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Agnesis of palmaris longus muscle in representatives of Hungarian population of Slovakia

The palmaris longus is one of most variable muscles in the human body its agnesis is considered the most frequent anatomic variation of the muscle. Agnesis shows strong racial and ethnic variability. The aim of this study was to compare the prevalence of agnesis of palmaris longus muscle in the right- and lefthanders in a sample of the Hungarian population of Slovakia. 345 subjects of Hungarian ethnic origin were studied. All of them were students of J. Selye University. The palmaris longus muscle was absent in 104 subjects (30.1% of all examined subjects). Unilateral agnesis was found in 13.3% (8.1% on the right hand, 5.2% on the left hand). Bilateral agnesis was found in 17.4% of examined subjects.

Keywords: *palmaris longus muscle, agnesis, muscle absence, Komarno, Hungarian population.*

Introduction. Students of Selye Janos University are of Hungarian ethnic origin, coming from different parts of Slovakia. The aim of the study was to estimate the prevalence of agnesis of palmaris longus muscle (hereinafter PLM) in this young population. In addition, the associations between PLM agnesis, gender, left or right side, and hand dominance were evaluated.

The PLM is considered to be a phylogenetically degenerate muscle, its function no longer necessary for the proper operation of the human hand. Probably this is one of the main reasons of its great variability and frequent absence because even without it the human palm can function perfectly. According to studies done to date, the incidence of PLM agnesis is gradually increasing. It is suggested that because this muscle is phylogenetically regressive, the PLM will gradually lose its function totally [Ceyhan and Mavt, 1997]. The PLM is currently one of the most variable muscles in the human body, and its agnesis is the most frequent anatomical variation [Gray and Goss, 1973]. The rate of PLM agnesis varies greatly in different populations. Differences in prevalence of PLM absence in different populations can be observed in the literature dealing with this topic. It is generally accepted that there is a relation between ethnicity and the frequency of PLM agnesis [Reimann et al. 1944].

The prevalence of agnesis of Palmaris longus muscle among ethnic Hungarians has been studied in Transcarpathia, Ukraine [Боркач (Barkáts), 2012], but, to date, this has not been studied in similar subjects from Slovakia.

Material and method. 345 ethnic Hungarian students (165 males and 180 females) of the J. Selye University, Komarno, Slovakia, were studied.

The following five tests to confirm or refute the presence of a PLM were done:

1. Thompson's: the subject is asked to make a fist, then flex the wrist and finally the thumb is opposed and flexed over the fingers [Thompson et al. 1921],
2. Shaffer's: he subject is asked to oppose the thumb to the little finger and then flex the wrist [Schaeffer, 1909],
3. Pushpakumar's: 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 [Pushpakumar et al. 2004],
4. Mishra's 1: metacarpo-phalangeal joints of all fingers are passively hyperextended by the examiner and the subject is asked to actively flex the wrist [Mishra, 2001],
5. Mishra's 2: The subject is asked to abduct the thumb against resistance with the wrist in slight palmar flexion [Mishra, 2001].

For increased accuracy, palpation was performed in every case. This was necessary because of factors (most frequently obesity) which made it impossible to visualize the PML during all the tests, even though it was present. Many cases were observed where the PLM was absent, but tendons of Flexor carpi radialis or of Flexor digitorum superficialis were displayed in a way that could easily be confused with the tendon of PLM were it not for palpation.

The PLM was considered to be present in the cases where it could be visualized or palpated in at least one of the five tests, and it was considered absent when it could not be palpated or visualized in any of the tests.

Results. PLM was absent in 104 subjects (30.1% of all examined subjects).

PLM was absent unilaterally in 46 subjects (13.3% of the entire group).

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In 28 cases (8.1% of all examined subjects) it was absent in the right hand. This subgroup was made up of 17 women (4.9% of the entire group, 9.4% of all women), and 11 men (3.2% of the entire group, 6.7% of all men).

