

## Dermatoglyphic characteristics of a population from Gotse Delchev region (South-West Bulgaria)

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138 males and 177 females aged from 18 to 55 years from the villages of Kornitsa, Breznitsa and Lazhnitsa - Gotse Delchev region have been studied aiming at the distinction of a dermatoglyphic complex specific of this population. The results from the analysis of the basic ethnic dermatoglyphic features showed that as a whole the investigated sample belongs to the Europoid sphere and it is with well-pronounced South-Europoid features.

*Key words:* ethnic dermatoglyphics, South-Europoid features, eastern (mongoloid) complex, southern complex, combination polygons.

A number of studies concerned with the investigation of local variability of certain dermatoglyphic features have been carried out in our country recently. After a summed-up comparison of these features it is possible to determine the dermatoglyphic complex typical of the populations of every studied region of Bulgaria. The comparison of the dermatoglyphic complexes of the different populations groups gives the possibility some processes of amalgamation of different components in the formation of these groups to be traced [2].

The aim of this investigation is to make a dermatoglyphic characterization of a population from the Gotse Delchev region, South-West Bulgaria and to determine its specific dermatoglyphic complex.

### Material and Methods

The population of the villages Kornitsa, Breznitsa and Lazhnitsa has been studied. Bulgarian seeking Muslims present the majority of the population in these three villages. Because of their Bulgarian ethnic origin and Muslim confessional tradition they are separated in a specific community. Endogamy is the most important characteristic of the population structure of this community. More than 90% of the marriages in the studied villages are contracted in the same three villages. Thus the community is transformed into a biologic population.

A total of 138 males and 177 females aged 18 - 50 have had their dermatoglyphic digital and palmar imprints of the both hands investigated (24 males and 47 females from Breznitsa, 72 males and 49 females from Kornitsa and 42 males and 81 females from Lazhnitsa). The processing of the material was performed after the conventional method of Cummins and Midlo [1]. The position of the proximal palmar triradii was determined after the scheme of A. Sharma [4]. The calculation of the dermatoglyphic distance (DD) and the mongoloid (eastern) complex after the key features as well as the assessment of these parameters was carried out after the method of Heet [5]. This method gives also opportunities for determining the southern complex. Using the clusterisation after Lance, Williams [3] separate clusters were ruled out incorporating samples of similar dermatoglyphic types.

## Results and Discussion

*Digital relief.* Rainbow patterns in both sexes vary insignificantly - from 2.9 to 4% in men and from 4.4 to 5.3% in women. The highest frequency of the features was established in the women from the villages of Breznitsa. The radial loops vary in men from 1.7 to 3.1% and from 0.8 to 2.7% in women. With regard to the ulnar loops women from all three villages are almost uniform (52.9 - 55.2%). Similar is the tendency in men as well (46.7 - 48.3%). Among them the frequency of this feature is lower 48.3% than it is in women 54.2%. The overall quantity of this feature shows the same tendency 51.0% in men and 56.1% in women. The circular pattern in the men varies in the limits of 40.4 to 46.2% and in the women from 37.6 to 40.8%. A higher concentration of this feature was established in the men - 45.4% compared to the women - 39.1%. The pattern intensity index (PII) is distributed rather evenly in both sexes - 13.75 - 14.26 in the men and - 13.32 - 13.55 in the women. The higher value of the PII in the men results from the lower per cent of rainbow patterns and ulnar loops and from the higher concentration of the circular patterns (Table 1).

*Main palmar lines.* The A line most often ends up in fields 3 and 5 (49% and 30%) in men and (43% and 35%) in women. In both sexes the lower type predominates - 69.6% in men and 66.7% in women. Of the D line the high type of ending is characteristics also in both sexes (55.0% in men and 49.1% in women). The low type is weakly represented (10.1% in men and 15.2% in women). The Cummins index has medium values in both sexes (Table 2).

