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## **Debulking and tenolysis of an anomalous flexor digitorum superficialis muscle belly in the palm: A case report and review of the literature**

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### **Abstract**

Flexor digitorum superficialis (FDS) anomalies can manifest in many ways. Prior case reports have described FDS variants being found incidentally as well being associated with nerve compression and mechanical symptoms. We present a case of an 83-year-old woman complaining pain and locking of the right index finger with associated tenderness at the level of the A1 pulley. Surgical exploration revealed an anomalous FDS muscle belly originating from the FDS tendon with adhesions to the flexor digitorum profundus (FDP) tendon. Tenolysis and debulking of the anomalous muscle and its tendon were performed leading to resolution of her symptoms. This case highlights the importance of remaining vigilant for anatomic variants during hand surgeries.

**Keywords:** Flexor digitorum superficialis, anatomic variant, A1 pulley, trigger finger

### **Introduction**

Anatomic variation often poses a unique challenge to hand surgeons when diagnosing and treating patients' concerns. Anomalous flexor digitorum superficialis (FDS) muscle bellies located in the palm are uncommon findings in the human anatomy. Most previously described instances of this variation have been found in cadaveric dissections or incidentally during routine hand surgeries. Although uncommon, FDS variants have been found to mimic other pathology and can cause mechanical symptoms as well as nerve compression [1]. We present a case in which a patient presented with index finger pain and locking with tenderness over the A1 pulley and was found to have an anomalous FDS muscle belly during surgical intervention for a presumed trigger finger.

### **Case Report**

An 83-year-old right hand dominant woman presented to us with complaints of pain in the right volar palm. She was tender at the A1 pulley of the index finger and demonstrated locking of the digit. She was offered a steroid injection on two occasions but refused both times. She did not follow-up until eight months later due to the COVID-19 pandemic during which time her symptoms significantly progressed. At this time, the decision was made to release the A1 pulley for presumed trigger finger.

A longitudinal palmar incision was made overlying the right index finger A1 pulley. Blunt tissue dissection was carefully performed within the subcutaneous tissue, taking care to identify and protect the neurovascular bundles. Dissection was continued until the A1 pulley was encountered. With the neurovascular bundles carefully protected, the A1 pulley was incised. The A1 pulley was then completely divided using tenotomy scissors under direct visualization. When the digit was subsequently brought through flexion and extension, catching remained and tendon gliding was not smooth.

Further exploration revealed an anomalous muscle belly of the FDS (Fig. 1). The muscle belly originated from the FDS tendon approximately 1 cm proximal to the A1 pulley and measured 1.5 cm in length and 1 cm in width. It inserted onto the FDS tendon at the level of the A2 pulley.

Adhesions were noted between the anomalous muscle to the flexor digitorum superficialis and profundus tendons. A tenolysis of the FDS and FDP tendons as well as debulking of the anomalous muscle were performed at the palm and finger level. The digit was then brought through flexion and extension, revealing smooth tendon gliding. The wound was explored and no other lesions or masses were found.

The wound was irrigated using sterile saline and closed using nylon suture. A bulky soft sterile dressing was applied. The patient had tolerated the surgery well and without any complications. At two-week and six-week follow-up, the patient no longer had pain or triggering at the A1 level. She was doing well and had no complaints.



