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CLINICAL IMPLICATIONS IN THE DERMATOGLYPHIC PICTURE OF AN ENDOGAMOUS POPULATION IN MOLDAVIA

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Abstract. Objectives: The paper constitutes an ample study on digital dermatoglyphics, from a pathological perspective. **Material and methods**: Study population was represented by 200 subjects (100 men and 100 women) of all ages, coming from an endogamous rural locality - the village of Butea, county of Iaşi and there were used 400 dermatoglyphic files. It was noted that the high level of endogamy within the community - as illustrated by an index which, oscillated along the 20th century between 72% and 86% - had an outcome in the digital dermatoglyphic picture, in terms of pathological pattern. It assumes the presence of some significant anomalies with multiple and severe clinical implications which - at the level of the group - attain percent values quite close, equal or even higher than those recorded in communities with sekelary infantile encephalopathies (IEP), epilepsy, autism, ocular diseases (OD) and cardiovascular diseases (CVD). Therefore, the presence of above mentioned diseases is justified in the pathological pattern of the study population. **Results and discussion**: The digital dermatoglyphics anomalies, both in men and women, especially in the formers ones and on both hands, mainly on the left ones referred to: *the increased frequency on fingers for whorls (as accompanied by a more reduced one for loops), for the radiality of the digital structures, for the racketoid type loops and for the bilateral and individual monomorphism*, all peculiarities through which the population under study was close to the dermatoglyphics patient of the collectivities with various congenital and hereditary maladies, and sensibly different from that of the Romanian population, and Moldavian one, particularly. **Conclusions**: many of the carriers of grave malformative stigmats are apparently healthy somato-physically therefore the malformative stigmats of digital dermatoglyphic can indicate the risk of the disease and of the possible of the population's health condition.
Key words: digital dermatoglyphics, distortions, anomalies, endogamy

Rezumat. Scop: Lucrarea de faţă cuprinde un studiu al dermatoglifelor digitale, privit din perspectivă patologică. **Material şi metodă**: populaţia de studiu a fost reprezentată de 200 subiecţi de toate vârstele (100 bărbaţi şi 100 femei) provenind dintr-o localitate rurală endogamă (Butea) din judeţul Iaşi, de la care au fost recoltate 400 fişe dermatoglifice. Se constată că, nivelul crescut de endogamie al colectivităţii, ilustrat de un indice care în decursul secolului al XX-lea a oscilat între 72% şi 86%, s-a repercutat asupra tabloului dermatoglific digital, căruia i-a imprimat o amplă şi puternică încărcătură patologică. Ea presupune prezenţa unor însemnate anomalii sau distorsiuni cu multiple şi grave implicaţii medicale, care, la nivel de lot întrunesc procentaje ce se apropie, egalează sau chiar le depăşesc pe cele raportate pentru colectivităţi cu encefalopatii infantile (EPI) sechelare, cu epilepsie, cu autism, cu afecţiuni oculare (BO) şi boli cardiovasculare (BCV), ceea ce şi justifică prezenţa acestor afecţiuni, în spectrul tabloului clinic al acestei populaţii. **Rezultate şi discuţii**: prezenţa, atât la bărbaţi cât şi la femei, dar cu deosebire la primii şi pe ambele mâini ale purtătorilor, aceste

distorsiuni se referă la: *creşterea, frecvenţei pe degete pentru vârtejuri* (însoţită de o diminuare a celei pentru laţuri), *pentru radialitatea structurilor digitale, pentru laţurile raketoide şi pentru monomorfismul bilateral şi al celui individual*, particularităţi prin care seria studiată nu numai că se apropie de comportamentul colectivităţilor cu diverse afecţiuni congenitale şi ereditare dar se distanţează sensibil de cel al populaţiei româneşti în general, şi al celei din Moldova, în special. **Concluzii**: dat fiind că mulţi dintre purtătorii de grave stigmate malformative sunt aparent sănătoşi somato-psihic, ne sugerează că acestea constituie indicatori ai riscului de îmbolnăvire dar şi un semnal pentru o posibilă deteriorare în timp a stării de sănătate a populaţiei.

