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NEW CONTRIBUTIONS TO THE ELUCIDATION OF DERMATOGLYPHICS' PATHOLOGY WITH ENDOGAMOUS POPULATIONS

ABSTRACT: The paper studies digito-palmary dermatoglyphics, on a number of 583 subjects (283 men and 300 women) of various ages, from three endogamous rural Moldavian (North-East Romania) communities, i.e. the villages of Prăjeşti (the county of Bacău), Răchiteni and Hălăuceşti (the county of Iassy), from which 1,166 finger and palmar prints have been taken over between 1999 and 2001. It was observed that more than 80% of the persons subjected to investigation in the three endogamous villages evidence in the dermatoglyphic picture between 2 and 7 distortions or anomalies with deep pathological significance, out of the more than the 20 ones put into evidence, which assumes an ample pathological charge at both individual and populational levels. Present with both men and women, and arranged – in most cases – on both hands of their carriers, such anomalies record, in all situations, values equal or even exceeding the ones recorded in communities of individuals affected by various genetic maladies, evidencing even the same distribution tendency, as a function of sex, laterality and fingers. Actually, this explains the existence – among carriers – even in their ascendence, at colateral relatives or descendants – of some disease of the type, in parallels with a possible recurrence and, why not, of a diversification in the clinical image of such populations with future generations, if considering that many of the dermatoglyphically stigmatized subjects are children and young ones – apparently healthy, yet liable to getting ill, sometimes even in their descendants.

KEY WORDS: Dermatoglyphics – Endogamy – Pathology – Distortions (anomalies or abnormalities) – Moldavia

INTRODUCTION

It is well-known from the literature of the field that the high endogamy level of a community brings about a higher consanguinization risk and, implicitly, spreading in the population of some pathological genes, the malformative effects of which are influencing, too, the epidermal papillary ridges, where the so-called dermatoglyphic anomalies or distortions – known as having severe clinical implications – occur. They assume significant deviations from the arrangement of the dermal ridges and of the patterns they form and from the classical line of sexual dimorphism and bilateral differences; such deviations are frequently met in various genetic or terathological maladies (Holt 1968, David 1973, Schauman, Milton 1976, Țurai, Leonida 1979, Schauman, Opitz 1991, Țarcă 1997a, Țarcă 1998, Țarcă 2000a, Țarcă 2001a, Țarcă 2001c) and, equally, in demographically closed communities (Marquer, Jacobi 1976, Jacobi, Marquer 1978, Țarcă 1999a, Țarcă 1999b, Țarcă 2000b).

At populational level, such distortions represent nothing but deviations in the frequency of some dermatoglyphic characteristics, from values occurring in normal, demographically opened populations; these deviations tend to get close to, to equal or even to exceed the ones met in collectivities made of individuals affected by grave congenital and hereditary affections. That is why the dermatoglyphic abnormalities are considered to be signals

of some possible diseases (Schauman, Milton 1976, Schauman, Opitz 1991, Ţarcă 1997a, Ţarcă 1997b), that may be manifested either in their carriers (if they are of teratogene origin) or in their descendants – sometimes even with a lap over generations, if the causal factors are of genetic nature. The high occurrence of such malformative stigmata (anomalies) in the dermatoglyphic picture of an endogamous population suggests a possible degradation, in time, of its health condition, if no measures of demographic opening are taken, such as: reduction of marriages between individuals of the same community, and selection of the partner in marriage from more remote regions, thus permitting revigoration of the population's biological and genetic potential.

Having all these observations in view, the present paper develops a thorough study on dermatoglyphics in three endogamous communities from Moldavia, with Catholic population. It actually resumes other investigations of the author – the first ones devoted to such problems in Moldavia – performed in other demographically closed collectivities in the same region (Ţarcă 1999a, Ţarcă 2000b), as well as in the Danube Delta, the county of Tulcea (Ţarcă 1999b).

Mention should be made from the very beginning that the low level of demographic opening of the three communities taken into study is suggestively illustrated by an endogamy index that has oscillated, in the 20th century, between 70% and 80% (Istrate *et al.* 2000, Ştirbu, Simalcsik 2000). Nevertheless, the value of this index is not induced by the villages' geographical isolation but instead, by the preservation of a traditional marital model (between the community's individuals), to which one should add, too, the habitual marriages between persons more or less related among themselves (which is quite common with Catholic populations).

MATERIAL AND METHODS

With a view to attaining the objectives, between 1999 and 2001, 583 persons of various ages – 200 of which (100 men and 100 women) come from the village of Prăjeşti (the county of Bacău) another 200 (100 man and 100 women) from Răchiteni (the county of Iassy) and 183 (83 men and 100 women) from Hălăuceşti (the county of Iassy) – have been investigated dermatoglyphically, 1,166 finger and palm prints being thus taken over.

