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DERMATOGLYPHIC FEATURES OF MEN'S FINGERS PRONE TO DRUG

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Abstract. The article presents data on the peculiarities of the dermatoglyphic constitution of the distal, middle and proximal phalanges of the fingers in men prone to drug crimes. The object of the study was the peculiarities of the dermatoglyphic parameters of the distal, middle and proximal phalanges of the fingers obtained from 60 men aged 18 to 59 who were convicted of drug crimes and 60 persons of the control group. During the study, it was found that radial loops (52.31%) and curls (29.23%) are most common on the fingers of the left hand, complex patterns (8.08%), arcs (6.92%) and ulnar loops are less common (3.46%), curls (44.23%) and radial loops (39.62%) and arcs (5.77%), ulnar loops (5.38%) and complex patterns are most common on the fingers of the right hand (5.00%), at the level of a statistical trend ($p<0.10$), the pattern on the right and left hands differs according to the indicator of the total frequency of radial loops on the fingers of both hands – 52.31% versus 39.62% ($\varphi = 1, 30$; $p < 0.10$) and curls W – 29.23% versus 44.23% ($\varphi = 1.59$; $p < 0.10$). A comparative analysis of the total ridge counts for the fingers of the left and right hands of drug criminals and men of the control group showed that the variances of this variable in the groups are equal, and since the p-level of the Student's test for the values of these indicators is significantly less than 0.05, the average values of the total ridge counts numbers on the fingers of the right hand of drug offenders and men of CG differ at a high level of statistical significance.

Key words: forensic medicine, dermatoglyphics, drug crimes.

Introduction. It is indisputable that the phenotypic and psychotypic characteristics of a person are a manifestation of his genotype. The presence of such a connection allows scientists to predict the manifestation of certain signs, including diseases or behavioral features, based on available phenotypic data. One of the manifestations of the phenotype, which is strictly individual, unchanged throughout a person's life, is easily amenable to study and systematization, is the dermatoglyphic status of a person.

The separation of a separate branch of dermatoglyphics – psychodermatoglyphics was the result of numerous works devoted to the search for a connection between the peculiarity of the skin pattern and the mental sphere of a person's life. This field is used for professional profile selection of employees, students, pupils, detection of predisposition to mental illnesses, creation of a psychological portrait for the needs of investigative bodies [1].

Vasan, M. D., & Thakar, B. R. (2019) found that specific features of a person's skin pattern can be used to detect propensity for antisocial behavior associated with social isolation, depressive mentality, lack of emotion, and negativism [2].

Sergio Baxter Andreoli,, Maíra Mendes dos Santos, Maria Ines Quintana, Wagner Silva Ribeiro, Sergio Luiz Blay Jose Geraldo Vernet Taborda and Jair de Jesus Mari (2014) determined the prevalence of mental disorders among prisoners in the state of São Paulo, Brazil, by stratified random sample of 1,192 men and 617 women. The lifetime and 12-month prevalence of anxiety-phobic disorders was, respectively, 50% and 27.7% among women and 35.3% and 13.6% among men, affective disorders – 40% and 21% among women and 20.8% and 9.9% among men, and drug-related disorders were 25.2% and 1.6% among women and 26.5% and 1.3% among men [3].

Thus, determining the relationship between the dermatoglyphic and psychological constitution of a person is relevant today and requires further study.

Material, methods and objects of research. The object of the study was the peculiarities of the dermatoglyphic parameters of the distal, middle and proximal phalanges of the fingers obtained from 60 men aged 18 to 59 who were convicted of drug crimes and 60 persons of the control group.

Dermatoglyphs of the distal, middle and proximal phalanges of the fingers were obtained using the standard method of typographic paint, scanned and processed using the methods proposed by N. M. Kozan. (2018) and Yu. Z. Kotsyubynska. (2021) [4].

Analysis and discussion of the obtained data. The analysis of the dermatoglyphs of the fingers of drug criminals showed that on the fingers of the left hand radial loops (52.31%) and curls (29.23%) are most often found, complex patterns (8.08%), arcs (6.92%) and ulnar loops (3.46%), curls (44.23%) and radial loops (39.62%) are most often found on the fingers of the right hand, arcs less often (5.77%), ulnar loops (5.38%) and complex patterns (5.00%) (Table 1).

