

Case Report

Bilateral reversed palmaris longus muscle with trifold insertion, a rare variation

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ABSTRACT

Normally the palmaris longus muscle originates from the medial epicondyle of the humerus from common flexor origin. In the middle of the forearm, the muscle belly forms a tendon which is inserted into the flexor retinaculum and the palmar aponeurosis. In our study after dissection of both forearms of a 45-year-old male cadaver we found a reversed palmaris longus muscle. This means that the palmaris longus muscle was tendinous in its proximal part and muscular in its distal part. The fleshy belly of muscle was passing over flexor retinaculum, was ensheathed by separate fascia. The muscle belly was spreading on both the sides of each palm for insertion which was trifold, that is centrally into palmar aponeurosis, laterally continuous with the fascia covering the thenar muscles and medially with Abductor digit minimi. It was having tendinous interconnection with the muscle mass of both the sides. Bilateral reversed palmaris longus muscle mentioned in the literature, was a surgical finding in a patient who suffered from edema and pain in the wrist. The overuse of the reversed palmaris longus muscle can lead to the muscle's local hypertrophy. As per the literature a reversed palmaris longus muscle may cause a compartment syndrome with pain and edema in the wrist area, the carpal tunnel syndrome and Guyon's syndrome. The variation is also useful to the hand surgeon, as the palmaris longus muscle is an anatomical landmark for operations in this area.

Keywords: Reversed palmaris longus, Trifold insertion

INTRODUCTION

The palmaris longus muscle (PL) is described as probably the most variable muscle in the human body, being variable both in number and form.¹ It can be absent in about 11% of bodies and this absence is more often in females and on the left side.^{1,2} Bilateral absence is more common than unilateral absence.¹ Concerning the kind of muscle, it may be fleshy throughout its entire length or may be digastric. The muscle may have a proximal tendon or a distal one. It may be fleshy distally and tendinous proximally (Palmaris longus inversus), being known as the reversed palmaris longus muscle (RPL). The insertion is also highly variable and the muscle may be attached to the fascia of the forearm, the tendon of

flexor carpi ulnaris, the flexor retinaculum, the pisiform or the scaphoid bones, the abductor pollicis brevis muscle, the fascia or muscles of the hypothenar eminence, one of the flexor tendons, or near the metacarpophalangeal joints.¹ The distal end of the PL is of clinical interest because of its possible relationships with the median and ulnar nerves. Usually the anatomical variations of the PL are not symptomatic. Nevertheless, a RPL can cause median nerve compression,^{2,3} and less frequently ulnar nerve compression.⁴

CASE REPORT

During the routine dissection of a male cadaver of age 45 years, palmaris longus presented bilaterally as reversed

palmaris longus (RPL), i.e. tendinous at the proximal end with a normal origin from the medial epicondyle and muscular at the distal end. The tendon showed a descendant pathway on the forearm above the muscle belly of flexor digitorum superficialis. On the distal one third of the forearm, the PL had muscular belly. Muscle tendon and belly measurements were taken with the aid of a scale. Right palmaris longus: The total length of the muscle was 26.5 cm, with the tendon being 11.5 cm long. The reversed muscular belly was 15 cm long. Left palmaris longus: The total length of the muscle was 26.5 cm, with the tendon being 13.5 cm long. The reversed muscular belly was 13 cm long. The muscle was originating from medial epicondyle as tendinous origin along with common flexor origin. For insertion the fleshy belly of muscle was passing over flexor retinaculum, at this site belly was ensheathed by separate fascia. The muscle belly was spreading on both the side of each palm for insertion. Insertion of the muscle was trifid, i.e. centrally into palmar aponeurosis, laterally continuous with the fascia covering the thenar muscles and medially continuous with Abductor digit minimi (ADM) having tendinous interconnections in the muscle mass of both the muscles (Figure 1). The median nerve in the distal one third of the forearm was lateral to the tendon of flexor digitorum superficialis and medial to the tendon of flexor carpi radialis. In the wrist region the MN was situated under the muscular belly of the palmaris longus.

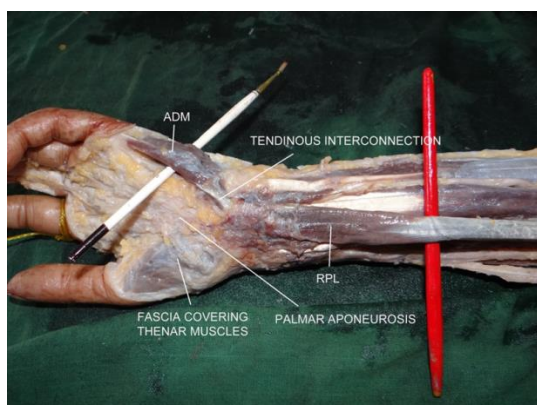


Figure 1: Insertion of reverse palmaris longus.



Figure 2: Muscles of forearm.