In parallel with the action of printing, individual inquiries have been initiated on the health condition in the family, including its ascendance (parents, grandparents) and also colateral relatives (uncles, aunts, etc.) and descendants (children, grandchildren). For all indicators of dermatoglyphic pathology taken into study, the sexual and bilateral differences, along with their disposition at the carriers, have been followed and analysed. The results obtained have been reported: to normality, on employing as reference group a sample of 200 persons from Moldavia (Ţarcă 1995a); as well as to the author's own observations, made on a group of 200 subjects – either blind or affected by other serious ocular affections – OA (Ţarcă 2001c); to 98 persons suffering of heart congenital malformations or other severe cardio-vascular diseases – CVD (Ţarcă 2000a); to 200 deaf-mute (DM) subjects and 200 mentally-handicapped (MH) persons (Ţarcă 1994); to 200 parents with malformed or plurimalformed children – MCP (Ţarcă 1997b, Ţarcă 1998), and finally to 108 Downian children parents – DCP (Ţarcă 2001b), the dermatoglyphics of which evidence the stigmata of their children's diseases, all these groups of subjects being from Moldavia.

The explanation to such comparative analyses lies in the fact that inquiry on stigmatized subjects evidenced that the above-mentioned diseases were not only present with some of their carriers but they had been declared as having occurred in their ascending line, as well, in colateral relatives or in some descendants, which indicates that they had already been fixed in the genofund of the populations taken into study.

The working methods applied in the present study are the classical ones (Cummins, Midlo 1961, Penrose 1968, Ţurai, Leonida 1979), to which some new methodologies currently employed in studies of pathological dermatoglyphy (Holt 1968, Schauman, Milton 1976, Loesch 1983, Schauman, Opitz 1991, Ţarcă 1997a, Ţarcă 1998) are added.

RESULTS AND DISCUSSION

Individual analysis of the dermatoglyphic files showed that, out of the total number of investigated subjects, 85% men and 77% women from the village of Prăjeşti, 85% men and 80% women from Răchiteni and, respectively, 81.92% men and 80% women from Hălăuceşti, present, in their digito-palmary dermatoglyphic picture, between 2 and 7 abnormalities or distortions – out of the more than 20 put into evidence – with deep clinical implications. This assumes an ample and strong pathological charge of the dermatoglyphic image, which is correlated – as shown in the following – with a precarious health condition of the three populations. Out of the digital distortions, a special place is occupied by the considerable increase, in all the three closed collectivities under study, of the arches' frequency, with both masculine and, especially, feminine series, the values recorded exceeding considerably not only those of the reference sample, but also those recorded by us for severe ocular affections (OA), for serious cardio-vascular diseases (CVD) or at the malformed children's parents (MCP) from Moldavia (*Table 1*). This actually explains the occurrence of such congenital and hereditary maladies among carriers, and suggests, too, a possible future recurrence of them – if considering that many of the stigmatized persons are children and young ones apparently healthy in the moment of the inquiry.

The substantial increase – comparatively with normal values – of arches' frequency, induced another two

TABLE 1. Comparative data on the frequency of the main digital distortions as a function of sex.

Collectivities	Sex	A on all fingers %	L on all fingers %	W on all fingers %	Lr (racketoid type loops) %	Radiality of the digital structures %	Monomorphism Left %	Right %	Individual %
Prăjeşti	M	12.40	62.10	25.50	6.40	13.10	24.00	14.00	6.00
N = 200	F	14.40	57.00	28.50	5.70	9.40	26.00	22.00	10.00
Răchiteni	M	12.10	63.30	24.60	6.90	12.80	28.00	23.00	13.00
N = 200	F	18.40	59.00	22.80	4.00	10.60	20.00	18.00	11.00
Hălăuceşti	M	6.75	59.76	33.49	5.78	10.10	21.68	14.64	7.23
N = 183	F	17.80	55.90	26.30	7.50	11.20	26.00	24.00	9.00
Reference sample	**M**	**4.50**	**62.40**	**33.10**	**0.80**	**4.60**	**13.00**	**10.30**	**3.10**
(Moldova) N = 200	**F**	**7.20**	**63.10**	**29.00**	**0.75**	**3.80**	**12.10**	**11.50**	**3.20**
O. A.	M	7.30	58.80	33.90	4.80	9.60	18.00	14.00	4.00
N = 200	F	12.30	53.90	33.70	5.30	9.20	29.00	24.00	12.00
C.V.D	M	7.00	56.25	36.70	8.25	14.25	30.00	22.50	10.00
N = 95	F	12.72	58.36	28.91	6.19	8.73	34.54	23.64	12.73
M.C.P	M	6.50	53.60	39.90	7.20	11.70	22.00	24.00	14.00
N = 200	F	13.30	54.70	32.00	6.80	11.40	21.00	23.00	9.00

O.A. – ocular affections; C.V.D. – cardio-vascular diseases; M.C.P. – malformed children's parents; M – males; F – females

important distortions, namely a considerable diminishing of both loops' (at Hălăuceşti) and whorls' (at Prăjeşti and Răchiteni) frequency. More than that, one may notice a change in the classical line of sexual dimorphism for loops (in all the three villages) – which assumes their higher frequency with men than with women, and only at Prăjeşti for whorls, – which means their higher weight in the case of women and not in men – a tendency quite frequently met in endogamous populations (Marquer, Jacobi 1976, Jacobi, Marquer 1978, Ţarcă 1995a, Ţarcă 1999a, Ţarcă 1999b, Ţarcă 2000b) and with profound medical implications.

