**Hypertrophy of the First Lumbrical Muscle**

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Lumbricals play a significant role in the intrinsic movements of the hand. These muscles are unique in their position as they connect the flexors of the digits to the extensors, both the attachments being mobile. During, the routine dissection procedure being carried out for the 1st year MBBS students we found the first lumbrical to be hypertrophied in 1 out of the 30 upper limbs which were dissected. The hypertrophied first lumbrical may lead to the compression of radial collateral digital arteries leading to chronic sub–ischaemia of fingers. The clinical significance of variation is discussed.

**Keywords:** Lumbricals, Hypertrophy, Chronic sub –ischaemia
INTRODUCTION

Lumbrical muscles constitute an important aspect of the intrinsic musculature of the hand. There are four lumbricals in each hand. Though small in size they play an important role in the dynamics of the intricate movements of the fingers required for the precision work. These muscles arise from the tendons of flexor digitorum profundus and are inserted into the dorsal digital expansion of the medial four digits or fingers. The first and the second lumbrical muscles are normally unipennate and the third and fourth lumbrical muscles are bipennate.

Lumbricals play a vital role in the precision movements of the hand along with the thenar, hypothenar and interosseus muscle. This indicates even the simplest action of the hand employs all the constituent parts of the limb in a concert which is very complex and not fully understood. Flexion at metacarpophalangeal joint and extension at the interphalangeal joint is produced by lumbricals. Lumbricals also play a significant role in proprioception. Numerous variations in these muscle have been reported in the literature which ranges from complete absence to reduction in their numbers, presence of accessory slips, bulky lumbricals and so on. Entrapment of median nerve at the wrist leads to carpal tunnel syndrome. Numerous causes have been described in the literature for carpal tunnel syndrome among which stands the anomalous anatomic structures (eg: muscles like lumbricals extending into the carpal tunnel or presence of bulky lumbricals) and their mechanical overuse.

The present case report shows a bulky first lumbrical with a proximal origin, extending into the carpal tunnel.

CASE REPORT

During the gross anatomical dissection of an adult male cadaver, we observed the hypertrophy of the first lumbrical muscle in the right hand of the cadaver (Figure 1). The hypertrophied lumbrical showed a proximal origin from the tendon of flexor digitorum profundus beneath the flexor retinaculum. However its insertion was normal. The other lumbricals were observed to be of the normal size. As described in the present study the hypertrophied first lumbrical has the potential to cause the compression of the radial digital collateral artery and it may also lead to median nerve compression due to its proximal origin extending beneath the flexor retinaculum and the increase in the bulk of the muscle.

DISCUSSION

Lumbricals show anomalous variations in their origin and insertion. The carpal tunnel syndrome (CTS) is caused by the compression of the median nerve as it passes through the carpal tunnel formed by the flexor retinaculum and the carpal bones. Causes of the CTS with respect to the lumbricals includes the incursion of the lumbrical muscles during the finger movement.

Hypertrophy of the lumbricals, anatomic variants such as abnormally long lumbrical muscles and the aberrant tendinous origin of the first lumbricals can lead to CTS. Fist test has been described by Cobb et al (1995) to ascertain the CTS due to the lumbrical muscle incursion in carpal tunnel. According to this test if a person keeps the hand in sustained fist position for 45 seconds it would result in the numbness in the area of distribution of the median nerve. According to Robinson et al, to obtain a permanent cure for the CTS caused by the hypertrophied lumbrical; the treatment should include the release of transverse carpal ligament accompanied by the release of the muscle belly. As described by Siegel et al in 1995, the origin of the lumbrical muscle is noted to be proximal in patients with carpal tunnel syndrome. If the lumbricals are large and more proximal in origin then in people carrying out jobs requiring the regular use of hand motions would result in the hypertrophy of the muscle leading to compression of median nerve. Joshi et al, conducted a detailed study to note the origin and insertion of the lumbrical muscles and their relation to carpal tunnel (CT). It was found that the second lumbrical was bulkiest among all the lumbricals in most of the cases. In half of the cases however the first lumbrical was found to be bulky. As reported by Chaudruc et al, the hypertrophied lumbricals may cause compression of the radial and ulnar collateral arteries of the digits which is presented as chronic sub-ischaemia of the finger clinically and it requires a surgical release for the recovery of vascularized and sensitive finger.
CONCLUSION
The lumbrical muscles should not be regarded as trivial in their functional role. The clinicians and hand surgeons should be constantly aware of the possibilities of variations in lumbricals. Though the preoperative diagnosis of such variations is difficult, the treatment depends mainly on the intra operative findings which may include either the incision of flexor retinaculum or release of origin of the muscle in case of the proximal origin of the muscle or resection of the involved muscle. The hypertrophied lumbrical may lead to digital vascularization diseases by compressing the radial and the ulnar digital arteries and thereby leading to white finger or chronic subischemia of the fingers being supplied by these arteries. Carpal tunnel syndrome (CTS) occurs when there is a decrease in the size of the carpal canal or increase in the number of structures in the canal thereby causing compression of median nerve. The individuals with CTS have tight lumbrical muscles which increase the incursion and hence cause CTS symptoms. The CTS due to lumbricals can be reduced by designing a good instrument which may reduce the incursion of lumbricals.

CONFLICTS OF INTEREST
None declared

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