



SHORT COMMUNICATION

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Angular Photometric Analysis of Khana People in Rivers State, Nigeria

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ABSTRACT

Aim: This study is aimed at ascertaining the socio-ethnic identification and classification of the Khana people using photometric analysis. **Methods:** Standardized photographs of 310 subjects (158 males and 152 females) of adult Khana people were used for this study. The parameters measured were the nasofacial, nasofrontal, nasomental, nasolabial and mentocervical angles. **Results:** The mean for the nasofrontal angle for males was $133.46 \pm 8.59^\circ$, nasolabial angle was $86.21 \pm 16.61^\circ$, nasofacial angle was $33.54 \pm 4.09^\circ$, nasomental angle was $128.99 \pm 5.52^\circ$ and the mean for the mentocervical angle was $93.25 \pm 7.26^\circ$ while for the females the nasofrontal angle was $137.36 \pm 6.37^\circ$, nasolabial angle $91.73 \pm 14.8^\circ$, nasofacial angle $32.09 \pm 3.61^\circ$, nasomental angle $130.97 \pm 5.68^\circ$ and mentocervical angle was $93.76 \pm 9.59^\circ$. There was significant sexual dimorphism ($p < 0.05$) with the females having higher angles except for the mentocervical angle. **Conclusion:** The results of this study could be useful to clinicians, orthodontics, facial surgeons and forensic scientists.

Keywords: Angular, Photometry, Khana, Nigeria

INTRODUCTION

The face provides our identity as an individual; it is the anterior part of the head from the forehead to the bottom of the chin and sideways across the ears. Over the years various methods have been used to evaluate these facial characteristics such as; Anthropometry [1] and Photogrammetry [2]. An understanding of the soft tissues and their normal range enables a treatment plan to be formulated to normalize the facial traits for a given individual [3]. Measurements of facial proportions from various ethnic groups have been carried out. These facial measurements included the heights and widths of the upper, middle and lower faces. Their results revealed that the greatest inter ethnic variability in facial proportions exists on the ethnic group and are also present in the measurement of the eyes, nose and mouth. There was no significant difference between sexes in the neo classical facial proportions [4]. Anthropometric measurements of the face were taken of 109 men of African-

American decent aged between 18 and 30 years, and the results were compared with the neo-classical canons of facial proportions and the average of the anthropometric measurements for the North-American white man. The neo-classical canons of facial proportions were not found to be applicable to more of the African-American men [5]. A study was conducted on the proportionality in Kadazan Dunsun using neo-classical facial canons as criteria. Results showed that there were differences observed [6]. A research carried out on the Urhobo ethnic group in Nigeria showed that Urhobo males had higher nasofacial and nasofrontal angles while the Urhobo females had a higher nasomental and mentocervical angles than their male counterparts [7]. It has been observed that nasofrontal angles are larger in the Javanese women than the American women [8]. A study on the presence of sexual dimorphism on different morphometric parameters of the nose in adult Chileans have also been carried out [9], Yorubas in Nigeria [10], and Young Turkish adults [11]. Modern day anthropometric measurements of soft tissue points allow more objectives and angles. This makes use of digital cameras and imaging software; it is referred to as photometric analysis. This photometric analysis involves a detailed examination of objects using images obtained from the objects [12]. The

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standards of facial beauty vary in different cultures and are known to change overtime; extreme beauty though is generally accepted to be associated with the magnification and/or diminution of certain facial features [13]. Facial beauty may be characterized by a combination of factors that involve symmetry and aesthetically pleasing proportions and relationship; these proportions are referred to as canons [6].

MATERIALS AND METHODS

A total number of 310 adults (comprised of 158 males and 152 females) between the ages of 18 to 45 from Khana by both parents and grand parents in Rivers state of Nigeria were recruited for this study. Subjects had no history of facial surgery, no dental occlusion, allergies, prior facial fracture and no craniofacial anomaly. After a verbal informed consent have been obtained from the subjects, standardized lateral photographs were taken. The photographic set up consists of a tripod stand supporting a mounted digital camera. The tripod height was adjusted to fit the subject's height and it also controls the stability of the camera. The subjects were made to stand in an upright and relaxed position, with both hands by their sides in front and a graph sheet which was pinned to the wall behind them providing a life size measurement. With the aid of a the meter rule, the camera was placed exactly 100cm away from the subjects, the camera lens was zoomed as required to suit each subjects head size. The subjects had to look straight into a mirror that was placed 120cm in front of them as lateral photographs were taken. Photographs were taken carefully and as accurately as possible to ensure that facial soft tissues were captured and visible. The facial parameters measured were the nasofacial angle, nasofrontal angle, nasomental angle, nasolabial angle and mentocervical angle.