Cuvinte cheie: dermatoglife digitale, distorsiuni, anomalii, endogamie

INTRODUCTION

The present study is an integrant part of some multi - and interdisciplinary researches there were performed upon communities in Moldavia.

The demographic analysis on the matrimonial areal of the married partners in the village of Butea has evidenced, to a considerable extent, a limitation to the local area and neighbouring villages, which means quite a low level of its demographic opening, as it was suggestively illustrated by an endogamy index which, in the 10 decades of the XX^{th} century, has oscillated between 72% and 86%. Mention should made (of the fact) that such a high community endogamy was not determined by its geographical isolation, but of the local unaltered preservation of the traditional model of marriage, belonging to the Catholic religion. Consequently, the risk of con-sanguinization in population increased, with a potential spreading, of some malformative pathological genes.

Such negative effects of enddogamy occur, although, at the level of the epidermal papillary ridges as deviations from normality, the so-called dermato-glyphic distortions or anomalies, with profound clinical implications on their carriers.

Actually, they are but sketches or signals ("malformative stigmats") of some possible diseases, that will be manifested either exclusively in the carriers (if they are of teratological nature) or in their descendants, as well, sometimes with a leap over generations (when the causal factors are genetic). Having all these in view, the dermatoglyphics may be rightly considered as indicating the risk of disease in endogamous populations (1,2,8). Consequently, they could be used as a screening test applied for the precocious tracing of some (either hereditary or not) congenital maladies, as well as in their individual diagnosis in apparently healthy persons.

Based on the above-observations, the present paper studied the dermatoglyphics in the Catholic population of Butea aiming possible to detect modifications and clinical outcomes.

MATERIALS AND METHOD

For the attainment of the objectives proposed, 200 subjects (100 men and 100 women), of all ages, from Butea the county of Iasi, have been investigated dermatoglyphically, by printing, a

total number of 400 fingerprints being taken over along the year 2003.

In parallels with printing, an individual inquiry was developed, on the health condition in the family's ascending line, for both the two parents and the collateral relatives, for the evaluation - if certain dermatoglyphic distortions or anomalies are traced - of their possible correlation with a malady declared as having been manifested in more or less distant relatives, with the risk of its being transmitted in descendants, as well.

For the evaluation of the population's health condition from this perspective, the indicators of dermatoglyphic pathology, have been analyzed comparatively with those recorded by the author in those collectivities of people with various congenital diseases, many of them hereditary in most of the cases, such as: sekelary infantile encephalo-pathies (IEP), epilepsy, autism, severe ocular diseases (OD), (blindness included), and cardio-vascular diseases (CVD). A control group, of apparently healthy population, has been considered, too (3,6,7,9,11).

The explanation of this approach lies in the fact that, at populational level, the anomalies or the dermatoglyphic distortions actually represent only deviations, in the frequency of certain dermatoglyphic characteristics, from the values recorded in the apparently healthy population, or its similarity with those recorded in various maladies, investigated, too, at the group levels.

The dermatoglyphic peculiarities bearing clinical significance have been analyzed from the viewpoint sexual dimorphism, bilateral differences and distribution on the cumulated 5 fingers of two hands.

The study method, a classical one, as currently applied in research of pathological dermatoglyphy (1,2,4,12).

RESULTS AND DISCUSSION

The population of Butea may be circumscribed to the overall picture of the Romanian population (12), and to that from Moldavia, especially (3), but analysis and statistical processing of the dermatoglyphic date evidences some significant peculiarities, with multiple clinical implications, which make it sensibly different from the reference Moldavian batch, being instead much similar to the collectivities with sekelary EPI-es, epilepsy, autism, OD and CVD, that were already present in the community's pathological picture.

