

## Termination Patterns of the Palmar C – Line in Nigerian Populations: A Comparative Study of Two Groups

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**Abstract:** The pattern of alignment, direction and orientation of dermal ridges on the palms are morphologic indices which are used to study interpopulation affinities and diversities. The population relationships these variables suggest of the tribes inhabiting the Niger Delta region of southern Nigeria are unknown to any extent. The objective of this study was to examine the extent of resemblance between the Ijaw and the Ogoni tribes, two prominent tribes of the region, in the termination patterns of the palmar C – line. The study revealed that in both tribes, there were no radial terminations of the C – line. Among the Ijaw, ulnar termination was the most common termination pattern, but among the Ogoni, proximal termination was the most predominant ( $p>0.05$ ). A low incidence of missing c – triradius was noted among the Ogoni as compared to the Ijaw; and only in absent termination pattern was a significant sex difference seen across both populations. The study has indicated that though geographically close, these two population groups are distinct in the termination patterns of the palmar C-line. The study also validate the routine inclusion of data on the termination pattern of the C-line in dermatoglyphic studies in Nigerian and other African populations, which hitherto is not the practice.

**Key words:** Dermatoglyphics, Ijaw, Ogoni, Niger Delta, Nigeria

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### INTRODUCTION

The palm has on its surface numerous minute ridges whose function in humans has not been fully determined although they may minimize friction following grasping of objects (Moore and Dally, 1999). These ridges, however, have provided significant insight into the phenotype effect of genetic disorders (Schauman and Alter, 1976; Goldberg *et al.*, 1997; Ravindranath *et al.*, 2005) and the extent of biologic relatedness or otherwise among different population groups (Igbigbi and Msamati, 2005). The usefulness of dermal ridge pattern configuration analysis derives from the fact that ridge pattern formation is polygenically controlled and as such less susceptible to genetic drift. Unlike metric indices used in anthropometry, dermal ridge pattern configurations are postnatally unalterable (Jantz, 1987).

As a multiethnic country, Nigeria has over two hundred tribal entities with very few of these dermatoglyphically evaluated despite that dermatoglyphic traits may provide a means of assessing interpopulation affinity and in tracing the ethnohistoriography of a given people. Where available, dermatoglyphic reports on Nigerian populations often do not include analysis of palmar indices, especially the termination pattern of the C-line. The C-line has been shown to be polymorphic and a practical analytical endpoint for dermatoglyphic investigations (Plato, 1970). This study was designed to evaluate specifically the termination patterns of palmar C – line among the Ijaw and Ogoni population groups of Nigeria, the aim being to describe the extent to which these two indigenous groups are alike or otherwise in this dermatoglyphic variable. The Ijaw and Ogoni peoples inhabit the coastal plains of the Niger Delta region of southern Nigeria. Our choice of them is informed by the remarkably dissimilar linguistic and historical antecedents of both tribes, despite their geographic proximity (Alagoa, 2005; Isichei, 1983).

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## MATERIALS AND METHODS

For the purpose of the study, we obtained inkprints of both palms from 390 Ijaw subjects and 402 Ogoni subjects according to the method described by Antonuk (1975). The Ijaw subjects were undergraduates of the Niger Delta University in Bayelsa State, Nigeria. The Ogoni subjects were senior secondary school students of four schools in Ogoni land, namely Beeri High School, Beeri; Community Secondary School, Bomu; Government Secondary School, Nonwa and Community Secondary School, Nweol.

Each subject was apparently healthy and had no physical defect or injury on the palm and the subjects' parents and grandparents were also of the same tribe as the subjects and had lived in the same area as the subject. We obtained permission to conduct the study from the respective schools' authorities and only verbally consenting volunteers were sampled.

