



## VARIATIONS IN THE EXTENSOR TENDONS OF HAND

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### ABSTRACT

Extensor Indicis (EI) and Abductor Pollicis Longus (APL) are known for different variations with respect to their attachments. During routine dissection of undergraduate students of batch 2013, in a 57 years formalin fixed old male cadaver, we observed two tendons of Extensor Indicis (EI) muscle bilaterally. One passes with Extensor digitorum (ED) tendon and other inserts on capsule of second

metacarpo-phalangeal joint. We also noted that the tendons of Extensor Indicis (EI) lies on radial side of Extensor digitorum (ED) tendons. There were three slips (tendons) of insertion of Abductor Pollicis Longus (APL) on both the sides of cadaver. Knowledge of presence of such additional tendons is definitely useful for an operating surgeon performing tendon repairs, tenoplasties or tendon transfers.

**KEY WORDS:** Extensor indicis, Abductor pollicis longus, Extensor digitorum, Variation.

### INTRODUCTION

The Extensor Indicis (EI) muscle arises from the posterior surface of ulna distal to the origin of extensor pollicis longus muscle and from the adjacent interosseus membrane. The tendon of the muscle passes below the extensor retinaculum and lodges in a compartment deep to the tendons of extensor digitorum with which it shares a common Synovial sheath. Close to the head of second metacarpal bone, the tendon joins with the index tendon of extensor digitorum on its ulnar side and enters in the formation of dorsal digital expansion of the index finger.

The Abductor Pollicis Longus muscle arises, distal to the supinator and close to extensor pollicis brevis, from the posterior surface of the shaft of ulna, distal to anconeus, from adjoining interosseus membrane and from middle third of posterior surface of radius distal to the attachment of supinator. Muscle emerges downwards and laterally between posterior and lateral groups of superficial and extensor muscles and forms a tendon just proximal to the wrist, this runs in a groove on the lateral side of distal end of radius accompanied by the tendon of extensor pollicis brevis. The tendon is inserted into the radial side of base of first metacarpal bone.<sup>[1]</sup>

A variation in insertion of extensor tendons of forearm in hand and wrist is not a rare phenomenon. Various studies have reported about splitting of the Abductor Pollicis Longus muscle (APL) and presence of more than one tendon of insertion of Extensor Indicis (EI).<sup>[2-4]</sup>

### CASE REPORT

During routine dissection of undergraduate students, in a formalin fixed 57 years old male cadaver, we observed two tendons of Extensor Indicis muscle (EI) bilaterally. One tendon of Extensor Indicis muscle joins with the index tendon of extensor digitorum on its radial side and enters in the formation of dorsal digital expansion of the index finger. Other tendon of Extensor Indicis muscle inserts on dorsal aspect of capsule of second metacarpo-phalangeal joint (fig 1 & 2). We also observed that the Abductor Pollicis Longus muscle (APL) was with three tendons (slips) and inserting on the radial side of base of first metacarpal bone by three tendons on both the sides of cadaver (fig 3 & 4).

### DISCUSSION

The extensors of the forearm are known to exhibit wide range of variations. Out of all the extensors muscles of forearm the Extensor Indicis is known for its variations.<sup>[2-4]</sup> According to the author the most frequent variation of EI and that supernumerary tendon of EI are more frequently encountered on the ulnar side of the ED tendon for the index finger than on the radial side.<sup>[4]</sup> But in our study we observed that both the tendons of Extensor Indicis muscle lies on radial side of index tendon of extensor digitorum and joins with the index tendon of extensor digitorum on its radial side. So the operating surgeon should keep in mind about this variation. In the literature the variations of EI were classified into four types. Type 1 includes cases in which EI had a single muscle belly and one tendon at the proximal part which split into two slips. Cases possessing two tendons arising from the muscle were classified into

types 2 and 3. The variation having a radially positioned supernumerary tendon in addition to EI was classified as type 2. In type 3, the supernumerary tendon was found on the ulnar side of EI and was inserted into the long finger. EI with three tendons arising from the muscle was classified as type 4.<sup>[4]</sup> Our case fits in to type 2. The additional tendon of EI having an insertion on the dorsal aspect of the capsule of second metacarpo-phangeal joint may probably result in the pathology of the joint capsule or the joint it self which may result in the ganglion formation or may restrict the movements of the joint. The EI muscle allows independent extension of the index finger. The muscle itself is frequently used for tendon transfer. The additional tendon of EI may be better used in the tendon transfer or grafting. The EI is the muscle that is affected in extensor indicis proprius syndrome.<sup>[5]</sup> Proliferative tenosynovitis in the fourth compartment is common in patients with rheumatoid arthritis. There was a study done on patients presented with a painful wrist mass over fourth extensor compartment with characteristic limitation of active wrist extension with fingers extended and improvement when the fingers were flexed into a fist. In this group of patients surgical tenosynovectomy yields excellent results.<sup>[6]</sup> An author reported a unique case of an anomalous extensor indicis causing a painful snapping wrist.<sup>[7]</sup> So the through or sound grasp of knowledge of such variations is important to understand the consequences of tendon injury and to plan and undertake repair for the surgeons. A suspicion of variation should arouse in the mind of radiologist while reporting and an anatomist while dissecting the cadaver. Sarikcioglu et al. reported an APL consisting of seven tendon slips in one case. The medial two inserted into the abductor pollicis brevis, the other five inserted into the base of the first metacarpal bone. In the right side of the same case, the abductor pollicis longus consisted of three bellies.<sup>[8]</sup> Martinez and Omer reported that bilateral subluxation of the trapeziometacarpal joint was due to an abnormal insertion of the APL tendon. They found that the APL tendon had four slips, all inserted into the fascia of the abductor pollicis brevis muscle, distal and palmar to the trapeziometacarpal joint.<sup>[9]</sup> Developmentally, in the forearm, the precursor extensor muscle mass differentiates into a radial portion which subsequently divides into superficial and deep portions. The superficial portion differentiates into the ED, extensor carpi ulnaris, and extensor digiti minimi. The deep portion, gives rise to the abductor pollicis longus, extensor pollicis brevis, extensor pollicis longus and extensor indicis. Comparative anatomical studies in primates suggest that the deep portion undergoes marked variations.<sup>[10]</sup> Variations recorded in this study could be explained by alterations in the deep portion of extensor muscle mass.





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