



## Hair Whorl Patterns On The Posterior Aspect Of The Scalp Among Nigerians

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### ABSTRACT

The types and incidence of hair whorl pattern on the posterior aspect of the scalp amongst Nigerians was studied using a population sample with ages ranging between 15 and 40 years. The age range chosen was so because the scalp hair apparently deteriorates with aging as seen in senile alopecia. Five hundred subjects within and around Enugu metropolis, chosen randomly were studied. A photograph of the individual's scalp was taken from the rear (posterior) view. Observations for the location of the hair whorls were noted and studied. It was observed that Nigerians tend to have the centre of their hair whorl located mainly in the right superior-medial aspects of the scalp (44%) relative to the median plane and majority of the population (68.6%) had their hair whorls running in the clock-wise direction. We note that, hair whorls patterns of Nigerian deviate from the midpoint of the head with a mean value of  $18.37^{\circ} \pm 0.77^{\circ}$ . This is not too acute within the sample, when compared with the minimum value  $0^{\circ}$ .

**Keywords:** Types, incidence, distribution, patterns, hair whorl, scalp.

It is known that the pattern of hair distribution on the scalp, like most other specialised anatomical organs and parts of the body varies. The pool of structural, functional, and genetic based variations that are present within a population of any species provides the capacity for those individuals having feature most suitable to the needs of time (Enlow, 1995). There has been no polytypical variation in human hair form for at least the last 10, 000 years. In view of the wide variety of hair forms, it must be assumed that biological adaptation has occurred, several features of the scalp hair, such as form, colour, thickness, density, maximal length, tensile strength, etc. are clearly genetically determined (Eckes, 1985). However, hair patterns in mammals have been of interest to anatomist, zoologists, taxonomists, geneticist and paediatricians for many years. The study of hair direction in man is complex, since growth patterns in human tends to have more asymmetry variation than those seen in the rest of the animal kingdom (Behrman, 1952).

Normal whorl patterns appear in the posteroparietal area but some individual have theirs on the right temporoparietal area; running in an anticlockwise or clockwise direction (Samlaska et al, 1989). The pattern of hair distribution on the scalp, like most of our other specialized anatomic part, certainly differs in various individual. Little work has been done on anthropological features of epidermal appendages such as the scalp hair in Nigeria. This

may be due to non recognition of its relevance due to lack of motivation and initiative for such a study. This study therefore aims at determining the centre of hair whorl patterns on the scalp, the various sites of location of the whorl patterns, frequency of each site, difference in the direction of rotation of the hair whorl on the occiput and the mean angle and standard deviation of the centre of the whorl pattern.

### MATERIALS AND METHOD

The study population used was five hundred male Nigerians within the Enugu metropolis. Their ages range from 15 40 years. The sampling method employed was the multiphase random sampling technique. Major converging centres e.g. institutions of learning, market and business centres within Enugu metropolis were used and the number of subjects chosen from each centre was noted (Table 1).

Ages of individual were determined through oral communication (Table 2). During each shot the subject was asked to either seat or stand at a point such that the occiput was made to lie anterior to the camera. The volunteers were recounted by simply having their photographs taken and essential personal data collected on a spread sheath (Table 2). The age range chosen was 16 40 years because the scalp hair apparently deteriorates with aging as seen in senile alopecia. Secondly, subjects with scalp infections or diseases were excluded.

**Table 1: Showing major centres, their location and the subject number collected from each centre**

S/N	Names Of Major Institutions And Other Centres	Location	L.G.A.	Number Of Subjects
1	Union secondary school (Awkwunanaw Boys Sec. Sch.)	Agbani Rd.	Enugu South	100
2	Army Day Secondary School	Gariki Awkwunanaw	Enugu South	50
3	Uwani Secondary School	Uwani	Enugu South	30
4	C.I.C Enugu	Uwani	Enugu south	80
5	University of Nigeria Enugu Campus	College Rd.	Enugu South	41
6	St. Mary's hospital	Ogui Rd.	Enugu North	5
7	Ogbete Main Market	Ogui Rd.	Enugu North	70
8	Foto-Tech Laboratory	Ogui Rd.	Enugu North	4
9	Central Bank Main Office	Okpara Avenue	Enugu North	10
10	Nike grammer School	Abakpan Nike	Enugu East	80
11	C.B.N.Quarters	Trans-Ekulu	Enugu East	30