As to **the digital dermatoglyphic picture**, to which the present study is actually devoted, a first deviation to be noticed is ***the sensible increase of whorls' frequency (W), on the whole***, up to 32.85%, *versus* a value of only 24.50% - recorded in the reference batch, - which was almost equal, to that recorded by us in sekelary EPI - es (32.70%) and CVD (32.83%), close to that of the subjects with severe OD (33.80%) and higher comparatively with that of epileptics (30.29%) and autists (29,62%). As in the case of the above - mentioned affections, the higher weight of W with the Butea series - as noticed in men (35.60% *versus* 31.10% recorded in women) - was developed mainly at the expense of the prevailing pattern - the loops

(L) - the average ratio of which decreased up to 60.50% (and even to 56%, in affected subjects), that is with about 10% comparatively with the reference group (69.50%).

The substantial increase of W's frequency at Butea, accompanied by the sensible diminution of the one for L is even more suggestively illustrated by Furuhata index (W/Lx100), the average value of which, 54.34, exceeds the maximum threshold of its normal variability scale, in the Romanian population, ranging between 38.0 and 50.5. Closer values of this index to the Butea series have been observed in sekelary IEP-es (53.33), epilepsy (53.89), while values lower to 5.31 index units were noted in patients with infantile autism (49.03).

A digital anomaly whose medical implications and malformative effects on their carriers may be compared to those caused by the reversion of the internal organs' normal position refers to the higher incidence, comparatively with the normal situation - of the radial orientation of the digital structures, taken as a whole (A + L + W). Such tendency of the digital models' radiality has been observed, too, in other endogamous populations in Moldavia - mostly of Catholic religion (5, 8, 10), but also in some orthodox confessions from other zones (3) as well as in patients with various severe congenital and hereditary maladies.

In the studied population of Butea, taken as a whole, radial orientation attains a very high average ratio - 9.30% - which is a value practically equal to that of the patients suffering from severe OD (9.40%), and close to that of the CVD subjects (11.05%) with sekelary EPI-es (11.50%) or of those with epilepsy (12.30%), yet higher than the value recorded in autists (7.35%) (table 1). As in the case of the reference sample (where radiality attains only 2.85%) or of most of the above - mentioned maladies, such orientation is more frequently occurring in the masculine series (11.10% *versus* 7.5% - of the feminine series), however in relatively similar ratios on the two hands, even with a tendency towards higher values for the left ones (i.e., 9.50% *versus* 9.10% - on the right ones), instead of its prevalence on the right hands, which is the general case.

As to ***the distribution of radial orientation on the cumulated 5 fingers of the two hands, its predominance should be noticed on fingers II and III***, similarly with the case of epielptics or of the reference sample, a reversion from the classical succession occurred for the following three positions, in the order: IV > I > V instead of V > I > IV. This last change in radiality's hierarchy is also considered as one of the most severe malformative stigmats, bearing multiple and deep clinical significances (1,2,7, 9,11).

Another important digital distortion, with profound medical implications for its carriers, refers to ***the presence, on the fingers, of the raketoid loops,*** a pattern which is usually absent in apparently normal populations or

appears only exceptionally, in the Butea series, it attained an average frequency of 8.20%, higher than those recorded in the affections considered for comparative reasons, autism excepted (9.19%) (1,7,8).

Out of the two sexes, ***men recorded slightly higher percent values than women*** (i.e., 8.50% and 7.90%, respectively) while, ***as to the disposition as a function of laterality,*** mention should be made of ***the tendency towards somewhat higher frequencies on the left hands*** (8.60% *versus* 7.80% - on the right ones), there is in both sexes (table 1). The same preferential disposition of the racketoid loops for the left hands has been evidenced, also, in OD and CVD (6,7).

