IJAE
Vol. 124, n. 3: 333-336, 2019
ITALIAN JOURNAL OF ANATOMY AND EMBRYOLOGY

Research Article - Human Anatomy Case Report

An accessory tendon of flexor digitorum superficialis to the fifth digit

Logan S. Bale[1,2,*], Sean O. Herrin[1]

[1] Department of Basic Sciences, University of Western States, Portland, Oregon, USA 97230
[2] Department of Biomedical and Molecular Sciences, Queen's University, Kingston, Ontario, Canada K7L 3N6

Abstract

Variations of the muscle belly and tendon of flexor digitorum superficialis to the fifth digit are common. We encountered an unusual variant during routine educational dissection; an accessory tendon of flexor digitorum superficialis that united with the tendon of flexor digitorum profundus to the fifth digit. This variant is not documented in the literature. Known variations of flexor digitorum superficialis to the fifth digit are discussed to allow for comparison with the variant identified in this report. The potential clinical significance of the variant is speculated upon.

Keywords

Variant, tendon, flexor digitorum superficialis, flexor digitorum profundus, extremity.

Introduction

Flexor digitorum superficialis (FDS) is the sole muscle of the intermediate layer of the anterior forearm. It arises as two distinct heads (humeroulnar and radial), inserts via four tendons onto the middle phalanges of digits 2-5, is innervated by the median nerve, and is supplied blood by the ulnar artery. Variations associated with the muscle belly and tendon of flexor digitorum superficialis to the fifth digit (FDS-V) have been discussed at great length in dedicated reviews and in case reports. To our knowledge, a tendon of FDS that 1) is found in addition to the muscle's four typical tendons, and 2) unites with the tendon of flexor digitorum profundus to the fifth digit (FDP-V) has not been reported in the literature. This variant may be of clinical interest because of its possible role in compression of the median nerve or because it may be encountered unexpectedly during surgical procedures.

Case report

Bilateral variations of the FDS muscles were identified during routine educational dissection of a 77-year-old female cadaver. On each side, FDS featured an accessory tendon that arose from the muscle's humeroulnar head. The accessory tendon did not replace any of the typical tendons of FDS, thus each muscle featured five tendons instead of the usual four.

* Corresponding author. E-mail: bl46@queensu.ca

http://www.fupress.com/ijae
DOI: DOI: 10.13128/ijae-11662

Figure 1. Left upper extremity (1: flexor digitorum profundus muscle, 2: accessory tendon of flexor digitorum superficialis, 3: flexor digitorum superficialis muscle).

On the left side, the accessory tendon of FDS was 18 cm long and 0.3 cm wide (Fig. 1). The most proximal portion of the tendon was located approximately 8 cm superior to the musculotendinous junction of the FDS muscle belly and the typical tendons of FDS. The accessory tendon was located between the muscle bellies of FDS and FDP. Upon entering the hand, the accessory tendon of FDS united with the tendon of FDP-V (Fig. 2). The point of union of the two tendons was approximately 1.5 cm proximal to the decussation of the tendon of FDS-V. The united FDP-V/accessory tendon of FDS coursed through the FDS bifurcation and inserted onto the base of the distal phalanx in the manner that is typical for the tendon of FDP-V.

On the right side, the accessory tendon of FDS measured 13.5 cm in length and 0.3 cm in width. It traveled between the intermediate and deep layers of the anterior forearm and was associated with a small slip of muscle from the humeroulnar head of FDS. The accessory tendon merged with the tendon of FDP-V at the level of the wrist (proximal compared to the point of union on the left side).

Discussion

While variants of FDS-V are common, to the best of our understanding the specific variant documented presently is not reported in the literature. Developmentally, this variant may represent abnormal splitting of the common premuscle mass that gives rise to elements of the intermediate and deep layers of the anterior forearm (Jones, 1966). A brief review of variants of FDS-V is provided for comparison to the present case.

Wood (1867) identified a separate muscle for the little finger which took origin from the medial condyle of the humerus. A connection between the tendons of FDS-V and FDP-V was reported by Macalister (1875), however that case did not involve a long accessory tendon as documented here. An accessory muscle, the flexor digiti minimi longus, was reported by Greiner (2008) and is somewhat similar to the abnor-

