

THE PREVALENCE OF AGENESIS OF PALMARIS LONGUS MUSCLE IN STUDENTS OF NISHTAR MEDICAL UNIVERSITY, MULTAN

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ABSTRACT

Background: Palmaris longus muscle belongs to the superficial group of muscles of forearm. This group normally have five muscles. It is the weak flexor of wrist joint and also anchor the skin and fascia of the hand. It is among the very useful muscles which are used for plastic and reconstructive surgery. The agenesis of Palmaris longus is variable in different population and countries.

Objective: To determine the prevalence of agenesis of Palmaris longus muscle in students of Nishtar Medical University, Multan.

Materials and Methods: The study was carried out on 567 randomly selected normal students of 1st year and 2nd year MBBS classes. There were 236 male students and 331 female students. The age was ranging from 17 years to 25 years. The anterior aspect of forearm and wrist was inspected and different tests were applied to find out the presence or absence of Palmaris longus muscle.

Result: The bilateral agenesis of palmaris longus was 5.64%. The unilateral absence of palmaris longus was 7.23%. The right and left arm agenesis of palmaris longus was 4.05% and 3.17% respectively. The bilaterally agenesis in males and females is 6.35% and 5.13% respectively. Right arm and left arm agenesis in males is 4.66% on both sides while in females is 3.62% and 2.11% respectively.

Conclusion: The prevalence of agenesis of palmaris longus in our study group was 12.87%. It is similar as mentioned in Standard Anatomy Text Books.

There was no significant dominance in any arm side ($P > 0.05\%$) but when compared in gender it was significantly higher in males ($P < 0.05\%$).

Key words: Palmaris longus muscle, Absence, Sex.

INTRODUCTION

There are eight muscles in the anterior compartment of forearm five included in to the superficial group and three to deep group. Palmaris longus belongs to the superficial group. Variability of Palmaris longus is most common among all the muscles of our body. Its variations are seen during dissection, physical examination, diagnoses and treatment.^{1,2} It is slender fusiform muscle with a shorter belly and longer tendon.

It arises from the medial epicondyle of humerus as common flexor origin; from intermuscular septa and deep fascia^{1,3}. It passes in front of flexor retinaculum to which it is partly adherent⁴. In the palm it broadens out and is inserted into the palmar aponeurosis. In forearm its tendon lies between flexor carpi radialis and flexor carpi ulnaris. The tendon of palmaris longus lies in front of median nerve just above the wrist. A branch of median nerve supplies it. It is the weak flexor of the wrist and anchors the skin and fascia of hand.

It can also play a part in thumb abduction through its insertion on the thenar eminence.^{5,11,12}. Although it has little functional use but assumes great importance where used as donor tendon for tendon transfer and tendon reconstruction and pulley reconstruction. Plastic surgeons also utilized the palmaris longus muscle in reconstruction of lip and chin defects, in correction of ptosis and facial paralysis⁵⁻¹⁰.

In spite of obvious clinical importance of this muscle, there is dearth of information about prevalence of this muscle in the population of South Punjab.

OBJECTIVE

The aim of present study was to determine the prevalence of unilateral or bilateral agenesis of palmaris longus muscle among 1st and 2nd year students of Nishtar medical University, Multan. We will also compare the prevalence of absence in both sexes.

MATERIAL AND METHODS

This was a descriptive study conducted among student of 1st year and 2nd year MBBS in Nishtar Medical University Multan to determine the prevalence of agenesis of palmaris longus muscle. Total number of 567 students of 1st year and 2nd year were included in the study sample. Among these 236 were male and 331 female students. The age was ranging from 17 year to 25 years.

The students with a history of injury or any deformity and disease to any forearm were excluded from the study.

The procedure by which one can determine the presence or absence of Palmaris Longus Muscle is as follows.

The anterior aspect of wrist was examined to find out the presence or absence of palmaris longus muscle tendon just medial to flexor carpi radialis tendon and lateral to flexor carpi ulnaris above and flexor digitorum superficial below. The standard schaeffers's test was performed to visualize the muscle. The test was performed by asking the student to oppose the thumb to the little finger while flexing the wrist.

During the test, if the palmaris longus tendon was not visualized than we have to perform three more tests for confirmation of its absence

Each test was performed on both forearms of the student. These tests are given below:

1. Thompson Test:

The student was asked to make a fist, thumb is flexed and opposed over fingers and wrist is flexed.

2. Mishra's Test-1:

The metacarpophalangeal joints of all the fingers were passively hyperextended by the examiner and student was asked to actively flex the wrist.

3. Pushpakumar's "Two finger Sign" method:

The student was asked to fully extend the index and middle fingers, ring and little fingers are flexed, wrist is also flexed and the thumb is fully opposed and flexed. All the data was analysed by SPSS (version-21) to analyze the significance of study by Chi-Square Text.

RESULTS

Total numbers of students included in the study were 567. There were 236 males and 331 females. The overall prevalence of absence was 73 (12.87%). The unilateral agenesis was 41 (7.23%). The total bilateral agenesis was 32 (5.64%). The total right arm and left arm agenesis were 55 (9.70%) and 50 (8.81%) respectively.

