
Incidence of Agensis of Palmaris Longus amongst Students Populations in Anambra State University, Uli Campus

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ABSTRACT

Palmaris longus is a muscle that assists in flexion of the wrist. There is a growing interest in the existence of the muscle because its tendon is reported to be most frequently harvested for reconstructive plastic and hand surgery which led to the study of its unilateral and bilateral absence amongst student of Anambra State University Uli. A descriptive study was conducted in 300 healthy subjects (145 males and 155 females) who were examined clinically by Schaeffer's test. In subjects with agensis of palmaris longus tendon, four other was carried out on them and when still absent, exercise was introduced. Overall incidence of the agensis of palmaris longus was observed in 11 (3.7%) which were all unilaterally agenetic, consisting of 1.3% of males and 2.3% females. Agensis in the fat subjects (obsessed subjects) was 12.1% while that of the slim subjects was 1.7%. In this study, there was a statistic significant ($P > 0.05$) relationship with agensis of palmaris longus with gender among population in Anambra state university, Uli campus. This research proves that the eastern geographic zone of Nigeria has a low incidence of agensis of palmaris longus.

Keyword: Palmaris Longus, Agensis, Students.

INTRODUCTION

Palmaris longus (PL) is a rudimentary muscle found in the superficial flexor compartment of the forearm that is phylogenetically degenerating. It is a weak flexor of the wrist and is considered functionally negligible. It is a spindle-shaped muscle with a long tendon, which passes into the hand and attaches to the flexor retinaculum and to a thick layer of deep

fascia, the palmaris aponeurosis, which underlines and attaches to the skin of the palm and finger. The tendon of palmaris longus is seen medial to the interosseous membrane (Richard et al., 2010). There is a growing interest in the existence of the muscle because its tendon is reported to be most frequently harvested for reconstructive plastic and hand surgery (Sebastin et al, 2005). The palmaris longus muscle has been well studied following the first report of its absence in 1559 by Colombos in *De Re Anatomica Libri* (Thompson et al., 2001). The presence or absence of palmaris longus muscle can be examined clinically through Schaeffer's test, which was the first clinical test approved for examining the presence or absence of palmaris longus muscle, other test includes Mishra test, Pushapakumar's test (two finger sign method), etc.

This muscle is one of the most variable muscles in humans. The variations include duplication (digastric) and the presence of accessory palmaris longus (Koo et al., 1997). The origin of this variation as illustrated by Humphrey (Kawashima et al., 2002), suggested the presence of radial, intermediate and ulnar sectors in the superficial layers of the forearm flexor muscular angulus. Thus PL usually differentiates from the intermediate sector but differentiation from the other two sectors may also be possible. It is also reported to develop independently from palmar aponeurosis and is associated only by anatomic proximity (Caughell et al, 1988).

The tendon of PL is considered a dispensable tendon because its absence does not significantly contribute to the function of the wrist. It is useful in orthopaedics, hand and reconstructive surgery. It is commonly used by hand surgeons for tendon transfers, second stage tendon reconstruction, pulley reconstruction as well as tendon grafting. Plastic surgeons also utilizes the palmaris longus muscle in restoration of lip and chin defects (Carroll et al., 2000), ptosis correction (Kurihara et al., 1984; Naugle & Faust, 1999), and in the management of facial paralysis (Atiyeh, et al., 1998).

The distribution of the palmaris longus agenesis and other aspects of variations of the muscle are studied in different ethnic groups and populations of the world. Despite the surgical importance of this muscle, there is scarcity of information on its prevalence in our population. The aim of this study was to determine the incidence of unilateral and bilateral absence and variations of Palmaris longus for the selected group of students in Anambra State University Uli, Anambra State Nigeria in 2014.

MATERIALS AND METHODS

This study was a descriptive survey of either the student or staff of Anambra state university Uli campus to determine the prevalence of the absence of PL. The study utilized a simple stratified random sampling technique, with student nominal roll as the sampling frame. A sample size of 300 subjects (145 males, 155 females) in Anambra state university, Uli campus was obtained. Ethical permission to carry out this research was sorted and granted from institutions research and ethics committees. Individual with physical disability (including those resulting from trauma, be it spine, lower or upper limb), any prior surgery (to upper or lower limb) and any upper limb injuries were excluded from the study.

Subjects were pre-informed of the objectives and procedures to be carried out in the study and permission was obtained from the subjects. This was achieved by clinical inspection of the volar aspect of the wrist and by performing the Schaffer's test (Schaeffer) which is the standard test for the assessment of the palmaris longus tendon. Each of the subjects was asked to oppose the thumb to the little finger and then flexes the wrist slightly. The palmaris longus tendon was labeled as present in the limb if the prominent tendon is visible and or palpable. If the Schaffer's test failed to demonstrate a PL tendon, it was considered absent. Four additional tests were done to confirm the absence.



1. Thompson's test: (Thompson et al., 1921). The subjects were asked to make a fist and then flex the wrist and finally the thumb is opposed and flexed over the fingers.



