

Abductor Pollicis Longus: A Study of 50 South Indian Cadavers

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ABSTRACT

The abductor pollicis longus (APL) muscle has been studied bilaterally in 50 cadavers. In one of the specimens we observed an additional muscle belly arising from the lateral aspect of the distal portion of the typical abductor pollicis longus muscle unilaterally on the left side. The tendon of additional belly inserted to the abductor pollicis brevis, opponens pollicis and flexor pollicis brevis muscles. Whereas the normal APL tendon inserted to the first metacarpal bone. Morphologic features of the abductor pollicis longus muscle are important because of its role in the stabilization of the carpometacarpal joint of the thumb. The presence of such a variation could contribute to the plastic reconstructions of the hand and the clinical evaluation of thumb functions. An understanding of this unusual finding may be clinically relevant in describing the dorso-lateral compartment of the distal forearm. ©2007, Fırat University, Medical Faculty

Key words: *Abductor pollicis longus muscle, Insertion, Forearm, Variation*

ÖZET

M. Abductor Pollicis Longus: Güney Hindistanlı 50 Kadavra Üzerinde Yapılan Bir Çalışma

M. abductor pollicis longus 50 kadavra üzerinde bilateral olarak çalışıldı. Kadavraların bir tanesinde tek taraflı olarak, m. abductor pollicis longus distal parçasının lateral yüzünde yükselen ilave bir kas karnı gözlemledik. Bu ilave kas karnının tendonu m. abductor pollicis brevis, m. opponens pollicis ve m. flexor pollicis brevis kaslarına tutunmaktaydı. Oysa normal olarak m. abductor pollicis longus tendonu birinci metakarpal kemiğe yapışmaktaydı. Art. carpometacarpea pollicis'in stabilizasyonundaki rolünden dolayı m. abductor pollicis longus'un morfolojik yapısı önemlidir. Böyle bir varyasyonun varlığı el fonksiyonlarının klinik olarak değerlendirilmesi ve ele yapılacak olan plastik cerrahi yaklaşımlar açısından anlamlıdır. Bu sıra dışı bulguların bir önemi de, ön kolun distal kısmının dorsolateral kompartmanının kliniğiyle alakalı olmasıdır. ©2007, Fırat Üniversitesi, Tıp Fakültesi

Anahtar kelimeler: *Musculus abductor pollicis longus, İnsersiyö, Önköl, Varyasyon*

The typical muscular arrangement in the region at the base of the thumb and along the dorso-lateral aspect of the forearm involves three muscles that act on the thumb. Moving from lateral to medial across the dorsal aspect of the deep compartment in the posterior forearm these muscles are the abductor pollicis longus, extensor pollicis brevis (EPB), and the extensor pollicis longus (1). The most common description of the proximal attachments of the abductor pollicis longus lists the dorsal surface of the middle one-third of the ulna and radius and the interosseus membrane between the ulna and radius as attachment sites (1, 2). The muscle belly traverses the deep compartment of the posterior forearm to emerge superficially as it spirals around the distal dorso-lateral surface of the radius. At this point the APL normally crosses over the tendons of the extensor carpi radialis longus (ECRL) and extensor carpi radialis brevis (ECRB) (1). The most common point of distal attachment for the APL is typically given to be the base of the first metacarpal (1-3). The distal attachment of the abductor pollicis longus tendon demonstrates a close relationship with the carpometacarpal (CMC) joint of the thumb and helps in stabilizing it (3, 4). This important association demonstrates the clinical significance of tendon and muscle variations in this region for consideration in re-constructive hand and thumb surgery. Considering the importance of thumb and wrist mobility in hand function and the complexity of surgical

procedures currently being used to remedy dysfunction in these areas an awareness of anatomical variations in this region would be useful to many healthcare professionals.

MATERIALS AND METHODS

50 South Indian cadavers were dissected in the Melaka Manipal Medical College Anatomy Laboratory. One of the specimens revealed an unusual abductor pollicis longus (APL) muscle.