Table 1

Total frequency (%) of patterns on the fingers of male drug offenders and the control group

Pattern type	A group of drug criminals		Control group	
	left	right	left	right
Lr	52,31[1]	39,62	22,67[2]	19,56[2]
Lu	3,46	5,38	37,78[2]	40,00[2]
LW	8,08	5,00	10,67	6,67
W	29,23[1]	44,23	24,44	28,44[2]
A	6,92	5,77	4,44	5,33

Notes: 1 – differences in the frequency distribution of patterns on the fingers of the right and left hands in drug offenders at the level of a statistical trend ($p < 0.10$);

2 – statistically significant differences in the frequency of distribution of patterns on the fingers of the right and left hands in drug criminals and CG ($p < 0.05$); (according to the Fisher φ-angle transformation criterion).

After statistical processing of the dermatoglyphs of the fingers of drug criminals, it was established that at the level of a statistical trend ($p<0.10$), the pattern on the right and left hands differs according to the indicator of the total frequency of radial loops on the fingers of both hands – 52.31% versus 39.62% ($\varphi = 1.30$; $p < 0.10$) and curls W – 29.23% versus 44.23% ($\varphi = 1.59$; $p < 0.10$).

The analysis of the corresponding dermatoglyphs of the fingers of ordinary men showed that on the fingers of both hands the most frequent ulnar loops (37.78% and 40.00% on the left and right hands), curls (24.44% and 28.44%, respectively) and radial loops (22.67% and 19.56%, respectively), complex patterns (10.67% and 6.67%, respectively) and arcs (4.44% and 5.33%, respectively) are less common. There was no difference in the distribution of drawings on the right and left hands, even at the level of a statistical trend.

A comparative analysis with the corresponding dermatoglyphs of the fingers of normal men showed statistically significant differences in the frequency of occurrence of such types of patterns as radial and ulnar loops on the fingers of both hands. Thus, the frequency of radial loops on the left hand was 52.31% in drug criminals against 22.67% in CG ($\varphi = 2.68$; $p < 0.01$), on the right – 39.62% against 19.56%, respectively ($\varphi = 2.86$; $p < 0.01$); ulnar loops – 3.46% versus 37.78% on the left ($\varphi = 2.38$; $p < 0.01$) and 5.38% versus 40.00% on the left ($\varphi = 2.98$; $p < 0, 01$), as well as curl on the right hand – 44.23% versus 28.44% ($\varphi = 4.70$; $p < 0.01$). The frequency of arcs and complex patterns among representatives of both groups is approximately the same.

Regarding the distribution of patterns on different fingers of the same person, it can be noted that the radial loops on the 1st finger of the left hand of drug criminals were most often found – 55.77%, and on the same finger of the right hand – curls (44.23%), the least common – ulnar loops (3 .85% and 5.77%, respectively) and arches (3.85% and 0%, respectively) on both hands; curls were most often found on the II fingers – 42.31% on the left and 55.77% on the right hands, as well as radial loops (30.77%) on the left hand and arcs (17.31%) on the right hand, the least common – ulnar loops (1.92% each); radial loops (57.69% and 50.00% on the left and right hands, respectively) and spiral

patterns (26.92% and 36.54%, respectively) were most often found on the III finger; on the 4th finger, spiral patterns (46.15% and 63.46%), radial loops (44.23% and 28.85%) were most common; on the V finger, the frequency of such patterns as radial (73.08% and 69.23%) and curls (13.46% and 21.15%) was almost the same on both hands (Table 2). It should be noted that there were no complex patterns on the III, IV and V fingers of the right hand.

In men of the control group, ulnar loops were most often found on I, III, and V fingers of both hands (35.56%, 40.00%, and 53.55%), and on II, IV – spiral patterns (33.33%, and 47. 78%) and ulnar loops (30.00% and 35.55%); there were no arcs on IV and V fingers.

It should be noted that there is a statistically significant difference in the distribution of the total frequency of patterns on the right and left hands ($\chi 2 = 13.00$, $p < 0.01$) in the group of drug criminals and the absence of such a difference in the men of CG.

Table 2.

Distribution frequency (%) of patterns on the fingers of drug offenders (H) and the control group (CG)

Pattern type	Hend	I		II		III		IV		V	
		H	CG	H	CG	H	CG	H	CG	H	CG
Lr	L	55,77[1]	26,67**	30,77[1]	20,00	57,69	24,44**	44,23[1]	13,33**	73,08	28,89**
	R	38,46	17,78**	11,54	11,11	50,00	28,89**	28,85	13,33*	69,23	26,67**
Lu	L	3,85	33,33**	1,92	28,89**	1,92	40,00**	3,85	40,00**	5,77	46,67**
	R	5,77	37,78**	1,92	31,11**	5,77	40,00**	5,77	31,11**	7,69	60,00**
LW	L	19,23	26,67	5,77[2]	13,33	5,77[1]	6,67	3,85[1]	6,67	5,77[1]	–**
	R	11,54	20,00	13,46	6,67	–	6,67**	–	–	–	–
W	L	17,31[1]	13,33	42,31[2]	31,11	26,92[2]	13,33**	46,15[1]	40,00	13,46	24,44
	R	44,23	20,00**	55,77	17,78**	36,54	17,78**	63,46	55,56	21,15	13,33
A	L	3,85[1]	–*	19,23	6,67**	7,69[2]	15,56	1,92[2]	–	1,92	–
	R	–	4,44**	17,31	6,67	7,69	6,67	1,92	–	1,92	–

