

## Case Report: Variation in Pattern of Insertion of Peroneus Brevis and Peroneus Tertius in Middle Aged Male Cadaver

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### Abstract:

Variations in insertion pattern of different tendon of dorsum of foot are not very common. Bifurcation of tendon of peroneus brevis and peroneus tertius was reported by some authors recently. In my present study we found that tendon of peroneus brevis was inserting on the base of fifth metatarsal and some part of the tendon is extending distally and ultimately inserted over the base of proximal phalanx of little toe. In the same cadaver we also found that some of tendon of extensor digitorum longus are joining the tendon of peroneus tertius and peroneus tertius is inserted over the lateral surface of shaft of fifth metatarsal. These variations are very important for anatomist, anthropologist, surgeons, orthopedicians and sports medicine clinicians. The elongated tendons can be used for reconstructive surgery of tendons and retinacula in cases of trauma.

**Keywords:** Peroneus brevis, Peroneus tertius, Tendons, Metatarsal.

### I. Introduction

Lateral compartment of leg contains only two muscles that is Peroneus (Fibularis) longus and Peroneus brevis. Peroneus brevis arises from lower two third of lateral surface of fibula and anterior and posterior intermuscular septum(1). Muscle fibres pass vertically downward and end in tendon which runs behind lateral malleolus within synovial sheath. Then it runs forward on lateral side of the calcaneus above the calcaneal tubercle. Then it is inserted on the tuberosity at the base of fifth metatarsal on its lateral side. It is innervated by superficial peroneal nerve and its chief action is eversion of foot. It also prevent excessive inversion of foot and protects the lateral ligaments of ankle joint.

Peroneus tertius lie in anterior compartment of leg. It is also known as fifth tendon of extensor digitorum longus. Peroneus tertius arises from the lower one third of the anterior surface of the fibula and from interosseous membrane. It is inserted over the medial surface of base of fifth metatarsal. It is innervated by deep peroneal nerve and helps in dorsiflexion and eversion of foot. This muscle is seldom found in other primates, a fact that linked its function to efficient terrestrial bipedalism (1, 2, 3).

### Case Report

Variations in the musculature of lateral compartment of leg are very rare. In present study during our routine dissection class of first year of MBBS in AIIMS, Patna we found that the origin or proximal attachment of peroneus brevis was normal and its insertion was unique. The tendon of peroneus brevis was inserted over lateral surface of base of fifth metatarsal and some of its part became elongated and got inserted over the lateral surface of the base of the proximal phalanx of the little toe. In the same cadaver we found that some part of the tendon of extensor digitorum longus was joining the tendon of peroneus tertius. Unique finding which we found that peroneus tertius inserted over the lateral surface of shaft of the fifth metatarsal instead of base of fifth metatarsal which is a rare.

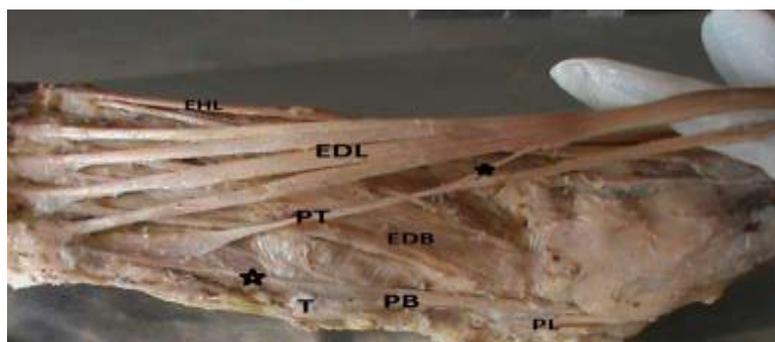


Figure 1:

Lateral view of dorsum of left foot showing tendons of EDL, EHL, PL, PB, PT and EDB

Big star mark shows elongated tendon of PB

Small star shows communicating tendon between EDL and PT

EDL: Extensor Digitorum Longus

EHL: Extensor Hallucis Longus

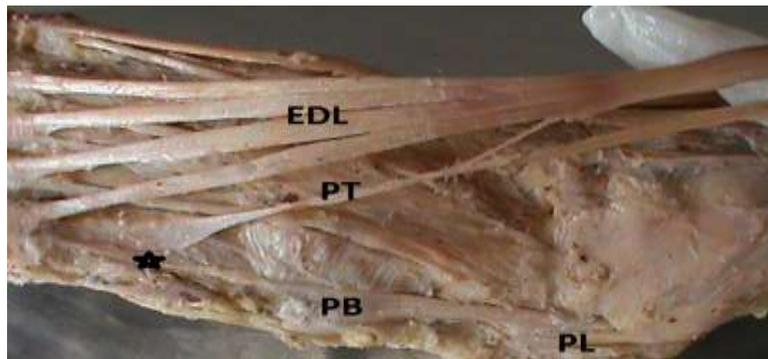
EDB: Extensor Digitorum Brevis

PL: Peroneus Longus

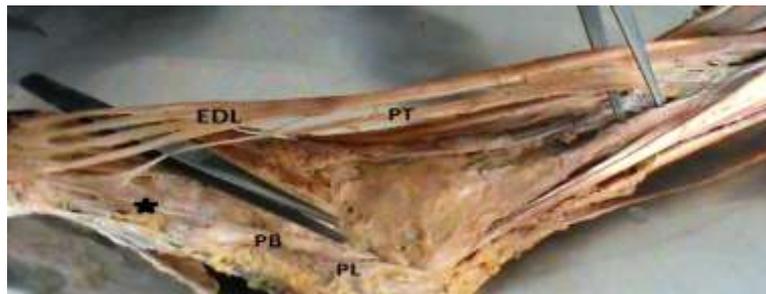
PB: Peroneus Brevis

PT: Peroneus Tertius

T: Tuberosity of base of fifth metatarsal



**Figure 2:** Lateral view of dorsum of left foot showing same features as above



**Figure 3:** Lateral view of lower part of leg and foot showing distal attachment of PT and elongated tendon of peroneus brevis