Table 1. Comparative data on the frequency and distribution of some digital anomalies, as a function of sex, laterality and on the 5 cummulated fingers

Digital anomalies	Colectivities	%	Sexual differences	Bilateral differences	Distribution on the cummulated 5 fingers
Radiality's digital modeles (A + L + W)	Butea (N=200)	9.30	M > F	L ≥ R	II > III > IV > I > V
	IEP (N=200)	11.50	F ≥ M	R > L	II > IV > III > I ≥ V
	Epilepsy (N=102)	12.30	M ≥ F	R ≥ L	II > III > IV > I > V
	Autism (N=137)	7.35	F ≥ M	L > R	II > IV > I > III > V
	CVD (N= 95)	11.05	M > F	L ≥ R	II > IV > I > III > V
	OD (N=200)	9.40	M ≥ F	R ≥ L	II > IV > I > III > V
	Reference sample (N=200)	**2.85**	**M > F**	**R > L**	**II > III > V > I > IV**
Raketoid loops	Butea (N=200)	8.20	M > F	L > R	IV > V > II > III > I
	IEP (N=200)	7.50	M > F	R > L	V > IV > II ≈ III > I
	Epilepsy (N=102)	6.66	M = F	R ≥ L	IV > V > I ≥ II > III
	Autism (N=137)	9.19	F > M	R ≥ L	IV > V > II > III > I
	CVD (N= 95)	7.05	M > F	L > R	IV > V > II > III > I
	OD (N=200)	5.05	F > M	L > R	IV > V > III > II > I
	Reference sample (N=200)	-	-	-	-

Last but not least, ***a very important malformative stigmat*** as to its clinical implications and, equally, to its multiple malformative effects - seen as recording spectacular frequencies in the population under study - ***refers to the hand or bilateral monomorphism*** (assuming the presence of the same pattern type on all 5 fingers of one hand) ***and to the individual monomorphism*** (the same pattern on an individual's all 10 fingers) - as illustrated in table 2. As to ***the left-hand monomorphism***, the population of Butea considered as a whole, evidences an average ratio of 28% (table 2), which is practically equal to that recorded in mentally-handicapped (28.37%) and sekelary EPI - affected patients (27.50%), higher with about 10% comparatively to autists, with 6.50% *versus* the persons with malformed children in their families, with about 5% *versus* deaf-and-dumb

ones, epileptics and OD - affected ones and, finally, with 14% *versus* the Moldavian reference sample (table 2). ***Sexual dimorphism for the left-hand monomorphism is expressed by percent values which are clearly superior in men, comparatively with women*** (i.e., 33% and 23% respectively).

Table 2. Frequency of hand and individual monomorphism, differentiated on the two sexes and individual, comparatively with that of the various congenital affections

Colectivities	L	R	Individual	L	R	Individual	L	R	Individual
Butea (N=200)	**33.00**	**29.00**	**21.00**	**23.00**	**26.00**	**10.00**	**28.00**	**27.50**	**15.50**
IEP (N=200)	32.00	27.00	14.00	23.00	23.00	10.00	27.50	25.00	12.00
Epilepsy (N=102)	25.49	11.76	3.92	19.60	19.60	7.84	22.55	15.68	5.88
Autism (N=137)	21.00	26.86	8.95	17.14	21.43	8.57	18.97	24.09	8.75
OD (N=200)	18.00	14.00	3.00	29.00	24.00	12.00	23.50	19.00	7.50
CVD (N=95)	30.00	22.50	10.00	34.64	23.64	12.73	32.63	23.16	11.58
MH (N=200)	29.16	23.61	9.72	27.53	27.53	15.94	28.37	25.53	12.76
DM (N=200)	25.84	24.72	10.11	19.74	21.05	11.84	23.03	23.03	10.90
PMC (N=200)	22.00	24.00	14.00	21.00	23.00	9.00	21.50	23.50	11.50
Reference sample (N=200)	**15.00**	**12.00**	**2.50**	**13.00**	**11.00**	**1.50**	**14.0**	**11.50**	**2.00**

