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A comparative analysis of canthal index of ekowe indigenes, bayelsa state

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Abstract

Human body parts are useful in the predictive study of the unknown. The aim of this study is to know the normative values of the canthi of the Ekowe people. Measurements such as inner and outer canthal distances were carried out. The mean value of the innercanthal distance for males and females are 3.55 ± 0.58 and 3.43 ± 0.52 . The mean outer canthal distance for male and female is 13.91 ± 0.84 and 13.62 ± 0.76 . The canthal index for male and female is 25.59 ± 4.54 and 25.30 ± 4.03 . Sexual dimorphism exists and statistical significant difference was noticed in the outer canthal distance between the males and females ($P < 0.05$). This study has provided us with normative reference values of inner and outer canthal distances and canthal index for the Ekowe Population which is import to the health care givers, Anatomist, ophthalmic industry and anthropologist.

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Introduction

Normal values of craniofacial measurements for idiopathic benign macrocephalic healthy children are useful in early identification of some craniofacial syndromes, congenital or posttraumatic telecanthus, epicanthus, and hypo-hypertelorism and of planning surgical intervention [2]. The comparison of craniofacial dimensions of macrocephalic healthy children must be performed with normal standards specific for age as well as sex and race [2]. Inner intercanthal distance is the measurement of the distance between the two medial canthi of the eyes, while outer intercanthal distance is the measurement of the distance between the lateral canthi of the eyes Canthal index was derived by dividing the inner intercanthal distance by the outer intercanthal distance and multiplying by 100 (Anderson, 1945). There was no significant difference ($p < 0.05$) between the males and females in the measured parameters and the canthal index [14]. The knowledge of normative values of head circumferences, inner and outer canthal distances, canthal index and circumference interorbital index are useful parameters in the evaluation and treatment of congenital or post traumatic deformities of the cephalic and facial regions such as telecanthus, ocular hypotailorism and craniosynostosis [9-12]. Significant interorbital measurement differences were found between Sudanese children according to gender and age [7]. It is suggestive that age and gender should be considered in Sudanese children in any orbital surgery. To individualize the treatment planning and diagnosis, it is important for the surgeons to have knowledge of these local Sudanese

interorbital norms [7]. The normal IP values are useful in the identification of ocular hypo- or hypertelorism in various syndromes which might be otherwise obscured by the various somatometric traits of the face [5]. Interpupillary distance (IPD) and innerrouter intercanthal distance (IOICD) measurements are strongly and positively correlated; IOICD measurements are simpler to obtain and may be used to calculate IPD readings which are more difficult to measure by usual methods in children (Mohammad and Samira, 2008). Ethnic variation often renders anthropometric reference values obtained in one population unsuitable for use in others [15]. Eye distance measurements in the study population do not consistently reflect those in any one other population for which such measurements have been published. Population-specific reference values of eye distance measurements should be established for South African children [15]. The IPD is a crucial measure that needs to be considered before frames can be selected for patients who have been prescribed with spectacle corrections [6]. IPD data from other populations are unsuitable due to variations with age, sex and race. IPD is affected by age, ethnicity and gender variations.

Statistical analysis using T-test for values obtained from head circumference, intercanthal distances, canthal index and circumference interorbital index of children and adolescents Bayelsans showed that males had significantly higher values than the females in measured parameters ($p < 0.05$) indicating that sexual dimorphism exist [4]. There is also statistical significant difference in inner canthal distance, canthal index

and circumference interorbital index among the various ethnic groups in Bayelsa State [4]. Osuobeni and Al-Gharni, 1994; results showed that Japanese have wider inter-outer canthal distance (IOCD) than Arabs and Caucasians, both of whom have similar IOCD. Arabs have wider inter-inner canthal distance (IICD) than Caucasians. African-Americans and Japanese have wider inter pupillary distance (IPD) than Arabs. Percentile values of the measured distances will aid in syndrome diagnosis among male Arabs.

Materials and Methods

This study was carried out on 300 Ekowe indigenes (subjects) of which 179 males and 121 females between the age ranges of 18 years and above. Informed consent was sought from subjects before the measurement procedure commenced. The measured parameters were inner canthal distance which is the measured distance between the medial palpebral of the two eyes. The outer canthal distance which is the distance between the lateral palpebral of the two eyes? Canthal index was calculated as inner canthal distance /outer canthal distance multiplied by 100 according to Anderson (1945). Subjects recruited for this study were with normal craniofacial architecture (no neurological disease, craniofacial trauma).

