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Angular Facial Analysis of the Isoko Adults of Delta State, Nigeria.

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ABSTRACT
Angular facial analysis is important in human identification and for use between populations. The aim of this study was to determine the facial norms of the Isoko people by using facial analysis. A total number of 180 subjects comprising 90 males and 90 females of Isoko origin were recruited for this study. Standardized lateral view photographs of subjects were taken in the natural head position and aesthetic facial angles which includes; nasofacial, nasofrontal. Nasomental, nasolabial and mentocervical angles were determined. Results showed that the mean values for the Isoko females were 137.30±0.71º, 30.3±0.41 º, 84.94 ±1.50º, 132.28±0.68º, 98.62±0.92º for nasofrontal, nasofacial, nasolabial and mentocervical angles respectively while for the males it was 133.42±1.89º, 30.85±0.34º, 83.53±1.21º, 130.60±0.51º, and 99.43±0.73º for nasofrontal, nasofacial, nasolabial, nasomental and mentocervical angles respectively. Significant difference was observed in the nasofrontal but all other measured parameters had no observed sexual dimorphism. In conclusion, facial angles are important features for identification and forensic investigation among populations.

Key words: Angular facial analysis, Isoko Adults, Nigeria.

INTRODUCTION
The Isoko people are an ethno linguistic group that inhabits the Isoko region of Delta state in Nigeria. They are people of southern Nigeria near the north-western Niger delta. They are found in the southern coastal region of Edo and Bayelsa States where their predominant occupation is farming, trading and fishing [1]. It is a long standing ideology that facial appearance strongly influences self-esteem. The face is the most attractive and variable part of the human body [2]. Facial traits are largely influenced by race, ethnic group, age, sex and culture [3]. The face is divided into aesthetic units that are further subdivided into subunits. Major subunits that are exclusively marked for facial analysis include the forehead, eyes, nose, lips, chin, ears and neck[4]. Czarnecki *et al.,* estimated the perception of facial balance by varying chin development, lip protrusion and nose length. They found out that these facial features must be in harmony[5]. Determining the attractiveness of the face is dominated by subjectivity in close correlation with age, sex, ethnicity and the level of culture and professional development. To this effect, photometric analysis of aesthetically pleasant and unpleasant facial profile have been carried out by researchers to identify which linear, angular and proportionality measures could influence a profile to be considered aesthetically pleasant or unpleasant and to assess sexual dimorphism [6]. Facial angle studies the forehead to jaw relationship and has long history of being employed to make judgement of inferiority and superiority of certain human races [7]. The facial angle is an angle formed by drawing two lines; one horizontally from the nostril to the ear and the other perpendicularly from the advancing part of the forehead [8].

The facial angle was also one of the main initiations of racial craniology which emerged during the nineteenth century to justify racism [9]. Photometric studies are currently being done to determine aesthetic facial angles in humans. This is preferable as it eliminates the exposure to radiation experienced in cephalographic studies [10]. Evaluation of facial profile characteristics in a population of central Romania region has been reported [11]. Soft tissue analysis using linear and angular measurements of adolescent Persians have also been done[12], Adult Okrikans of Nigeria[13], facial aesthetic angles of Ibo and Yoruba of Nigeria [14,15], Adult Efiks of Nigeria [16] and Bekwara ethnic group of Cross river in Nigeria [17].

This study is aimed at carrying out an angular photometric analysis to ascertain the facial norms of the Isoko people.

MATERIALS AND METHODS

A total number of 180 subjects (one hundred and eighty) comprising 90 males and 90 females within the age range 18-45 years whose parents and grandparents up to the second generation are of Isoko origin were selected to participate in this study. Subjects who had craniofacial abnormalities, plastic reconstructive facial surgery or any trauma to the face were excluded from this study. The photographic set up consisted of a tripod stand (A300), supported by a digital camera (Sony Cyber-Shot DSC-W180). Standard photographs of the lateral and frontal view of the subjects were taken in the natural head position with both hands hanging by their side. The subjects had to stand in front of the graphic background which allows measurement at life size with a mirror held 120cm in front of the subjects. Subjects were positioned on a line marked on the floor with a meter rule, 100cm from the camera and had to look into the mirror with their lips relaxed and recordings were taken. Facial angles that were determined include:

Nasofacial angle: It is formed by drawing a vertical line tangent to the forehead at the glabella (G) and tangent to the chin at the pogonion (PG) so that a line drawn along the nasal dorsum (ND) intersects it.

Nasomental angle: It is formed by a line drawn through the nasal dorsum (ND) intersecting a line drawn from the nasal tip to the soft tissue of the chin pogonion (PG).

