

Case Report

UNILATERAL VARIATION OF LUMBRICALS WITH AN INCOMPLETE SUPERFICIAL PALMAR ARCH

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ABSTRACT

Lumbricals as a part of intrinsic musculature of hand, are important for precise movements of digits. They perform flexion at metacarpo-phalangeal joints and extension at inter-phalangeal joints. During routine dissection of an adult male cadaver we observed a rare variation of lumbricals of the right hand. The first lumbrical was unusually arched, making a sinuous appearance instead of being linear. The other lumbricals were also showing a sinuous pattern. In addition, the second lumbrical was bipennate in origin. This variation was accompanied by an incomplete superficial palmar arch where the radial and ulnar sides of the arch were separated. Though it's a case report but we can't deny a role of evolution process of human being or any occupational impact for better proprioception for such a variation. Clinicians and surgeons should be aware of such variations of lumbricals and superficial palmar arch while dealing with hand surgeries.

KEYWORDS: Lumbricals; Metacarpo-Phalangeal Joints; Inter-Phalangeal Joints; Superficial Palmar Arch.

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INTRODUCTION

The lumbricals are four small fasciculi which arise from the tendons of flexor digitorum profundus [1]. The lumbrical muscles are unique in having their origin and insertion on tendons. The lumbricals assist in metacarpo-phalangeal joint flexion; they contribute to inter-phalangeal joint extension by acting as deflexors of the proximal inter-phalangeal joint. Anatomically, they are highly specialized in terms of their architectural properties, with a small physiologic cross-sectional area but long fiber length. Their unique properties indicate that they are probably important in fast, alternating movements and fine-tuning digit motion [2].

The first and second lumbricals arise from the radial sides and palmar surfaces of the tendons

of the index and middle fingers respectively. The third arises from the adjacent sides of the tendons of the middle and ring fingers, and the fourth from the adjoining sides of the tendons of the ring and little fingers. Each passes to the radial side of the corresponding finger, and is attached to the lateral margin of the dorsal digital expansion of extensor digitorum which covers the dorsal surface of the finger. First and second lumbricals are unipennate, while third and fourth are bipennate; however any of them may be unipennate or bipennate. Variations in the attachments of the lumbricals are common. When they are bipennate, the two heads arise from adjoining tendons of flexor digitorum profundus, and, in the case of the first lumbrical,

Fig. 1: Dissected right hand showing superficial structures.

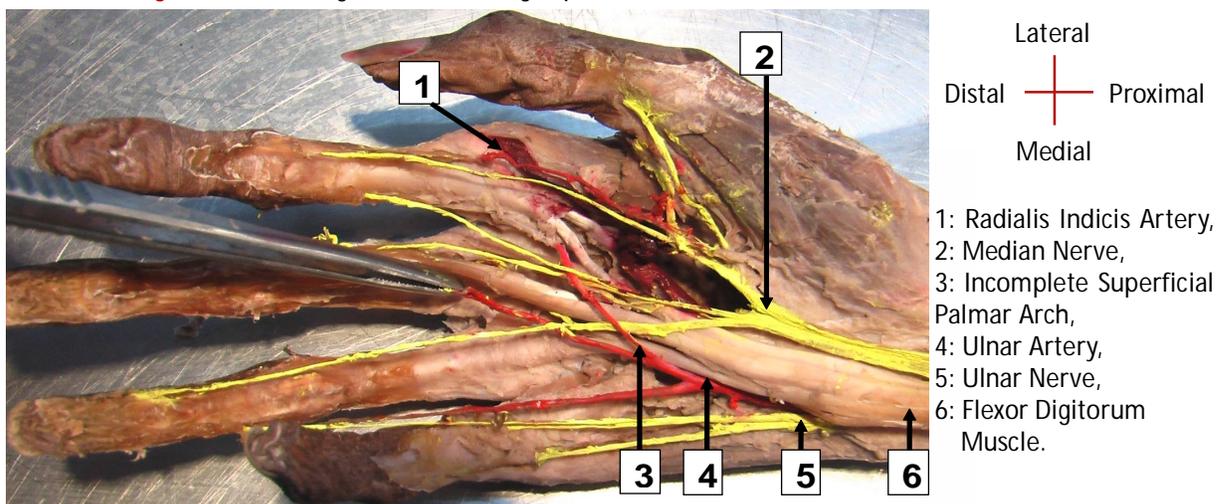
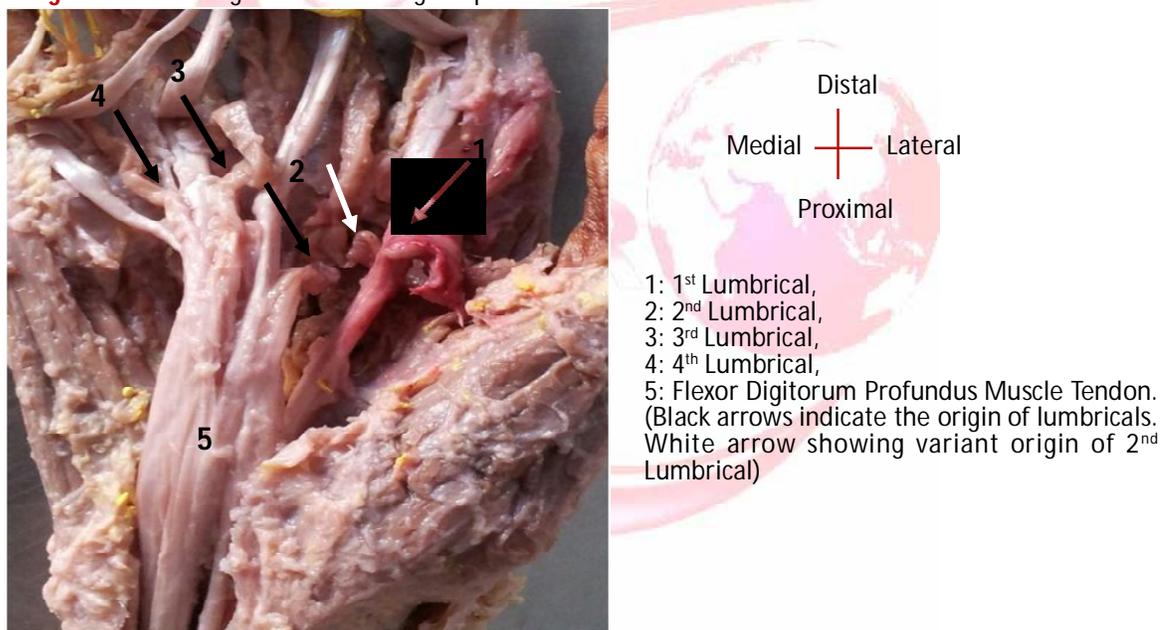


