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Comparative Study on Dermatoglyphics in Alcoholic Patients

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A B S T R A C T

According to the world's prevalence rate, alcoholism is in the third place after heart and blood vessel diseases and malignant tumors. With the development of neuroscience, the causes of alcoholism's biological etiologic sources are still being studied. Considering that dermatoglyphics are highly determined by heritage, we contemplated the possibilities of their discrimination in alcoholic patients in relation to phenotypically healthy subjects. We analyzed the quantitative and qualitative dermatoglyphics properties of 100 alcoholic patients without psychiatric comorbidity, who have been cured in the Psychiatric Hospital »Sveti Ivan« two or more times, and those of 100 phenotypically healthy men. Through the t-test we evaluated the heterogeneity of the examined groups. Results showed a statistically significant difference on five examined variables. In the calculation of fluctuating asymmetry measure, we found no statistically significant differences in the correlation of values of the right and the left hand on the tested variables, beside one. Chi-square tests showed that there is no relation between the dermatoglyphic qualitative properties of alcoholic patients and those of the examinees from the comparison group. Despite the indisputable genetic role in the genesis of alcoholism, the analysis of the dermatoglyphics carried out in our study did not show any etiological connection between the results of the test on dermatoglyphics and the appearance of alcoholism.

Key words: *alcohol, alcoholism, alcoholic, dermatoglyphics, heritage, genes*

Introduction

The human skin on the palm of both hands and fingers and on the sole each foot and toes is ridged, so that you can see many ridges separated by grooves, whose courses create lines of different shapes, called dermatoglyphics[1].

Volar pads start defining themselves during the third month of the embryonic growth. When volar pads are at the peak of their formation in the third month of embryogenesis, the border between the epidermis and the dermis, which is initially smooth, comes to a corrugation process of the epidermis' basal membranes, which leads to the formation of dermatoglyphics[2]. The formation of dermatoglyphics ends with the beginning of the seventh month of the embryogenesis, when the papillary ridges on the surface open the lumen of the sweat glands[2,3].

Dermatoglyphic features mainly have extremely high hereditary properties. Quantitative dermatoglyphic properties, that is, the number and width of the ridges on fingers and palms, are hereditarily transmitted according to the laws of polygenic heritage, which means that they change more difficultly and that they are less affected by genetic drift and micro-evolutional changes. Unlike them, the qualitative properties, that is, the shape of the lines are hereditarily transmitted according to monogenic laws, which is why they change more quickly.

Several analysis showed that dermatoglyphic changes are most pronounced in chromosomal aberrations, but also in different diseases[4,5] that appear in subjects with a normal number of chromosomes. Disorders were thought or could be thought to be caused by genetic influence and by the influence of factors from the outside on the development of dermatoglyphics in the early prenatal period. Hence, many studies on dermatoglyphic samples were carried out in relation to several psychiatric and neurological disorders, such as schizophrenia, autism, mental retardation and others[6–8].

The consummation of alcoholic drinks has been known since the earliest history of humanity. Due to their anxy-

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olitic effects, alcoholic drinks have become a means, which people from a smaller social group and later also from the state constantly affirm. Drinking has become an integral element of normal behavior and, throughout history, human society has built a series of customs and habits related to the consummation of alcohol.

The conception of alcoholism as a disease was articulated in the 19th century. The Swedish physician Magnus Huss was the first to use the expression *alcoholismum chronicus* for the condition of illness caused by alcohol. At the same time, they found out that alcoholic patients need to be actively engaged in their own cure and in their psychosocial and somatic rehabilitation, which can be effective only if an alcoholic patient is an active participant in the curing and rehabilitating process.

According to the records of the Register of Alcoholics of the Republic of Croatia, 15% of Croatian male adults are affected by alcoholism and another 15% drink excessively. In the Republic of Croatia there are about 200 000 to 240 000 alcoholics, and each year 7 000 are hospitalized for the first time. The proportion of cured male and female alcoholics is 5.2:1, considering the fact that lately alcoholism in women has been growing phenomenon.

