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Article

Dermatoglyphics of the Ogoni of Nigeria and its historiographic implications

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With 4 figures and 6 tables

Summary: The dermal ridges on the surfaces of the palms and the fingers form dermatoglyphic patterns which are phylogenetically stable traits useful for evaluating interpopulation affinities and distinctiveness. In this study, these traits were investigated according to traditional methods among the Ogoni people of the Niger Delta region of Southern Nigeria, considering the uncertainties surrounding the people's historiography and the paucity of morphologic studies on the tribe. The evidences of finger whorl pattern frequencies, Total Ridge Count and palmar A-B ridge count indicate the close dermatoglyphic resemblance of the Ogoni to tribal populations of southern Ghana. These findings have implications as to the likely provenance of the Ogoni people, providing support to the traditionally view among the people that their ancestors are migrants from some tribe in southern Ghana, West Africa.

Key words: dermatoglyphics, Ogoni, Nigeria, physical anthropology.

Introduction

In the quest to reconstruct the history of the different peoples of Africa, much reliance has been placed on oral tradition with its confounding plurality of accounts (Naanen 1981). Dermatoglyphic traits are well established tools for studying population dynamics and may provide empirical morphologic evidences corroborating archaeological, cultural and linguistic features in defining the ethno-historical connections of a given people (Newman 1960, Cummins & Midlo 1961). Much data has accumulated on the dermatoglyphic patterns of African populations following probably a century of research (Wilders 1904, Igbigbi & Msamati 2005). However, only a few studies exist in published literature on the several autonomous tribes of Nigeria with much of the available reports limited to the major tribes of Yoruba, Ibo and Hausa-Fulani (Ojikutu 1964, Jantz & Brehme 1978, Borroffice 1978, Igbigbi et al. 1994, 1996).

In this study, we examined the dermatoglyphic features of the Ogoni, a popular minority tribe of Nigeria, in whom remarkably little morphologic studies have been undertaken. These people are predominantly farmers and fishermen who live in closely knitted rural communities comprising a hundred and eleven villages in four local government areas of Rivers State, Nigeria (Loolo 1981). They are regarded as about the first settlers to inhabit the Niger delta region of southern Nigeria, after the

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Ijaw (Alagoa 1972). Much speculation exists among historians as to the likely provenance of the Ogoni. Writing about the historiography of the people, Loolo (1981) noted that unlike several other African tribes, the Ogoni do not have a myth as to their origin around which to build a common destiny and identity. They neither share cultural nor linguistic similarities to neighbouring tribes. One tradition has it that the ancestors of these people are migrants from coastal tribes of southern Ghana, West Africa, who were displaced following internecine wars during the African slave trade era, and they eventually settled in present day Ogoni land in Southern Nigeria (Loolo 1981). A recent hypothesis rather postulates a Bantu origin for the Ogoni, most probably from Bantu tribes inhabiting the southern parts of Nigeria's border with Cameroon (Naanen 1981).

Given the divergent views on the population relationships of the people and the usefulness of dermatoglyphic traits as a tool for assessing biologic relatedness among humans, there is the need for empirical morphologic studies on the Ogoni. This may help in resolving the issues surrounding the provenance of the people. This study therefore addresses itself to this objective by providing data on the dermatoglyphic configurations of the Ogoni people and their population affinities as indicated by these variables.

Subjects and methods

Bilateral finger and palm dermatoglyphic prints were obtained according to the inking procedure of Antonuk (1975) from 406 Ogoni subjects comprising equal numbers of males and females. These were then analysed manually with the aid of a magnifying lens. The sampled subjects were senior secondary school students of four grammar schools in Ogoniland; namely Beeri High School, Beeri, Community Secondary school, Bomu, Government Secondary School, Nonwa and Community Secondary School, Nweol. Permission to recruit subjects for the study was obtained from the authorities of the schools and informed consent was granted by each of the participating subjects. These subjects were all apparently healthy looking, physically able-bodied and had parents and grandparents who were also from Ogoni and had lived in the same area of Ogoniland as the subjects.

The morphological descriptions we utilized in this study were according to traditional methods described by Cummins & Midlo (1961). Ridge counts were done according to Holt (1968). All print analyses were undertaken by a single investigator (B.N.R. Jaja) to avoid interobserver variation and tests of significance were performed using student's t-test and chi square as appropriate. Multivariable analysis by a hierarchical clustering technique (using STATA version 11.0, Statacorp, Texas, USA) was also performed to measure population distance between our sampled population and other populations previously studied.