A higher incidence – versus normality – of the racketoid type loops, a model quite frequently met in several grave genetic and terathological maladies (David 1973, Marquer, Jacobi 1976, Loesch 1983, Ţarcă 1995a, Ţarcă 1999a, Ţarcă 1999b, Ţarcă 2000b) and also in the affections listed in *Table 1*, represents another digital anomaly, which records, in all the three closed communities considered, percentual values strikingly close to both those evidenced by subjects suffering from OA (Ţarcă 2000a) or by MCP (Ţarcă 1997a, Ţarcă 1998) and to those recorded in other endogamous populations investigated (Marquer, Jacobi 1976, Ţarcă 1997b, Ţarcă 1999b, Ţarcă 2000b). Similarly to the above-mentioned cases, racketoid, type loops occur, in all series studied, more frequently on the left hands, at both sexes, evidencing even the same hierarchization in their distribution on the fingers, in decreasing order of their frequency: IV > V > III > II > I.

Another serious digital anomaly, the medical consequences of which may be compared with those determined by reverse of the internal organs' normal position (*situs inversus organum*), refers to the increased frequency of the digital structures' radial orientation (radiality of the digital structures), recording quite close values, for the two sexes, as in the case of the affections listed in *Table 1*, too. This radial orientation of the digital models is more frequently met on the left hand (with both men and women) instead of the right one – as usual with the reference sample and, generally, with open populations (Cummins, Midlo 1961, Ţurai, Leonida 1979, Ţarcă 1995a). Also, the succession radiality's distribution in decreasing order of frequency differs in the endogamous populations investigated, with the exception of the first position in the diagram, as follows II > IV > I > III > V or II > I > IV > V > III instead of II > III > V > I > IV or II > V > III > IV > I, which occurs in open populations and in the reference sample. Such inversions from the classical tendencies of radiality's distribution as a function of hand and fingers may be considered among the digital anomalies frequently occurring in closed collectivities (Marquer, Jacobi 1976, Ţarcă 1995a, Ţarcă 1997b, Ţarcă 1999a, Ţarcă 1999b, Ţarcă 2000b), as well as in several serious genetic diseases (David 1973, Schauman, Milton 1976, Schauman, Opitz 1991, Ţarcă 1994, Ţarcă 2000a, Ţarcă 2001a, Ţarcă 2001c).

Finally, the last digital distortion present in all the three endogamous populations under investigation, to be met in almost all severe genetic maladies (David 1973, Ţurai, Leonida 1979, Loesch 1983, Schauman, Opitz 1991), and also in the diseases recorded in *Table 1*, involves a sensible increase in the frequence of both bilateral monomorphism (left – and right – with the same type of pattern on all the five fingers) and individual monomorphism (the same type of pattern on all the ten fingers) comparatively with the reference sample. For each of the three types of monomorphism (left, right and individual), in the villages of Prăjeşti and Hălăuceşti, women evidence higher values than men – as

TABLE 2. Comparative data on the percent distribution of patterns in the 5 palmar compartments.

Populations	Hp.	Th/I	II	III	IV
Prăjeşti	30.00	7.20	4.25	29.00	44.25
Răchiteni	30.20	7.00	2.70	23.50	46.00
Hălăuceşti	34.69	7.10	2.18	22.68	39.89
Săbăoani – Moldova (Ţarcă 1998)	29.70	8.00	2.50	28.75	37.00
Fărăoani – Moldova (Ţarcă 2000)	39.50	5.00	2.25	22.25	49.75
Gherăeşti – Moldova (Ţarcă 2000)	33.50	8.50	1.75	31.25	39.25
O.A. – Moldova (Ţarcă 2000, 2001)	33.00	3.50	3.50	31.75	43.50
M.H. – Moldova (Ţarcă 1994)	31.91	11.70	3.56	30.85	46.81
M.C.P. – Moldova (Ţarcă 1998)	34.00	6.50	3.70	30.20	45.50
D.C.P.– Moldova (Ţarcă 2001)	31.13	6.60	–	28.30	41.51
Reference group from Moldavia (Ţarcă 1995)	**33.69**	**9.47**	**3.48**	**41.61**	**53.84**

IV > Hp > III > Th/I > II instead of: IV > III > Hp > Th/I > II; O.A. – ocular affections; M.H. – mentally handicapped persons; M.C.P. – malformed children's parents; D.C.P. – Down children's parents

in the case of OA and CVD, too – while at Răchiteni, on the contrary, men show higher values than women – a tendency also met with MCP in Moldavia.

