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AN ACCESSORY FLEXOR OF THE FIFTH TOE

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ABSTRACT

The presence of accessory muscles and other organs on the lower limbs of some individuals have variously been reported in the literature. We report an unusual muscle located on the plantar surface of the left foot of a cadaver, which had not been previously described. This muscle originated from the tendon of tibialis posterior and inserted into the middle phalanx of the fifth toe. It differed from the 'expansions' of the tibialis posterior tendon, which usually pass from its insertion on the navicular bone to other tarsal bones and are ligamentous in nature. The muscle produced flexion of the fifth toe and is innervated by the medial plantar nerve. Awareness of this is important to Anatomists and surgeons, especially those working on the foot.

Key Words: Muscle, Flexor, Toe, Anatomic Variation.

INTRODUCTION

It is erroneous to consider anatomy a fixed and rigid subject that never changes as many unsuspected, repetitive anomalies have been reported that are of clinical importance[1-9]. Muscles on the sole of the foot are broadly divided into intrinsic (those contained entirely within the foot) and extrinsic (coming from outside). They are arranged in four layers as seen in dissection, though functionally they are divided into medial, lateral and central (intermediate) groups. They function to maintain the arches of the foot and to enable one stand on uneven ground[2,3,7]. On the plantar surface of the foot the tendon of tibialis posterior muscle usually attach to the tuberosity of the navicular bone and by tendinous expansions to the other tarsal and metatarsal bones. The first (superficial) layer contains three short muscles all of which extend from the posterior part of the calcaneus to the phalanges. The flexor digitorum brevis attach distally to the sides of the middle phalanges of the medial four toes, flexes these and is innervated by the medial plantar nerve (S1,2), others attach variously. The second layer contains the flexor digitorum accessorius (quadratus plantae) and four lumbrical muscles. The third layer is the short muscles of the great and little toes and confined to the metatarsal region of the foot while the fourth layer is made up of both plantar and dorsal interossei and tendons of peroneus longus and tibialis posterior[2]. In the course of our regular cadaver dissection, we found an unusual muscle on the plantar surface of the left foot, which did not fit into any of the above-described layers nor of their known variations. This muscle we describe here.

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CASE REPORT

We report an unusual muscle located on the sole the left foot of a male, Nigerian adult, black cadaver. The cadaver had all the named muscles, aponeuroses, tendons, ligaments, fasciae and other structures disposed variously on the four descriptive layers of the sole of the foot. The unusual muscle with a long tendon originates from the tendon of tibialis posterior near its insertion at the navicular bone. The muscle belly measured 7cm and the tendon 6cm and attaches to the middle phalanx of the fifth toe on both sides. It belongs to the superficial layer.

A pull on the tendon produced flexion of the fifth toe. Innervation is from the medial plantar nerve. Based on the functional status and location we labeled it "FLEXOR DIGITI MINIMI ACCESSORIUS"

MATERIALS AND METHODS

The cadaver in which this muscle was found was that of a male adult and black. Dissection was done as outlined by Cunningham's Manual of Practical Anatomy[4]. All the named muscles were dentified with their nerve supplies and functions as described. An unusual Muscle was seen on the sole of the left foot. Photograph of the unusual muscle and its related structures is as shown in Fig 1

(Fig I).

A: Flexor digiti minimi accessorius
B: Tendinous Expansion of Tibialis posterior.
C: Tendon of tibialis posterior.

DISCUSSION:

Flexion of the fifth toe is usually produced by action of muscles. The flexor digitorum brevis attached to the middle phalanx distally, originates from the medial process of tuber calcanei, plantar aponeurosis and intermuscular septa. The abductor digit minimi with similar origin as this, and attached to the lateral side of base of proximal phalanx of fifth toe abducts and flexes it. The quadratus plantae (flexor accessorious) of the second layer originating from the medial surface and lateral margin of the pantar surface of calcaneus and attached to the posterior lateral margin of tendon of flexor digitorum longus assists this in flexion. The lumbricals flex proximal phalanges and extend middle and distal phalanges. The flexor digiti minimi brevis muscle of the 3rd layer, which originates at the base of the fifth metatarsal bone inserts on the base of the proximal phalanx of the fifth toe and flexes the proximal phalanx. The muscle described above flexes the middle phalanx of the fifth toe. Anatomical variations of origins and insertions of these muscles are well known[7]. The flexor digiti minimi brevis sometimes extend to the fifth metatarsal bone then termed opponens digiti minimi. The muscle described here does not fit into any of those earlier documented variations. This muscle probably assists the flexor digiti minimi in the living subject. The presence and significance of unusual muscles and other organs have been reported in the literature [3,5-9]. Advancements in sonography, computerized tomography and angiography have revealed new facets and naunces of anatomy that could not be appreciated earlier in the dissecting laboratories (1). The finding of an unusual swelling on the popliteal fossa with ultrasound and Magnetic Resonance Imaging (MRI) to be an accessory muscle tensor fasciae suralis in a 20 year old white man was of diagnostic importance[8]. Absence of musculocutaneous nerve[9] and accessory abductor of the thumb[6] have all been reported among others, as well as accessory soleus muscle [3] which is associated with pain and edema during prolonged exercise.

This report surely will rekindle the interest of Anatomists and dissectors to muscle phylogeny and stimulate surgeons to fully investigate abnormal swellings (with USS, MRI etc) as these may well be accessory muscles.

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