Anthropometric Studies of Inner Canthal Distance, Outer Canthal Distance and Canthal Index of Adult Ibibios

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Abstract: Outer canthal distance, inner canthal distance and canthal index are important components of craniofacial anthropometry. Craniofacial anthropometry is vital in making precise and systematic measurement of the human skull. Eight hundred (800) adults comprising 400 males and 400 females were used for this study. The subjects were measured for inner and outer canthal distances using a non-stretchable plastic ruler and the canthal index was obtained as the ratio of inner canthal distance and the outer canthal distance multiplied by 100. The results showed that Ibibio males and females had inner canthal distances of 3.52 and 3.36 cm, respectively, outer canthal distances of 11.15 cm for male Ibibios and 10.73 cm for the females. Mean canthal index for both males and females was 31.64 and 31.47, respectively. The canthal index of Ibibio males is higher than that of females (p<0.05) using Z-test. This study will be useful in anthropology and medicine most especially in craniofacial surgery.

Key words: Canthal index, Ibibios, inner canthal distance, Nigeria, outer canthal distance

INTRODUCTION

Anthropometry is concerned with measurement of physical sizes and shapes of human body (Basciftci et al., 2004). Craniofacial anthropology is an integral part of craniofacial surgery and syndromology (Farkas et al., 1992). It is a technique used in both physical and clinical anthropology comprising precise and systematic measurements of the human skull (Mahfouz, 1988). Craniofacial anthropology also includes measurement of the inner (medial) and outer (lateral) canthal distances and canthal index. It is important for the study of human growth and variations in different races and also for clinical diagnosis and treatment Poswillo (1963). It has been reported by Kasai et al. (1993) that people with different genetic background subjected to significantly different environmental influences have different craniofacial morphology.

Oladipo et al. (2008) reported that the canthal index of male Ijaw and Igbo were 37.04 and 35.15, respectively and female Ijaws and Igbos were 33.11 and 32.59, respectively. Similarly studies were carried out by Cem et al. (2001) in Turkey. He reported the inner canthal distance, outer canthal distance and canthal index of 28.33 mm, 81.74 mm and 34.66, respectively for Turkish males while those of females were 28.14, 81.17 and 34.6 mm, respectively. Although, Nigeria is the most populous country in Africa, she has few reports on craniofacial anthropometry Oladipo et al. (2008) including those of Urhobo and Itsekiri ethnic group Oladipo et al. (2009). Thus the aim of this study is to find out the outer and inner canthal distances and the canthal index among the Ibibio ethnic group of Akwa Ibom state which could be of importance in clinical practices, Forensic Anthropology, Genetics and paleoanthropological studies.

MATERIALS AND METHODS

This research was carried out on Ibibio ethnic group in Akwa Ibom state. Eight hundred adults (18-80 years) were selected randomly from Uyo in Akwa Ibom state and Port Harcourt in Rivers state. The study was carried out between June and December, 2009. The eight hundred (800) subjects were made up of four hundred (400) males and four hundred (400) females by both parents and grandparents. Subjects with craniofacial defects were not used. The method used for assessing the canthal index was Cem et al. (2001) method. A non stretchable plastic ruler with 0.5 cm interval was used for the measurement. The subject was made to seat comfortably in a chair with his/her head at the same level as the examiner’s head. The subject’s face was well illuminated. The inner canthal distance (distance between medial angles of the two eyes) was then determined by having the subject look straight at the examiner while the ruler was held tightly against the bridge of the nose of the subject. The inner canthal distance was measured as the distance from the medial...
Results of this study are presented on Table 1-3. Observation showed that the values of outer and inner canthal distances of males were significantly higher than those of females-Table 2 (p<0.05). The mean inner canthal distances for Ibibio males and females were 3.52 and 3.36 cm, respectively while the mean outer canthal distances for Ibibio males and females were 11.15 and 10.73 cm respectively (Table 2). Thus these parameters were sexually dimorphic in Ibibios. The mean canthal indices among Ibibio males and females were found
to be 31.64 and 31.47, respectively. However no difference was observed in canthal index between the sexes (p>0.05). Table 3 consists of comparative data of canthal indices (CI) of Nigerian Ijaw, Igbo, Urhobo, Itsekiri, Ibibio and other races with Nigerian Igbo and Ijaw showing higher values than the Ibibio while the values reported for the Itsekiri and Urhobo were lower than those of Ibibio. Other populations also such as Indians, Turks and African Americans equally showed higher values while Latvians showed lower values than Ibibio.

**DISCUSSION**

Craniofacial anthropometry is important in the evaluation of facial trauma, facial defect, congenital and post traumatic deformities, easy identification of certain congenital malformation, and diagnosis of hypo/hypertelorism. The normal values of inner and outer distances and canthal index are important for successful reconstruction of the canthal area. Thus it is necessary to have a local data of this parameters since these standards reflect the potentially different patterns of craniofacial growth resulting from racial, ethnic, sexual and dietary differences.

The study has shown that the canthal parameters (inner and outer canthal distances) of males are larger than those of females and it has also shown that the values of canthal indices obtained for Ibibio are clearly different from other populations of the world. The result from the study was in agreement with those of Cem et al. (2001) on Turks, Oladipo et al. (2008) on Ijaw and Igbo and Erika et al. (2005) on Latvians but at variance with those of Singh and Banerjee (1983) on Indians, Juberg et al. (1975) on African American and Oladipo et al. (2009) on Urhobo and Itsekiri who reported larger values of canthal indices in females than males.

**CONCLUSION**

Canthal index among the Ijaw and Igbo are larger than that of Ibibio. In conclusion, genetics and environmental factors are responsible for the variation in canthal indices and other craniofacial indices between and within populations. The result of this study will be very useful in forensic medicine, surgery ophthalmology and anthropology and will also serve as a future framework for estimating the canthal index of Nigerians.

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**REFERENCES**