A larger range of dermatoglyphic distortions, having deep pathological significance, was provided by the palmary image of the three endogamous populations. The first one, which is more general, refers to the change in the distribution succession's frequency with the patterns in the palmar compartments in decreasing order of its value, by positioning the Hypothenary on the second place of the formula IV > Hp > III > Th/I > II, instead of IV > III > Hp > Th/I > II, as occurring with the reference sample (*Table 2*), as well as with other Romanian (Ţurai, Leonida 1979, Ţarcă 1995a,) and Europoid (Cummins, Midlo 1961) populations. Analysis of *Table 2* evidences the fact that the same hierarchization of the pattern's frequency observed in the endogamous collectivities taken into study will be met with other closed populations from the same regions (Ţarcă 1991, Ţarcă 2000b) – that is, from the villages of Săbăoani, Gherăeşti (the county of Neamţ) and Fărăoani (the county of Bacău), as well as in the case of congenital and hereditary affections presented also in *Table 2*.

As will be seen in the following, such a generalized anomaly is to be correlated with others, equally important from the viewpoint of their clinical implications, and whose frequency, comparatively with that of some genetic maladies, is presented in *Table 3*. One may observe from here that, for all palmar anomalies evidenced, the series of men and women from Prăjeşti, Răchiteni and Hălăuceşti are significantly different from the percent values of the reference group, being equal or even exceeding those recorded by us with MH, DM, CVD, OA, MCP, DCP, all from the same area of Moldavia.

In the Hypothenary area, a first anomaly refers to the very high frequency, with all series taken into study, of the ulnar oriented loop (L^U), a genetically determined ridge formation (*Figure 1a*), quite rarely met in open collectivities (0–2.5%) and of 4.70% in the reference group. One should observe from *Table 3* that, with the exception of the series from Răchiteni, where L^U is more frequent in women, comparatively with men, this rare ridge formation attains higher ratios in the case of men, and also on the right palms of both males and females (the Hălăuceşti series excepted), a tendency to be observed, too, with the disease recorded by us in the same *Table 3*.

The increased incidence, in the same Hypothenar of the structurally complicated type patterns [W = whorls (*Figure 1d*); LP = lateral pockets; TL = twin loops], or of the coupling of 2 or 3 patterns (L+A (*Figures 1b, 1c*), L+L, A+L+W, etc.), induced an unexpected increase of the frequency of palms in which 2, 3 or even 4 triradia – among which at least one in distal position – occur. The frequency of cases evidencing such distortion is much similar to that met with the parents of Downian children, with mentally handicapped or deaf-dumb persons (as occurring in the Prăjeşti population), or to that of MCP (as at Răchiteni) or it equals that occurring with OA, as in the case of Hălăuceşti population. Once again, this explains the occurrence of such diseases in the populations considered, as well as their possible recurrence in future generations.

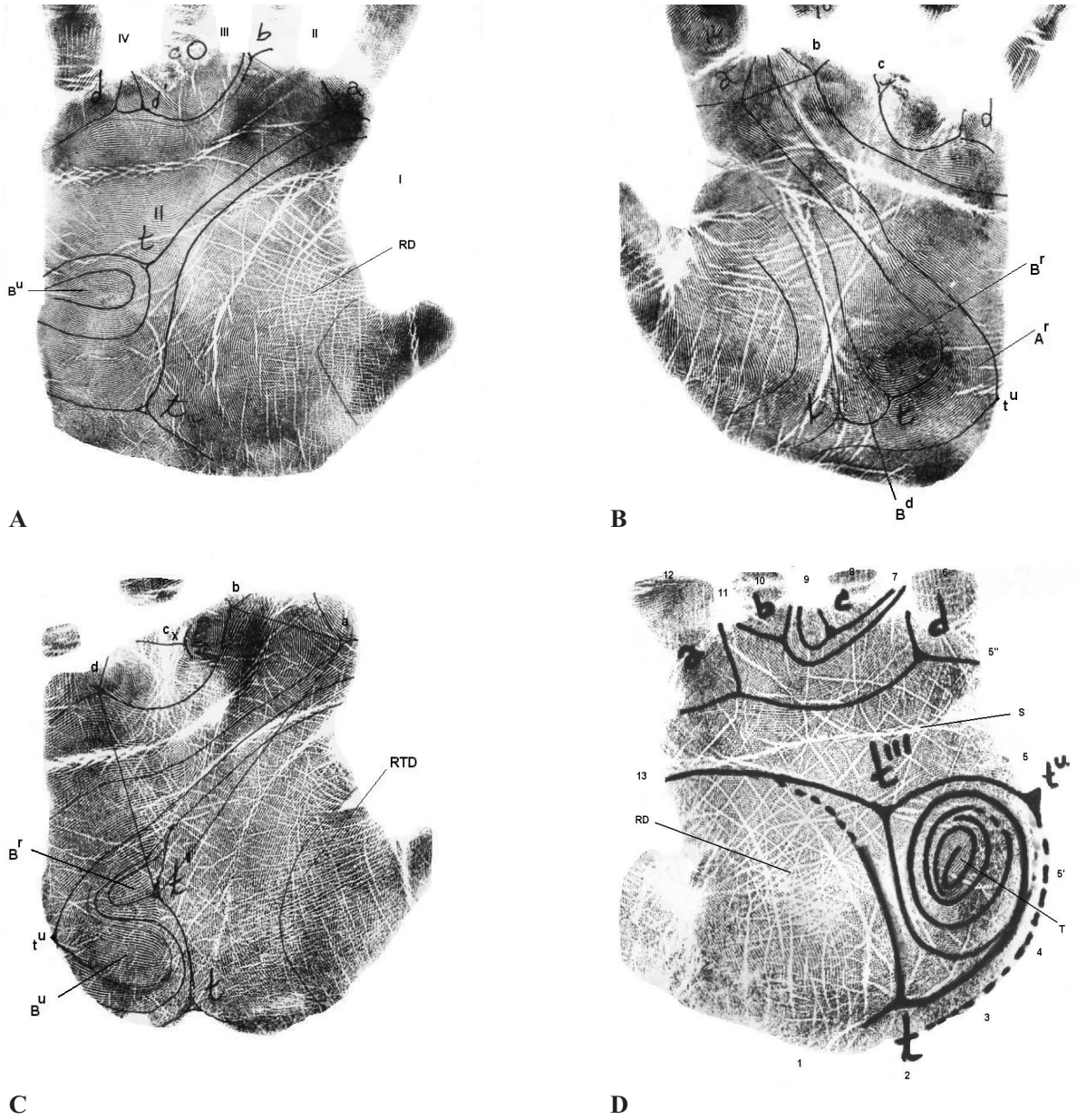
The increase of frequency for combinations of 2, 3 or 4 triradia in palm's Hypothenar (*Figures 1a, 1b, 1c, 1d*) induced a sensible diminishing for the basal or axial position of the "t" triradius. This distortion is better observed with the feminine series, and also in the left palms of both the male and female persons – which is actually the same situation as that of persons affected by various hereditary maladies (listed in *Table 3*), as well as in other endogamous populations (Marquer, Jacobi 1976, Ţarcă 1999a, Ţarcă 1999b, Ţarcă 2000b).

