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# The Interconnecting Slip: A Cadaveric Case Report on Accessory Extensor Carpi Radialis Tendon and Its Clinical Significance

Vihaan Thool, Lakshmi Kiruba N, Swapna Parate, Sonali Satpute

## Abstract

**Background:** Cadaveric examinations help identify rare anatomical variations of radial wrist extensors, particularly Extensor Carpi Radialis Longus and Extensor Carpi Radialis Brevis. Such variants are clinically relevant due to the restricted space of the second dorsal compartment. This accessory slip may enhance wrist extension strength but increases local friction within the already crowded compartment, potentially producing radial wrist pain resembling De Quervain's tenosynovitis. MRI can assist in preoperative identification. The slip's structure also makes it a viable autologous graft option for procedures such as adductor plasty or Extensor Pollicis Longus repair.
**Methods:** During routine dissection of a 74-year-old male cadaver, an accessory tendon slip was found originating from the Extensor Carpi Radialis Longus muscle belly, in the posterior compartment of the right forearm.
**Results:** An accessory tendon slip was observed arising from the ECRL muscle belly. It coursed through the second dorsal compartment and inserted at the base of the third metacarpal, positioned between the normal insertions of ECR Land ECRB. The primary ECRL tendon retained its standard insertion at the second metacarpal.
**Conclusion:** Awareness of this anatomical variation is essential for accurate diagnosis, avoidance of intraoperative complications, and effective planning of tendon transfer or reconstructive procedures.

**Keywords:** Anatomical Variation, Extensor Carpi Radialis Accessory Tendon, De Quervain Tenosynovitis, Wrist Pain, Tendon Transfer.
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## Introduction

A dozen muscles occupy the extensor compartment of the forearm. Below the extensor retinaculum, the second osseofibrous tunnel of the wrist typically transmits the tendons of the Extensor Carpi Radialis Longus (ECRL) and Extensor Carpi Radialis Brevis (ECRB). The ECRL tendon inserted distally onto the dorsal surface of the base of the second metacarpal. However, variations in the muscle bellies and tendons of the extensor compartment are frequent, with cadaveric studies reporting accessory slips in approximately 33.8% of limbs.[1] These variations are of considerable clinical interest because any increase in the volume of the contents within the rigid second compartment can lead to overcrowding. This phenomenon alters the biomechanics of the wrist, predisposing the patient to friction syndromes and chronic radial-sided wrist pain.[2,3]

## Case Description

During routine dissection of the posterior compartment of the right forearm in a 74-year-old male cadaver, a distinct morphological variation was observed:

**Proximal Attachment (origin):** An accessory musculotendinous slip originated from the muscular belly of the extensor carpi radialis longus (ECRL) (figure 1).

Department of Anatomy, SMBT IMS & RC, Nashik, Maharashtra, India.
**Corresponding Author:** Lakshmi Kiruba N
(**Email:** lakshmikiruba1@gmail.com)

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**Course & Relations:** The accessory tendon coursed distally, lateral to the ECRB tendon, and passed deep to the extensor retinaculum within the second dorsal compartment.
**Distal Attachment (Insertion):** The accessory tendon inserted to the dorsal aspect of the base of the 2nd metacarpal bone, fusing with the primary ECRL tendon (figure 2).

The accessory tendon paralleled the distal attachment of the ECRL, coursing along the medial side of its insertion; increasing the tendinous volume within the osteofibrous tunnel.

