J. Expt. & Clin. Anat. 4(2): 44-47 (2005).

JECA

Dermatoglyphic Patterns In Androgenetic Alopecia In A South Eastern Nigerian Population

*G. S. OLADIPO AND B. E. AKANIGHA
Department of Anatomy, College of Health Sciences, University of Port-Harcourt
*Author for correspondence

ABSTRACT

This study was carried out to determine any characteristic dermatoglyphic patterns associated with androgenetic alopecia in South Eastern Nigeria. Dermatoglyphic analysis of three hundred (300) subjects comprising one hundred and fifty (150) androgenetic alopecians and one-hundred and fifty (150) normal subjects (non-alopecians) was carried out. The subjects were all of Igbo tribes selected at random from Enugu, Imo and Anambra States. Their grand parents were also from Igbo ethnic group. The parameters studied included: The digital patterns, digital ridge count, atd angle, dat angle and crease pattern. The results on the digital patterns showed that whorl had the highest percentage in all the digits of the alopecians while ulnar loop had the highest percentage in normal individuals. The digital ridge count was significantly higher ($P<0.05$) in alopecians than normal individuals. Also the atd and dat angles in angles in alopecians were significantly higher ($P<0.05$) than normal subjects. However, there were no cases of Sidney and Simian crease in both groups. The above named parameters (digital pattern, digital ridge count, atd and dat angles) which showed significant differences between the two groups are suggestive of characteristic patterns in alopecians. These are important features for identification and medical diagnosis of alopecia.

Keywords: Alopecia, dermatoglyphics, patterns.

Dermatoglyphis is the study of finger, palmar and plantar ridges (Cummins and Midlo, 1943). A large number of reports exist on dermatoglyphic studies in racial groups, abnormal psychology, congenital defects and genetic disorders. Nearly all chromosomal disorders have been known to show characteristics dermatoglyphic patterns useful in diagnosis of such disorders (David, 1981). Barta et al (1978), Shield et al (1995) and Oladipo and Ogunnowo (2004) reported dermatoglyphic correlation in Diabetes Mellitus. Hirsch (1978) reported dermatoglyphic studies in mental retardation, congenital heart defects, child psychiatric groups, retarded growth. He found clear relationships in these disorders. Blanka and Milton (1976) reported dermatoglyphic patterns in autosomal trisomies, trisomy 21 (Downs syndrome) trisomy 13 and 18, trisomy 8 (Mosaicissm), sexual chromosomal anomalies, leukemia and other conditions. Widespread dermatoglyphic variations exist between ethnic groups therefore there is need to determine the parameter values for use in making a diagnosis in each ethnic group. In addition, no documented work exists on dermatoglyphics in alopecia. Thus the objective of this study was to determine dermatoglyphic pattern in androgenetic alopeci and the parameter values for use in Nigeria most especially South Eastern Nigeria where the subjects for the study were selected.

MATERIALS AND METHODS

A total sample size of 300 male subjects which comprised 150 androgenetic alopecia subjects and 150 normal (non-alopecia) subjects were used in the study. The subjects were of Igbo ethnic origin by both parents and grand parents. They were chosen at random from Imo, Enugu and Anambra States. The subjects were 40 years old and above.

Ink prints of palms and fingers of both hands were taken. The prints were studied with the aid of magnifying glass. The prints were analyzed based on Cummin's method (Cummins et al, 1929). The parameters studied included: digital pattern, atd angle, dat angle, digital ridge

count and palmar crease pattern (see figure 1). Record was made for each subject. The results for the two groups were compared using discrete statistics.

RESULT

The results of this study are shown in tables 1A,1B,2, 3,4A, 4B and 5. tables 1A and 1B show the percentage frequencies of digital patterns of right and left hands respectively of Alopecians (A) and Normal subjects (non-alopecia) (N). from the tables, whorld pattern had the highest percentage occurrence in all the digits of the right and left hands of Alopecians while ulnar loop had the highest percentage occurrence in Normal subjects. Also no radial loop was observed in the first right digit (RI) of the Alopecians (Table1A). Using chi-square test, the differences observed in the percentage frequencies of digital patterns between these two groups were statistically significant ($P<0.05$).