Results

Mean finger Total Ridge Count (TRC) in sampled subjects was 128.3 ± 48.4 in males and 109.7 ± 49.9 in females ($p < 0.001$). There were more individuals with higher ridge counts on the right fingers than on the left fingers. The right hand tended to be the less variable hand (Table 1). The highest mean finger ridge counts were seen on the thumb and fourth finger of both hands, with the thumb as the most variable digit. The overall percentages of arch, whorl, ulnar loops, and radial loops were 9.0, 34.9, 53.8 and 2.3 respectively for males and 13.8, 27.5, 55.1 and 3.6 for females. Tables 2 and 3 present the distribution of pattern types in sampled subjects as absolute num-

Table 1. Finger Ridge Count (FRC) in sampled Ogoni subjects.

		Male		Female	
		Right	Left	Right	Left
Finger	I	15.05 ± 6.77	13.73 ± 6.77	12.47 ± 6.92	11.03 ± 6.93
	II	10.72 ± 6.23	10.80 ± 6.20	9.36 ± 5.62	8.88 ± 6.39
	III	11.06 ± 5.74	11.88 ± 6.14	9.75 ± 5.39	9.62 ± 6.22
	IV	15.11 ± 5.95	14.91 ± 6.08	13.79 ± 5.96	12.96 ± 5.83
	V	12.88 ± 5.13	12.32 ± 4.74	11.50 ± 4.87	10.87 ± 5.00

I = Thumb, II = Index finger, III = Middle finger, IV = Ring finger, V = Little finger

Table 2. Finger pattern frequency in male subjects (n = 203).

		Right				left			
		A	R	U	W	A	R	U	W
Finger	I	17	2	78	106	20	1	83	99
	II	31	15	73	84	32	21	74	76
	III	24	3	123	53	24	2	115	62
	IV	9	1	90	103	10	1	121	71
	V	8	0	164	31	7	0	172	24
Total		89	21	528	377	93	25	565	332

Table 3. Finger pattern frequency in female subjects (n = 203).

		Right				left			
		A	R	U	W	A	R	U	W
Finger	I	29	8	77	89	41	5	68	89
	II	35	29	86	53	48	26	68	61
	III	32	4	130	37	41	0	117	45
	IV	12	0	119	72	15	1	121	66
	V	12	1	169	21	15	0	163	25
Total		120	42	581	272	161	32	537	286

A = Arch, R = Radial loop, U = Ulnar loop and W = Whorl

bers. Table 4 presents Pattern Intensity Index (PII) among sampled subjects. In the hypothenar area of the palm, pattern types were identifiable in 21.9 % of males and 22.2 % of females, with loops as the most prevalent pattern type. Whorl pattern was less common in females as compared to males (Table 5).

In Table 6, we present comparative data on Total finger ridge count (TRC), palmar A-B ride count (ABRC) and finger frequency of whorl pattern in sampled male Ogoni subjects and male subjects of select African populations previously reported. Data on female subjects were not included in the study of Sunderland & Coope (1973) on indigenous populations of southern Ghana, predominantly of the Akan cluster of tribes, to allow for comparison in this report. Nevertheless, we observed that mean TRC among the male Ogoni subjects was significantly higher than what was reported for male subjects of Kenya and Tanzania ($p < 0.01$). Mean ABRC among Ogoni

Table 4. Pattern intensity index in sampled Ogoni subjects.

		Male		Female	
		Right	Left	Right	Left
Finger	I	1.44	1.39	1.29	1.24
	II	1.26	1.22	1.08	1.11
	III	1.14	1.19	1.01	1.02
	IV	1.40	1.30	1.28	1.19
	V	1.11	1.08	1.04	1,06
Total		6.35	6.18	5.70	5.62

Table 5. Palmar variables in sampled subjects.

		Male		Female	
Parameter		Right	Left	Right	Left
atd angle		39.95 ± 5.33	39.64 ± 4.93	42.09 ± 5.60	42.10 ± 5.01
ABRC		37.02 ± 7.26	38.62 ± 5.51	36.39 ± 4.95	36.82 ± 4.69
Hypothenar					
Patterning					
I	Arch/open	154	163	158	158
Ii	Loop	45	38	44	44
Iii	Whorl	4	2	1	1
Thenar/I					
I	Arch/open	193	185	194	188
Ii	Loop	9	17	8	14
Iii	Whorl	1	1	1	1

Table 6. A Comparison of total ridge count, palmar A-B ridge count and finger whorl frequency among male Ogoni subjects and selected Africa populations.

