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Sexual dimorphism dermatoglyphic parameters of fingers in population of Hutsul and Boiko Ethnic groups

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Abstract
The paper presents the results of research in finger dermatoglyphics on hands of male and female belonging to Hutsul ethnic group living in the Ivano-Frankivsk region. Based on the research there were established criteria factors differentiating these groups (frequency and characteristics of the distribution patterns on different fingers of one person). In result of the study were established criteria for dermatoglyphic sexual differentiation status of persons belonging to Hutsul ethnic group: in females was observed high frequency of pattern type Lr on the fingers of both hands, high indixes Poll, Heypely and Furuhata; in males was observed high frequency of pattern type W, LW on the fingers of both hands, high indixes total credit to the comb fingers of both hands, inability to determine the index Furuhata, high frequency heterolateral symmetry at one person with primary repeat of pattern type W, LW and Lu.

Keywords: Forensic medicine, dermatoglyphics, identification of person, sex

1. Introduction
Problem of person identification is one of the topical issues of forensic medicine. Most scientific work in this area is devoted to improving traditional methods based on comparing objects of identification with the material, reflecting similar features of person's identification [1, 2, 3]. One of such methods is fingerprinting, which has experienced a revival for the recent years. Dermatoglyphics in the practice of forensic medical expertise has an important significance in the identification of unknown persons, including cases that study mass casualties, and to address issues of consanguinity [1, 5]. For recent years several authors performed work, which demonstrated that the formation of dermatoglyphic pattern natives to a region is affected by geographic, climatic and other environmental factors [6, 7, 8]. In forensic medicine and genetics during recent years dermatoglyphic markers are widely used for diagnostics of human phenotypic traits (ethno-racial background [9, 10, 11, 12, 13, 14, 15], sex [9, 10, 11], and anthropometric antroposkopic parameters [1, 4]) and of consanguinity [1, 5].
Hajn V., Gsiorowski A. [12] conducted a long-term study of fingerprints and palms of 400 people (200 men and 200 women) from Olomouc (North Moravia, Czech Republic) and 200 people (100 men and 100 women) from Lublin (Poland). It was established that the dermatoglyphic aspect of ethnic differences between the two groups is minimal. In particular, the patterns found papillary lines on the fingers and palms indicate the proximity of the two ethnic groups studied. V.P. Myshahyn [9], studying finger's dermatoglyphics of inhabitants of Tobolsk region (Russia), found that in Tobolsk Tatars there is a set of indicators comb skin of hands, which is the standard of dermatoglyphics constitution of the indigenous population of the Tobolsk region, that is Russian Tobolsk indigenous population of the region in dermatoglyphics constitution is similar to Tobolsk Tatars, born in Tobolsk region in the first generation are dermatoglyphics indicators that bring them closer to the original inhabitants - the Tatars and Russians. Relief of comb skin on hands of newcomer Russian population that has not undergone a period of adaptation, on a number of parameters is significantly different from the indigenous population of Tobolsk region, but not different from that of dermatoglyphics summary (control) group of Russians. In the "Tobolsk continent" it is observed phenomenon effect of selective accumulation of individuals with dermatoglyphics constitution, approaching the indigenous population living in the area for many generations - Tobolsk Tatars. I.G. Shyrobokov [10], studying the anthropological composition and the origin of Karel according to dermatoglyphics, found that in the Karelian groups, on the one hand, typical caucasian proportion of radial frequency patterns was observed on the radial and

ulnarnogo of the hand and on the other hand,the overall incidence of radially oriented patterns at them is extremely low (in the range of values found in Negroid groups). Thus, S.A. Antonjuk [8], exploring dermatoglyphics soles and toes of Belarusian men and women, found that the first toe, regardless of gender, largely dominated by the loop. In women, their frequency are above on the right foot over left foot from that of men. The frequency of cranial patterns prevail on the first finger of the left foot to right foot when comparing men to women. Comb account was observed more in men than in women, especially on the right foot. According A.L. Bevza [7], among the inhabitants of the south of the Tyumen Oblast (Russia) in men compared with women, were found "complication" skin patterns, which was reflected as increase in number of delta patterns on fingers and in men nondelta - in women, increasing the number of additional three radii ; complications patterns are found more in right foot than the left compared to the male and female groups, manifested in increasing the number of men is the delta patterns on the toe of his right foot and nondelta on the left in women - to increase the nondelta patterns on his left foot, increasing the comb on account sole of the right foot.

