

## Bifurcation of Tendon of Peroneus Brevis in Human Cadavers: Case Study

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**ABSTRACT** Keeping in view the frequency of variations in morphology and nerve supply of musculature of the lower limb, the present study has been taken up. Under the research study of Peroneus brevis muscle in adult human cadavers of Punjab, the dissection of thirty cadavers (sixty limbs) was performed. The origin of this muscle from fibula and intermuscular septum and its insertion on the lateral aspect of base of fifth metatarsal was dissected. Two limbs were found to have the common tendon dividing in two slips near the insertion. One slip was inserted on lateral side of base of fifth metatarsal and the second on medial side of the same metatarsal. The present paper is for the interest for the disciples of orthopedics, radiology and sports medicine. The clinical significance of this muscle is that the reconstruction of superior peroneal retinaculum can be done by using a portion of Peroneus brevis. The accessory tendons can be used in cases of tendon rupture, besides the repair of main tendon, to increase the power. The clinicians and radiologists must be aware of anatomical alterations in this muscle which is must for diagnostic purpose. The knowledge of the variations will also help the surgeons to avoid post-operative complications.

### INTRODUCTION

Variations within the musculature of the lateral compartment of the leg are uncommon. However, clinicians and radiologists should be aware of anatomical alterations in this region when involved in diagnosis or imaging interpretation (Tubbs et al. 2008). The present study is a humble attempt to highlight the morphological description of an anomalous disposition of peroneus brevis tendons with clinical significance. Awareness of such anatomical variants is important to surgeons undertaking reconstructive procedures of superior peroneal retinaculum which can be done by using a portion of Peroneus brevis in anterolateral subluxation of peroneal tendons which occurs most frequently in skiers (Stein 1987). The knowledge of variation of the tendon of the peroneus brevis is also important because of the role of their variations in ankle pain and instability cases (Taser et al. 2009). The management of chronic Achilles tendon tears by a less-invasive peroneus brevis repair is technically demanding these days (Ma-

ffulli 2011). Human bipedalism is unique in that we stand and walk with trunk erect and knees almost straight. Another unusual feature is that we are plantigrade, setting down the whole length of the foot on ground. A few muscles because of process of evolution are either degenerating or appearing. Frequent variations seen in the mode of origin and insertion of the muscles indicate that they have yet to attain their final evolutionary stage (Bhargava et al. 1961). The muscle is still in an evolutionary stage and the tendon of insertion attached to the proximal or the intermediate phalanx of little toe represents tendencies to develop a Peroneus digiti quinti, a muscle present in the monkeys. Fibrous slip to fourth metatarsal like-wise manifests tendency to reproduce Peroneus digiti quarti, a muscle present in tarsius but absent in monkeys (Jones FW 1962).

### CASE REPORT

While exploring Peroneus brevis from its origin to the insertion, two limbs were found to have the common tendon dividing in two slips near the insertion. Out of two slips, one slip was inserted on lateral side of base of fifth metatarsal and second slip on medial side of the same metatarsal (Fig. 1). No variation in mode of origin of this muscle was found. The pattern of insertion of Peroneus brevis on tubercle on the lateral side of base of fifth metatarsal was found in rest of

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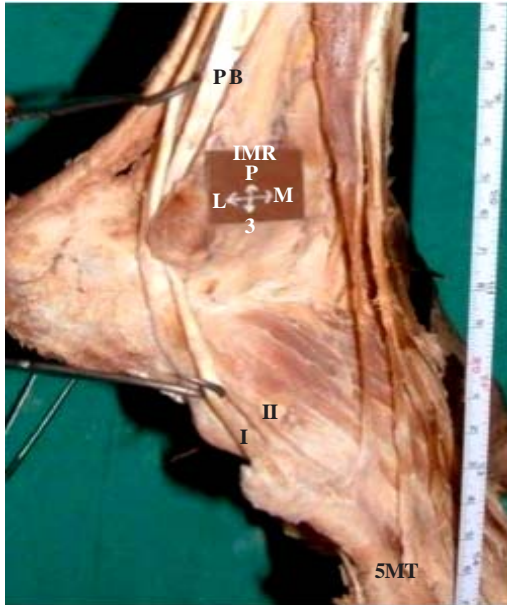
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the limbs. Superficial Peroneal nerve supplied Peroneus brevis muscle in all the sixty limbs thus in unison with standard textbook pattern.



