Introduction

Most humans have four lumbrical muscles in each hand numbered as first, second, third and fourth from the radial to ulnar side. Lumbrical muscles of the hand flex the second to fifth metacarpophalangeal joints and extend the interphalangeal joints of the fingers [1, 2]. The first and second lumbrical muscles originate from the radial side of the flexor digitorum profundus (FDP) tendons of the second and third fingers, respectively. The third lumbrical muscle originates from the ulnar side of second FDP tendon and radial side of third FDP tendon. Similarly the fourth lumbrical muscle originates from the ulnar side of the third FDP tendon and radial side of fourth FDP muscle tendon [3]. Thus the first and second lumbrical muscles are unipennate, whereas third and fourth are bipennate. Two ulnar and two radial lumbrical muscles are innervated by the ulnar and median nerves, respectively [4].

This paper presents a unique fourth lumbrical muscle in regards to its origin and insertion in the left hand of a 93-year-old male body donor at the University of South Australia Human Anatomy.

Case Report

While dissecting the left hand of an 93-year-old body donor, we discovered a unipennate fourth lumbrical muscle with dual origins from the forearm and the fourth tendon of flexor digitorum profundus with the muscle belly bifurcating in to two musculotendinous slips before inserting on to the dorsal digital expansion of the ring and little fingers. The muscle belly bifurcated distally into musculotendinous slips before inserting on to the dorsal digital expansion of the ring and little fingers. In the same hand specimen, the third lumbrical muscle had a textbook origin, with variant bifurcated musculotendinous slips inserting on to the dorsal digital expansion of the middle and ring fingers.

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Abstract

Some variations of the third and the fourth lumbrical muscles were found in the left hand during dissection at the University of South Australia Human Anatomy laboratory. A unipennate fourth lumbrical muscle in the left hand, had two sites of origin; one from a long, thin tendon arising from the flexor digitorum profundus muscle in the forearm and the other from the radial side of the fourth flexor digitorum profundus tendon. The muscle belly bifurcated distally into musculotendinous slips before inserting on to the dorsal digital expansion of the ring and little fingers. In the same hand specimen, the third lumbrical muscle had a textbook origin, with variant bifurcated musculotendinous slips inserting on to the dorsal digital expansion of the middle and ring fingers.


Key words [lumbrical] [flexor digitorum profundus] [intrinsic] [hand]
The third lumbrical muscle belly in the same specimen measured 35 mm x 8 mm, and had a usual origin; however, that bifurcated into musculotendinous slips before insertion. The radial musculotendinous slip attached on to the ulnar side of third dorsal expansion and the ulnar musculotendinous slip attached to the radial side of the fourth dorsal expansion. Each slip measured 15 mm x 3 mm.

The first and second lumbrical muscles were observed usual in origin and insertion; all the lumbrical muscle tendons were transmitted distally anterior to the DTML. Both the third and fourth lumbrical muscles were innervated by the deep branch of ulnar nerve.

Discussion

Lumbrical muscles in the human hand show a wide range of variation in origin and insertion [3], including their absence in some cases [5]. Our case describes atypical third and fourth lumbrical muscles of the left hand, with unique site of origin of the fourth lumbrical muscle.

Anatomical variation has been reported in the fourth lumbrical muscle at the insertion site, wherein bifurcated muscle tendon slips of fourth lumbrical muscles were found in 5% cases [6]. A variant fourth lumbrical muscle was found, where bifurcated tendon slips surrounded the flexor tendons of the hand, and inserted mainly on to the tendon of flexor digitorum superficialis (FDS) [7]. Cases of unipennate third and fourth lumbrical muscles have been described however all originated from the flexor digitorum profundus distal to the wrist flexor retinaculum [8]. In this case report the fourth
lumbrical not only had atypical insertion but also unique site of origin from the forearm.

Bilateral absence of the first and second lumbrical muscles with atypical third and fourth lumbrical muscles has been found. The third lumbrical originated from the flexor digitorum profundus muscle mass in the forearm; however, the poorly developed fourth lumbrical had usual origin from the medial two flexor digitorum profundus tendons [9].

Accessory first lumbrical muscle bellies have been found arising from the deep layer of flexor digitorum superficialis [10] and flexor digitorum profundus [11] in the forearm. Furthermore, there is report of an accessory first lumbrical muscle belly arising from the radial side of flexor digitorum profundus tendon near to the proximal border of the transverse carpal ligament [12], suggesting that the first lumbrical muscle demonstrates frequent variation.

There are functional implications associated with atypical fourth lumbrical muscles. Sudden rupture of the fourth lumbrical muscle has been reported to cause carpal tunnel syndrome [13]. Carpal tunnel syndrome has been described in subject with an organized hematoma and a degenerated atypical second lumbrical muscle [14]. Chronic pain in the fourth metacarpal space on the left side with minimal range of motion of the little finger has been attributed to an injured fourth lumbrical muscle [15], and laceration of the radial origin of the fourth lumbrical [16].

In conclusion, the presence of a proximal, tendinous origin of the fourth lumbrical results in ten rather than nine tendons within the carpal tunnel, could have predisposed this individual to carpal tunnel syndrome. The tiny ulnar slip of the bifurcated fourth lumbrical tendon could be liable to rupture especially during repetitive grasping activities such as using pliers, rock-climbing, or playing a musical instrument. The final clinical implication of these two variations may be that they restricted independent finger motion between the long, ring and small fingers.

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References