

Palmaris Longus Tendon Absence Prevalence in an Egyptian Population

Moayad Abu Qa'oud (1)
Ahmad Al-Zoubi (1)
Mahdi Jaradat (1)
Mohammed Al-Hasan (2)
Yanal Abaza (3)

(1) MBBS, JB (Orthopaedics), Jordanian Royal Medical Services
 (2) JB (Emergency Medicine), Jordanian Royal Medical Services
 (3) JB (Pediatric Surgery), Jordanian Royal Medical Services

Corresponding author:

Dr. Moayad M. Abu Qa'oud,
 Department of Orthopaedic Surgery, Royal Medical Services,
 P.O. Box 2533, Khelda 11953,
 Amman, Jordan
 Mobile#: ++962 77 6595 032
 Email: meds104@hotmail.com

Received: December 2018; Accepted: January 2019; Published: February 1, 2019

Citation: Moayad Abu Qa'oud, Ahmad Al-Zoubi, Mahdi Jaradat, Mohammed Al-Hasan, Yanal Abaza. Palmaris Longus Tendon Absence Prevalence in an Egyptian Population. World Family Medicine. 2019; 17(2): 14-19.

DOI: 10.5742/MEWFM.2019.93612

Abstract

Objectives: to explore the frequency of palmaris longus tendon absence among 700 patients in an Egyptian population and to compare it with other populations.

Methods: A prospective study was conducted at Jordanian Field Hospital in Ein Shams, Cairo, Egypt between November 2013 and July 2014. All subjects who attended Jordanian Field Hospital orthopaedic clinic were included in this study. Patients with scars or injuries or other abnormalities of the upper extremity that would affect examination for the presence of the palmaris longus tendon were excluded from the study. Patients were examined regarding the presence of palmaris longus tendon by using the standard test.

Results: 700 patients, aged between 8-84 years (median is 43 years), 202 were males (1:2.5; male to female ratio) were examined. Overall prevalence of absence of palmaris longus was 34.3%. Bilateral absence of palmaris longus was present in 15.2%, while in 19.1% of patients it was unilateral which was more common on the right side (54%) but without statistical significance (P value=0.6). There was also no statistically significant difference regarding gender despite the frequency being more common among females.

Conclusion: Our results in this prospective study showed that the frequency of palmaris longus absence in the Egyptian population was found to be 34.3% with no statistical significance regarding gender, body side and hand dominance which is compatible with other Middle East countries studied.

Key words: Egyptian population, palmaris longus tendon agenesis

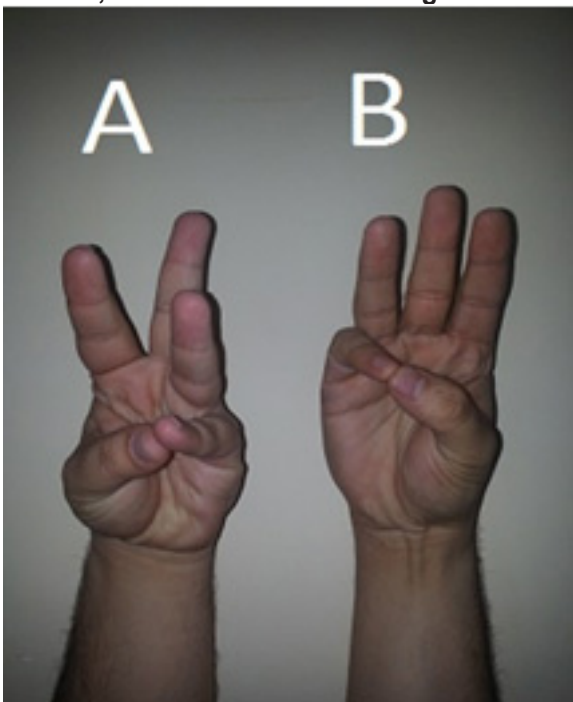
Introduction

Palmaris longus (PL) is a superficial flexor muscle of the forearm that originates from the medial epicondyle. It has a long tendon with short muscle belly that crosses the transverse carpal ligament volar and is attached to the distal half of its anterior surface and centrally to the palmar aponeurosis; it passes medial to the flexor carpi radialis. (1, 17) This muscle is considered to have the most muscle variability in humans; it could be absent either unilaterally or bilaterally. (1,8)

