

Absent palmaris longus with hypoplastic flexor digitorum superficialis of the little finger: A rare case report

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ABSTRACT

Anatomy of the tendons of the hand is of high clinical importance for plastic and reconstructive surgeons operating on hand and dealing with tendon injuries and hand reconstruction surgery. Among the variations in tendon Anatomy, variants of Flexor Digitorum Superficialis (FDS) and Palmaris longus (PL) are common. Here, we report an 18-year-old male patient, presenting to the emergency department with an alleged history of accidental glass cut injury over the volar aspect of the right wrist. On intraoperative exploration, his FDS of the little finger was hypoplastic and PL was found absent. Clinically, the absence of PL and Hypoplastic FDS to little finger can lead to problems in hand reconstructive surgeries. To the best of our knowledge, this case is the first of its kind where absent PL is associated with hypoplastic and thin FDS of the little finger.

Key words: Flexor digitorum superficialis, Hypoplastic tendon, Palmaris longus, Reconstructive surgeries


Flexor Digitorum Superficialis (FDS) and Palmaris longus (PL) are the muscles of the flexor compartment of the forearm that often exhibit morphologic variations. FDS is the sole muscle in the intermediate layer of the flexor compartment of the forearm [1]. The FDS is innervated by the median nerve and is supplied by the ulnar artery. It has three heads originating from the medial epicondyle of the humerus, anteroproximal radius, and coronoid process of the proximal ulna [2]. The humeral and ulnar heads typically fuse to form the humeroulnar head [1,2]. All three heads form a central belly in the proximal half of the forearm before diverging into four tendons after passing beneath the flexor retinaculum [2]. These tendons insert into the radial and ulnar aspects of the proximal half of the middle phalanx at Camper's chiasm of each digit except that for the thumb [1]. PL, also innervated by the median nerve arises from the medial epicondyle of the humerus and inserts into the palmar aponeurosis after passing superficial to the flexor retinaculum. It acts as a tensor of the palmar aponeurosis along with acting as a weak flexor of the wrist. It has a short muscle belly; a long tendon and distal part of the tendon are replaced by the ligamentous palmar. Because of its anatomical variability, this phylogenetically degenerated expendable tendon assumes importance [3]. PL is commonly used as a tendon graft in various reconstructive surgeries. The

most common variation of PL is its absence being reported in up to 25% [4]. Other variations include reversed, duplicated, bifid, or hypertrophied muscle bellies [4]. Many variations concerning FDS have been reported [5] including hypoplastic FDS [6]. However, there are certain studies publishing an absent PL with weak FDS of the little finger, especially in males [7,8]. We report similar findings in an 18-year-old male patient.

CASE REPORT

An 18-year-old male presented to our emergency department with an alleged history of accidental glass cut injury to the right wrist by slipping on the wet floor and hitting his right hand against the glass window. The patient was brought to the hospital within a half-hour of sustaining injury.

The patient was calm, conscious, cooperative, and well oriented to time, place, and person. The patient was lying supine with his right arm lying by his side with hand supinated, wrist, and fingers in extension. His left wrist radial pulse rate was 88/min, regular, and of good volume. The blood pressure was 112/74 mmHg recorded from the left arm in the supine position. There was a transverse laceration measuring 5 cm × 3 cm on the volar aspect of the wrist approximately 4 cm proximal to the wrist. On examination, the laceration was deep with no underlying bony fracture identified. The proximal cut ends of the radial and ulnar arteries were pulsating and were not palpable

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distal to the laceration though the pulp of all the digits showed normal capillary refill. Sensations at the median nerve and ulnar nerve specific regions were absent with radial nerve spared.

On testing, there was an absence of flexion at thumb metacarpophalangeal (MCP) and Interphalangeal (IP) joint, absence of flexion at 2nd–5th finger MCP, Proximal IP (PIP), and distal IP (DIP) joints, including the absence of flexion of individual digital joint with all other digits held in extension. There was an absence of wrist flexion and ulnar and radial deviation.

The patient was taken to the operating theatre for exploration under general anesthesia. Intraoperatively, the transected ends of the radial and ulnar arteries were identified, flushed with heparin saline to clear off clot, and were clamped with microvascular clamps. Complete transaction of Flexor Carpi Ulnaris, Flexor Carpi Radialis, and Flexor Pollicis Longus were identified and repaired. The Flexor Digitorum Profundus (FDP) of the second-fifth finger and FDS of the second-fourth finger were identified and tagged. The FDS of the fifth (little) finger was found hypoplastic in the form of a single tendinous fiber, lying in close proximation to FDS of the fourth (ring) finger along its ulnar side distally (Figure 1a) as well as proximal to laceration (Figure 1b).

To confirm this finding, we traced this hypoplastic FDS until the head of the fifth metacarpal where it was found running above the FDP and then underneath the A5 pulley (Figure 2). Pulling this hypoplastic tendon flexed the little finger at PIP joint. The PL tendon was found to be absent distally as well as proximally. All the tendons were then repaired with 2 stranded modified Kessler technique nylon 40 along with epitendinous repair with Prolene 6-0, whereas, the hypoplastic FDS was repaired microscopically with Prolene 6-0 using 4 strand Bunnell suture. The microvascular repair of the radial and ulnar arteries was then done, followed by the repair of median and ulnar nerves with 8-0 prolene. The skin was then closed primarily. Postoperatively, the splint was applied in dorsal with the wrist in 30°–40° flexion, MCP joints in 60°–70° flexion while IP joints in extension.

