Extensor carpi ulnaris: bilateral accessory tendons to the fifth metacarpal

Zailene D. FLOOD
Dustin J. HAWLEY
Mia C. MARSHALL
Anthony A. CAPEHART +

Department of Biology, East Carolina University, Greenville, NC, USA.

Abstract

We report bilateral accessory tendons discovered during routine anatomical dissection that originated from the extensor carpi ulnaris and inserted into the 5th metacarpals. The left variant arose from the tendon of extensor carpi ulnaris under the extensor retinaculum and passed superficial to its primary tendon to reach the medial side of the head of the 5th metacarpal separate from extensor digiti minimi. The right variant, however, originated from a small 2 cm muscular slip of extensor carpi ulnaris close to origin of its primary tendon in the mid-forearm. This accessory tendon was 16 cm in length and traveled alongside that of extensor carpi ulnaris. In its course across the dorsum of the hand, this variant also passed superficial to insertion of extensor carpi ulnaris and inserted on the 5th metacarpal head to the medial side of extensor digiti minimi.

Case Report

Bilateral occurrence of variant tendons arising from extensor carpi ulnaris was observed in an elderly Caucasian female cadaver during routine dissection and preparation of specimens for nursing and allied health anatomy laboratories. In the left upper limb, the tendon variant was identified as it crossed the dorsum of the hand, medial and parallel to the tendon of extensor digiti minimi (Figure 1a). Upon reflection of the extensor retinaculum it was noted that this 8.5 cm slip arose directly from the dorsal aspect of the extensor carpi ulnaris tendon, shared the 6th extensor compartment, and in its course crossed over the insertion of extensor carpi ulnaris (Figure 1b). The accessory tendon was 1 mm in width, consistent in this dimension, and inserted on the head of the 5th metacarpal medial to and separate from extensor digiti minimi. Some terminal fibers blended with the proximal extensor expansion along its medial aspect.

As shown in Figure 2a, the right tendon variant arose from a small muscle slip located on the lateral aspect of extensor carpi ulnaris 14 cm distal to its origin from the lateral epicondyle. This 2 cm muscular slip was located near the origin of the muscle’s primary tendon. The tendon variant was 2 mm wide and closely accompanied the tendon of extensor carpi ulnaris on its lateral side, consistent in width throughout...
the majority of its course. The accessory tendon was 16 cm in length, passed over insertion of the primary tendon of extensor carpi ulnaris (Figure 2b) and traveled straight across the dorsum of the hand, similar to the path noted in the contralateral limb. The right variant tendon increased to 7 mm in width as it approached the metacarpophalangeal joint and inserted into the head of the 5th metacarpal. Fibers from this distal expansion blended into the proximal aspect of the extensor hood separate from insertion of extensor digiti minimi (Figure 2c).

The extensor digiti minimi tendon was not duplicated on the right hand (Figures 2b, c) and on the left exhibited only a bifid appearance immediately proximal to its insertion (Figure 1b). Juncturae tendinum interconnected extensor digiti minimi to the extensor digitorum tendon servicing the 4th digit in both instances (Figures 1b, 2b, c). This fascial band was notably robust on the right side, measuring 1 cm in width.

Discussion

Several reports of unilateral extensor carpi ulnaris tendon variation have been documented with differing frequency among populations examined. In Nakashima’s classic study [3], the Type C accessory tendon inserted into the 5th metacarpal head and was the least frequent of variants described, occurring in 1.7% of cases. A similar insertion was noted in 5.6-14.8% of variants from different populations [2, 4, 6]. Herein we report an unusual case in which there was bilateral extensor carpi ulnaris tendon variation with the Type C insertion [3]. To our knowledge this is the first report of duplication of this specific tendinous variation in the same individual. Origin of the left tendon was like that described by Nakashima [3] in that it arose from the primary tendon of extensor carpi ulnaris within the 6th extensor compartment and inserted on the 5th metacarpal head, medial and separate from extensor digiti minimi. Its width (1 mm) was the same as described previously [5]. In the right extremity, however, the variant had a proximal origin directly from a small lateral muscular slip associated with the belly of extensor carpi ulnaris. While there has been report of the variant tendon arising proximal to the 6th compartment sheath [4], few have documented its origin from the heads of extensor carpi ulnaris [6] or elsewhere along the muscle belly, indicating that this may be a rare occurrence. In the present case the width of the right variant slip (2 mm) was slightly larger, but

Figure 1. Photographs of the left upper limb illustrating the accessory tendon from extensor carpi ulnaris (ECU). a) Overview of forearm anatomy showing the variant tendon (Var) on dorsum of the hand. (Asterisk: extensor retinaculum; large arrowhead: extensor digiti minimi tendon) b) Closer view of variant tendon origin (small arrowhead) and route superficial to extensor carpi ulnaris insertion (large arrowhead), ending on the 5th metacarpal head. Note bifid insertion of extensor digiti minimi tendon (EDM) and junctura tendinum to extensor digitorum (ED) digit 4 tendon (asterisk).

Figure 2. Photographs of right forearm demonstrating the accessory tendon from extensor carpi ulnaris (ECU). a) Origin (arrowhead) of tendon variant (Var) and path to the wrist alongside the primary tendon of extensor carpi ulnaris. b, c) Course of variant tendon on dorsum of wrist and hand passing superficial to insertion of extensor carpi ulnaris to end on the 5th metacarpal head. Note expansion of accessory tendon at insertion and separate insertion of extensor digiti minimi (EDM) tendon with prominent junctura tendinum joining tendon of extensor digitorum (ED) to digit 4 (asterisk).
similar to that reported previously [3]. Its insertion into the 5th metacarpal was like that of the contralateral extremity with the exception that the right accessory tendon exhibited a notable expansion in width just proximal to insertion that permitted greater association with fibers of the proximal extensor apparatus. As in the left hand, the variant remained medial to and separate from insertion of extensor digiti minimi.

In a recent large study [7], it should also be noted that most tendons of the extensor digiti minimi were duplicated, remaining single at insertion in only 20% of cases. In the present instance, a single tendon of extensor digiti minimi on the right was present and on the left, split into 2 short adjacent slips just before insertion. It is unknown whether presence of the additional tendon slips from extensor carpi ulnaris impacted extensor digiti minimi tendon structure and lessened an overall need for duplication; however, it is interesting that duplication of the extensor digiti minimi tendon often resulted in medial and lateral slips that insert separately [7], similar to the relationship of digit 5 tendons noted in the present report. The juncturae tendinum between extensor digitorum and extensor digiti minimi could potentially offset single tendon weakness [8].

Little is known of mechanisms that govern limb tendon morphogenesis although ectodermal signals appear essential for induction [9]. Misexpression of scleraxis and other regulators of tenocyte differentiation may perhaps result in variants such as described here. Accessory slips of extensor carpi ulnaris that do occur and insert on the 5th metacarpal head can have clinical significance in wrist/digit function or may be utilized for tendon graft [6]. Accessory extensor carpi ulnaris tendons have been documented in all populations examined and extent of this variation should be considered during development of surgical strategies for the hand.

References