Palmaris longus plays a major role in multiple reconstructive surgical procedures such as tendon grafts, ptosis correction, lip augmentation and other reconstructive procedures.(2,3,4) The reason for choosing this tendon for such procedures is attributed to its unique characteristics in term of its diameter, length and availability. (1,8)

The presence of this tendon can be determined through simple, non-invasive, clinical tests of individuals such as Schaeffer's test which is the standard exam for eliciting the presence of palmaris longus (Figure 1).

Figure 1: Schaeffer's Test; A: Absent Palmaris Longus Tendon, B: Present Palmaris Longus.



In this exam the patient is asked to oppose the little finger to the thumb while doing slight wrist flexion, (5) modified Schaeffer's Test (Figure 2 - next page) and Mishra's II tests (Figure 3 - next page) are also used for the same purpose in certain cases. (6, 7). The absence of this tendon doesn't result in any significant effect on wrist flexion which leads us to consider this muscle is functionally negligible (1).

The presence of Ppalmaris longus varies among different populations; it ranges between 2.2% and 63.9 % (8,18). The goal of this study was to evaluate the frequency of Palmaris longus absence in an Egyptian population and to compare it with that of other populations.

There is no potential conflict of interest in this study

Materials and Methods

700 patients were enrolled in the study; 202 individuals were males and 498 individuals were females. The age ranged from 8 to 84 years (median was 43 years).

All patients attended the orthopedic clinic in the Jordanian Field hospital in Ein Shams, Cairo, Egypt and were examined for the absence of palmaris longus tendon between December, 2013 to May, 2014 by the main author and 2 co-authors on a 2- month basis. The exclusion criteria included uncooperative patients and patients with scars, injuries, or other abnormalities at the track of palmaris longus distally.

Our exam was done by asking the patient to oppose his thumb to the little finger with slight wrist flexion (Schaeffer's test). However, in some patients such as obese patients difficulties were found in visualizing the tendon so other tests were performed to overcome this problem, like modified Schaeffer's test in which we resist the 3 middle fingers during wrist flexion and thumb to little finger opposition, and Mishra's test II in which the thumb abduction is resisted while slightly flexing the wrist.

Statistical analysis was done using the SPSS program.

Figure 2: Modified Schaeffer's Test; A: Absent Palmaris Longus Tendon, B: Present Palmaris Longus