2. Mishra's test 1 (Mishra, 2001). The metacarpophalangeal joints of all fingers were passively hyperextended by the examiner and the subjects were asked to actively flex the wrist.



3. Mishra's test 2 (Mishra). The subjects were asked to abduct the thumb against resistance with the wrist in slight palmar flexion.



4. Pushpakumar's "two-finger sign" method (Pushpakumar et al., 2004). The subject was asked to fully extend the index finger and middle finger, the wrist and other fingers are flexed and finally the thumb is fully opposed and flexed.

Statistical Analysis

All data were electronically analyzed on an IBM compatible computer, employing social science (SPSS, Windows 21). A level of significance (P-value) was set at $P < 0.05$, Chi square test was used to compare gender and sides. Percentage and proportion were worked out and represented in charts and tables allowing inference to be drawn.

RESULTS

In this study, 300 healthy subjects were examined consisting of 145 (48.3%) males and 155 (51.7%) females. 53.7 % of subjects were between the age range of 16-22 years, 16.3% of the subjects were within the age range 23-29 years, 30-36 years contributed 9.0%, 44-50 years contributed 1.7% and 0.3% respectively. 242 subjects out of 300 were slim subjects having 80.7% while 58 were the fat subject having 19.3%. Out of 300 forearms, 294 (98.0%), left forearm was present while 6(2.0) left forearm was absent. Out 300 forearms, 295 (98.3%) right forearm was present while 5 (1.7%) was absent. Techniques of results on the left forearm, not applicable (i.e those who are a genetic of palmaris longus) were 7 (2.3%), palmaris longus was examined by one test (scaeffers's test) in 238 (79.3%) subjects, 49 (16.3%) was examined by more than one test (Thompson's test, Mishra's I and II test and pashpakumar's test) while

6 (2.0%) were examined by exercise. On the right forearm, not applicable was in 4 (1.3%) subjects, by one test was examined in 257 (85.7%), by more than one test was 30 (10%) and by exercise was 9 (3.0%). Out of 300 subjects, 99 (33.0%) were workers while 201 (67.0%) were students.

Unilateral Absent Not Applicable %	P-value			
	Left forearm%	Right forearm%		
Gender				
Male	141(97.24)	1(0.69)	3(2.07)	
Female	148(95.48)	5(3.23)	2(1.29)	0.258

DISCUSSION

Many surgeons agreed that the palmaris longus tendon is the first choice as a donor tendon because it fulfills the necessary requirements of length, diameter and availability, and can be used without producing any functional deformity (Troha et al., 1990). According to a study by Thejodhar et al. (2008) there appears to be considerable divisional (racial), ethnic and regional variation in the frequency with which the muscle is absent. Palmaris longus agenesis has been the subject of several studies, both cadaveric and in vivo. Prevalence of its agenesis has been variously reported to be from 3% in black people to 64% in Turkish people (Sebastin et al., 2005). Hence it is clear that a generalized

figure cannot be applied to all populations. This means that it is important to be aware of the prevalence of Palmaris longus agenesi s in the population being treated (Sebastin *et al.*, 2005).

In this, study, overall agenesi s of palmaris longus was 3.7%, which was compared to Osonuga *et al* (2012) having 3.1% whose incidence was lower compared to the incidence in this study. Sebastin *et al* (2005) reported total agenesi s as 4.6%, Sangeeta *et al* (2013) reported their total incidence as 16.0%. Morais *et al* (2012) reported their total agenesi s as 26.5%. Kose *et al* (2009) and Adejuwon *et al* (2012) reported their total agenesi s as 26.6% and 31.25% respectively.

Some authors have reported the incidence of agenesi s to be higher in female subjects and on the left side (Schaeffer, 1909; Reimann *et al.*; Kapoor *et al.*, 2008). This notion is in line with the present study, female were found to have a higher incidence of agenesi s of PL 2.3% than that of the males (1.7%) and this was supported by Kose O, (2009). Enye and Osinubi (2011), in their study had their females (13.95%) being higher than the males (9.5%). Morais *et al.*, (2012), in their study had their females (29.7%) to be higher than the males (21.1%). Adejuwon *et al.*, (2012) in their studies had their incidence of agenesi s of palmaris longus higher in females (32.3%) than the males (21.4%).

Some research works contradicted the higher incidence of agenesi s of PL in female than males. According to Mbaka G.O (2009), there were higher incidences of PL in male (6.9%) than in female (6.4%) while Sangeeta *et al* (2013) reported no difference.

CONCLUSION

Incidence of agenesi s of palmaris longus can vary in gender, hand sides, bilaterally and unilaterally. At the end of the study, the data analysis showed that can be occurrence of only unilateral or bilateral agenesi s. From the present it can be stated that incidence of palmaris longus was

more common in females than males. And more on the left hand than the right hand side. This study showed lowest incidence of palmaris longus in all the studies done in Nigeria, this may be an indication that the eastern geographic zone of Nigeria has low incidence of agenesis of palmaris longus.

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