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Palmar and digital dermatoglyphic patterns of the Ijaws in Delta State of Nigeria

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ABSTRACT

Dermatoglyphics concerns the configuration of epidermal ridges of the volar surfaces of the fingers, toes, palms and soles. The aim of this study is to determine the asymmetry of dermal ridges and palmar variables of atd angle (angle between the triradia a, t and d), a-b ridge count (ABRC) and total finger ridge count (TFRC) of dermal ridges for the Ijaw people of Nigeria. 200 healthy students who are Ijaws were studied. Ink prints of their fingers and palms were obtained. Counting and classifying of palmar and digital ridge pattern configurations of arches, loops and whorls was based on standard techniques. Ijaw males have higher TFRC than the females ($p < 0.001$). The males have lower ABRC than the females ($p < 0.005$). The males have higher atd angles than the females ($p < 0.05$). *The digital variables of arch, whorl as well as loop and palmar variables such as atd angle and ABRC were distinct in each individual. Hence they may be useful in personal identification. Dermatoglyphic traits may be used in identifying an individual's gender. The results of this study are compared with similar studies for the Ijaws and other ethnic groups in Nigeria.*

Key words: Forensic science, palm, digit, dermatoglyphics, Nigeria.

INTRODUCTION

Dermatoglyphics was derived from the Greek word, "dermis" meaning skin and "glyph" meaning curving. Dermatoglyphics is the science of configuration of epidermal ridges of the volar surfaces of the fingers, toes, palms and soles [1]. Dermatoglyphic traits serve as useful tools in the diagnosis of congenital malformations [2]. They are valuable as somatic markers of

genetic and environmental influences that may destabilize developmental processes prenatally [1, 3-5].

Researches on dermatoglyphics among several Nigerian populations have been carried out. Research has reported digital patterns of ten ethnic groups [6]. There are studies on the palmar and digital dermatoglyphics of the Yoruba and Ibo ethnic groups in Nigeria [7]. Dermatolyphic patterns in Ibo and Ikwere ethnic groups have been studied [8]. Palmar and digital dermatoglyphic patterns in the Ndokwas of Delta State, Nigeria have been studied [9]. Research on digital and palmar dermatoglyphics has been undertaken among the Ijaw people of the Niger Delta region of Southern Nigeria [10]. About four years after a related study in this population [10], the present study has been undertaken to evaluate the present status of these people in relation to digital and palmar dermatoglyphics. The Ijaws are predominant indigenous people in the Niger Delta region of Nigeria. The Ijaws are vital in the economy of Nigeria because they are blessed with minerals such as crude oil.

This study examines the pattern of asymmetry of dermal ridges of the Ijaws. It determines the palmar variables of atd angle, ABRC and TFRC of dermal ridges among the Ijaws.

MATERIALS AND METHODS

The descriptive survey method was adopted in this study. The study population comprised 200 Senior Secondary School Students (100 males and 100 females) who are of Ijaw ethnic group in Delta State, Nigeria. The multistage sampling technique was used. The three Local Government Areas (Patani, Bomadi and Burutu) of the Ijaws were covered. Three Schools were sampled in each of the Local Government Areas. At the Schools, subjects were sorted into males and females. Subjects who are non-Ijaws were excluded from the study. The age range of the subjects was 14-19 years. Bilateral palmar and digital prints were obtained by the inking procedure. All prints were clear enough to be classified into patterns and also to carry out ridge counting with the aid of magnifying lens. Counting and classifying of palmar and digital ridge pattern configurations of arches, loops and whorls were based on standard techniques. This study lasted for a period of two weeks (July 25th – August 5th 2010]

Ethical issues were considered. Prior to the study, the consent of the respective head of Schools was sought as the legal representative of the Students. The subjects were informed about the nature of the study and only those who were willing participated.

The data obtained was subjected to statistical analysis using Microsoft Excel 2007. The descriptive statistics was used and student t-test was used to test for significant differences between male and female variables.

RESULTS

Table 1 shows the overall distribution of digital dermal ridge pattern types in both males and females. Concerning pattern asymmetry, the whorls are more on the right hand digits in both genders. The arches are more on the left hand digits in both genders. The Ulnar loop counts are more on the right hand digits in both male and female.

Table 2 **c**omprises of the TFRC, ABRC and atd angles. Ijaw males have higher TFRC than the females ($p < 0.001$). The males have lower ABRC than the females ($p < 0.005$). The males have higher atd angle than the females ($p < 0.05$). Tables 3A and 3B is a comparison of pattern types and complexity variables between the Ijaws and other Nigerian tribes. Males tend to have a higher whorl count on the right hand relative to the left hand. Table 4 is a comparison of TFRC, atd angle and ABRC between Ijaw subjects and other Nigerian tribes. The Ijaws have a lower TFRC and ABRC than the other six Nigerian tribes compared.

