

Anomalous Forearm Muscles and Their Clinical Relevance

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Despite their relatively low prevalence in the population, anomalous muscles of the forearm may be encountered by nearly all hand and wrist surgeons over the course of their careers. We discuss 6 of the more common anomalous muscles encountered by hand surgeons: the aberrant palmaris longus, anconeus epitrochlearis, palmaris profundus, flexor carpi radialis brevis, accessory head of the flexor pollicis longus, and the anomalous radial wrist extensors. We describe the epidemiology, anatomy, presentation, diagnosis, and treatment of patients presenting with an anomalous muscle. Each muscle often has multiple variations or subtypes. The presence of most anomalous muscles is difficult to diagnose based on patient history and examination alone, given that symptoms may overlap with more common pathologies. Definitive diagnosis typically requires soft tissue imaging or surgical exploration. When an anomalous muscle is present and symptomatic, it often requires surgical excision for symptom resolution. (*J Hand Surg Am.* 2018; ■(■): ■–■. Copyright © 2018 by the American Society for Surgery of the Hand. All rights reserved.)

Key words Anatomy, forearm, hand, muscle, variant.

SEVERAL ANOMALOUS FOREARM muscles may be encountered during imaging or surgical exposure of the forearm. Although the prevalence of these muscles in the general population is low, many upper extremity surgeons can expect to encounter them during their careers. Anomalous muscles may be noted incidentally during surgery, or may cause symptoms such as a compressive neuropathy for which the patient seeks care. In this review, we describe 6 anomalous muscles: the aberrant palmaris longus (PL), anconeus epitrochlearis (AE), palmaris profundus (PP), flexor carpi radialis brevis (FCRB), accessory head of the flexor pollicis longus (AHFPL), and the extensor carpi intermedius. We review the

anatomy and epidemiology of these muscles, and discuss the presentation, diagnosis, and treatment of patients presenting with symptoms attributable to these variants.

ANOMALOUS PALMARIS LONGUS

Anatomy

The normal PL originates from the medial epicondyle with a proximal muscle belly and long distal tendon that inserts into the palmar fascia. A substantial amount of variation has been noted, however, with variations reported as duplicate, reversed, centrally located, bifid, divided with an ulnar slip, or hypertrophic (Fig. 1A–F).¹ Additional reports have described an anomalous PL with 3 heads or as 3 distinct muscles.^{1,2} Variants in the muscle belly represent 50% of the anomalies of the PL reported.¹ The PL can originate from the lacertus fibrosis, flexor digitorum superficialis, flexor carpi radialis, and flexor carpi ulnaris and may insert into the antebrachial fascia, thenar eminence, flexor carpi ulnaris, or into the carpal bones. An accessory tendon may also exist at the ulnar aspect of the main tendon distally (Fig. 1F).¹ The PL is most commonly