Table 2 represents the mean, standard deviation and standard error of atd angles (^{0}) of the right and left palms of Alopecians and Normal subjects. From the table, the mean atd angles of the right and left palms of Alopecians were significantly higher ($P<0.05$) than the mean atd angles of the right and left palms respectively of normal subjects (student t-test). Similarly the mean dat angles of the right and left palms of Alopecians were significantly higher ($P<0.05$) than those of the right and left palsm respectively of normal subjects (Table 3).

Table 4A and 4B represent the digital ridge count of each digit of the right and left hand respectively of Androgenetic Alopecians and Normal individuals while table 5 shows the summary of mean, standard deviation and standard error of total ridge count of the right and left digits of the two groups. In the tables, Alopecians had a significantly higher ($P<0.05$) ridge count than normal subjects in all the digits of both hands.

Analysis of the palmar crease was found in either Alopecians or normal subjects. A number of studies have indicated racial or ethnic differences in dermatoglyphic patterns among different populations. Also, several reports exist on dermatoglyphic correlation in a large number of genetic disorders. The variables implicated with dermatogyphic correlation include: digital pattern, atd angle, dat angle, digital ridge count and palmar crease pattern (Schaumann and alter, 1976, Boroffice, 1978, penrose, 1965; Shield et al, 1995, Oladipo et al 2005). Cummins (1926) and Boroffice (1978) indicated that ulnar loop had the highest frequency of occurrence followed by whorl, arch and radial loop in Normal subjects. This order agreed with our findings on normal subjects in the present study but different from our observation for the Alopecians. Our observation on the percentage of digital where the whorl pattern had the highest percentage in all digits of Alopecian was however in agreement with results of Schaumann and Alter (1976) on patients with Down's syndrome. However features like simean creases and Sydney lines peculiar to Ddown syndrome which is not an aabnormality as widely speculated, rather it is an inherited condition.

The mean atd angle of Alopecians in the present study which averaged 45.96^0 was observed to be significantly higher ($P<0.05$) than that observed for normal subjects (41.520). This was in concordance with the result reported by Penrose (1963) for Down's syndrome, which put the mean atd angle at 46.20. Similarly, the mean dat angles for the Alopecians were significantly higher than those of both hands of Normal Nigerians ($P<0.05$). This observation was also similar to that of Schaumann and Alter (1976) on Down syndrome.

The digital ridge counts of all digits of Alopecians were also significantly higher ($P<0.05$) than that observed for Normal subjects. This results is at variance with most reports on Diabetes mellitus which has lower ridge count than the normal population (Vera et al, 1995; Barta et al, 1978) but in agreement with reports of some authors on other genetic disorders. (Penrose, 1963; Penrose 1973).

Table 1a: Percentage (%) Frequencies Of Digital Patterns Of The Right Hands Of Androgenetic Alopecians (A) And Normal (N) Male Subjects.

PATTERNS	RIA	RIN	RIIA	RIIN	RIIIA	RIIIN	RIVA	RIVN	RVA	RVN
Ulnar Loop	32.00	42.67	30.00	37.33	34.00	38.67	29.33	52.67	32.00	42.67
Radial loop	0.00	3.33	2.67	7.33	2.00	12.00	4.67	8.00	11.33	17.33
Whorl	53.33	38.67	52.00	32.67	51.33	30.66	56.67	21.33	49.33	18.00
Arch	14.67	15.33	15.33	22.67	12.67	18.00	9.33	18.00	7.34	22.00

P< 0.05.

A- Alopecians. N – Normal Subjects. R – Right Side.