Table 1. Frequency of digital pattern of Ijaw males and females

PATTERN TYPES	MALE			FEMALE		
	Left	Right	Mean	Left	Right	Mean
Whorl	19.67	22.38	21.025	27.24	27.27	27.26
Arch	0.53	0.41	0.47	1.59	1.42	1.51
Ulnar loop	33.24	34.48	33.86	15.62	19.74	17.68
Radial loop	0	0.24	0.12	0	0	0

Table 2. TFRC, ABRC and atd angle among Ijaw subjects

PARAMETER	SEX	MEAN
TFRC	Male	55.01
	Female	44.94
ABRC	Male	35.19
	Female	36.93
Atd Angle	Male	42.80
	Female	41.54

Table 3: A comparison of pattern types between the Ijaws and other Nigerian tribes

A

Variable	IBO [7]				OGONI [11]				HAUSA [7]			
SEX	Male (250)		Female (140)		Male (203)		Female (203)		Male (300)		Female (305)	
	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
Arch	14.4	11.4	12.9	11.4	9.2	8.7	15.8	11.8	9.5	7.1	16.1	13.7
Whorl	22.3	24.2	28.3	28.1	32.8	37.1	28.2	26.8	34.3	36.8	29.9	31.5
Ulnar Loop	62.0	61.8	55.7	58.3	55.5	52.0	52.9	57.2	54.9	53.8	51.9	53.1
Radial Loop	2.3	2.6	3.1	2.1	2.5	2.1	3.2	4.1	1.3	2.4	2.1	1.7

B

Variable	YORUBA [7]				URHOBO [7]				IJAW (Present study)			
SEX	Male (250)		Female (133)		Male (250)		Female (140)		Male (100)		Female (100)	
	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
Arch	10.2	10.1	11.6	10.2	14.6	11.8	14.1	11.8	0.53	0.41	1.59	1.42
Whorl	26.7	28.5	25.7	23.3	29.7	35.1	32.6	31.6	19.67	22.38	27.24	27.27
Ulnar Loop	61.2	58.7	66.5	65.4	53.0	49.4	51.3	54.7	33.24	34.48	15.62	19.74
Radial Loop	1.9	2.7	2.3	1.1	2.7	3.7	2.0	1.9	0	0.24	0	0

Table 4. A comparison of TFRC, atd angle and ABRC between Ijaw subjects and other Nigerian tribes.

A. MALE

STUDY	POPULATION	TFRC	ATD ANGLE	ABRC
Present study	Ijaw	55.0	42.8	35.2
Jaja. & Igbigbi [10]	Ijaw	113.8	37	80.9
Igbigbi *et al* [[7]	Ibo	113.8	77.1	74.2
Igbigbi *et al* [7]	Yoruba	101.6	76.3	72.8
Igbigbi *et al* [7]	Hausa	130.1	78.04	72.9
Igbigbi *et al* [7]	Urhobo	115.5	59.9	74.4
Jaja [12]	Ogoni	128.3	39.57	75.6
Anibor *et al* [9]	Ndokwa	102.91	39.39	68.11

B FEMALE

STUDY	POPULATION	TFRC	ATD ANGLE	ABRC
Present study	Ijaw	44.9	41.5	36.9
Jaja. & Igbigbi [10]	Ijaw	111.4	39.2	73.6
Igbigbi *et al* (7)	Ibo	111.4	76.6	73.4
Igbigbi *et al* (7)	Yoruba	121.6	77.9	74.4
Igbigbi *et al* (7)	Hausa	124.7	79.72	78.7
Igbigbi *et al* (7)	Urhobo	110.48	68.10	74.4
Jaja (12)	Ogoni	109.7	42.09	73.2
Anibor *et al* [9]	Ndokwa	99.94	40.97	69.50

DISCUSSION

Dermatoglyphics is of interest in such diverse fields as medicine, anthropology, and criminology. The dermatoglyphic patterns of the hand are the intimate and private symbol of the individual. Although this is true of all the skin-ridge patterns on the surface of the hand as a whole, it is especially true of the digital dermatoglyphics, the fingerprints. Everyone possesses a unique set of fingerprints, a knowledge which is used by police forces around the world, and these patterns do not change. Their use as a means of identification shows how significant they are as an indicator of identity; their uniqueness shows how significant they are as a measure of individuality. Research has confirmed that these patterns not only have a genetic significance but that they also betray certain distinctive psychological characteristics.

