

Prevalence of Absence of Palmaris Longus in Students of a Medical College in Nepal

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ABSTRACT:

Introduction: Palmaris longus is one of the most variable muscles present in the superficial layer of the anterior compartment of forearm and is phylo-genetically categorized as retrogressive muscle. It arises from the medial epicondyle of humerus and forms a long slender tendon which becomes flattened in palm to form palmar aponeurosis and helps in the flexion of hand at wrist. This muscle can be used in plastic surgery or reconstructive surgeries. The present study was carried out to find the prevalence of presence or absence of palmaris longus tendon in Nepalese population so that it would be helpful to provide a baseline data for surgeons to perform surgical procedures. **Methods:** This was a cross-sectional descriptive study conducted among 200 medical students after the approval from Institutional Review Committee. The presence or absence of tendon of palmaris longus was observed and confirmed on the flexor aspect of wrist by using Schaffer's test and Thompson's test. **Results:** The overall absence of palmaris longus was observed in 55 students (27.5%) with the prevalence of bilateral absence in 27 students (13.5%) and unilateral absence in 28 students (14.0%). The overall absence of palmaris longus was reported in 20 males (23.2%) and in 35 females (30.7%). **Conclusion:** Absence of palmaris longus (either unilateral or bilateral) was observed in about one fourth of the participants.

Keywords: Palmar aponeurosis, Palmaris longus, Phylo-genetically, Retrogressive

INTRODUCTION:

Palmaris longus is a long slender, fusiform muscle and is phylo-genetically categorized as a retrogressive muscle.[1] It is the superficial muscle of the anterior compartment of forearm arising from the medial epicondyle of humerus as a common flexor origin and from adjacent intermuscular

septa and deep fascia. It converges to form a long slender tendon which passes superficial to the flexor retinaculum and becomes flattened in the hand to form palmar aponeurosis. Its main function is to anchor skin and fascia of hand to improve the grip of hand and also helps in weak flexor of hand at wrist joint.[2,3,4] It is one of the most variable muscles of the body and may be absent on one side or both sides.[5,6]

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The variation of palmaris longus muscle depends upon race, sex and sides.[7] The prevalence of absence of palmaris longus is about 15% as reported by the standard books of hand surgery[8,9,10] but the variation of palmaris longus has been reported ranging from 1.5% in Korean population to 63.9% in Turkish population.[11,12]

Palmaris longus is commonly used as the first choice muscle for the tendon grafts and reconstructive surgeries. So, the knowledge about the variation of palmaris longus muscle is very important for the surgeons during reconstructive plastic surgery, lip augmentation procedures, ptosis correction, repair of ruptured tendon in rheumatoid arthritis.[6,13,14].

Different researches have been conducted regarding the variation of palmaris longus in different countries. The present study was carried out to find the prevalence of presence or absence of palmaris longus tendon in Nepalese population so that it would be helpful to provide a baseline data for surgeons to perform surgical procedures.

METHODS:

This was a cross-sectional descriptive study conducted in the Department of Anatomy from 29th March 2021 to 20th April 2021. Ethical clearance was obtained from the Institutional Review Committee of Lumbini Medical College and Teaching Hospital(IRC-LMC 02-B/021). The convenient sampling technique was performed and the required sample size was calculated to be 97 by using formula: $N = \frac{z^2 pq}{d^2}$; Where, N= minimum sample size required, Z= constant (1.96), P= Prevalence (50%), q = (100-p) = 100-50=50%, d= standard error=10%

The study was carried out in 200 undergraduate students (both males and

females) of Lumbini Medical College and Teaching Hospital (LMCTH). Informed consent was taken from the involved students individually. The inclusion criteria for the study were normal and healthy students. The exclusion criteria were students with the deformities, injury to the hand and exposure to surgery of upper limb.

The presence or absence of tendon of palmaris longus was determined by using:

Schaffer's test: Each student was asked to oppose the thumb to the little finger and then flex the wrist.[15] If the tendon was not visualized under the skin on the volar aspect of wrist by Schaffer's test, then the presence or absence was confirmed by using:

Thompson's test: Each student was asked to flex the fingers to form a fist followed by flexion of the wrist and finally thumb was opposed and flexed over the fingers.[16]

The data was recorded in Microsoft Office Excel and analyzed using SPSS 20.00.

RESULTS:

The present study included 200 undergraduate students from Bachelor in Medicine and Bachelor in Surgery (MBBS) first, second and third years, out of which 86 students were males and 114 were females. As shown in Table 1, the overall absence of palmaris longus was observed in 55 students (27.5%) with the prevalence of bilateral absence in 27 students (13.5%) and unilateral absence in 28 students (14.0%).

