

Case Report

# A Case Report of Unilateral Absence of Palmaris Longus

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## ABSTRACT

Palmaris longus is one among the superficial flexor muscles of forearm possessing a short fusiform belly and a long tendon lying between the flexor carpi radialis and the flexor carpi ulnaris. It is phylogenetically a degenerating muscle which shows a lot of variations, the most common one being absence. Based on ethnicity, gender, race, and hand dominance, it may be absent in individuals either unilaterally or bilaterally. <sup>[1]</sup> This paper describes the unilateral absence of palmaris longus muscle in the right forearm which was observed during routine cadaver dissection of a male cadaver aged about 65 yrs in the department of Shareera Rachana at Sri Dharmasthala Manjunatheshwara College of Ayurveda & Hospital, Hassan, Karnataka, India. The variation was compared with the presence of palmaris longus muscle of left limb and other possible variations of palmaris longus muscle reported in the literature. The prevalence of absence, related variations, clinical importance & evolutionary aspect of palmaris longus muscle has been discussed in the paper.

**Keywords:** Palmaris longus, Flexor muscle, Variation

## INTRODUCTION

Palmaris longus is a slender fusiform muscle medial to flexor carpi radialis. It springs from the medial epicondyle of humerus by the common flexor tendon, from adjacent intermuscular septa & deep fascia. It converges on a long tendon which passes superficial to flexor retinaculum. As the tendon crosses the retinaculum, it broadens out to become a flat triangular sheet called the palmar fascia or palmar aponeurosis through which the muscle gets widely inserted into the skin & fascia of distal palm & digital webs. It is suggested to be a phylogenetically degenerate metacarpophalangeal joint flexor which also helps in carpal flexion. Main function of the muscle appears to be an anchor for skin & fascia of hand thereby stabilising the palmar

skin in grasping objects by tensing it. The muscle is supplied by branches of ulnar artery & median nerve. <sup>[2]</sup>

## CASE REPORT

During routine cadaver dissection for undergraduate students in the department of Shareera Rachana at Sri Dharmasthala Manjunatheshwara College of Ayurveda & Hospital, Hassan, Karnataka, it was noted that palmaris longus was absent in the right forearm of a male cadaver aged about 65 years. All other muscles & neurovascular structures in the forearm were found to be normal.

## DISCUSSION

**Prevalence of Absence:** Palmaris longus is often described as one of the most variable

muscles in the human body and is phylogenetically classified as a retrogressive muscle. [3] The absence of the palmaris longus muscle was described for the first time in Columbus' book entitled *De Re Anatomica* and published soon after his death in 1559. [4] Most standard textbooks of hand surgery quote the prevalence of absence of palmaris longus as about 15%. However, this figure varies considerably in reports from different ethnic groups. Literature review reveals a low prevalence of absence in Asian, Black and Native American populations and a much higher prevalence of absence in Caucasian populations. Hence it is clear that a standard prevalence of absence of the palmaris longus cannot be applied to all populations. [5]

**Other variations:** A study by S. J. Sebastin et al in 418 normal Asian subjects reports that the absence of the muscle is neither related to body side and sex nor associated with a decrease of grip as well as pinch strength. The loss of the palmaris longus does not result in any functional deficit. The tendon is not associated with a decrease of grip or pinch strength. [5] Yet another study by D K Sharma et al concludes that the unilateral absence of tendon is statistically little more common than the bilateral absence and that there is no statistical association between the Palmaris Longus absence and handedness and other neighbouring anomalies like absence of Flexor Digitorum Superficialis to little finger, incomplete Superficial Palmar Arch etc. in a population of central India. [6] Another study by Reimann et al in 1600 extremities reports incidence rates of 12% & 9% of unilateral agenesis & other anomalies respectively. Variations in form included central, distal, digastric muscle belly or completely muscular instead of being tendinous. [7]