This study demonstrates that homologous fingers tend to have comparable counts of pattern types. This is in accordance with what has been obtained among other Nigerian tribes previously studied [7, 12]. Left hand digits have slightly higher counts of arches as compared to right hand digits in both male and female gender. This conforms to what has been documented previously [7, 12].

In male Ijaw subjects the whorl patterns and radial loops occur more commonly on right hand digits. In female Ijaw subjects only the whorl patterns occurred more commonly on right hand digits. This does not conform to the generalization of Cummis and Midlo where it is expected that whorl patterns and radial loops should occur more commonly on the right hand digits in both sexes as compared to the left hand digits [1].

Research on digital and palmar dermatoglyphics has been carried out among the Ijaw people of the Niger Delta region of Southern Nigeria by Jaja and Igbigbi [10]. They saw that the most prevalent digital ridge pattern type was ulnar loops followed by whorls, arches and the least prevalent was radial loops. This study conforms to their findings. Boroffice also reported the ulnar loops as being the most prevalent digital ridge pattern type, followed by whorls, arches and the least being the radial loops [6]. Jaja and Igbigbi [10] saw no significant gender disparity in TFRC and ABRC. In this research, males have higher TFRC than the females ($p < 0.001$). Also the males have lower ABRC than the females ($p < 0.005$). Gender dimorphism was observed in this study concerning the atd angle. The males have higher atd angles than the females ($p < 0.05$). This does not conform to the findings of a previous study of the Ijaws [10]. In that study, females showed significantly greater atd angles than males ($p < 0.05$). This could be due to differences in sample sizes of the two studies.

CONCLUSION

The pattern asymmetry of digital dermal ridge types among the Ijaw people is in conformity with the pattern expected in a normal Nigerian population. However, the TFRC and ABRC in the male and female are markedly low. The digital variables of arch, whorl, loop and palmar, variables such as atd angle and ABRC were distinct in each individual. Hence they may be useful as means of identification. The ABRC showed significant gender dimorphism ($p< 0.001$). Gender disparity exists in the atd angle as the males have higher atd angles than the females ($p < 0.05$). It is therefore concluded from this study that dermatoglyphic traits may be used in identifying an individual's gender.

This study conforms to an extent to the findings from a previous research on digital and palmar dermatoglyphics by Jaja and Igbigbi [10] among the Ijaws. The similiarities may be attributed to the Ijaws common ancestral origin. The disparities may be due to genetic as well as environmental factors.

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REFERENCES

[1] H .Cummins and C. Midlo. Finger prints, palms and soles: An introduction to Dermatoglyphics. Dover Publication. New York.**1961**, 1 – 5.
[2] L. S. Penrose. *Brit. Med. J*. **1968**, 2: 321-325.
[3] B. Schaumann and M. Alter. Dermatoglyphics in Medical Disorders. Springer – Verlag. New York. **1976**, 220 – 289.
[4] Y.R. Ahuja and C.C. Plato. Effect of environmental pollutants on Dermatoglyphics. In Durhan NM and Plato CC (eds). Trends in Dermatoglyphics Research. Kluwer Academic Publishers. London. **1990**, 125 – 128.
[5] A. Rosa, B. Gutierrez, A. Guerra, B. Arias and L. J. Fananas. **2001**, *Intellect. Disabil. Res.* 45, 5: 416 – 423.
[6] R.A. Boroffice. **1978**, *Am. J. Phy. Anthropol*.. 49: 167 – 170.

[7] P.S. Igbigbi, B.C. Didia, T.U. Agan and R.E. Ikpae. **1994**, *West Afri. J. Anat*. 23: 147 – 178.
[8] G.S.Oladipo, J. Olotu and B.C. Didia. **2005**, *J. Sci. Technol. Res*. 4, 2: 24 – 27.
[9] E. Anibor, P.S. Igbigbi, O.G. Avwioro and A. Okpor . **2012**, *Afri. J. Med. and Med. Sci*. In press.
[10] B.N. Jaja. and P.S. Igbigbi. **2008**, *Afr. J. Med. Med. Sci*. 37, 1: 1-5.
[11] P.S. Igbigbi, B.C. Didia, H. Owhojedo and O. Obochio. **1996**, *West Afr. J. Anat*. 4: 51 – 56.
[12] B.N.R. Jaja. **2008**, *Scientific Research and Essays*. 3, 2 : 51 – 56.