An anomalous leg flexor muscle

Lowell A Hughes MBBS FRCS, James L Mahoney MD FRCSC FACS
Division of Plastic Surgery, St Michael's Hospital, Toronto, Ontario

LA Hughes, JL Mahoney. An anomalous leg flexor muscle. Can J Plast Surg 1993;1(1):50-51. A case of an anomalous flexor muscle in the leg (flexor digitorum intermedius) is described and the normal anatomy of the flexor digitorum longus discussed along with known variations and abnormal muscles in the deep posterior group of leg muscles.

Key Words: *Anomalous muscle, Flexor digitorum intermedius (FDI), Muscle variations*

Muscle fléchisseur anomal de la jambe

RÉSUMÉ: Un muscle fléchisseur anomal de la jambe (flexor digitorum intermedius) est décrit et l'anatomie normale du flexor digitorum longus est présentée avec les diverses variations et divers muscles anormaux du groupe des muscles postérieurs profonds de la jambe.

There is considerable variation in the origins and insertions of muscles throughout the body, and the leg is no exception. Muscles are also known to vary considerably in the degree of differentiation from each other, eg, peroneus tertius and extensor digitorum longus (1), and in the extent of their development. Abnormal or anomalous muscles have also been described in the lower limb musculature but these are usually rare (1).

An anomalous flexor muscle was discovered during an anatomic study of lower leg muscles. The features of this previously unreported anomalous muscle are described.

FLEXOR DIGITORUM INTERMEDIUS

A small unipennate muscle was found arising from the fascial coverings of the flexor hallucis longus (FHL) approximately 11 cm above the medial malleolus and giving rise to a tendon 3 cm above the medial malleolus (Figures 1,2). This tendon was traced to its insertion in the foot and was found to give rise to two slips which inserted into the base of the distal phalanges of the second and third toe. These slips of tendon passed through a confluence of tendinous structures which also received contributions from the flexor digitorum longus (FDL) and the flexor accessorius (Figure 3).

The FDL appeared normal with its usual origin from the posterior tibial surface below the soleal line; however, it divided into only two tendons which inserted into the base of the distal phalanges of the fourth and fifth toe. The usual slip which is contributed to the FDL by the FHL was also noted to be present, joining the main tendon of the FDL before it divided (2).

When the tendon of this anomalous muscle was pulled it produced flexion of the second and third toes only. The flexor digitorum brevis was also noted to be normal in this specimen. The opposite limb was carefully examined for a similar anomaly, but it was not present. This anomalous muscle was named the 'flexor digitorum intermedius' (FDI).

DISCUSSION

The FDL lies in the intermediate layer of muscles on the back of the leg, concealed by the soleus, and only emerging from under cover of it near the ankle. It has a fleshy origin from the medial part of the posterior surface of the body of the tibia inferior to the soleal line, and from the fascia surrounding it.

The tendon crosses the lower end of the tibia lateral to that of tibialis posterior, and then passes deep to the flexor retinaculum in an individual synovial sheath. It runs on the medial margin of the sustentaculum tali and enters the sole superior to abductor hallucis (3).

In the sole it travels forwards superior to flexor digitorum brevis, and crosses inferior to the tendon of FHL which separates it from the plantar calcaneonavicular ligament. As the tendons cross each other, a slip from FHL passes into the medial two of the four tendons into which flexor digitorum divides. In the middle of the sole these tendons receive the insertion of flexor accessorius which converts their oblique pull towards the medial side of the ankle into a straight one towards the heel (4).

Variations

The muscles of the deep posterior group may be more or less fused with one another or be united by fasciculi. This is especially common between the two flexors of the toes. The individual muscles vary in development (1).

Correspondence and reprints: Dr LA Hughes, 633 Bay Street, Suite 509, Toronto, Ontario, M5G 2G4. Telephone (416) 585-9317, Fax (416) 585-9452

Figure 1 Muscle belly of flexor digitorum intermedius (FDI) supported on black tape (small arrow); muscle originating from the deep fascia over the flexor hallucis longus (large arrow)

Figure 2 Full extent of FDI and its musculotendinous junction (arrow)

Figure 3 Tendon of FDI passing deep to a confluence of tendons (arrow), which were made up of the flexor digitorum longus and the flexor accessorius

The FDL may be more or less divided into separate fasciculi for the individual toes. The slip from the FHL to the FDL varies greatly in extent, but usually passes mainly to the second and third toes, more rarely to the second, third, and fourth, and very rarely to the fifth.

In most of the apes the tibial flexor (flexor digitorum) sends tendons to the second and fifth, the fibular flexor (flexor hallucis) to the first, third and fourth toes. This condition is also sometimes found in man. A slip may pass from the tendon of the flexor digitorum to that of the FHL. There may be a sesamoid bone in the tendon of the flexor hallucis as it passes over the talus and calcaneus.

The tibialis posterior may be doubled. Aberrant fasciculi may arise from various regions on the back of the leg and join any one of the three muscles of the group (1).

Abnormal muscles

The soleus accessorius arises by a tendon from the head of the fibula beneath the soleus. It is usually a slender muscle inserted into the medial surface of calcaneus.

The tibialis secundus is a small muscle that arises from the tibia beneath the flexor digitorum and is inserted into the capsule of the ankle-joint.

The fibulo calcaneus medialis (peroneo calcaneus internus

of Mac Alister, flexor accessorius longus, digitorum longus) is a fasciculus that arises from the lower third of the body of the fibula and gives use to a tendon that passes beneath the lacinate ligament to the flexor accessorius or to the tendon of the flexor digitorum longus.

Added to this list now is the 'flexor digitorum intermedius' which has been found in one of our specimens and described above.

ACKNOWLEDGEMENTS: We express our thanks to Mr Steve Toussaint and to the Department of Anatomy at the University of Toronto for the assistance and advice given.

REFERENCES

1. Grant JB. The Musculature. Reprint. Section V. Morris Human Anatomy, 10 edn. Philadelphia: Blackiston Co, 1946.
2. Last RJ. Anatomy Regional and Applied, 7th edn. Edinburgh: Churchill Livingstone; 1984.
3. Basmajian JV. Primary Anatomy, 8th edn. Baltimore/London: Williams & Wilkins, 1982.
4. Romanes AJ. Cunningham's Textbook of Anatomy, 12 edn. Oxford, New York, Toronto: Oxford University Press, 1981.