Thus, the lack of data on regional standards of population of Hutsul ethnic groups' constitution and the possibility of their use in forensic medicine for identification studies determine the relevance of this work.

The aim of our research is to study complex traits of comb fingers picture of females Hutsul ethnic group for further use of the data in the practice of forensic medical expertise in the identification of an unknown person.

2. Material and methods.

As research materials (obtained by cross-sectional non-randomized study) served dermatoglyphic finger's parameters of male persons (120) and women (86), aged 19-55 years residing in Ivano-Frankivsk region. The criteria for inclusion in the study was voluntary consent of the patient; lack of dermatological and genetic diseases, aged 18 years or older. Exclusion criteria from the study was refusal at any stage, the presence of dermatological and genetic diseases, age persons under 18 years of age. Dermatoglyphic examination procedure meets the requirements of the Helsinki Declaration (1975.). Prints comb fingers figure were obtained by scanning them with scanner Futronic's FS80 USB2.0 Fingerprint Scanner using the program ftrScanApiEx.exe. followed by the transfer of data to a personal computer. Processing of the data was performed by the standard method [4] when in macro mode were studied qualitative and quantitative dermatoglyphic fingers. Isolated main types of patterns: arc (A), radial loop (Lr) and ulnarnogo (Lu), curl (W) and complex patterns (LW). Due to the low frequency of complex patterns in the statistical analysis were attached to the cranial. Defined as indixes Poll (A / L), Heypel (number of curls on I-III fingers / 0.5 curls on-IV in fingers) and Furuhaty (W / Lx100). The study used the classification of papillary drawings of proximal and middle phalanges of the fingers, which was developed by L. Shpak [6, p. 25]. According to this classification papillary drawings of distal and proximal phalanges of the fingers are divided into: 1) Direct (S); 2) Whis a slope (L); 3) distal Sickles (Hd); 4) Sickles proximal (Hp); 5) Arc distal (Ad); 6) Doug proximal (Ar); 7) The distal arch/with a slope (L / Ad); 8) The proximal arch/slope of (Ap / L); 9) The double curve (Da); 10) Double Arc/whith a slope (Da / L); 11) Wave (V); 12) of the event Aug (Dh); 13. sickle curve (Ah); 14) Peropodibnyy (F); 15) Closed (Cl); 16) The distal angle (Nd); 17) Proximal angle (Np); 18) Double angle (Dn); 20) The distal arch / angle (Nd/Ad); 21) proximal arch/angle (Ap/Np); 22) Random (AC). These patterns can be ulnar and radial. Mathematical processing research was conducted by one- and multidimensional statistical analysis [7].

3. Results and discussion.

The survey examined the sex dermatoglyphic characteristics of the population Hutsul ethnic group living in the Ivano-Frankivsk region (Tables 1, 2).

Table 1: Frequency distribution (%) of patterns on the fingers of males belonging to Hutsul ethnic group

Type of pattern	I		II		III		IV		V	
	LH	RH	LH	RH	LH	RH	LH	RH	LH	RH
Lr	-	-	20	20	-	-	-	-	-	-
Lu	20	60	-	-	20	20	40	40	60	60
A	-	-	20	20	20	20	-	-	-	-
W,LW	80	40	60	60	60	60	60	60	40	40

Table 2: Frequency distribution (%) of patterns on the fingers of females belonging to Hutsul ethnic group

