

Case Report

An anomalous origin of 1st lumbrical: a case report

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Received: 18 February 2023

Accepted: 17 March 2023

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ABSTRACT

Hand is an organ of prehension. Human hand is an example of revolution in evolution. It is endowed with skilled movements. It consists of different group of muscles, ligaments, joints which are responsible for the fine movements of hand. It also contains neurovascular structures which are the terminal branches of median nerve, ulnar nerve and radial nerve. The terminal branches of ulnar and radial arteries provide the arterial supply. Here, we have reported the variant of lumbrical muscles. Lumbricals perform movements on metacarpophalangeal joints, proximal interphalangeal joints and distal interphalangeal joints. Lumbricals are spindle rich fibres. Variations in the structures present are immensely important for the orthopaedic surgeon, digital transposition surgery, cleft hand surgery etc. Anatomically, incursion of the lumbricals inside the carpal tunnel may lead to work related carpal tunnel syndrome.

Keywords: Lumbricals, Superficial palmar arch, Deep palmar arch, Metacarpophalangeal joint, Hypertrophy

INTRODUCTION

Hand is an organ of prehension. It consists of total 27 bones with numerous intrinsic and extrinsic muscle attachments. Human hand is an example of revolution in evolution. Philosophically, action of lumbricals shows the indices in civilization.¹ It is endowed with precision skilled movements which makes humans different from other species. It is provided with the sensory end organs which are responsible for the tactile sensation thus maintain the spinal tracts of the central nervous system in the body mechanism. Hand contains many ligaments thus forming the various types of synovial joints providing multiaxial movements. Hand is enriched with arterial supply in the form of arches; superficial palmar and deep palmar arch which are the anastomotic channels between superficial and deep terminal branches of the ulnar and radial arteries. It has rich nerve supply from the terminal branches of median nerve and ulnar nerve in the palm whereas radial, ulnar and median nerves supply the dorsum. The venous network is designed as in the form

of dorsal venous arch from where the cephalic and basilic veins start their courses. Hands need a higher degree of neuromuscular coordination thus representing higher cortical functions. The intrinsic muscles of the hand are divided as thenar, hypothenar and metacarpal group of muscles. The lumbricals come under metacarpal group of muscles. Lumbricals in the hand are 4 in numbers. These muscles are very thin earthworm-like muscles, thus named lumbricals, earthworm: *Ascaris lumbricoides*. From lateral to medial in the way of anatomical positioned hand; 1st, 2nd, 3rd and 4th lumbricals. 1st and 2nd lumbricals are unipennate whereas 3rd and 4th are bipennate. First and second are innervated by the median nerve branches whereas 3rd and 4th are innervated by the ulnar nerve branches. Lumbricals usually originate from the tendon of flexor digitorum profundus distal to the flexor retinaculum and gets inserted into the same tendon proximal to the fingers.¹ In their courses, they pass the metacarpophalangeal joints and proximal interphalangeal joints. The metacarpophalangeal joints perform flexion and interphalangeal joints perform extension of the fingers. Apart from the normal anatomy, various studies

have been reported of the variations of the attachments of the lumbricals. Knowledge of the normal anatomy or any variant attachment of the muscles or any other structures are very important to perform orthopaedic surgery, cleft hand surgery, digital transposition surgery etc. Abnormally high origin of the muscle may have the compressive action on the median nerve in the tunnel leading to the compressive neuropathy.

CASE REPORT

During routine dissection, a variable presentation of 1st and 2nd lumbricals on the right palm was noted in a male cadaver. We followed the steps from Cunningham's manual of practical anatomy. After careful dissection of skin over the palm, we reflected the palmaris brevis, palmar aponeurosis, then superficial palmar arch, the branches of the median and ulnar nerve. We noticed that the 1st and 2nd lumbricals are taking origin from the flexor digitorum superficialis tendon. Anatomically, the lumbricals take origin from the flexor digitorum profundus tendon.



Figure 1: a) Tendon of flexor digitorum superficialis, b) tendon of flexor digitorum profundus, c) 1st lumbrical, d) adductor pollicis, e) flexor pollicis brevis, f) abductor pollicis brevis, g) opponens pollicis brevis.

