



# Anthropometric Study of Canthal Index among Yorubas of Owo Origin in Ondo State, Nigeria

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## Research Article

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## Abstract

The canthus is the angle where the upper and lower eyelids converge. The terms "inner canthus" and "outer canthus" refer to the medial and lateral canthuses, respectively. The aim of this study is to determine the inner, and outer canthal distance as well as canthal index between males and females of Owo origin in Ondo State, Nigeria. This study adopted the descriptive cross-sectional survey of the quantitative design. For each subject, the inner canthal distance and outer canthal distance was measured and recorded while the canthal index was calculated. Data obtained for this research was analysed using descriptive statistics (Mean and Standard deviation) to test the hypotheses of this study and inferential statistics (t-test) to describe the nature of the data. The statistical test was done with the aid of the Statistical Package for Social Science (SPSS version 24.0). Results showed that in the outer canthal distance, the mean value in male was statistically significantly greater than in females ( $p < 0.05$ ). Results also showed that in the inner canthal distance, the mean value in male was statistically significantly greater than in females ( $p < 0.05$ ). It was concluded that there was a significant sexual dimorphism in canthal parameters among Owo males and female population.

**Keywords:** Morphometry; Face; Canthal Index; Nigeria

## Abbreviations

CI: Canthal Index; OCD: Outer Canthal Distance; ICD: Inner Canthal Distance.

## Introduction

Anthropometry is the measurement of body weight, height, subscapular skin-fold, triceps skin-fold, belly circumference, calf circumference, mid-arm muscle circumference, and elbow breadth [1]. In forensic

anthropology, which is a subfield of physical anthropology, skeletal remains are examined for medicolegal purposes [2]. When identifying a person from their skeletal remains, the forensic anthropologist is frequently asked to provide information that could help confirm or aid in the process. This could be at the scene of a homicide, suicide, or large-scale disaster [3]. Craniofacial anthropometry is defined as the measurements of medial (inner), lateral (outer) canthal distance and canthal index. It is very important for the study of human growth variation in different races for clinical diagnosis and treatment as described by Poswillo [4].

The canthus is the angle where the upper and lower eyelids converge. The terms “inner canthus” and “outer canthus” refer to the medial and lateral canthuses, respectively. An essential component of craniofacial anthropometry is the canthal index (CI), which contains the outer canthal distance (OCD) and inner canthal distance (ICD). According to Anibor, et al. [5], measurements of the canthal distance can be utilized to diagnose a variety of systemic disorders and in reconstructive technologies. It aids in the diagnosis of naso-orbitoethmoid damage, traumatic telecanthism, and hypertelorism [6]. A straightforward quantitative way to evaluate the corner of the eyes is to measure soft tissue with an anthropometric tool. The medial and lateral portions of the superior and inferior eyelids make up the inner canthus (also known as the nasal canthus) whereas the superior and inferior eyelids’ lateral portions make up the outer canthus (also known as the temporal canthus) [7]. According to Osunwoke, et al. [8], the inner inter-canthal distance (ICD) is the distance between the medial canthi of the eyes and the outer canthal distance (OCD) is the distance between the lateral canthi of the eyes.

According to Kasai, et al. [9], individuals with various genetic backgrounds who are exposed to vastly varied environmental effects have various craniofacial morphologies. According to Oladipo, et al. [10] the canthal index for male Ijaws and Igbos was 37.04 and 35.15, and for female Ijaws and Igbos, it was 33.11 and 32.59. Similar experiments were conducted in Turkey by Cem E, et al. [11]. He noted that Turkish men’s inner, outer, and canthal distances were 28.33 mm, 81.74 mm, and 34.66 mm, respectively, while Turkish women’s values were 28.14, 81.17, and 34.6 mm, respectively. Despite having the largest population in Africa, Nigeria has little reports on craniofacial anthropometry. Numerous authors have taken on the task of documenting normative values that may serve as references in the index population because these parameters differ depending on age, sex, and ethnic background. As a result,

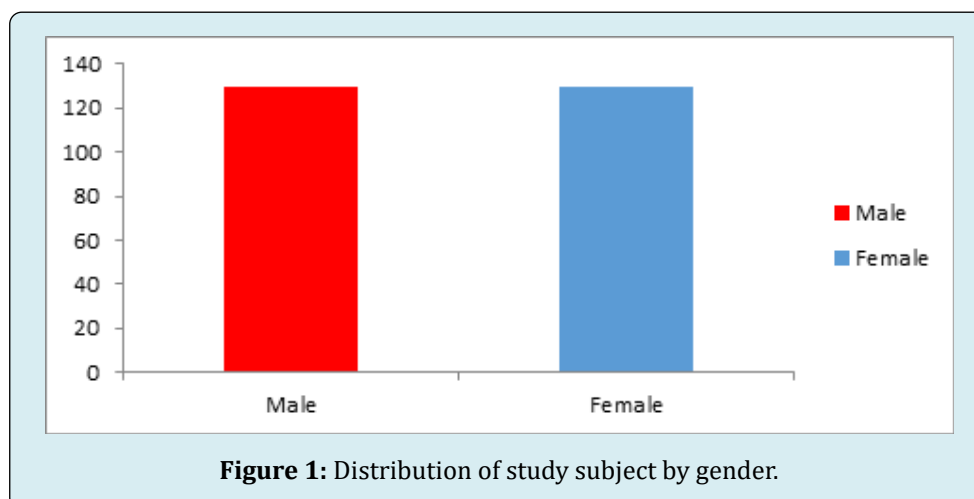
canthal distances have been studied in participants from Taiwan [12], China [13], Mexico and Japan [14]. This study therefore was done to determine the inner, and outer canthal distance as well as canthal index between males and females of Owo origin in Ondo State, Nigeria.

