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## Additional Belly of Flexor Digitorum Superficialis - A Case Report.

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### ABSTRACT

An additional belly of flexor digitorum superficialis (FDS) was noticed in the right forearm of an adult female cadaver. This additional belly was fleshy and originated from the lateral surface of radius, just below the level of insertion of pronator teres. It measured 9.6 cm in length and its width measured 2.1 cm near origin but gradually tapered and measured 1.5 cm near insertion. The belly was obliquely inserted into the tendon of FDS proceeding to middle finger. The median nerve traversed deep to the additional belly of FDS and also innervated it from its deep surface. The main FDS muscle displayed its usual attachments and innervation. The course of median nerve passing deep to the additional belly may form a potential site of nerve compression. This extra muscle belly may also possibly alter the biomechanics of the tendon traversing to middle finger. Awareness of possibility of such anomalous muscles is important for surgeons undertaking reconstructive procedure.

**Keywords:** flexordigitorum superficalis, additional belly, muscle.

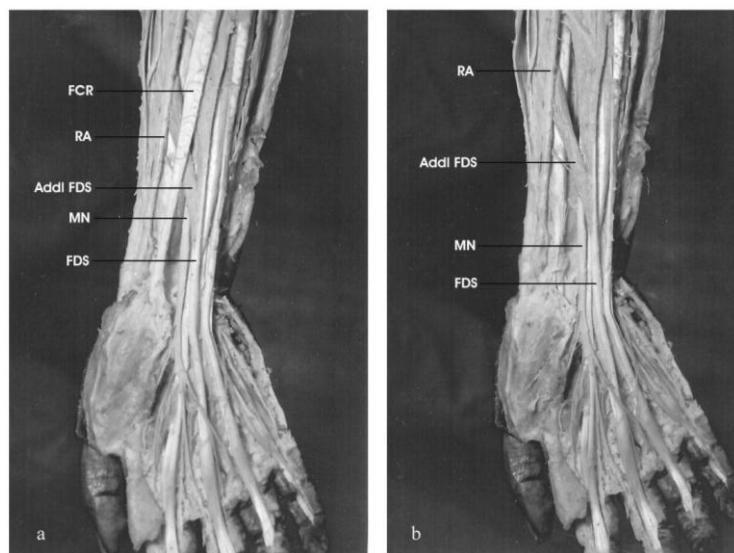
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**INTRODUCTION**

Various hypotheses on the origin of the FDS have been proposed, based on its variations, innervation, ontogeny and phylogeny. The FDS is the flexor of wrist and middle phalanges of the medial four digits at the proximal interphalangeal joints. It forms the second layer of the flexor muscle mass and divides into four muscle bundles in the distal third of the forearm as per the standard text book description by Hollinshead and Standring[1]. The muscle has two heads of origin: humeroulnar and radial. At the mid point of the proximal phalanx, the FDS tendon flattens and splits, allowing the flexor digitorum profundus ( FDP) tendon to pass through it. The two slips of the FDS tendon are inserted into sides of the shaft of the middle phalanx[2]. An anomalous belly of FDS muscle originating from the ulnar side of thenar eminence and inserting into the index finger flexor sublimis was reported by Chris[3]. In another study, an anomalous FDS muscle originated from the volar surface of the flexor retinaculum and was inserted into the palmar aspect of base of the middle phalanx of the little finger[4]. An extra muscle belly arising from the ulnar bursa and joining the FDS of the little finger was noticed by Furnas[6]. Several other authors have also reported anomalies of the morphology of flexor digitorum sublimis[5,6] but the present case is unique since the attachment and orientation of additional belly of FDS and its relationship to median nerve is different from the previously reported literature. The present study attempts to highlight the morphological details of this muscle belly and to discuss its clinical implications and possible symptomatology in the superior extremity.

**Case Report**

An additional muscle belly of flexor digitorum superficialis (FDS) was observed in the right forearm of a 50 years old female cadaver during routine educational program of undergraduate medical students. This additional muscle belly was fleshy and was 9.6 cm long. Its width measured 2.1 cm near origin but gradually tapered and measured 1.5 cm near insertion. It originated from the lateral surface of radius, 0.5 cm distal to the level of insertion of pronator teres. The additional muscle belly was directed inferomedially to gain insertion into the tendon of FDS proceeding to middle finger at a point, 3.7cm proximal to the wrist joint. The median nerve was found traversing deep to this additional belly of FDS and also innervated it from its deep surface. The additional belly also received few twig from the radial artery. The tendon of flexor carpi radialis was found crossing superficial to the additional belly of FDS (fig.1 a, b).



**Dissected Flexor compartment of right forearm**

**a. Flexor carpi radialis crossing superficial to the additional belly of Flexor digitorum superficialis.**

**b. Flexor carpi radialis has been removed to expose the entire extent of additional belly of Flexor digitorum superficialis.**

FCR- Flexor carpi radialis, MN-Median nerve, Addl FDS- Additional belly of Flexor digitorum superficialis, RA- Radial artery, FDS- tendon of flexor digitorum superficialis proceeding to middle finger.

However, the main FDS muscle displayed its usual attachments and innervation from median nerve. No unusual gross morphological feature was noticed in the muscles of left forearm.

### DISCUSSION

The FDS, is a mammalian feature and is an evolutionary derivative of the intermediate superficial flexor mass[7]. The adaptations for weight bearing and grasp have developed first in the amphibians and show gradual specialization throughout the higher primates. The flexor palmaris profundus in reptiles is similar to human flexor digitorum profundus, short finger flexors, the homologus of lumbricals and sublimis mechanism[8]. In the present study, the muscle originated from the flexor surface of the radius and was inserted into the tendon of FDS proceeding to the middle finger. Although, anomalies related to FDS have been reported in the palm but the present study is unique since it describes the additional belly of FDS in the forearm.

Anomalous muscles related to flexor mechanism of hand are frequently atavistic [3]. The additional muscle belly encountered in the present study could be designated atavistic forming a feasible phylogenetic explanation for the anomaly. The pseudocarpal tunnel syndrome caused by distal flexor sublimis belly has been described [5]. The presence of abnormal muscles in the hand causing symptoms of median nerve compression have been reported earlier [6,9].

In the present study flexor carpi radialis muscle crossing superficial to the additional belly may exert pressure and possibly offer mechanical resistance to the action of FDS. Presumably, the topography of median nerve, just deep to the additional belly of FDS may render it a vulnerable site of nerve compression and be responsible for symptoms that may mimic carpal tunnel syndrome. Further, the separate innervation of additional belly of FDS on its deep surface in the present study, may serve as a physiological advantage since it may save at least one tendon of FDS traversing to middle finger in the event of high median nerve injury.

An anomalous muscle may simulate a soft tissue tumor [10]. It may cause pressure neuritis and produce symptoms of carpal tunnel syndrome if in close proximity to a nerve [11]. Admittedly, in the present case, the clinical history of the individual was not available for correlating the anomaly with the clinical profile. However, besides the academic interest, the awareness of possibility of such anomalies is relevant for clinicians in their day today practice.

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