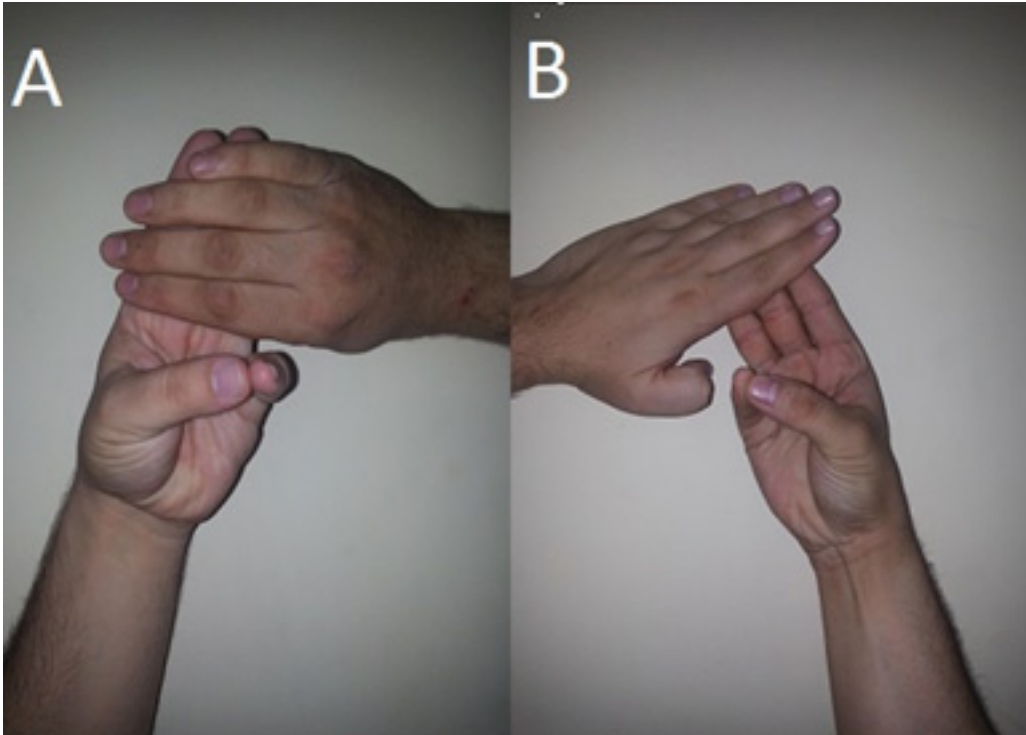
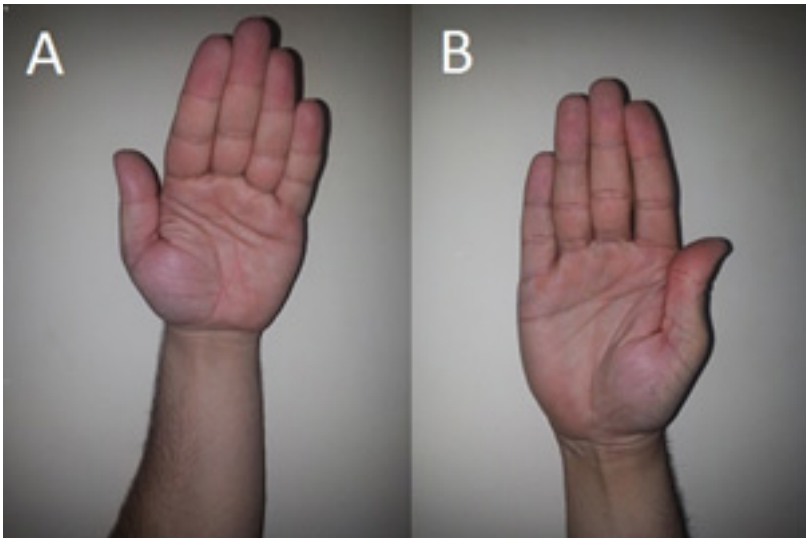


Figure 3: Mishra's Test II; A: Absent Palmaris Longus Tendon, B: Present Palmaris Longus.



Results

In our sample, 28.9% of the patients were males. PL tendon agenesis was found in 240 patients (34.3%). Table 1 summarizes the frequency of PL absence in regard to gender.

Table 1: The frequency of PL absence among males and females

Patients number	Overall absence	Absence in males	Absence in females
700	240 (34.3%)	64 (31.6%)	176 (35.3%)
Right Handed-Patients	Overall absence	Absence in males	Absence in females
672	233 (34.7%)	62 (33.0%)	171 (35.3%)
Left-Handed Patients	Overall absence	Absence in males	Absence in females
28	6 (21.4%)	2 (14.3%)	4 (28.6%)

In females, unilateral absence of PL tendon was found in 100 subjects (20.1%), 54 of them (10.8%) were on the right side. The bilateral absence of this tendon was found in 76 patients (15.3%). The overall frequency of absence in females was 35.3%. On the other hand, in males, unilateral absence of PL tendon was found in 34 patients (16.8%); 18 of them were on the right side (8.9%). The bilateral absence of this tendon was detected in 30 patients (14.8%). The overall frequency of absence in males was 31.6%. The results are summarized in Table 2.