## Materials and Methods

This study consisted of 260 subjects comprising 130 males and 130 females. The simple random sampling technique was used. The study population was Owo origin of Ondo State, Nigeria between the ages of 18-50. Subjects with the deformed face were excluded from the study. For each subject, the inner and outer corners of each eye while the outer canthal distance (OCD) was measured and recorded from the lateral angle of the left eye to the lateral angle of the right eye. The canthal index was calculated using the following equation (Nasal Index = inner canthal/ outer canthal X 100). Data obtained for this research was analysed using descriptive statistics (Mean and Standard deviation) to test the hypotheses of this study and inferential statistics (t-test) to describe the nature of the data. The statistical test was done with the aid of the Statistical Package for Social Science (SPSS version 24.0).

## Results

Figure 1 shows the number of subjects used for the study. Out of two hundred and sixty (260) subjects that participated in the study, 130 (50.0%) were males while 130 (50.0%) were females. Results showed that in the outer canthal distance, and inner canthal distance, the mean value in male was statistically significantly greater than in females ( $p < 0.05$ ) (Tables 1 & 2). From the study, it showed that in the canthal index, the mean value in male was statistically significantly greater than in females ( $p < 0.05$ ) (Table 3).



**Figure 1:** Distribution of study subject by gender.

Parameter	Group	Min	Max	Mean±SD	P-value
Outer canthal distance	Male	120.2	124.9	122.79±0.79	0
	Female	117.5	123.9	120.06±1.52	

Min=minimum; Max=maximum; SD= standard deviation.

**Table 1:** Comparison of outer canthal distance between males and females.

Parameter	Group	Min	Max	Mean±SD	P-value
Inner canthal distance	Male	26	31.9	30.18±1.34	0
	Female	20.1	25.9	21.93±1.40	

**Table 2:** Comparison of inner canthal distance between males and females.

Min=minimum; Max=maximum; SD= standard deviation

Parameter	Group	Min	Max	Mean±SD	P-value
Canthal index	Male	21	35.6	24.68±1.75	0
	Female	16.4	21	18.22±1.18	

Min=minimum; Max=maximum; SD= standard deviation

**Table 4.3:** Comparison of canthal index between males and females.

## Discussion

The angle where the upper and lower eyelids converge is known as the canthus. The medial and lateral canthuses are referred to as the "inner canthus" and "outer canthus," respectively. The canthal index (CI), which includes the inner canthal distance (ICD) and outer canthal distance (OCD), is a crucial part of craniofacial anthropometry. Anibor, et al. [5] state that measurements of the canthal distance have applications in reconstructive technologies as well as in the diagnosis of various systemic disorders. It facilitates the diagnosis of traumatic telecanthism, hypertelorism, and naso-orbitoethmoid damage [6].

Study results revealed sexual dimorphism in the population, which is consistent with earlier research on Yorubas and Hausa conducted by Yadav, et al. [15]. According to Cem, et al. [11] in Turkey, Turkish men had higher canthal indices, outer canthal distances, and inner canthal distances than females. In addition, Radha, et al. [16] conducted an anthropometric analysis of South Indians' canthal distances and canthal index and found evidence of sexual dimorphism. Adhikari and Ambekar's study also revealed a similar pattern [17]. Similar findings were obtained by Kingsley, et al. [18] in their study on canthal parameters among the Annang Tribe in Nigeria's Akwa Ibom State. Males in the current study have greater values for the canthal index, outer canthal distance, and inner canthal distance than females. Once more, we were found to be substantially higher in every parameter. This study showed that the males have a higher mean value compared to the females in their canthal parameters of Owo population. This finding agrees with previous studies conducted by Oria, et al. [19], Ogoun, et al. [20], Abdallah, et al. [21] and Ehizokhale, et al. [22] Okoro, et al. [23], Okoro, et

al. [24].

## Conclusion

The results of the study indicate that genetics, environment, geography, gender, and ethnicity can all be factors in differences in a number of craniofacial anthropometry parameters. However, this research indicates that the males had larger canthal parameters than the females. The present investigation is extremely important to medical, forensic, and genetic anthropology. Canthal anthropometry, which serves as the foundation for typical data in Owo origin, can also benefit from it.

## Source of Fund

Nil

## Conflicts of Interest

Nil

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