*Axial palmar triradii.* The studied population from the villages of Kornitsa, Breznitsa and Lazhnitsa showed a low frequency of the proximal palmar triradius

Table 1. Digital pattern (%) and pattern intensity index (PII)

Group	Number and sex	A+T	R	U	R+U	W	PII
Breznitsa	24 m.	2.9	1.7	55.0	56.7	40.4	13.75
	47 f.	5.3	0.8	52.9	53.8	40.8	13.55
Kornitsa	72 m.	3.6	3.1	47.1	50.1	46.2	14.26
	49 f.	4.7	1.4	53.9	55.3	40.0	13.53
Lazhnitsa	42 m.	4.0	2.6	46.7	49.3	46.7	14.26
	81 f.	4.4	2.7	55.2	57.9	37.6	13.32
Total	138 m.	3.6	2.7	48.3	51.0	45.4	14.17
	177 f.	4.7	1.9	54.2	56.1	39.1	13.44

T a b l e 2. Types of the main palmar lines (%) and Cummins index (MLI)

Group	Number and sex	Line A				Line D				MLI
		1(1+2)	3(3+4)	5(5+6+7)	M	7	9	11	M	
Breznitsa	24 m.	6.2	66.7	27.1	3.42	12.5	45.8	41.7	9.58	8.13
	47 f.	5.3	67.0	27.7	3.45	8.5	34.0	57.5	9.98	8.66
Kornitsa	72 m.	2.8	70.8	26.4	3.47	6.2	28.5	65.3	10.18	8.83
	49 f.	2.0	66.3	31.6	3.59	17.3	31.6	51.0	9.67	8.40
Lazhnitsa	42 m.	8.3	69.0	22.6	3.29	15.5	39.3	45.2	9.59	8.06
	81 f.	8.0	66.7	25.3	3.35	17.9	38.9	43.2	9.51	8.04
Total	138 m.	5.0	69.6	25.4	3.41	10.1	34.8	55.0	9.89	8.47
	177 f.	5.6	66.7	27.7	3.44	15.2	35.6	49.1	9.67	8.30

T a b l e 3. Axial palmar triradii (%)

Group	Number and sex	t	t'	t''	tt'	tt''	t't''	tt	t't'	t''t''	tt't''	tt't''	0
Breznitsa	24 m.	60.4	25.0	6.2	—	4.2	—	2.1	—	—	—	—	2.1
	47 f.	43.6	29.8	3.2	8.5	7.4	—	—	—	3.2	—	—	4.3
Kornitsa	72 m.	56.2	18.8	4.9	4.9	9.7	5.5	—	0.7	—	—	—	—
	49 f.	60.2	19.4	8.2	6.1	4.1	—	—	1.0	—	1.0	—	—
Lazhnitsa	42 m.	57.1	19.0	7.1	4.8	3.6	2.4	—	1.2	—	—	—	4.8
	81 f.	50.6	22.2	11.7	2.5	6.2	3.1	—	0.6	0.6	0.6	0.6	1.2
Total	138 m.	57.2	19.6	5.8	3.9	6.9	3.6	0.4	0.7	—	—	—	1.8
	177 f.	51.4	23.4	8.5	5.1	5.9	1.4	—	0.6	1.1	0.6	0.3	1.7

(57.2% in the men and 51.4% in women) in both sexes. The intermediate triradius is more often met in women - 23.4% than in men - 19.6%. In both sexes the median triradius is more rare — 5.8% in men and 8.5% in women. Parting is even more rare - 1.8% in the men and 1.7% in the women (Table 3).

Real palmar pattern. With regard to the hypothenar pattern the men from the villages under study do not differ among themselves. The incidence of the feature varies between 35.4% and 35.7%. In the women's sample the incidence of the hypothenar pattern is lowest in the village of Kornitsa - 29.6%. In the villages of Lazhnitsa and Breznitsa this feature varies between 40.1% and 43.6%. The frequency of the pattern on the II<sup>nd</sup> interdigital pad is low 9% in the males and 4.5% in the females. The pattern on the III<sup>rd</sup> and IV<sup>th</sup> interdigital pads has almost identical frequencies in the males 32.6 - 34.8% while in the women the IV<sup>th</sup> interdigital pad shows a greater incidence of the pattern - 37.6% compared to the III<sup>rd</sup> one - 27.7%.

