

A POSSIBLE PHYLOGENETIC DEGENERATION OF THE PALMARIS LONGUS MUSCLE

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Introduction

Variations in the human muscular system are common and may vary with the side of the body or sex of the subject. The palmaris longus muscle (PL) is subject to such variability¹. PL is frequently found to be missing without any adverse effects. This makes the PL appear to be phylogenetically degenerative²⁻⁵.

McMinn² stated: "it is supposed that the PL muscle once existed as a flexor of the proximal phalanges, with its tendons lying in the palm superficial to those of flexor digitorum superficialis, and splitting around them to be attached to the proximal phalanges." Standing use the phrase "phylogenetic degenerative metacarpophalangeal joint flexor"

The PL is always present in Orangutans and, occasionally, absent in vertebrates who do not use their forelimbs in ambulation⁶. Sebastin and co-workers³ suggests that the function of these muscles have been taken over by the other flexors in the limbs, while Mobbs and Chandran⁴ contend that the distal tendon of the PL is replaced by the palmar aponeurosis.

Thompson¹ stated that the variations of PL are hereditary and the absence of this muscle is a dominant trait. In the literature it is recorded that PL is absent in 4-30%^{2,5,7} of the population. This has yet to be determined on a South African population.

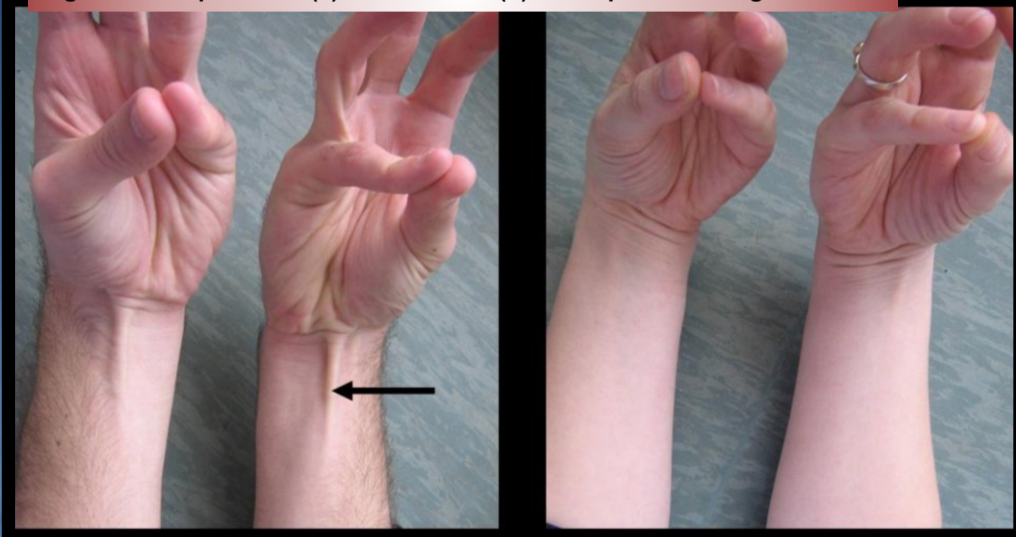
Aim

1. To determine the prevalence of the PL muscle in a South African population
2. To determine whether there exists a phylogenetic degenerative trend for the PL

Materials and Methods

706 participants were randomly selected for this study. The participants were divided into five age groups (1 = 1-19 years; 2 = 20-39 years; 3 = 40-59 years; 4 = 60-79 years; 5 = 80-99 years). Informed consent was obtained from the participants older than 18-years-old, or the parent(s)/ guardian(s) permission for younger individuals. The age, sex, absence and/or presence of the PL muscle on one or on both sides were recorded (See Figure 1).

Figure 1. The presence (a) and absence (b) of the palmaris longus muscle



The data obtained from the five groups were statistically analyzed by means of Chi-squared tests. The null-hypothesis states that a possible phylogenetic trend can be established in this sample. The prevalence of the muscle was also compared between the five groups.