Alcoholism is characterized by abnormal behavior, which includes an excessive need for alcohol and weak control over drinking. The main phenomena connected to the development of alcoholism include toleration and physical, psychological addiction. These phenomena contribute to a feeling of gratification that comes with consuming alcohol, to persisting drinking and to a final development of alcoholism in people who are inclined to the illness due to existing genetic, psychic and social factors.

An important indicator in the progress of studies on alcoholism was the proof that a great share in the predisposition for alcoholism is hereditary. Understanding the genetic role in the development of alcoholism helps to explain the etiology of the illness, and puts down the bases for an early recognition of the predisposition, for curing and for prevention activities.

Genetic studies were started when it was noticed that alcoholism most frequently appears in certain families. Studies on foster children showed that the children of alcoholics raised in families that did not consummate alcohol, show nevertheless, an increased risk of developing alcoholism[11]. However, other studies showed that the identical twin of an alcoholic has 60% of probabilities to become an alcoholic, while in the case of a heterozygote twin, there are 38% of probabilities to develop alcoholism.

Certain abnormalities of biochemical functions can be inherited along with the predisposition for alcoholism. The activity of cerebral enzymes involved in the neurotransmission metabolism is potentially the following indicator of predisposition. However, a low level of monoamine oxidizes (MAO) enzymes can be a biochemical indicator of the genetic predisposition for alcoholism[13].

The etiopathology of alcoholism is connected to the variations in the genes, which take part in the regulation of the transmission of serotonin and dopamine. It also involves glutamate and opoid neurotransmitter system[14–24].

Alcohol is extremely connected with the generation of mortality by cirrhosis, cancer of the esophagus, larynx, mouth, lungs, and it is more and more often related to carcinoma of liver, breasts and rectum[25–27]. A chronic and excessive consummation of alcohol leads to disorders of the immune system, to cognitive disorders (10% of the causes of dementia in adults) and to fetal alcohol syndrome[28,29]. In addition there are accidents related to alcoholism, such as grave traffic accidents, drowning, arsons, domestic violence, suicides and murders.

Extremely early working, domestic and social dysfunction in a large share of alcoholics and, in many, invalidity in the productive years of work in life have significantly unfavorable economic and social repercussions on the economy and management of the state, an on the public health policy.

Material and Methods

The sample of examinees numbers 100 male subjects over 18 years of age, who were assigned a diagnosis of Alcoholism (F10.2) according to the International Statistical Classification of Diseases and Health Related Problems – Tenth Revision (ICD –10), who were not assigned any other diagnoses according to the criteria of the same classification, and who were cured two or more times in the Psychiatric Hospital »Sveti Ivan«. A comparison group featured 100 phenotypically healthy examinees over 18 years of age[30].

We examined the digito-palmar dermatoglyphic prints of all ten fingers on the right and on the left hand, and of both palms of the examinees of both groups, using the method described by Cummins and Midlo (1943–1961) and according to the guidelines of the books »Practicum of biological anthropology – genetic methods« (1977) and »Dermatoglyphics in anthropological researches« (1989)[1,31].

We analyzed the following dermatoglyphic properties:

a) Quantitative – number of ridges on the fingers of the left and of the right hand (FRL1, FRL2, FRL3, FRL4 i FRL5, and FRD1, FRD2, FRD3, FRD4 and FRD5), the number of ridges between digital triradii on the palms (a-b rcl, b-c rcl, c-d rcl, a-b rcd, b-c rcd and c-d rcd), the size of the atd angle of the left and right hand;
b) Qualitative – frequency of the lines on the fingers (whrol, and radial loop, arch), frequency of the lines on the palm and the position of the axial triradii on the palm.

Results

Descriptive analysis showed the features of the quantitative dermatoglyphic properties of the digito-palmar complex in alcoholics and in the comparison group of phenotypically healthy examinees (Tables 1 and 2).

