

THE INCIDENCE OF AGENESIS OF *PALMARIS LONGUS* AMONG THE YORUBA TRIBE IN NIGERIA

Journal website at;
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SUMMARY

Background: Palmari longus (PL) has received a growing interest for its role in constructive surgery. Since the agenesi s of PL showed strong racially variation, it was conceivable to investigate on Yoruba ethnic population in Nigeria.

Objective: To investigate the frequency of PL agenesi s amongst the Yoruba population. The result obtained would be subjected to correlation analysis with the view to ascertaining the linearity between both limbs in the two sexes.

Materials and Methods: A total of 600 subjects comprising 335 males and 265 females aged 8-60years were used to assess the prevalence of agenesi s of the PL in Yoruba tribe.

Results: The overall prevalence of absence was 6.7%. In males, unilateral absence was 5.4%. The distribution on the right and left were 2.4% and 3.0% respectively. The bilateral absence was 1.5%. In females, unilateral absence was 6.0%. The distribution on the right and left were 2.6% and 3.4% respectively. Bilaterally, it was 0.4%.

In one subject unilaterally, PL was observed to have differentiated from flexor carpi radialis.

Conclusion: Results of this finding suggested that the prevalence of PL agenesi s as reported in standard anatomy texts does not apply to Yoruba population. The consistency in higher prevalence of its agenesi s amongst the Caucasian population in contrast to most Asians or blacks populations suggested that the incidence of PL absence is racially dependent.

Key Words: Palmaris longus; Agenesi s; Yoruba tribe; Males; Females.

INTRODUCTION

Palmaris longus (PL) is a small vestigial muscle that is phylogenetically degenerating. It is a slender muscle that arises from the medial epicondyle by a common flexor

tendon and from adjacent intermuscular septa. The characteristic of this muscle is shown by its short belly and long tendon (McMinn, 1997). The belly soon gives way to a long slender tendon of variable length (Ito et al, 2001) that inserts adherent across the front of flexor retinaculum to the palmar aponeurosis (Williams et al, 1989; McMinn, 1997; Palastanga et al, 1998).

This muscle is one of the most variable muscles in humans. The variations include duplication (digastrics) 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).

PL, a weak flexor of the wrist is considered functionally negligible. However, 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). Besides, it had earlier been noted as a stabilizer of superficial structures in the palm in preparation to thumbs abduction (Fahrer, 1973; Fahrer and Tubiana, 1976).

The agenesi s of PL has been reported in anatomy texts (Williams et al, 1989; McMinn, 1997; Palastanga, et al, 1998). The prevalence of the agenesi s of this muscle as reported in most standard anatomy texts is about 15% (McMinn, 1997). A higher prevalence (24%) was reported in North America Caucasians (Troha et al, 1990). A survey in Pennsylvania, USA showed 23% incidence of absence (Wehbe, 1992). Ceyhan et al (1997) reported a higher prevalence of agenesi s (25%) in Gaziantep population in Turkey. Studies among the Asian population showed that

the incidence is 3.4% in Japanese (Adachi, 1999) and 4.6% in Chinese (Sebastin et al, 2005) respectively. Within Africa, studies have equally been conducted. Available information showed that the incidence is 1.02% in Ugandan population (Igbigbi, 1998).

The Yoruba tribe located in southwest Nigeria extends through Benin republic to Togo. It is the second largest ethnic group in Nigeria constituting about 30% of her entire population. Their lives are structured around agriculture being the largest producer of cocoa in Nigeria, a major cash crop. They equally engage in trading and handicrafts (Olamijulo, 2004).

Since the incidence of agensis reported in most anatomy texts represent Caucasian populations, we think it will be informative to report on the prevalence of this muscle in Yoruba population, southwest, Nigeria.

MATERIALS AND METHODS

Subjects: A total of 600 subjects comprising 335 males and 265 females aged 8-60 years were used to assess the prevalence of agensis of PL. It was believed that within this age bracket, the subjects would be able to manoeuvre their hands to conform to the instruction. The subjects were selected from amongst members of the university community, primary and secondary schools and business community using systematic random selection technique.

Materials/Instrumentation: The exercise was conducted with four different methods of assessments which has been field validated and are known to be reliable techniques for PL assessment (Sebastin et al, 2006). These include; standard test (Schaeffer's test), Thompson's test, Mishra's test I and Pushpakumar's "two-finger sign". Each subject was initially asked to do the standard test, where the technique was not sufficiently manoeuvred, either Thompson's, Mishra's or Pushpakumar's "two-finger sign" tests and in some situations the three were used for retest. The use of any of these tests was however not in any particular sequence.

Ethical approval was sought and obtained from the schools used and with the co-operation of the teachers many were enthusiastic for the exercise. Also, those that consented among the business class were used. The investigation was carried out amongst subjects that both parents were ethnic Yoruba irrespective of their religion.

