VARIATION IN THE PALMARIS LONGUS TENDON IN SULAIMANI POPULATION

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Submitted: 6/3/2012; Accepted: 24/6/2012; Published: 1/12/2012

ABSTRACT

Background

Ethnic variations in the prevalence of the absence of the palmaris longus (PL) tendon are well known. However, most studies have been done in Caucasian populations. The present study was done to know the occurrence of absence of palmaris longus tendon in Sulamani population.

Objective

The aim of this study was to determine the incidence of unilateral and bilateral absence of palmaris longus for the Sulaimani population of Kurdistan Region.

Subjects and Methods

The presence of the PL tendon was clinically determined in 300 (600 limbs) in normal male and female subjects bilaterally using the standard techniques. From the 300 subjects were; 150 male and 150 female, of (18-40) years old, 8 subjects were left hand dominant, i.e. 3%. In subjects with an absent PL tendon, three other tests were performed to confirm its absence.

Results

The 22 subjects (7.3%) were found to have bilateral absence of the palmaris longus tendon. From these 13 subjects were male (59%) and 9 subjects were female (40.9%). 33 subjects (11%) had unilateral absence of the tendon, of this 21 subjects absence of the right side (63.63%) and 12 subjects had absence in the left hand (36.36%). Of those with unilateral absence 20 were male (60.6%) and 13 were female subjects (39.3%).

Conclusion

Unilateral absence of PL percentage (11%) is more than the bilateral absence (7.3%) and both unilateral and bilateral absence is more in male compared to female. However this was not statistically significant. In those subjects with unilateral absence, the right side was found to be more commonly affected however no statistical significance was evident.

***Keywords*:** *Palmaris longus (PL), Anatomical variation*.

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https://doi.org/10.17656/jsmc.10025

INTRODUCTION

Absence of the palmaris longus muscle has been well documented in several populations at a prevalence rate ranging between 2.2 and 63.9% which varies according to race, sex, and side of the body. There is little documentation of the prevalence of absence of this muscle from populations in the nearby localities [(1)].

Normally Palmaris longus is a slender fusiform muscle medial to flexor carpi radialis and arises from medial epicondyle by common flexor tendon, from adjacent intermuscular septa and antebracheal fossa.Its long slender tendon passes anterior to the flexor retinaculum and is attached to its distal half and centrally to the palmar aponeurosis often sending a tendinous slip to the thenar muscle. It is well known that there is a wide variation in the reported prevalence of P.L in different ethnic group and its absence is more common in women [(2)].

Palmaris longus often used in tendon grafting, lip augmentation [(3)] facial paralysis [(4)] and Ptosis correction [(5)]. Others have attempted to correlate the absence of P.L with other anatomical anomalies [**(6)**].

SUBJECTS AND METHODS

For the purpose of this study, 300 normal subjects (150 males, 150 females) aged between 18 and 40 years were randomly selected. Individuals with a history of injury or abnormality of the upper extremities were excluded. Hand dominance was recorded for each subject. The examination entailed observation of the volar aspect of the wrist, looking for the palmaris longus tendon in its usual anatomical position just ulnar to the flexor carpi radialis tendon. If the tendon was not visible, the subject was asked to oppose his or her thumb to the little finger and flex at the wrist, (Figure 1). If all of the above failed to demonstrate a palmaris longus tendon, it was considered absent (Figure 2).

The presence or absence of the palmaris longus tendon was recorded for both sides. Relationships between tendon absence, hand dominance and gender were analysed using the Chi-squared test. (Table-1).

Four additional tests were done to confirm the absences which are the followings:

1. Standard test (Schaeffer's test)

The subject is asked to oppose the thumb to the little finger and then flex the wrist (Figure 3).

2. Thompson's test

The subjest is asked to make a fist, flex the wrist and finally the thumb is opposed and flexed over the fingers (Figure 4).

3. Mishra's test I

The metacarpophalengeal joints of all fingers are passively hyper extended by the examiner and the subject is asked to actively flex the wrist (Figure5).

4. Mishra's test II

The subject is asked to abduct the thumb against resistance with the wrist in slight palmar flexion (Figure 6).

5. Pushpakumar's (2004) two finger sign method

It involves extension of the index and middle finger with flexion of the other fingers and the wrist followed by opposition and flexion of the thumb (Figure 7).