*Accessory interdigital triradii.* In both sexes this feature is more common on the IV<sup>th</sup> interdigital pad in the men - 13.8% than in the women - 12.7%. The overall amount of this feature is lower in the men - 18.1%. In women the frequency of this feature is 23.2% (Table 4).

*Eastern (mongoloid) complex.* In the males it varies from 39.5% of the ones from the villages of Kornitsa and Breznitsa to 46.3% for the ones from the village of Lazhnitsa. For the total male sample the eastern complex is 41.6% is in limits of the Europoid groups. In the women the eastern complex varies from 52.6% in the village of Kornitsa to 31.7% the village of Breznitsa. In the village of Lazhnitsa it is 46.9%. For the total female sample the eastern complex is 44.5% which is also in the scope of the Europoid groups. The calculated southern complex varies between 67.0% and

**T a b l e 4.** True palmar pattern and accessory interdigital triradii (%)

Group	Number and sex	Palmar pattern					Accessory interdigital triradii (AIT)			
		Hy	Th/I	II	III	IV	II	III	IV	II-IV
Breznitsa	24 m.	35.4	16.7	10.4	12.5	50.0	10.4	—	20.8	31.2
	47 f.	43.6	8.5	8.5	31.9	36.2	8.5	—	21.3	29.8
Kornitsa	72 m.	35.4	8.3	10.4	40.9	25.7	10.4	0.7	11.8	22.9
	49 f.	29.6	8.2	3.1	31.6	35.7	3.1	1.0	10.2	14.3
Lazhnitsa	42 m.	35.7	15.5	6.0	29.8	41.7	5.9	—	13.1	19.0
	81 f.	40.1	12.3	3.1	22.8	39.5	3.1	1.2	9.2	13.6
Total	138 m.	35.5	11.9	9.0	32.6	34.8	9.0	0.4	13.8	23.2
	177 f.	38.1	10.2	4.5	27.7	37.6	4.5	0.8	12.7	18.1

**T a b l e 5.** Variations of the basic dermatoglyphic features (%)

Group	Number and sex	PII	MLI	t	Hy	AIT	Th/I	MC	SC
Breznitsa	24 m.	13.75	8.13	60.4	35.4	31.2	16.7	39.7	62.8
	47 f.	13.55	8.66	43.6	43.6	29.8	8.5	31.7	71.9
Kornitsa	72 m.	14.26	8.83	56.2	35.4	22.9	8.3	39.5	67.0
	49 f.	13.53	8.40	60.2	29.6	14.3	8.2	52.6	50.9
Lazhnitsa	42 m.	14.26	8.06	57.1	35.7	19.0	15.5	46.3	60.3
	81 f.	13.32	8.04	50.6	40.1	13.6	12.3	46.9	55.3
Total	138 m.	14.17	8.47	57.2	35.5	23.2	11.9	41.6	64.2
	177 f.	13.44	8.30	51.4	38.1	18.1	10.2	44.5	58.4
Kapantsi	94 m.	12.92	8.48	53.2	37.2	26.1	9.0	32.9	63.2
	86 f.	12.95	8.32	48.8	40.7	16.8	11.0	41.4	58.6
Busmantsi region	119 m.	13.59	8.53	55.4	31.5	25.6	11.7	37.9	60.7
	126 f.	12.97	8.27	37.7	38.9	19.4	7.1	37.6	62.5
Dospat-Devin region	298 m.	13.74	7.93	61.9	30.9	25.1	10.6	46.6	55.8
	362 f.	13.28	7.75	57.2	38.2	20.7	10.3	48.8	53.2
Shiroka laka region	102 m.	13.7	8.17	71.6	32.8	21.1	7.3	47.1	50.1
	107 f.	12.21	8.13	49.1	41.6	18.7	9.8	39.5	56.2

60.3% in the males and 71.9% and 50.9% in the females. The men from the villages of Kornitsa display the highest southern complex 67.0% together with the women from the village of Breznitsa - 71.9%. In the total samples males are the ones with a higher southern complex - 64.2% and 58.4% in women (Table 5).