The individual right arm and left arm absence was seen 23 (4.05%) and 18 (3.17%) respectively. Bilateral agenesis of palmaris longus in males was 15 (6.35%) and in females was 17 (5.13%). Right arm and left arm agenesis in males was equal in both sides in our study i.e. 11 (4.66%). Right arm agenesis in females was 12 (3.62%) and left arm agenesis was 7 (2.11%). If we calculate the total agenesis in both males and females, it turned out to be 37 (15.67%) in males and 36 (10.87%) in females. These results are also summarized in Table No.1 and Table No.2. This difference is significant. The P value is <0.05%)

Table 1: Overall prevalence of palmaris longus agenesis according to gender and limbs:

Agenesis	Total	Males	Females
Right Arm Agenesis	23 (4.05%)	11 (4.6%)	12 (3.62%)
Left Arm Agenesis	18 (3.17%)	11 (4.6%)	7 (2.11%)
Bilateral Agenesis	32 (5.64%)	15 (6.35%)	17 (5.13%)
Total Absence	73 (12.87%)	37 (15.67%)	36 (10.87%)

Table 2: Comparison of prevalence of Absence and presence in both sexes.

Gender	Total	Absence of Palmaris Longus Muscle	Presence of Palmaris Longus Muscle	P Value
Male	236	37	199	0.048%
Female	331	36	295	

DISCUSSION

Palmaris longus is one the most variant muscle of the superficial group of forearm. Its agenesis does not have any profound effect on the function of hand and wrist. It is considered to be the first choice by most of the plastic and hand surgeons during reconstructive procedures^{13,14}.

In human beings the absence of palmaris longus muscles is a congenital but how it is transmitted in genetics, it is not well established. It is found well developed in those mammals who use their forearm for ambulation¹⁵. Palmaris longus muscle is stronger in primates living in or on the trees and become weaker or absent in terrestrials¹⁶. In human beings intrinsic muscles of hand take over these functions of Palmaris and it is retrogressing^{25,26}. Its belly is small and has been replaced by a long tendon and degenerated distal tendon in the palm has become palmar aponeurosis which retains the five distal slips of the attachment.

This study shows that agenesis of palmaris longus is higher in males (15.67%) than females (10.87%) and the total absence is (12.87%).

The total absence was nearly similar to the study done by Enye LA et al in Lagos, Nigeria (12.6%) in 2010⁵. But its male to female ratio was reverse i.e. it was more in female (14.05%) than males (9.5%) but in our study it was less i.e. (10.87%) in females and more (15.67%) in males.

The total percentage of absence of palmaris longus was lowest (1.5%) in the study done in Black Africans in Zimbabwe in 2009 by Gngata¹⁸. Total absence was also much lower in other two studies than our study. These were conducted in East Africa in 2011 by Kigera JW and Mukwaya S.¹⁹ (4.4%) and in China in 2005 by Sebastin SJ et.al⁶ (4.6%). The prevalence of agenesis of palmaris longus was much higher in Turkey¹⁰ (26.6%), Brazil (26.5%)²⁰, Saudi Arabia (24.5%)²², Egypt (25.4%)²³ Jordan (38.62%)²⁴ and Eastern Azerbaijan²¹ (24.4%).

Table 3:

City/ Country	Sampling size N	Total absence %	Male %	Femal e %
Zimbabwe, (Black Africans)	890	1.5	--	--
East Africa	800	4.4	4.9	3.9
Chinese	329	4.6	4.2	4.8
North Iran	562	5.2	5.3	4.9
Ethiopia	1424	14.85	12.2	17.5
Lagos, Nigeria	500	12.6	9.5	14.0
AJK, Pakistan	700	17.05	10.8	23.3
Eastern Azerbaijan	1247	24.4	19.8	29.1
Jizani population, Saudi Arabia	400	24.5	21.5	27.5
Egypt	386	25.4	11.9	38.9
Chilean, Brazil	740	26.5	21.1	29.93
Turkey	1350	26.6	20.7	32
India	852	27.0	16	38
Jordon	1020	38.62	33.47	42.94
South Punjab, Pakistan	567	12.87	15.67	10.87

It was also slightly higher (18.36%) in a study conducted in Azad Jamu Kashmir, Pakistan in 2016 by Khan MJ et.al²⁷.

A study done by Berhe T. and Bekele A. in Ethiopia²⁸ in 2014 gave nearly similar results (14.8%) as in the present study but in another study done in Madiha Pardesh in Central India by Sexena S. gave much higher results (27%) of absence of palmaris longus muscle²⁹.

When we compared the absence of palmaris longus muscle in both gender, the absence was higher in females in most of the studies but it was slightly higher in males in a study done in East Africa¹⁹ by Kigera JW and Mukwaya S. and in North Iran³⁰ by Nasiri, E. et.al (Table 3). In our study incidence was significantly higher in males the P value was <0.05%. In a study done by Eric's in Serbia in 2010¹⁷ in males it was equal in both arms, similar results was found in our study (table 1).

CONCLUSION

It is evident from this study in South Punjab that the prevalence of agenesis of palmaris longus in our study group was nearly similar as mentioned in Standard Anatomy Text Books (15%). The tendon is repeatedly disappearing. There were no significant dominance in any arm. In contrast to most of the studies this absence was higher in males as compared to females. When performing hand surgery and plastic reconstructive surgery in this region of Punjab, these results should be kept in mind. These findings will be helpful for anatomy students and surgeons.

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