



Duplication of palmaris longus muscle

Published online December 22nd, 2013 © <http://www.ijav.org>

Kumar PRATHAP +
Saroja PRAKASH
Kadirappa PADMALATHA
Bindinganavile RAMESH

Department of Anatomy, M. S. Ramaiah Medical College,
Bangalore, Karnataka, INDIA.



+ Dr. Prathap Kumar J
Assistant Professor
Department of Anatomy
M. S. Ramaiah Medical College
MSRIT Post
Bangalore- 560054, Karnataka, INDIA.
☎ +91 9035433303
✉ dr.prathapkumar@gmail.com

Received January 14th, 2013; accepted May 19th, 2013

Abstract

The palmaris longus is a slender superficial flexor muscle of the forearm. It takes origin from the anterior surface of medical epicondyle in common with the other superficial flexor muscles. It converges to form a long tendon, which passes superficial to flexor retinaculum and then attached to the apex of palmar aponeurosis. Palmaris longus is innervated by median nerve (C7-8). It is a phylogenetically degenerate metacarpophalangeal joint flexor. During routine dissection study and teaching to undergraduate students, we found variation in the palmaris longus muscle in the right forearm in an adult male cadaver aged 60–70 years. Duplication of the palmaris longus muscle was noted. Morphological and clinical implications of the variation are discussed.

© *Int J Anat Var (IJAV)*, 2013; 6: 207–209.

Key words [metacarpophalangeal] [palmar] [median nerve] [flexor] [duplication]

Introduction

Palmaris longus is a slender superficial flexor muscle of the forearm. The muscle belly is fusiform in shape which takes origin from the anterior surface of medical epicondyle in common with the other superficial flexor muscles of forearm. It converges to form a long tendon, which passes superficial to flexor retinaculum and then the tendon broadens out to form a flat sheet which gets attached to the apex of palmar aponeurosis. Palmaris longus muscle is innervated by median nerve (C7-8) and “phylogenetically it is a degenerate metacarpophalangeal joint flexor” and a weak flexor of the wrist joint [1].

Palmaris longus is often absent on one or both sides [1].

At the wrist, median nerve lies partly undercover of palmaris longus or between the tendons of flexor carpi radialis and palmaris longus [1].

The knowledge of the anatomical variations of palmaris longus is important due to its clinical significance. Variations of palmaris longus are common but asymptomatic; they may become important during surgeries and in some radiological procedures. Awareness of such variations is important for clinicians and surgeons.

Case Report

During routine dissection study and teaching of upper limb region to undergraduate students in Anatomy department, Dr. B. R. Ambedkar Medical College, Bangalore, we found variation in the palmaris longus muscle in an adult male cadaver aged 60–70 years. The palmaris longus in the present case was duplicated in the right forearm. Both the bellies of the duplicated muscle were proximal and their tendons were distal (Figure 1). The usual palmaris longus muscle belly was slender and its tendon was elongated but the accessory palmaris longus muscle belly extending up to the middle of forearm and its tendon was shorter (Table 1). Left forearm had normal palmaris longus without any variations.

Both muscles were taking origin from common flexor origin, while the insertion of usual tendon was to the apex of palmar aponeurosis, and insertion of the accessory tendon was to the flexor retinaculum (Figure 1).

Discussion

Muscles are highly variable and are often found in the course of routine dissection of the human body. There are three types of variations in the muscles: it may be progressive, retrogressive and atavistic. The muscles which have tendency to become increasingly more complex represent progressive type. Deep flexor muscles of forearm belong to progressive



Figure 1. Photograph showing the duplication of palmaris longus muscle in the right forearm. (*PL*: palmaris longus inserted into apex of palmar aponeurosis at 1; *AccPL*: accessory palmaris longus inserted in to flexor retinaculum at 2)

Table 1. Length of the palmaris longus muscle belly and its tendon.

	Usual palmaris longus	Accessory palmaris longus
Muscle belly length (cm)	09	14
Tendon length (cm)	17	11
Total length of muscle (cm)	26	25

group of variations. The muscles which tends to undergo degeneration with subsequent loss of its function represent retrogressive type, example for this type are palmaris longus and plantaris muscles. Atavistic muscles are the muscular elements which have been lost completely during the course of evolution and they make an abrupt appearance again. Axillary arch muscle, a remnant of panniculus carnosus is an example for atavistic type [2].

