Extensor digitorum brevis manus: a Cadaveric Study and Review
Surekha Dilip Jadhav*, B R Zambre
Associate Professor*, Professor and HOD, Department of Anatomy, Padamshri Dr. Vithalrao Vikhe Patil Medical College, Ahmednagar, Maharashtra, India

ARTICLE INFO

Keywords:
Extensor digitorum manus
Anatomy
Atavistic
Cadavers
Dorsum of hand.

ABSTRACT

Introduction: The extensor digitorum brevis manus is an atavistic, small muscle which rarely present on the dorsum of the hand. It is often misdiagnosed as ganglions, synovial cyst, soft tissue tumor, giant cell tumor or carpal bosses and results in unnecessary exploratory surgery. Aim: The aim of the present study is to observe the incidence and anatomy of extensor digitorum brevis manus. Material and Methods: Ninety six upper limbs of adult cadavers of unknown sex were studied to note down the incidence, nerve supply and blood supply of extensor digitorum brevis manus. Results: This muscle was observed in 4.1% cadavers. Conclusion: A detail Knowledge of the anatomy and incidence of extensor digitorum brevis manus muscle is of great practical importance to prevent diagnostic errors and can be used for tendon transfer to restore malfunctioning muscles such as a damaged extensor pollicis longus.

The Extensor Digitorum Brevis Manus (EDBM) is an anomalous, small muscle present on the dorsum of the hand [1, 2]. Ogura et al. [2] quoted in his paper that, EDBM was first described by Albinus in 1734 as “musculus extensor brevis digitii indicis vel medi” but Macalister coined it as “extensor digitorum brevis manus”. Since that, many authors have used this term. The incidence of EDBM muscle has been reported to be from 1% to 10% in cadavers but in clinical practice it is rarely found [3, 4]. It can be unilateral or bilateral [2].

The common sites of proximal attachment of EDBM muscle are wrist joint capsule, the dorsal radio-carpal ligament, the distal end of the radius and carpal bones, dorsal metacarpal surface [5, 6, 7]. The most common distal attachment sites of this muscle, in order of decreasing frequency are the extensor hood of the second digit, extensor hood in second and third digits and may be inserted ulnar to extensor digitorum tendon of index finger with or without accessory slip to long finger, below the extensor digitorum tendon of long finger [7]. These variations are similar to variations of extensor indicis proprius muscle [8]. When EDBM muscle inserts in the second digit that times in 50% individuals the extensor indicis muscle and its tendon is absent. In this situation, the EDBM muscle is the only muscle responsible for independent extension of the second digit [9].

The EDBM muscle receives its innervation and blood supply through posterior interossious nerve and artery respectively. The importance of presence of this muscle lies in the fact that at times it is often misdiagnosed as ganglions, synovial cyst, soft tissue tumor, giant cell tumor or carpal bosses and results in unnecessary exploratory surgery [10]. A detail Knowledge of the anatomy and incidence of EDBM muscle is of great practical importance to prevent diagnostic errors and to avoid surgical complications during hand surgery [11]. Considering its importance this study was conducted to evaluate the anatomy and incidence of it.

1. Introduction

2. Materials and Methods:

Ninety six upper limbs of adult cadavers of unknown sex were studied. They were carefully inspected and those upper limbs without any deformities, external trauma were taken for study. The specimens were then dissected carefully to see the presence of EDBM muscle, its proximal and distal attachments. We also noted its nerve supply and blood supply. Appropriate photographs were taken by Sony digital camera of 5.1 megapixels.
3. Results:

EDBM was observed (Fig. 1, 2, 3) in the hands of four out of ninety six cadavers (4.1%). It was present on right side in two hands and other two were on left side. The EDBM had a single belly in all four cases. The belly extended to the midportion of the second or third metacarpal bone. The belly was present between tendons of the extensor digitorum to the index and middle fingers.

