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Relationship of the comb pattern of fingers with phenotypic features in men belonging to various ethno-territorial groups of the carpathian region

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Abstract
The article presents the results of the study of the interactions of finger dermatogliphycal and anthropometric parameters of the population of various ethno-territorial groups of the population of the Carpathian region. As a result of the correlation analysis, we received data on that for men of different ethno-territorial groups with high level of reliability (p> 0.05) the positive and negative correlation between anthropometric and dermatogliphycal parameters of fingers was revealed. It is established that in men of Hutsul group with a high level the reliability of each other correlates the length of the body, palm length and sign LW, forehead height and sign W; men of Boyko group -nose height and A height of face, zygomatic diameter and LR, height of face, zygomatic diameter and LU, transverse diameter of the head, upper width of face and LW; in men of Lemko group between the length of the hand and A, head circumference, upper width of face and W; for control group - palm length, upper width of face and LU, head circumference, bigonial width, upper width of face and LW, high nose and LR, W.

Keywords: Dermatoglyphics, phenotype, gender, ethno-territorial belonging.

1. Introduction

Diagnosis of general phenotypic parameters of a person in various ethno-territorial groups in recent years are one of the most urgent issues of forensic anthropology [1, 2, 3].

The fundamental work in the field of ethno-dermatology is research Segeda S.P. [4], who studied the differentiation of the population of Ukraine according to dermatogliphyc and on the basis of analysis of variations of the leading features of this system, identified local dermatological variants (complexes) on the territory of Ukraine (northern, central and southern).

Features of finger patterns somatic healthy men are studying the Vinnytsia school of scholars [5, 6]. In particular, they have proved that the analysis of discriminatory models of the affiliation of practically healthy men to the northern or other administrative-territorial regions of Ukraine on the basis of peculiarities of finger and palmar dermatologic indices was constructed and analyzed. The highest level of discrimination was found among the men of the northern and southern and northern and eastern regions of Ukraine. Most often discriminant variables between men of the northern and other regions of Ukraine are the type of pattern on the fingers of the right hand and the asymmetry of the comb account of the lines a-b and c-d. The largest contribution to discrimination between northern and other administrative-territorial regions of Ukraine has the asymmetry of the comb account of the lines a-b and c-d.

Bozhchenko A.P [7]. theoretically substantiated, experimentally developed and practically confirmed the possibility of forensic identification of a person by morphological features of papillary relief of fingers by means of a comprehensive study of his group, intra-family and individual variability and their interrelations. They have been selected three groups of dermatogliphycal features: congenital immutable (type of pattern, orientation, ulnar and radial comb count, rudiments of lines, dysplasia); congenital variables (altitude-latitude index, distance "Delta-Interfail-fold ", line density); and acquired variables (horizontal, vertical and mesh white lines, traces of scarring) and proved their group variability. It is proved that sexual dimorphism is manifested uniformly in all three groups, age variability - mainly among variables, and growth variability - among the congenital ones dermatogliphycal signs. Diagnosis of signs of a person is possible on one specific feature or in a set of characteristic features of one or several finger patterns. For all groups of investigated features are characteristic local finger variation and interdigital interconnection, which determine the

possibility of solving reconstructive tasks. Complex developed methods allows in most cases to recognize correctly the hand and a finger, during dividing the body into parts -to decide on the affiliation of parts as a whole and thereby create the necessary conditions for a more effective solution following diagnostic tasks.

Suvorova N.A [8]. during comparing ethnographic and anthropological data showed that which is based on materials of anthropological research the contribution of the local (genetic) substrate in the formation of the physical characteristics of Bashkirs (appearance, morphology of the dental system, dermatogliphycal parameters) looks more weighty than according to historical and ethnographic data. Moreover, if according to the craniological study the carriers of this component are mainly women, then according to dermatoglyphics not less clearly it is traced also to men.

In particular, Mazur E.S [9].was the first in forensic medicine and in cryminalistic science who conducted a multi-faceted study of finger and palmar dermatoglyphics using the original program, which includes the estimation of the comb account in the arc, swirling and complex (atypical) finger patterns and the study of qualitative dermatogliphycal features for further analysis of them, using the method of multidimensional statistics. The author shows significant correlations and were created high-precision diagnostic models of forecast of absolute somatometric parameters of a person on the basis of nonlinear integration transformations of dermatogliphycal features.

The aim of the study. Establish the relationship between the comb drawing of the fingers and toes with phenotypic signs of person in men, belonging to various ethno-territorial groups of the Carpathian region.

2. The object and methods of research

The object of the research is the internal and external interrelations between the anthropometric and dermatoglphyical parameters obtained from 280 male males aged 18-59, who live in the Ivano-Frankivsk region and belong to the Hutsul, Boyko, and Lemko ethno-territorial groups. Specially designed questionnaires included information about gender, age, ethno-territorial affiliation, anthropometric parameters (height, length of foot and hand, length of arm and leg, body length, shoulder width, transverse and longitudinal head diameters, head circumference, height of forehead, height, upper and middle face width, zygomatic diameter, bigonial width and height of the nose). Images of finger dermatogliphs were obtained by scanning with the Futronic's FS80 USB 2.0 scanner. using the improved Fingerprint Identification Algorithm (FIA). There were three basic types of simple patterns on the pads of hands: arc (A), ulnar loop (LU) or radial (LR), curl (W) and complex curl (LW). For the statistical evaluation of the connection (correlation) of dermatological features with anthropometric we used the Piarson`s correlation analysis [10].

