

## Incidence of Palmaris Longus Muscle Absence in Nigerian Population

Incidencia de la Ausencia del Músculo Palmar Largo en la Población de Nigeria

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**SUMMARY:** A lot has been reported about variation of palmaris longus muscle in journals and conventional textbooks. The incidence of palmaris longus muscle absence among people of the six geo-political zones of Nigeria was evaluated using 600 subjects. 31.25% (187 subjects) lack palmaris longus muscle either of the forearms. 12.5% (75 subjects) shows unilateral absence and 18.75% (112 subjects) shows bilateral absence. 25% (150) of subjects lacks palmaris longus muscle on their right forearms while 25% also lacks it on their left forearms. 6% (37) shows double tendons of palmaris longus muscle on both forearms. Highest incidence of absence was recorded among people of South-West zone.

**KEY WORDS:** Palmaris longus muscle; Tendons; Flexors muscles; Forearm.

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### INTRODUCTION

Much has been reported about the variations in palmaris longus muscle in relation to its morphology, origin, insertion, nerve supply and presence or absence in different individuals. Proximally, it is attached to the medial epicondyle of the humerus along with other superficial flexors of the forearm. Distally its long thin tendon forms the superficial portion of the mid palmar fascia (Nigro, 2001). Skin and fascia of the palm and digital webs give attachment to the fibres of palmar fascia. The palmaris longus muscle is innervated by a branch of the median nerve (Linell, 1921; Sunderland & Ray, 1946).

Palmaris longus muscle is one of the superficial slender muscles of the forearm that act on the skin and distal digital webs. It has been described as a phylogenetically degenerate metacarpophalangeal joint flexor (Gray *et al.*, 1999; Jones, 1941). Palmaris longus muscle is a choice muscle in cosmetic, plastic and reconstructive surgery. It serves as an anchor for the skin and fascia of the hand, resisting horizontal shearing forces in a distal direction, which would tend to deglove the skin of the palm. Often absent on one or both sides, the muscle is very variable. (Machado & Didio 1967; Stack, 1973).

The first three-headed reversed palmaris longus muscle was recorded by Yildiz *et al.* (2000) in a 36 year old woman. Oommen (2002) has also recorded inverse (up-down) palmaris longus muscle in a cadaver, in which the muscle originates by a long thin tendon from the medial epicondyle by the common flexor tendon and from the antebrachial fascia in both limbs. He recorded that the muscle stemmed from a long tendon instead of muscle belly. On both sides the tendon was replaced by a muscle belly around the middle of the fore-arm. In the region of the wrist the muscle fibers ended and a tendon continued into the palmar aponeurosis. An atypical innervation was recorded in cadaver at New Delhi, India (Chauhan, 2003). Palmaris longus muscle is present in about 70-85% population (Wehbé, 1992) and fully developed at birth (Vastamäki, 1987).

Nigeria, a Western Africa nation, bordering the North Atlantic Ocean, between Benin and Cameroun, is the largest black nation in the world. It is located on area 92376868sq kilometers, land area of 910770sq kilometers. The population is estimated at 130.000000 with more than 250 ethnic groups. The 31 states are grouped into 6 geo-political

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zones as follows: North-Central (Benue, Kogi, Kwara, Nasarawa, Niger, Plateau, and Federal Capital Territory, Abuja), North-Eastern (Adamawa, Bauchi, Borno, Gombe, Taraba and Yobe), North-Western (Jigawa, Kaduna, Kano, Katsina, Kebbi, Sokoto and Zamfara), South-Eastern (Abia, Anambra, Ebonyi, Enugu, and Imo) South-South (Akwa Ibom, Bayelsa, Cross River, Delta, Edo and Rivers) and South-Western (Ekiti, Lagos, Ogun, Ondo, Osun and Oyo).

Most of the recorded variations occur among the Caucasians and Chinese. Only few as been reported concerning the percentage incidence of palmaris longus muscle among Nigerian.

This study aims at evaluating the incidence of palmaris longus muscle absence among Nigerian population, using the three major ethnic groups as case studies.

