



AN ADDITIONAL EXTENSOR CARPI RADIALIS LONGUS MUSCLE AND ITS CLINICAL SIGNIFICANCE

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Abstract: Muscular variations of the extensor compartment of the forearm are unusual and can result in multiple clinical conditions. During a routine cadaveric dissection of the extensor compartment of the forearm, an unusual additional extensor carpi radialis longus muscle was noted on the left side of a middle aged male cadaver. It was also noted that, the radial nerve was passing between the two extensor carpi radialis longus muscles after piercing the additional extensor carpi radialis longus muscle. Such course of radial nerve makes it highly vulnerable to compression and injury, which may manifest as wrist drop, or radial compression of posterior interosseous nerve. Thus the additional extensor carpi radialis longus muscle found in this case can be used in the surgical rehabilitation of patients with paralytic disorders or tendon reconstruction surgeries. Proper knowledge of such neuro muscular variations is clinically essential in operative procedures and appropriate treatment for compressive neuropathies.

Keywords: Extensor Carpi Radialis Longus, Radial Nerve, Tendon Reconstruction, Wrist Drop.

INTRODUCTION

The extensor carpi radialis longus (ECRL) is one of the superficial muscles of the extensor compartment of the forearm travels along the radial side of the forearm that control movements at the wrist. It originates from the lateral epicondyle, lateral supracondylar ridge of the humerus and lateral intermuscular septum, the fibers end at the upper third of the forearm in a flat tendon and attached to the base of the second metacarpal bone.

The variations of the muscles, especially presences of additional bellies and tendons of existing muscles or presence of additional muscles in unusual locations might misguide surgical procedures such muscles may simulate soft tissue tumors and can result in nerve compressions.^[1]

In this case we describe an unusual additional ECRL of the extensor compartment of the forearm and its Clinical Significance

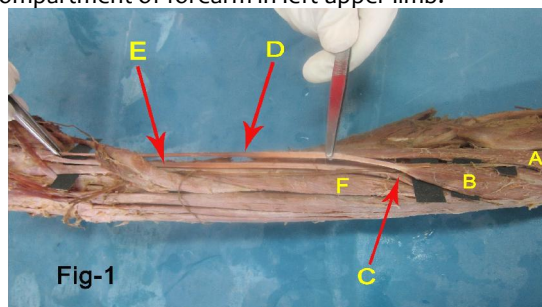
Case Report:

During a routine cadaveric dissection for the undergraduate students in the Department of Anatomy, we noted an unusual additional muscle in extensor compartment of the forearm of left side, in a middle - aged male cadaver.

1. An additional ECRL muscle was found on the ulnar side of brachioradialis and superficial to extensor carpi radialis longus. Through the additional muscle had a common origin with the extensor carpi radialis longus, when traced distally it was clearly distinct from the extensor carpi radialis longus. This additional muscle at the upper third of the forearm had a thick flat long tendon and was

passed deep to the abductor pollicis longus and extensor pollicis brevis and ended by getting inserted into the base of the dorsal surface of the second metacarpal bone [Figure.1].

Figure.1: Photographic presentation of additional extensor carpi radialis longus muscle in extensor compartment of forearm in left upper limb.



A - Brachioradialis muscle; **B**- Additional extensor carpi radialis longus muscle; **C**- Extensor carpi radialis longus muscle; **D**- Tendon of additional extensor carpi radialis longus muscle; **E**- Tendon of extensor carpi radialis longus muscle; **F**- Extensor carpi radialis brevis muscle.

2. The radial nerve in the lower part of anterior compartment forearm was noted between the brachioradialis medially, and the two ECRL muscles laterally, before it piercing the additional ECRL muscle. The additional ECRL muscle was innervated by the radial nerve [Figure.2].
3. The photographs of the neuro muscular variations were taken for proper documentation.

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Figure.2: Photographic presentation of additional extensor carpi radialis longus muscle in relation to the radial nerve in extensor compartment of forearm in left upper limb.

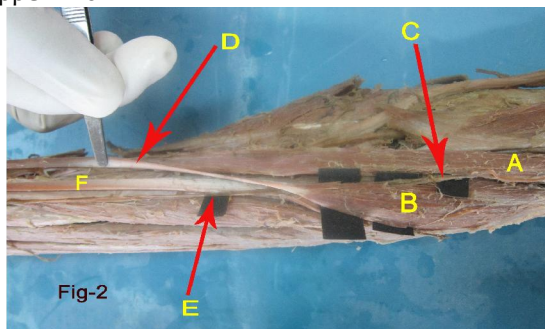


Fig-2
A - Brachioradialis muscle; B- Additional extensor carpi radialis longus muscle; C- Radial nerve piercing additional extensor carpi radialis longus muscle; D- Tendon of additional extensor carpi radialis longus muscle; E- Superficial branch of radial nerve; F- Tendon of extensor carpi radialis longus muscle.

The neuro muscular variations noted in the present case was compared with that of previous studies from medical literature shows that the occurrence of such (neuro muscular variations) additional ECRL muscle in relation to radial nerve, has not been reported in modern literature.

DISCUSSION

Muscular variations of the extensor compartment of the forearm are unusual and the variations in the superficial group of extensors are rarely observed. The accessory head of extensor carpi radialis longus,^[2] an additional belly of the ECRL with a thin tendon,^[3] aberrant muscle slips of superficial group extensors of forearm,^[4] extensor carpi radialis longus dividing into two tendons with the absent of extensor carpi radialis brevis,^[5] accessory tendon making the union between the tendons of the extensor carpi radialis longus and the extensor carpi radialis brevis,^[6] was reported in the literature. However, it can be noted that none of these cases were similar to our observations in the present case. The additional ECRL muscle noted in this case may augment the action of ECRL and could certainly improve in extension and abduction strength at the wrist joint. Presence of its flat thick tendon in the second compartment of the extensor retinaculum along with the tendons of ECRL and extensor carpi radialis brevis may compress the posterior interosseous nerve directly or indirectly which may manifested by chronic dorsal wrist pain.^[7]

Tendon transfers are frequently used in obstetrical brachial plexus injuries to restore elbow function.^[8] We as anatomists, opine that the additional ECRL and its

thick tendon noted in the present case could be utilized effectively and reliably in surgical rehabilitation of patients with paralytic disorders or tendon transfer.

The radial nerve in the lower upper part of anterior compartment forearm descends in an intermuscular interval between brachioradialis and ECRL laterally, and the brachialis medially. Where as in this case the radial nerve was noted between the brachioradialis medially, and the two ECRL muscles laterally, before it piercing the additional ECRL muscle. Such unique course of the radial nerve found in this case makes it highly vulnerable to compression and injury, which may manifest as radial nerve neuropathy or wrist drop or radial tunnel syndrome. Occurrence of such additional ECRL muscle in relation to radial nerve may arise primarily due to errors of embryologic developmental timing or persistence of an embryologic condition.

CONCLUSION

Additionally knowledge of such muscular variations in relation to radial nerve supplements the anatomical information on the muscles of the antebrachial and carpal regions may become significant in preoperative diagnosis and in the hand during surgery. Our premise is that the additional ECRL muscle and its thick tendon may be used for tendon reconstruction surgeries.

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