Three EDBM were originated deep to extensor retinaculum from carpal joint capsule, carpal ligaments and one was arising from the dorsal surface of the third metacarpal and carpal joint capsule (Fig. 3). They were running within the compartment for the extensor digitorum. The tendon of all these four muscles passed medial to the tendon of the extensor indicis and they were inserted into the extensor hood of the index finger (Fig. 1, 2, 3). In all cases, a fine branch of the posterior interossious nerve was providing innervations and branch of anterior interossious artery was supplying this muscle.

Table I: Incidence of EDBM in dissection studies by different authors

<table>
<thead>
<tr>
<th>Author</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>McGregor (1926), [15]</td>
<td>3% (3/100)</td>
</tr>
<tr>
<td>Wagenseil (1937), [16]</td>
<td>2.7% (2/75)</td>
</tr>
<tr>
<td>Moriya (1956), [17]</td>
<td>2.4% (2/82)</td>
</tr>
<tr>
<td>Ogura et al. (1987), [2]</td>
<td>3.8% (11/286)</td>
</tr>
<tr>
<td>Ranade et al. (2008), [18]</td>
<td>4.2% (4/72)</td>
</tr>
<tr>
<td>Present study</td>
<td>4.1% (4/96)</td>
</tr>
</tbody>
</table>

Legend:
Fig. 1- EDBM- Extensor Digitorum Brevis Manus, ER- Extensor Retinaculum.
Fig. 2- EDBM- Extensor Digitorum Brevis Manus, EH- Extensor Hood.

4. Discussion:

In human population, the hand is an exquisite organ for performing various activities in day to day life and it is one of the most frequently used parts of our body. The important fact is that, the extensor muscles and tendons of the forearm and hand shows great variability. Therefore, the knowledge of muscles and tendons of hand and their variations appears to be very important especially when surgery is planned in that area [12].

The EDBM is an atavistic muscle and a remnant from the amphibians which controlled the digital joints and it could represent a homologue of extensor digitorum brevis on the dorsum of the foot1. According to Bunnel [13] and Souter [14], the EDBM may represent a failure of proximal migration of ulnocarpal elements of the antebrachial muscle mass in humans, which is found normally in amphibians.

The incidence of the EDBM muscle in the present study was almost the same previously reported by other authors (Table I). Previous researchers reported several variations in proximal attachments of EDBM. In our dissections we reported, the proximal attachment of EDBM from capsule and ligament of wrist joint and in one case it was from the dorsal surface of the third metacarpal and carpal joint capsule (Fig. 3).

Paraskevas et al. [7] reported the incidence of EDBM occurring bilaterally in approximately one third of cases, and no difference in incidence between the right and left hands or between the genders has been reported. In present study, we did not come across bilateral presence of this muscle and we observed equal distribution on right and left side. But Ranade et al. [18] observed this muscle only on the left side. Generally, this muscle consists of a single belly, but cases with two bellies with variable sizes also have been reported by Paraskevas et al. [7] and Stith and Browne [19]. In our dissection, we reported a single belly of EDBM in all cases.

Presence of EDBM muscle is usually asymptomatic, but sometimes the patient may present with a painful dorsal wrist swelling, particularly in individuals who are involved in sports such as, tennis, golf, cricket, weight lifting were repetitive wrist
movement is involved [9]. During clinical examination, this muscle may be confused with ganglion cyst, soft tissue tumors etc. Complementary tests can be useful for the proper diagnosis, such as electromyography, ultrasonography and MRI [4]. Therefore, knowledge of this muscle is of great practical importance in making a correct diagnosis and using proper surgical procedure during hand surgery and may be used for tendon transfer to restore malfunctioning muscles such as a damaged extensor pollicis longus [4, 11].

5. Conclusion:

A rare variation found in the dorsum of the hand is the presence of EDBM. One must remember it as a possible diagnosis when there is swelling on the dorsum of the hand. Precise anatomical knowledge of possible variants of extensor tendons of the hand is vital for success of reconstructive procedures in this region, assessing the traumatized or diseased hand for differential diagnosis. Knowledge of this variation should be bared in mind by clinicians, surgeons and academicians who manipulate this particular site.

6. References:
