

Anatomical Variations in the Muscles of Extensor Compartment of Forearm and Hand- A Case Report



Medical Science

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ABSTRACT

The extensor musculature of forearm and hand shows diverse morphological variations including presence of additional bellies with tendon of existing muscle or presence of additional muscle at unusual location. During routine cadaveric dissection of a 62 year old male at Maulana Azad Medical College, New Delhi, India, variations were observed in the muscles of extensor compartment of the left forearm. An accessory muscle was found originating from the posterior surface of ulna just distal and medial to abductor pollicis longus it was inserted on to the dorsal surface of base of proximal phalanx of index finger lateral to the tendon of extensor indicis muscle. Also, the extensor

INTRODUCTION

The skilled movements of human hand are important in performing our routine activities. Hence a normal anatomy of this region gains immense importance. Any variations may hamper the movements of the forearm and hand. The arrangement of the human extensor muscles of the forearm and wrist varies greatly. Knowledge of such variations is of importance for surgeons performing hand surgeries. Accessory muscles may cause compressive neuropathy and maybe misdiagnosed as soft tissue swellings¹. As these variations are clinically significant, we hereby report a case of an accessory muscle in extensor compartment of forearm along with variations in the tendons of the extensor digitorum muscle.

Extensor digitorum normally arises from the common extensor origin on lateral condyle of humerus and the adjoining intermuscular septum. It divides distally into four tendons which pass in a common synovial sheath with the tendon of extensor indicis, through a tunnel under the extensor retinaculum. The tendon to the index finger is accompanied by extensor indicis, which lies medial to it. The digital attachments enter a fibrous expansion on the dorsum of the proximal phalanges. The tendons of extensor digitorum may be variably deficient or may be multiple in one or more digits, most often in the index finger or the middle finger².

CASE REPORT

Routine cadaveric dissection of 62 year old male at Maulana Azad Medical College, New Delhi, India, revealed an accessory muscle in the posterior compartment of left forearm and also variations in the number of tendons of extensor digitorum (ED) muscle. The variations were observed, dissected, photographed and appropriate measurements were taken. [Fig.1]

In the posterior compartment of the left forearm, an accessory muscle was found originating from the posterior surface of ulna just distal and medial to abductor pollicis longus and inserted on to the dorsal surface of base of proximal phalanx of index finger lateral to the tendon of extensor indicis muscle. The posterior interosseous vessels and nerve lay deep to it. The belly of this accessory

muscle was 12 cm in length and 1.5 cm in width and its tendon was of 10.5 cm in length. The nerve supply to the accessory muscle was derived from the posterior interosseous branch of radial nerve. Another variation was found in which the extensor digitorum muscle divided into three tendons for middle, ring and little finger instead of four. These three tendons inserted normally via the dorsal digital expansion. No such variation was observed in the extensor compartment of the right side.

DISCUSSION

The anomalous muscle observed here is usually described in literature as the extensor indicis brevis manus muscle. The extensor digitorum brevis manus muscle (EDBM) is an aberrant finger extensor occurring on the dorsum of the hand^{2,3}. This muscle, being an anatomic variant of the finger extensor musculature, is found in approximately 2% to 3% of the population with a slight male predominance and is easily mistaken for other dorsal hand pathology like ganglion, synovial nodule or cyst^{3,4,5}. Although usually asymptomatic, the patient may present with a painful dorsal wrist mass, particularly in individuals performing repetitive movements of the wrist and hand⁶. The origin of EDBM has been described as being at the distal end of the radius, the dorsal radiocarpal ligament, or the wrist joint capsule. Its insertion has been described as being in the extensor hood of the index, middle, ring, or little finger, although multiple insertions into more than one finger has been reported^{4,7,8}. The most common insertion is said to be into the index finger, followed by the middle, and then the ring and little fingers⁵. The nerve supply and blood supply of EDBM has been confirmed to be from the posterior interosseous nerve and artery⁵. The absence of ED tendon for little finger has been documented by various authors^{9,10,11}.

The presence of an accessory muscle can be explained embryologically by the appearance of an extra cleavage in the forearm muscle mass during development. The extensor muscle mass divides into three parts, a radial part, a superficial and a deep part. The deep part is highly varied in the evolution of primates¹².

The first indication of limb musculature is observed in 7th

week of development as a condensation of mesenchyme near the base of limb buds. The mesenchyme is derived from the dorsolateral (DML) cells of the somite regulated by WNT proteins that migrate into limb buds to form muscle. Connective tissue derived from the parietal layer of lateral plate mesoderm regulated by BMP4 (Bone morphogenetic protein) and FGF (Fibroblast growth factor) dictates the pattern of muscle formation. The combined influence of WNT and BMP4 protein activates expression of the specific myogenic regulatory factors MYF5 and MyoD for muscle development¹³.

An accessory muscle can be utilized by the surgeon for muscle graft, thereby sparing the normal muscles. The additional muscle if small, may remain asymptomatic and unnoticed. However, if it is large, it may reduce the space in the respective compartment and increases the risk of tenosynovitis and extensor indicis proprius syndrome. Various symptoms of pain on flexion of wrist, snapping wrist and subluxation of ring finger tendon due to the presence of a hypertrophied extensor indicis proprius muscle have also been reported¹⁴.

CONCLUSION

Anatomical knowledge of such possible variations of muscles in the extensor compartment are clinically very important for proper diagnosis and planning of various reconstructive and orthopedic surgeries of the hand.. Accessory muscles may cause compressive neuropathy and maybe misdiagnosed as soft tissue swellings.

CONFLICT OF INTEREST: Nil

Fig1. Showing the variations in posterior compartment of left forearm



AP=Abductor pollicis longus, AN=Accessory muscle, EP=Extensor pollicis brevis, EP=Extensor pollicis longus, EI=Extensor indicis, ED=extensor digitorum, ECU=Extensor carpi ulnaris

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