



## A RARE ANATOMICAL VARIATION OF COMMON TENDINOUS INSERTION OF TIBIALIS POSTERIOR AND FIBULARIS LONGUS: A CASE REPORT

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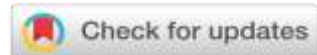
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## ABSTRACT

The tibialis posterior muscle is the deep muscle of the back of the leg and the fibularis longus is the muscle of the lateral compartment of the leg. These muscles impact the maintenance of the longitudinal and transverse arch of the foot. In This case, it was observed that the common tendinous insertion of tibialis posterior and fibularis longus was identified in the right lower limb during routine dissection at the National Institute of Ayurveda, Jaipur. The subject was a 55-year-old male cadaver of north Indian origin. Numerous pathologies could be linked with the common tendinous insertion of these two muscles, tibialis posterior and fibularis longus. This study aims to investigate anatomical variations of the distal insertion of the tibialis posterior and fibularis longus.

**Keywords:** tibialis posterior, fibularis longus, acquired flat foot deformity.

## INTRODUCTION

The Tibialis Posterior muscle (TP) is one of the most critical muscles supporting the longitudinal arch of the foot. Malfunction of TPT is the most important reason for a flat foot.<sup>1</sup> The fibularis longus muscle spans the foot from the lateral to the medial side

providing support to the transverse and lateral longitudinal arches.<sup>2</sup> Fibularis longus is planter flexor of the ankle and it maintains the various arches of the foot. Clinical relevance: Numerous pathologies could be linked with the common tendinous insertion of PL

tendon and TP tendon that consists of injuries, inflammation of the tendon, fractures, tendosynovitis, AAFD, rupture due to accident, tear, and dislocation. This study aims to investigate anatomical variations of the distal insertion of the tibialis posterior and fibularis longus.

### **CASE REPORT**

The dissection was done in the Dept of Sharir Rachana, National Institute of Ayurveda, Jaipur. This variation was found while dissecting an approximately 55-year-old male cadaver of North Indian origin (Asian breed). It was observed that the common tendinous insertion of tibialis posterior and fibularis longus was identified in the right lower limb.

### **VARIATION**

While doing cadaveric dissection, it was observed that in the right lower limb, the tendon of tibialis posterior is conjoined with the fibularis longus tendon at distal attachment and inserted together to the first metatarsal bone, as shown in Fig. 1.

### **NORMAL COURSE OF TIBIALIS POSTERIOR TENDON**

Its origin lies between flexor hallucis longus and flexor digitorum longus and is overlapped by both, especially by the former. The medial process arises from the posterior surface of the interosseous membrane, except at its most distal part, and from a lateral area on the posterior surface of the tibia between the soleal line above and the junction of the middle and lower thirds of the shaft below. The lateral part arises from a median strip of the posterior fibular surface in its upper two-thirds. The muscle also arises from the transverse intermuscular septum and the septum sepa-

rating it from adjacent muscles. In the distal quarter of the leg, its tendon passes deep to that of the flexor digitorum longus, with which it shares a groove behind the medial malleolus, each enclosed in a separate synovial sheath. It then passes deep to the flexor retinaculum and superficially to the deltoid ligament to enter the foot.<sup>3</sup>

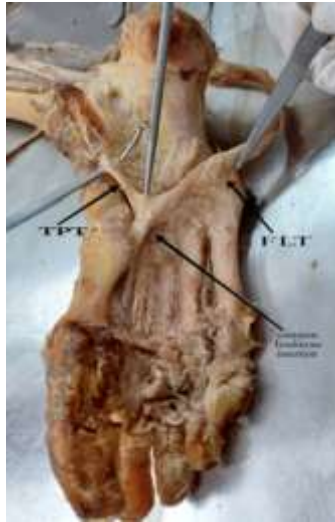
### **NORMAL COURSE OF FIBULARIS LONGUS TENDON**

It arises from the head and proximal two-thirds of the lateral surface of the fibula, the deep surface of the deep fascia, and the anterior and posterior intermuscular septa. The muscle belly ends in a long tendon that runs distally behind the lateral malleolus in a groove it shares with the tendon of the fibularis brevis. The groove is converted into a canal by the superior fibular retinaculum so that the tendon of fibularis longus and fibularis brevis, which lies in front of the longus tendon, are contained in a common synovial sheath.

The fibularis longus tendon runs obliquely forward on the lateral side of the calcaneus.<sup>4</sup>

### **COMMON DISTAL ATTACHMENT OF TIBIALIS POSTERIOR AND FIBULARIS LONGUS:**

While doing cadaveric dissection, it was observed that the fibularis longus tendon crosses the sole obliquely and is attached by two slips, one to the lateral side of the base of the first metatarsal and one to the lateral aspect of the medial cuneiform. In the right lower limb, the tendon of the tibialis posterior conjoined with a first slip that attached to the base of the first metatarsal.



**Fig. 1** The tibialis posterior tendon conjoined with the fibularis longus tendon at distal attachment and inserted into the first metatarsal bone.

### CLINICAL SIGNIFICANCE OF THIS VARIATION

Adult Acquired Flatfoot Deformity (AAFD): During the stance phase of gait, the tibialis posterior is the main dynamic stabiliser of the foot. As a vital contributor to the midtarsal joint locking mechanism, the TPT inverts the hindfoot, creating a rigid midfoot, allowing the gastrocnemius-soleus complex to transmit plantar flexion forces to the metatarsal heads. Posterior tibial tendon dysfunction (PTTD) is the prevailing cause of adult-acquired flatfoot deformity (AAFD), which is characterised by a collapse of the medial longitudinal arch.<sup>5</sup> Loss of tibialis posterior function enables hindfoot eversion, “unlocking” of the midtarsal joints and causing plantar flexion at the talonavicular joint and forefoot abduction. TPT degeneration and elongation are associated with age-related AAFD, but multiple etiologies, including traumatic TPT rupture, have been identified. Although controversy exists about the condition and its treatment, it is clear that the complex course and function of the TPT plays a detrimental role in the patho anatomy of AAFD.<sup>6</sup> TP insertion on the cuneiforms and base of metatarsals assists in elevating the longitudinal arch of the foot, and the FL tendon has a supportive effect on both the longitudinal and transverse arch.<sup>7</sup> But as in this kind of variation, TP inser-

tion through the conjoined tendon with fibularis longus may result in painfully acquired flatfoot. Despite acquired flatfoot deformities (AFFDs) often being associated with tibialis posterior or spring ligament defects, their pathogenesis and, subsequently, their management remains unclear and controversial. The diagnosis of TPT and FLT common insertion can be clinical. An increased awareness of the common insertion of TPT & FLT should help patients with earlier referral and treatment. This study may provide a novel Differential Diagnosis target in managing AFFDs. Other pathologies could be linked with the common insertion of PL tendon and TP tendon that consist of injuries, tendon inflammation, fractures, tendosynovitis, rupture due to accident, tear, and dislocation.

### CONCLUSION

Knowledge of these variations is essential for anatomists, radiologists, clinicians, and surgeons, as such variations may contribute to various ankle pathologies. Understanding the symptoms of diseases affecting the fibularis longus and tibialis posterior tendons and the tendon's function in preserving the arch of the foot may be helped by knowing the findings of this study. This study offers the groundwork for future research into this specific tendon and how it affects

arch stability. The performed study, as well as the literature review, showed that anatomical variations of the tibialis posterior tendon are rare so knowledge of them may have clinical importance. The present study adds to current knowledge on the footprint anatomy of the TPT & FLT.

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