DISCUSSION

The palmaris longus muscle is a superficial flexor muscle of the forearm and arises along with the other superficial flexor group from the medial epicondyle of the humerus by a common flexor origin (Figure 2). These muscles are the Pronator Teres (PT), the Flexor Carpi Radialis (FCR), the Palmaris Longus (PL), the Flexor Digitorum Superficialis (FDS) and the Flexor Carpi Ulnaris (FCU). Palmaris longus is considered as a phylogenetically degenerating metacarpophalangeal joint flexor. Although it plays a role in carpal flexion, its main function appears to be as an anchor for the skin and fascia of the hand, in resisting horizontal shearing forces in a distal direction, as in holding a golf club.⁵ The palmaris longus muscle is one of the most variable muscles in the human body and it belongs to the class of retrogressive muscles. With the palmar aponeurosis the muscle represents the most superficial part of the primitive common flexor muscle of the fingers.⁶ Many cases of reversed palmaris longus muscle either as an anatomical or mainly as a surgical finding have been described in the literature.^{2,4,7} The correlation between the reversed palmaris longus muscle and the carpal tunnel-like syndrome has been reported in the literature. With repetitive work a reversed PL can lead to hypertrophy of the muscle belly. Limited by a relatively non-compliant fascia pressure in the anterior compartment can markedly increase during muscle activity and may compromise capillary blood flow and the metabolic demands of the tissues. When active a reversed PL can manifest as an effort-related compartment syndrome,⁸ with a painful swelling of the distal forearm.⁹ Reversed PL can also elicit pain due to local pressure on the median or ulnar nerves.^{8,10} The occurrence of pain is also diurnal being activity related.

Another pathological condition that is related to the reversed palmaris longus muscle is the Guyon's syndrome, which is the compression of the ulnar nerve at the wrist. This can be explained by the phylogenetic fact that all intrinsic muscles of the hand are derived from muscle masses that originated in the forearm. In a surgical excision of a double reversed palmaris longus muscle by Regan et al. (1988),⁴ the bundle that was compressing the ulnar nerve was originated from the reversed palmaris longus muscle belly and it was inserted into the pisiform bone. In more recent reports, two authors reported that the MRI report was negative preoperatively, whereas postoperatively and after the excision of the reversed muscle, the second careful inspection of the MRI proved that the previously mentioned muscle was apparent.^{2,3} This was explained by the fact that the reversed palmaris longus muscle belly has the same sign in the MRI with the remainder of the forearm muscles and was missed by the ignorance of the existence of this anatomical variation.²

To conclude the knowledge of such a reversed palmaris longus muscle is useful to surgeons who operate in the wrist area. The existence of a mass in the palmar surface

of wrist together with symptoms of the median or the ulnar nerve compression, aggravating on hand movements, should lead to the suspicion of a reversed palmaris longus muscle. The radiologists should also bear this variation in mind, as its diagnosis is difficult due to the plethora of the forearm muscles and its variations. The PLM is functionally redundant and easily accessible, so it is frequently used as a tendon graft. Hence awareness of the variations of palmaris longus muscle form significant anatomical landmark.

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REFERENCES

1. Tountas CP, Bergman RA. Extensor indicis. In: Tountas CP, Bergman RA, eds. Anatomic Variations of The Upper Extremity. 1st ed. New York: Churchill Livingstone; 1993: 133-135.
2. Depuydt KH, Schuurman AH, Kon M. Reversed Palmaris longus muscle causing effort-related median nerve compression. J Hand Surg. 1998;23B(1):117-9.
3. Schurman AH, Van Gils APG. Reversed palmaris longus muscle on MRI: report of four cases. Eur Radiol. 2000;10:1242-4.
4. Regan PJ, Roberts JO, Bailey BN. Ulnar nerve compression caused by a reversed palmaris longus muscle. J Hand Surg [Br]. 1988;13:406-7.
5. Ellis H, Healy JC, Johnson D, Williams A. Forearm. In: Standring S. Edinburg, eds. Gray's Anatomy: The Anatomical Basis of Clinical Practice. 39th ed. Philadelphia: Elsevier Churchill Livingstone; 2005: 873-887.
6. Reimann AF, Daseler EH, Anson BJ, Beaton LE. The palmaris longus muscle and tendon. A study of 1600 extremities. Anat Rec. 1944;89:495-505.
7. Yildiz M., Sener M., Aynaci O. 2000. Three-headed reversed palmaris longus muscle: a case report and review of the literature. Surg Radiol Anat. 2000;22:217-9.
8. Guler MM, Celikoz B. Anomalous palmaris longus muscle causing carpal tunnel-like syndrome. Arch Orthop Trauma Surg. 1998;117:296-7.
9. Polesuk BS, Helms CA. Hypertrophied palmaris longus muscle, a pseudomass of the forearm MR appearance-Case report and review of the literature. Radiol. 1998;207:361-2.
10. Schlafly B., Lister G. Median nerve compression secondary to bifid reversed palmaris longus. J. Hand Surg [Am]. 1987;12:371-3.

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