Characteristics of the Flexor Carpi Radialis Brevis Tendon on Magnetic Resonance Imaging and its Use in Basal Joint Arthroplasty

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We report the incidental discovery of a flexor carpi radialis brevis tendon, a rare anatomical variant identified during a surgical procedure. Magnetic resonance imaging of the contralateral side helped to delineate the anatomy of the flexor carpi radialis tendon and to differentiate the flexor carpi radialis brevis tendon from it. We describe the use of this rare tendon in ligament reconstruction of the basal joint of the thumb.

Introduction

Few documented references to the flexor carpi radialis brevis (FCRB) muscle and tendon have appeared in the medical literature [1-4]. Moreover, no clinical reports of this rare anatomic variant have been published. In contrast, the congenital absence of the flexor carpi radialis (FCR) is well documented [5]. In this report, we present a case of bilateral FCRB and review what little has been published on the subject.

The FCR tendon is one of the most commonly used tendons in surgical procedures involving the hand. It is harvested in part or in whole for interpositional arthroplasty of the thumb [6], for tendon transfers after radial nerve injury [7], and for opponensplasty [8]. The presence of two FCR tendons to choose from could be quite useful for such procedures.

Case Report

A 71-year-old right-hand-dominant woman presented for evaluation of pain in her left thumb of 5 years’ duration. She had been examined by another hand surgeon, who diagnosed her condition as bilateral basal joint arthritis. The patient complained of swelling, pain, and a deep burning sensation whenever she sewed or used keys or zippers. She also could no longer loosen or tighten the lids of jars. She denied any history of trauma to the thumb. To alleviate her pain, she had taken ibuprofen, used splints, and tried cortisone injections, but these were no longer of benefit.

Physical examination revealed hyperextension of more than 35° in the left thumb, which had marked subluxation and crepitation. Grip strength (average, 3 tries) was 15.88 kg on the left and 22.68 kg on the right. Pinch strength was 3.63 kg on the left and 4.99 kg on the right. Radiographs of the left thumb showed joint arthritis (Eaton stage III).

The patient underwent basal joint arthroplasty of the left thumb. At surgery, what appeared to be two FCR tendons were present, both inserting onto the base of the index metacarpal. When both tendons were dissected proximally, they were identified as two separate musculotendinous units, a FCR and a FCRB, rather than as a bifurcation of the FCR. The FCRB originated in the radius. It was similar in size to the FCR. The FCRB was deep to the FCR.

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To preserve the FCR, the entire FCRB was mobilized and...
used for the ligament reconstruction and suspensionplasty (Burton technique).

Magnetic resonance imaging (MRI) of the wrist and forearm of the contralateral hand showed that the FCRB was present bilaterally. This additional imaging was done for research purposes and was approved by the institutional review board. The patient gave informed consent and was not charged for the study. The MRI scan showed that the FCRB arose from the radius and inserted onto the base of the index metacarpal. There was no trapezial insertion identified. The FCRB was located deep to the FCR (Figures 1 and 2).

Discussion

To our knowledge, no previous description of the FCRB tendon has been given in published reports on the hand, although the FCRB has been mentioned in anatomical studies. In the Compendium of Human Anatomic Variations, Bergman and colleagues [9] briefly described the work of Wood [4] in 1865 on FCR variations.

The FCR can receive an additional slip from the biceps tendon, the brachialis, the coronoid process, or the anterior oblique line of the radius [9]. Bishop and colleagues [1] noted that its insertion onto the trapezium might be absent. Instead, it may insert onto the base of the second and third metacarpals. Another variation is partial insertion of the FCR onto the flexor retinaculum or scaphoid. The slip to the third metacarpal can extend to the fourth metacarpal. Anomalous interconnections between the FCR and the FCRB have been described [3]. Gabel and colleagues [2] found that an anomalous flexor tendon can result in tenosynovitis of the FCR.

Saadeh and colleagues [10] described the FCRB and a doubled FCR. As viewed on our MRI scan, the FCRB is a small muscle arising from the radius and inserting onto the base of the index metacarpal. Bergman and colleagues [9] described it as inserting more commonly onto the fibrous sheath of the FCR tendon. They identified the FCRB in only 1 of 400 dissected limbs (0.25%), and Wood [4] reported it in 6 of 70 specimens (8.6%). In more than 500 ligament reconstruction surgeries we have conducted using the FCR for tendon interposition, this was the first FCRB we encountered.

Our patient recovered well and had excellent pain relief and improved function. At 2-year follow-up, her pinch strength had improved to 19.5 kg. Although her range of motion remained essentially unchanged, she was pain free.

This case report highlights the flexor carpi radialis brevis, an anatomic variant that may be present and harvested for use in hand reconstruction surgery.
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