Notes: 1 – statistically significant differences in the frequency of distribution of patterns on the fingers of the right and left hands of drug criminals ($p < 0.05$);

2 – differences in the frequency distribution of patterns on the fingers of the right and left hands in drug criminals at the level of a statistical trend ($p < 0.10$);

* – statistically significant differences in the frequency of distribution of patterns on the fingers of drug criminals and CG ($p < 0.05$); ** – statistically significant differences in the frequency of distribution of patterns on the fingers of drug criminals and CG ($p < 0.01$) (according to the Fisher φ-angle transformation criterion).

It should also be noted that there is a statistically significantly greater number of radial loops in drug criminals than in CG men, on the fingers of both hands, with the exception of II ($\varphi I = 2.95$; $\varphi III = 3.39$; $\varphi IV = 3.48$; $\varphi V = 4.50$; $p < 0.01$), curls on III fingers ($\varphi III = 1.69\text{-}2.10$, $p < 0.05\text{-}0.01$), as well as a smaller number of ulnar loops on all fingers of both hands ($\varphi I = 4.11$; $\varphi II = 4.21$; $\varphi III = 5.36$; $\varphi IV = 4.79$; $\varphi V = 5.94$; $p < 0.01$).

In one person, representatives of both drug criminals and control groups, two or three types of patterns in various combinations were found on the fingers of both hands.

To carry out a correct statistical analysis of parametric data, it is necessary to know the type of distribution of continuous data that the variable accepts.

The test for normality is performed in order to reveal the type of data distribution in the variables. If the data is normally distributed, then this allows further use of parametric methods of analysis, such as Student's t-test, ANOVA, etc.

The Shapiro-Wilk test was used to check for normality. This test tests the null hypothesis that the distribution of the trait does not differ from the theoretically expected normal distribution

Therefore, the Shapiro-Wilk test values range from 0.957 to 0.987. This means that with a probability of 95.7-98.7%, the distribution of the data of the comb count of the fingers of the hands

of drug criminals is normal. In CG men, the values of the Shapiro-Wilk criterion range from 0.953 to 0.973, which also indicates the normality of the data distribution.

To clarify the statement, the Kolmogorov-Smirnov consistency criterion was also used. For the Kolmogorov-Smirnov criterion, it is rejected at the level of $p \geq 0.20$.

The Kolmogorov-Smirnov clarifying (control) criterion confirms our assumption about the normality of the distribution – the p-level (Sig.) of this criterion is greater than 0.20.

Since the probability of validity of this hypothesis P (Sig.) turned out to be less than 0.05 for each of the indicators, we assume that the distribution of signs differs from the normal one, which is also confirmed by the value of the Kolmogorov-Smirnov test.

Since the distribution of the values of the ridge counts of the fingers corresponds to a normal distribution, the Student's t-test for independent samples can be used for comparative analysis.

The level of p-Levene for the values of the ridge counts of the fingers of the left and right hands of the signs of drug criminals is greater than 0.05. This means that the hypothesis about the heterogeneity of variances can be rejected and the data we obtained are reliable.

For the Student's criterion, the p-level for the values of the ridge counts of the first finger of the left and right hands is less than 0.05. This means that the hypothesis about the equality of the averages is rejected, that is, we can say that the values of the average ridge counts of the first finger of the left and right hands of drug criminals differ.

We will conduct a comparative analysis of the ridge counts of the fingers of the left and right hands of drug criminals and men of CG (Table 3).

Table 3

The value of the Student's t-test for the values of the ridge counts of the fingers of the left hand in the group of male drug offenders of the CG

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% CI of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
RCLHT	RCLHT_CG	1,738	,191	4,691	95	,000	5,63120	1,20043	3,24805	8,01435
RCLHI	RCLHI_CG	6,016	,016	3,009	95	,003	4,87521	1,62014	1,65882	8,09161
RCLHM	RCLHM_CG	5,908	,017	4,901	95	,000	7,61923	1,55476	4,53265	10,70581
RCLHR	RCLHR_CG	,207	,650	3,314	95	,001	4,58632	1,38397	1,83880	7,33385
RCLHL	RCLHL_CG	3,208	,076	4,703	95	,000	5,39145	1,14638	3,11559	7,66731
TRCLH	TRCLH_CG	1,548	,216	5,062	95	,000	28,29573	5,58973	17,19871	39,39274

As can be seen from Table 3, the level of p-Levene for the values of the ridges of II and III fingers of the left hand of drug criminals and men of CG is less than 0.05. This means that the variances of this variable in the groups are not equal. Therefore, this feature should not be taken into account when analyzing the data using the Student's t-test.