Results

The data collected from the various measured and calculated parameters were analysed statistically and the results are presented in the tables below.

Table 1: Mean Values of Ekowe Male and Female

S/N	Parameter	Male	Female
1	INNER CANTHAL DISTANCE	3.55±0.58	3.43±0.52
2	OUTER CANTHAL DISTANCE	13.91±0.84	13.62±0.76
3	CANTHAL INDEX	25.59±4.54	25.30±4.03

Keys: All values = Mean ± S.D

Table 2: Showing Mean±S.D, Z-Test of Evaluated Parameters of Ekowe Males and Females

S/N	Parameter	Male	Female	Z-Calculated	Inference
1	Inner Canthal Distance	3.55±0.58	3.43±0.52	-1.74	P>0.05
2	Outer Canthal Distance	13.91±0.84	13.62±0.76	-3.06	P<0.05*
3	Canthal Index	25.59±4.54	25.30±4.03	-0.58	P>0.05

Key: All values for male and female = Mean±S.D,

* = Statistically significant

Table 3: Comparasion of Mean Values of Cephalic Indices of Ekowe and Other Nigerian Tribes

Researcher/Year	Tribe	Male Canthal Index	Female Canthal Index
Oladipo <i>et al.</i> (2008)	Ijaw	37.04	33.11

Oladipo <i>et al.</i> (2008)	Igbo	35.15	32.59
Oladipo <i>et al.</i> (2009)	Urhobo	24.38	29.38
Oladipo <i>et al.</i> (2009)	Itsekiri	26.03	27.70
Oladipo <i>et al.</i> (2011)	Ibibio	31.64	31.47
Oria <i>et al.</i> (2018)	Ejagham	29.80	28.55
Present study (2021)	Ekowe	25.59±4.54	25.30±4.03

Table 4: Comparasion of Mean Values of Canthal Index of Ekowe with Various Races

Researcher/Year	Race	Male Canthal Index	Female Canthal Index
Farkas <i>et al.</i> (1985)	Caucasians	36.80	36.41
Sadacharan (2015)	Mongoloid	31.77	31.31
Vasanthakumar <i>et al.</i> (2013)	Australoid	35.87	36.14
Oria <i>et al.</i> (2018)	Negroes	29.80	28.55
Present study (2021)	Ekowe (Negroes)	25.59±4.54	25.30±4.03

Discussion

The usefulness of craniofacial parameters of the skull cannot be under estimated in anthropology. Metric analysis of the canthi of the Ekowe aborigines have shown premise to the estimation sexual dimorphism. Measurements such as Inner canthal distance, outer canthal distance and the calculated canthal index have expressed varying degree of mean values viz; 3.55±0.583 and 3.43±0.52 for male and female inner canthal distance., 13.91±0.84 and 13.62±0.76 for outer canthal distance; 25.59±4.54 and 25.30±4.03 for male and female canthal index. Amongst the three parameters under study, outer canthal index indicates sexual dimorphism in the Ekowe population (P<0.05). This sex difference is in corroboration with findings of Oladipo *et al.* (2008, 2009) on the Ijaws, Igbos, Orhobos and the Itsekiris of the South-South Nigerians. Inter racial variation is also established when comparing the mean values of the Ekowe indigenes with other races like the Caucasians possessing 36.80 and 36.41 as male and female canthal index as posited by Farkas *et al.* (1985) . The Mongoloid have values as 31.77 and 31.31 for male and female as presented by Sadacharan (2015). The Australoid males and females exhibits values as 35.87 and 36.14 as the canthal index published by Vasanthakumar *et al.* (2013)).The mean value of the present study tend have lower mean canthal index than the aforementioned races; this towed the finding of Oria *et al.* (2018) on the Negroes.

It is obvious that craniofacial anthropometric parameter should be studied and values made available for facial surgery, esthetics glassware for each tribe and race.

Conclusion

This study has provided us with normative reference values of inner and outer canthal distance and canthal index for the

Ekowe Population which is import to health care givers, Anatomist, ophthalmic industry and anthropologist.

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