The obtained palm prints were studied with the aid of a magnifying lens and variations in the termination pattern of C – line analyzed according to the technique proposed by Plato (1970). The four triradii points located in the interdigital areas, at the base of the digits, and designated a, b, c, d triradii respectively were identified. A triradius is a delta shaped point on the palm where three opposing dermal ridges meet or change their direction (figure 1). The ridge that extends from each triradius point and ends on the outer border of the palm is a Main line and are designated as A, B, C and D Main lines respectively. The focus of this study was on the C main line otherwise called palmar C-line.

The four likely termination patterns of the C – line are:

- 1 Ulnar termination: in which C – line terminates on the ulnar (little finger) border of the palm.
- 2 Radial termination: C – line terminates on the radial (thumb) side of the palm.
- 3 Proximal termination: C – line terminates on the base of the little or ring fingers or the interdigital area between these fingers.
- 4 Absent termination: the c – triradius and by extension the C – line are missing or not present at all.

The proportion of each termination pattern was computed for each tribe and the data obtained were subjected to simple statistical analysis using frequency tables and chi square for test of significance with the level of significance set at  $p < 0.05$ .



**Fig. 1:** Palm print with the triradial points circled

## RESULTS AND DISCUSSION

Table 1 shows the percentage frequency of C – line terminations in both tribes. The Palmar C – line most commonly terminated along the ulnar side of the palm among the Ijaw, but more proximally among the Ogoni subjects sampled in this study. It did not terminate on the radial side of the palm in any of the sampled subjects. The sex differences seen in ulnar termination pattern were statistically insignificant ( $p>0.05$ ) in both tribes, likewise with proximal termination pattern of the C-line among the Ogoni subjects. A significantly greater proportion of proximal termination pattern was seen in female Ijaw subjects in comparison to their Ogoni counterpart ( $p<0.05$ ). In both tribes, male subjects had higher proportion of absent pattern of C-line termination when compared with female subjects but this difference was statistically significant among the Ijaw subjects only ( $p<0.05$ ).

Tables 2 and 3 show sex related comparisons of data on palmar C – line termination patterns in Nigerian tribes, an India and a Peruvian tribe in whom this variable has been previously reported. Complete absence of radial pattern termination was seen among the Yoruba, Ibo, Hausa and Urhobo peoples but not so among the Gujjar and Quecha populations. Absent termination pattern expressed sex differences with values in males consistently higher than values in females in the study groups under comparison, except in the Gujjars in whom the converse was the case. The Ogoni subjects had the lowest incidence of absent pattern of C-line termination among the Nigerian populations under review.

### **Discussion:**

The main lines indicate the direction of palmar ridge alignment in any given individual or population (Sunderland and Coope, 1973), with the C – line being the only one of the four main lines that has been shown to be truly polymorphic (Plato, 1970). The termination patterns of C - line has been previously reported among the Yoruba of Nigeria by Jantz and Brehme (1978), while Igbigbi and coworkers (1994, 1996) provided further data among the Ibo, Hausa, Urhobo and the Yoruba as well. Beside these studies, no other studies in published literature has provided data on C-line termination patterns in Nigerian groups, to our awareness.

In the present study, significant sex differences were not found in the termination patterns of the C-line, an observation that is consistent with what is seen also among the Ibo, Hausa, Urhobo and Yoruba of Nigeria. Generally, dermatoglyphic parameters are not reliable tools for sex differentiation in human populations (Grace and Ally, 1972; Roberts *et al.*, 1994; Igbigbi and Msamati, 2005). Incidentally, in the parameter of absent C-line termination, male subjects had consistently higher values when compared to females across the Nigerian groups reviewed, the Ijaw and Ogoni inclusive, although still not statistically significant. Considering that the incidence of missing c-triradius correlates with the frequency of absent termination pattern, we speculate that this finding probably indicates a relatively higher incidence of missing c- triradius in males as compared to females in the Nigerian population. This pattern of sex difference is seen also among the Peruvian Quechua (Table 2 and 3).