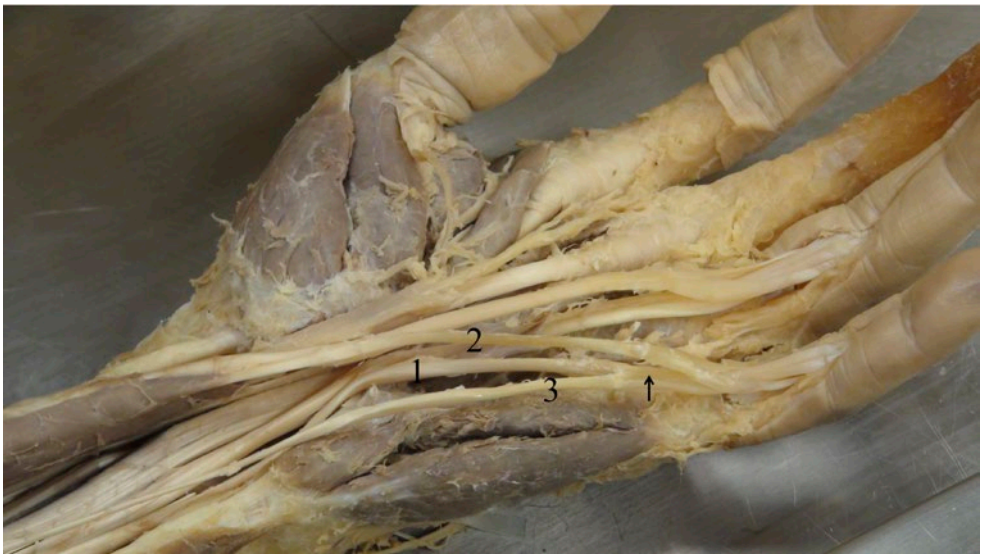

Figure 2. Left wrist and palm (1: FDP-V tendon, 2: FDS-V tendon, 3: accessory tendon of FDS, arrow: united FDP-V and accessory tendons).

mal musculotendinous slip identified in the present case report. As flexor digiti minimi longus featured an origin that was independent of flexor digitorum superficialis, we feel that the variant identified here is not an example of flexor digiti minimi longus. The FDS-V muscle belly may have a digastric appearance, whereby an accessory belly is located in the palm (Gonzalez et al., 1997). The tendon of FDS-V is often absent; the prevalence of this relatively common variation has been determined for a range of ethnicities (see Guler et al., 2013 for a comprehensive summary). If absent, FDS-V may be replaced by a belly that can arise from several locations, such as the medial collateral ligament of the ulna, the palmar aponeurosis, and the fourth lumbrical (Tubbs et al., 2016). There is no link between absence of FDS-V and absence of palmaris longus (Thompson et al., 2002).

Anomalous muscles can cause compression of the median and ulnar nerves (De Smet, 2002). Normal side to side movement of the median nerve has been shown to occur during flexion of the index finger or thumb (Van Doesburg et al., 2010). It is unknown how the actions of FDS and/or FDP would be affected by the accessory tendon described in this case report and whether altered biomechanics, if any, could lead to a peripheral neuropathy. The accessory tendon of FDS-V may cause issues during tendon transfer surgery or other operative procedures of the forearm, wrist, and hand.

Acknowledgements

The authors wish to thank individuals who donate their bodies and tissues for the advancement of education and research. Special thanks to Christopher Zimmerman,

Madison Grahn, Michaela Oehler, Kaylee-Shaye Peters, Justin Souvanlasy, and Robert Spackman for their careful dissection. Funding provided by University of Western States. The authors have no conflicts of interest to declare.

References

De Smet L. (2002) Median and ulnar nerve compression at the wrist caused by anomalous muscles. Acta. Orthop. Belg. 68: 431-438.

Gonzalez M.H., Whittum J., Kogan M., Weinzweig N. (1997) Variations of the flexor digitorum superficialis tendon of the little finger. J. Hand Surg. Br. Eur. 22: 277-280.

Greiner T.M. (2008) An additional flexor of the fifth digit: Flexor digiti minimi longus. Clin. Anat. 21: 792-793.

Guler F., Kose O., Turan A., Baz A.B., Akalin S. (2013) The prevalence of functional absence of flexor digitorum superficialis to the little finger: A study in a Turkish population. J. Plast. Surg. Hand Surg. 47: 224-227.

Jones E.G. (1966) Some unusual muscular anomalies explained embryologically. Acta. Anat. (Basel) 64: 516-530.

Macalister A. (1875) Additional observations on muscular anamolies in the human anatomy (third series) with a catalouge of the principal muscular variations hitherto published. Trans. Roy. Irish Acad. 25: 1-130.

Thompson N.W., Mockford B.J., Rasheed T., Herbert K.J. (2002) Functional absence of flexor digitorum superficialis to the little finger and absence of palmaris longus – is there a link? J. Hand Surg. Am. 27: 433-434.

Tubbs R.S., Shoja M.M., Loukas M. (2016) Bergman's comprehensive encyclopedia of human anatomic variation. Wiley-Blackwell, Hoboken.

Van Doesburg M.H.M., Yoshii Y., Villarraga H.R., Henderson J., Cha S.S., An K.N., Amadio P.C. (2010) Median nerve deformation and displacement in the carpal tunnel during index finger and thumb motion. J. Orthop Res. 28: 1387-1390.

Wood J. (1867) On human muscular variations and their relation to comparative anatomy. J. Anat. Physiol. 1: 44-59.