Finalization of line T's trajectory (starting from triradius t) in palm's fields 11 and 12 instead of 13 – as generally recorded with Romanian population (Ţurai, Leonida 1979), and that of Moldavia, especially – (Ţarcă 1995a), represents one of the palmary distortions with deep medical implications (Ţurai, Leonida 1979, Schauman, Opitz 1991, Ţarcă 1997a, Ţarcă 2000a, Ţarcă 2001c), which records the highest rates at Hălăuceşti, followed by Prăjeşti and

TABLE 3. Comparative data on the frequency of the main palmar anomalies as a function of sex.

Collectivities	Sex	L^U from Hp	Axial or basal t	Combinations of 2.3 or 4 t (tt', tt't'', t't''t^u etc.)	Finalization of T line in fields 11 and 12 instead of 13	Dense and very dense network in Th/I	Distance a-b much below 21 mm of F and 24 mm of M	Distance a-b much over 21 mm of F and 24 mm of M	Cx (partial suppression of "C" line)	Co (total suppression of "C" line)	Transverse palmary sulcus (Simian crease)
Prăjeşti	M	13.00	63.50	21.50	25.50	4.37	25.90	28.31	31.00	5.00	9.03
N = 200	F	11.50	49.00	30.00	22.00	29.00	21.00	34.00	33.00	7.50	4.50
Răchiteni	M	9.50	62.50	25.00	17.50	11.50	40.00	19.00	37.50	5.00	11.00
N = 200	F	12.00	49.50	26.00	18.50	44.00	29.00	15.50	31.00	12.50	8.50
Hălăuceşti	M	12.05	53.61	30.12	27.71	15.06	33.13	12.65	35.54	6.02	4.22
N = 183	F	9.50	48.00	30.50	29.50	41.00	14.00	25.00	36.00	8.00	8.50
Reference sample – Moldova N=200	**M**	**5.90**	**75.70**	**15.20**	**5.20**	**2.10**	**5.70**	**3.50**	**15.90**	**2.20**	**2.10**
	F	**3.50**	**66.80**	**18.80**	**7.00**	**5.50**	**6.10**	**4.20**	**11.60**	**2.50**	**1.50**
M.H.	M	9.30	52.90	28.30	18.60	20.70	82.90	3.60	21.50	9.10	8.00
N = 200	F	2.50	51.80	21.30	19.20	45.80	49.20	14.20	21.00	7.20	9.20
D.M.	M	9.50	56.70	27.50	13.60	18.20	60.20	9.60	20.00	8.00	7.90
N = 200	F	8.00	48.70	29.60	23.00	32.70	30.00	20.80	19.10	9.20	3.00
M.C.P.	M	11.00	59.50	27.00	21.90	25.50	27.30	52.00	28.00	7.00	12.00
N = 200	F	11.00	51.00	26.00	32.10	43.50	15.00	67.00	25.50	10.50	17.10
D.C.P.	M	12.50	62.50	22.00	9.40	9.45	37.50	15.60	34.40	3.10	6.60
N = 108	F	10.80	44.50	29.70	14.80	19.00	16.20	35.10	31.10	10.80	9.50
O.A.	M	14.60	58.00	30.50	14.00	23.50	53.50	7.50	33.50	10.50	4.50
N = 200	F	11.50	53.00	30.00	19.00	58.50	25.00	16.00	21.00	12.50	4.10
C.V.D.	M	17.50	48.70	38.70	35.00	31.20	56.20	7.50	38.70	8.80	2.50
N = 95	F	10.10	41.80	31.80	35.50	42.70	32.70	32.00	27.70	8.20	8.20

