



Original Article

An Investigation of the Sole Dermatoglyphics of Ogoni People of Niger Delta, Nigeria

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Background: Dermatoglyphics: Is the study of the patterns made by ridges and crevices of the palms and soles of the feet. It is now well established that skin ridges that form well define patterns characterized individuals. **Aim:** The dermatoglyphic patterns of the distal soles of a random sample of the Ogoni's was analyzed with a view of correlating these patterns to the sex of the individual subjects. **Materials and Methods:** A total of two hundred (200) human subjects were investigated. These includes 100 males and 100 females without any known medical conditions. Patterns observed in these sole areas were classified according to the classification of Cummins and middle. **Results:** The result of the study revealed that there was indeed a correlate between dermatoglyphic patterns in the sole of the Ogoni's in Niger Delta of and sex. It also showed that the frequency of distribution of true patterns on the sole of females were significantly greater than males possibly with the exception of plantar aches which were not available for analysis on all the samples collected. Two major deviations from other studies were noticed — absence of whorls in the males and more loops — females than males. **Conclusion:** The Dankmeijer index analysis showed that the males have more arches/Loop on their toes, it means there is less number in distribution of whorls in this region. By implication it means that females have more whorls on their toes than the males. The absence of whorls on the males and the abundance of loops in females than males suggest that these differences distinguish the Ogoni's in the Niger Delta.

Keywords: Arches, Whorls, Loops, Ogoni, Niger Delta.

1. INTRODUCTION

Dermatoglyphics: Is the study of the patterns made by ridges and crevices of the palms and soles of the feet. It is now well established that skin ridges that form well define patterns characterized individuals.¹⁻⁵

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These patterns are genetically determined and their inheritance is multi-factorial. Dermatoglyphics is applied to anthropometric research in isolated societies or populations. As an aspect of physical anthropology, it is a collective name used to describe all patterns of the ridged skin of the palm and soles; though these patterns show great diversity and combination found in persons, they can be conveniently categorized into a number of different types; parallel ridges and furrows forms whorls, loops and arches on the finger tips. In a pattern so highly individualistic, that finger printing has been used as a reliable method of personal identification. There are notable differences in dermatoglyphic patterns on the palms, fingers of the same individual.⁶⁻¹⁰

Statistically the patterns of women contain more whorls and fewer arches than those of men. Also the configuration of the characteristic ridge patterns of the volar surface of the skin in the hand of man, distal segment of each of the digits has three types of configuration also known as (A L W) Arch Loop-whorls system.

Dermatoglyphics has become an important field of study in medicine because of the help it provides in the diagnosis of certain diseases, such as Mongolism. It is also of proven value in certain other congenital disease e.g., Klinefelter's syndrome.¹¹⁻¹⁵

Dermatoglyphics patterns differ in the regions of the body. However, these difference are not consistent. In their study of toes and finger in the Caucasian of both sexes. Schwartz and Roger observed the arch patterns in the toes and whorl pattern in the finger. The study of Dermatoglyphics has enabled early detection of genetic abnormalities such as Down's syndrome, defects caused in utero by infections agent such as German measles virus. Histologically, Palmar & Planter skin is characterized by a thick cornified layer, prominent retina and papillae, numerous nerve ending and eccrine sweat units and the absence of hair follicles.¹⁶⁻²⁰

Dermatoglyphic features are inherited and they follow a polygenetic mode of inheritance. The poly-genetic mode of inheritance of dermatoglyphic patterns both quantitatively and qualitatively has been demonstrated in morphological characters of the configurations, dermal ridge count and measurements).²¹⁻²⁹

Galton (1892) brought forward at a conclusion that dermatoglyphics of five different racial groups. He arrived at a conclusion that dermatoglyphics patterns show racial variation; the fact is used in ethnographic physical anthropological studies.

There are a good numbers works that have been studied on dermatoglyphics of the fingers but not much on the sole.^[1-15]

Aim of the Study

This study was aimed at investigating whether there is a characteristic dermatoglyphic pattern that is peculiar to the Ogoni people of the Niger Delta.

2. MATERIALS AND METHODS

Research Design: The study was non-experimental.

Sample Size and Sampling Technique: A total of two hundred (200) human subjects were investigated. These include 100 males and 100 females without any known medical conditions, using simple random sampling.

Criteria for Subject Selection: subjects recruited for this study had no known deformities of toes and soles of the feet. The subjects were selected from Ogoni tribe of Niger Delta.

Ethical Clearance: Ethical clearance was obtained from the Research Ethics Committee of the University of Port Harcourt, Nigeria.

Data Collection: Two plywood surfaces were pinned clean sheets of duplicating papers. Subjects were made to wet their soles, by standing on a piece of foam soaked with endorsing ink. These were then transferred to the duplication papers. Each used duplicating paper, was replaced by a new one for a fresh subject. The sex of the subject, and the foot used i.e. (left or right) were indicated on the top right hand side of the Paper. The Papers with the foot prints were kept separately until the ink were dry. The soiled soles were washed using water soap and sponge.

A hand lens was used to examine the prints to magnify and make counting easy. Counts were obtained from both soles, and the mean calculated. Standard statistical methods were used to analyze the data.

