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DIGITAL AND PALMAR DERMATOGLYPHS IN THREE ETHNIC GROUPS OF EGYPTIAN NUBIANS

DIGITÁLNE A PALMÁRNE DERMATOGLYFY TROCH ETNICKÝCH SKUPIN EGYPTSKÝCH NÚBIJCOV

Autori analyzovali palmárne a digitálne dermatoglyfy 470 príslušníkov troch etnických skupín egyptských Núbijcov, a to Kenúzov, Fedidžov a arabsky hovoriacich Núbijcov. Materiál získali počas dvoch arabsko-československých antropologických expedícií k Núbijcom. Hlavné výsledky analýzy sú tieto:

1. Fedidžovia a Kenúzi sú si po dermatoglyfickej stránke veľmi podobní, zatiaľ čo arabsky hovoriaci Núbijci sa od oboch týchto skupín značne odlišujú.

2. Kenúzi vykazujú preukazne najvyššiu variabilitu kvantitatívnych dermatoglyfických ukazateľov, konkrétne celkového počtu línií a indexu vzorovej intenzity.

Tieto výsledky sú v dobrom súlade s výsledkymi, ku ktorým dospel rozbor antropometrických a antroposkopických charakteristík, najmä u mužov.

It has been known for some time that the variability of dermatoglyphic patterns in the human population contains an important genetic element (for recent review see: HOLT 1969, LOEFFLER 1969), though the exact genetic process has remained, at least for the most part, unknown and unrecognized. It is also well known that the frequency of the individual variants of dermatoglyphic patterns is different in various populations and ethnic units (see for survey: CHAMLA 1962, 1963). Because these patterns can be defined almost unambiguously, they are easy to establish and are absolutely independent of the age of the individual, it is understandable that they find their role in ethnic anthropology in the search for genetic relations between ethnic groups. It is not surprising, therefore, that in the course of the two Czechoslovak-Arab Expeditions to

the Nubians attention was also given to the collection of dermatoglyphic material.

The aims, extent, actual work and some results of these two expeditions have already been discussed at this symposium on other occasions (STROUHAL 1974, HUSSIEN 1974). Therefore, the present authors would like to limit themselves to a recapitulation of the fundamental data.

The object of examination were the inhabitants of the Egyptian part of Nubia, who had been resettled in connection with the construction of the Assuan Dam. These people received new homes in Upper Egypt, in the region of the town Kom Ombo. Our material includes three main ethnic elements of Egyptian Nubians — the Kenuz, who originally lived in the northernmost section of the country, the Fadidja, who lived in the southernmost part of Egyptian Nubia, and the Arabic-speaking Nubians (in contrast with the first two Nubian-speaking groups) who lived between these two first groups. The latter will be called for the sake of brevity the Arab.

One of the aims of the two expeditions was to work out an anthropological picture of the Nubians as a whole. Ethnically and virtually also geographically the Nubians are situated on the border-line between the "white" and the "black" Africa. The history of the Nubians is very interesting and relatively well known. These people are known for some very interesting and unusual features related to demography, genetics and population problems, such as high rate of interbreeding, one-dimensional rather than the usual planar distribution of the population, etc. (see: HUSSIEN 1971, HERZOG 1957, STROUHAL 1974).

Another aim of the expeditions was the discovery and explanation of the ethnic relations among the three groups of Nubians that were examined — the Kenuz, the Arab, and the Fadidja. This aim was closely connected with an endeavour to interpret the anthropological findings against the background of historical and ethnographic data.

Other tasks of the two expeditions to the Nubians are in no relation to the contents of the present paper or to the main theme of this symposium.

The purposes for which the dermatoglyphic material was collected are closely linked up with the more general aims and objectives of the research, which have already been mentioned above.

These purposes are in substance as follows:

- 1) To work out the dermatoglyphic picture of the Nubian population as part of the overall anthropological description of these people. Data on the dermatoglyphic features of the African populations are relatively sporadic (GESSAIN 1957 a, b, 1961; EMBERGER and FOURMONT 1970; HIERNAUX 1964; HUIZINGA 1965; LESCHI 1948; LESTRANGE 1951; PONS 1953; POSPÍŠIL 1963; RIFE 1953 and a few others). In most cases they inform only about digital dermatoglyphs. So far, no data is available on the dermatoglyphs of the Nubian population.
- 2) To try to find, time and lack of comparative material permitting, the relations between the Nubians and the neighbouring and related white and Negro populations. Dermatoglyphic analysis should in this way

become one of the means and methods of the anthropological classification of the Nubians and of the establishment of a place for this population within the system of neighbouring ethnic groups. Thus, it will contribute to the solution of the problem of their ethnogenesis.