Table 2: The frequency of PL absence in regard to side and gender

Absence	Right side absence	Left side absence	Bilateral absence
Male	18 (8.9%)	16 (7.9%)	30 (14.8%)
Female	54 (10.8%)	46 (9.2%)	76 (15.2%)
Both	72 (10.3%)	62 (8.8%)	106 (15.1%)

There was no significant difference between the unilateral and bilateral absence of PL tendon between males and females, (P. value>0.05).

28 of patients were left handed and the remaining were right handed. Table 3 summarizes the frequency of PL absence regarding hand dominance.

Table 3: Frequency of PL absence regarding hand dominance

Hand dominance	Present	Right side absence	Left side absence	Bilateral absence
Right hand dominant (no.672)	438 (65.2%)	72 (10.7%)	60 (8.9%)	102 (15.2%)
Left hand dominant (no.28)	21 (75.0%)	1 (3.6%)	2 (7.1%)	4 (14.3%)

There was a high variety of patient's occupation. However, there was no difference in the frequency of PL absence as regards this issue.

Discussion

PL is a thin muscle with a short belly and a long tendon originating from the medial epicondyle with the common flexor muscles and inserted on the palmar aponeurosis with limited functional significance.(1,17)

The presence of PL is detected by using Schaeffer's test in which the patient is asked to oppose the thumb to the little finger while slightly flexing the wrist and by inspection; the presence of the tendon is noticed as shown in Figure 1(5). However, sometimes it is difficult to detect it especially in obese patients, so other tests may be performed in such cases like the modified Schaeffer's test in which we resist wrist flexion while the thumb is opposed to the little finger, and Mishra's test II in which the thumb abduction is resisted while slightly flexing the wrist(5,6,7).

PL is considered one of the most variable muscles in the body and the frequency of its absence varies from one population to another. Its absence ranges from 2.2%-63.9 %, (8,18) . It was reported to be as high as 63.9% among the Indian population and it was as low as 4.4% in East Africa and 1.5% in Zimbabwe(9,10,11,12). In this study the overall frequency was 34.3%. Although this percentage is quite different and is considered to be high when compared to that found in other parts of the world, when we compare it to other nearby countries it was found to be close. For example, in Bahrain and Jordan it was found to be 36.8% and 38.6%, respectively, (8,13) taking into consideration that Bahrain, Jordan and Egypt belong to the same ethnic group. However, in Ethiopia which is considered geographically close to Egypt, the frequency was low and close to that of other countries in east Africa. (11, 14) This all suggests the role of ethnicity in determining the frequency of PL absence rather than the geographical distribution. This explanation is supported by the results reported in other studies which were conducted to elicit the frequency among multiethnic populations. For example Ali M. Soltani et al found that the prevalence of PL absence in African Americans was 4.5% which was much lower than that of Caucasians ethnic group in the USA which was 14.9 %.(15)

Some of the studies conducted in Africa demonstrated that the lower prevalence of PL absence is attributed to the high prevalence of manual workers increasing instances in which PL is called into action (11). However the prevalence was also found to be low among Ethiopian students (14).

In the present study, females and the right side were found to be more affected than males and the left side, respectively, but without statistical significance. This was similar to that found in most other studies performed worldwide(10,15). Right sided absence of PL was found to be more frequent in right handed individuals but without statistical significance (p value 0.62) and in bilateral absence there was no such difference between right and left handed subjects (p value 0.75). This all suggests that the role of environmental factors like manual working in

affecting the presence of PL is doubtful. This was also suggested by the results found in other studies (16).

Although the sample size of this study was relatively small to attain the actual prevalence of the PL absence among the Egyptian population, however it demonstrated that the overall absence of PL tendon was 34.3% which was higher than that found in most other populations but it was similar to populations with the same ethnicity. This high percentage of absence should be taken into consideration by surgeons in local society before taking a decision to proceed for reconstructive operations using the PL tendon. This study also confirmed what was found in most other studies in that there was no significant statistical differences in regard to sex, body side and hand dominance.

Conclusion

Our results in this prospective study showed that the frequency of agenesis of palmaris longus tendon in an Egyptian population sample was found to be 34.3% without statistically significant difference regarding gender, body side and hand dominance.