For the Student's test, the p-level for the values of ridge counts I, IV and V of the fingers of the left hand is significantly less than 0.05, i.e. the average values of the ridge counts on the fingers of the left hand of drug criminals and men of CG differ at a high level of statistical significance.

We will conduct a comparative analysis of ridge counts for the fingers of the right hands of drug criminals and men of CG.

The level of p-Levene for the values of ridge counts II, III and V of the fingers of the right hand of drug criminals and male CG is less than 0.05. This means that the variances of this variable in the groups are not equal. Therefore, this feature should not be taken into account when analyzing the data using the Student's t-test.

For the Student's criterion, the p-level for the values of ridge counts I and IV of the fingers of the right hand is significantly less than 0.05, i.e. the average values of the ridge counts on the fingers of the right hand of drug criminals and men of CG differ at a high level of statistical significance.

That is, for the pair of drug offenders-Control, the statistically significant variables (according to the Student's criterion) are the ridge counts of the I and IV fingers on both the left and right hands.

As it was established above, the distribution of the total delta score of the left and right hands both in the group of drug criminals and male CG differs from normal.

As the results of the comparative analysis using the non-parametric Mann-Whitney test showed, the values of the delta score of the fingers of the right and left hands of drug criminals are statistically significantly different ($U = 1085 < U0.05 = 1098$, $p < 0.05$), while no such difference is observed in CG. It should be noted statistically significant differences of this indicator on the fingers of the right hands of drug offenders and men of CG ($U = 823 < U0.01 = 849$, $p < 0.10$).

Conclusions. In the course of the study, it was established that the dermatoglyphics parameters of the distal middle and proximal phalanges of the fingers of men prone to drug crimes differ from the dermatoglyphs of men of the control group according to the indicators of the total frequency of radial loops on the fingers of both hands – 52.31% versus 39.62% ($\varphi = 1.30$; $p < 0.10$) and curls W – 29.23% versus 44.23% ($\varphi = 1.59$; $p < 0.10$).

Prospects for further research include studying the features of palmar dermatoglyphics in persons prone to drug crimes.

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ДЕРМАТОГЛІФІЧНІ ОСОБЛИВОСТІ ПАЛЬЦІВ РУК У ЧОЛОВІКІВ, СХИЛЬНИХ ДО НАРКОЗЛОЧИНІВ

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Резюме. У статті представлено дані щодо особливостей дерматогліфічної конституції дистальних, середніх та проксимальних фаланг пальців рук у чоловіків, схильних до наркозлочинів. Об'єктом дослідження були особливості дерматогліфічних параметрів дистальних, середніх та проксимальних фаланг пальців рук, отриманих у 60 чоловіків віком від 18 до 59 років, що були засуджені за наркозлочини та 60 осіб контрольної групи. У процесі дослідження встановлено, що на пальцях лівої руки найчастіше трапляються радіальні петлі (52,31%) та завитки (29,23%), рідше зафіксовані складні візерунки (8,08%), дуги (6,92%) та ульнарні петлі (3,46%), на пальцях правої руки найчастіше трапляються завитки (44,23%) та радіальні петлі (39,62%), рідше дуги (5,77%), ульнарні петлі (5,38%) та складні візерунки (5,00%), на рівні статистичної тенденції ($p<0,10$) відрізняється візерунок на правій і лівій руках за показником сумарної частоти радіальних петель на пальцях обох рук – 52,31% проти 39,62% ($\varphi = 1,30$; $p < 0,10$) та завитків W – 29,23% проти 44,23% ($\varphi = 1,59$; $p < 0,10$). Порівняльний аналіз сумарних гребневих рахунків для пальців лівої та правої рук наркозлочинців та чоловіків контрольної групи показав, що дисперсії цієї змінної в групах рівні, а оскільки p-рівень критерію Стьюдента для значень цих показників значно менший за 0,05, то середні значення сумарних гребневих рахунків на пальцях правої руки наркозлочинців та чоловіків КГ відрізняються на високому рівні статистичної значущості.

Keywords: судова медицина, дерматогліфіка, наркозлочини.

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