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Case Report
Indicis Brevis

Extensor Indicis Brevis Replacing Extensor Indicis Bilaterally - A Case Report and Surgical Considerations

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The anatomical variation while dissecting a particular region may go unrecognised. It becomes the responsibility of anatomist to identify and report such variations as they greatly influence diagnostic accuracy, surgical approaches and therapeutic outcomes. During the routine dissection of extensor aspect of forearm and dorsum of the hand, the extensor indices, a deeper muscle of extensor compartment which typically guide the extension of index finger was found to be absent bilaterally. In its place, a smaller accessory muscle present on the dorsum of the hand found, identified to be extensor indices brevis bilaterally. This muscle may be present in 2% to 3% population which may be mistaken for pathology of dorsum of the hand. These findings underscore the importance of vigilance during anatomical study and caution during tendon reconstruction procedures to avoid misdiagnosis or surgical complications.

Keywords: Extensor indices brevis, Extensor indices, Extensor digitorum

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Introduction

The anatomical variation while dissecting a particular region may go unrecognised. It becomes the responsibility of anatomist to carefully notice and report such variations which may be a guide of light for the diagnosis, treatment or surgical approach. Sometimes the variation may be congenital or also as a result of physical stress pertaining to certain profession.

Similarly, there may be number of variations in the extensor compartment and the dorsum of the hand. The extensor compartment muscles which are twelve in number, are anatomically organized into superficial and deep groups. Seven muscles are present superficially and five are deep.

Extensor Indices (EI), one among the deep muscles of the extensor compartment has the origin from the posterior surface of ulna distal to extensor pollicis longus and from the adjacent interosseous membrane. It is a narrow, elongated muscle which lies parallel to extensor pollicis longus.**[1]** The tendon passes through the fourth compartment containing the tendons of extensor digitorum; opposite the head of the second metacarpal bone, it joins the ulnar side of the tendon of the extensor digitorum (ED) for the index finger.**[2]**

Sometimes the tendon of extensor indices brevis (EIB) may be interrupted on the dorsum of the hand by an additional muscle belly calling it as extensor indicis brevis manus.**[3]** This muscle may be present in 2% to 3% population which may be mistaken for pathology of dorsum of the hand. It is found slightly dominant in males. Action of this muscle is the extension of metacarpophalangeal joint of index finger. It receives blood supply from posterior interosseous artery and nerve supply from posterior interosseous nerve.

The knowledge of anatomical variations plays a crucial role in understanding various symptoms of disease and also prevent the misinterpretation of the diagnostic tools. For the surgeons the knowledge of anatomical variation is must to prevent the mishaps.

Materials and Methods

The routine dissection was carried out on a 10% formalin fixed male cadaver of 75 Years old at Department of Rachana Sharir, National Institute of *Ayurveda*, Jaipur. The cadaver was received through voluntary body donation program. The study adhered strictly to established ethical standards.

The dissection was carried out on the extensor compartment of forearm and dorsum of the hand. standard incisions were made and the skin was reflected. Following the removal of the superficial fascia, the extensor retinaculum, a specialized thickening of the deep fascia was exposed. The six osseofibrous compartments formed beneath the retinaculum were clearly identified.**[4,5]**

All seven superficial extensor muscles were meticulously traced from their respective origins.

Case Report

During the routine dissection of the extensor compartment of the forearm and dorsum of the hand, in a formalin fixed male cadaver, standard incisions were made and the skin was reflected.

Following the removal of the superficial fascia, the extensor retinaculum, a specialized thickening of the deep fascia was exposed. The six osseofibrous compartments formed beneath the retinaculum were clearly identified.

All seven superficial extensor muscles were meticulously traced from their respective origins. We found these unusual findings and are reported below.

Upon proceeding to examine the deep muscles of the extensor compartment, only four of the five expected muscles were observed. The EI, typically found within the fourth extensor compartment, was notably absent. In this compartment, only the tendons of ED were present.

Upon careful dissection and clearance of the ED tendons, an unusual fusiform shaped muscle belly was identified on the dorsum of the hand. This muscle originated from the base of the fourth extensor compartment, with single belly measuring approximately 8.5 cm in length and width of 1.8 cm and gave rise to a long tendon having length of 7.2cm that inserted onto the middle phalanx of the index finger.

Based on its origin, insertion, and morphological characteristics, this accessory muscle was identified as an extensor indicis brevis (EIB).