Naso-frontal angle: (G-N-Prn): formed by drawing a line tangent to the glabella through the nasion that will intersect a line drawn tangent to the nasal dorsum.

Mentocervical angle: A vertical line tangent to the forehead passing through the glabella (G) and pogonion (PG) and second line intersecting tangent to the chin of the menton (M).

Nasolabial angle: A vertical line drawn tangent to the pogonion intersected by another line drawn tangent to the lower limit of the lower lip.

Data Analysis: Data was analysed using Z-test and images were analysed using IMG pro image analyser

RESULTS

The results of this study is presented in the table below: Table 1 shows the mean and standard error of mean of the facial angles of the sampled population. The Mean ±S.E of the nasofrontal angle for females was 137.30±0.71 º while that of males was 133.42±0.89 º. Nasofacial angle in females was 30.32±0.41 º while for males it was 30.85±0.34 º. Nasolabial, nasomental and mentocervical angles were 84.94± 1.50 º, 132.28±0.68 º and 98.62±0.92 º respectively for females while for males it was 83.53±1.31 º, 130.60±0.51 º and 99.43±0.73 º respectively. Except for the nasofrontal angle which was significant, all other parameters showed no significant difference.

Table 1: Comparison of mean values for measured parameters in males and females

Parameter	Sex	N	Mean±SEM (º)
Nasofrontal angle	Females	90	137.30±0.71
	Males		133.42±0.89
Nasofacial angle	Females	90	30.32±0.41
	Males		30.85±0.34
Nasolabial angle	Females	90	84.94±1.50
	Males		83.53±1.21
Nasomental angle	Females	90	132.28±0.68
	Males		130.60±0.51
Mentocervical angle	Females	90	98.62±0.92
	Males		99.43±0.73

DISCUSSION

Major parameters that are used presently in facial aesthetics are based on Powell and Humphreys[18]. They formulated suitable relationships between the face and the nose and defined the facial angles which includes; nasofacial, nasofrontal, nasolabial, nasomental and mentocervical angles. The present study has shown that the nasofrontal, nasomental and nasolabial angles were higher in females though only the nasofrontal was statistically significant while in males the mentocervical angle was higher. The values obtained in this study is in line with that gotten by Eliakim-Ikechukwu *et al.,*[14] on the facial angles of the Ibo and Yoruba ethnic groups in Nigeria which showed that the Ibo males and females had a nasofrontal angle of 127.10±0.55 º and 131.70±0.53 º respectively, nasofacial angle of 37.80±0.45º and 36.30±0.37 for males and females respectively, nasolabial angle of 76.10±0.89 and 82.50±1.45 for males and females, nasomental angles of 125.90±0.39 and 125.10±0.92 and mentocervical angles of 86.60±0.33 and 87.50±0.65 for males and females respectively. For the Yorubas the nasofrontal angle is 127.90±0.69 and 134.30±0.57 for males and female respectively, nasofacial angle of 37.30±1.76 and 35.50±0.38, nasolabial angle of 77.00±1.28 and 84.00±1.36, nasomental angle of 125.60±0.54 and

126.8±0.68 and mentocervical angle of 85.90±0.68 and 85.60±0.71 for males and females respectively. The results of this study also correlates with that conducted by Mussamat *et al*., on angular facial analysis of the Bangladesh Garo in which the values obtained for nasofrontal, nasomental and nasolabial angle of females were higher than that of males[2]. The study on adult Urhobos by Oghenemavwe *et al*.[7], in which they found the nasomental and nasofrontal angles wider in females, corresponds with the findings from this study.

However, the findings from this study was slightly different from a similar study conducted on the Urhobo adults by Anibor and Okumagba in which the values obtained for males in nasofacial and nasofrontal angles were higher than that obtained for the females while the values obtained for the nasomental and mentocervical angles were higher in the females[8]. The acute angle measurement obtained from the Isoko adults both in males and females indicates that they possess a slightly protruded lips and a nose that is oriented downwards, flat and short. Also the obtuse angle of the nasofrontal angle shows that the Isokos have a less prominent glabella, while that of the nasomental reveals a short nose and menton. Thus, it is can be inferred that, according to anthropometric classifications that the Isoko adults possess the platyrhine nose type which best describes one that is short and broad.

CONCLUSION

In conclusion, there exists sexual dimorphism in the nasofrontal angle of the Isoko adults which is very useful as a means of gender differentiation with the females having a higher angle. Facial angles are necessary in maxillofacial, orthodontics and plastic surgery.

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CONFLICT OF INTEREST

There is no conflict of interest.

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