Here, the 1st lumbrical is present on the radial side of the FDS tendon, it got a twig from the median nerve. Tracing the muscle proximally we reflected the flexor retinaculum. It was taking origin under the retinaculum from the flexor digitorum superficialis tendon. In the carpal tunnel it is present lateral to the termination of median nerve which is a very rare presentation. Beyond the distal margin the muscle belly took composite origin

from both FDS and FDP whereas towards insertion again the fibres are solely attached to the FDS, it got inserted on the radial side of the FDP tendon distal to the metacarpophalangeal joint. The muscle belly shows hypertrophy.

The 2nd lumbrical solely taking origin from the radial side of FDS. Here it doesn't extend till the carpal tunnel. The 2nd Lumbrical also showed hypertrophy.



Figure 2: a) Median nerve in the carpal tunnel reflecting the flexor retinaculum, b) 1st lumbrical, c) 2nd lumbrical. This picture shows the digital branches of median nerve, ulnar nerve and the superficial palmar arch.

DISCUSSION

Hosapatna et al conducted a study on the morphology of lumbricals in hand and there they concluded bifid and hypertrophied 1st lumbrical, bipennate 2nd lumbrical and absent 3rd lumbrical.² Kumar et al found hypertrophied 1st lumbrical in 3.3% of cases out of 30 number of cadavers.³ Trivedi et al reported a case of variation of 1st lumbrical taking origin from tendon of FDS which extended till the Index finger.⁴ Bhingardeo et al reported a case of 1st lumbricals composite from FDP and FDS in the left side.⁵

Afroze et al conducted a case study on lumbricals where they found hypertrophy of 1st lumbricals in one cadaver out of total 74 dissected cadavers.⁶ They also concluded variation in 2nd lumbrical in 2 cadavers. And split insertion in 3rd and 4th lumbricals.

As stated by Koizumi et al and Heines et al, the FDS and 1st lumbrical share a common embryological origin. It may be the reason for the variant finding of origin from the FDS as lumbrical usually take origin from the FDP. Here in our findings we report the variant origin of the

1st lumbrical from the FPD proximally beneath the flexor retinaculum, then composite fibres from the FDP and FDS both finally distal attachment to the FDS tendon solely. Here we also report the hypertrophied muscle belly. In addition, we also report the origin of 2nd lumbrical from the FDS solely and it is also hypertrophied.

CONCLUSION

Our study has reported the case of unusual variant of 1st and 2nd lumbrical morphology. This study may be helpful for orthopedic surgeons and reconstructive surgeons. Abnormally high origin of lumbricals may lead to carpal tunnel syndrome causing compressive neuropathy. Distally the hypertrophied muscle may compress the terminal branch of median nerve, it may also compress the distal digital branches of the radial and ulnar arteries which may lead to chronic ischemia.

ACKNOWLEDGEMENTS

We are thankful to the noble souls who donated their bodies for the purpose of medical education and research studies. We are also thankful to the staffs of dissection hall, department of Anatomy and the Institute.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: Not required

REFERENCES

1. Standring S (ed). Gray's Anatomy. The Anatomical Basis of Clinical Practice, 40th Ed., Edinburgh, Churchill Livingstone. 2009: 886
2. Hosapatna M, Bangera H, Kumar N, Sumalatha S, Hosapatna N. Morphological Variations in Lumbricals of Hand—A Cadaveric Study. Plastic Surgery: An International Journal. 2013;23:1-10.
3. Kumar A, Mishra A, Goswami D, Ganesh E. Morphological Variations in Lumbricals of Upper Limb: A Cadaveric Study. Anat Physiol. 2014;5(165):2161-940.
4. Trivedi S, Satapathy BC, Rathore M, Sinha MB. A rare case of anomalous origin of first lumbrical from the tendon of flexor digitorum superficialis to index finger. Journal of Clinical and Diagnostic Research: JCDR. 2016;10(11):AD03.
5. Bhingardeo AV, Khambatta S. Unilateral variant origin of first lumbrical. MedPulse – International Journal of Anatomy. 2017;1(2):39-40.
6. Afroze MKH, Sangeeta M, Varalakshmi KL. Revisiting the Morphological Variations in Lumbricals of Hand Acad Anat Int. 2020;6(1):43-8.

Cite this article as: Barma MD, Ahlawat H. An anomalous origin of 1st lumbrical: a case report. Int J Res Med Sci 2023;11:1369-71.