**Fig. 1.** Common tendon of Peroneus brevis (PB) dividing in 2 slips near the insertion. Out of 2 slips, one slip was inserted on lateral side of base of 5th metatarsal (MT) and 2nd slip on medial side of the same metatarsal

## DISCUSSION

Peroneus brevis muscle of lateral compartment of leg, apart from providing eversion to foot also prevents undue inversion and protects the lateral ligament from being put to stretch by this movement. This muscle acts like a ligament in performing this action, but being active, alert and elastic, it is much superior to a ligament (Bhargava et al. 1961). Peroneal tendon disorders are rare, are frequently missed, and can be a source of lateral ankle pain. Magnetic resonance imaging is the standard method of radiographic evaluation of peroneal tendon disorders (Heckman 2008). It is important to recognise these variations especially during fasciotomies, creating fascio cutaneous flaps and in traumatic pain syndromes of leg. Sometimes Peroneus brevis can be fused with Peroneus longus. (Borley et al. 2008; Bergman et al. 2011). Distal attachment of peroneus brevis can be to the fourth metatarsal rather than fifth (Borley NR et al. 2008). White et

al. (1974) noted an accessory Peroneus accessorius muscle which was originated from the Peroneus brevis muscle. Edwards (1928) described the relations of the peroneal tendons to the fibula, calcaneus and cuboideum. While doing magnetic imaging of the ankle, a low-lying peroneus brevis muscle which extended beyond the tip of the fibula was recorded by Chepuri et al. (2001).

Bhargava et al. (1961) listed origin and insertion of the lateral musculature of the leg, the Peroneus longus and Peroneus brevis muscles in 100 Indian cadavers and found variations in origin and insertion of these muscles. According to him, the additional slips of insertion may be present and inserted on to the head of fifth metatarsal bone, middle or distal phalanx of little toe, cuboid bone, calcaneum bone, posterior tibiofibular ligament and fourth metatarsal bone. Peroneus brevis muscle may give additional slips to head of fifth metatarsal, middle and distal phalanx of little toe. It may give a slip of origin to abductor digiti minimi and it may have a slip joining it to peroneus longus (Bergman et al. 2011).

In the present study, the common tendon of peroneus brevis bifurcated in two limbs and out of the two slips, one slip inserted on base of fifth metatarsal on its lateral side and the other on the medial side of same metatarsal (Fig. 1). Variations of Peroneus brevis in our study were chiefly in the mode of insertion and it was in consonance with the study of Bhargava et al. (1961). Johnson et al. (1994) also reported an anomalous tendon during routine cadaver dissection. This accessory peroneus brevis tendon arose with the peroneus brevis muscle. The tendon passed through a channel in the peroneus tertius and inserted into the extensor hood apparatus of the fifth digit. Almost similar mode of insertion was found by Bergman et al. (2011). According to his finding, the tendon of peroneus brevis may bifurcate, with one part also joining peroneus tertius. Superficial Peroneal nerve supplied Peroneus brevis muscle normally in all the sixty limbs in the present study.

## CONCLUSION

In the present study, no variation in mode of origin of peroneus brevis was found. The pattern of insertion of Peroneus brevis on tubercle on the lateral side of base of fifth metatarsal in fifty-eight (96.7 %) limbs was in accordance with the standard textbook. Two (3.33%) cases

showed variations in their mode of insertion (Fig. 1) which were found to have the common tendon dividing in two slips near the insertion. Out of two slips, one slip was inserted on lateral side of base of fifth metatarsal and second slip on medial side of the same metatarsal. These variations indicate that the muscle is still in an evolutionary stage. Superficial Peroneal nerve supplied Peroneus brevis muscle normally in all the sixty limbs. Clinical significance of this muscle is its usage in reconstruction of superior peroneal retinaculum. The accessory tendons can be used in the repair of main tendon. The knowledge of the variations will help the surgeons to avoid post-operative complications and for the clinicians and radiologists for diagnosis or imaging interpretation.

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