

## Original Articles

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# Anthropometric study on inner canthal distance and outer canthal distance in adult Bangladeshi people

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### Abstract

**Context:** Inner canthal distance and outer canthal distance are important parameters in craniofacial anthropometry. Various studies have been conducted on anthropometric measurement of the canthal distance from different parts of the world. These studies prove that much variability exist depending on age, sex, race and genetic background. Knowledge of normal canthal distance is necessary for plastic and reconstructive craniofacial surgeons and ophthalmologists for correction of craniofacial and ocular defect, implanting prosthesis and cosmetic purpose.

**Materials and Methods:** A cross sectional and analytical study was conducted on 55 adult male and 55 adult female Bangladeshi people age ranging from 18-35 years in the Department of Anatomy, Dhaka Medical College, Dhaka, from July 2017 to June 2018. Inner and outer canthal distance is measured by round end spreading caliper. Comparison of measurement was done by unpaired Student's 't' test.

**Results:** The result revealed that the mean inner and outer canthal distance were significantly ( $p < 0.001$ ) higher in male than female.

**Conclusion:** The study showed there is sexual dimorphism in inner and outer canthal distance among adult Bangladeshi people.

**Key words:** Inner canthal distance, outer canthal distance, adult Bangladeshi people.

### Introduction:

Inner canthal distance is the distance between two medial canthi and outer canthal distance is the distance between two lateral canthi. There are certain studies in the literature indicating that the morphology and anatomical relationship of canthal distance varies according to age, sex and ethnicity. From the surgical point of view advanced corrective

and surgical procedures have been developed in the field of reconstructive surgery. The lack of knowledge of the variations in the morphological and anatomical relationship of canthal distances among different ethnic groups may hamper the surgeon's efforts to retain the ethnical feature, since the normal data base of one ethnic group may not represent the others. There is a requirement for ethnically specific database.

A standard database which gives a normal range of canthal distances for adult Bangladeshi population would be useful for ophthalmology, plastic and reconstructive surgery. The data can be a guideline in the field of surgery (ocular prosthetics, blepharoplasty), diagnosis and manufacturing of optical products. Anthropometric data for various ethnic and racial groups have been established in

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many studies. The aim of the present study was to generate normative data for Bangladeshi adults and evaluate the association of sexual dimorphism on these measured parameters.

**Materials and Methods:**

A cross sectional and analytical study was conducted on 55 adult male and 55 adult female Bangladeshi people age ranging from 18-35 years in Department of Anatomy, Dhaka Medical College, Dhaka, from July 2017 to June 2018. Samples were selected from adult Bangladeshi male and female attending in the outpatient department of Dhaka medical college and hospital for treatment or as attendance. Socio demographic information and different measurements of the subjects were recorded. Age of each subject was recorded by asking them and was confirmed by their national ID card. Participants having history of craniofacial or pariocular surgery, facial asymmetry and tribal population were excluded from the study. Anthropometry of canthal distance may vary with age, height, weight, nutritional status of the subject. To avoid any error in result of measurements of the present study, subjects with average height, weight and normal BMI were included in this study. Each subjects was made to seat comfortably on a chair with his head at the same level as approximately in front of the reacher’s head in a well illuminated room. A round end spreading caliper graduated in centimeter was placed in between the bridge of the

subject’s nose.<sup>1</sup> The inner canthal distance between right and left medial canthi was measured and recorded. For the safety the eyes were remain closed. The outer canthal distance was measured as the distance from lateral angle of right eye to lateral angle of left eye instructing the subject to look upward to maximize the contrast between the sclera and skin.<sup>1</sup> The measurements were recorded in millimeter. The data were statistically analyzed by a software package SPSS (Version 22.0). Comparisons of the measurements between male and female was done by using an unpaired student’s t-test.

**Ethical clearance:**

This study was approved from the Ethical Review Committee (ERC) of Dhaka Medical College, Dhaka.