TABLE 1
RESULTS OF THE DESCRIPTIVE STATISTICS OF QUANTITATIVE DERMATOGLYPHIC PROPERTIES OF THE DIGITO-PALMAR COMPLEX IN THE GROUP OF ALCOHOLICS (N=100)

	$\overline{X}$	Standard deviation (SD)	Min	Max	N
RIGHT HAND					
FRR1	16.63	5.027	1	27	100
FRR2	10.13	6.152	0	22	100
FRR3	10.41	5.137	0	27	100
FRR4	13.94	5.639	0	28	100
FRR5	10.74	5.338	1	23	100
a-b rcR	37.79	7.249	20	58	100
b-c rcR	26.45	6.243	7	36	100
c-d rcR	32.55	7.864	12	49	100
atd R	43.61	6.260	33	63	100
LEFT HAND					
FRL1	15.56	6.220	2	40	100
FRL2	9.23	5.499	0	21	100
FRL3	10.46	4.916	0	20	99
FRL4	14.19	5.662	0	27	100
FRL5	11.25	4.531	1	25	100
a-b rcL	39.12	6.091	19	54	100
b-c rcL	26.57	6.691	10	58	100
c-d rcL	30.79	8.548	3	47	100
atd L	44.24	7.475	31	75	100

FRR1 – FRR5 – finger ridge count right, FRL1 – FRL5 – finger ridge count left
a-b rcR, b-c rcR, c-d rcR – ridge count between digital triradii a-b, b-c and c-d on the right palm
a-b rcL, b-c rcL, c-d rcL – ridge count between digital triradii a-b, b-c and c-d on the left palm
atd R – atd L – values of atd angle of right and left hand

TABLE 2
RESULTS OF THE DESCRIPTIVE STATISTICS OF THE QUANTITATIVE DIGITO-PALMAR DERMATOGLYPHIC PROPERTIES IN THE COMPARISON GROUP (N=100)

	$\overline{X}$	Standard deviation (SD)	Min	Max	N
RIGHT HAND					
FRR1	16.09	5.143	0	33	100
FRR2	9.97	5.723	0	24	100
FRR3	10.20	4.851	0	23	100
FRR4	13.21	4.619	0	31	100
FRR5	10.38	3.969	2	21	100
a-b rcR	33.03	7.323	13	49	100
b-c rcR	24.03	6.211	11	46	100
c-d rcR	28.81	8.187	5	45	100
atd R	43.39	8.252	30	85	100
LEFT HAND					
FRL1	14.46	4.633	0	24	100
FRL2	9.71	5.767	0	23	100
FRL3	11.14	5.162	0	25	100
FRL4	13.75	4.680	3	30	100
FRL5	11.31	4.182	3	20	100
a-b rcL	35.47	6.614	16	55	100
b-c rcL	24.65	6.379	9	44	100
c-d rcL	30.03	8.100	8	47	100
atd L	43.73	7.092	32	72	100

FRR1 – FRR5 – finger ridge count right, FRL1 – FRL5 – finger ridge count left
a-b rcR, b-c rcR, c-d rcR – ridge count between digital triradii a-b, b-c and c-d on the right palm
a-b rcL, b-c rcL, c-d rcL – ridge count between digital triradii a-b, b-c and c-d on the left palm
atd R – atd L – values of atd angle of right and left hand

A statistically significant difference among the alcoholics and the comparison group in the number of quantitative dermatoglyphic traits exists in the following properties:

- Number of ridges between the triradii a and b on the right hand ($p<0.001$): alcoholics have in average more ridges between the triradii a and b on their right hand than the examinees from the comparison group;
- Number of ridges between the triradii b and c on the right hand ($p=0.007$): alcoholics have in average more ridges between the triradii b and c on their right hand than the examinees from the comparison group;
- Number of ridges between the triradii c and d on the right hand ($p=0.001$): alcoholics have in average more ridges between the triradii c and d on their right hand than the examinees from the comparison group;
- Number of ridges between the triradii a and b on the left hand ($p<0.001$): alcoholics have in average more ridges between the triradii a and be on their left hand than the examinees from the comparison group;
- Number of ridges between the triradii b and c on the left hand ($p=0.039$): alcoholics have in average more ridges between the triradii b and c on their left hand than the examinees from the comparison group (Table 3).

We concluded that the variables with the highest discriminative weight, that is, the variable with the largest share of discrepancy in the results between the group of alcoholics and the comparison group of healthy examinees, are the number of ridges between the triradii a and b on the right hand and the number of ridges between the triradii c and d on the right palm (Table 4).