Study	Population	TFRC	ABRC	Whorl frequency
Sunderland & Coope (1973)	Akan tribes	128.9 ± 42.9	75.1 ± 11.5	29.2
Present study	Ogoni	128.3 ± 48.4	75.6 ± 12.8	34.9
Igbigbi & Msamati (2005)	Kenya	125.3 ± 39.0	89 ± 15.4	16.0
Igbighi & Msamati (2005)	Tanzania	115.0 ± 32.1	85.4 ± 19.8	21.0
Igbigbi et al (1994)	Yoruba	101.6 ± 37.9	74.2 ± 8.7	23.3
Igbigbi et al (1994)	Ibo	113.8 ± 44.3	74.2 ± 8.7	23.3
Igbigbi et al (1996)	Hausa	130.1 ± 9.1	72.9 ± 10.4	35.5

males was statistically lower than those of the latter population groups ($p < 0.05$). In both TRC and ABRC, the sampled male Ogoni subjects had statistically same values as those of tribesmen of south and central Ghana ($p > 0.001$).

Furthermore, we performed cluster analysis in order to measure the population distances between the Ogoni and the other groups that were compared in Table 6. Fig-

ure 1 shows a cluster dendrogram based on TRC, ABRC and whorl frequency among these populations. Two clusters were identified with the Ogoni grouped into the same cluster as the Akan of southern Ghana and the Hausa of Northern Nigeria. A second less discrete cluster was formed among the Kenyan, Tanzanian, Yoruba and Ibo groups.

Figure 2 shows a more robust cluster dendrogram based on TRC and ABRC only. We excluded whorl frequency in order to optimize sensitivity to distance metric and to highlight the superior discriminant ability of the ridge counts. Three clearly distinct clusters were formed which are more indicative of the natural disposition of the population groups under comparison. The Ogoni and Akan were closely related in a cluster that also contain the Hausa people. The Kenya and Tanzanian groups another cluster, whereas the Yoruba and Ibo groups formed a third cluster.

Discussion

Dermatoglyphic traits present advantages over other phenotype traits for purposes of studying population structure. Jantz (1987) reported that these traits are controlled by multiple genes, consequently are less susceptible to genetic drift. Unlike the traits of anthropometry, dermal ridge configurations are unalterable once formed and are considered to be highly inheritable.

Local and continent wide variations exist in the dermatoglyphic configurations of African populations. Jantz & Hawkinson (1979) have reported on a ridge count variation among indigenous Africans in which a cline of increasing index – middle finger

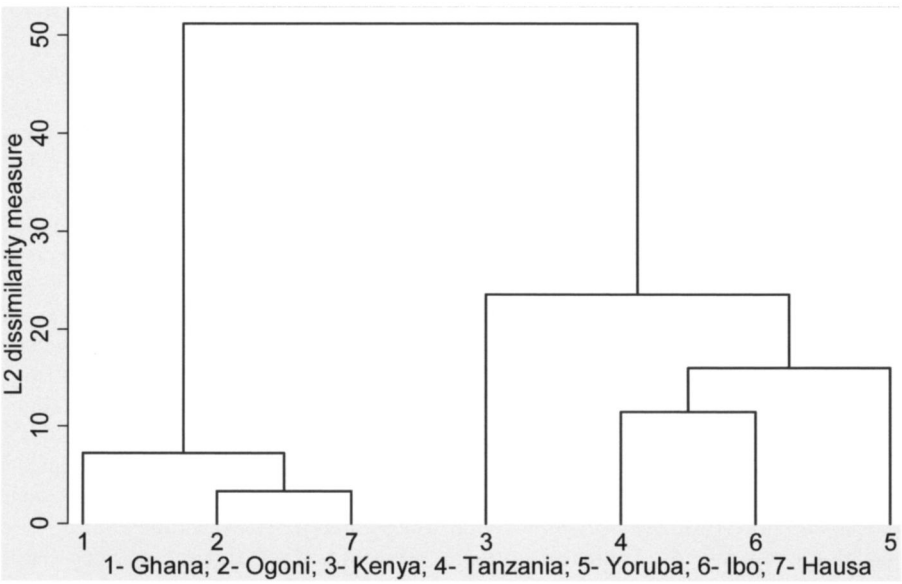

Fig. 1. Cluster dendrogram based on average ridge counts and whorl frequency of the African populations which are compared in Table 6.

