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Presence of rare variation of double extensor medii proprius muscle on the
dorsum of the hand

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Abstract

Introduction: The finding of accessory muscles or tendons in the hand is significant from point of view of hand surgeons as well as evolution. These accessory muscles must be kept in mind while performing hand surgeries. Their existence might also be an indicator of direction of evolution of hand.¹

Materials and Methods:

During routine dissection by Medical Students, an adult male cadaver preserved in 10% formalin showed presence of 2 variant muscles which were dissected meticulously.

Results:

Two extensor medii proprius(EMP) muscles were observed on the dorsum of the right hand. One of the muscles had a well developed belly while the other had a very small belly and was mostly tendinous. The muscles were seen taking origin from the carpals and lower end of radius and were inserted into dorsal digital expansion for the middle finger. Both the muscles were supplied by branches from posterior interosseous nerve.
Discussion:

There have been reports of occurrence of extensor medii proprius muscles earlier, however there is no mention of duplication of these muscles in the same body as seen in present article. These accessory muscles may occasionally give rise to dorsal wrist pain. In the present article authors discuss the evolutionary as well clinical implication of this variation.

Keywords: Extensor medii proprius, variant, hand, extensor indicis proprius

Introduction

The hand is the most frequently used body part in humans and variation in its anatomy therefore assumes significance from functional point of view.

In 1916 a young male pianist complained of pain on the dorsum of his right hand on “trilling” using the right hand, the pain being relieved on rest. During surgery he was found to be having a supernumerary muscle which attached itself to the extensor tendons for index and middle fingers. Lack of awareness of existence of such accessory muscles in the dorsum of the hand can lead to prolonged suffering of patients.

Abbreviations: Extensor medii proprius: EMP, Lateral extensor medii proprius: EMP-L, Medial extensor medii proprius: EMP-M
Case Report

During routine dissection by Medical Students, two extensor medii proprius (EMP) muscles were observed on the dorsum of the right hand of an adult male cadaver preserved in 10% formalin. The two muscles were found deep to the tendons of extensor digitorum muscle. The lateral extensor medii proprius (EMP-L) had a well defined fusiform muscle belly. It was attached proximally to the joint capsule covering the dorsal surface of the carpal bones in front of lower end of radius, running across the 3rd metacarpal bone, over the distal part of 2nd dorsal interosseous muscle, distally attached to the radial side of dorsal aspect of base of the proximal phalanx of the middle finger. The medial extensor medii proprius (EMP-M) was made of thin long tendon and a small muscle belly at its distal attachment. The muscle was proximally attached to dorsal surface of lower end of radius and distally attached to the dorsal digital expansion formed by the extensor digitorum tendon to the middle finger, over the head of 3rd metacarpal and proximal phalanx of the middle finger. (figure 1) Table 1 depicts dimensions of both muscles. No variations were observed in the left hand.

Discussion:

The extensor tendon to the middle finger that lies in a plane deep to extensor digitorum communis has been reported variously as “extensor medii proprius”, “extensor brevis digiti medii” or as “extensor digitorum brevis manus”.2,3,4
Von Schroeder has described EMP as a muscle analogous to the extensor indicis proprius with a similar origin, but with an insertion into the middle finger (digitus medius).5

Different origins of accessory extensor muscles have been reported by different authors. Most authors have described the muscle as taking origin from ulna just distal to origin of extensor indicis and dorsal surface of carpal bones.6,7 In the present study while the EMP-M is seen taking origin from the dorsal surface of lower end of radius, the EMP-L takes origin from dorsal surface of carpal bones, neither having any attachment to the ulna.

Similarly different distal attachments have been described by authors. Insertion of tendon of EMP into the proximal phalanx of middle finger has been described by Carlos.7 Insertion of the EMP into the dorsal aponeurosis, palmar and ulnar to the extensor digitorum communis of the long finger has been reported by Von Schroeder.5 In the present study the muscles were inserted either into dorsal digital expansion or into the proximal phalanx of the middle finger. Neither muscle gave any additional slips of attachment to any other tendon or fascia. No duplication of the EMP as seen in the present study has been reported by other authors.

Both the EMP muscles appear to cause extension of the middle finger at the metacarpophalangeal joint when their tendon is pulled.

Both the muscles described in the present study were supplied by posterior interosseous nerve similar to reports by other authors.6,7
During the development of extensor muscles of forearm, the deep layer of extensors is said to be highly unstable and undergoing considerable evolutionary changes. Carlos observes that due to this there seems to be a great variation in final expression of the deep layer in different species of primates.\textsuperscript{7}

Young studied evolution of hand explained that while the chimpanzees have hands modified such that the 3\textsuperscript{rd} and 4\textsuperscript{th} digits are especially robust to absorb maximum compression during knuckle walking, the human hand has adapted itself to “throwing action”. During evolution, the balance and robusticity of hand has shifted radially to the thumb, 2\textsuperscript{nd} and 3\textsuperscript{rd} fingers. He states that the 3\textsuperscript{rd} finger has to be hyperextended during process of throwing as it is the last structure to lose contact with the object being thrown and that anatomical changes reflecting this adaptation should be discernible in hominid hand specimens.\textsuperscript{1} Presence of additional extensor muscles in relation to 3\textsuperscript{rd} finger, may be evidence of attempt at such an adaptation.

Usually EMP is asymptomatic. It can appear as soft fusiform swelling in the metacarpal spaces which becomes firm when respective digit to which it is attached is extended against resistance. The swelling is transilluminant and yields no fluid on aspiration. However the coexistence of ganglions associated with the accessory muscle must be ruled out as mechanical stress due to accessory muscle can cause formation of ganglions.\textsuperscript{8} Electrophysiologic studies using surface electrodes or MRI scans can be done to confirm the diagnosis preoperatively.\textsuperscript{3,9}

Unusually EMP may produce symptoms of swelling and pain on prolonged use of hands for repetitive motions, as reported by Pfeiffer in case of the pianist.\textsuperscript{2,3}
In case of mild pain resulting from the accessory muscle, authors opine that reassurance of harmlessness of the condition can often relieve the patient’s discomfort thus avoiding surgery.⁸

A more severe form of pain may be treated with rest, immobilization, anti-inflammatory drugs, short wave diathermy etc.³

Prolonged dorsal wrist pain cases are often misdiagnosed as dorsal wrist ganglion, nodular tenosynovitis, synovial cyst, or a benign soft tissue tumors.³ Such a misdiagnosis may lead to unnecessary surgery unless investigated thoroughly.¹⁰

Knowledge of variations of extensor tendons of the dorsum of the hand by surgeons and practitioners who deal with musculoskeletal conditions, is necessary for diagnosis, assessment and management of diseased or traumatized hands. It is especially significant in cases of tendon transfer or reconstruction surgeries.⁷ An extra extensor of digits can mislead the practitioner from diagnosing rupture of one or more tendons of extensor digitorum communis in cases of trauma of hand.

References:


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<th>Table 1. Dimensions of each extensor medii proprius muscle</th>
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<td>Length in mms</td>
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<td>Width (in mms) at the midpoint of its maximum diameter</td>
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<td>Extensor medii proprius-</td>
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<td>Extensor medii proprius-medianal</td>
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**Legends for Figure 1**

Photograph of the dorsum of the right hand. The extensor digitorum tendons(c) have been cut and reflected distally to display the EMP-L(a), EMP-M(b).