With the intent to evaluate the discrimination force, the examinees were divided up according to an extracted discriminative function. Results showed that 64% of the examinees classified correctly, 65% of which were alcoholics and 63% were healthy examinees (Table 5).

In order to establish the grouping of quantitative dermatoglyphic properties in the group of alcoholics, we carried out a factor analysis with the method of the main components on all 18 variables of quantitative dermato-

TABLE 3
TEST OF THE DIFFERENCES IN THE AVERAGE NUMBER OF FINGER RIDGES

	Levene's Test for Equality of Variance		t-test of average equity		
	F	P	T	df	p
RIGHT HAND					
FRR1	0.014	0.907	–0.751	198	0.454
FRR2	1.541	0.216	–0.190	198	0.849
FRR3	0.599	0.440	–0.297	198	0.767
FRR4	3.698	0.056	–1.001	198	0.318
FRR5	11.656	0.001	–0.541	183	0.589
a-b rcR	0.198	0.657	–4.619	198	0.000
b-c rcR	0.101	0.751	–2.748	198	0.007
c-d rcR	0.284	0.595	–3.295	198	0.001
atd R	2.367	0.126	–0.212	198	0.832
LEFT HAND					
FRL1	3.254	0.073	–1.418	198	0.158
FRL2	0.002	0.967	0.602	198	0.548
FRL3	0.199	0.656	0.945	197	0.346
FRL4	4.410	0.037	–0.599	191	0.550
FRL5	0.114	0.736	0.097	198	0.923
a-b rcL	0.001	0.976	–4.059	198	0.000
b-c rcL	0.000	0.987	–2.077	198	0.039
c-d rcL	0.297	0.586	–0.645	198	0.519
atd L	0.017	0.895	–0.495	198	0.621

FRR1 – FRR5 – finger ridge count right, FRL1 – FRL5 – finger ridge count left
a-b rcR, b-c rcR, c-d rcR – ridge count between digital triradii a-b, b-c and c-d on the right palm
a-b rcL, b-c rcL, c-d rcL – ridge count between digital triradii a-b, b-c and c-d on the left palm
atd R – atd L – values of atd angle of right and left hand

TABLE 4
CORRELATION OF DISCRIMINATIVE VARIABLES AND CANONIC DISCRIMINATIVE FUNCTIONS AMONG THE GROUP OF ALCOHOLICS AND THE COMPARISON GROUP OF EXAMINEES SHOWN IN ORDER OF THE CORRELATION SIZE INSIDE THE FUNCTION

Variable	FUNCTION
a-b rcR	0.907
c-d rcR	0.647
a-b rcL (a)	0.553
c-d rcL (a)	0.417
b-c rcR (a)	0.359
b-c rcL (a)	0.329
atd R (a)	0.296
atd L (a)	0.161
FRR 1 (a)	0.096
FRR 2 (a)	–0.082
FRR 4 (a)	0.080
FRL 5 (a)	0.056
FRL 2 (a)	0.048
FRL 4 (a)	0.023
FRL 3 (a)	0.020
FRL 1 (a)	0.019
FRR 3 (a)	0.018
FRR 5 (a)	0.017

(a) – variable not used in the analysis
FRR1 – FRR5 – finger ridge count right, FRL1 – FRL5 – finger ridge count left
a-b rcR, b-c rcR, c-d rcR – ridge count between digital triradii a-b, b-c and c-d on the right palm
a-b rcL, b-c rcL, c-d rcL – ridge count between digital triradii a-b, b-c and c-d on the left palm
atd R – atd L – values of atd angle of right and left hand

glyphic properties. The varimax solution with Kaiser's normalization produced 5 statistically significant factors, which together explain the 67.28% of the total variance.

On the first factor, which explains the highest percentage of the total variance (almost 31%), we extracted digital dermatoglyphics of the second, third, fourth and fifth finger of both hands (all the fingers except the thumb). On the second factor, we extracted the area between the triradii c, d and a, b of both palms. As factors *per se* we extracted: the first finger of both hands (thumbs) on the third factor, the atd angles on both palms on the fourth factor, and the area between the triradii b and c on both palms on the fifth factor (Table 6).

