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A CASE STUDY OF UNUSUAL MUSCULAR VARIANT OF EXTENSOR INDICIS BREVIS MUSCLE IN CONTEXT TO ITS CLINICAL SIGNIFICANCE

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ABSTRACT

Knowledge of anatomical variations of the muscles is important for interpreting unusual clinical conditions. We observed the presence of an abnormal extensor indicis muscle in the right hand of an adult male cadaver. Clinically, this natomical variation may be associated with pain and swelling at the back of the hand. In these cases symptoms tend to increase due to mechanical stress and can be confused with the presence of a dorsal synovial cyst. This report will help clinicians, Surgeons, occupational and physical therapists formulate better clinical or surgical decisions when presented with a rare anatomical variation.

INTRODUCTION

Anomalous muscles are often a matter of concern to clinicians as they mislead the diagnosis. Knowledge of such variant muscles is important clinically to avoid misdiagnosis. The hand is an exquisite organ in human population for performing activities in everyday life. It is one of the most frequently used parts of our body. Therefore, the knowledge of muscles and tendons of hand and their common variants appears to be very important, especially when surgery is planned there. The fact is that the extensor muscles and tendons of the forearm and hand have great variability.[1] In this report we present an anomalous muscle on the dorsum of hand, extensor digitorum brevis manus an uncommon variation present as a swelling on the dorsum. It is originated from the dorsal wrist capsule

within the compartment deep to the extensor retinaculum for the extensor digitorum and inserted into the extensor hood of the index finger, this variant muscle often cause dorsal wrist pain and often confused as ganglion, soft tissue tumor, synovial cyst or tenovaginitis. The presence of such variant muscles on dorsum of hand, their clinical significance and literature has been reviewed.

Clinically, the pain and swelling in the back of the hand can be associated to physical exertion, and these symptoms worsen with further exertion. This pain and Swelling in the hand can sometimes be confused with dorsal synovial cyst. The extensor indicis is still an important option for tendon transfer in chronic disability of the abductor pollicis brevis and opponens pollicis muscles.

MATERIALS AND METHODS

The study involved dissection of a 50-year-old male cadaver. The cadaver was preserved by the injection of formalin based preservative (10% formalin). The dissection of upper extremities were carried out in the Department of *Sharir Rachana*, National Institute of Ayurveda Jaipur(RJ), India.

CASE REPORT

During routine post graduate dissection procedure we were dissecting a 50-year male cadaver. While dissecting a posterior surface of forearm and dorsum of hand we exposed the superficial muscles of the extensor and followed to their insertions to study them, than we decided to expose the deep muscle of extensor group. The tendons of the extensor digitorum, extensor indicis and extensor digiti minimi were studied respectively with their proper photographs.

When we tried to clear extensor indicis muscle we found three additional small muscle strips (Figure 1), were attached from its origin point. We carefully followed their origin to insertion and appropriate photographs were also taken.

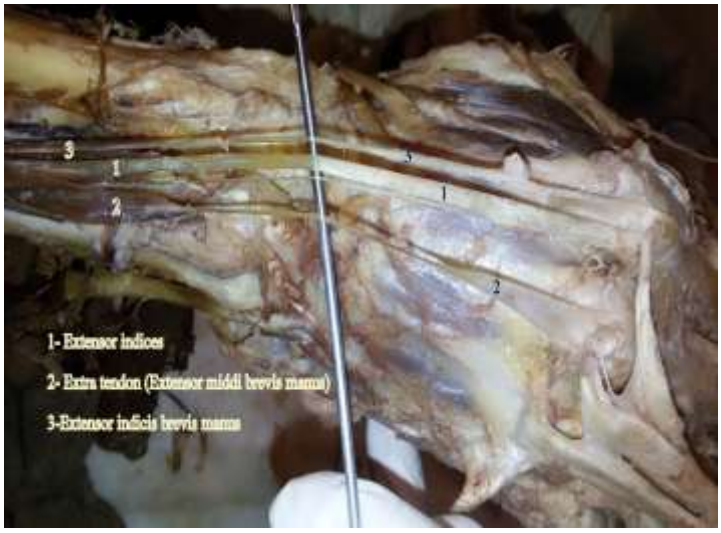

Fig. 1A. Dorsal view of the wrist and hand.

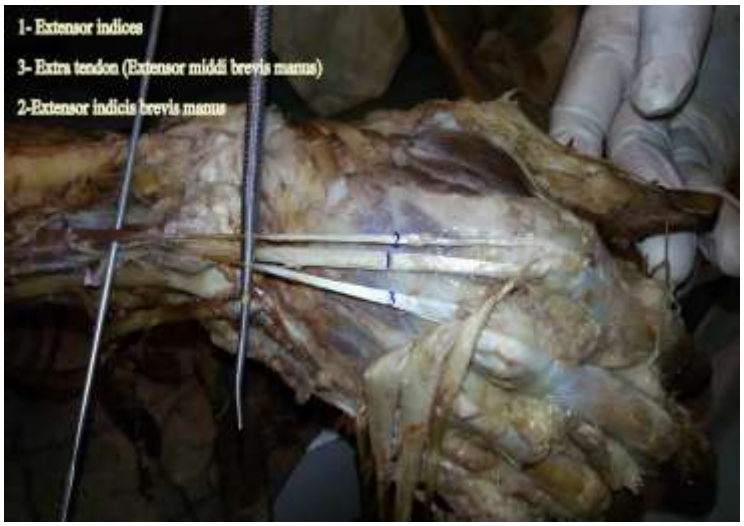

Fig. 1B. Dorsal view of the wrist and hand.

