



*International Journal Of*  
**Recent Scientific  
Research**

ISSN: 0976-3031  
Volume: 6(12) December -2015

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THE OFFICIAL PUBLICATION OF  
INTERNATIONAL JOURNAL OF RECENT SCIENTIFIC RESEARCH (IJRSR)  
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**RESEARCH ARTICLE**

**CLINICAL EVALUATION OF AGENESIS OF PALMARIS LONGUS MUSCLE IN SOUTH INDIAN POPULATION**

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**ARTICLE INFO**

**Article History:**

Received 15<sup>th</sup> September, 2015  
Received in revised form 21<sup>st</sup>  
October, 2015  
Accepted 06<sup>th</sup> November, 2015  
Published online 28<sup>st</sup>  
December, 2015

**Key words:**

Palmaris longus muscle, Agnesis of  
Palmaris longus, Tendon grafting,  
Autograft.

**ABSTRACT**

The Palmaris longus muscle is the most suitable autograft material for various reconstructive surgeries. Keeping this in view the present work was undertaken. A cross sectional descriptive study was done by three clinical methods, 220 medical and paramedical students (120 females and 100 males), aged between 18-21 years, from various parts of south India were clinically tested for the presence or absence of the muscle. It was noted that there was absence of the muscle unilaterally mostly left sided (non dominant hand) and bilaterally was predominantly seen in females compared to the males. The observations made here suggest that the Palmaris longus muscle present in the dominant right hand which is involved in more motor activity compared to the left is less likely to get degenerated than the left side which is the nondominant hand due to disuse. Overall agnesis was seen in 13.63% unilaterally and 2.72% bilaterally.

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**INTRODUCTION**

Palmaris longus muscle is a flexor muscle, it is fusiform and lies superficially in the forearm. It takes its origin from the medial epicondyle of the humerus and gets inserted into the Palmar aponeurosis, it is supplied by the branches of the median nerve and is a weak flexor of the forearm. It is considered as a phylogenetically degenerated muscle its main function being anchoring of the skin and fascia of the hand (William *et al*, 2005). It is the most variable muscle in the body, its absence was reported as early as 1559, it was absent in 7.7% of cases, absent on the right side in 4.5% and absent on the left side in 5.2% out of 800 cases, it was absent more often in females and on the left side in both sexes (Bergmann *et al*, 1988). Tendon transfer/grfts are being used in various reconstructive surgeries by orthopaedic surgeons, plastic surgeons, ophthalmologists and onco-surgeons in the trauma centres due to high rise of road traffic accidents, therefore, the Palmaris longus muscle as an autograft material is very much suitable for reconstructive surgeries because of its easy accessibility from the patient himself without causing residual deformity, it is less expensive, easy to manipulate as a graft

material and the percentage of graft rejection is less compared to a synthetic graft.

**MATERIAL AND METHODS**

Clinical tests were done on 220 medical and paramedical students belonging to various parts of south India, 120 females and 100 males between the ages of 18-21 years to assess the agnesis of Palmaris longus muscle. Informed consent from the students was taken along with approval from the institution to conduct the study. Information regarding the gender, age, region to which they belong and handedness was collected. Exclusion criteria included hand and wrist deformities, history of previous hand or wrist injuries or surgeries.

**Clinical method – 1 (Schaeffer's test):** The thumb is opposed with the little finger and the wrist is flexed against resistance. The taut Palmaris longus tendon can be seen and felt in the midline of the flexor wrist crease since the tendon passes superficial to the flexor retinaculum. (Chummy, 1999). Failure to see or feel the tendon was taken as absent Palmaris longus.

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**Clinical method – 2:** The thumb is opposed with the middle finger and the wrist is flexed against resistance. The taut Palmaris longus tendon can be seen or felt in the midline of the flexor wrist crease.