In 18 cases (5.2% of all examined subjects) the PML was absent in the left hand. This subgroup comprised 11 women (3.2% of all subjects, 6.1% of all women) and 7 men (2.0% of all subjects, 4.2% of all men).

Bilateral absence was found in 60 subjects (17.4% of all subjects). This subgroup was made up of 33 women (9.5% of all subjects, 18.3% of all women) and 27 men (7.8% of all subjects, 16.3% of all men).

(Fig. 1.)

From 345 examined subjects 333 were right-handed (161 males, and 172 females).

In right-handers:

PLM was absent in 97 subjects (29.1%).

PLM was absent unilaterally in 39 subjects (11.7% of the entire group).

In 23 (6.9% of all examined subjects) it was absent in the right hand. This subgroup was made up of 14 women (4.2% of the entire group, 8.1% of all women), and 9 men (2.9% of the entire group, 5.5% of all men).

In 16 subjects (4.8% of all subjects) the PML was absent in the left hand. This subgroup comprised 9 women (2.7% of all subjects, 5.2% of all women) and 7 men (2.1% of all subjects, 4.3% of all men).

Bilateral absence was found in 58 subjects (17.4% of all subjects). This subgroup was made up of 31 women (9.3% of all subjects, 18.0% of all women) and 27 men (8.1% of all subjects, 16.7% of all men).

Of the 345 examined subjects, 12 were left-handed (4 males, and 8 females).

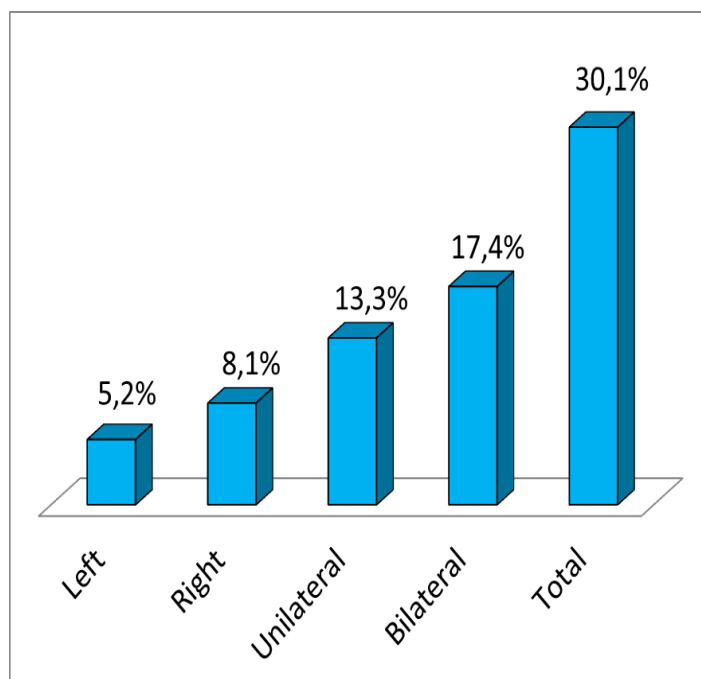


Fig. 1. Distribution of palmaris longus muscle agenesis in examined sample

In left-handers:

In these 12 left-handers, PLM agenesis was observed in 7 (58.3% of all the left-handers, 1 male and 6 females). Of the 7 left-handers with PLM agenesis, 4 had unilateral agenesis on their right hand – 1 male and 3 females. Agenesis on the right hand thus occurred in 33.3% of left-handers.

Bilateral PML agenesis occurred in 2 cases both females, (16.6% of all left-handers) (Fig. 3), and only 1 of all examined left-handed subjects had agenesis of the left hand alone, also a female subject (8.3% of all examined left-handed persons).