Summing up results from the individuals analysis of the different dermatoglyphic features is must be noted that judging from their variations the studied population from the villages of Kornitsa, Breznitsa and Lazhnitsa - the Gotse Delchev region, belongs to the Europoid groups. Analyzing the results from the summed-up comparison after a complex features it is seen that the values obtained for the main dermatoglyphic features of the sample under study are more typical of the Southern Europoids in comparison with the Middle and North European populations. This results was conformed also by the obtained values of the southern complex (SC): 64.2% in males and 58.4% in females. The well expressed southeuropoid features in the population of the villages of Kornitsa, Breznitsa and Lazhnitsa are the result of: increase PII, a greater frequency of the hypothenar pattern and the accessory interdigital triradii, the diminished value of the proximal palmar triradius frequency and the augmented index of Cummins (Table 5, Fig. 1).

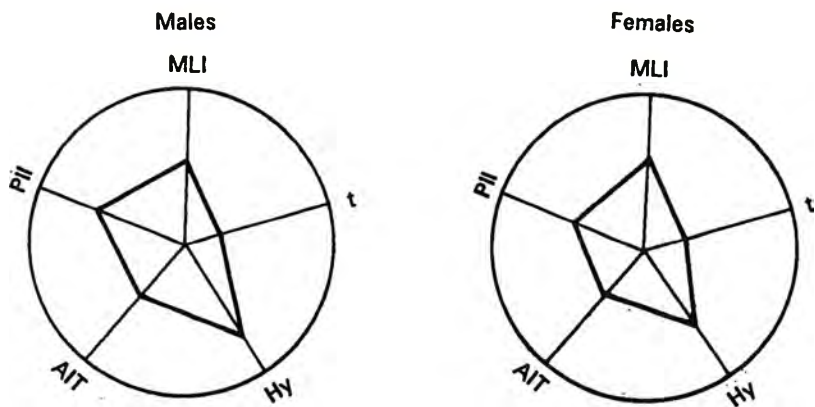


Fig. 1. Polygonic graphs showing the variation of dermatoglyphical traits circle radii correspond to the Eurasian ranges taken for 100 %, circle centres corresponding minimal values. Traits: 1-PII, 2-MLI, 3-t, 4-Hy, 5-AIT

