

REVERSED *PALMARIS LONGUS* MUSCLE AND MEDIAN NERVE RELATIONSHIPS. CASE REPORT AND LITERATURE REVIEW

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ABSTRACT

The *Palmaris longus* muscle (PL) is considered one of the most variable muscles in the human body. Usually, the anatomical variations of the PL are not symptomatic. Nevertheless, a reversed *Palmaris longus* (RPL) can cause median nerve and less frequently, ulnar nerve compression. It is usually described in the anatomical literature that the RPL is more often on the left side. Nevertheless, the literature review shows that most of the cases show a right side RPL. In this study we describe an RPL, its relationship to the median nerve, discuss the clinical importance of this finding and review the literature.

Key words: Reversed *Palmaris longus* muscle, Median nerve, Muscle variation, Nerve compression, Anatomical variation

INTRODUCTION

The *Palmaris longus* muscle (PL) is described as probably the most variable muscle in the human body [2], being variable both in number and form [16]. It can be absent in about 11% of bodies [2,16] and this absence is more often in females and on the left side [2,4,16]. Bilateral absence is more common than unilateral absence [16]. 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 origin of the muscle is variable, and may be from the medial intermuscular septum, the biceps or brachialis muscles, the fascia of the forearm proximally, one of the neighboring muscles, the coronoid process or the radius [2]. The muscle may be doubled at its proximal end, with the additional head arising from one of the sites mentioned above [16]. Usually, no clinical concerns are related to the variations of the *Palmaris longus* muscle origin.

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 [2,16]. 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 (MN) compression [4, 6-8, 12-14], and less frequently, ulnar nerve (UN) compression [9].

In the present study we describe an RPL, its relationship to the MN, discuss the clinical importance of this finding and review the literature.

Case report:

An adult, black, female cadaver, aged 45 years, fixed in 10% formalin solution, was used in this study. During the routine dissection of the forearms, no variations were found on the right side. Nevertheless, the left forearm presented a PL, which was tendinous at the proximal 2/3, with a normal origin from the medial epicondyle, and muscular at the 1/3 distal part, inserted directly into the flexor retinaculum (Figure 1). The tendon showed a descendant pathway on the forearm, above the flexor digitorum superficialis muscle belly. On the distal 1/3 of the forearm, the PL muscular belly was

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inserted directly in the superficial aspect of the flexor retinaculum, with no insertion tendon. Muscle tendon and belly measurements were taken with the aid of an electronic digital caliper (range of 0 – 300 mm, resolution 0.001 mm, Gehaka, SP, Brazil). The total length of the muscle was 26.51 cm, with the tendon being 17.74 cm long and 0.72 cm wide. The reversed muscular belly was spindle-shaped, being 8.77 cm long, 1.62 wide in its middle portion and 1.30 cm wide at the insertion on the retinaculum.

The MN, on the 1/3 distal forearm presented a lat

eral course to the flexor digitorum superficialis tendons and medial to the flexor carpi radialis tendon. In the wrist region, the MN was compressed under the muscular belly of the PL. The median nerve diameter was measured with the aid of the same caliper used in the PL measurements. During its course between the flexor digitorum superficialis and flexor carpi radialis tendons, the diameter was 0.35 cm, and the nerve was round in shape. Under the muscular belly of the PL, the MN assumed an oblong form, and its maximum diameter was 0.63 cm.