There was no major difference in our results compared to similar ethnic groups of elaborated Middle East countries regardless of the geographical factor.

Ethnic variations should be considered when planning to use the PL tendon for grafting or other reconstructive surgeries.

Other larger samples from other parts of Egypt should be studied as Egypt is one of the biggest countries of the Middle East.

References

1. P. The Jodhar, Bhagath Kumar Potu, and Rakesh G. Vasavi, Unusual palmaris longus muscle. *Indian J Plast Surg.* 2008; 41(1): 95–96.
2. Po-Jung. Chu, H.M. Lee, Y.T. Hou, et al. Extensor-tendons reconstruction using autogenous palmaris longus tendon grafting for rheumatoid arthritis patients. *Journal of Orthopaedic Surgery and Research* 2008; 3:16
3. C Y Wong, D S P Fan, J S K Ng, et al. Long-term results of autogenous palmaris longus frontalis sling in children with congenital ptosis. *Eye* 2005; 19: 546–548.
4. Trussler AP, Kawamoto HK, Wasson KL, et al. Upper lip augmentation: palmaris longus tendon as an autologous filler. *Plast Reconstr Surg.* 2008; 121(3):1024-32
5. Schaeffer JP. On the variations of the palmaris longus muscle. *Anat Rec.* 1909; 3: 275-278.
6. Dong-soo Kyung, Jae-Ho Lee, In-Jang Choi, et.al. Different frequency of the absence of the palmaris longus according to assessment methods in a Korean population. *Anat Cell Biol* 2012; 45 (1): 53-56.
7. K. Devi Sankar, P. SharmilaBhanu, and Susan P. John. Incidence of agenesis of palmaris longus in the Andhra population of India. *Indian J Plast Surg.* 2011; 44(1): 134–138.

8. Mai S Sater, Amol S Dharap, Marwan F Abu-Hijleh, The prevalence of absence of the palmaris longus muscle in the Bahraini population. *Clinical Anatomy* 2010; 23(8):956-61.
9. Sankar KD, Bhanu PS, John SP. Incidence of agenesis of palmaris longus in the Andhra population of India. *Indian J PlastSurg* 2011; 44: 134–138.
10. Ceyhan O, Mavt A. Distribution of agenesis of palmaris longus muscle in 12 to 18 years old age groups. *Indian J Med Sc* 1997; 51: 156-160.
11. James W. M. Kigera, Stephen Mukwaya, Frequency of Agenesis Palmaris Longus through Clinical Examination - An East African Study. *PLoS ONE* 2011; 6(12): 1-3.
12. Gangata H . The clinical surface anatomy anomalies of the palmaris longus muscle in the Black African population of Zimbabwe and a proposed new testing technique. *ClinAnat* 2009; 22: 230–235.
13. FO Abu Hassan, SK Jabaiti. Absence of the palmaris longus tendon in Mid Eastern population. *Journal of the Bahrain Medical Society* 2013; 20 (2): 70-73
14. Tesfamichael Berhe and Assegedech Bekele. Agenesis of Palmaris Longus Muscle among Selected Ethiopian Students. *AnatPhysiol* 2014; 4 (2): 1-5
15. Ali M. Soltani, Mirna Peric, Cameron S. Francis. The Variation in the Absence of the Palmaris Longus in a Multiethnic Population of the United States: An Epidemiological Study. *Plastic Surgery International* 2012; Int ID282959.
16. Erić M, Koprivčić I, Vučinić N. Prevalence of the palmaris longus in relation to the hand dominance. *SurgRadiol Anat.* 2011; 33(6):481-4.
17. P. Thejodhar, Bhagath Kumar Potu, and Rakesh G. Vasavi
Unusual palmaris longus muscle. *Indian J Plast Surg.* 2008; 41(1): 95–96.
18. Pawan Agarwal. Absence of the palmaris longus tendon in Indian population. *Indian J Orthop.* 2010; 44(2): 212–215