M.H. – mentally handicapped; D.M. – deaf-mutes; M.C.P. – malformed children's parents; D.C.P. – Down children's parents; O.A. – ocular affections; C.V.D. – cardio-vascular diseases; M – males; F – females



Ar = radial arch
Lu = ulnar loop
Lr = radial loop
Ld = distal loop (parathenar model)
W = whorl
DN = dense network in the Th / I area
VDN = very dense network in the Th / I area
Cx = partial deletion of the C line
C0 = total deletion of C line
a, b, c, d = subdigital triradii
I, II, III, IV = interdigitals spaces of the palm
1,2, …, 13 = the fields of the palm
t = axial triradius
t'; t" et t'" = distal triradii
tu = axial triradius
S = sulcus

FIGURE 1. The main distortions (abnormalities) of the palm.

Răchiteni (*Table 3*). Special mention should be made of the fact that the frequencies recorded for both men and women at Hălăuceşti are the closest to those observed by us with CVD and MCP. However, in the Răchiteni and Prăjeşti series, T_{11} and T_{12} either exceed the frequency present in OA, at DCP or MH, or is close to that of the persons from Moldavia affected by congenital deafness. Out of the two hands, T_{11} and T_{12} are more frequently met, with all series of men and women, on the carriers' left, and not right palms.

In the Thenary compartment (Th/I), a quite frequent anomaly observed at blind people or at subjects suffering from serious ocular affections, in CVD at DM (deaf-mutes) and MCP, and also frequent enough in the endogamous populations under study, refers to the arrangement of the dermal ridges occurring as a dense or very dense network *(Figures 1d, 1c)*. In all cases, the mentioned affections included, such a distortion is much more frequent with women than with men and on the right palms of both sexes.

In the interdigital space II, two distortions almost always present in the anomalies of the sexual chromozomes (David 1973, Schauman, Opitz 1991), which are also to be met in several other genetic or terathological maladies (Cummins, Midlo 1961, Holt 1968, Loesch 1983, Schauman, Opitz 1991, Țarcă 1994, Țarcă 1997a, Țarcă 2000a, Țarcă 2001a, Țarcă 2001c), and which record high ratios in the series investigated, refer to the reduction, much below the average values recorded with the Romanian population (21 mm in women and 24 in men) of the distance between triradia a and b (a-b), which delimitates this compartment of the palm *(Figure 1b),* or to the increase – much above average values – of this a-b distance *(Figure 1c)*. Out of the 3 endogamous populations under investigation, diminishing, much below the average, of the distance a-b, is most frequently met with the series at Răchiteni, while its increase over the normal average value – with the series at Prăjeşti. The first distortion is more frequent with men and on the right palms of both sexes, while the second, on the contrary, is present predominantly with women, and on the left palms (with the exception of the Răchiteni population for sexual differences and of the Prăjeşti population for bilateral ones). Similarly to the previously analysed distortions, decreasing or increasing of the distance a-b in the interdigital area II tends to attain percentual values quite close to those recorded in the genetic affections listed in *Table 3*.

The above-mentioned considerable decrease of the patterns frequency in the interdigital area III is mainly caused by two palmar anomalies occurring at this level. These are: the partial or total suppression of C line (Cx and, respectively, Co), which starts from triradius c found under finger IV, which represent very important formations in studies of human pathology (Țarcă 1995c) with multiple medical implications. The former one, also named by C. Plato (1971) "the proximal model type of C line (Cx)" *(Figure 1c),* attains its highest ratios in the Hălăuceşti population, being followed closely by those recorded at Răchiteni and Prăjeşti. The percent values for this serious distortion exceed those evidence by us at MH, DM, OA, CVD, MCP, DCP, which explains, too, its profound clinical significance. The sexual dimorphism in the distribution of the modal type Cx which, in both the reference group and in the above-mentioned affections, assumes higher frequencies with men, comparatively with women, is oscillating in the three closed communities, Cx recording higher ratios either with men (the situation in Răchiteni) or with women (Prăjeşti and Hălăuceşti), although no significant differences are noticed. For abortive or missing C Line, named by the same author (C. Plato) "the absent modal type of C Line" (*Figure 1a*), the endogamous populations investigated maintain the classical dimorphic tendency, present in Romanian and Europoid populations, which assumes higher percentual values for women comparatively with men. Higher ratios are recorded in the women at Răchiteni, followed by those at Hălăuceşti and Prăjeşti. As to the distribution of the two modal types, Cx and Co, as a function of laterality, special mention should be made of the fact that, generally, with all series, it assumes higher frequencies on the left palms of persons of either sex, a tendency actually present in the Romanian population in general (Țurai, Leonida 1979) and especially in the Moldavian one (Țarcă 1995a, Țarcă 1995b).