Table 1b: Percentage (%) Frequencies Of Digital Patterns Of The Left Hands Of Androgenetic Alopecians (A) And Normal Subjects

PATTERNS	LIA	LIN	LIIA	LIIN	LIIIA	LIIIN	LIVA	LIVN	LVA	LVN
UlnarLoop	35.33	48.00	30.67	39.33	28.00	46.00	36.67	52.00	28.67	48.00
Radial loop	0.67	1.33	4.00	7.33	3.33	13.33	7.33	12.00	12.67	18.00
Whorl	46.67	34.00	48.00	31.34	58.00	23.33	50.67	21.33	52.66	14.67
Arch	17.33	16.67	17.33	22.00	10.67	17.34	5.33	14.67	6.00	19.33

P<0.05. L – Left Side

Table 2: Summary Of Mean, Standard Deviation And Standard Error Of Atd Angles (^{0}) Of The Palmar Prints Of Androgenetic Alopecians And Normal Individuals

PARAMETERS	RA	RN	LA	LN
Mean	45.92	41.82	46.00	41.82
Standard deviation	0.23	0.49	0.32	0.33
Standard error	0.02	0.4	0.03	0.03

Table 3: Summary Of Mean, Standard Deviation And Standard Error Of Dat Angles (^{0}) Of The Right And Left Palms Of Androgenetic Alopecians And Normal Individuals.

PARAMETERS	RA	RN	LA	LN
Mean	66.22	62.39	66.24	62.89
Standard deviation	0.14	0.32	0.42	0.16
Standard error	0.01	0.03	0.03	0.01
Arch	14.67	15.33	15.33	22.67

P< 0.05

Table 4: Summary Of Mean, Standard Deviation And Standard Error Of The Digital Ridge Count Of Each Digit Of The Right Hand Of Androgenetic Alopecians And Normal Individuals

	RI		RII		RIII		RIV		RV	
Parameter	A	N	A	N	A	N	A	N	A	N
Mean	13.05	10.68	12.79	10.23	12.59	10.05	12.94	9.59	12.57	9.23
Standard deviation	0.092	0.021	0.31	0.32	1.05	0.59	0.23	0.25	0.19	0.37
Standard error	0.0075	0.0017	0.025	0.026	0.086	0.048	0.019	0.02	0.016	0.03

Table 4b: Summary Of Mean, Standard Deviation And Standard Error Of Digital Ridge Count Of Each Digits Of The Left Hand Of Androgenetic Alopecia And Normal Individuals.

	Li		Lii		Liii		Liv		Lv	
Parameter	A	N	A	N	A	N	A	N	A	N
Mean	13.08	10.96	12.65	10.67	12.86	9.91	12.56	9.64	12.63	9.14
Standard deviation	0.18	0.47	0.35	0.42	0.49	0.36	0.39	0.28	0.18	0.13
Standard error	0.015	0.038	0.029	0.0034	0.04	0.029	0.032	0.022	0.015	0.011

P<0.05

Table 5: Summary Of Mean, Standard Deviation And Standard Error Of Total Ridge Count Of The Right And Left Hand Digits Of Androgenetic Alopecians And Normal Individuals

	RIGHT HAND		LEFT HAND	
Parameter	Alopecian	Normal	Alopecians	Normal
Mean (x)	12.79	10.96	12.76	10.06
Standard deviation	0.21	0.56	0.21	0.75
Standard error	0.0082	0.0230	0.0081	0.0300