**Use:** The palmaris longus tendon is the most frequently harvested tendon for reconstructive plastic and hand surgical procedures. [8] This muscle is mainly used for tendon grafts in the wrist due to the

length and diameter of palmaris longus tendon and the fact that it can be used without producing any functional deformities. [9] When a tendon becomes ruptured in the wrist, the palmaris longus tendon may be removed from the flexor retinaculum and grafted to take the place of the ruptured tendon. The tendons most commonly replaced or supplemented by the palmaris longus tendon when ruptured are the long flexors of the digits and the flexor pollicis longus tendon. [10] The palmaris longus muscle itself is a weak flexor and provides no substantial flexing force that would inhibit movement in the wrist if its tendon was cut and moved elsewhere. If the palmaris longus muscle is not available for harvesting in an individual, the anatomically analogous plantaris muscle in the leg may be taken instead. [11] Use of the patient's own tendon is advantageous as it does not introduce foreign material into the body. [12]

The palmaris longus is also used as a graft source for elbow ligament reconstruction such as lateral collateral ligament reconstruction or ulnar collateral ligament reconstruction. [13] The muscle tendon is the most preferred one for tendon graft of the hand as palmaris longus tendon is extra synovial and does not have synovial membrane. Instead of synovial membrane, the tendon has a paratenon which does not promote gliding. [14]

The tendon is administered for reconstruction of multiple tendon ruptures as well as for those associated with extensor lag and impairment of overall function. Extensor tendon reconstruction for multiple tendon ruptures in rheumatoid arthritis using autogenous palmaris longus tendon graft is a salvage procedure. Free interposition graft of the tendon in the rheumatoid wrist is a viable option to achieve good clinical functional result. [15,16]

Other than reconstructive plastic surgeries like that of tendon graft, it is often used in wide variety of procedures including lip augmentation, ptosis correction and in the management of facial paralysis. [17]

The presence of the palmaris longus should be checked for preoperative evaluation for the harvesting of grafts. The measurement of the tendon of the palmaris longus muscle has the advantage of allowing the estimation of its length and width before removing it for surgical graft procedures besides favoring the possibility of making only two excisions to remove it. [18]

Numerous tests have been described to detect the presence of the Palmaris Longus in the living patient. The first test was described by Schaeffer in 1909. [19] The muscle tendon can be palpated by touching the pads of 5th & 1st digits & flexing the wrist; the tendon if present, will be visible. This test is thus named after the scientist as Schaeffer's test. [11]

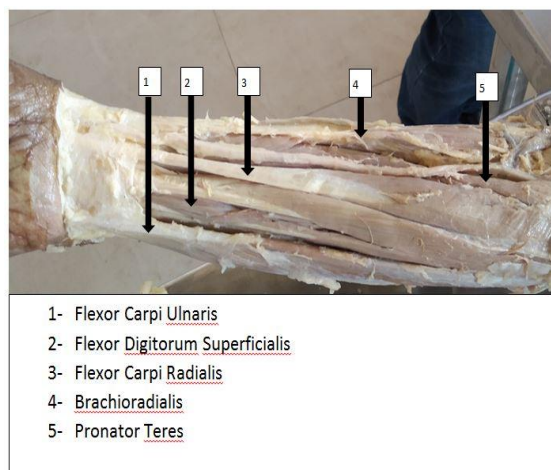
**Evolution:** The evolutionary interpretation of the absence of muscle explains the inheritance of muscle by humans through common descent. Numerous animals such as the orangutan that humans share a common ancestor with, still actively employ the muscle. But close primate relatives such as the chimpanzee and gorilla do not actively employ the muscle and hence they also demonstrate the same variability. The common descent principle suggests that at some stage our ancestors employed the muscle actively. The primate branch then began to evolve the thumb apparatus particularly the thenar muscle group and consequently the Palmaris longus became vestigial. As there is no apparent pressure either positive or negative concerning the muscle, evolution has largely left it alone. Its persistence might possibly be due to the fact that the necessary changes to the genes involved in losing the muscle may have other consequences, but this is only speculation. [20]

Agenesis of the palmaris longus is said to be hereditary and has been attributed to Mendelian characteristics.

## CONCLUSION

PL anomalies are very important for hand surgeons. In spite of being a landmark

to the structures in the wrist, the variations of this tendon may confuse even an experienced surgeon. The clinician must therefore consider every possibility of absence of this muscle along with its variations, if present. [21] However, lack of said muscle is considered disadvantageous as the tendon cannot be harvested as a graft if necessary.



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