)

Materials & Methods:

The present study was done in our department over the last 3 years duration. The procedure was carried out during our routine dissection.

Exposure of the dorsum of the foot was achieved following classical incisions and dissection procedures in the department of Anatomy .

All the extensor tendons on the dorsum of the foot

were dissected meticulously. The tendon of extensor digitorum longus going to the little toe was also observed carefully to note any thickening. The lower part of the medial surface of the fibula was also dissected properly. The photographs of the dorsum of the foot were taken for proper documentation and for ready reference.

Observations:

All the extensor tendons on the dorsum of the foot were observed. All the tendons of the extensor digitorum longus were observed. There was no thickening seen on the tendon of extensor digitorum longus going to the little toe. There was no signs of any muscle fibres arising from the lower part of the medial surface of the shaft of the fibula. There was no evidence of presence of peroneus tertius on the dorsum of the left foot. During in our routine dissection, we observed that the peroneus tertius was absent on the dorsum of the left lower limb of a 62 years old and same in only 3 cadavers during last 3 years. The absence of the peroneus tertius is very rare and not found in literature.

Discussion:

The muscle arises from the lower third of the anterior surface of the fibula (anterior compartment of lower leg); from the lower part of the interosseous membrane; and from an intermuscular septum between it and the peroneus brevis muscle. The septum is sometimes called the intermuscular septum of Otto.(3,4)

The tendon, after passing under the superior extensor retinaculum of foot and inferior extensor retinaculum of foot in the same canal as the extensor digitorum longus, is inserted into the dorsal surface of the base of the metatarsal bone of the fifth digit.(8)

It is innervated by the deep fibular nerve, unlike the other peroneal muscles which are innervated by the superficial fibular nerve, since the peroneus tertius is a member of the anterior compartment.

Its action is that of weak dorsiflexion of the ankle joint and to evert the foot at the ankle joint.

This muscle is seldom found in other primates, a fact that has linked its function to efficient terrestrial bipedalism.

The peroneus tertius tendon can be used for transplant surgeries. In foot drop, the tibialis posterior tendon manipulation might be required. There are past reports of the tibialis posterior tendon being transferred to the anterior compartment and anastomosed to the peroneus tertius tendon (**1**). The peroneus tertius causes dorsiflexion and eversion of the foot during the swing phase of gait and it is important that the toes be lifted from the ground to assist in bipedal walking (**4**). The attachment of the peroneus tertius to the fifth metatarsal might define its role in providing proper support to the outer aspect of the sole of the foot. We, as anatomists believe that in the absence of the peroneus tertius as seen in the present study, the support along the lateral border would be weakened. It should not be forgotten that both Jones' fractures and stress fractures involve the proximal fifth metatarsal and the insertion of the peroneus tertius might play an important role in imposing torsional stress (**5**).

Conclusion:

The peroneus tertius may be considered as an accessory muscle for eversion and dorsiflexion.

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