Variations of the palmaris longus can be a) complete agenesis of the muscle; b) variation in location and form of the muscle belly; c) aberrancy of attachment at its origin or its insertion; d) duplication or triplication; e) accessory slips [3].

The present case report belongs to (d)-group of variation.

Absence of palmaris longus has been reported in the literature in 11.2% of arms [3].

Palmaris longus is a functionally negligible muscle and is of morphological interest, it is absent in 13% of arms [4].

Morphological significance

The long flexors muscles of the forearm, with development of forelimb as a prehensile organ, it started degenerating in a caudo-cranial direction. Degeneration of functionless muscle

occurred much earlier in phylogenetic forebearers likes Gibbon and Orangutan [5].

Chimpanzees and apes shows maximum degeneration, only 25% of Gorillas have this muscle. Palmaris longus is more degenerate in apes and monkeys than in man [5].

Embryological significance

The flexor muscles of the forearm develop from the flexor mass, which subsequently divides into 2 layers, superficial and deep. The deep layer gives rise to the flexor digitorum superficialis, flexor digitorum profundus and flexor pollicis longus. The superficial layer of flexor mass gives rise to the pronator teres, flexor carpi radialis, palmaris longus and flexor carpi ulnaris [6]. The embryological basis of the present variation can be explained due to the additional cleavage of the superficial layer of forearm flexor mass during development.

Clinical significance

This variable muscle are usually asymptomatic, but of academic interest. A variation in the anatomy at the wrist is often associated with carpal tunnel syndrome [7] or can result in ulnar neuropathy [8].

Palmaris longus muscle is an important graft material for various cosmetic and reconstructive surgeries like lip augmentation, repair of tendo calcanei, collapsed lunate replacement, congenital ptosis, auto graft for ruptured extensor tendons, acute thenar injury–Camitz opponensplasty [9].

Ultrasound or MRI studies can be used to assess for palmaris longus variations in patients who are to undergo tendon transfer procedures, carpal tunnel release or Guyon's canal release, or who have had previous failed nerve releases [7].

At rest it may be asymptomatic but repetitive contractions may cause median nerve palsy. Hence the knowledge of this variation is important for clinicians, radiologists and therapists.

Conclusion

Palmaris longus muscle is a degenerate metacarpophalangeal joint flexor shows a varied variation in its form. Such variations

have to be kept in mind by surgeons, clinicians, radiologists, therapists and anatomists. The present variation may be helpful for surgeons during tendon graft surgeries.

References

- 11) Johnson D, Ellis H. Pectoral girdle and upper limb. In: Standring S, ed. *Gray's Anatomy*. 39th Ed., Edinburgh, Elsevier Churchill Livingstone. 2005; 876–877.
- 12) Le Gros Clark WE. *The tissues of the Body*. 6th Ed., Oxford, ELBS. 1980; 139–140.
- 13) Bergman RA, Thompson SA, Afifi AK, Saadeh FA. *Illustrated Encyclopedia of Human Anatomic Variation: Opus I: Muscular System: Alphabetical Listing of Muscles: P; Palmaris Longus*. <http://www.anatomyatlases.org/AnatomicVariants/MuscularSystem/Text/P/03Palmaris.shtml> (accessed Jan 2013)
- 14) McMinn RMH. *Last's Anatomy. Regional and Applied*. 8th Ed., Edinburgh, ELBS Churchill Livingstone. 1990; 88.
- 15) Ashby BS. Hypertrophy of the palmaris longus muscle; report of a case. *J Bone Joint Surg Br*. May 1964; 46: 230–232.
- 16) Kumar V, Naveen NS, Murlimanju BV, D'souza PS. A rare muscular variation in the flexor compartment of the forearm. *Int J Anat Var (IJAV)*. 2011; 4: 115–116.
- 17) Cope JM, Looney EM, Craig CA, Gawron R, Lampros R, Mahoney R. Median nerve compression and the reversed palmaris longus. *Int J Anat Var (IJAV)*. 2009; 2: 102-104.
- 18) Lal RA, Raj S. Guyons canal syndrome due to accessory palmaris longus muscle: aetiological classification: a case report. *Cases J*. 2009; 2: 9146.
- 19) Chauhan R. Atypical innervation of palmaris longus — a case report. *J Anat Soc India*. 2003; 52: 171–173.