ORIGINAL RESEARCH PAPER

Volume-8 | Issue-7 | July - 2019 | PRINT ISSN No. 2277 - 8179

INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

STUDY OF VARIATIONS OF PALMARIS LONGUS IN THE DISSECTED UPPER LIMBS DURING ANATOMY DISSECTION

Anatomy

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ABSTRACT

The palmaris longus is considered a phylogenetic degenerate metacarpophalangeal joint flexor muscle in humans, a small vestigial forearm muscle; it is the most variable muscle in humans, showing variation in position, duplication, slips and could be reverted.

The palmaris longus (PL) is one of the most variable muscle reported up to 90% of humans. The characteristic of this muscle is shown by its short belly and long tendon. The belly soon gives way to a long slender tendon of variable length that inserts adherent across the front of the flexor retinaculum to the palmar aponeurosis

Palmaris longus muscle is one of the superficial muscles of flexor compartment of forearm. Its main function is to anchor the skin and fascia of the hand. It is a weak flexor of the hand at wrist and tenses the palmar aponeurosis. It is one of the most variable muscles and is phylogenetically classified as a retrogressive muscle.

The agenesis of Palmaris longus ranges from 0% to 63% with an overall 16% unilateral and 9% bilateral. It is very useful in orthopedics, cosmetic, plastic and reconstructive surgery.

KEYWORDS

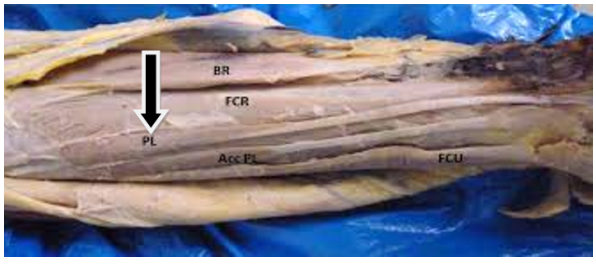
INTRODUCTION

Palmaris longus is often described as one of the most random muscles in the human body . Its absence appears to be hereditary but the genetic transmission is not clear. Its absence can easily be determined clinically; it is easy to harvest and it has a long and flat tendon allowing good revascularization. For these reasons, it is commonly used as a tendon graft by plastic and hand surgeons

The Palmaris Longus (PL) is one of the most variable muscle. It is classified phylogenetically as a retrogressive muscle . 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 that inserts adherent across the front of the flexor retinaculum to the palmar aponeurosis . It lies between flexor carpi radialis laterally and flexor carpi ulnaris medially. Median nerve, at the level of wrist lies between its tendon and flexor carpi radialis. The long slender tendon passes anterior to the flexor retinaculum. It is attached to the distal half of retinaculum and predominantly to the palmar aponeurosis. PL, a weak flexor of the wrist is considered functionally negligible.. Furthermore, PL tendon in various combinations is used to repair oncogenic defects of head and neck, arthritis of the thumb and ptosis in children.

MATERIAL AND METHODS :

During a routine gross anatomy dissection of upper limb (arm) 20 cadavers were observed at the Apollo Institute of Medical Science and Research, Hyderabad. Absence of palmaris longus was checked . The incision was on the midline of the arm , the skin and fascia were cleared and the muscles were dissected .



Observation

The overall prevalence of absence was 16% (16 subjects) .In males, PL was found to be absent unilaterally in 7 subjects (11.7%); the distribution on the right and left were 4 (6.7%) and 3 (5%) respectively. Bilaterally , this muscle was absent in 3 subjects (5%).The overall prevalence of absence in males was 10 (16.7%). In females, PL was absent unilaterally in 5 subjects (12.5%); the distributions on the right and left were 3 (7.5%) and 2 (5%) respectively. Bilaterally, it was 1 (2.5%). The overall prevalence of absence for females was 15% (6) . The unilateral prevalence of absence between the males and females showed no significant difference . However, bilateral prevalence of absence in males was comparatively higher than in females.

Palmaris longus is absent

DISCUSSION

PL muscle is very useful for its role in orthopedic and plastic surgeries. Therefore, all possible variations in the important muscle should be well known. Its presence in 70-85% population and its superficial location makes it the most common donor material for tendon and joint reconstructive surgeries.[16] PL is completely developed at birth while fascia lata, which is also used for reconstructive surgeries, is not so well developed at that age.[17] All these factors facilitate harvesting of PL as the donor material in all age groups.

The presence of an anomalous superficial palmar arch (SPA) was more frequently observed when the PL tendon was absent; therefore, the absence of PL might be a predictor of the pattern of the SPA. O' Sullivan et al. demonstrated that if the PL tendon was absent, then in 47% of the hands it was associated with an abnormal SPA.[17] Another association is that if a patient has a PL tendon, then there is a high chance of Dupuytren's disease developing in that hand.[7]

The overall prevalence of weak FDS in the little finger irrespective of the presence or absence of PL in our study was 16.10%. This is comparable to other studies in Caucasian populations, which report a rate of absence of around 15-21%. [10],[11],[12],[19] If we compare the deficiency of the FDS in the little finger with absent PL, the overall incidence is 4.15%, and it is statistically significant, while the sexwise distribution of weak FDS with absent PL was statistically significant in males and in females it was statistically insignificant.

It has been postulated that an absence of the plantaris may be associated with the agenesis of the PL tendon. However, most of the studies failed to demonstrate any association between the presence (or absence) of the PL tendon and the plantaris.[18]-[20]

One advantage of the PL tendon is that it protects the median nerve which passes deep into it. In the absence of the PL tendon, the most superficial structure in the wrist is median nerve, which is at risk of injury during trauma and surgical incisions.[21]

The assessment of the presence of the PL tendon was based on a clinical method that is not entirely reliable, and a weakly developed or an anomalous tendon can be taken as absent. Magnetic resonance imaging (MRI) would be a sure way of detecting even an anomalous tendon, but the performance of MRI in such a large number of patients would not be feasible and cost effective. Hence, clinical examination remains the only feasible way of documenting the presence or absence of this tendon in such a large number of subjects. MRI may demonstrate a midline mass superficial to the flexor retinaculum at the wrist, but the diagnosis may require more proximal imaging of the forearm.[22]

Variations of the PL tendon are not uncommon. However, different rates are given for the types and agenesis of PL. In one study, the incidence of agenesis was 12.8% and other anomalies were 9%. Variations in form constituted 50% of these anomalies. The muscle belly may be central, distal, or digastric or it may be completely muscular. Variations also include a unilateral absence of the PL tendon as well. Other variants include an anomalous insertion deep into the retinaculum and distal belly of the PL muscle causing apparent compression of the median nerve producing a carpal tunnel-like syndrome; the accessory PL muscle that appeared to compress the ulnar nerve during repeated contractions and hypertrophy of the PL muscle seen as a pseudo mass of the forearm.[23]th

CONCLUSION:

The prevalence of the unilateral absence of the PL in an Indian population is comparable to the western population but bilateral absence is significantly less. Weak FDS with absent PL was statistically significant in males, while in females it was insignificant. There is also no relationship between the absence of the PL and gender, and whether the absence is unilateral or bilateral. The association between the absence of the PL and other anatomical structures like plantaris and the superficial palmar arch anomalies needs further multicentric studies

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