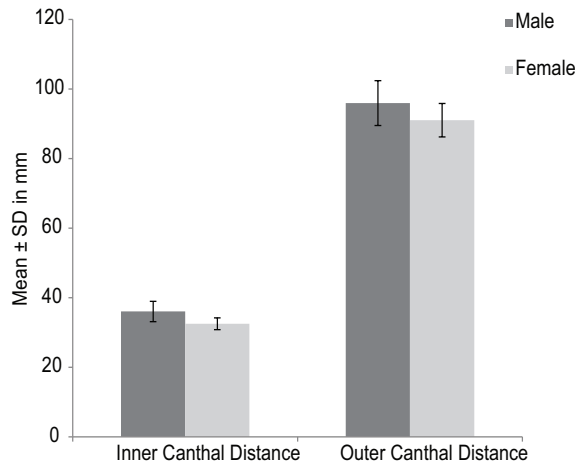
**Results:**

The mean inner canthal distance of male was 36.05±2.94 mm. It was ranged from 26.70 mm to 41.90 mm. The mean inner canthal distance of female was 32.51±1.71 mm. It was ranged from 28.60 mm to 35.24 mm. The mean outer canthal distance of male was 95.98±6.43 mm. (Figure 1) It was ranged from 69.30 mm to 115.10 mm. In female, the mean outer canthal distance was 91.08±4.81 mm. It was ranged from 70.17 mm to 100.20 mm. (Figure 1) From Table I, It is revealed that in male the mean inner and outer canthal distance is significantly (p<0.001) higher than female (Table I).

**Table I**  
*Inner canthal distance and outer canthal distance in male and female*

Variable	Male n=55 Mean±SD (Range)	Female n=55 Mean±SD (Range)	p value
Inner canthal distance	36.05 ± 2.94 (26.70-41.90)	32.51 ± 1.71 (28.60-35.24)	<0.001***
Outer canthal distance	95.98 ± 6.43 (69.30-115.10)	91.08 ± 4.81 (70.17-100.20)	<0.001***

SD = Standard Deviation  
\*\*\* = significant at p< 0.001



**Fig.- 1:** Bar diagram showing inner canthal distance and outer canthal distance in male and female

#### Discussion:

It has been widely recognized that anthropometry of human being are influenced by the racial factor, genetic background, gender and age. So each population should have their own specific standard baseline to optimize the accuracy of identification. Anatomy of eye is complex and unique in every person. The researchers carried out their study on living subject or photograph of external eye of people in different countries such as India, Turkey, Egypt, Malaysia and Nigeria. Many anthropologists believe that the Bengalis, the people of Bangladesh and West Bengal state of India make a vastly mixed race and one of the oldest groups of humans inhabiting in this region.

Results of the present study showed that male have larger palpebral fissure dimensions than female. The release of more growth hormone in male may be the cause of this difference.<sup>11</sup> The variation between male and female may also be influenced by genetic factors which vary with sex.<sup>9</sup>

In present study, the mean of inner canthal distance was found significantly higher in male ( $p < 0.001$ ) than in female. The findings were similar to the figures reported by Farkas et al<sup>3</sup> on adult Vietnamese people and Ibraheem et al<sup>4</sup> on African people. Farkas et al<sup>3</sup> reported lower mean value in a study on adult Turkish population. Oladipo et al<sup>6,7</sup> observed higher values on Nigerian Ijwas ethnic group compared to

present study. Osunwoke et al<sup>8</sup> and Vasanthakumar et al<sup>10</sup> studied on Nigerian Igbos and South Indian ethnic groups respectively and reported no significant difference between male and female.

In present study, the mean of outer canthal distance was found significantly higher in male ( $p < 0.001$ ) than in female which is similar to that of Bozkir et al<sup>2</sup> on Turkish adult people. Farkas et al<sup>3</sup> reported a higher value in females than in males for Thais people. Oladipo et al<sup>6,7</sup> observed higher values on Nigerian Ijwas ethnic group compared to present study.

The findings in the present study have some similarities as well as dissimilarities with the findings of the different study by other researchers. Similarities are may be due to presence of almost same race all over the sub-continental area and dissimilarities are due to age, sex, genetic, factors, socioeconomic, nutritional (protein and carbohydrate ratio) and environment factors that are different in Bangladesh when compared to other country.

#### Conclusion:

The study revealed that inner canthal distance and outer canthal distance is significantly higher in male than female.

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