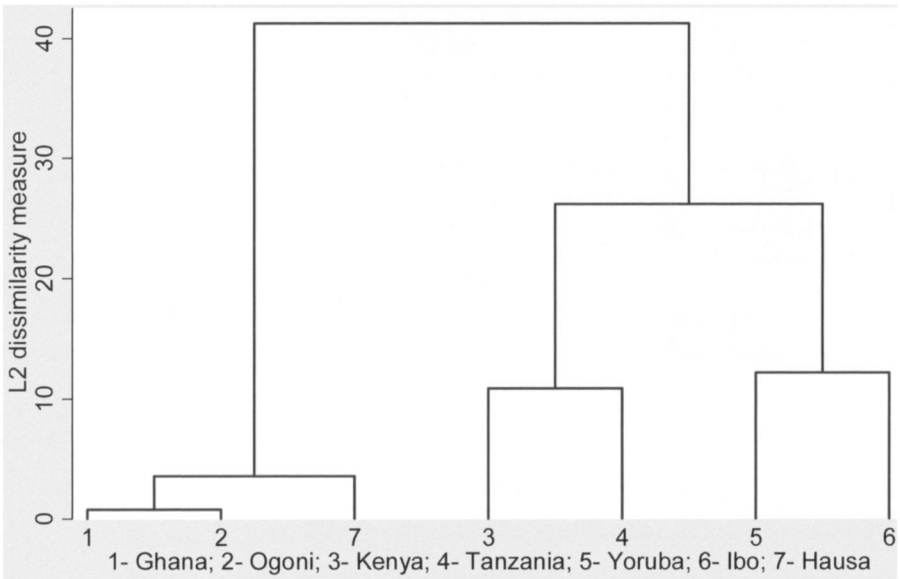

Fig. 2. Cluster dendrogram based on the average ridge counts only of the population groups compared in Table 6.

ridge counts and decreasing ring – little finger counts are seen as one proceeds from north to southern Africa. The Ogoni of this present study conform to this preferential disposition of ridge counts of the fingers (Table 1). Relative to other West African tribes, arch frequency among the Ogoni is on the high side; but it is similar to those of other Nigerian populations such as the Yoruba, Ibo, Hausa – Fulani and the Urhobo (Igbigbi et al. 1994, 1996). This may reflect the geographic proximity of Nigerian tribal groups.

It is noteworthy, however, that the Ogoni do not fit into the discernible geographic pattern of a west to east decline in whorl frequencies seen across Africa (Sunderland & Coope 1973). In this parameter, the people resemble, to a greater extent, more westerly located tribes of the sub region such as the Kurumba with a whorl frequency of 31.4 %, and tribal groups of south and central Ghana, than they do the Nigerian tribes of Yoruba and the Ibo to the eastern part of west Africa and, to an even lesser extent, indigenous groups of east Africa in whom much lower whorl frequencies are seen (Table 6). To our minds, this observation is significant considering that Sunderland & Coope (1973) have drawn attention to a remarkable similarity in the historiography and dermatoglyphic patterns of the Kurumba of northern Ghana and indigenous groups of south and central Ghana, in this case, predominantly the Akan cluster of tribes. The population affinity of the Ogoni to tribes of southern Ghana in contrast to east African populations of Kenya and Tanzania is seen also in Total Ridge Count (TRC) and in A-B ridge count, as shown in this study. These two parameters are very useful quantitative discriminant tools for assessing population differences (Holt 1968).

Kenyan and Tanzanian populations are, to a large extent, Bantu populations (Shillington 2005). The Bantu are believed to have originally inhabited the southern parts