## II. Discussion

Variations in morphology of musculature of lower limb are very uncommon but we have to be aware of the anatomical variations which we encounter and it is very essential for the orthopedicians and sports medicine clinicians for the diagnosis and treatment. Bhargava et al (1961) listed origin and insertion of the muscles of the lateral compartment of leg after dissection of 100 Indian cadavers. They found variations in origin and insertion of peroneus longus, Peroneus brevis and Peroneus tertius. They also found the additional slips of insertion of peroneus brevis which got inserted over head of fifth metatarsal, middle or distal phalanx of little toe. It may have a slip joining it to peroneus longus (Bergman et al 2011).

Sometimes peroneus brevis can be fused with peroneus longus (Borley et al 2008). Distal attachment of Peroneus brevis can be to the fourth metatarsal rather than fifth (Borley et al 2008). White et al (1974) noted an accessory peroneus muscle which was originated from the peroneus brevis muscle. Poonam verma et al (2011) studied over thirty cadavers and in one cadaver they found bifurcation of tendon of peroneus brevis. Out of two slips one slip inserted on base of fifth metatarsal on its lateral side and the other on its medial side of same metatarsal. Reconstructive procedures of superior peroneal retinaculum can be done by using a portion of peroneus brevis tendon in anterolateral subluxation of peroneus tendons which occurs most frequently in Skiers (Stein 1987). The knowledge of variations of tendon of peroneus brevis is also important because of their role in ankle pain and instability cases (Taser et al 2009). The management of chronic Achilles tendon tear by less invasive peroneus brevis repair is technically demanding these days (Maffulli 2011).

The muscles are still in an evolutionary stage. Frequent variations in mode of origin and insertion indicate that they have yet to attain their final evolutionary stage (Bhargava et al 1961). Peroneus brevis tendons on insertion attached to proximal or middle phalanx represent a tendency to develop peroneus digitiquinti, a muscle present in monkey (Jones FW 1962).

Dr. Sharad kumar P.S. et al (2012) has reported a rare finding of absence of peroneus tertius which is not mentioned in literature. Dr. Santosh dixit (2013) reported the rare bilateral dual tendinous insertion of peroneus tertius. Tendon of peroneus tertius bifurcated into two slips, one part of it inserted on the base of fifth metatarsal and other part inserted into the shaft of the fifth metatarsal bone. The pull of the peroneus tertius may be responsible for causing stress on fifth metatarsal and can lead to stress fracture of it.

### III. Conclusion

In present study we noted that there was no variation in origin but we found variation in mode of insertion of peroneus brevis and peroneus tertius also. Elongated tendon of the peroneus brevis can be used in reconstructive repair of tendons and retinaculum on dorsum of foot. Peroneus tertius helps to clear the ground in the swing phase of walking and its distal attachment enhance its efficacy during its action. The disadvantage of its distal attachment is that it may lead to shaft fracture of fifth metatarsal in case of muscle pull.

### References

- [1]. Susan Standring, Gray's Anatomy, The Anatomical Basis of Clinical Practice, 40<sup>th</sup> Edition, Elsevier Churchill Livingstone, London, 2008, page no. 1419-1420.
- [2]. Keith L Moore, Clinical Oriented Anatomy, 6<sup>th</sup> Edition, Published by, Wolters Kluwer (India) Pvt. Ltd, New Delhi-2009, page no.-589
- [3]. Snell R.S., Clinical anatomy for medical students, 7<sup>th</sup> edition, Lippincott Williams & Wilkins, Baltimore, 2000, page no.-561-562
- [4]. Bergman RA, Afifi A, Miyauchi R 2011. Anatomy Atlases is a Digital Library of Anatomy Information. Illustrated Encyclopedia of Human Anatomic variation: Opus I: Muscular system: Alphabetical Listing of Muscles: P. Peroneus Brevis and Longus.
- [5]. Bhargava KN, Sanyal KP, Bhargava SN 1961. Lateral musculature of the leg as seen in hundred Indian Cadavers. Ind J Med Sci, 15:181-185.
- [6]. Borley NR, Healy JC, Collins P, Johnson D, Crossman AR, Mahadevan V et al. 2008. Leg. In: S Standring (Ed.): Grey's Anatomy, 40<sup>th</sup> Edition. New York: Churchill Livingstone Elsevier, P.1419-1420.
- [7]. Jones FW 1962, Anomalous peroneus tertius and extensor digitorum longus muscles. J. AnatSocInd, 10-11:36-38.
- [8]. Maffulli N, Spiezia F, Longo UG, Denaro V 2011. Less invasive reconstruction of chronic Achilles tendon ruptures using a peroneus brevis tendon transfer. Am Jol of Sports Med, 39: 2304-2312.
- [9]. Stein R 1987. Reconstruction of the superior peroneal retinaculum using a portion of the peroneus brevis tendon. J Bone and Joint Surg, 69:298-299.
- [10]. Verma P, Arora AK, Abrol S: Bifurcation of tendon of Peroneus brevis in human cadaver, J. Life sci,3(1): 13-15(2011).
- [11]. Sawant SKP, Shaikh ST, More R M: The muscular variation on the dorsum of foot observed during routine dissection in medical college Mumbai, India. Ijbm, Dec 2012, issue-5,vol-2,p-447-449.
- [12]. Dixit S: A rare bilateral dual tendinous insertion of the peroneus tertius; IAMJ, vol-1, issue-1, Jan-Feb 2013.