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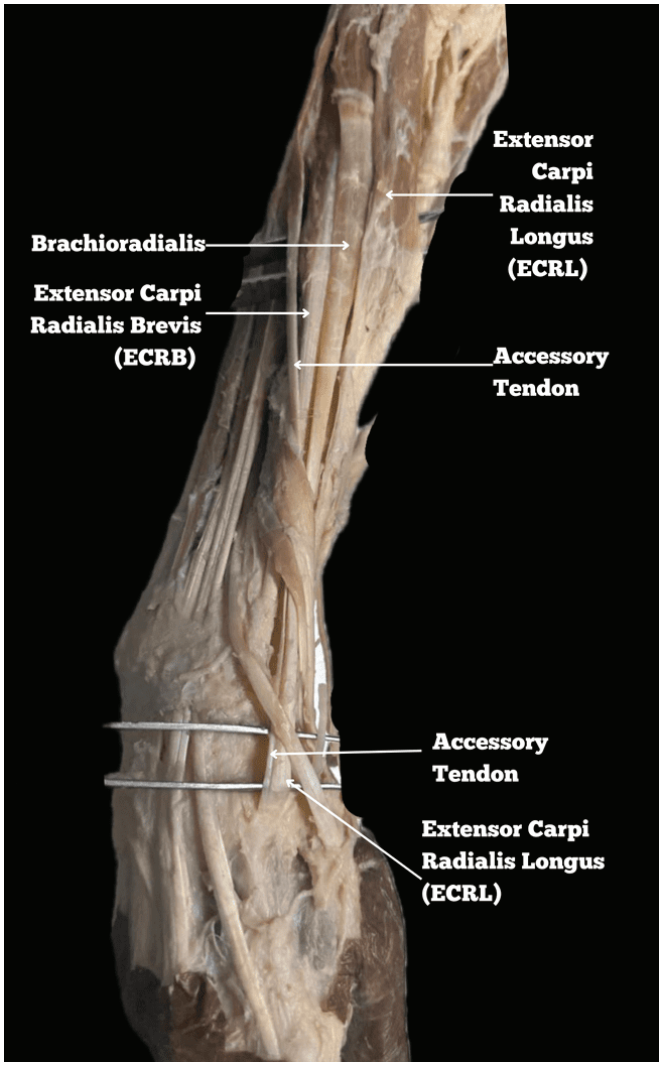