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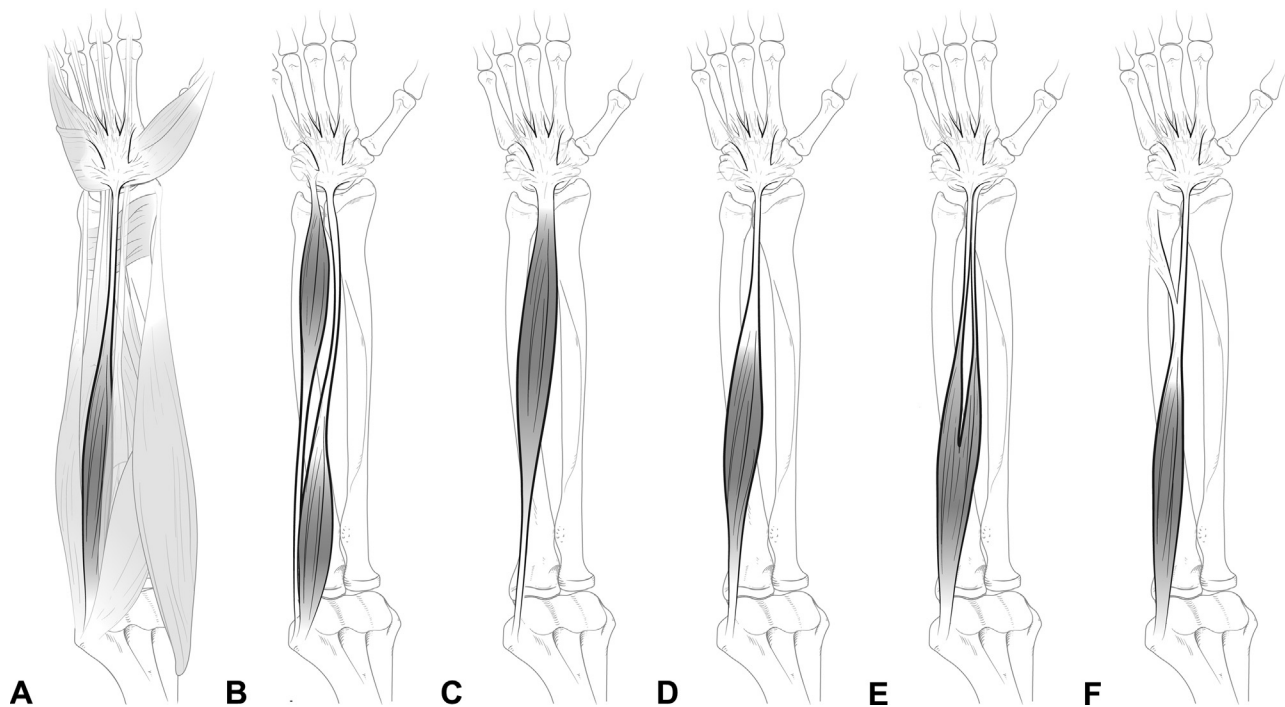


FIGURE 1: Anomalous palmaris longus. **A** Regular, **B** duplicate, **C** distally based muscle belly, **D** centrally based muscle belly, **E** bifid muscle, and **F** divided tendon with an ulnar slip.

innervated by the median nerve but may be innervated by the ulnar nerve as well.^{1,2}

Epidemiology

Variations in the PL may preclude its use for tendon transfer or as a source of tendon graft. In 1944, Reimann et al¹ published their seminal study in which they examined 1,600 upper extremities and revealed the absence of the PL in 12.8% of specimens. The authors then evaluated 530 of the 1,600 specimens and found that 46 of those 530 (9%) exhibited variations with respect to form, origin, or insertion. Females were 10% more likely to have an absent PL, and absence was more likely in the left upper extremity.¹ Thompson et al³ found that the absence of the PL was highest in Caucasian (26%) and American Indian (18%) subjects. Lower rates of absence were noted in subjects of Asian (12%) and African (6%) descent.

Patient presentation

An anomalous PL may be encountered incidentally, or may present insidiously with symptoms similar to carpal tunnel syndrome, exertional compartment syndrome, or compression of the ulnar nerve near Guyon's canal.^{2,4} The most commonly compressed nerve is the median nerve; however, the ulnar nerve may also be affected.^{2,4,5} Patients with chronic,

severe compression neuropathy may present with atrophy of the hand muscles.⁴ The muscle itself may also appear as swelling or hardness in the distal volar forearm on flexing the digits.^{2,5} Depuydt et al⁵ described 1 anomalous PL that presented with bluish swelling over the volar wrist that changed consistency on active flexion or extension of the wrist.

ANCONEUS EPITROCHLEARIS

Anatomy

The AE is a muscular variation of the Osborne ligament at the medial elbow, and is most commonly encountered incidentally while performing a cubital tunnel release. The AE originates from the medial epicondyle and courses superficial to the ulnar nerve before inserting onto the medial olecranon (Fig. 2).⁶⁻⁸ The muscle itself becomes taut in flexion and lax in extension.⁹ There is little variation in the anatomy of the AE, and it is reliably innervated by the ulnar nerve.⁷ The AE has been described as a weak extensor of the elbow,^{7,10} although it is theorized that with decreased evolutionary need for the assistance extending the elbow, AE degenerated into the Osborne ligament.^{8,10} In its current state, the Osborne ligament may prevent ulnar nerve subluxation from the cubital tunnel during elbow motion.

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