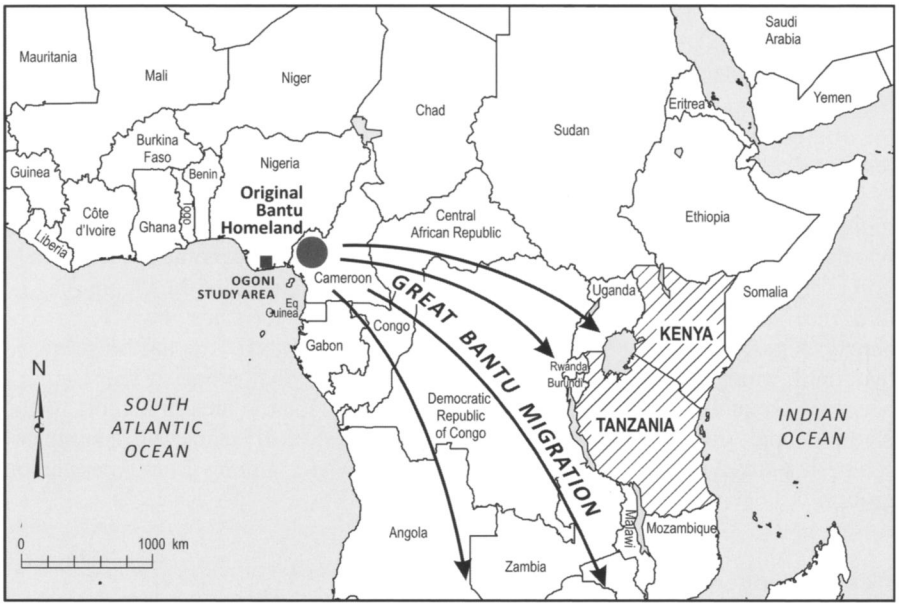

Fig. 3. A map of Africa showing the migratory pattern of the Bantu from their supposed original homeland close to the Nigerian- Cameroon border.

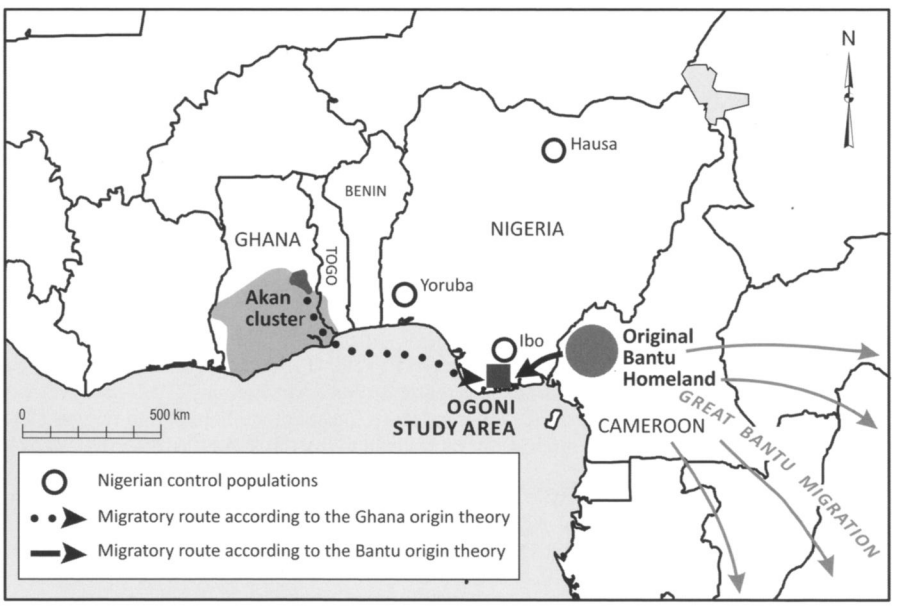

Fig. 4. A map of West Africa showing the location of the populations compared in this study and the supposed migratory routes of the Ogoni according to the two contending theories of their origin.

of Nigeria close to her border with Cameroon and embarked on one of the most profound population movements in Africa, called the great Bantu migration. This resulted in the occupation of eastern, central and southern Africa by Bantu-speaking peoples (Vansina 1995, Ehret 1998). The Ogoni and other semi Bantu groups around the original homeland of the Bantu are believed to represent vestiges of Bantu with less extensive migratory routes (see Figs 3 and 4).

This study has indicated greater dermatoglyphic variability between the Ogoni and indigenous groups of east Africa, in contrast to tribal groups of southern Ghana with whom the Ogonis share similar dermatoglyphic features. At the moment, the implication of the findings of this study in relation to the tribal origin of the Ogoni may be inconclusive, given the complexities of dermatoglyphic inheritance, the likelihood of genetic admixture, among other likely confounders. However, it could be surmised that until stronger morphologic or genetic evidences that point to the contrary becomes available, the likely direction in which to trace the ancestral roots of the Ogoni people, from the findings of this study, is westward, among tribal groups of southern Ghana in West Africa, rather than eastward, among Bantu population groups.

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