



## Extensor digitorum brevis manus: Its clinical significance and morphology

Published online December 7th, 2008 © <http://www.ijav.org>

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Received August 27th, 2008; accepted November 7th, 2008

### ABSTRACT

Anomalous muscles are often a matter of concern to clinicians as they mislead the diagnosis. Knowledge of such variant muscles is important clinically to avoid misdiagnosis. In this report we present an anomalous muscle on the dorsum of hand, extensor digitorum brevis manus an uncommon variation present as a swelling on the dorsum. It is originated from the dorsal wrist capsule within the compartment deep to the extensor retinaculum for the extensor digitorum and inserted into the extensor hood of the index finger, this variant muscle often cause dorsal wrist pain and often confused as ganglion, soft tissue tumor, synovial cyst or tenosynovitis. The presence of such variant muscles on dorsum of hand, their clinical significance and literature has been reviewed.

© IJAV. 2008; 1: 32–34.

**Key words** [extensor digitorum brevis manus] [variation] [fourth compartment syndrome]

### Introduction

In normal anatomy we don't see any muscle on the dorsum of the hand except for the long extensor tendons of digits. Rarely may we see a small muscle belly on the dorsum, which is called as "extensor digitorum brevis manus". The morphology and clinical anatomy of this variant muscle is discussed along with the present case.

### Case Report

During routine dissection of upper limb for first year medical students, in a 55-year-old male cadaver we found a soft swelling on the dorsum of hand, after dissection this anomalous extensor muscle was found on the dorsum of the hand (Figure 1), where usually no muscle belly is seen in normal anatomy. This anomalous muscle was originating from the dorsal wrist capsule beneath the extensor retinaculum of the wrist at the fourth compartment through which extensor digitorum, extensor indicis, posterior interosseous nerve were passing. The insertion of the muscle was into the extensor hood of the index finger. The muscle was supplied by the posterior interosseous nerve.

### Discussion

Several muscular variations have been reported in literature. Anomalous extensor muscles of the hand are not uncommon. The anomalous muscle encountered in this cadaver is usually described as the extensor digitorum brevis manus. It has also been called the "m. extensor anomalus" [1] and "le muscle manieux" [2].

Vast majority of variant muscles are asymptomatic throughout the life of the individual. These anomalies are often found incidentally during surgery, such as during removal of ganglion. Some, however, may be associated with dorsal wrist pain, particularly if the extensor digitorum brevis manus (EDBM) arises from the distal radius close to the fourth dorsal compartment of the wrist as reported in the present case, the "fourth compartment" syndrome may develop, which consists of pain in the dorsal wrist. The pain is produced by the increase of pressure in the fourth compartment, which leads to a direct or indirect compression of the posterior interosseous nerve [3].

There are some cases reported in literature about EDBM. They include an origin from the dorsal metacarpal surface or from the extensor tendons have also been reported [4]. Its insertion has been described as being only into the extensor hood of the index, middle, ring or little finger as well as combined insertions into more than one finger [5]. Depending on where it inserted, EDBM has also been named extensor indicis brevis [6], extensor digiti III brevis [7], extensor medii brevis, extensor brevis digiti indicis vel medii, extensor medii and annularis brevis [8]. The EDBM has been found with other muscular variations such as extensor pollicis et indicis communis; extensor indicis radialis [9].

The EDBM has clinical interest. In the past, it was frequently misdiagnosed as a dorsal wrist ganglion and was found during surgery for its removal [10]. A close



**Figure 1.** Extensor digitorum brevis manus muscle arising from fourth compartment of the extensor retinaculum. (*EDBM: Extensor digitorum brevis manus muscle*)

physical examination and the consideration that the EDBM becomes more prominent with active extension of the wrist and fingers whereas a ganglion becomes more prominent with wrist flexion may help in diagnosis [8]. New high resolution imaging techniques such as MRI should confirm the cause of the swelling [11]. The EDBM has been proposed as a source for tendon transfer to restore malfunctioning muscles such as a damaged extensor pollicis longus. The importance of this muscle as a possible graft for tendon transfer is limited. It may, however, cause confusion when trying to recognize, through a small incision, it is a tendon in the dorsum of the hand that has been selected for tendon transfer procedures to restore malfunctioning muscles such as a damaged extensor pollicis longus [12]. Finally, it is noteworthy that the EDBM has also been observed with pathological findings such as capitate- hamate synostosis and extensor synovitis as well as with a ganglion [13].

In amphibia, the digits are controlled solely by intrinsic muscles, an EDBM muscle being situated on the dorsum of the manus. In humans, however, this muscle has disappeared in the upper limbs, its function being taken over by forearm muscles with long tendons to the digits. Most investigators believe that the EDBM is atavistic, representing parts of the old extensor brevis, a throwback to the intrinsic amphibian extensor due to failure of proximal migration of the ulnocarpal elements of the antebrachial muscle mass [14]. EDBM usually causes little or no pain, although resistive extension of the finger may cause pain in the hands containing the EDBM, and pain may be produced by the patient pushing

the palm against the table with the wrist extended. The pain is likely to be a consequence of muscle hypertrophy and of impingement of the muscle against the extensor retinaculum [15]. Heavy use of the hand may lead to pain during the most active period in the patient's life, and when EDBM is present bilaterally the symptoms usually occur in the dominant hand. Preoperatively EDBM is often confused with a ganglion, a synovial condition (tenosynovitis, synovial tumor, and tendon sheath cyst), other benign soft tissue tumors, carpal bossing, or exostosis. Moreover, ganglions associated with EDBM have been reported [13] and this occurrence may make a correct diagnosis of EDBM more difficult.

An electrophysiological study using surface electrodes can establish a preoperative diagnosis of EDBM [15], although this test may be rather cumbersome. In recent years, noninvasive MRI scans have been found to be helpful in distinguishing EDBM from tumors, thereby avoiding surgery. MRI scans usually display EDBM as an intermediate- to low-density signal with extreme homogeneity on both T1- and T2-weighted images, an appearance similar to that of normal skeletal muscle [16]. However, resection of EDBM should be avoided in cases where EDBM is compensating for the absence of the extensor indicis proprius [15].

As this anomalous muscle may cause fourth compartment syndrome which may be confused as dorsal wrist ganglion, EDBM should be included in the differential diagnosis of soft tissue masses on the dorsal aspect of the wrist and hand and may be diagnosed by MRI.

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