6. *Thompson's fist test*

In a patient with an absent palmaris longus demonstrating prominence of the flexor carpi radialis which could be mistaken for the palmaris longus (Figure 8).

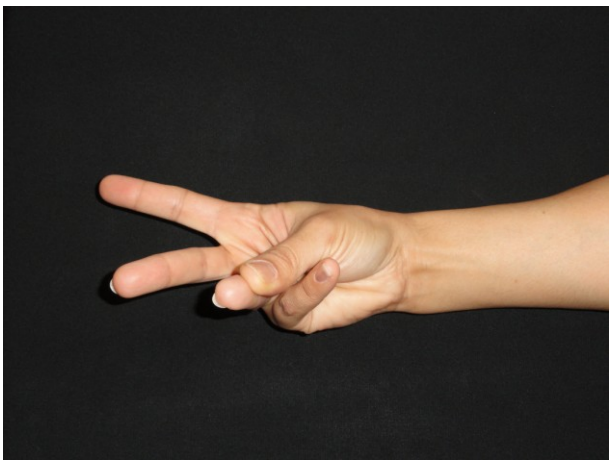

Figure 1. Presence of palmaris longus on clinical testing.

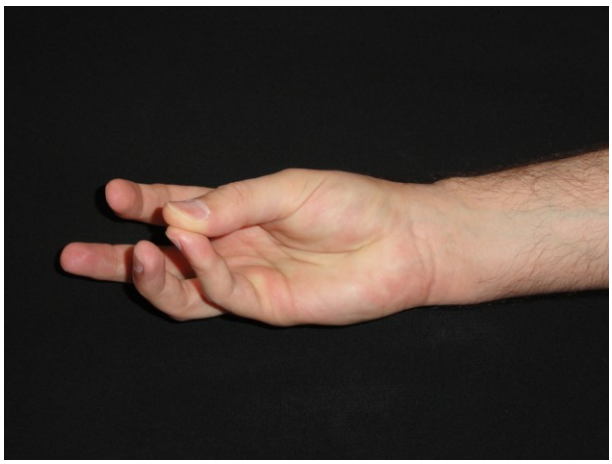

Figure 2. Unilateral absence of palmaris longus (left).

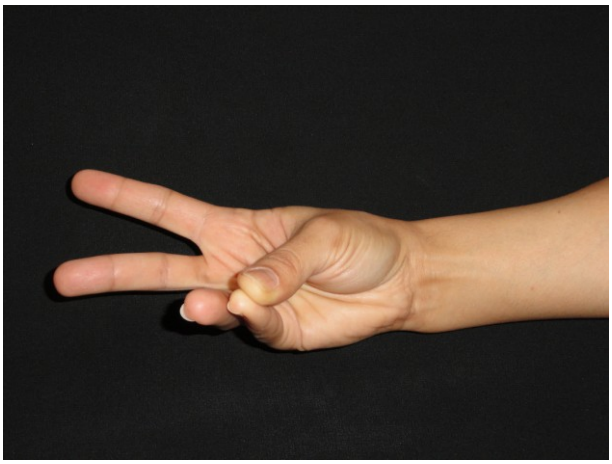

Figure 3. Schaeffer's (1909) technique for assessment of the PL. It involves opposition of the thumb to the little finger and flexion of the wrist.

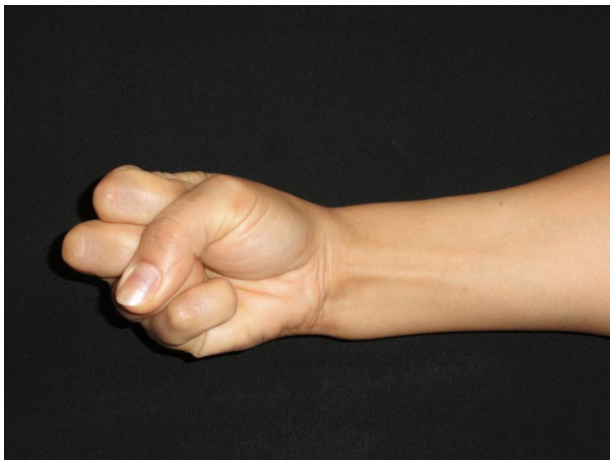

Figure 4. Thompson's (1921) technique for assessment of the PL. It involves flexion of the fingers to form a fist followed by flexion of the wrist and finally the thumb is opposed and flexed over the fingers.