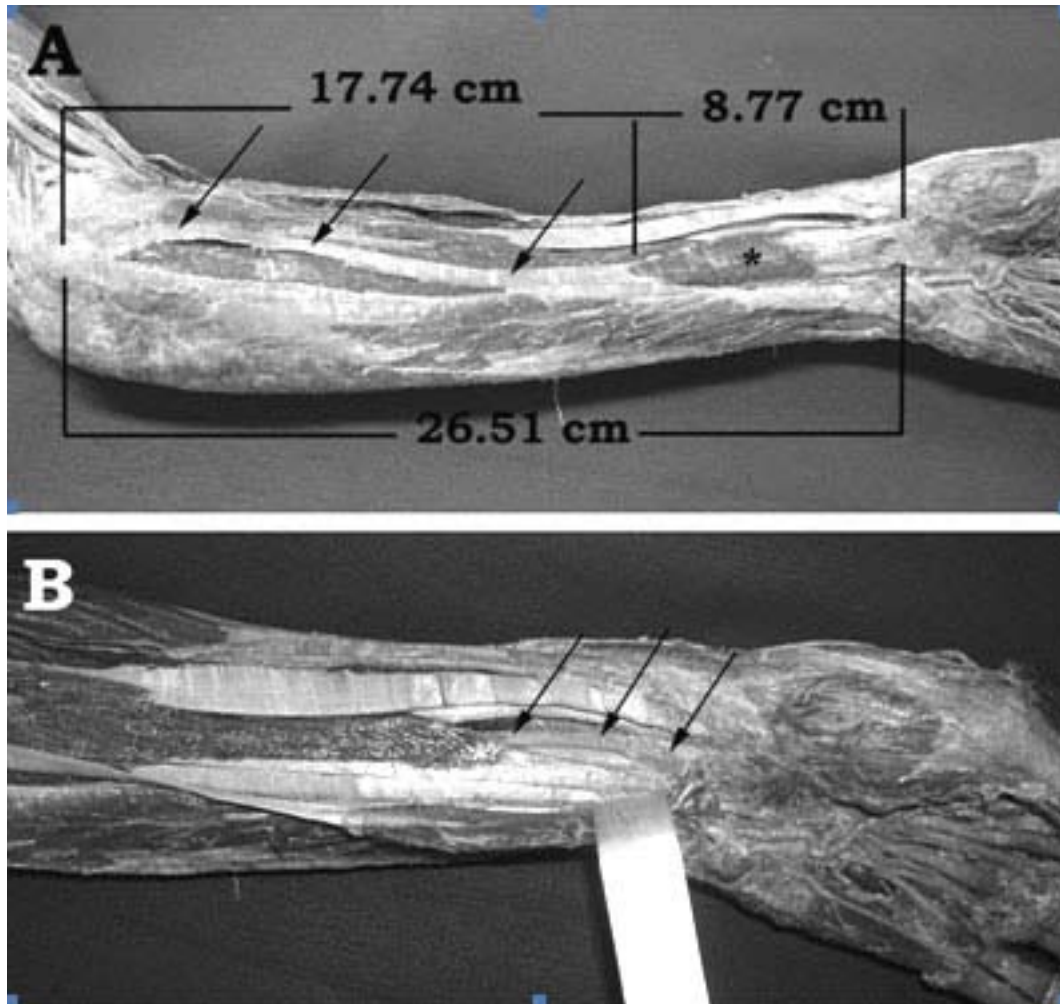


Figure 1: A: Reversed *Palmaris longus* muscle (RPL) on a female black cadaver left forearm, and its measurements. Arrows indicate the tendon of origin and * indicates the muscular belly, which is inserted directly in the flexor retinaculum. B: The muscular belly of the RPL muscular belly is repaired to show its relationship with the median nerve (arrows).

DISCUSSION

In the present study, we describe an RPL on the left forearm of a female cadaver. We also provide measurements of the MN diameter in two different points of

its course. Our results suggest that the MN of the present study was compressed by the RPL muscular belly, since its shape was altered, due to an increase in the diameter of the nerve under the muscular belly of the RPL.

In the anatomical literature, it is usually described that the RPL is more often on the left side [2,16]. Nevertheless, the literature review shows that most of the cases described show a right side RPL (Table 1). It is important to understand that most of these literature reports are published in clinical/surgical journals, and the cases are of patients who were researched for the presence of an abnormal wrist mass and/or symptoms of the MN compression.

It is also important to be aware that symptoms of a muscular variation may occur depending on the use of the variant muscle. In the case of an RPL, the use of the right arm, forearm and hand might cause the muscle to hypertrophy, rather than cause the median nerve compression symptom.

Despite the anatomical study of the PL in 1600 extremities by Reimann et al. [10], to date there have been 24 reports of symptomatic RPL (Table 1), being 58.3% of the cases with median nerve compression description and 50% in females. Interestingly, except for the bilateral case described by Giunta et al. [6], this is the first description of a left side RPL recently published, with suggestion of an MN compression. Also, only the case described by Saadeh and Bergaman [11] and the present one are based on cadaver descriptions.

A symptomatic RPL is of obvious clinical/surgical importance. However, an asymptomatic muscle

may also be of interest in clinical situations because an unexpected muscular belly in the wrist region can cause difficulties in the interpretation of local radiological images. Difficulties on endoscopic wrist procedures and electromiographycal studies of the MN at the wrist may also be caused by the presence of the muscular belly of the RPL.

Since the PL tendon is commonly used as a graft source by hand surgeons, pre-operative researches should be carefully performed in suspicious cases. A description of a left RPL muscle is a warning for the possibility of an asymptomatic anatomic variation usually not described in the clinical/surgical literature.

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Table 1: Reversed *Palmaris* longus muscle (RPL) and median nerve compression literature review.

Authors	Year	MN Compression	Side	Gender	N Cases
Still and Kleinert[15]	1973	2Y/1N	R	1M/2F	3
Backhouse and Churchil-Davidson[3]	1975	Y	??	F	3
Fragiadakis et al. [5]	1978	1Y/2N	1R/2??	2M/1F	3
Meyer and Pflaum [8]	1987	Y	R	F	1
Schlaflly and Lister [12]	1987	Y	R	F	1
Saadeh and Bergman [11]	1988	??	R	M	1
Regan et al. [9]	1988	Y+	R	M	1
Giunta et al. [6]	1993	Y	R	M	1
Depuydt et al. [4]	1998	Y	R	F	2
Güler and Çeliköz [7]	1998	Y	R	M	1
Schuurman and Van Gils [13]	2000	Y	R	3F/1M	4
Yildiz et al. [17]	2000	Y	R	F	1
Bencteux et al. [1]	2001	Y	R	F	1
Seyhan [14]	2005	Y	R	M	1

MN = median nerve; N Cases = number of cases, Y = yes; Y+ = ulnar nerve symptom associated; R = right; B = bilateral; F = female; M = male; ?? = unknown

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