3) To try to find dermatoglyphic relations among the three groups of Nubians that were examined, with the objective to establish genetic connections and relations among the three ethnic groups.

The tasks mentioned under 1) and 2) are dealt with in other publications now in preparation. The present paper is therefore concerned with the problem mentioned under 3), and the solution to this problem is based on palmar and digital dermatoglyphs only.

Of the total number of about 52,000 Nubians settled in Egypt some 2,500 were examined by the two expeditions. There were made fingerprints and palmprints of 470 people, and also soleprints of most the 470 people were made. The distribution of this sample of population, which represents the material basis of the present paper, with information on the ethnic classification and the sex of the individuals, is given in the following table:

ethnic group	males	females	total
Kenuz	51	67	118
Arab	85	78	163
Fadidja	68	121	189
total	204	266	470

Of the qualitative dermatoglyphic traits there have been selected for the purposes of the present paper the following ones: frequency of true patterns in the hypothenar area, in the thenar area and / or in the first interdigital field, frequency of patterns in the second, third and fourth interdigital field, position of carpal triradius, total frequency of arches, loops and whorls (together with double-loops and related patterns) on all ten fingers of both hands.

Of the quantitative characters there have been studied the total ridge count (TRC), the main-line index (MLI), and the Volockoj's index (VI). The results are contained in Tables 1 and 2.

For testing the significance of the differences in the frequency qualitative traits found in the individual groups of the population the u-test has been used, for comparison of the mean values of the qualitative traits the t-test, and for examination of the differences in the variances we used the F-test. The results of these tests are shown in Figure 1. In the vertices of the individual triangles the reader will find the letters representing the three populations examined. If the vertices are connected with a line there are no ascertainable differences between the parameters that are compared (percentages, means, variances). If the vertices are connected with a filled in area the differences are significant on a 1 % - level of probability, if the connecting areas are empty the differences are ascertained on a 5 % - level of probability. At the same

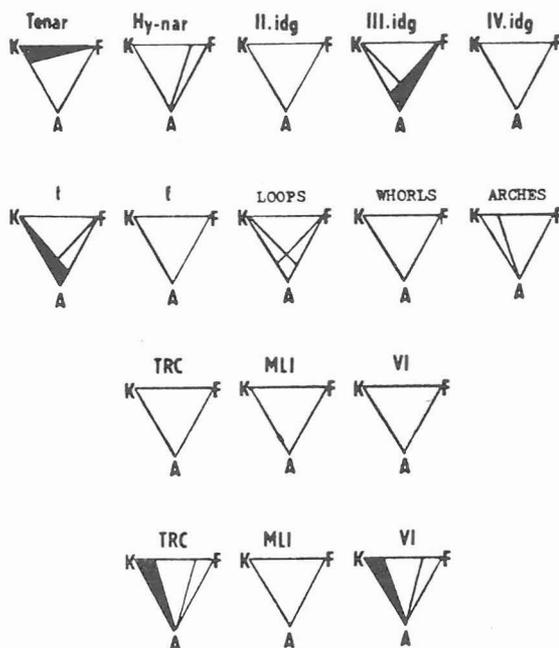


Fig. 1: Comparison of the three Nubian populations examined.

K — Kenuz A — Arab F — Fadidja

The filled in area indicates that the difference in the parameter examined between the populations is significant on 1 %-level of probability, empty area indicates that the difference is significant on 5 % - level of probability. Simple line indicates insignificant difference. For detailed information see the text.

time the parameter of the population where the area is broader shows higher values than that of the population with which it is compared.

The comparison of the frequency of the most important dermatoglyphic features of the palm and fingers among the ethnic groups examined shows that the most characteristic group among the Nubians, from the viewpoint of dermatoglyphic study, are the Arabic-speaking Nubians (see the first two lines in Fig. 1). In five of the ten features studied they differ markedly from at least one of the other ethnic groups; in three features they even differ from both other groups at the same time (third interdigital, t-triradius, loops on the fingers of both hands). On the other hand, between the Kenuz and the Fadidja there exists only one difference, in the frequency of the patterns in the thenar and/or in the first interdigital.

This result is very interesting and came rather unexpectedly, because geographically the Arab were situated (in Old Nubia) between the regions of the Kenuz and the Fadidja. Our finding, however, is in keeping

with the findings of STROUHAL (1974), which have already been mentioned here. Strouhal verified the anthropologically distinct character of this Nubian ethnic group by classical anthropometric and anthroposcopic methods. It is evident, therefore, that the Arabic-speaking Nubians differ from the other ethnic groups not only linguistically but also genetically.

