

Surgical Management of Symptomatic Extensor Digitorum Brevis Manus: A Proposed Algorithm for Treatment

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ABSTRACT First described in 1734, the extensor digitorum brevis manus (EDBM) is an anomalous extensor muscle found in the dorsum of the wrist and hand. Extensor muscle variants of the hand are not uncommon, and EDBM has an estimated reported incidence of approximately 2%. Although few extensor muscle variants become clinically significant, there is a paucity of literature discussing these anatomic variants, with most reports arising from cadaveric studies or isolated case series. Similarly, there are few established indications for surgical treatment of EDBM. In this case report, we describe the successful treatment of a young patient with persistently symptomatic anomalous extensor tendon with surgical excision and propose an algorithm for management after failure of conservative measures.

CASE REPORT

A 16-year-old, right hand dominant, male high school football player presented with pain identified at the dorsal aspect of his right wrist and hand after an injury during competition. When discussing the mechanism of injury, he describes an axial load applied to his extended wrist during midseason blocking drills. However, he did not seek treatment at that time, but continued to complain of pain and mild edema with heavy or repetitive loading of the wrist until his presentation 6 months after injury.

On physical examination, the patient had no evident deformity with tenderness localizable to his anatomical snuff box. Radial deviation and axial loading with wrist extension reproduced the patient's symptoms, although he did also note discomfort with isolated wrist extension. Despite his fracture, he demonstrated excellent range of motion, normal neurovascular examination, and otherwise, nonfocal findings.

After imaging, wrist radiographs showed a proximal pole scaphoid nonunion with slight distraction. No secondary deformities or advanced chondral wear was evident, and further magnetic resonance imaging (MRI) confirmed the proximal one-fifth scaphoid nonunion without evidence of trabecular bridging or proximal pole necrosis.

After informed consent with discussion of diagnosis and treatment options with the patient and his parents, the decision was made pursue open reduction and internal fixation. During an open dorsal approach to the scaphoid (Fig. 1), an anomalous

muscle belly was identified and retracted for identification of the proximal pole of the scaphoid. The scaphoid demonstrated evidence of fibrous nonunion with the maintenance of overall articular congruity, so dual pitch screw fixation was performed with direct and fluoroscopic confirmation of compression.

Thereafter, the anomalous muscle belly was evaluated and coursed directly in the vicinity of surgical fixation. When placed under tension, extension of the middle finger was observed. It was noted that the extensor digitorum brevis manus (EDBM) was not the sole extensor to the middle finger in this patient. Through a separate small incision overlying the metacarpophalangeal joint, the distal tendon was traced deep and ulnar to the of extensor digitorum communis (EDC) to the middle digit and inserted onto the dorsal joint capsule, consistent with described patterns of the EDBM (Figs. 2 and 3). With ranging from flexion to extension, mechanical symptoms were reproducible and the EDBM muscle belly demonstrated radiocarpal impingement at the extremes of motion. Therefore, the decision was made to excise the EDBM in an effort to reduce persistent painful symptoms. Care was taken not to disrupt the primary extensor mechanism to the middle digit, and metacarpophalangeal extension was reproduced with EDC traction and wrist tenodesis effect.

Postoperatively, the patient healed uneventfully and demonstrated excellent return of wrist motion without complaints of pain. Radiographic healing of the fracture was evident at 4 months postoperatively, and he was allowed to return to competitive athletics at 6 months.

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DISCUSSION

Anatomically, the EDBM has multiple origins. The most commonly reported origins are the capsule of the radiocarpal joint and the carpal bones,^{1,3} whereas other attachments at the distal radius, metacarpals, and ulna are described. Distally, tendinous insertion occurs most frequently on the index finger followed by the middle finger¹⁻³; however, the insertion can be seen on small finger, ring finger, or span multiple fingers.



FIGURE 1. Anomalous muscle belly identified during dorsal approach to scaphoid.

