Extensor digitorum brevis manus - its incidence and clinical insight

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Abstract
Background and aims: Extensor digitorum brevis manus is an accessory muscle on the dorsum of the hand. It lies in the fourth extensor compartment of the wrist. Its occurrence is relatively rare. Incidence of this muscle is 4% in the general population. Presence of this muscle is usually asymptomatic but rarely it may produce painful swelling which can be misdiagnosed as lipoma or ganglion or synovial cyst. Aim of the present study was to find out the incidence of extensor digitorum brevis manus muscle in Indian cadavers. Material and Methods: Study was conducted on 64 human hands of adult Indian cadavers of unknown age and sex in the department of anatomy. A longitudinal incision was placed on the dorsum of hand along the axis of middle finger, skin flaps were raised both on radial and ulnar side. A transverse incision was taken at metacarpophalangeal joints from second to fifth fingers. Dorsum of each hand was dissected carefully to see the presence of extensor digitorum brevis manus. Results: We found extensor digitorum brevis manus muscle in 3 hands [rt. -1; lt. -2] out of 64, i.e. 4.68%. Conclusion: Anatomical knowledge of this muscle present in the extensor compartment may be helpful in planning tendon transfer or graft surgeries Therefore, the knowledge of these variant muscles may be important.
Keywords: extensor digitorum brevis manus, dorsum of the hand, extensor compartment, tendon transfer

Introduction
The dorsum of the hand is devoid of any muscle bellies. However, rarely the extensor digitorum-brevis manus [EDBM] an accessory muscle is present on the dorsum of the hand. It is found in 1%-10% of the cases. It may be present unilaterally or bilaterally. When EDBM is present, it is usually asymptomatic, but may cause pain in the dorsal aspect of the wrist due to undue extension of the wrist. The first description of EDBM was given by Albinus in 1734 as “musculus extensor brevis digitis indicisvelmed” but in 1866, Macalister used the term extensor digitorum brevis manus and since then it is called so.

EDBM can originate from the dorsal radio-carpal ligament, posterior aspect of distal end and from the dorsal aspect of capsule of wrist joint. Its insertion is into the dorsal extensor hood of middle and ring fingers. Sometimes, it can extend into all fingers except thumb. Ogura et al classified EDBM into three types. It is based on its insertion site and relationship to extensor indices.

Type I – EDBM inserted onto the dorsal aponeurosis of index finger with absence of Extensor indicis proprius [EIP].

Type II – both EIP and EDBM inserted on the index finger. This type is further subdivided into three types.

i. Type II a: a small extensor indicis arises from ulna and gets united with EDBM belly which inserts into the index finger.

ii. Type II b: the distal end of EDBM joins with the extensor indicis.

iii. Type II c: EDBM tendon inserts with a membranous slip into the index finger along with normal insertion the of extensor indicis.

Type III - EIP inserted into the index finger and EDBM inserted into the long finger with or without a slip from the extensor indicis.

It receives its innervation and blood supply through posterior interosseous nerve and artery respectively. Clinically the presence of this muscle is important because it is often misdiagnosed as ganglion or synovial cyst, soft tissue tumor, giant cell tumor or carpal bosses.
and results in unnecessary exploratory surgery. Precise knowledge of the anatomy and incidence of EDBM muscle is practically important to avoid diagnostic errors and surgical complications during surgery in the dorsum of the hand. This study was taken up to know the incidence of EDBM.

**Material and Methods**

Present study was conducted on 64 human hands of adult Indian cadavers of unknown age and sex in the department of Anatomy. Upper limbs with any deformities and external trauma were excluded from the study. A longitudinal incision was placed on the dorsum of hand along the axis of middle finger, skin flaps were raised both on radial and ulnar side. A transverse incision was taken at the level of metacarpo-phalangeal joints from second to fifth fingers. Dorsum of each hand was dissected carefully to see the presence of extensor digitorum brevis manus. Its proximal and distal attachments along with its nerve supply and blood supply was observed. Appropriate photographs were taken.

**Results:**

Extensor digitorum brevis manus was present [Fig. in 1-3 hands out of 64, i.e. 4.68% cadavers. It was present on right side in one hand [Fig.3] and the other two were observed on the left side [Fig.1, 2]. The EDBM had a single belly in all three cases. The belly extended to the mid-portion of the second and third metacarpal bone. The belly was present between the tendons of the extensor digitorum to the index and middle fingers. They were found to be originating deep to the extensor retinaculum, from carpal joint capsule and carpal ligaments [Fig.1]. They were running within the compartment for the extensor digitorum. The tendon of EDBM passed medial to the tendon of the extensor indicis and they were inserted into the extensor hood of the index finger [Fig. 1]. In all cases, a fine branch of the posterior interosseous nerve was providing innervations to fleshy part of EDBM and branch of anterior interosseous artery was supplying it.

**Discussion:**

Occurrence of an extensor digitorum brevis manus-muscle represents a variation of the normal anatomy of the fourth extensor compartment of the dorsum of the hand. It occurs bilaterally in approximately one third of cases. There is no difference in incidence between the right and left hands or between the genders. Usually this muscle consists of a single belly, but rarely with two bellies. Many case reports from Indian subcontinent are published which reports the presence of EDBM.

Jadhav and Zambare have reported four cases of
EDBM muscles and all four were inserted on to the index fingers. Ranade et al. reported EDBM muscle getting inserted into the index finger hood. Two bellies of EDBM have been reported by Paraskevas et al1 and Stith et al13. Present study reports that, the EDBM was present in three hands out of the 64 cadavers. It was observed in two cases on the left side and one on the right side.

**Embryological and Phylogeny importance**

In amphibians the digits are controlled solely by intrinsic muscles. In humans, these muscles have disappeared in the upper limbs and their function has been taken over by forearm muscles with long tendons to the digits. Many researchers believe that the EDBM is atavistic muscle and it represents parts of the old extensor brevis14. According to Bunnell and Souter, EDBM found normally in amphibians may represent in humans as a failure of proximal migration of ulnocarpal elements of the antebrachial muscle mass15,16. The presence of EDBM would remain asymptomatic, but due to heavy manual labour like pushing etc., symptoms such as pain or swelling of the dorsum of the hand would be aggravated10. Also, its presence would be associated with the “fourth compartment syndrome”17. However, due to the presence of EDBM the fourth dorsal [extensor] compartment would be crowded and during extension of the wrist there could be compression of the posterior interosseous nerve leading to pain in the fourth dorsal compartment18. Radiologists may misinterpret EDBM as a ganglion or synovial cyst or a soft-tissue tumor19,20. Also, it is used in the tendon transfer or graft surgeries to restore malfunctioning extensor muscles21.

**Conclusion**

Awareness of incidence of EDBM on the dorsum of the hand is essential for correct diagnosis and to avoid surgical complications during surgery of dorsum of the hand. Present data will be helpful for surgeons, radiologists as well as for anatomists.

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**References:**


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