Figure 5. Mishra's 1 (2001) first test for demonstrating the PL. It involves passive hyperextension of the metacarpo-phalangeal joints followed by resisted active flexion at the wrist.

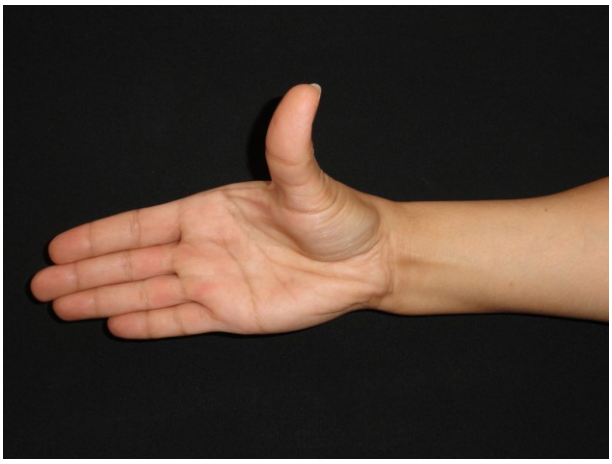

Figure 6. Mishra's II (2001) test for demonstrating the PL. It involves resisted abduction of the thumb.

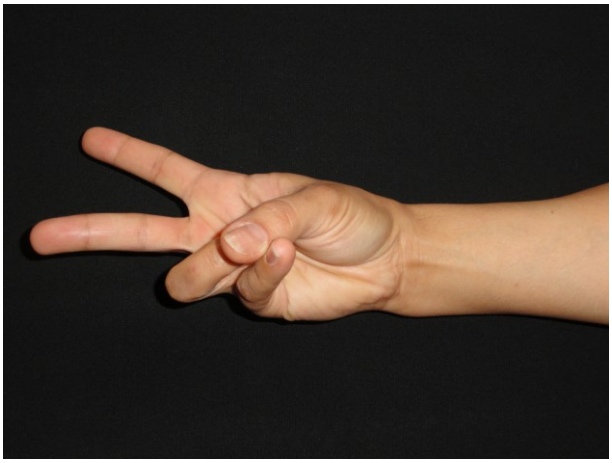

Figure 7. Pushpakumar's (2004) two finger sign method. It involves extension of the index and middle finger with flexion of the other fingers and the wrist followed by opposition and flexion of the thumb.

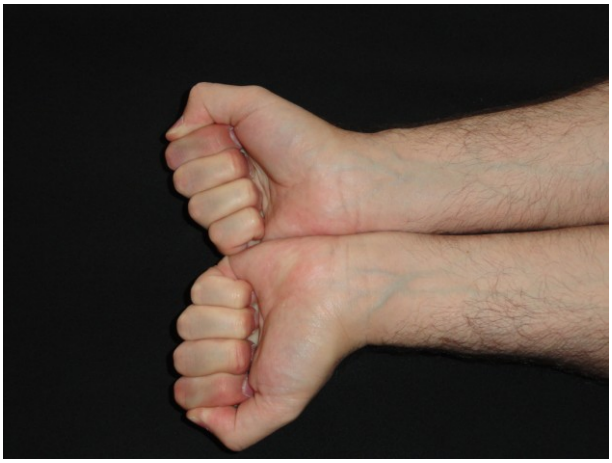

Figure 8. Thompson's fist test in a patient with an absent palmaris longus demonstrating prominence of the flexor carpi radialis which could be mistaken for the palmaris longus.

RESULTS

Of the studied population, 8 subjects were left-hand dominant (3%).

Twenty-two subjects (7.3%) were found to have bilateral absence of the palmaris longus tendon. 33 subjects (11%) had a unilateral absence of the tendon. Of this group, the tendon was absent on the right side in 21 subjects (63.63%). 12 subjects (36.36%) had absence of the tendon on the left. Of the subjects with bilateral absence of palmaris longus, 13 were male (59%) and 9 female (40.9%). Of those with unilateral absence, 20 male subjects (60.6%) and 13 female subjects (39.3%) were affected, (Table 1).