In as many as half of cases, EDBM can represent the sole extensor mechanism of the index finger.³ The EDBM may represent a developmental vestige arising from failure of the proximal migration of ulnocarpal element.⁴ There is a slight male predominance and there is no difference in presence of the muscle in left versus right.²

Clinically, EDBM may cause hand and wrist pain by compressing on the dorsal extensor compartments.^{1,3,5} This pain is often reported after repetitive motion associated with hypertrophy of the muscle.⁵ On examination, EDBM can be present as mass on the dorsum of the wrist. As such, EDBM is often confused with ganglion cysts or soft tissue tumors when it becomes clinically relevant.^{1,3} The relationship between clinical symptoms and EDBM has mostly been attributed to reduction or elimination of pain after excision. Separate reports suggest that the presence of EDBM can be seen on MRI or ultrasound.^{6,7}

Although the presence of EDBM is not uncommon,¹⁻³ few actually become clinically significant. EDBM often presents as a mass on the dorsum of the hand. In this case, no mass



FIGURE 3. Dissection of EDBM, note that EDC insertion remains intact.

was appreciated, although both mechanical and painful symptoms were present in conjunction with the scaphoid nonunion. The clinical algorithm in this case relied on the presence of normal extensors, primarily the EDC. If EDBM serves as the sole extensor present, judicious debridement may be considered, but the tendon attachments should be preserved in situ. Alternatively, with primary extensor function, excision may be considered to avoid secondary causes of wrist pain, as in the current case.

Limited cases of surgical management of symptomatic EDBM are described. Yet, surgical options may include simple decompression of extensor retinaculum and total excision of EDBM muscle. However, the absolute indications for either surgical management remain unclear, particularly with other concomitant wrist pathology or symptomatic pain. Simple decompression of extensor retinaculum through a dorsal approach has been proposed in the past as a first-line surgical management of symptomatic EDBM,⁸ however, recurrence of symptoms necessitating reoperation to excise the muscle has been documented.⁹ While total excision of EDBM had much higher success rate in symptomatic relief.⁵ While other cases have been misidentified as either a ganglion cyst or soft tissue tumor, current indications for removal remain unclear.

We propose an algorithm for management based on careful physical examination and scrutiny of preoperative imaging to better discern possible anatomic variants. Conservative measures may include primarily a period of immobilization and anti-inflammatory medications, followed by occupational therapy. If these measures do not improve wrist pain, a MRI may be obtained. If the MRI reveals an EDBM, which corroborates with appropriate physical examination findings, open debridement versus excision may be considered. Physical examination findings may include discomfort with maximal stretch to affected finger, most typically index or middle, or resisted extension of that digit. Open debridement or excision involves a dorsal incision made over the tedious insertion. Simple decompression of the extensor retinaculum may be reasonable if the EDBM tissue is not inflamed or hypertrophic.

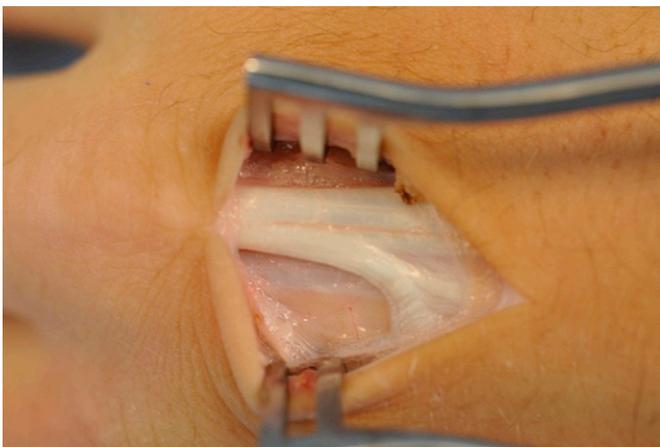


FIGURE 2. Distal insertion of extensor tendons, note separate insertions of EDC and EDBM.

However, the authors recommend that surgeons err on the side of excising the accessory EDBM. This approach will save a patient, who may undergo only a debridement, a return trip to the operating room if symptoms persist. The aim of surgical management is to alleviate local mechanical symptoms and decrease secondary sources of wrist pain in the presence of primary extensor mechanism.

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