**Figure 1:** Origin and Course of Accessory Tendon.

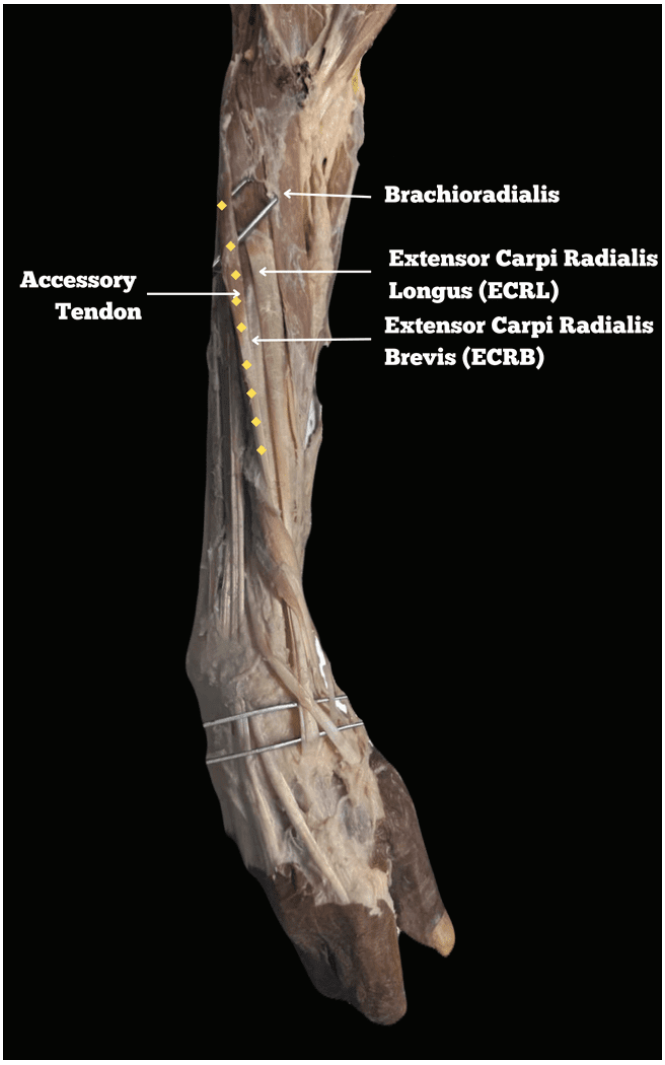


**Figure 2:** Distal Attachment (Insertion) of Accessory Tendon.

## Discussion

The "Interconnecting Slip" observed in this case represents a significant variation in the ontogeny of the extensor muscle mass of the forearm. Embryologically, the extensor musculature differentiates from the dorsal muscle mass of the developing limb bud. Under normal developmental conditions, this primordial mass undergoes a process of longitudinal splitting or cleavage to form distinct muscular units, such as the Extensor Carpi Radialis Longus (ECRL) and Brevis (ECRB). The persistence of an accessory tendon or a muscular slip is attributed to the incomplete cleavage or aberrant delamination of this common extensor mass.[4]

While the literature documents a broad spectrum of such anomalies; ranging from simple tendinous interconnections to distinct supernumerary entities like the Extensor Carpi Radialis Intermedius (ECRI).[5,6] This duplication of the ECRL tendon inserting onto the 2nd metacarpal reflected the developmental plasticity of the dorsal muscle mass.

From the perspective of Clinical Anatomy, the presence of an accessory tendon within the second osseofibrous tunnel is of paramount importance due to the "mass effect" it creates. Anatomically, this compartment is defined anteriorly by the distal radius and posteriorly by the thick, unyielding fibers of the extensor retinaculum. The addition of a supernumerary tendon increases the compartmental volume, leading to a phenomenon of overcrowding. This reduces the free space available for tendon excursion, predisposing the patient to friction syndromes or stenosing tenosynovitis. Clinically, this "volume-conflict" often manifests as chronic radial-sided wrist pain. A critical diagnostic challenge arises because these symptoms closely mimic De Quervain's Tenosynovitis, which affects the adjacent first compartment (Abductor Pollicis Longus and Extensor Pollicis Brevis).[3] Since routine physical examination may fail to differentiate between inflammation of the first compartment and overcrowding of the second due to their anatomical proximity, MRI is the investigation

of choice. It effectively visualizes the supernumerary slip, confirming the structural etiology and ruling out purely inflammatory pathologies.[3]

Surgically, this anatomical variation presents a "double-edged sword". On one hand, it poses an iatrogenic risk during minimally invasive procedures. For instance, during arthroscopic release for Lateral Epicondylitis (Tennis Elbow), where the origins of the ECRL and ECRB are debrided or released, the accessory slip may be mistaken for the primary tendon or obscured by inflammatory tissue, leading to inadvertent injury or incomplete release.[7] On the other hand, this variation offers a unique therapeutic advantage. Morphometric studies indicate that these accessory tendons often possess adequate length and cross-sectional area to function as robust autologous grafts.[8] This makes the accessory slip a valuable "spare part" for reconstructive surgeries, such as the repair of neglected Zone VII extensor tendon injuries. Utilizing this local tissue allows the surgeon to reconstruct the defect, while sparing the Palmaris Longus tendon, thus preserving other anatomical resources for future needs.[8,9]

## Clinical Significance

The accessory ECRL slip inserted on the base of the second metacarpal constituted a notable anatomical variant that highlighted the "overcrowding effect" in the pathogenesis of radial sided wrist pain syndromes. Clinicians should include this entity in the differential diagnosis of persistent radial-sided wrist discomfort and use MRI to differentiate it from conventional stenosing tenosynovitis. Surgically, the slip posed a risk of inadvertent injury during wrist arthroscopy, while serving as valuable donor material for tendon grafting in reconstructive procedures, such as extensor repairs, thereby minimizing harvest morbidity from conventional sites. This observation emphasized adopting a variation-centric paradigm over rigid anatomical templates in wrist procedures, positioning such slips as dual-role elements; pathogenic triggers and reconstructive resources.

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