## MATERIAL AND METHOD

In 600 subjects (300 males & 300 females) were randomly sampled without replacement, according to Spiegel & Stephens (1998), from the staff and student populations of Igbinedion University, Okada, Edo State, and University of Benin, Benin City, Edo State. They represented the six geopolitical regions of Nigeria: South-South (100), South-West (100), South-East (100), North-North (100), North-East (100) and North-Central (100). The subjects' ages range between 19 years and 35 years.

They were made to perform various exercises to test for the absence of palmaris longus muscle in both forearms. The tests were combined according to Sebastin & Lim (2006). The tests are as follows:

Standard test (Schaeffer's test): The subject is asked to oppose the thumb to the little finger and then flex the wrist.

Thompson's test: The subject is asked to make a fist, then flex the wrist and finally the thumb is opposed and flexed over the fingers.

Mishra's test I: The metacarpo-phalangeal joints of all fingers are passively hyperextended by the examiner and the subject is asked to actively flex the wrist.

Mishra's test II: The subject is asked to abduct the thumb against resistance with the wrist in slight palmar flexion.

Pushpakumar's "two-finger sign" method: The subject is asked to fully extend the index and middle finger, the wrist and other fingers are flexed and finally the thumb is fully opposed and flexed.

## RESULTS

Among the 60 subjects examined in this work, 31.25% (187 subjects) lack palmaris longus muscle on either of the forearms. 12.5% (75 subjects) shows unilateral absence and 18.75% (112 subjects) shows bilateral absence.

## DISCUSSION

The morphology, nerve supply and functions of palmaris longus muscle have been extensively discussed by Chauhan. Some authors suggest that apart from its ethnic variations, its absence is more common in women, bilateral absence is more common, and that unilateral absence occurs more frequently on the left side (Schaeffer, 1909) Others have attempted to correlate the absence of the palmaris longus muscle with other anatomical anomalies, like an anomalous superficial palmar arch, an absence of the plantaris, etc. (O'Sullivan & Mitchell, 2002; Ito *et al.*, 2001). None of the subjects used in this study has any record of phenotypical anomalies.

Among the 600 subjects examined in this work, 31.25% (187 subjects) lack palmaris longus muscle on either of the forearms. This is in consonance with the work of Wehbé, who reported 70-85% presence of palmaris longus muscle. 12.5% (75 subjects) shows unilateral absence and 18.75% (112 subjects) shows bilateral absence. These confirmed the higher percentage recorded for bilateral against unilateral incidence by Schaeffer and Reimann *et al.* (1944). 25% (150) of subjects lacks palmaris longus muscle on their right forearms, while 25% also lacks it on their left forearms. This suggests that absence of palmaris longus muscle is equally encountered against the account of Schaeffer and Reimann *et al.*, who reported that it is more absent on the left forearm than the right forearm. Also in this study, 6% (37) shows double tendons of palmaris longus muscle on both forearms. The muscle may have a proximal tendon or be reduced to a tendinous strand. It may be digastric or reduplicated. It may also end in antebrachial fascia, tendon of flexor carpi ulnaris muscle, pisiform, scaphoid, etc. (Williams *et al.*, 1995 and Oommen).

Highest incidence of absence was recorded among people of South-West zone. The reason for the highest incidence among the people of South-West zone is not known. It appears that the gene responsible for the

development of palmaris longus muscle is less dominant among this zone. palmaris longus muscle is completely developed at birth (Vastamäki).

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**RESUMEN:** Mucho se ha informado acerca de la variación del músculo palmar largo en revistas y libros de texto convencionales. La incidencia de ausencia del músculo palmar largo entre las personas de los seis zonas geo-políticas de Nigeria se evaluó usando 600 sujetos. 31,25% (187 sujetos) no tenían músculo palmar largo en cualquiera de los antebrazos, 12,5% (75 sujetos) mostró ausencia unilateral y 18,75% (112 sujetos) mostró ausencia bilateral. 25% (150) de los sujetos carece de músculo palmar largo en su antebrazo derecho, mientras que el 25% carece de él también en su antebrazo izquierdo. 6% (37) muestra dobles tendones de músculo palmar largo en ambos antebrazos. Mayor incidencia de ausencia se registró entre las personas de la zona Sur-Oeste.

**PALABRAS CLAVE:** Palmar largo; Tendón, Músculos flexores, antebrazo.

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