The mean values of the three quantitative dermatoglyphic traits examined (TRC, MLI, VI) are in all three populations similar (see third line in Fig. 1). In no case the difference was significant. The situation changes, however, when we evaluate not the mean values but the variances of these quantitative characters (fourth line in Fig. 1). In two of them, in the total ridge count and the Volockoj's index, the Kenuz show the significantly greatest variability, in the third one, the main-line index, which is generally known to be relatively little variable, there exists no significant differences between the variances of the three groups examined.

This finding, too, is in keeping with the results of anthropometric examinations (HUSSIEN 1974), which also point to the fact that the Kenuz are the most variable population group of all ethnic groups in Nubia that have been examined.

It is not easy to find an explanation to this fact. Ethnographically (HERZOG 1957, personal investigation) the Kenuz keep strictly to the Nubian traditions and they are also at the same time the most endogamous group. On the other hand, with the Fadidja we find some historically evidenced extraneous elements, either of the white race (from the period of Turkish rule) or of the Negro race (from the period of the export of slaves from Africa).

Thus we have evidence pointing to the fact that the coefficient of inbreeding with the Kenuz is higher than that in the remaining two population groups. This coefficient is certainly very high, though it was not possible to assess it. For quantitative features, conditioned by the polygene system with an additive effect of the genes concerned (in our case such characters include almost certainly the total ridge count and perhaps also the Volockoj's index) the genetic variance of a population with the coefficient of inbreeding F is $(1+F)V_G$. The value V_G represents the genetic variance of the basic population without inbreeding (FALCONER 1960, 267). Because F is positive by definition, inbreeding increases the genetic variance of a character brought about by such polygene system. The authors are of the opinion that their findings of greatest variability in the total ridge count and the Volockoj's index with the Kenuz may be explained, at least in part, by this population-genetic phenomenon.

On the other hand, the frequency of marriages between close relatives, which in the Nubians is the highest in the world, does not show the highest values in the Kenuz but in the Nubian Arab (HUSSIEN 1971). In case that the frequency of such marriages also affects the value of the coefficient of inbreeding of a population, our explanation of the high coefficient of variability of the quantitative characters with the Kenuz is open to discussion, and it will be the task of all interested scholars to explain this phenomenon in a plausible way.

Conclusions

The analysis of palmar and digital dermatoglyphs in the three ethnic groups of the Nubians, the Kenuz, the Arab and the Fadidja, has resulted in the following facts:

- 1) The Fadidja and the Kenuz stand very close to one another from the viewpoint of dermatoglyphic analysis, while the Arabic-speaking Nubians differ markedly from both these population groups.
- 2) The Kenuz show the greatest variability of quantitative dermatoglyphic features: in the total ridge count and the Volockoj's index. These results are in keeping with the findings of anthropometric and anthroposcopic examination of these ethnic groups (STROUHAL 1974), and this fact underscored the importance and usefulness of dermatoglyphic analysis in ethnic anthropological and population genetic studies.

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Tab. 1. The frequency of the main dermatoglyphic configurations in three Nubian ethnic groups (on both hands; averages for both sexes)

Ethnic group	N	true patterns		true patterns in interdigital			trir.	trir.	finger-patterns		
		thenar	hypothenar	II.	III.	IV.	t	t'	arches	loops	whorls
Kenuz	118	18,4±2,5	36,3±3,1	6,8±1,6	35,0±3,1	66,2±3,1	64,5±3,1	28,6±2,9	4,3±0,6	60,0±1,4	35,5±1,4
Arab	163	13,8±1,9	31,3±2,6	6,7±1,4	42,9±2,7	65,6±2,6	77,0±2,3	22,4±2,3	2,6±0,4	64,7±1,2	32,6±1,2
Fadidja	189	10,5±1,6	38,6±2,5	7,3±1,4	33,6±2,4	69,8±2,3	69,6±2,4	26,4±2,3	3,3±0,4	61,4±1,2	35,2±1,1

Tab. 2. Mean values and standard deviations of the values: total ridge count (TRC), main-line index (MLI), Volockoj's index (VI) in three Nubians ethnic groups (on both hands, averages for both sexes).

Ethnic group	N	TRC	MLI	VI
Kenuz	111	121,3±46,2	8,1±2,0	13,3±3,4
Arab	160	128,5±36,8	8,5±2,0	13,0±3,1
Fadidja	187	126,9±41,9	8,2±2,0	13,3±3,4