RESULTS

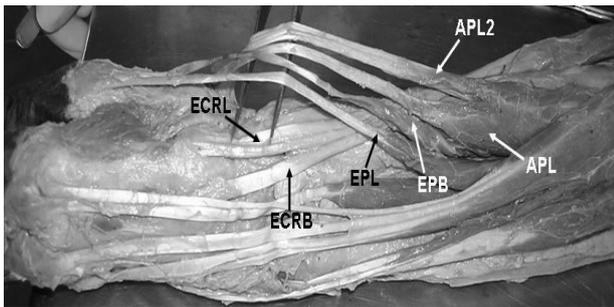
There was an additional belly arising from the lateral aspect of the distal portion of the typical APL muscle just proximal to the formation of its tendon (Figure. 1) on left side. The tendon of this additional muscle belly (APL2) extended from the belly of the APL, coursed superficial to the ECRL and ECRB tendons, and attached to abductor pollicis brevis, opponens pollicis and flexor pollicis brevis muscles. In our study (Table. 1) only in 30 cases there was a single tendon of abductor pollicis longus and in most of them it was either double or multiple. Slips from APL tendon proceeded for attachment to trapezium, thenar fascia, abductor pollicis brevis or opponens pollicis.

Table 1. Number of tendons, their insertion, and number of additional bellies of Abductor Pollicis Longus (APL) muscle observed

No. of upper limbs	No. of APL tendons	Insertion							No. of Additional bellies
		Base of 1 st metacarpal Lateral surface	Anterolateral surface	Trapezium	Abductor pollicis brevis	Opponens pollicis	Thenar fascia		
30	1	12	18	0	0	0	0	0	
50	2	0	0	15	22	8	5	1	
11	3	0	0	3	5	2	1	0	
9	4	0	0	3	4	1	1	0	

Abductor pollicis longus tendon was single in only 30%, in all of these cases the tendon was getting inserted on to the base of first metacarpal bone (in 40%, on the lateral surface and in 60%, on the anterolateral surface) and in the remaining cases two or multiple tendons were present (Two tendons in 50% and multiple in 20%). The accessory tendons were found to be inserted on to trapezium (30%), abductor pollicis brevis (44%), and opponens pollicis, (16%) or merging with thenar fascia (10%).

However an additional belly was seen in only one specimen, which is reported here. Whereas the rest of the variations we found were of abnormal attachment of APL tendon, splitting of the tendon into two or multiple tendons.

**Figure 1.** Anomalous abductor pollicis longus

APL- abductor pollicis longus, APL2- additional belly of abductor pollicis longus, EPB- extensor pollicis brevis, EPL- extensor pollicis longus, ECRL- extensor carpi radialis longus, ECRB- extensor carpi radialis brevis

DISCUSSION

Reports in the literature suggest that variations in the numbers of APL tendons, distal attachment sites of the tendons, and the

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structure of the APL can have clinical relevance. It has been suggested that variations in the number of APL tendons and corresponding osseo-fibrous canals are involved in the etiology and subsequent surgical decompression of DeQuervains Syndrome (5-7). An incomplete understanding of the possible variations in the dorso-lateral forearm can lead to inadequate surgical decompression of DeQuervains Syndrome (6). Patel and Desai (8) described a case report of a patient with an extension of the APL muscle belly into the first dorsal compartment under the extensor retinaculum producing wrist and thumb pain with activity. Additionally, Martinez and Omer (9) described a case where the tendons of the APL inserted into the fascia of the abductor pollicis brevis resulting in laxity and repeated subluxation of the trapezometacarpal joint bilaterally. It has also been shown that the confining nature of the intersection area where the APL and EPB cross over the tendons of the ECRL and ECRB in the dorsolateral forearm can contribute to Intersection Syndrome or peritendinitis crepitans (10-12). One can only speculate regarding the mechanical significance of the current finding. Further significance may lie in the ability of an APL2 tendon to contribute as a stabilizer of the CMC joint (3, 4). In surgery, the APL tendon can be used for interposition arthroplasty in cases of osteoarthritis of the first carpometacarpal joint (13), as a tendon transfer to restore extension of the thumb (14) or to restore the first dorsal interosseous muscle (15), and for tendon translocation for chronic subluxation of the carpometacarpal joint of the thumb (16). Additional clinical significance lies in the understanding of the prevalence of the current finding to aid in a more complete and accurate description of the dorso-lateral compartment of the distal forearm for surgical approaches. The APL is an important muscle for the function of the human thumb and hand, and knowledge of its function is important in clinical assessment and reconstructive surgery.

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