**Clinical method – 3:** The thumb is opposed with the middle and ring fingers, the wrist is flexed against resistance. The taut Palmaris longus tendon can be seen or felt in the midline of the flexor wrist crease. (William *et al*, 2005)

## OBSERVATIONS AND RESULTS

**Table 1** Frequency of agenesis of Palmaris longus.

Clinical methods	Right side		Left side		Bilateral agenesis	Total agenesis	
	Present	Absent	Present	Absent		unilateral	bilateral
1 Females(120)	108(90%)	08(6.66%)	104(86.66%)	12(10%)	4(3.33%)	16.66%	3.33%
Males(100)	94(94%)	04(4%)	92(92%)	06(6%)	2(2%)	10%	2%
2 Females(120)	108(90%)	08(6.66%)	104(86.66%)	12(10%)	4(3.33%)	16.66%	3.33%
Males(100)	94(94%)	04(4%)	92(92%)	06(6%)	2(2%)	10%	2%
3 Females(120)	108(90%)	08(6.66%)	104(86.66%)	12(10%)	4(3.33%)	16.66%	3.33%
Males(100)	94(94%)	04(4%)	92(92%)	06(6%)	2(2%)	10%	2%

It was observed that in all the three methods the total percentage of agenesis out of 220 subjects was 13.63% unilaterally and 2.72% bilaterally. In females total agenesis was 16.66% unilaterally more so on the left side and 3.33% bilaterally. In males total agenesis was 10% unilaterally and 02% bilaterally. Percentage of agenesis of Palmaris longus whether unilateral or bilateral was more in females compared to the males. All the subjects tested were right handed.

## DISCUSSION

Though the Palmaris longus muscle has no functional importance, because of the very well developed flexors taking over its function, it is the best graft material that can be used for various reconstructive surgeries. It is used in emergency reparative surgeries like opponensplasty procedures, in median and ulnar nerve palsies, hand and wrist deformities, tendo Achilles reconstruction (Isenberg *et al*, 1995), reconstruction of maxillo-facial surgeries (Katou *et al*,1996), in leprosy – correction of hand and finger deformities(Malaviya,2003), repair of ruptured tendons in rheumatoid arthritis(Wehbe,1992), Camitz Palmaris longus abductorplasty for severe thenar atrophy secondary to carpal tunnel syndrome (Terrono *et al*,1993), lip augmentation procedures (Barry,1995) and correction of ptosis in children (Dennis *et al*,1998).

In 1975, it was revealed that there was an increased incidence of absence of the Palmaris longus muscle in patients suffering from manic-depressive psychosis and endogenous depression, it was stated that the defect was genetically determined, inherited in a monofactorial way, and determined by an autosomal gene of a dominant character with incomplete penetrance. The absence of the Palmaris longus muscle was a dominant trait, its presence a recessive trait. (Michel *et al*, 1978). The Palmaris longus has a highly variable prevalence in different ethnic populations. It was studied that the African American population had a statistically significantly lower rate of absent Palmaris longus (4.5%) and Asians (2.9%) compared to the Caucasians having unilateral absence of 16% and bilateral absence of 9%,with males being more affected. (Ali *et*

*al*, 2012). A prospective study done in Andhra population showed that the overall agenesis in both sexes was 264 out of 942 (28.0%),out of which 40.2%was seen in females and 14.7% in males with the ratio of 3:1.Unilateral absence was seen in 70.5% and bilateral absence was seen in 29.5%.Left side agenesis was seen in 51.6% and right side in 48.4% subjects. (Devi Sankar *et al*, 2011). In another study done in eastern Nepal, the overall incidence of agenesis was 11.8% with bilateral absence of 3.5% and unilateral absence of 8.2%. (Ranjib Jha *et al*, 2015).

## CONCLUSION

From this study we can conclude that the incidence of agenesis is quite high in south Indian population compared to the other regions of India and African American population. The Palmaris longus muscle which was once thought to be a vestigial and degenerating structure, can now be used as an autograft material for various reconstructive surgeries, without producing any residual defects in the donor. It is imperative for the surgeons to know the local incidence of agenesis before planning for tendon grafting, thus this study gives an idea to the surgeons working in this region their likelihood of finding the tendon for grafting, by utilizing the three different clinical methods, the surgeons can test the patient for agenesis before planning for surgery.

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**How to cite this article:**

Najma Mobin.2015, Clinical Evaluation of Agenesis of Palmaris Longus Muscle In South Indian Population. *Int J Recent Sci Res* Vol. 6, Issue, 12, pp. 8002-8004.

T.SSN 0976-3031



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