Accessory slips of the extensor digiti minimi

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Abstract

During the educational dissection of a 69-year-old Chinese male cadaver, an extensor digiti minimi (EDM) with five slips on the right hand was discovered. Except for the two slips of the little finger, the two radial slips were inserted into the dorsal aponeurosis of the middle finger and the ring finger, respectively. The middle slip was connected to the junctura tendinum in the fourth intermetacarpal spaces. Variations in this region are of paramount importance for the reconstructive surgeons, who may utilize the accessory slips to restore functional capacity of the fingers.

Keywords: extensor digiti minimi, tendon, variant, clinical significance.

Introduction

The common pattern of the extensor digiti minimi (EDM) is a single tendon at the origin, which split into two and inserted as two slips into the dorsal aponeurosis of the little finger [1–3]. However, variation of the extensor tendon anatomy has been well-documented [3–6]. In particular, the EDM had been noted to consist of multiple tendon slips and may have variable attachments to the extensor digitorum communis (EDC) [3, 7–9]. The EDM tendon may be used for tendon transfer in cases of median and ulnar nerve palsy [10], correction of small finger abduction [11], and in the treatment of metacarpal synostosis [12].

Seradge et al. [13] reported an EDM with three slips; two slips to the little finger and one to the ring finger. Le Double [14] described a case in which the EDM exhibited four tendons, two for the little finger and one each for the ring and middle fingers. In 1543, Vesalius [15] described an EDM supplying the 4th and 5th fingers. However, in this study, the tendon of the EDM split into five slips that supplied the 3–5 fingers.

Materials and Methods

The 69-year-old male cadaver belonged to the Department of Anatomy of Jining Medical University, Shandong, China. It was obtained in accordance with the ethical and legal recommendations of the University, following the Ethical Principles for Medical Research Involving Human Subjects (Declaration of Helsinki). The cadaver was fixed in buffered formalin (4% neutral solution of formaldehyde) for at least three months.

After fixation, the specimen was carefully dissected in order to expose the structures of the upper limbs. The skin and superficial fascia on the back of each hand were removed; the extensor retinaculum was longitudinally opened to expose the tendons, intertendinous fascia and junctura tendinum. The extensor digitorum communis (EDC) tendons were separated laterally to expose the EDM. Representative photographs of the dissection were taken.

Results

The EDM muscle originated from the posterior surface of the lateral epicondyle and the muscle belly traveled between the extensor digitorum communis (EDC) and extensor carpi ulnaris (ECU). The tendon of EDM split into the ulnar (EDM-ulnar) and radial slips (EDM-radial) just proximal to the extensor retinaculum. The extensor digitorum communis to little finger (EDC-little) was absent and the slip of the EDC-ring deviated to attach on a junctura tendinum.

The EDM-radial again split into two slips, namely the EDM-medi and the EDM-ring. The EDM-medi ran beneath the EDC-ring and was inserted into the extensor aponeurosis of the middle finger, ulnar side of EDC-medi. The EDM-ring coursed forward, inferior to the junctura tendinum of the fourth intermetacarpal space and was inserted into the extensor aponeurosis of the ring finger, ulnar side of EDC-ring.

The EDM-ulnar split into three slips; two slips inserting to dorsal aponeurosis of the little finger and one to the junctura tendinum in the 4th intermetacarpal space, creating a “Y” shape (Figure 1).

Discussion

A common description of the extensor mechanism to the little finger was a single slip of the EDC and two slips of the EDM inserting into the extensor hood [16]. However, EDM may have the following variations [17–19]: (1) EDM was absent and substituted by a slip of the extensor communis or by a slip by the extensor carpi ulnaris; (2) EDM was doubled, both muscle and tendon; (3) EDM with doubled tendons, the lateral one going to the ring finger, and the other to the little finger; (4) EDM with treble tendon, two going to the little finger and one to the ring finger; (5) EDM may receive an accessory slip from the common extensor.
The EDC to the little finger was usually absent [20], an incidence from 15% to 92% [11, 21–23]. Variations of the EDC contribution to the small finger were classified into three types in accordance with previous publications [24]: type A was an EDC tendon that lay over the 4th metacarpal and then bifurcated with one limb passing radially to the ring finger and the other ulnar limb passing to the extensor expansion of the little finger; type B was reported rarely [6, 7, 24, 32]. Variation of this case was sometimes connected with the medial slip of EDM [30]. Kaplan and Spinner [19] published a study of 10% [3, 4, 6–9, 24, 28, 31, 32], and four slips of EDM was reported rarely [6, 7, 24, 32]. Variation of this case may be important for academic and clinical purpose. Such variation may help check any inadvertent injury during hand surgery or help in planning tendon graft surgeries.

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References

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