THE PREVALENCE OF ABSENCE OF PALMARIS LONGUS - A POPULATIONAL STUDY

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Running Title – The Prevalance of Absence of Palmaris Longus - A Populational Study

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ABSTRACT:

BACKGROUND: Palmaris longus is a small vestigial forearm muscle that is phylogenetically degenerating and is variable in nature. It is used by surgeons as a source of tendon graft. Ethnic variations in the prevalence of the absence of the palmaris longus are well known.

MATERIALS AND METHOD: The presence of palmaris longus was clinically determined in 100 subjects using the standard technique (Schaeffer's test) and the absence of the palmaris longus was confirmed using three other tests (Thompson, Pushpakumar's "two-finger sign" and Mishra II tests) to determine its absence.

RESULT: Out of the 100 subjects examined the overall agenesis of palmaris longus was 15%. Unilateral (left) agenesis was seen in 4 subjects, unilateral (right) agenesis was seen in 2 subjects and bilateral in 9 subjects. The overall presence of palmaris longus was seen in 85 subjects.

CONCLUSION: Palmaris longus has received a growing interest for its role in constructive surgery as it serves as a source of tendon graft and is a key interest for maxillofacial surgeons and ENT surgeons.

Keywords: Palmaris longus, Graft, Prevalence.

INTRODUCTION:

Palmaris longus is a small vestigial forearm muscle that is phylogenetically degenerating. This muscle is one of the most variable muscles in the body which tenses the palmar fascia and flexes the wrist, the role of this muscle is to help with wrist flexion. The palmaris longus is seen as a small tendon between the flexor carpi radialis and the flexor carpi ulnaris. It arises from the medial epicondyle of the humerus by the common flexor tendon, from the intermuscular septum between it and the adjacent muscles, and from the antebrachial fascia. Ethnic variation shows the prevalence or absence of this muscle. The absence of this muscle does not have an effect on grip strength [1]. The tendon, if present, will be visible in the midline of the anterior wrist. Individuals may have bilateral or unilateral absence of palmaris longus, although its role in the upper forearm is considered insignificant, it plays a major role in the surgical field as it is used in reconstructive plastic surgery mainly in the setting of tendon grafting, and also has been used for a wide variety of procedures including lip augmentation, ptosis correction and in the management of facial paralysis [2] [3]. Karimi-Jashni et al. reported the prevalence of absence of the palmaris longus muscle (30.7%) in the south of Iran [4]. The palmaris longus can be absent in 11% of bodies and bilateral absence is more common than unilateral absence, further this muscle is more commonly seen in females that too on the left side [5]. A clinical study has even attempted to determine the relationship between the functional absence of the flexor digitorum superficialis (FDS) to the little finger and the absence of the palmaris longus [6]. The muscle can be palpated by touching the pads of the fifth finger and thumb while flexing the wrist when placed over a flat surface. Other studies showed the prevalence of palmaris longus muscle agenesis in Tehran (the capital of Iran) was reported as 22.8% in medical students [7]. The aim of this study was to determine the incidence of unilateral and bilateral absence of palmaris longus.

MATERIALS AND METHOD:

This prospective study was conducted on 100 individuals (1st year BDS) from Saveetha Dental College, Chennai, India. The subjects were evaluated with four tests to detect the presence of palmaris longus. To be considered as an absence

of palmaris longus the subject should not show a positive result in all the four tests. If the subject had a positive result for even one test then the subject is considered to have a palmaris longus. For examining the palmaris longus muscle tendon, standard clinical methods were used. The exercise was conducted with four different methods of assessment; standard test (Schaeffer's test), Thompson's test, Mishra's test II and Pushpakumar's "two-finger sign" method [8]. In Schaeffer's test, volunteers were made to steady their forearm at 90° before opposing the thumb to the little finger with the wrist partially flexed [9]. In Thompson's test the subject were asked to make a fist, then flex the wrist and finally the thumb is opposed and flexed over the fingers [10]. In Mishra's test II the subject is asked to abduct the thumb against resistance with the wrist in slight palmar flexion [11] and 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 [12]. The absence of palmaris was indicated by using Thompson, Pushpakumar's "two-finger sign" and Mishra II tests. Participants with obvious hand and wrist deformities, previous hand and wrist injuries and previous surgery to the hand and/or wrist were excluded for this study. Data were collected and tabulated using Microsoft excel sheet.

RESULT:

We examined 100 subjects of which all were students. There were 25 males and 75 females. The overall agenesis of palmaris longus was 15%. Unilateral (left) agenesis was seen in 4 subjects, unilateral (right) agenesis was seen in 2 subjects and bilateral agenesis in 9 subjects.

The overall prevalence of palmaris longus agenesis is shown in table 1:

ABSENCE	MALE	FEMALE	TOTAL
Left agenesis	2	2	4
Right agenesis	1	1	2
Bilateral agenesis	3	6	9
Total absence	6	9	15
Total presence	19	66	85

The overall presence of palmaris longus was 85%.

ISCUSSION:

The palmaris longus is a variable muscle which belongs to retrogressive muscle in the human body. This muscle is also compared equivalent to the plantaris muscle in the lower limbs. The muscle is absent in about 14 percent of the population; however, this number varies greatly in African, Asian, and Native American populations [13]. Despite the fact this muscle exists in humans its role in hand functioning is decreased and is used in most cases of limb surgery as a graft. When a tendon becomes ruptured in the wrist, the palmaris longus tendon may be removed from the flexor retinaculum and grafted to take the place of the ruptured tendon. The tendons most commonly replaced or supplemented by the palmaris longus tendon when ruptured are the long flexors of the fingers and the flexor pollicis longus tendon [14]. The palmaris longus muscle provides no substantial flexing force that would inhibit movement in the wrist if its tendon were cut and moved elsewhere as it is a weak flexor. In this study the overall absence of palmaris longus was 15%. The right agenesis was in 2 subjects, left agenesis was in 4 subjects, and the bilateral agenesis was in 9 subjects. The overall presence of palmaris longus was 85%. Various studies done in African populations have shown a lower rate of absence ranging from 6.7% in the Yoruba to 1.5% in Zimbabwe [15]. Most researchers reported occurrence of palmaris longus absence in women more than in men and in the left side more than in the right side [16]. There is vast difference in the prevalence of Palmaris longus agenesis in different population of world. Its absence has been reported in, 4.5% of the Chinese population, 37.5% of the Serbian population, 25% of in various Caucasian and 28% of Indian population [17]. This indicates that there is a strong variation in occurrence of palmaris longus due to racial variation. The median nerve is more vulnerable to injury when there is an absence of Palmaris longus and it is important for surgeons in every region to know about the local incidence of agenesis before planning for utilization of this tendon for grafting or other reconstructive purposes.

CONCLUSION:

Palmaris longus is often regarded as phylogenetically degenerating tendon but a variable one. From our study the incidence of unilateral agenesis (right) was seen in 2 subjects, unilateral agenesis (left) in 4 subjects and bilateral agenesis was seen in 9 subjects. Palmaris longus has received a growing interest for its role in constructive surgery and is a key interest for maxillofacial surgeons and ENT surgeons.

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