Furthermore, among the population groups under comparison, the Ogoni had the lowest incidence of missing c-triradius, which is another significant finding emphasizing the lesser degree of dermatoglyphic resemblance between the Ogoni on one hand and the Yoruba, Hausa, Ibo, Urhobo groups on the other hand. This is in keeping with the linguistic disposition of these population groups. In contrast to the other groups, the Ogoni are considered to be semi-bantu (Alagoa, 2005; Isichei, 1983). The other Nigerian tribes with semi-bantu features are the Efik- Ibibio, Andoni, and Ogbia tribes in whom the termination patterns of palmar C-line has not been reported to allow for comparison in this present study.

In relation to the most frequent termination pattern, the Ogoni and the Ijaw also differ. Whereas among the Ijaw people the C – line terminated most frequently on the ulnar side of the palm, among the Ogoni it tended to end more proximally. However, both tribes had a complete absence of radial terminations, as are the other Nigerian tribes under review, suggesting their common anthropologic heritage. Interestingly, Sternberg *et al.*, (1975) has reported a 21 – 43% incidence of radial termination in black American populations and Balgar and Sharma (1986) has shown that among male Gujjars of India, the commonest termination pattern of the C – line is the radial termination.

### **Conclusion:**

This study has shown that the Ijaw and Ogoni tribes of the Niger delta region of southern Nigeria, though geographically close, have distinct termination patterns of the palmar C – line that, to some extent still affirm their affinity to other Nigerian tribes in whom this variable has been previously studied. A particular feature of the Ogoni which distinguished them from the Ijaw and indeed the Yoruba, Hausa, Ibo and Urhobo peoples

of Nigeria is the tendency of the Ogoni to have a lower incidence of missing c-triradius as compared to the latter populations. Finally, this study justify the routine inclusion of data on termination patterns of the palmar C-line in future dermatoglyphic studies on Nigerian populations and indeed other African populations.

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**Table 1:** Percentage Frequency of C – line Terminations among the sampled Ijaw and Ogoni Subjects (left and right hands combined)

Terminations	Ijaw		Ogoni	
	Male (197)	Female (193)	Male (201)	Female (201)
Ulnar	44.5	43.2	38.4	48.0
Radial	0	0	0	0
Proximal	28.1	41.7	53.2	46.3
Absent	27.4	14.1	8.4	5.7

**Table 2:** Distribution of Palmar C – line terminations (%) among male subjects of some select populations previously studied.

Tribe	N	Proportion of terminations in percentage			
		Ulnar	Proximal	Radial	Absent
Hausa <sup>1</sup>	320	36.5	42.5	0	21.0
Urhobo <sup>1</sup>	342	40.4	46.5	0	13.2
Yoruba <sup>2</sup>	250	34.4	44.0	0	21.6
Ibo <sup>2</sup>	250	37.4	40.2	0	22.6
Ijaw <sup>3</sup>	197	44.5	28.1	0	27.4
Ogoni <sup>3</sup>	201	38.4	53.2	0	18.4
Gujjar <sup>4</sup>	92	30.5	16.6	38.1	14.7
Quechua <sup>5</sup>	115	55.7	10.8	14.8	18.8

**Table 3:** Distribution of palmar C – line terminations (%) among female subjects of some populations previously studied.

Tribe	N	Proportion of terminations in percentage			
		Ulnar	Proximal	Radial	Absent
Hausa <sup>1</sup>	305	40.1	43.7	0	16.2
Urhobo <sup>1</sup>	207	37.0	51.5	0	11.5
Yoruba <sup>2</sup>	133	39.9	42.9	0	17.3
Ibo <sup>2</sup>	140	43.6	42.1	0	14.3
Ijaw <sup>3</sup>	193	43.2	41.7	0	14.1
Ogoni <sup>3</sup>	201	48.0	46.3	0	5.7
Gujjar <sup>4</sup>	108	41.7	15.3	24.5	18.5
Quechua <sup>5</sup>	120	59.1	13.0	14.0	14.1

1 = Igbigbi *et al*, 1996

2 = Igbigbi *et al*, 1994

3 = Present study

4 = Balgir and Sharma, 1986

5 = Klayman *et al*, 1977

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