Fig. 2: Dissected right hand showing deep structures.



from the tendon of flexor pollicis longus. Accessory lumbrical slips may be attached to an adjacent tendon of flexor digitorum superficialis [1].

CASE REPORT

During routine dissection of an adult male cadaver, we observed a rare variation of the lumbricals of the right hand. The first lumbrical was unusually arched making a sinuous appearance instead of being linear. The other lumbricals too showed a sinuous pattern. In addition, the second lumbrical was seen to be arising from the Flexor Digitorum Longus tendons for the index and middle fingers (bipennate), instead of arising only from tendon of middle finger (unipennate). This variation was accompanied by an incomplete superficial palmar

arch whereby the radial and ulnar sides of the arch were separated.

DISCUSSION

There are many studies describing variation in origin or insertion of lumbricals. Mehta and Gardner[3] described the anomalous origin of first lumbrical in 2.7% cases. K Perminder[4] had observed the variations in insertion of the 3rd lumbrical (32%) and 4th lumbrical (24%) confined more to the right hand. Most commonly encountered variations were, split and misplaced insertion of the third & fourth lumbricals. Hosapatna M et al. [5] were observed that in majority (93.3%) of palms lumbricals with their normal attachments, proximal origin of lumbricals beneath the flexor retinaculum was found in 6.67% cases, bifid 1st lumbrical were seen in 3.3% of

cases and equal percentage of cases showed the presence of bipennate 2nd lumbrical arising from lateral two tendons of flexor digitorum profundus muscle, absent 3rd lumbrical was seen in 3.3% cases and same number of cases showed the hypertrophied lumbricals. Joshi S.D [6] studied seventy normal hands (from 35 cadavers) where they had found that in 50% cases the first lumbrical was quite bulky, grooved on its medial surface and it lodged the tendon of flexor digitorum superficialis. The second lumbrical was bipennate in 45% and in 4% fourth lumbrical was absent. S.nayak[7] found that an additional muscle belly of the first lumbrical muscle took origin from the FDS tendon within the carpal tunnel. Cobb TK[8] et al mentioned that lumbrical muscle incursion into the carpal tunnel could be a variable in the cause of work-related carpal tunnel syndrome. Pierre Jerome[9] had also found 2 female cases of having anomalous muscles (lumbricals) inside the carpal tunnel in his MRI based study.

In the present case there was a variation in the origin of 2nd lumbrical only where instead of being unipennate and arising from one tendon, it originated from the adjacent sides of 1st and 2nd tendons of Flexor Digitorum Longus. In addition, a very rare and unique finding of an arched 1st lumbrical making a sinuous curve was observed. This finding was unilateral and associated with an incomplete superficial palmar arch. The radial and ulnar sides of the arterial arch were separated.

Gray's textbook of anatomy[1] mentions that lumbricals contain many muscle spindles and have a long fibre length: it is therefore reasonable to assume that they play a role in proprioception. If it is true, then can this variation be a part of any modification for better proprioception? Or is it suggestive of a part of any evolution process of human species? To find out proper reasoning behind it, we either need to have proper history of cadaver or we would have to dissect many more cadaveric hands. But this is for sure that we have to be aware of such variation and need more evaluation for better reasoning.

CONCLUSION AND CLINICAL SIGNIFICANCE

Though it's a case report but the role of evolution process of human being or any occupational

impact for better proprioception for such a variation can be assumed or hypothesized. The lumbrical muscles, especially the 1st and 2nd lumbricals, are used as muscle flaps for the coverage of the median nerve and its palmar branches. Hypertrophy of the lumbrical muscles causes compression of the radial and ulnar collateral arteries, leading to chronic sub-ischemia. [3] Awareness of such variations of lumbricals is necessary to avoid complications during radio-diagnostic procedures [10] or hand surgeries like lumbrical release operation. [11].

Conflicts of Interests: None

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