IEP = infantile encephalopathies; OD = ocular diseases; CVD = cardio-vascular diseases; MH = mentally-handicapped; DM = deaf-mutes; PMC = parents with malformed children

On the right hands, the monomorphism attained an average ratio quite close to that of the left ones, of 27.50%, exceeding the recordings for all diseases listed in table 2, with the highest positive difference, comparatively with the sample batch, being of +16%. As in the case of the left-hand mono-morphism, ***the masculine series records higher percent values for the right-hand monomorphism,comparatively with the feminine one*** (of 29% and 26%, respectively). As table 2 shows mention should be made that, in the population of both sexes at Butea, the right hand monomorphism (with only one exception, and only in the feminine series) records frequencies had higher values than those there were registered in the congenital affections analyzed for the sake of comparison.

The individual monomorphism whose pathological significances are much more severe -in the Butea population reached an unexpectedly high average ratio of 15.50%, compared to the only 2% of the sample (table2). The values characterizing the diseases under study, ranged between 5.88% in epileptics and 12.76% in mentally-handicapped ones, and in other endogamous collectivities. As is cited, the individual

monomorphism in apparently normal population, did not exceed the values of 3% (5,8,10,12).

In the masculine series, the individual monomorphism is more than double, comparatively with the feminine one (21% and, respectively, 10%). Both sexes, but men especially, are sensibly different in the presence studied diseases, as table 2 shows. This suggests once more the higher risk of these diseases' extension, in the Butea population.

CONCLUSIONS

The dermatoglyphic study performed on the population of Butea the county of Iaşi, there was evidenced that the high level of the community's endogamy can induce an ample and strong pathological charge of its image, as suggestively illustrated by the presence, in the finger prints of several persons inquired, of certain deviations from normality (anomalies or distortions) bearing multiple clinical significance. In the study group, the "malformative stigmats" attain ratios by which they get closer, equal or even exceed the values registered in communities affected by various congenital maladies, hereditary most of them, such as: sekelary IEP-es, epilepsy, autism, severe OD, CVD.

Both in men and women, but intensively in men, the deviations from normality at the level of the digital image on both hands, have referred to:

- ***the sensible increase of whorls' frequency,*** more intense in men, on the right hands and on fingers I and IV;
- ***a much higher incidence for the radiality of the digital structures***, considered as a whole (A + W + L), mostly in men and on the left hands, as well as in CVD, - and infantile autism - affected subjects, an orientation whose succession on the fingers is identical to that of the epileptics (II > III > IV > I > V);
- ***a high frequency of the racketoid-type loops' presence on the fingers***, with higher values, again, in men and on the carriers' left hands, their distribution on fingers following the same hierarchy as that of the patients affected by infantile autism and OD (IV > V > II > III > I);
- ***considerably high percent values,*** comparatively with those recorded in other endogamous collectivities or in those affected by severe congenital and hereditary maladies, ***for the bilateral and individual monomorphism***. As in the case of previous anomalies, the two forms of monomorphism attain - in the series under study - significantly higher ratios in the masculine series, which suggests a higher degree of affection in men, comparatively with women, as to the pathology of digital dermato-glyphics.

Actually, the dermatoglyphic behavior recorded in Butea population, so similar to that of subjects with sekelary IEP-es, epilepsy, autism, OD and CVD, explains their presence in the population's clinical image (as shown by the declaration of the malformative

stigmats carriers), evidencing at the same time a possible risk of the disease's spectrum extension and even amplification in future generations, the only solution being the community's demographic opening view. In this respect, one of the immediate step to be taken by the decision makers in the field would be the organization of specialized consulting rooms providing premarital genetic advice and family planning information, i.e. selection of the marriage partners from more distant regions, which would undoubtedly revigorate the biological and genetic potential of the community and, improve its health condition.

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