

# Anatomic Variant of Retrogressive Palmaris Longus: A Case Report

Suyashi Sharma<sup>1\*</sup>, Ravi Shankar Sharma<sup>2</sup>, Sonali Adole<sup>1</sup>, Shilpi Gupta Dixit<sup>1</sup>, Surajit Ghatak<sup>1</sup>

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## ABSTRACT

An interesting case of unusual unilateral variant of palmaris longus tendon of forearm was noticed by us. We found two bellies of palmaris longus as well as their different insertions. These observations will help in understanding morphological variations of this muscle and its clinical implications. Palmaris longus is a fusiform muscle in the superficial flexor group of muscles of forearm. It originates from medial epicondyle of humerus by common

flexor tendon. We found PL having one origin i.e. from medial epicondyle from common tendinous origin of flexor muscles and then it divided to form two bellies having two long tendons distally. Understanding of presence or absence or anomalies of PL is not only important for medical professionals but also for evolutionary biologists. Awareness of anatomy and variations of flexor tendons is important for health care practitioners for correct diagnosis and management of pain, disease and trauma of forearm and hand.

**Key Words:** Variation, Palmaris longus, Volkmann's ischaemic contracture, Tendon graft

## INTRODUCTION

The Palmaris longus muscle (PL) is a fusiform muscle. It lies in the superficial flexor group of muscles of forearm. It originates from medial epicondyle of humerus by common flexor tendon (along with flexor digitorum superficialis muscle (FDS), flexor carpi ulnaris muscle (FCU) and flexor carpi radialis muscle (FCR)). After removing skin, subcutaneous tissue and fascia of anterior compartment of forearm, PL can be seen, lying superficial to FDS and between FCU and FCR muscle. It is directed downwards and outwards [1]. It has short muscular belly (up to mid forearm level) and then it takes the form of long and slender tendon. It then crosses in front of flexor retinaculum and is continuous with the central part of palmar aponeurosis [2]. It is innervated by median nerve [3]. Anatomical awareness of structures of forearm and their relations is essential for clinicians and surgeons. As there are several patients of distal neuropathies, so this study will be useful for medical professionals for the correct diagnosis and treatment. We found a case of PL having two bellies and two insertions. Such a case has never been reported in India.

## CASE REPORT

We found an interesting case of unusual unilateral variant of Palmaris longus tendon of forearm in male cadaver of Indian origin, during routine cadaveric dissection sessions of MBBS students in Department of Anatomy, All India Institute of Medical Sciences, Jodhpur. During dissection of flexor compartment of forearm after removing skin and superficial fascia, PL was seen. This structure was traced from origin to insertion. Due to its anatomical location and tendinous insertion, it was identified as PL. We found PL having one origin i.e. from medial epicondyle from common tendinous origin of flexor muscles and then it divided to form two bellies having long tendon distally. Medial and lateral tendons were inserted medially into the fourth slip and medial aspect of third slip of FDS respectively (Figure 1). Both the bellies were innervated by branches of median nerve.

## DISCUSSION

Important observations were done by us in our case report. We found two bellies of PL as well as their different insertions. These observations will help in understanding morphological variations of PL muscle and its clinical implications.

Embryologically, during 7th week of intrauterine life, forearm flexor muscles develop from a mesodermal condensation of dorsolateral cells of somite's which then migrate into the limb bud. Further these mesenchyme cells undergo division and form superficial and deep group of flexor muscles of

forearm. During development if an additional rift is present in the superficial forearm flexor mass, then this develops into additional tendon of PL [4]. Morphogenetically, development of tendon and muscle of PL was regulated by HOX gene [5].

PL is a muscle with short belly and long tendon, so it is phylogenetically considered as a retrogressive muscle. And its absence in humans is common. Going back to evolution, PL was well developed in the species who used their forelimbs for walking and weight bearing. So, it was well developed in mammals [6]. While according to some other researches, PL is well developed in species with a significantly higher ratio of upper limb weight to body weight. This ratio is very low in humans and hence PL is less developed and also its function is accessory. As the species evolved, forelimbs too evolved to a prehensile organ. Long flexor muscles of forearm began to undergo partial atrophy caudocranially [7]. And intrinsic muscles of hand took over the functions of PL. This resulted in partial degradation of PL and was replaced by fibroaponeurotic palmar aponeurosis. Further with the evolution of bipedal gait, degeneration of PL continued. PL finally evolved as a muscle with small belly and long tendon. Its function became rudimentary. Now it functions as accessory flexor for wrist and metacarpophalangeal joints. It helps in slight amplification of palmar grip. It acts as an anchor of palmar fascia. It tauts the skin and palmar fascia of hand. And therefore, shear the forces to palmar aponeurosis in distal direction. It may assist in thumb abduction movement.

PL has great clinical importance. It is used for cosmetic and reconstructive purposes. Plastic surgeons use it for tendon transplantation.



**Figure 1)** Image shows dissected view of palmaris longus. (\*- origin of palmaris longus, a,b- Tendons of palmaris longus after its belly got divided, 1- Flexor carpi radialis, 2- Flexor carpi ulnaris)

<sup>1</sup>Department of Anatomy, All India Institute of Medical Sciences, Jodhpur, Rajasthan, India.

<sup>2</sup>Department of Anaesthesiology, All India Institute of Medical Sciences, Rishikesh, Uttarakhand, India

Correspondence: Suyashi Sharma, Department of Anatomy, All India Institute of Medical Sciences, Jodhpur, Rajasthan, India. E-mail: suyashiravi1304@gmail.com

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Otorhinolaryngologists and ophthalmologists use this tendon as graft for surgeries like lip augmentation, ptosis correction and treatment of facial paralysis [8]. It is preferred as tendon donor because it is easily approachable (because of its superficial location) and it satisfies the criteria of required diameter, length and availability and can be used without leading to any complication or malfunctioning. It also helps in recognizing median nerve during surgeries.

Variants of PL can cause Volkmann's ischemic contracture, Carpal tunnel syndrome, Guyon's syndrome and Dupuytren's contracture due to compactness of tendons n nerves in anterior compartment of forearm. This leads to pain and numbness in the region of median nerve in hand and ape-thumb like deformity. Person having PL variation have pain in wrist on doing repetitive hand movement (like mechanics) due to median nerve compression. Anomalies of PL makes electro-myographical studies of median nerve at wrist and in endoscopic wrist procedures difficult [9]. According to some studies variants of PL can increase the pinch strength of fingers of hand [10].

### CONCLUSION

Knowledge of variations of PL variations is crucial not only for the anatomists but also plastic surgeons, pain physicians, radiologists and orthopedists for correct diagnosis and treatment of disease or trauma of forearm and hand. Understanding of presence or absence or anomalies of PL is not only important for medical professionals but also for evolutionary biologists.

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