Procedure: The exercise was conducted with the subjects in the standing position. In Schaeffer's test, subjects were made to steady their forearm at 90° before opposing the thumb to the little finger with the wrist partially flexed. In Thompson's test, a fist was made followed by flexing the wrist against resistance with the thumb flexed over the fingers. In Mishra's test I, the subjects were asked to abduct the thumb against resistance with the wrist partially flexed. In Pushpakumar's "two-finger sign" method, the subjects were made to fully extend the index and middle finger while the wrist and other fingers were fully flexed with the thumb opposed and flexed.

Statistical analysis: The incidence of agensis of this muscle in both sexes and on the two sides of upper limbs was analyzed using SPSS. Correlation and percentage score were used to assess the association of its agensis in both sexes unilaterally and bilaterally. The percentage score besides being the more conventional assessment technique was less technical. However, the inclusion of correlation coefficient was to determine the linearity of agensis between both limbs and in the two sexes.

RESULTS
 In a total of 335 male subjects examined: 84 were primary school pupils (below 12 years); 95 were secondary school students (12-16 years); 112 university students (17-29 years) while 44 were from the business community (30-60 years). Amongst the 265 females examined; 68 were primary school pupils (below 12 years); 89 were secondary school students (12-16 years); 91 were university students (17-29 years) while 17 were from the business community (30-60 years).
 The overall prevalence of absence was 6.7% (40 subjects) (Table 1). In males, PL was found to be absent unilaterally in 18 subjects (5.4%); the distribution on the right and left were 8 (2.4%) and 10 (3.0%) respectively. Bilaterally (Table 2), this muscle was absent in 5 subjects (1.5%). The overall prevalence of absence in males was 6.9% (23). In females, PL was absent unilaterally in 16 subjects (6.0%); the distributions on the right and left were 7 (2.6%) and 9 (3.4%) respectively. Bilaterally (Table 2), it was 1 (0.4%). The overall prevalence of absence for females was 6.4% (17) (Table 1). The unilateral prevalence of absence between the males and females showed no

Table 1: The distribution of palmaris longus absence on both sexes

Number of subjects assessed	Overall total	Total for males	Total for females
600	40 (6.7%)	23 (6.9%)	17 (6.4%)

Table 2: The distribution of palmaris longus absence on both limbs

Absence of palmaris longus	Right	Left	Bilaterally
Male	8 (2.4%)	10 (3.0%)	5 (1.5%)
Female	7 (2.6%)	9 (3.4%)	1 (0.4%)
Overall	15 (2.5%)	19 (3.2%)	6 (1%)

Table 3: Correlation coefficient of palmaris longus absence

	Male right	Male left	Female right	Female left
Male right	1	.330	.777	
Male left	.330	1		.380
Sig. (2-tailed)	.000			
Female right	.777		1	.081
Female left		.380	.081	1
Sig. (2-tailed)			.000	
Number	335			265

significant difference ($P < 0.05$) (Table 2). However, bilateral prevalence of absence in males was comparatively higher than in females.

The correlation analysis showed (Table 3) that the agenesis on males right was strongly correlated to the males left with linearity of 1 to 0.330 ($P < 0.01$). On the contrary, the assessment of the two females limbs indicated weak correlation {1 to 0.081 ($P < 0.01$)}. However, the interclass assessment of males' right and females' right agenesis was observed to be most strongly correlated with 1 to 0.777 ($P < 0.01$).

DISCUSSION

The findings on Yoruba ethnic population showed an overall prevalence of absence of PL to be 6.7%. This observation differs markedly with most reports in standard anatomy texts (15%) believed to represent Caucasian population. This assumption is strengthened by a similar high prevalence of absence (24.4%) reported in North American Caucasians (Troha et al, 1990); Pennsylvania (23%; Wehbe, 1992) and on Germans (20.4%; Gruber, 1872). However, our observation tallied with the reports on Asian population which according to Adachi (1909) and Sebastin et al, (2005) were 3.4% and 4.6% for Japanese and Chinese respectively but differed with the report of recent survey on Indian population of 17.2% (Kapoor et al, 2008). A black population report on Ugandans subjects (Igbigbi and Ssekitoleko, 1998) showed much lower result of 1.02%. This is indicative of strong racial dependent agenesis of the muscle.

The unilateral absence observed to be higher in females (6.0) than in males (5.4%) correlated with most previous reports (Troha et al, 1990; Ceyhan et al, 1997) except for the report on Ugandans (Igbigbi and Ssekitoleko, 1998). The difference between the unilateral and bilateral absence of the muscles was marked. The much lower incidence observed bilaterally is consistent with other accounts (Thompson et al, 2001; Sebastin et al, 2005) but differed markedly with Ceyhan et al, (1997) report on Gaziantep population. There was no significant difference in the unilateral absence in both sexes. But bilaterally, the difference was marked. A strong correlation of agenesis was observed particularly between the interclass assessment of male right and the female right.

CONCLUSION

We conclude from these results that there is low incidence of absence of PL among the Yoruba in Southwest Nigeria. It is clear from standard prevalence of agenesis of PL that the report does not apply to Yoruba population. The consistency in higher prevalence of its agenesis amongst the Caucasian population in contrast to most Asians or blacks populations suggested that the incidence of PL absence is racially dependent. Furthermore, this finding showed strong association of PL agenesis in both limbs of males and females.

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