We carried out a factor analysis with the method of all components in order to establish the grouping of quantitative dermatoglyphic properties in the comparison group of examinees. The varimax solution with Kaiser's normalization produced 5 statistically significant factors, which together explain 70.10% of the total variance.

On the first factor, which explains the highest percentage of the total variance (just over 32%), we extracted digital dermatoglyphics of the first, fourth and fifth finger of both hands. On the second factor, we extracted the digital dermatoglyphics of the second and third finger of both hands. On the third factor, we extracted the areas between the triradii b, c and a, b on both palms. As factors *per se* we extracted atd angles on both palms on the forth factor and the area between the triradii c and d on both palms on the fifth factor (Table 7).

We noticed the following differences in latent groups of quantitative dermatoglyphic properties of the two groups of examinees: while the alcoholics' quantitative dermatoglyphic properties of all fingers of both hands besides the thumb are grouped together and the thumbs of both hands form a factor *per se*, the comparison group's quantitative dermatoglyphic properties of the thumb are grouped together with the fourth and fifth finger of both hands in one factor and the quantitative dermatoglyphic properties of the second and third fingers of both hand form a factor *per se*. In addition, while in the group of alcoholics, the areas of the triradii c, d and a, b on both

TABLE 5
OVERVIEW OF THE RESULTS OF THE EXAMINEES' CLASSIFICATION IN RELATION TO THE DISCRIMINATIVE FUNCTION

	Classified				
	Correctly			Incorrectly	
	N	N	(%)	N	(%)
Alcoholics	100	65	(65%)	35	(35%)
Comparison group	100	63	(63%)	37	(37%)
Total of correctly classified:		64%			

palms are grouped together with the areas b and c forming a factor *per se*, in the control group of examinees, the areas between the triradii b, c and a, b on both palms are grouped together with the areas c and d forming a factor *per se*.

We also calculated the fluctuating asymmetry measure (FA), which indicates that between the comparison group and the group of alcoholics there are no statistically significant differences in the correlations of values of the right and left hands on the tested variables.

A statistically significant difference between the comparison group and the group of alcoholics in the average difference of values of the right and the left hand exists only in the number of ridges between the triradii c and d ($p=0.016$). The examinees from the comparison group have a negative average (–1.22), which means that they have a higher number of ridges between the triradii c and d on the left hand, while the alcoholics' average is positive (1.76), which means that they have a higher number of ridges between the triradii c and d on the right hand. In other values of the right and left hands there were no statistically significant differences between the comparison group and the group of alcoholics.

χ^2-tests show that in neither one of the fingers (neither of the left nor of the right hand) is there a connection among qualitative dermatoglyphic properties, re-

TABLE 6
FACTOR ANALYSIS OF THE VARIABLES IN THE GROUP OF ALCOHOLICS (VARIMAX ROTATION WITH KAISER'S NORMALIZATION)

	Factors				
	1	2	3	4	5
FRL4	0.820	–0.147			0.126
FRR3	0.819		0.204		–0.115
FRL5	0.812		–0.122		0.173
FRR4	0.805				0.178
FRR5	0.778				0.158
FRL2	0.766	0.139	0.234		–0.116
FRL3	0.700		0.297		–0.287
FRR2	0.640		0.338	0.135	–0.107
c-d rcL		0.778			
c-d rcR		0.730	–0.177		0.227
a-b rcR		0.646		0.119	0.246
a-b rcL	–0.192	0.628	0.166	0.234	0.133
FRL1	0.187		0.872		
FRR1	0.451		0.719		
atd R			–0.114	0.882	
atd L		0.127		0.869	
b-c rcL		0.199			0.782
b-c rcR	0.186	0.229			0.782
Variance percentage	30.798	14.877	8.540	6.859	6.205

FRR1 – FRR5 – finger ridge count right, FRL1 – FRL5 – finger ridge count left
a-b rcR, b-c rcR, c-d rcR – ridge count between digital triradii a-b, b-c and c-d on the right palm
a-b rcL, b-c rcL, c-d rcL – ridge count between digital triradii a-b, b-c and c-d on the left palm
atd R – atd L – values of atd angle of right and left hand