From the 8 left handed subjects 3 of them have PL tendon bilaterally and the other 5

unilateraly,which have been calculated with the right handed subjects.

Unilateral absence of PL percentage (11%) is more than the bilateral absence (7.3%) and both unilateral and bilateral absence is more in male compared to female; however this was not statistically significant.

In those subjects with unilateral absence, the right side was found to be more commonly affected however no statistical significance was evident.

Table 1. Results after clinical evaluation of 300 subjects for the absence of palmaris longus.

Tendon absence	Males	Females	Right side	Left side
Unilateral	20 (60.6%)	13 (39.3%)	21(63.63%)	12 (36.36%)
Bilateral	13 (59%)	9 (40.9%)		

DISCUSSION

Tendon grafts are frequently needed in reconstructive surgery on the hand. Many surgeons agree that the palmaris longus tendon is the first choice as a donor tendon because it fulfils the necessary requirements of length, diameter and availability, and can be used without producing any functional deformity [7].

The palmaris longus tendon is often considered the ideal donor for tendon grafts for replacement of the long flexors of the fingers, and of the flexor pollicis longus tendon[3]. Palmaris longus is often described as one of the most variable muscles in the human body and is classified as a phylogenetically retrogressive muscle i.e. a short belly with a long tendon[6].

In vertebrates it is found only in mammals and is best developed in those where the forelimb is used for ambulation [8]. In humans the absence of palmaris longus appears to be hereditary but its genetic transmission is not clear [9]. From the results of numerous previous studies investigating the incidence of palmaris longus absence it has been reported that bilateral absence occurs in 8% to 16% of individuals, with unilateral absence occurring in 4% to 14% [8].

Our figures compare favourably (bilateral absence, 7.3%; unilateral absence, 11%), and like most of the previous studies, reflects the incidence of palmaris longus absence in Caucasian individuals [8, 9]. Racial variations are however well recognised [7, 9].

Previous studies have conflicted with regard to the incidence of palmaris longus absence in relation to gender and body side [9,10, 11]. In our study, males were found to have a higher incidence of both bilateral and unilateral absence of palmaris longus, however this was not statistically significant (p= 0.56 and 0.25 respectively).

In summary, the palmaris longus tendon is often regarded as the ideal tendon donor. Clinical testing revealed an incidence of unilateral absence of 11% and a bilateral absence of 7.3% in Sulaimani population. No statistically significant correlation was found between tendons absence and gender.

REFERENCE

1. Sater MS, Dharap AS, Abu-Hijleh MF. The prevalence of absence of the palmaris longus muscle in the Bahraini population. Clin Anat. 2010 Nov;23(8):956-61

2. Machado AB,Dido L J,Frequency of the musculus Palmaris longus studied in vivo in some Amazon Indians,AmJ phys Anthrop 1967;27:11-20

3. Zeybek A,Giiriinluoglu R,Cavder S,Bayramigli M.A clinical reminder Palmaris longus muscle variation ,Ann Plast surg 998;41:224-5

4. Davidson BA .Lip augmentation using the palmris longus tendon ,plast reconst surg 1995;95:1108-10

5.Naugle J C J r ,Faust DC,Autogenous Palmaris longus tendon as frontalis suspension material for ptosis correction in children ,AmJ ophthalmol 1999;127:488-9

6. Koo C C, Roberts A H N. The palmaris longus tendon, another variation in its anatomy. J Hand Surg 1991;22-B: 138-9.

7. Troha F, Baibak G J, Kelleher J C. Frequency of the palmaris longus tendon in North American Caucasians. *Ann Plast Surg* 1990; 25: 477-8.

8. Vanderhooft E. The frequency and relationship between the palmaris longus and plantaris tendons. *Am J Orthop* 1996; 25: 38-41.

9. Wehbe M A, Mawr Bryn. Tendon graft donor sites. *JHand Surg* 1992; 17-A: 1130-2.

10. Schaeffer J P. On the variations of the palmaris longus muscle. *Anat Rec* 1909; 3: 275-8.

11. N W Thompson, B J Mockford , G W Cran Absence of the palmaris longus muscle: a population study, *The Ulster Medical Journal, Volume 70, No. 1, pp. 22-24, May 2001.*