Finally, a last palmar distortion, equally serious as to its pathological significance (Holt 1968, David 1973, Marquer, Jacobi 1976, Schauman, Milton 1976, Loesch 1983) is the transverse palmar sulcus or the Simian Crease *(Figure 1d)*, an atavistic formation all-present in Simians, and met in over 50% of the persons suffering from the Down syndrome (Cummins, Midlo 1961, Schauman, Milton 1976, Schauman, Opitz 1991, Țarcă 2001a), in their parents (Țarcă 2001b), as well as in other severe maladies listed in *Table 3*. The highest frequency of a single transverse flexion crease (sulcus) was recorded with the Răchiteni populations, which is almost equalizing that of MH. From this point of view, the series from Prăjeşti and Hălăuceşti evidence percent values closer to those of DM and DCP, exceeding nevertheless those observed by us in OA and CVD, a fact which confirms the medical implications of this atavistic formation for both the carriers and their descendants. For all the three series, the sexual dimorphism concerning the distribution of the transverse palmar sulcus maintains the tendency registered with the reference sample and, generally, with the Romanian population (Țurai, Leonida 1979, Țarcă 1995a) – i.e. higher frequencies in men, comparatively with women, the reverse situation of that occurring in most of the severe genetic maladies (DM excepted). Considering the two hands, the Simian crease is always more frequently occurring on the left hands, as well as in collectivities with various affections – with the exception of the deaf-dumb ones, where they are prevailing on the right palms, both with men and women, a peculiarity which, together with another one of the present study, is specific to this malady (Țarcă 1994).

As both carriers' and descendants' extent of affection is correlated – from the viewpoint of the pathological

TABLE 4. Disposal of palmar dermatoglyphic anomalies with carriers from the three endogamous populations.

	Collectivities	Left hand only	Right hand only	Both hands	Total carriers/ investigated persons
L^U from Hypothenar	Prăjeşti	12 : 38 = 31.58	15 : 38 = 39.47	11 : 38 = 28.94	38 : 200 = 19.00
	Răchiteni	11 : 33 = 33.33	12 : 33 = 36.36	10 : 33 = 30.30	33 : 200 = 16.50
	Hălăuceşti	10 : 28 = 35.71	7 : 28 = 25.00	11 : 28 = 39.28	28 : 183 = 15.30
axial "t" from Hp	Prăjeşti	33 : 136 = 24.26	16 : 136 = 11.76	87 : 136 = 63.97	136 : 200 = 68.00
	Răchiteni	28 : 136 = 20.59	22 : 136 = 16.17	86 : 136 = 63.23	136 : 200 = 68.00
	Hălăuceşti	23 : 116 = 19.83	25 : 116 = 21.55	68 : 116 = 58.62	116 : 183 = 63.39
tt'. t't"t^u. etc.	Prăjeşti	15 : 76 = 19.74	34 : 76 = 44.73	27 : 76 = 35.53	76 : 200 = 38.00
	Răchiteni	20 : 76 = 26.31	30 : 76 = 39.47	26 : 76 = 34.21	76 : 200 = 38.00
	Hălăuceşti	21 : 77 = 27.27	23 : 77 = 29.87	33 : 77 = 42.86	77 : 183 = 42.07
T_{11} şi T_{12} instead of T_{13}	Prăjeşti	45 : 76 = 59.21	12 : 76 = 15.79	19 : 76 = 25.00	76 : 200 = 38.00
	Răchiteni	35 : 58 = 60.34	12 : 58 = 20.69	11 : 58 = 18.96	58 : 200 = 29.00
	Hălăuceşti	44 : 84 = 52.38	14 : 84 = 16.66	26 : 84 = 30.95	84 : 183 = 45.90
Dense and very dense network in Th/I	Prăjeşti	6 : 39 = 15.38	8 : 39 = 20.51	25 : 39 = 64.10	39 : 200 = 19.50
	Răchiteni	11 : 68 = 16.17	14 : 68 = 20.59	43 : 68 = 63.23	68 : 200 = 34.0
	Hălăuceşti	9 : 62 = 14.52	9 : 62 = 14.52	44 : 62 = 70.97	62 : 183 = 33.88
a-b distance much below 24 mm in men and 21 mm in women	Prăjeşti	6 : 51 = 11.76	13 : 51 = 25.49	32 : 51 = 62.74	51 : 200 = 25.50
	Răchiteni	16 : 90 = 17.77	26 : 90 = 28.88	48 : 90 = 53.33	90 : 200 = 45.00
	Hălăuceşti	14 : 71 = 19.72	20 : 71 = 28.17	37 : 71 = 52.11	71 : 183 = 38.80
a-b distance much over 24 mm in men and 21 mm in women	Prăjeşti	20 : 79 = 25.31	23 : 79 = 29.11	36 : 79 = 45.57	79 : 200 = 39.50
	Răchiteni	15 : 51 = 29.41	12 : 51 = 23.53	24 : 51 = 47.06	51 : 200 = 25.50
	Hălăuceşti	22 : 56 = 39.28	12 : 56 = 21.43	22 : 56 = 39.28	56 : 183 = 30.60
Cx	Prăjeşti	44: 101 = 43.56	30 : 101 = 29.70	27 : 101 = 26.73	101 : 200 = 50.50
	Răchiteni	44 : 109 = 40.36	38 : 109 = 34.86	27 : 109 = 24.77	109 : 200 = 54.50
	Hălăuceşti	43 : 105 = 40.95	34 : 105 = 32.38	28 : 105 = 26.66	105 : 183 = 57.37
Co	Prăjeşti	7 : 19 = 36.84	6 : 19 = 31.58	6 : 19 = 31.58	19 : 200 = 9.50
	Răchiteni	14 : 30 = 46.66	10 : 30 = 33.33	6 : 30 = 20.00	30 : 200 = 15.0
	Hălăuceşti	7 : 21 = 33.33	9 : 21 = 42.86	5 : 21 = 23.81	21 : 183 = 11.45
Simian crease	Prăjeşti	7 : 18 = 38.88	5 : 18 = 27.77	6 : 18 = 33.33	18 : 200 = 9.00
	Răchiteni	19 : 32 = 59.37	6 : 32 = 18.75	7 : 32 = 21.87	32 : 200 = 16.00
	Hălăuceşti	10 : 21 = 47.62	8 : 21 = 38.09	3 : 21 = 14.28	21 : 183 = 11.47