Images were analysed using IMG pro image analyser. Statistical analysis (using excel and SPSS software) was performed using the Z-test. T-test was used to determine sexual dimorphism.

RESULTS AND ANALYSIS

The result of this study is presented in the table below. Table 1 shows the descriptive statistics for the facial parameters of the males and females. Results showed that for the Nasofrontal, Nasolabial, Nasofacial, and Nasomental angles there was a significant difference in the mean for males and females ($p < 0.05$), where as for the Mentocervical angle, there was no significant difference observed in both sexes ($p > 0.05$).

DISCUSSION

The Powell analysis which is made up of the nasofrontal, nasolabial, nasomental, nasofacial and mentocervical angles provides an insight into an ideal facial profile [14]. In the present study, sexual dimorphism was observed, it was also established that the females of khana posses higher and steeper facial angles than their male counterparts and with a significant

Table 1: Descriptive statistics for facial parameters based on sex

Parameters	Sex	N	Mean $\pm$ SD $^{\circ}$
NFR	M	158	133.63 $\pm$ 8.59
	F	152	137.36 $\pm$ 6.37
NLB	M	158	86.21 $\pm$ 16.61
	F	152	91.73 $\pm$ 14.85
NFA	M	158	33.54 $\pm$ 4.10
	F	152	32.09 $\pm$ 3.61
NAM	M	158	128.99 $\pm$ 5.52
	F	152	130.97 $\pm$ 5.68
MCER	M	158	93.25 $\pm$ 7.28
	F	152	93.76 $\pm$ 9.59

NFR = nasofrontal angle, NLB = nasolabial angle, NFA = nasofacial angle, NAM = nasomental angle, MCER = mentocervical angle, M = male, F = Female. Results are in degrees.

difference, this is not in line with the work of Anibor *et al.*, where the Igbo males recorded higher facial angles with a mean angle of 83.1 $^{\circ}$, while the females had 81.1 $^{\circ}$ [15]. It was also not in agreement with that of the Urhobo people in Nigeria with mean values of 82.6 $^{\circ}$ and 82.5 $^{\circ}$ for the male and female subjects respectively [7]. This study though concurred with the assertion that facial angles, proportions, and contours vary with sex [16]. Sexual dimorphism was seen in an angular photogrammetric analysis of the soft tissue facial profile of Antolian Turkish adults [17]. Analysis of soft tissue facial profile of a Croatian (Caucasian) sample by means of angular measurements revealed significant gender differences as well [18]. When comparing the cephalometric data of Iowan and northern Mexicans, a significant gender difference was seen amongst the northern Mexicans [19]. No significant difference was observed in the Ibos of Eastern Nigeria [20]. A study presented measurements for total facial angle or facial convexity including the nose (nasion- pronasale- pogonion) for males as 130.5 $\pm$ 3.7 degrees and females as 130.2 $\pm$ 3.5 degrees, indicating no significant gender difference [17]. Higher values were seen for the male subjects (140 $\pm$ 5.0 degrees) than the females (139 $\pm$ 4.5 degrees) [21]. This study is not in line with their research as there was no significant gender difference in their research. Yeun and Hirananka encountered gender dimorphism though almost equal values were displayed (males =135 $\pm$ 4 degrees, females 135 $\pm$ 3 degrees) [22]. In a research in Turkey, the soft tissue facial angles of both sexes were found to display statistically significant differences. Here, the facial angle for females and males were 87.41 $\pm$ 4.10 and 86.49 $\pm$ 4.82 degrees respectively [23], the higher angles of the females in that research concurs also with that in this work. Significant differences were found between males and females in measurements of soft tissue facial angles in a sample of Jordanian adolescents [24].

CONCLUSION

The photometric facial analysis of the Khana people in Ogoni has established gender differences in the angles of the face. The

data in this study can serve as reference for further studies.

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