Discussion

The distribution of agenesis rate in the sample according to the uni- or bilateral absence, and agenesis on left or right hand among the Hungarian students of Selye János University shows that the bilateral agenesis is higher than the agenesis on the right and left hand together. 57.7% of all agenesis cases is bilateral and only 42.3% is unilateral. It is unusual for bilateral agenesis to be higher than the unilateral in Caucasian populations, but similar proportion can be observed in Hungarian population in Transcarpathia, Ukraine [Боркач, 2012a; Боркач, 2012b], and also in Turkey [Ceyhan and Mavt, 1997; Kose et al. 2009; Hiz et al.

2011]. This may suggest genetic relationship between Turkish and Hungarian ethnic groups, and might be a morphological proof of common origin of Turkish and Hungarian ethnic groups. The similarity in agenesis proportion is most visible if we compare the results of given study with the results of Kose et al. 2009. (Fig. 2.)

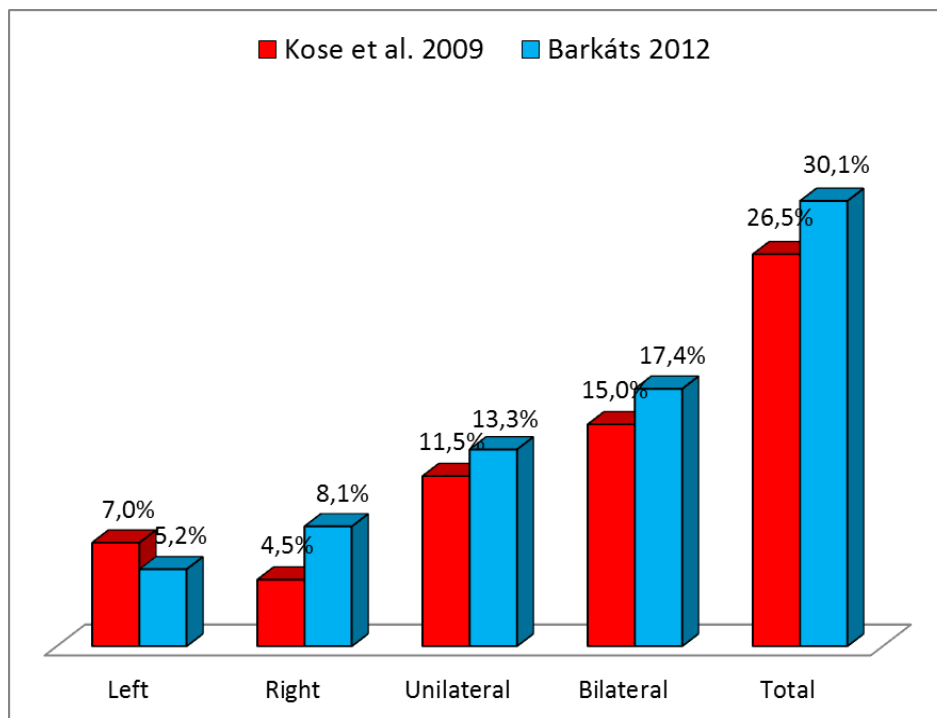


Fig. 2. Comparison of results by Kose et al. 2009 and Barkáts 2012.

Most of surgeons agree that the Palmaris longus tendon is the first choice as a donor tendon during many reconstructive and plastic surgery procedures [Thompson et al. 2001; Troha et al. 1990]. This research has shown that 30.1% of our subjects have an absent PLM in one or both hands, as the bilateral agenesis rate is higher than the unilateral; it is more likely to encounter a patient with agenesis on both hands. The same tendency can be seen in the Hungarian population of Transcarpathia, Ukraine [Боркач, 2012a; Боркач, 2012b]. This means that surgeons wishing to use the PML tendon for treating patients of Hungarian ethnic origin, that need tendon grafts for injury repair or during reconstructive or plastic surgery should be prepared to use an alternative method in patients who have no PML. It also may cause complications in some cases of median nerve blocks (regional anesthesia of the median nerve).

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