**Table 2: Showing number of subjects collected for each age brackets.**

AGE	NO of subjects
16 – 21	200
22 – 26	161
27 – 31	70
32 – 36	39
36 – 40	30

**Diagrams defining each of the variables (Figures 1a - f) are described below**

**Horizontal Plane:** This is drawn by joining the vertices of the pinnae (Auricles) together. However if the head is not in an erect position, it is drawn to cut across the vertices of the pinnae in the slanting position and was measured using a ruler. It divides the head into two equal halves: Superior and Inferior (Fig. 1a).

**Vertical Plane:** This plane is also known as the median plane; a protractor was placed on the point to draw a perpendicular line across the horizontal plane. This plane divides the superior halve into: left and right superior quadrants and thus, the inferior half into: left and right inferior quadrants (Fig. 1b).

**Bisecting Planes:** These are drawn from the point of intersection of the vertical and horizontal planes; on both sides. However, a protractor was placed to divide each of the quadrants into two, measuring  $45^\circ$  each and thus; two other halves are formed (fig. 1d)

**Quadrants:** The right and left superior quadrants are formed as explained above. Further division as exemplified by the bisecting planes gives subdivision in relation to the median plane.

As shown in Fig. 1c, the bisectors produce: Right and Left superomedial parts these are closer to the

median plane on the right and left sides respectively. Right and Left superolateral parts These are farther away from the Median Plane on the right and left sides respectively.

**Angles:** Two angles were formed and measured: **Angle Alpha ( $\hat{\alpha}$ ):** This is the angle made or formed by the point of intersection of the perpendicular line made from the horizontal at the midpoint of the median line and was determined by measuring with a protractor.

**Angle Beta ( $\hat{\beta}$ ):** is angle made by the perpendicular line at its point of intersection with the horizontal line from the mid-point of the whorl drawn to meet the median plane at a right angle (Fig 6). Mathematically as shown in (Table 6) it is determine as,  $\hat{\beta} = 180^\circ - [90^\circ + \hat{\alpha}]$ .

**Rotation of hair whorl:** This was traced from the midpoint of the hair whorl pattern taken as the focal point and was found to run in either the clockwise or anticlockwise direction (Fig. 1e & f).

## RESULTS

It was observed that 44% had the centre of their whorl pattern located in the right supero-medial aspect of the scalp, 6% had theirs located in the left supero-medial aspect of the scalp. 28% of the subjects had their hair whorl pattern located on the

plane between right supero-medial and right supero-lateral aspect, 4% had theirs located on the plane between left supero-lateral and left supero-medial aspect of the scalp and 14% had their hair whorls located on the median plane of the scalp while only 2% had dual whorl patterns located on the plane between left supero-medial and right supero-medial aspect of the scalp respectively.

68% of the subjects had their whorl pattern running in anticlockwise direction, 30% had of the

subjects had their whorl patterns running clockwise direction while 2% of the subjects had dual rotation in opposite direction.

The mean value of angle was  $18.37^{\circ} \pm 0.77^{\circ}$  though not too acute. The most frequent angle observed was  $10.68^{\circ}$  (25%), while 75% of the study population had their whorl patterns centre at points below  $25.96^{\circ}$ . The minimum and maximum angles are  $0^{\circ}$  and  $63^{\circ}$  respectively.

**Table 3: Frequency Distribution of Site of the Whorl patterns in the Sample Population**

S/N	Variations	Frequency	Percentage (%)
1	Right Supero – Medial	220	44
2	Plane B/w right supero - lateral and right supero - medial;	150	30
3	Dual location	10	2
4	Median plane	70	14
5	Plane between left supero - lateral and left supero – medial	20	4
6	Left supero – medial	30	6
	Total	500	100

**Table 4: Frequency Distribution of Rotation Direction of Whorl Pattern in the Sample Population**

Variations	Frequency	Percentage (%)
Clock Wise	343	68.6
Anti clockwise	147	29.4
Dual Rotations	10	2
TOTAL	500	100

**Table 5: Frequency distribution of angle  $\alpha$  in Sample Population**

Angle A	Angle B	Frequency	Percent (%)	Cum-Percent
0-6	84	29	14.22	14.22
7-13	77	49	24.02	38.24
14-20	70	43	21.08	59.32
21-27	63	42	20.59	79.91
28-34	56	27	13.23	97.15
35-41	49	8	3.92	97.07
42-48	32	4	1.96	99.03
49-55	25	1	0.49	99.52
56-63	17	1	0.49	100.00
		204	100	

In determining angle  $\alpha$  and  $\beta$  a sub sample of 204 subjects were used.