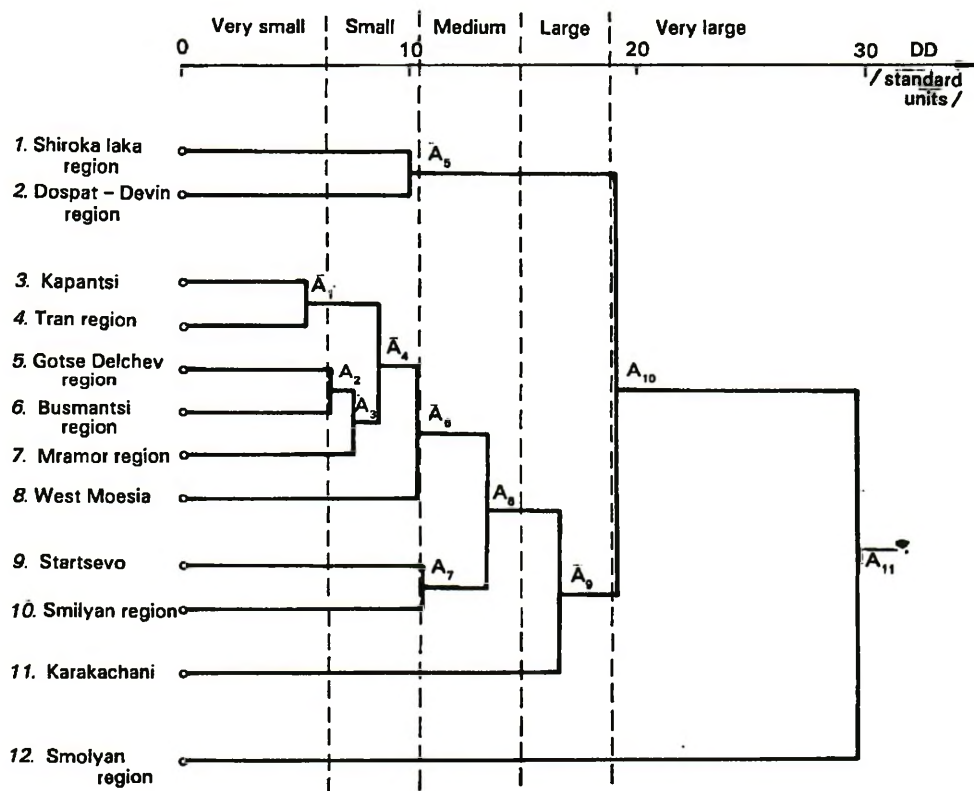


Fig. 2. Clustering of different sample from Bulgaria according to the DD matrix (proper studies, males) Behind the matrix are average distances within clusters. DD categories are the same as in Table 6

Table 6. Dermatoglyphic distances (DD) between different samples from Bulgaria (proper studies, males)

Group	1	2	3	4	5	6	7	8	9	10	11	12
1. Shiroka Laka reg.	—	10.0	14.3	11.3	14.1	13.3	17.8	21.2	22.3	18.4	18.6	32.2
2. Dospat-Devin reg.	#	—	18.6	15.1	11.0	12.3	17.7	19.0	17.1	13.5	22.2	31.0
3. Kapantsi	*	"	—	5.4	8.7	7.0	7.0	10.2	13.9	16.2	13.5	23.1
4. Tran region	*	"	@	—	9.2	9.8	10.1	13.5	17.2	11.3	13.1	24.4
5. Gotse Delchev reg.	*	*	#	#	—	6.5	8.0	9.4	14.1	14.1	17.8	26.3
6. Busmantsi region	*	*	#	#	#	—	7.0	9.8	9.7	11.6	14.0	24.8
7. Mramor region	"	"	#	#	#	#	—	8.1	13.5	17.1	20.5	18.3
8. West Moesia	"	"	#	*	#	#	#	—	11.6	13.3	16.7	17.5
9. Startsevo reg.	"	"	*	"	*	#	*	*	—	10.5	19.8	27.9
10. Smilyan region	"	*	"	*	*	*	"	*	*	—	13.9	25.6
11. Karakachani	"	"	*	*	"	*	"	"	"	*	—	31.7
12. Smolyan region	'	'	'	'	'	'	"	"	'	'	'	—

Above diagonal — distances in original units, below — their categorisation on territorial group level (@ — very small, # — small, \* — medium, " — large, ' — very large)

As illustration of the summed-up comparison were used the combinations polygons built upon the extension of the variations of the analyzed features on the Eurasian scale (Fig.1).

The results of the cluster analysis applied in this study are presented in Table 6 and Fig. 2. 11 other samples from different parts of Bulgaria have been used for comparison. The calculated dermatoglyphic distances and the following clusterisation showed that the similarity with the closest territorially sample of Bulgarian Mohammedans from the Dospat-Devin region is at the level of the “medium distances”. This sample belongs to the cluster A5 with the Christian Bulgarians from Shiroka Laka region. The higher eastern complex (EC) is typical of this cluster.

The sample of Bulgarian Mohammedans from the villages Kornitsa, Breznitsa and Luzhnitsa under study belongs to a common cluster A6 at the “small distance” level together with other territorial groups from the country - Christian Bulgarians from the Sofia region (the villages Busmantsi, Kazichane, Krivina; Mramor and Dobroslavtsi; the town of Tran and its neighbourhood), from North-West Bulgaria and from ethnographic group “Kapantsi” inhabiting the Razgrad region, North-East Bulgaria. Pronounced South-Europoid features are typical of the samples from this cluster.

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