TABLE 7
FACTOR ANALYSIS OF THE VARIABLES IN THE COMPARISON GROUP (VARIMAX ROTATION WITH KAISER'S NORMALIZATION)

	Factors				
	1	2	3	4	5
FRR1	0.756	0.216		–0.224	0.113
FRL1	0.738	0.145	0.104		
FRR5	0.733	0.224	–0.109	0.217	
FRL5	0.726	0.160		0.246	
FRL4	0.693	0.449			0.103
FRR4	0.640	0.456	0.160	–0.133	
FRL2	0.244	0.856			
FRR2	0.268	0.799	–0.182		
FRR3	0.497	0.687			
FRL3	0.587	0.671			
b-c rcR	–0.139		0.823		–0.145
b-c rcL			0.803	0.134	–0.151
a-b rcR			0.755		0.372
a-b rcL	0.191	–0.148	0.617	0.241	0.343
atd L			0.122	0.862	0.153
atd R		0.136	0.336	0.749	0.165
c-d rcR	0.206				0.807
c-d rcL	–0.117			0.245	0.762
Variance percentage	32.166	17.050	8.652	6.668	5.560

FRR1 – FRR5 – finger ridge count right, FRL1 – FRL5 – finger ridge count left
a-b rcR, b-c rcR, c-d rcR – ridge count between digital triradii a-b, b-c and c-d on the right palm
a-b rcL, b-c rcL, c-d rcL – ridge count between digital triradii a-b, b-c and c-d on the left palm
atd R – atd L – values of atd angle of right and left hand

gardless whether the examinee is from the group of alcoholics or from the comparison group.

Fisher's exact tests show that in neither one of the interdigital areas (neither of the left nor of the right hand) is there a connection among the existence of lines, regardless whether the examinee is from the group of alcoholics or from the comparison group.

χ^2-tests show that there is no connection between the qualitative properties of atd angles in the alcoholic and comparison groups, neither on the left nor on the left hand, nor on the overall.

We also checked whether there is a connection among the qualitative properties of atd angles in the alcoholics and the comparison group, through a series of multiple binary logistic regressions, in which the size of atd angles of the left and right hands are taken as predictors of the belonging to the comparative or the alcoholic group. These predictors explain 5.5% of the variance, and the statistically significant relations are the following:

- The examinees that have an angle between 46 and 55 degrees on their right palm have 2.8 times bigger chances to be alcoholics than the examinees who have a 45 degree angle on the right palm (p=0,032; OR=2,759; 95% of the reliability interval for OR: 1,094–6,960);
- The examinees that have an angle between 46 and 55 degrees on their right palm have 2.8 times bigger chances to be alcoholics than the examinees who have 2 or more angle on the right palm (p=0.013; OR=4.478; 95% of the reliability interval for OR: 1.376–6.960).

Discussion

The damaging consummation of alcoholic drinks has been known since the earliest beginning of humanity. Currently there is constant growth of expenses due to the medical consequences and social problems caused by the excessive consummation of alcohol. Reports on traffic accidents with outcomes like injuries, permanent disabilities or even death of numerous people are a daily matter. In addition, more than 50% of crimes are related to alcohol, not to mentioned that the highest number of alcoholics ask for medical help between 30 and 44 years of age, the period of life in which they should be at the peak of their activity at work and in their family[32].

These are all good reasons why alcoholism is still in the center of the attention of numerous biomedical and clinical medical science-research projects. In the past two decades, in a time of great development of neuroscience, a series of studies have been carried out on the factors in

the etipoathogenesis of alcoholism, which point out the existence of genetic components of excessive drinking, along with a clearly indisputably important influence of the environment and surrounding.

Modern science, and in particular neuroscience, has given up studies on genes as bearers and causative agents of diseases in, we could say, Mendel's classic concept of heritage, in which a gene, autosomnally dominantly or recessively inherited, would be the cause of abnormal genetic expressions with an abnormal genetic product that leads to the appearance of certain diseases or disorders[33].