Mean = 18.37

Median = 17.40

Standard deviation = 11.03

75<sup>th</sup> percentile = 25.96

Min = 0

Max = 63

25<sup>th</sup> percentile = 9.68

Mode = 10.68

Standard error of mean = 0.77

**Statistical analysis of data shows:**

The most frequent angle is 10.68

The mean value however is  $18.37 \pm 0.77$

75% of the population have below 25.96 of this angle

Minimum and maximum values are  $0^{\circ}$  and  $63^{\circ}$

## DISCUSSION

The present study reveals that most Nigerians have the centre of their hair whorl pattern located in the left superomedial aspect (LSM) of the scalp (44%), 28% in the plane between right superomedial aspect (RSM), 14% on the median plane of scalp, 6% on left superomedial (LSM) aspect of the scalp, 4% on the plane between left superolateral (LSL) and left superomedial (LSM) aspect of the scalp and 2% had dual whorls located on two different sites of the scalp (left superomedial and right superomedial) and running in the opposite directions (clockwise and anticlockwise). It was observed that none had hair whorl located in right superolateral and left superolateral (RSL and LSL) aspect of the scalp. 68.5% of the study sample had the centre of their hair whorl pattern running in the clockwise direction compare to 29.5% that had theirs running in anticlockwise direction, while 2% had dual whorl patterns running in opposite directions, hence confirms the normal variation in site as speculated by Kidd (1903), Smith (1973) and Gong (1974) that in spite of changes in location, majority of the population have their hair whorls running in the clockwise direction and further agrees with the findings of Smith and Gong, (1974) that most of the posteroparietal whorls has a clockwise orientation.

Hence, it is noteworthy that the center of hair whorl pattern can be of great anatomical use in transplanting of hair to the bald areas. There is confirmation by (Website E) that relocating healthy growing hair to the bald area will not affect its growth pattern as long as the entire follicular clump along with its supporting structures is moved. Secondly that hair bearing flaps often have an unnatural appearance. The

flap hairline will invariably be directed in the opposite direction. These findings could also be of importance in anthropological and forensic medicine. In general, Nigerians tend to have the origin of their hair whorls located mainly in the right superomedial aspect of the scalp relative to the median plane.

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## REFERENCES

- Barnett, S.A. (1965); Adaptation of mice to cold. *Bro L. Rev.* 40.5
- Courtois M; Loussourng; Hour Seau C; Grollier J.F. (1995). Ageing and hair cycles; *Br- Dermatol.* 1995 Jan; **132** (1): 86-93.
- Eckes Lk (1985): Ethnic Variations of Scalp hairs; *Hautarzt*, 1985 Jul; **36** (7): 381-5.
- Enlow, CA. (1995); "Patterned loss of hair in Men; Types and incidence"; *Ann Ny Acad Sci.* **53** (1951): 708 28.
- Halmilton JB (1951): "Patterned loss of hair in men; Types and incidence"; *Ann Ny Acad. Sci.* **53** (1951): 708 28.
- Kid, W. (ed) [1903]: Critical areas "Man in the direction of hair in animals and Man. London, Adam and Charles Black Ltd, 1903, PP. 66-108.
- Norwood, O. T. [1973]: *Hair Transplant Surgery*; Charles C. Thomas Pub. 1973.
- Smith DW and Gong BT [1978]: Unruly Scalp Hair in Infancy: its Nature and Relevance to problems of Brain Morphogenesis; *Pediatrics* Vol. 61 No 5 May 1978.
- Taylor J.W; Douglas WW; Hugh DP and Basil AP [1977]: Scalp as a Donor Site; *AM J. Surg.* **133** (2): 218-20, Feb 77.
- Websites: <http://www.hairtransplantation.com/option.html>; 1999 [E].