As shown in Table 2, the absence of palmaris longus was reported in 20 males (23.2%) with unilateral absence in 13 males (15.1%) and bilateral absence in seven males (8.1%). The overall absence of palmaris longus was observed in 35 females (30.7%) with unilateral absence in 15 females (13.2%) and bilateral absence in 20 females (17.6%).

Table 1: Prevalence of Absence of palmaris longus on the basis of laterality (N=200)

Unilateral Absence			Bilateral absence	Overall absence	Bilateral presence
Right	Left	Total			
12 (6.0%)	16 (8.0%)	28 (14.0%)	27 (13.5%)	55 (27.5%)	145 (72.5%)

Table 2: Prevalence of absence of palmaris longus on the basis of gender (N=200)

	Unilateral Absence		Bilateral Absence	Overall Absence
	Right	Left		
Male (n=86)	5 (5.8%)	8 (9.3%)	7 (8.1%)	20 (23.2%)
Female (n=114)	7 (6.1%)	8 (7.0%)	20 (17.6%)	35 (30.7%)

DISCUSSION:

The present study showed that the prevalence of overall agenesis or absence of palmaris longus is about 27.5% which was almost similar to the study conducted by Mehta DK et al. who reported 27.65% of overall absence in Nepalese population.[7] Shankar KD et al. observed the absence of 28% in Indian population which is consistent to the present study.[17] The overall absence of palmaris longus in Turkish population was 26.58% as reported by Kose O et al.[18] In Indian population, Tejaswi H Let al. reported it to be 27.4% and Saxena S et al. reported 27%.[19,20] Its prevalence was 26.50% in Brazilian population as shown by Morais MA et al.[21] These findings are comparable with the present study. However, the lower prevalence of absence of palmaris longus was observed by different authors. A study by Agarwal P et al. reported 20.1%, Kapoor SK

et al. reported 17.2%, Sharma DK et al. reported 16.25% and Berhe T et al. reported 15.31%.[14,22,23,24] Studies by Hojjatollah et al. and Eric M et al. found the higher prevalence of overall agenesis with the frequencies of 30% and 37.5% respectively which were in contrast to previous study.[25,26]

Adejuwon SA et al. reported the bilateral absence in 13.65% which was in accordance to the present study (13.5%).[27] Similar results were observed by Kose O et al. and Eric M et al. with the prevalence of 15.04% and 15.9% respectively.[18,26] A study by Agarwal P et al. showed a lower prevalence of bilateral absence with the frequency of 3.37%.[14] Similarly, Sharma N et al. reported 3.7% and Kapoor SK et al. reported 8%, with the lower prevalence of bilateral absence.[12,22] However, the study by Safari

M et al. reported higher prevalence of bilateral absence (26.6%).[28]

The prevalence of unilateral absence on left side was 8% and unilateral absence on right side was 6% with the overall unilateral absence of 14%. Many studies had similar findings with the high prevalence of unilateral absence on left side. A study by Mehta DK et al. reported right unilateral absence in 9.2% and left unilateral absence in 10.99%. [7] Kose O et al. reported right unilateral absence in 4.5% and left unilateral absence in 7.04% resulting in higher prevalence of left unilateral absence. [18] A study performed by Tejaswi HL et al. reported the higher prevalence of right unilateral absence (9.39%) than left unilateral absence (7.51%) which was in contrast to the present study. [19]

The present study also found that the overall absence in female (30.7%) was higher as compared to that in males (23.25%). Similar findings were obtained by the study conducted by Tejaswi et al. (Male: 21.95%, Female: 32.16%), Safari M et al. (Male: 21.8%, Female: 34.19%) and Navigre VR et al. (Male: 13.6% and Female: 22.8%). [19, 28, 29] Some researchers namely Agarwal P et al. (Male: 24.6%, Female: 15.8%) and Eric M et al. (Male: 39.6%, Female: 35.6%) reported higher prevalence of overall absence of palmaris longus in males. [14, 26] The present study showed the bilateral absence was more common in females (17.55%) than in males (8.14%) whereas unilateral absence was more common in males (15.11%) than in females (13.15%) which were similar to study conducted by Mehta DK et al. [7]

Regarding the limitation of the present study, the assessment of palmaris longus tendon was done only by clinical method. The sample frame is also not representative of the entire Nepalese population.

CONCLUSION:

The present study observed overall absence (either unilateral or bilateral) of palmaris longus in about one fourth of the participants. As the palmaris longus muscle is the first choice for tendon grafts and reconstructive surgeries, this information might be helpful to the surgeons in the corresponding field.

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