According to a new hypothesis, different genes that create modified proteins (which can be receptors, transporters or carriers) lead to the appearance of multiple micro-abnormalities, which cause disorders in the processes of selection, migration and development of the neuron as in the communication among them[33]. In this cascade, they have been increasingly observing the so called endophenotypes or, as they were formerly called, collateral phenotypes. We can say that endophenotypes are something in between an abnormal gene and the clinical manifestation of a disorder, and are most frequently invisible to »naked eye«. Hence we differentiate biological and symptomatic endophenotypes[34,35]. The former involve biological phenomena such as different changes in anatomical structures and physiological functions (for instance, changes in the size of cerebral structures and in the intensity of evoked potentials or activities of singular enzymes), while symptomatic endophenotypes are singular symptoms that do not have to be clearly visible (in psychiatric disorders they are unusual and bizarre beliefs and attitudes, and an inappropriate feeling of fear, guilt, mistrust, suspicion, ect.). Although they do not have to be clearly manifested, both kinds of endophenotype are measurable and are always strongly connected with certain disorders. Subjects featuring these endophenotypes have more chances to develop disorders in their full clinical extent in combination with negative influences of specific pathogenic factors from the environment[35].

Despite the numerous studies pointing out the genetic basis of the development and genesis of alcoholism, in this work, through the analysis of quantitative and qualitative dermatoglyphic properties in alcoholics and in the comparison group of phenotypically healthy examinees, we did not find a connection between the dermatoglyphic properties and the genesis of alcoholism.

Dermatoglyphics of the digito-palmar complex are a polygene with determined properties, but also a reflection of the mutual actions of genetic and environmental factors in early intrauterine period. The starting hypothesis of this study was the existence of certain genetic differences between the group of alcoholics and the comparison group of phenotypically healthy examinees, and the possibility to identify these differences through the analysis of the dermatoglyphics of the digito-palmar complex. Through the analysis carried out in this study we did not find any connection between the dermatoglyphics and the genesis of alcoholism, which does not mean that alcoholism is not genetically conditioned, but that its genesis and development are influenced by a multiple and complex mutual interactivity of different genes in combination with the influence of the environment, that is, psychosocial stressors, or stressful events.

This fact matches the conclusions drawn by Breitenfeld in a dissertation on the analysis of quantitative dermatoglyphic properties, in which he did not find any role of heritage, pointing out the great influence of the environmental factor[36]. However, this would be a superficial conclusion, particularly if we consider the newest information on complex genetic psychic disorders. What was formerly mentioned, in fact, corresponds to the current stance of biomedical scientific disciplines that in the heritage of certain diseases, including psychiatric disorders, it is actually predisposition to be inherited, that is, the risk of developing diseases, influenced by a multiple and extremely complex interaction of different genes in combination with the influence and action of the environmental and surrounding factors, such as biological ones: viruses, toxins and many psychosocial stressors, that is, events that take place during a life time[37–41].

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POREDBENO ISTRAŽIVANJE DERMATOGLIFA U ALKOHOLIČARA

S A Ž E T A K

Po stopi prevalencije alkoholizam je u svijetu na trećem mjestu, iza bolesti srca i krvnih žila te zloćudnih tumora. Razvojem neuroznanosti i dalje se istražuje njegova biološka etiološka osnovica. Obzirom da su dermatoglifi visoko nasljedno determinirani promatrana je mogućnost njihove diskriminacije u alkoholičara u odnosu na fenotipski zdrave osobe. Analizirana su kvantitativna i kvalitativna svojstva dermatoglifa 100 alkoholičara bez psihijatrijskog komorbideta, koji su dva ili više puta liječeni u PB »Sveti Ivan« i 100 fenotipski zdravih muškaraca. T-testom procijenjena heterogenost ispitivanih skupina pokazala je statistički značajnu razliku u pet ispitivanih varijabli. Izračunavanjem mjere fluktuacijske asimetrije nije nađena statistički značajna razlika u korelacijama vrijednosti desne i lijeve ruke na testiranim varijablama osim kod jedne. χ^2-testovi pokazali su da nema povezanosti između kvalitativnih svojstava dermatoglifa alkoholičara i komparativne skupine. Unatoč neospornoj i genetskoj ulozi u nastanku alkoholizma, analizom dermatoglifa u istraživanju nije nađena povezanost dermatoglifskog nalaza s pojavom alkoholizma.