References

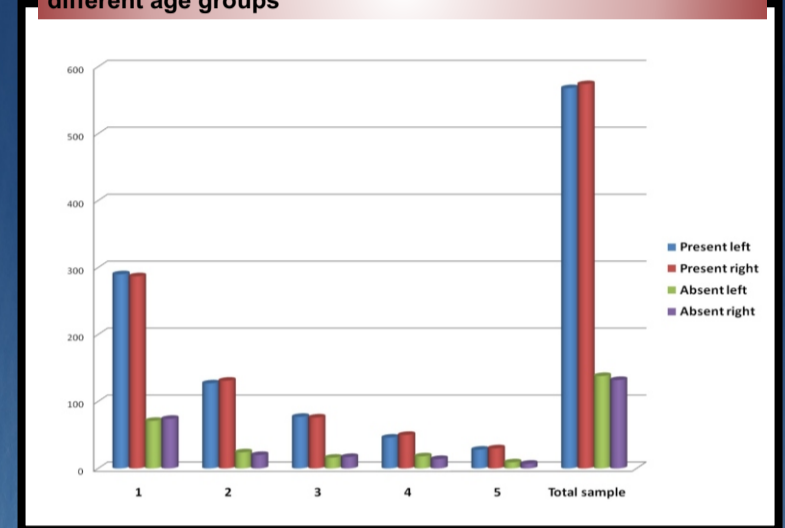
1. Thompson JW, McBatts J, Danforth CH. Hereditary and racial variation in the musculus palmaris longus. American Journal of Physical Anthropology. 1921;4: 205-20.
2. McMinn RHM, editor. Last's Anatomy. Regional and applied. 9th edition. London: Churchill Livingstone. 1994
3. Sebastin SJ, Lim AYT, Bee WH, Wong TCM, Methil BC. Does the absence of the palmaris longus affect grip and pinch strength? Journal of Hand Surgery. 2005; 30B (4): 406-408.
4. Mobbs RJ, Chandran KN. Variation of palmaris longus tendon. Aust. N.Z. J. Surg. 200;70:538
5. Standing S, editor. Gray's Anatomy. The anatomical basis of clinical practice. 39th edition. Philadelphia: Elsevier Churchill Livingstone. 2005.
6. Reimann AF, Daseler EH, Anson BJ, Beaton LE. The palmaris longus muscle and tendon; a study of 1600 extremities. Anat. Rec 1944; 89:495-505.
7. Lam DSC, NG JSK, Cheng GPM, Li RTH. Autogenous palmaris longus tendon as frontalis suspension material for ptosis correction in children. American Journal of Ophthalmology. 1998; 126(1):109-115.

Results

Table 1. Prevalence of the palmaris longus muscle for the total sample

	n	%
Present bilateral	519	73.51
Absent bilateral	84	11.9
Absent Left	54	7.65
Absent right	49	6.94
Total	706	

Graph 1. Prevalence of the palmaris longus muscle for the five different age groups



The Chi-square tests returned a p-value=0.27 for the left arm and p-value=0.39 for the right arm. The null-hypothesis can therefore be rejected and no trend could be established for the phylogenetic degeneration of the PL muscle in this study.

Discussion and Conclusion

McMinn² defines a phylogenetic degenerative muscle as one with a short belly and long tendon, while Sebastin and co-workers³ maintained that the function of the specific muscle is taken over by other muscles. McMinn² contends that by assessing these characteristics, the PL muscle fits the description of a phylogenetic degenerative muscle where its distal tendon is replaced by the palmar aponeurosis.

Sebastin and co-workers³ suggested that the absence of PL in a population may indicate a gradual phylogenetic degeneration of this muscle. This theory was tested in the present study. Although a bilateral absence of the muscle was found in 11.9% of the sample, which shows a higher incidence compared to previous studies, the results obtained do not support a degenerative trend of the PL muscle in a South African population.

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