significance of each palmar distortion – with the manner in which they are disposed, too, on either one hand or, simultaneously, on both, the individual dermatoglyphic files have been analyzed from this point of view, too. The analysis led to the observation that, as to the basal position of triradius "t", as to the disposition of the dermal ridges from Thenar/I in a dense and very dense network, as to the reduction, much below normal values, of distance a-b from the interdigital space II, as well as to its increase, much above normal values, most of the carriers – of both sexes – evidence them on both palms. As to T_{11} and T_{12}, Cx, Co and the transverse palmar sulcus (Simian crease), with most of the carriers, they are occurring exclusively on their left palms, while, in the case of L^U from Hypothenar and of the simultaneous coexistence, in the palm, of 2, 3 or 4 triradia, most frequent are the cases with exclusive disposal on the carriers' right palms, with the exception of the Hălăuceşti series, where the bimanual disposition remains major.

The fairly high frequency – in the endogamous populations investigated – of abnormalities' occurrence on both hands of the carriers, suggests a possible malformative double effect of the pathological genes responsible for these. However, if considering, too, the intense hereditary character of dermatoglyphics, and also the quite numerous clinical implications of the distortions put into evidence (besides those related to the maladies considered for the sake of comparison), there exists the risk of recurrence for many of these maladies, along with the amplification, in time, of the clinical image of these populations, and consequently, of a more precarious health condition with the coming generations. That is why our suggestion is that, for preventing such undesirable situations, a demographic opening of these localities is necessary; this means selection of the partners in marriage from more remote areas, which would bring about a new vigour in the populations' biological and genetic potential. One of the prevention and primary prophylaxy measures being, in this case, the dermatoglyphic test.

CONCLUSIONS

Analysis of the digito-palmar dermatoglyphics of the populations from the endogamous villages of Prăjeşti, Răchiteni and Hălăuceşti in Moldavia has shown that more than 80% of the investigated persons are being stigmatized, that is, their dermatoglyphic image evidences important distortions or anomalies with deep clinical implications. Out of the more than 20 malformative stigmata put into evidence, each carrier bears – within one's general digito-

palmar picture – between 2 and 7 such anomalies, which assumes an ample and intense pathological charge at both individual and populational levels. Present in both men and women, and occurring prevailingly on both hands of the carriers, these abnormalities do not only record, in each of the three closed communities, percent values close to, equal or even exceeding those recorded with subjects affected by various genetic maladies, but – with only a few exceptions – they evidence the same distributional tendency, as a function of sex, laterality and fingers, with that of the latter ones. This supports, once more, the idea that the timely presence of some of these maladies among carriers as well as in their ascendancy, colateral relatives or descendants, is more than justified. More than that, if considering the strong hereditary character of dermatoglyphics, one may assert that the risk of recurrence, and also of extension – and even amplification, in the future – of the clinical image of such populations, the more so that many of the stigmatized individuals are children and young ones which, in spite of their apparent good health condition in the moment of the inquiry, may get ill at any time in the future.

All these observations lead to the conclusion that utilization of dermatoglyphics in testing the illness' risk in endogamous populations becomes absolutely necessary, so that the decision makers in such communities should be given the opportunity to take measures of primary prevention, for opening such communities, which will undoubtedly contribute to the recovery of the biological and genetic potential of the endogamous populations and, implicitly, to their improved health condition.

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