

Original article:

A Cadaveric Study of Abductor Pollicis Longus Muscle

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Abstract

Background: Abductor pollicis longus muscle is known to exhibit numerous variations.

Aim: To study the abductor pollicis longus muscle with respect to its origin, insertion and innervation.

Materials and methods: In the department of anatomy, BJGMC, Pune, 100 hands were dissected and abductor pollicis longus muscle was studied in details.

Results: In our study, in 31% cases, there was a single tendon of abductor pollicis longus muscle, which was found to be inserted into base of first metacarpal. While interestingly, in 69% cases it showed multiple tendons (56% cases two tendons, 12% cases three tendons, one case four tendons).The additional tendons were found to be inserted at multiple sites like trapezium, abductor pollicis brevis muscle and thenar fascia.

Conclusion: Anatomical knowledge of such variations may be important for surgeons performing surgeries in dorsolateral region of hand and also in surgical decompression of de Quervain's syndrome.

Key Words: Abductor pollicis longus, variations, de Quervain's syndrome.

Introduction

The first extensor compartment of wrist involves abductor pollicis longus and extensor pollicis brevis tendons along with their synovial sheaths. Among these extensor tendons, abductor pollicis longus is the commonest one for its variation in the form of multiple tendons at its insertion site.¹ This muscle takes origin from the posterior surface of radius, ulna and the interosseous membrane. It is inserted into the base of first metacarpal and may have an additional attachment to trapezium bone.²

Many researchers have reported multiple tendons of APL few to name are Stein AH³, Lacey T⁴, Baba MA.⁵ In present study, we observed that APL has multiple sites of insertion around the first carpo metacarpal joint. This implicates an important role of APL in stabilizing this joint. Furthermore, additional tendons of abductor pollicis longus at the site of insertion may be used for reconstructive surgeries of hand. So, considering the importance of thumb and hand in humans, a complete anatomical knowledge of this region is extremely important for surgeons doing reconstructive surgeries of hand.

Materials and methods

Material for present study comprised of 10% formaldehyde solution fixed cadavers. In the department of anatomy, B.J.G.M.College, Pune, 100 hands were dissected in these cadavers according to cunnighams manual.⁶ Abductor pollicis longus muscle was studied in details with regard to its origin, insertion and innervation.

Results

In present study, origin of abductor pollicis longus muscle was found to be normal and innervation was by posterior interosseous nerve in all cases. But at the site of insertion, variation of APL muscle was observed in the form of two or more tendons. Only in 31% cases, a single tendon of abductor pollicis longus muscle was noted and it was found to be inserted into base of first metacarpal. Where as in 69% cases we found multiple tendons. Among these, in 56% cases abductor pollicis longus muscle showed two tendons, in 12% cases, it showed three tendons and in one case we noted maximum four tendons. (Refer table 1)

Table 1 Showing details of number of tendons and sites of insertions of Abductor pollicis longus muscle

No of tendons	No of hands	Insertion			
		Base of first metacarpal	Trapezium	Abductor pollicis brevis	Thenar fascia
1	31	31	0	0	0
2	56	56	37	17	2
3	12	12	10	9	5
4	1	2	0	0	2



Fig.1 Ventral View of Hand showing anomalous abductor pollicis longus
APL1- abductor pollicis longus inserted into base of first metacarpal
APL2- abductor pollicis longus inserted into trapezium
APL3- abductor pollicis longus inserted into abductor pollicis brevis muscle
APB- abductor pollicis brevis
EPB- Extensor pollicis brevis
EPL- Extensor pollicis longus

Discussion

Variations in the anatomy of first extensor compartment have been associated with development of de Quervain's syndrome.³ An incomplete knowledge of such variations may lead to inadequate surgical decompression of de Quervain's syndrome.⁷ The variations of the APL tendons have been reported by many workers. It may be stated that it is exceptional to find a single tendon or the insertion of APL muscle.⁸ Duplication and triplication of APL has been frequently reported^{4,5} and similar findings were also observed in the present study. Maximum nine tendons were reported by Dil Islam Mansur⁹ whereas present study reports maximum four tendons. The presence of multiple tendons may be important for surgeons performing reconstructive surgeries in dorsolateral compartment of hand. In surgery, APL tendon can be used as a tendon transfer to restore extension of the thumb¹⁰, or to restore index abduction in severe cases of cubital tunnel syndrome¹¹ and also to restore the first dorsal interosseous muscle¹². APL tendon can be used for interposition arthroplasty in cases of arthrosis of first carpometacarpal joint¹³. Further, the APL is known to have split insertion in chimpanzees, gorilla and gibbons⁴. The existence of such variation in human beings may be a result of atavism. Hence the presence of such anomalies in human being also underlines the anthropological importance.

Our work is a step towards reviving the findings on APL, but represents only a small subset of the population in the region of Pune and requires extensive furthering of work on APL for better implications.

Conclusion

Hand, which has such an important functional role in human beings, is the most frequently injured part of the body. The complexity and intricacy of hand function can only be revealed by understanding its anatomy. So, the prior knowledge of anatomical variations of APL muscles may be helpful for surgeons while treating de Quervain's syndrome and also during reconstructive surgeries of traumatized hand.

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