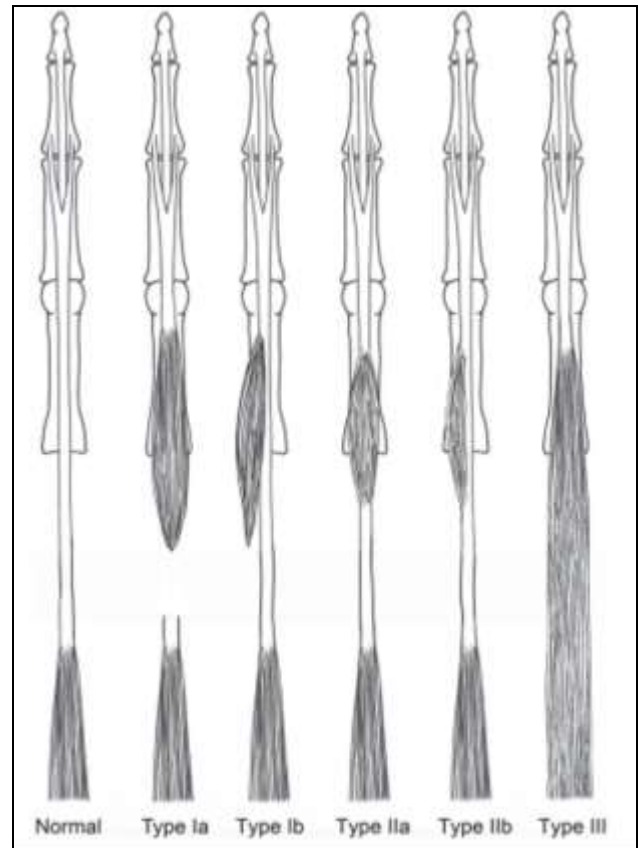
**Fig 1:** Anomalous FDS muscle belly present at the A1 pulley of the index finger

### Discussion

Although scarce, case reports on anomalous FDS muscles describe an impressive variety of clinical presentations and operative findings. Frequently, FDS variants have masqueraded as tumors [2-4]. Bhat *et al.* 2013 [3] reviewed the literature for symptomatic FDS anomalies in the hand. Of the resulting 32 reports, 84% occurred in right hand dominant women, and more than 80% affected the index finger. Patients frequently had an occupational history of jobs requiring manual dexterity and commonly presented with an enlarging palmar mass with dull aching pain after activity. Although our patient reflected some of these characteristics, she differed from the review's population in regards to her age. The majority of patients in their study presented in their 20s and 30s while our patient was 83 years old. The oldest patient in their review was 61 [3].

Other cases have attributed compressive neuropathies to anomalous FDS muscles. Robinson described a patient with ulnar neuropathy that resolved after resection of an anomalous FDS [5]. Elliot *et al.* demonstrated an anomalous muscle originating off the FDS tendon proximal to the wrist crease discovered during a carpal tunnel release. It was unclear whether the anomalous muscle was compressing the median nerve or was only an incidental finding [2]. Lillmars and Bush described an anomalous FDS muscle belly originating off the epineurium of the median nerve and the tenosynovium of the carpal canal incidentally found during FDP tendon repair [6]. Anomalous FDS muscles have also been associated with mechanical symptoms. Bou-Merhi *et al.* described a "trigger wrist" phenomenon in a 47-year-old

female with painful wrist and ring finger triggering. Surgical evaluation revealed an anomalous FDS muscle belly that originated deep to the transverse carpal ligament within the carpal tunnel. The patient's discomfort and mechanical symptoms resolved after surgical resection of the anomalous muscle [7].



**Fig 2:** Bhat *et al.* 2013 [13] classification of FDS anomalies (reprinted with permission from Bhat W, Davis CR, Akali A, Kay SP, Roberts AM. Painful, palpable and pathological: anomalous flexor digitorum superficialis brevis in the palm, comparative anatomical context, and an updated classification of anomalies of the flexor digitorum superficialis. *J Hand Surg Eur.* (2014;39(1):101-6).

To better characterize FDS anomalies, Bhat and his colleagues created a classification system derived from one published by Elliot in 1999 [2] which classifies variants into three types (Fig. 2) [2, 3]. Type-I includes variants with an intrinsic FDS brevis at the level of the palm. Type-II entails an FDS with digastric muscle bellies. Type-I and II variants can be subdivided into "A" if the variant has complete replacement of the FDS tendon with the anomalous muscle or "B" if the anomalous muscle belly exists alongside the normal tendon. Type III variants are those with distal extension of the FDS muscle belly into the palm [3]. Our patient's variant can be classified as Type-IIb. Although this classification lacks guidance in dictating specific management based on a variant's type, it does highlight the impressive variability of FDS anomalies. Anatomic variations may be encountered during any hand surgery. Accordingly, it is important to remain diligent during dissection as failure to identify an anomaly may lead to inadvertent injury or other catastrophic outcomes.

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