3. Results of research and their discussion

As a result of the processing of the input data, correlation matrices were obtained, in which the relationship between the anthropometric and dermatological parameters [11] is presented.

Analyzing the data, it can be argued that the Hutsul men with a high degree of validity (p> 0.05) correlate with each other the body length (0.34), palm length (0.44) and sign of LW in their hands, as well as the height of the forehead (0.32) and the sign W (Table 1).

Table 1: Matrix the coefficients of correlation between anthropometric and dermatogliphycal for the Hutsul ethno-territorial group

Antropological sign	Dermatogliphycs sign	The level and direction of correlation
Body length	LW	0,34
Palm length	LW	0,44
The height of the forehead	W	0,32

Interpreting the data can be said, that for men Hutsuls with an increase in the manifestation of the sign of LW with a great deal of probability we should expect an "increase" palm and body length (i.e., if a large number of these features are detected in the subject, it is assumed that the length of the palm and trunk is higher than the average). Similarly, with a large number of signs W, it is true that the height of the forehead will be greater than the average in the group.

In men of Boyko group with high reliability (p> 0,05) there is a positive correlation between the height of the nose (0,32) and the degree of manifestation of the sign A, face height (0.33), zygomatic diameter (0.39) and sign LR, as well as a negative correlation between the height of the face (-0.44), zygomatic diameter (-0.47) and LU, transverse diameter of the head (-0.35), upper width of face (-0.33) and LW (Table 2).

Table 2: Matrix the coefficients of correlation between anthropometric and dermatogliphycal for the Boyko ethno-territorial group

Antropologic sign	**Dermatogliphyc sign**	**The level and direction of correlation**
Height of the nose	A	0,32
Height of the face	LU	-0,44
Height of the face	LR	0,33
Zygomatic diameter	LU	-0,47
Zygomatic diameter	LR	0,39
Transverse diameter of the head	LR	-0,35
Upper width of face	LR	-0,33

That is, we can assume that for men of the Boyko group with the increase of the manifestation of the sign A with a large proportion of the probability one should expect an "increase" in the height of the nose, LR - face height and zygomatic diameter. Conversely, with increasing LR, the transverse diameter of the head and upper face width will decrease, LU is the height of the nose. In men of Lemko group with a high level of 0.05) there is a positive correlation between the length of the arm certainty (p> (0.33) and the degree of manifestation of the sign A, the head circumference (0.38), the upper width of face (0.39) and the sign W (Table 3).

Table 3: Matrix the coefficients of correlation between anthropometric and dermatogliphycal for the Lemko ethno-territorial group

Antopologic sign	Dermatogliphyc sign	The level and direction of correlation
Length of the arm	A	0,33
Head circumference	W	0,38
Upper width of face	W	0,37

That is, one can assume that for men of Lemko`s group, with the increase in the manifestation of the sign A, the length of the arm increases, and with increasing W - the circumference of the head and the upper width of face.

For a control group with a high level of reliability (p> 0.05) there is a positive correlation between palm length (0.41), the upper width of face (0.35) and the degree of manifestation of the sign of LU, head circumference (0.35), bigonial width (0.41) and LW, nose height (0.41) and LR. And there is also a negative correlation between the upper width of face (-0.36) and the sign of LW, as well as the height of the nose (-0.33) and the manifestation of W (Table 4).

Table 4: Matrix the coefficients of correlation between anthropometric and dermatogliphycal for the control group

Antropologic sign	Dermatogliphyc sign	The level and direction of correlation
Palm length	LU	0,41
Head circumference	LW	0,35
Upper width of face	LU	0,35
Upper width of face	LW	-0,36
Bigonial width	LW	0,41
Nose height	LR	0,41
Nose height	W	-0,33

That is, with increasing frequency of signs LU, LW, LR respectively, the average population values of palm length increase, head circumference, upper width of face, biogonial width and height of the nose and, conversely, the values of the upper width of face are reduced and the height of the nose with increasing LW and W.

Using the Shapiro-Wilc`s criterion (W) and graphical analysis researched sampling were checked for normal distribution. In parallel, the analysis was performed using the Kolmogorov-Smirnov`s criterion. For all variables, the hypothesis about the normality of distribution was not rejected with a high level of statistical certainty, and the value of the Shapiro-Wilk`s criterion fluctuated within W = 0.90-0.97.

4. Conclusions

As a result of the correlation analysis, we received data on that positive and negative correlation relations between anthropometric and dermatoglyphic parameters of fingers were revealed for the group of men of Hutsul`s, Boyko`s and Lemko`s group with high level of certainty (p> 0.05).

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