

## A Rare Case of Unusual Origin of Extensor Medii Proprius Muscle and its Clinical Significance

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In the current study, we established a variation of the forearm extensor muscles during a routine anatomical dissection of the left upper limb of a cadaver of 64-year-old woman. The variant muscle was represented by the presence of an extensor medii proprius muscle – it originated from the distal part of the extensor indicis muscle and its bundles ran parallel in distal direction. The distal tendon passed through the fourth extensor compartment and inserted into the dorsal aspect of the capsule of the metacarpophalangeal joint of the middle finger. Herein, we describe the unusual origin of this muscle, its relations to the adjacent structures and discuss its possible clinical significance.

*Key words:* dorsal forearm, variation, extensor medii proprius muscle

### Introduction

The extensor indicis muscle is the most medially situated muscle in the deep layer of the dorsal forearm, which originates from the posterior surface of the interosseus membrane and the distal part of the ulna. Its tendon passes through the fourth compartment of the extensor retinaculum and projects into the dorsal aponeurosis of the index finger. In addition, this muscle is widely used for tendon grafting procedures in the field of hand surgery.

In literature, numerous reports describe variations of the extensor tendons, as well as the presence of anomalous muscles in the dorsal forearm. The knowledge of these variant muscles may be useful in the differential diagnosis of pathological lesions such as exostosis, benign adipose tissue tumors, tenosynovitis of the extensor tendons, rheumatoid tenosynovitis, ganglion cysts, etc. Furthermore, the presence of anomalous muscles should be considered in advance in cases of reconstructive surgical procedures in the dorsal forearm and hand. Some of the variants of the extensor indicis muscle include: absence or unusual origin [3, 8]; the presence of two extensor indicis muscles [4]; an accessory slip from the extensor digitorum muscle [13]; the existence of an extensor indicis brevis muscle has also been described [6].

The aim of the current study was to present a rare case of unusual origin of extensor medii proprius muscle in the left dorsal forearm region and discuss its clinical significance.

## Case report

During a routine anatomical dissection of the left upper limb of a cadaver, 64-year-old female of Caucasian origin, preserved by an injection of a 10% formalin-based preservative, from the autopsy material available at the Department of Anatomy, Histology and Embryology, Medical University of Sofia, Bulgaria, an additional muscle bundle was found in the posterior forearm region. Dissections were approved by the Medical Legal Office and the Local Ethics Committee. After removing the skin and the subcutaneous adipose connective tissue, the antebrachial fascia and extensor retinaculum were demonstrated and dissected longitudinally in order to observe the deep group muscles. We noted the presence of a variant muscle originating from the distal part of the extensor indicis muscle the bundles of which ran parallel in distal direction. The muscle belly was fusiform, 21 mm in length and 5 mm in width. The distal tendon was about 121 mm long, passed through the fourth extensor compartment along with the extensor indicis and the extensor digitorum muscles and inserted into the dorsal aspect of the capsule of the metacarpophalangeal joint of the middle finger (**Fig. 1**). The dissection revealed that this additional muscle was innervated by branches of the radial nerve.

There was no clinical evidence of trauma or surgical procedures in the dissected region. No other variations in the anatomical structures of the left upper limb were observed.

## Discussion

A review of the pertinent literature shows that the described additional muscle is known as extensor medii proprius. It originates from the distal third of the ulna and the interosseous membrane and inserts on the extensor expansion of the middle finger [12]. This anomalous muscle is more frequent in males compared to females and has an incidence between 0.8% and 12% [1, 9, 13]. In addition, meta-analysis reveals that the presence of an extensor medii proprius muscle is significantly lower in Indian and European populations than North American and Japanese populations [15]. In contrast, our study describes an unusual origin of this muscle from the distal part of the muscle belly of the extensor indicis muscle and its bundles have no relations to the ulna and interos-



**Fig. 1.** Photograph of the extensor medii proprius muscle (arrow)

seous membrane. Li et al. described multiple variations characterized by the presence of bilateral extensor medii proprius with split tendon of extensor indicis proprius [9], while Holmes et al. noted an unusual origin of extensor medii proprius from the lunate bone [5]. The existence of extensor indicis and medii communis muscle has also been discussed [12]. It may be considered as a variation of extensor medii proprius, but its tendon splits into two parts and has attachments to both index and middle fingers [14]. The explanation for the observed variants of the extensor muscles may be associated with the embryonic development. It is known that the dorsal muscle mass of the forearm differentiates into superficial, radial and deep portions. The origin of extensor medii proprius muscle may be associated with the superficial and deep portions, because further they differentiate into muscles, which pass through the metacarpophalangeal joints [11].

Knowledge of anomalous extensor muscles in the dorsal forearm is clinically important. In the field of hand surgery, the tendon of extensor indicis muscle is widely used for tendon grafts [7]. The reason for this is that the extensor digitorum has also an attachment to the index finger. When an additional muscle is present, as the described extensor medii proprius, its tendon may be used for grafting procedures instead of the extensor indicis muscle. Furthermore, the presence of anomalous muscles can be misdiagnosed as ganglion cysts or palpable tumors [5]. Clinical examination may be useful with regard to the differential diagnosis – in a case of variant muscle, it becomes more prominent with active extension of the wrist and fingers, while the wrist flexion demonstrates a ganglion cyst better [2]. Because of the high incidence of variant extensor muscles in the dorsal forearm, any surgical procedures should be planned in advance, because the inappropriate dissection may lead to direct injury to the muscle bundles and postoperative functional reduction can be observed. To help the identification of anomalous muscles, new imaging techniques such as magnetic resonance imaging can be used [10].

## Conclusion

The described extensor medii proprius muscle is characterized by an unusual origin. It represents one of the numerous variations of the extensor muscles of the forearm and should be taken into consideration during surgical procedures in the back of the wrist and hand.

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