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RESEARCH PAPER

VARIATIONS IN CANTHAL INDEX OF THE ISOKOS IN DELTA STATE

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ABSTRACT

The aim of this study was to determine the mean values of Inner Canthal Distances (ICD), Outer Canthal Distances (OCD) and Canthal Indices (CI) of Isoko males and females within the age range of 12-35 years. The multi-stage sampling technique was used. The subjects hailed from Isoko North and South Local Government Areas of Delta State, Nigeria. Parameters measured included the OCD, ICD and CI using the Digital Vernier Caliper. The data obtained from the study were subjected to statistical analysis using Microsoft Excel windows. Results showed that Isoko males and females had mean OCD of 106.17 ± 3.73 and 107.13 ± 2.98 respectively and mean ICD of 36.98 ± 1.96 and 34.63 ± 2.24 respectively, while the mean CI of Isoko males and females were 35.58 ± 0.96 and 34.64 ± 0.83 respectively. The result also showed that the CI of Isoko males increased with increasing age when compared with those of Isoko females. It is believed that genetics and environmental factors may be responsible for the variation in CI and other craniofacial indices between and within the populations.

Key Words: Canthal index, craniofacial indices, Gender, Isoko

INTRODUCTION

Canthal index, which comprises of outer canthal distance (OCD), inner canthal distance (ICD) and canthal indices (CI), is an important component of craniofacial anthropometry (Oladipo *et al.*, 2011). Craniofacial anthropometry is a technique used in physical anthropology comprising of precise and systematic measurement of the bones of the human skull (Kolar and Salter, 1996).

Applied anthropometry is useful as a standard approach in racial classification and assessment of the nutritional and health status of a given population. It is also important in drawing up nomogram for population to determine standard sizes that will assist in prediction anthropology, posology and in construction of car seats and ranges of clothes as well as making the right size of eye glasses that will fit the eye (Ligha and Fawehinmi, 2011).

Accurate measurements are used in the estimation of several systemic syndromes and craniofacial abnormalities and also in surgical treatments of post-traumatic telocanthus (Farkas *et al.*, 1992). Normal canthal values can serve as a guide for the diagnosis of pathology and interventions for craniofacial abnormalities. Noteworthy are the ones available for Mexicans and Japanese (Laestadius *et al.*, 1969), North Americans blacks (Juberg *et al.*, 1975), North American whites (Pryor, 1969), Indians (Zuhail, 1994) and Nigerians (Saheeb *et al.*, 2004). This particular study goes further to determine the varying canthal index amongst ethnic groups precisely the Isokos.

MATERIAL AND METHODS

Study Area: The Isoko ethnic group is one of the smallest minority ethnic groups in the Niger Delta region of Nigeria in West Africa, occupying an area of about 1,200 square kilometres, with a residual population of over 750,000 by 2001 census.

Sample Size: Six hundred (600) subjects within the age range of 12-35 years old and whose second generation of parents (grandparents) are Isokos participated in this study. The subjects include 300 males and 300 females from the two Local Government Areas in Isoko land (Isoko North and South) of Delta State.

Sampling Technique: The multi-stage sampling technique was used; covering the two local government areas of Isoko land. The subjects were distributed within the age range of 12-17years, 18-23 years, 24-29 years, and 30-35 years respectively.

Inclusion and Exclusion Criteria: The subjects were selected based on some criteria. Parents, grandparents and great grandparents must hail from Isoko ethnic group. Their age must be within 12-35 years. Subjects with craniofacial malformation, trauma or signs of craniofacial syndromes were excluded from the study.

Anthropometric Measurements: Parameters were obtained as previously described by Laestadius *et al.* (2001), using the digital vernier caliper. The subjects were asked to sit on a chair in a relaxed manner with their eyes at the same level as the examiner's eye level. Parameters measured included the Outer Canthal Distance (OCD) -the distance between the lateral canthus of the left eye and the lateral canthus of the right eye; Inner Canthal Distance (ICD) -the distance between the medial canthus of the left eye and the medial canthus of the right eye; and Canthal Index -the ratio of the inner canthal distance to the outer canthal distance multiplied by 100.

Data Analysis: Data obtained from the study were subjected to statistical analysis using Microsoft Excel windows (version 2010). The Total number, mean, range, standard deviation and student t-test were determined. P-value less than 0.05 were considered statistically significant.

RESULTS

The mean OCD and ICD of Isoko males are higher than OCD and ICD of Isoko females (Table 1). Therefore the mean canthal index of Isoko male is higher than the mean canthal index of Isoko female as shown in table 2.

Table 1: Mean OCD and ICD (mm)

Variables	Male	Female
Mean OCD	106.17±3.73	107.13±2.98
Mean ICD	36.98±1.96	34.63±2.24
Sample Size	300	300

Table 2: Mean Canthal Indices

Variables	Male	Female
Mean Canthal indices	35.58±0.96	34.64±0.83
Sample size	300	300

DISCUSSION

The true values of inner and outer canthal distance and canthal index are important for successful reconstruction of the canthal area. Thus, it is necessary to have local data of these parameters since this standard reflects the potentially different pattern of craniofacial growth resulting from racial, ethnic, sexual and dietary differences (Oladipo *et al.*, 2009). Craniofacial dimensions may be determined by a single gene, gene groups, or environmental factors (Poswillo, 1975). When comparing normative population values as in this case, groups are matched for age and sex.

Also, the fact that the mean values in males were significantly larger than those of females ($p < 0.05$), is in agreement with that of Cem *et al.* (2001), Oladipo *et al.* (2010), Kasai *et al.*, (1993) and Etezzad-razvietal and Jalalifar (2008), who reported larger values for ocular dimension in males than females, but at variance with those of Singh and Banarjee (1983) and Juberg *et al.* (1975).

Above all, the findings of this study mark a significant contribution to relevant body of data, especially in the field of forensic medicine and anthropology. It will also serve as a future frame work for estimating ocular dimensions (inner/outer canthal distances and canthal indices) of the Isoko ethnic people in Delta State, since the observed variations in the canthal indices and other craniofacial indices of Isoko males and females may be attributed to genetics and environmental factors.

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AUTHORS CONTRIBUTIONS

Authors made substantial contributions to conception and design, acquisition of data, analysis and interpretation of data. Authors participated in drafting the article as well as revising it and giving final approval for the version submitted for publication.