3. RESULTS

For descriptive purposes, the toe was mapped topographically into 10 zones (fig1) based on the Original nomenclature of Cummins and Middlo (1) table (1). Areas I to v indicate distal planta zone while area Vitox indicate proximal planar zone

Table 1: Sole Area Classification

Areas adopted for topological original nomenclature	Cummins and Middlo original nomenclature
I	Hallucal
II	Second interdigital
III	Third interdigital
IV	Fourth interdigital
V	Hypothenar Distal
VI	Hypothenar Distal
VII	Hypothenar Proximal
VIII	Calcar (Heel)
IX	Thenar Proximal
X	Thenar Distal

Table 2: Percentage frequency of loops

	Sample size	1	2	3	4	5
Male						
Left	120	10.5	12	12	5.2	6.3
Right	120	12.70	14	11.1	6.6	7.9
Female						
Left	80	12.5	2.0	11	12.8	69
Right	80	14.6	0.6	10	11.7	75

Table 3: Percentage frequency of whorls

	Sample size	1	2	3	4	5
Male						
Left	120	-	-	-	-	-
Right	120	-	-	-	-	-
Female						
Left	80	115.0	-	-	-	-
Right	80	113.0	-	-	-	-

Table 4: Percentage frequency of arches

	Sample size	1	2	3	4	5
Male						
Left	120	57	39	34.5	33.5	25.8
Right	120	55	40	33.3	32.5	26.7
Female						
Left	80	75	49.8	40	42	36.5
Right	80	80	52.5	39	44	38.75

With the aid of hand lens, the prints were read and classified based on the work of Loesch and skrinjaril and penrose 1969(4). The percentage frequency of loop, whorls and arch patterns in the different Zones of the sole are summarized in tables 2, 3& 4.

Whorls are found exclusively on the hullucal. It shows the presence of whorl patterns, plantar surfaces of the females. Theses pattern is relative only one distal plantar of females. Assent of the males of signified dermatoglypic patterns found on the toe were abundant whorl on the big toe and the virtual absence of whorl in the small toe. All the toes had abundant loop and arch patterns with the Latter being the more females in the big toe.

Dermatoglyhic patterns found on the toes

The Dermatoglyhics pattern in toes include: Loop patterns, Whorl patterns and Arch patterns.

Loop pattern: Loop pattern were found to be more numerous than whorl in both sexes and on both feet. The pattern distribution provides basis for comparison (table 2).

Whorl pattern: Whorl pattern was found to be more abundance on the big too (Hallux) of females and was virtually absent on the small toe as in table (3). Whorl was not seen in males.

Arch patterns: Most abundant Dermatoglyhic pattern found in the toes. They are found between other dermatoglyhic pattern (Loop, whorl) patterns. They do not possess any tri-radius their abundance is observed in the toes of both sexes.

Data Analysis

Total sample population =200 (males 120 and females 80)

e.g. Loop distribution on proximal and distal sole

$$\% \text{ frequency} = \frac{\text{number of loop in area} \times 100}{\text{Total sample number}} = \frac{20 \times 100}{120} = 16.7 \text{ (left)}$$

Variability of toe pattern in both sexes

Two methods have been adopted in comparing the frequency of toe patterns in different population sample. One of such is Dankmeijers Index. The Dankmeijer's (1934, 1933) Arch whorl index: It is an inverse relation between the frequency

of whorl and arches expressed as fraction, or percentage (%) rise in the frequency of the other.

Dankmeijer adopted the formula below to calculate the index in sample population comparison.

Total frequency of arches = Dankmeiher's. Index
Total frequency of whorls

APPLICATION OF DANKMEIJER'S INDEX

Males:

Total frequency of arches = 189.8
Total frequency of whole = 0.0

$$\text{Dankmeijer's index} = \frac{189.8}{0.0} = 189.8$$

Females:

Total number of arches = 243.3

Total number of whorls = 115.0

$$\text{Dankmerijer's Index} = \frac{243.3}{115.0} = 2.116$$

3. DISCUSSIONS

This study was carried out on Ogonis and the results showed that the whorl pattern was more frequent on the big toes of females, and virtually absent on the small toe (table 3). Whorls were not seen in males. The findings here are in agreement with the work of Igbilgbi, Didia and Emenike, where a similar pattern was observed in the Igbos.

The study again revealed that the loops and arches where more in females than males, it agrees with the report of the study on the Hausa and Urohbos where a significant difference was found between the sexes. It shows therefore that dermatoglyhic patterns are sexually dimorphic. In the present study irrespective of age differences the same pattern was observed in both male and females: This shows no relationship between the ages and dermatoglyhic patterns. No mention is made of such relationship in earlier studies.

The absence of whorls in male is a significant variation from other studies. In previous works, even though differences exist, they were at last found in both sexes. Perhaps a study on the Ibibios with which the Ogonis have had long team relationship may reveal a similar pattern.

The Dankmeijers Index in the study showed a much higher index in the males than females, which also corresponds withthe works of Igbilgbi, *et al.*,²⁹ on the Igbos.

The frequency of loops in the two sexes differs significantly, being greater in females than males in this study.

4. CONCLUSIONS

The Dankmeijer Index analysis showed that the male has more arches/Loop on their toes, it means there is less number in distribution of whorls in this region. By implication it means that females have more of whorls on their toes than the males. Two major significant findings were obvious in this study. The absence of whorls on the males and the abundance of loops in females than males

suggests that these differences distinguish the Ogoni's in the Niger Delta.

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Author's Contribution

We write to state that both authors have contributed significantly, and that all authors are in agreement with the contents of the manuscript. 'Author A' (Josiah S. Hart) designed the study and protocol, 'reviewed the design, protocol and examined the intellectual content and 'Author B' (Tarimobo M. Otobo) wrote the first draft of the manuscript, managed the literature search and managed the analyses of the study. All authors read and approved the final manuscript.