Type of pattern	I		II		III		IV		V	
	LH	RH	LH	RH	LH	RH	LH	RH	LH	RH
Lr	22	11,5	34	22	22	11,5	22	6	22	22
Lu	33	55	22	34	44	55	66	22	33	33
A	22	11,5	10	10	17	11,5	6	6	12	22
W,LW	33	22	34	34	17	22	6	66	33	33

Among the quality indicators for finger dermatoglyphics importance is usually provided in frequency patterns of the fingers. It was established that highly statistically significant ($p < 0.001$) in sample of women belonging to Hutsul ethno-territorial groups differ in terms of total frequency in Lr on the fingers of both hands - under 2% and 18.5%, and also the total Comb account. Statistically significant ($p < 0.05$) for men and women differ in sampling frequency values W, LW - 42% and 30%. Regarding the distribution of patterns on different fingers of one person it can be noted that at men on I-V fingers of both hands more often (60%) were observed W, LW, and A and Lr were observed in 20% of cases; In addition, patterns of A and Lr were not observed at the I, IV and V fingers of both hands, Lu - on the II fingers of both hands, Lr - on the third fingers of both hands. Hetero-lateral symmetry in one of the following combinations was observed in each subject, in a repeated pattern type W, LW was determined in 60% of cases at I-III fingers, type A - for the second fingers in 20% of cases, such

as in Lu IV-V fingers in 40% of cases.

Women at the first, third fingers of the right hand and the fourth finger of the left hand is dominated by Lu (55% and 66%); patterns of type W, LW in 66% of cases occur on the fourth finger of the right hand. Most rarely were found patterns of A in the fourth fingers of both hands (6%), and Lr on the fourth finger of the right hand. In one female person on the fingers of both hands were observed mainly two or three types of patterns in various combinations. However hetero-lateral symmetry defined patterns repeated type Lr on all the fingers of one person in 11% of cases, such as W, LW on I, II, V fingers in combination with Lu on the fourth finger in 11% of cases, Lu on I fingers and a combination of W, LW on V fingers in 33% of cases.

The total expense ridge of both hands in men was 182,2 ± 0,4, women - 121,8 ± 0,4. Delta index in men was 14,8 ± 0,5, women - 11,2 ± 0,4. Indixes Poll and Heypel men accounted for, respectively, 16.6 and 1.5 for women - 44.4 and 1.0. In addition, women Furuhata defined index, which was 56.5.

Found that in females belonging to the ethnic group Boiko and have a growth within 155-165cm, dermatoglyphic patterns on medium and proximal phalanges occur with some frequency, namely with a slope (L) - 35%; distal arch (Ad) - 10%; Aug distal (Hd) - 25% straight (S) - 10%. The frequency of other dermatoglyphics patterns are not typical for the research group and ranges from 5-7%. Women of the second group have more even distribution of dermatoglyphic patterns, namely with a slope (L) - 27%; distal arch (Ad) - 16%; Aug distal (Hd) - 21%; direct (S) - 7%; proximal arch/whith slope (Ap/L) – 7%. The frequency of other dermatoglyphic patterns are not typical for the study group and ranges from 3-5%.

4.Conclusion

Thus, as a result of the study were established the following criteria for dermatoglyphic sexual differentiation status of persons belonging to Hutsul ethnic group:

1. In females there is high frequency of pattern type Lr on the fingers of both hands, high indixes Poll, Heypely and Furuhata.
2. In males there is high frequency of pattern type W, LW on the fingers of both hands, high indixes total credit to the comb fingers of both hands, inability to determine the index Furuhata, high frequency of heterolateral symmetry at one person with primary repeat of pattern type W, LW and Lu.
3. Thus, differences in the frequency of types L, Ad, Hd S pattern and between groups of persons belonging and not belonging to Boiko ethnic-territorial group is statistically weakly reliable; the main statistically significant difference between these groups is the lack of the patern of type Ap/L in Boyko ethnic-territorial group (and the presence of it in research group) pattern type Ap/L.

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