DISCUSSION

The tendon variations in the flexor compartment of the forearm are common and should always be kept in mind while planning surgery in that area. Variations of FDS and FDP muscles of the little finger were observed in two cadaveric studies. In both studies, FDP muscle for the little finger was absent. In one of them, the FDS muscle for the little finger was hypoplastic and in the second case, FDS had a variable insertion [9]. Hypoplastic FDS of the little finger has also been documented by Miura *et al.* who described a spontaneous rupture of the hypoplastic FDS of little finger due to its fibrosis [8]. Wahba *et al.* reported an accessory muscle belly and tendon of the FDP of the little finger with its insertion on the base of the proximal phalanx of the fifth finger [10]. Gonzalez *et al.* observed an absent FDS and doubled tendon of the FDP of the little finger, one of it behaving as FDS [11].

PL is one of the most variable muscles in humans [12]. Although ethnologically degenerate, its tendon is one of the most

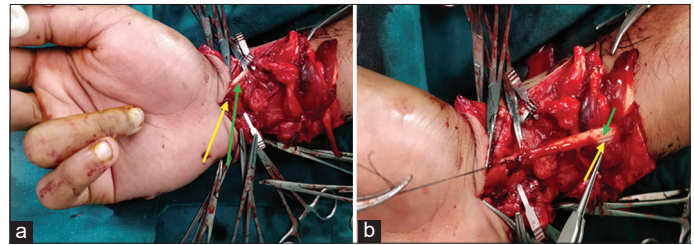


Figure 1: Intraoperative picture. (a) On pulling flexor digitorum superficialis (FDS) of ring finger, both 4th and 5th fingers are getting flexed at metacarpophalangeal and proximal IP joint yellow arrow – Hypoplastic FDS, green arrow- FDS of ring finger; (b) proximal part of hypoplastic FDS with proximal part of FDS of ring finger yellow arrow - hypoplastic FDS green arrow - FDS of ring finger

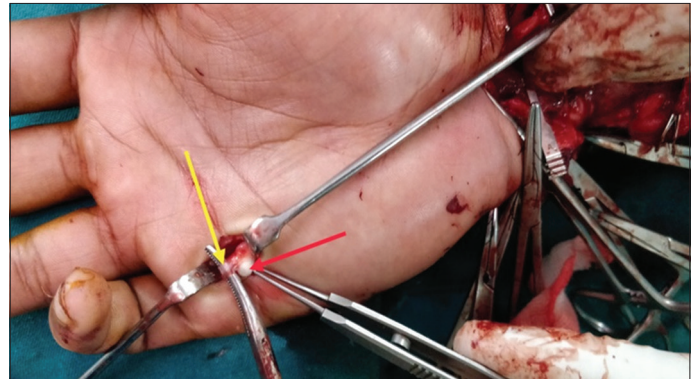


Figure 2: Hypoplastic flexor digitorum superficialis (FDS) little finger and Flexor Digitorum Profundus (FDP) of Little finger at the level of 5th metacarpal head. Functional testing confirms the findings (on pulling FDS, Proximal IP flexion is seen, and on pulling FDP, flexion at distal IP is appreciated). Yellow arrow – Hypoplastic FDS little finger Red arrow – FDP of little finger

sought-after tendons for tendon transfer in various reconstructive procedures. In a cadaveric study, morphological variations in the PL and FDS muscles were found. The PL tendon passed beneath the Flexor retinaculum to get inserted at the base of the middle phalanx of the fourth digit, replacing the tendon of FDS [13].

According to Aggarwal *et al.*, the overall prevalence of weak FDS in the little finger irrespective of PL was 16.10%. When deficiency of the FDS in the little finger was compared with absent PL, the overall incidence was 4.15%, which was statistically significant. Furthermore, the same study stated the sex-wise distribution of weak FDS with absent PL was found statistically significant in males while in females it was statistically insignificant [7]. In our case also, the hypoplastic FDS of the little finger along with absent PL was seen in a male.

The congenital absence of the PL tendon could co-exist with a variation of the FDS tendon of the little finger. A study concluded, in patients with an absent PL tendon, the FDS of the little finger is weak, especially in males [7]. Our case also describes a similar co-relation of PL and FDS in a male patient. However, most of the studies did not find a statistically significant association between the two tendons [12,14].

We found these findings in our patient on the right side as the glass cut was sustained on the right side. We cannot comment on the existence of similar findings on the left side if any. Our

observation is supported by a study conducted by Mugalur *et al.* who published a statistically significant association between the PL and the FDS tendons on the right side [15].

CONCLUSION

PL and FDS of the little finger are the most common tendons of the hand with variable anatomy and our reported case supports the various studies that prove that there occurs an association between the two. Thus, it is important to know the intrinsic anatomy of the individual hand before planning any reconstructive hand surgery such as opponensplasty or tendon transfer, where FDS of the little finger and PL tendons are most commonly used since these two can present with significant anatomical variations as in our case.

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