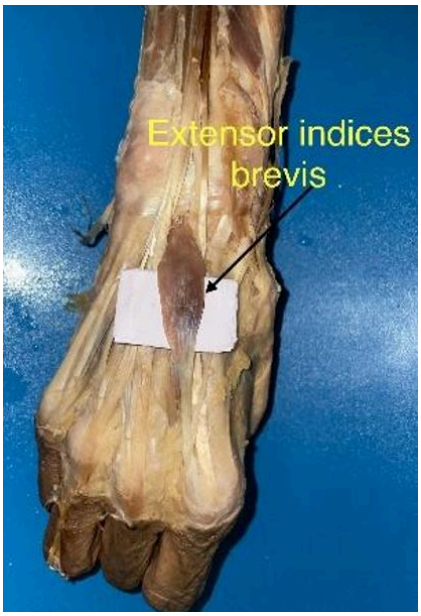

Figure 1: Showing the extensor indices brevis muscle belly on the dorsum of the left hand.

Figure 2: Showing the dimension of EIB muscle having width of 1.8cm.

Discussion

Eventhough the variations in muscles and tendinous distribution of the dorsum of the hand and wrist are common, the presence of EIB is relatively rare. One more point to be noted here is the absence of EI, where many of them reported the presence of EIB along with EI. del Índice, M. E. C. et al (2012) noted the origin of the muscle was noted be in the form of ligament and over the dorsum of scaphoid and trapezoid bones with insertion along the dorsal indices aponeurosis.**[6]**

Esakkiammal et al. (2017) reported an additional fusiform muscle belly of the extensor indicis arising from the dorsal carpal ligament in the left hand. This accessory belly joined the main tendon distally and gave a small medial slip that merged with the dorsal hand fascia near the head of the third metacarpal.

In the right hand, the extensor indicis extended up to the dorsal carpal ligament, from which a slender additional belly originated and merged with its main tendon unlike in this case where extensor indices is found absent.**[7]**

Hirai (2001) et al., Out of dissection of 548 cadavers only in 1 cadaver, the Extensor digitorum brevis manus (EDBM) as a variant of EIP was found in 1 specimen. The EDBM originated from the proximal portion of the radiocarpal ligament and ran ulnar to the EDC-index with the absence of EIP.**[8]**

Solomon (2021) et al., reported single belly of EIB 4.1cm x 0.4cm in right extremity having originating from ulnar styloid process and inserted as a tendon to the proximal phalanx of index finger.**[9]**

Table 1: Comparing the attributes of extensor indices brevis by various authors

Author	Origin	Insertion	Dissected hand	Length in cm	Thickness in cm	Gender	Extensor Indices
Our finding	Base of the fourth extensor compartment	Middle phalanx of the index finger	Bilateral	8.5	1.5	Male	Absent
Solomon	Ulnar styloid process	As a tendon to the proximal phalanx of index finger	Right	4.1	0.4	Male	Present
Hirai	The proximal portion of the radiocarpal ligament	Ulnar to the EDC of index finger	-	-	-	-	Absent
Garvelotti Junior, et.al	Ligament and over the scaphoideum and trapezoideum	Dorsal aponeurosis of the indices	Left	6.6	2.1	Male	
G. Paraskevas[10]	Joint capsule of carpus beneath extensor retinaculum	Ulnar side of the basis of the proximal phalanx of the long finger	Right	9	-	Male	Present
A. Iliev[11]	Joint capsule and ligaments of scaphoid and lunate	Ulnar side of the index extensor digitorum communis tendon	Left	4.5	0.55	Male	Present
Jing Li[12]	Joint capsule and ligaments of scaphoid and lunate.	Ulnar side of index extensor digitorum communis tendon	Bilateral	Rt - 3.6 cm Lt - 4.6 cm	Rt - 1.1 cm Lt - 0.75 cm	Male	Present

EIB is the muscle which guide in the extension of metacarpophalangeal joint of index finger. In living, EIB may present as a painful swelling and may be sometimes mistaken for the presence of ganglion. Sometimes this muscle may compress the underlying nerve which may result in pain. Careful identification of the muscle must be done before the performance of tendon reconstruction surgery.

Conclusion

The knowledge of variation plays a crucial role in diagnostic and treatment aspect in healthcare. The presence of EIB sometimes may result in pain and swelling of the dorsum of the hand, which may be mistaken for ganglion. To prevent such misdiagnosis, it becomes important to report such variations. The knowledge of variations in the tendinous distributions of ED and EDM muscles also play a vital role in tendon reconstruction surgery.

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