This anomalous muscle was originating from the dorsal wrist capsule beneath the extensor retinaculum of the wrist at the fourth compartment through which extensor digitorum, extensor indicis, posterior interosseous nerve were passing. The insertion of the muscle was into the extensor hood of the index finger. The muscle was supplied by the posterior interosseous nerve.

Clinical importance

The extensor indicis muscles can be confused with a ganglion or other tumor. They often will produce symptoms as a result of exercise or overuse (Tountas & Bergman) The knowledge of this rare kind of anatomical variation is necessary to help diagnosis and treat the presence of pain in the back of the wrist and hand. Clinically, the pain and swelling in the back of the

hand can be associated to physical exertion, and these symptoms worsen with further exertion. This pain and swelling in the hand can sometimes be confused with dorsal synovial cyst (Gahhos & Ariyan, 1983; Della Vella & de Giovannini, 1985). The extensor indicis is still an important option for tendon transfer in chronic disability of the abductor pollicis brevis and opponens pollicis muscles (Gonzalez *et al.*, 1996; Batra *et al.*, 2007).[2]

DISCUSSION

In the human embryo, the precursor extensor muscle of the forearm differentiates into three parts. The radial portion differentiates into the brachioradialis. Extensor medii digiti is often a differentiated portion of extensor indices; arising below that muscle from the back of the ulna, it varies only in its greater or lesser amount of differentiation from its neighbor. Wood found it eleven times in a hundred and two subjects; and the same author has seen it when separate from the extensor indicis, sending an additional tendon to the index finger; in one case this coalesced with the indicator before its insertion. Wood found it arising from the intermuscular septum between the extensor communis digitorum and the supinator brevis (supinator), above the other deep muscles. It has also been seen sending a slip to be inserted partly into the indicator tendon, and partly into the middle metacarpal fascia (Petsche).[3]; Meckel found it arising from the radius, Brugnone from the carpus. Most commonly, it is only a second tendon connected with the indicator, and showing no sign of being connected with a separate belly; sometimes, this tendon is an offshoot from the indicator tendon. See below also.[4]

The tendon of extensor indicis is occasionally doubled and one of the slips may pass, although rarely, to the thumb or ring finger, or more commonly to the middle finger. This last slip, forming an extensor digiti III may occur as a separate muscle (2-5%) arising from the ulna, or from the posterior ligament of the wrist joint below the indicator. An extensor digiti IV is a rarer variation. These slips of the deep or short extensor appear to be reversions to a primative arrangement, in which the muscle provides tendons to the whole series of digits. The tendons of these muscles may also be poorly developed.[5]

An extensor digitorum brevis manus is also found in rare cases. Macalister found this muscle once in fifteen subjects while Wood reported once in thirty six subjects. It may appear in two forms: slips arising from the back of the wrist, and slips arising from the carpus or metacarpus may be connected to the tendons of interosseous muscles as well as to the tendons of the extensor.[6]

Extensor digiti medii (present in 10% of bodies) arises from the ulna beneath the extensor indicis, with which it may be fused. It sends a tendon to the extensor aponeurosis of the middle finger or sends slips to the middle finger and the index finger. Extensor medii digiti is often a differentiated part of extensor indicis; arising below extensor indicis from the back of the ulna, it varies only in its greater or less degree of differentiation from its neighbor.[7]

RESULTS

In the present cadaver, the extensor digitorum divided into four tendons, which passed deep to the extensor retinaculum to the dorsum of hand and formed the dorsal digital expansions of the 2nd to 5th fingers. Each extensor expansion divided into three slips to insert the dorsal surface of the middle and distal phalanges respectively.

The extensor indicis muscle belly shows two extra tendons which originated from the shaft of the ulna, intermascular septum and ran across the second dorsal interosseous muscle. Out of three tendons two are inserted on index fingercalled as extensor indicis and extensor indicis brevis manus while one tendon inserted on middle finger named as extensor meddi brevi manus, The belly of extensor indicis brevis manus was 4.7 cm long, mean width 0.7 cm (Figure 1A &1B). The belly of extensor meddi brevis was 6.7 cm long, mean width 0.75 cm (Figure 1A & 1B). Extensor digiti medi arising below the extensor indices from back of ulna.When Extensor digiti medi is seprate it send additional tendon to the index finger. It arises from intermascular septum between extensor cummunis digitorum and supinator. Extensor digiti medi (present in 10%) originate below the extensor indicis with which it may be fused. It send tendon to the extensor apponeurosis of middle finger or send a slip to the middle and index finger.

CONCLUSION

Precise knowledge of possible variants of extensor tendons of the hand is vital for the success of reconstructive procedures in this region. Furthermore, accurate examination to this region requires profound familiarity with the variants of the extensor tendons. An understanding of anatomical variations of the musculoskeletal system is important when interpreting unusual clinical presentations and for diagnosing different dorsal hand masses of planned surgical tendon transfer.

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