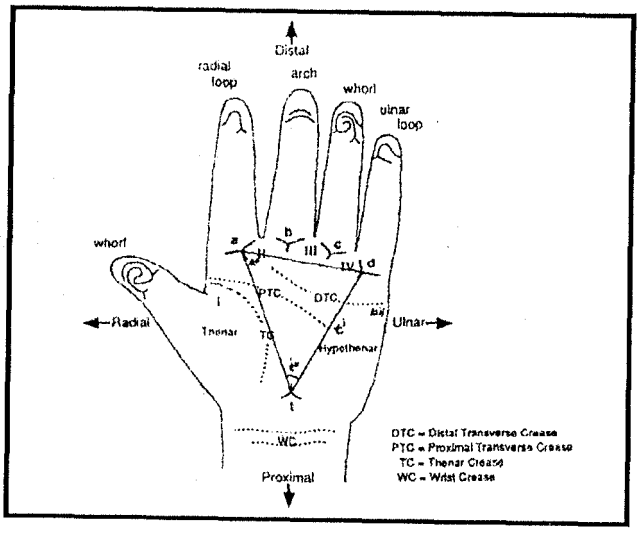

Fig. 1: Scheme To Show Digital Patterns, Atd Angle, Dat Angle, And The Palmar Creases.

CONCLUSION

This study has given an insight into the fingerprint and palmar print patterns predominant in Alopecians in the South Eastern zone of Nigeria (Igbos). Dermatoglyphic features like; atd angles, dat angle, digital ridge count which were significantly higher in Alopecians can be used for identification or diagnosis of Alopecia. On the other hand, since features like simean creases and Sydney lines were virtually absent in the pals of Alopecians, it is clean that Alopecia is not an abnormal condition as widely misconceived but an inherited condition which is a normal majifestation that has no serious health implication.

REFERENCES

Barta L, Regloy Merei A, Kammerer L. (1978). Dermatoglypics Features Diabetes Mellitus Acts paed Aaacad Scientiarum Hungarica **19** 31-34.

Blanka S and Milton A. (1976). Dermatoglyphics in medical disorders Spring Verlag New York 1-7.

Boroffice R.A. (1978). Down's Syndrome in Nigeria: Dermatoglyphic analysis of 50 cases. Nigerian Medical Journal 8: 571-576.

Cummins H and Midlo Charles (1926). Palmar and Plantar Epidermal configurations (Dermatoglyphics) In European Americans, AM J Phys Anthropol, **9**:471-1502.

Cummins Harold and Midlo Charles (1943). Finger prints, Palms and soles. An introduction to Dermatogphylics, (c) The Blakiston Company Philadelphia. Pp. 9.

Cummins Harold, keith H, Midlo Charles, Montgomery R, Harris H, Wilder W. (1929). Revised methods of interpreting and formulating palmar Dermatoglyphics Am. J. Phys. Anthropol **12**: 415-475.

David J. J. (1981). Dermatoglyphics in congenital heart diseases Journal of Medical Genetics **18**: 344-349. Dermatoglyphic analysis of 50 cases Nigeria Medical.

Hirssch W. (1978). Dermatoglyphics and creases in their Relationship to clinical syndromes: A Diagnostic criterion pp. 263-282 in Jamshed Mavalwala Editor, Dermatoglyphics An international Perspective Moulton Publishers the Hague/Paris Journal **8**:571-576.

Oladipo G.S and Ogunnowo B.M (2004). Dermatogpyphic Patterns in Ddiabetes Mellitus in A South Eastern Nigerian Population. African Journal of Applied Zoology and Environmental Biology **6**:6-8.

Oladipo G.S, Olotu J. and Didia B.C. (2005). Dermatoglyphic patterns in Igbo and Ikwerre ethnic groups. Journal of Science and Technology Reearch **2**: 24-27.

Penrose L.S. (1963). Fingerprints, Palmsand Chromosomes. Nature **197**:933-938.

Penrose L.S. (1965). Dermatoglyphic Topology. Nature. **205**: 544-546.

Sschaumann B. and Alter M. (1976). Dermatoglyphics in Medical disorders; Springer Verlag, 1-7.

Shield J.P, Wadsworth E.J. Hobbsk, Baum J.D. 1995, Dermatoglyphics Jetal Growth and diabetes in children. Archives of Disease in childhood **72**: 159-160.

Vera M., Cabrera E aand Gruel R. (1995). Dermatoglyphics insulin dependent diabetic patients in Cuba Acta Diabetologica **32**: (2) 78-81.