# An unreported variant of palmaris longus muscle

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**Abstract:** Palmaris longus is a highly variable muscle of the forearm. Knowledge of its variability is of importance to plastic surgeons, hand surgeons and radiologists. During our routine dissection classes for undergraduate medical students, a peculiar palmaris longus muscle was noted in the left upper limb of an adult male cadaver. The muscle had a fleshy belly in the middle and two tendons: a proximal and distal. The distal tendon of palmaris longus gave origin to a variant fleshy slip of muscle which was inserted partly to the pisiform bone and partly merged with the hypothenar muscles. The ulnar nerve and artery passed deep to this variant fleshy slip. The ulnar artery was tortuous both proximal and distal to this slip. The distal loop of the ulnar artery was very superficial and was in the median position. Both the palmaris longus and the variant fleshy slip were innervated by median nerve.

Key words: Ulnar artery, Hand, Variation, Forearm, Aponeurosis

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### Introduction

Palmaris longus is a highly variable superficial muscle of the forearm. It is a retrogressive muscle, which has a short belly and a long tendon. Its fleshy belly takes origin from the medial epicondyle along with the other superficial forearm muscles. Distally, its tendon merges with palmar aponeurosis. It is supplied by the median nerve and is a weak muscle and its absence does not cause any significant difficulty in the movement of the wrist. The muscle may be totally absent [1], hypertrophied [2], reversed [2-4], or have bifid [5] or trifid [6] tendons. Origin of additional muscles from its distal tendon have also been reported [7-9]. We report a unique variation of this muscle and discuss its possible clinical im-

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Department of Mathematics, Manipal Institute of Technology, Manipal Academy of Higher Education, Manipal 576104, India E-mail: soumya.kv@manipal.edu plications. The objective of this research is to present a rare variation of the palmaris longus muscle that could compress the ulnar artery in the distal forearm.

### **Case Report**

During dissection classes for first year medical students, a peculiar palmaris longus muscle was noted in the left upper limb of a male cadaver aged about 65 years. There is no evidence of any medical history of the individual. The muscle had a proximal and a distal tendon and a fleshy belly in the middle (Figs. 1, 2). The proximal tendon was 12 cm in length and the distal tendon was 4 cm in length. The muscle belly connecting these two tendons was 12 cm in length. The proximal tendon was attached to the medial epicondyle of the humerus with the other superficial flexors of the forearm. The distal tendon flatted out into palmar aponeurosis 2 cm proximal to the flexor retinaculum. The palmar aponeurosis passed superficial to flexor retinaculum into the palm. It partially merged with the thenar muscles (Figs. 1, 2). The distal splitting and

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**Fig. 1.** Dissection of the flexor compartment of the left forearm showing the variant palmaris longus muscle with its proximal and distal tendons. Note the extension of the palmar aponeurosis (PA) into the forearm. Also note the tortuosity of the ulnar artery (UA) in relation to the variant muscle slip arising from the distal tendon of palmaris longus.

attachment of palmar aponeurosis was normal. The distal tendon of palmaris longus gave origin to a variant muscle slip which was 1.5 cm in breadth and 5 cm in length. Distally some of the fibers of this slip were inserted to the pisiform bone and the rest of the fibers merged with the hypothenar muscles. The ulnar nerve and artery passed deep to this variant fleshy slip. The ulnar artery was tortuous both proximal and distal to this slip. The ulnar nerve did not show any tortuosity. The distal loop of the ulnar artery was very superficial and was in the median position (Fig. 2). Both the palmaris longus and the variant muscle slip were innervated by median nerve. The median nerve had a normal course in the forearm. It was lateral to the tendon of palmaris longus in the distal part of the forearm and then passed deep to the proximal part of the palmar aponeurosis and the flexor retinaculum. We did not observe any variations in the right upper limb or any other parts of the body.

### Discussion

Palmaris longus is a vestigial muscle of the forearm. It may be congenitally absent [1]. Its absence could be unilateral or bilateral. According to a recent study by Olewnik et al. (2018) [10], its absence was unilateral in 22.5% and bilateral in 26.25% of cases. However, Georgiev et al. (2017) [11] have reported its absence only in 2.68% cases. The origin of the



Fig. 2. Closer view of the dissection of the distal part of the flexor compartment of the left forearm. Note the variant muscle slip (VMS) arising from the distal tendon of the palmaris longus and the tortuosity of ulnar artery (UA) proximal and distal to it. Also note the extension of the palmar aponeurosis (PA) into the forearm. Median nerve (MN), ulnar nerve (UN) and the flexor carpi ulnaris (FCU) muscle have also been labelled.

muscle is constant though it could be fleshy or tendinous. The length and size of the fleshy belly and insertion pattern of the distal tendon is variable. There are reports on distal bifurcation [5] and trifurcations [6] of its tendon. Another commonly reported variation of the muscle is called 'reversed palmaris longus' where the tendon is proximal and the fleshy belly is distally placed [2-4]. Among reversed palmaris longus cases, hypertrophied [2], bilateral [3] and three headed palmaris longs [4] have been reported. Substitution of ring finger tendon of flexor digitorum superficialis by palmaris longus muscle is another rare variation that has been reported [12].

When the distal part of the muscle is fleshy, it could result in compression of the median nerve or ulnar nerve and vessels, leading to neurovascular symptoms. Afshar (2015) [7] has reported the origin of a variant muscle called abductor digiti minimi longus from the tendon of the palmaris longus. This muscle had caused ulnar tunnel syndrome in the patient. The variant muscle slip seen in the current case is quite different than the above said case since it was supplied by median nerve and had an insertion to the pisiform bone also. Additional muscle slips in the distal part of the forearm are known to cause symptomatic neurovascular compressions and they could be detected by magnetic resonance imaging techniques [8]. Spritzendorfer (1979) [9], has also reported such a muscle compressing ulnar nerve. Natsis et al. (2012) [13] have also reported a completely fleshy palmaris longus causing compression of median nerve.

From our literature survey, a muscle similar to the one being reported here, has not been reported earlier. This case is unique with respect to the following points. A) The palmaris longus had a fleshy belly in the middle and proximal and distal tendons. B) A muscle slip arising from distal tendon which was supplied by median nerve and merged with hypothenar muscles. C) Very superficial, median position of the ulnar arterial loop and D) beginning of palmar aponeurosis in the forearm. This type of variation of palmaris longus muscle might result in ulnar neurovascular symptoms and make ulnar artery vulnerable in the midline of the forearm. The tortuosity of the ulnar artery proximal and distal to the tendon could be due to the pressure exerted by the distal fleshy belly of palmaris longus. This case could be interesting and useful to plastic surgeons, radiologists, and other medical disciplines.

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### **Author Contributions**

Conceptualization: SBN. Data acquisition: SBN, VP, SKV. Data analysis or interpretation: SBN, VP. Drafting of the manuscript: SBN. Critical revision of the manuscript: VP, SKV. Approval of the final version of the manuscript: all authors.

# **Conflicts of Interest**

No potential conflict of interest relevant to this article was reported.

None.

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