

Intercanthal Width of Bangladeshi Medical Students – A Photo-Anthropometric Study

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Abstract

Background: Intercanthal width, the distance from the inner canthus (endocanthion) of right eye to the inner canthus (endocanthion) of left eye, helps to identify race, age & gender of an individual. It is an essential guide to reconstructive surgery like ocular prosthetics, blepharoplasty and ptosis correction. It is also useful for evaluation of various dysmorphic syndromes.

Objectives: Many studies were carried out in various populations to determine normative values of intercanthal width. However, there is no published article on this topic in Bangladesh. So, this study was aimed to measure the intercanthal width among the medical students of Bangladesh and to find out the variations in intercanthal width between male and female medical students.

Materials and Methods: This cross sectional analytical study was carried out in the Department of Anatomy, Sir Salimullah Medical College, Dhaka from July 2017 to June 2018. Digital photographs of face in frontal view both in opened and closed eyes of the study subjects were taken from 200 consented medical students (100 male and 100 female) aged between 20 to 25 years. The actual “nose height” of the study subjects was measured from nasion to subnasale by slide caliper. Then the “nose height” of individual photograph was transformed into physically measured value by using transform option of Adobe Photoshop version : CC 2014 and ultimately photograph of eye was converted into actual size. Then the intercanthal width was measured from photograph by MB ruler software.

Results: The mean \pm SD of intercanthal width was 30.28 \pm 3.16 mm (range 22.22 - 39.97 mm) in male and 28.36 \pm 3.38 mm (range 17.26 - 36.81 mm) in female. Intercanthal width is significantly higher in male than female ($P < 0.01$).

Conclusion: Intercanthal width shows sexual dimorphism.

Keywords: Photo-anthropometry, inner canthus, intercanthal width, medical students

Introduction

The human eye is an important key determinant of face in the perception of facial attractiveness,

youthfulness and health.¹ Endocanthion is the soft tissue point located at the inner commissure of each palpebral fissure.² Endocanthion is called as nasal or medial or inner canthus.³

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Anthropometry is concerned with measurement of physical sizes and shapes of human body.⁴ Intercanthal width is an important tool used by genetic counselor and in reconstructive surgery. The diagnosis of many dysmorphic syndromes is based on advanced cytogenetic and molecular techniques.⁵

Physical growth is a fundamental vital process and the common property of life. The normal distance between the inner canthus varies during embryogenesis and after birth in accordance with the general craniofacial development. Hyertelorumism

is an excessive distance between eyes⁶ and it is an integral part of various syndromes e.g. Cat eye syndrome. Dymorphic characters are usually reported by clinicians in descriptive terms such as 'wide set eyes', 'broad nose' or 'large mouth'. Anthropometric measurement can overcome these problems. Using both morphological features and measurements, the face can either be reconstructed (identifying the dead), superimposed or compared to a facial photograph (mistaken identities or missing personal or for the reconstruction surgeries after accidents). Congenital post-traumatic deformities can be better treated with the knowledge of normal values for this region to produce the best esthetic and functional result.⁵ It is also used for the estimation of combined width of the maxillary six anterior teeth and serve as a useful factor in selecting artificial teeth.⁷

Materials and methods

This cross sectional analytical study was carried out in the Department of Anatomy, Sir Salimullah Medical College, Dhaka from July 2017 to June 2018. The study was carried out on 200 medical students (100 males and 100 females) with age ranged from 20 to 25 years. The ossification of all bones of the face is completed by the age of twenty years. So, fully ossified face achieves its adult form and fixed measurements after this age. So, study subjects included in the study were between 20-25 years of age.⁸

At first the nature of the work was explained to the study subject. A written informed consent was taken from each study subject. Information was collected from study subject with the help of a questionnaire. Age of the study subject was recorded from birth certificate or from national identity card. Subject who had no history of congenital and acquired orbital anomaly like squint, oculoplastic surgery or orbital trauma, medical conditions like ptosis, facial palsy, hyperthyroidism were included in the study.⁹

Digital photographs of face – frontal view both in opened and closed eyes of the study subjects were

taken in the Anatomy Departments of Sir Salimullah Medical College, Dhaka, Mugda Medical College, Dhaka and Green Life Medical College, Dhaka.

The study subject was allowed to seat comfortably on a chair looking straight forward. The camera was set up on a tripod. Frontal facial photograph was taken with a digital camera at a 7.2-megapixel resolution under same lighting condition using flash mode from a fixed distance of 4 feet using zoom function. The subject's head was at the same level with the camera. The frontal facial photograph was taken at a particular time between 9 am to 2 pm to avoid diurnal variation. Before taking frontal facial photograph of each study subject the "nose height" was measured from nasion (its manifestation on the visible surface of the face is a distinctly depressed area directly between the eyes, just superior to the bridge of the nose) to subnasale (the point at which the nasal septum merges in the mid sagittal plane with the upper lip) by slide caliper and marked on the skin by black ball point. Then photograph was taken with the landmark "nasion" to "subnasale" and the "nose height" of individual photograph was transformed into physically measured value by using transform option of Adobe Photoshop version: CC 2014 and ultimately photograph of eye was converted into actual size.³ Then the variables were measured from the photograph of eye using MB ruler software.¹⁰

Procedure of measuring intercanthal width (ICW)

It is the distance from the inner canthus (endocanthion) of right eye to the inner canthus (endocanthion) of left eye.¹¹

To get the intercanthal width, endocanthion of right eye to the endocanthion of left eye was identified in a frontal digital photograph of face. Then the distance between the points was measured by using 'MB Ruler' software and was recorded on data sheet.

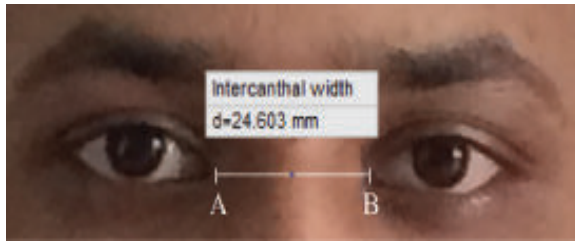


Fig.-1: Digital photograph of face in frontal view showing the measurement of intercanthal width. A-endocanthion of right eye, B-endocanthion of left eye and AB- intercanthal width.

Ethical clearance:

To avoid any medicolegal questions for collection of digital photograph of face from the study subjects, a written clearance from the Institutional Ethics committee of Sir Salimullah Medical College, Dhaka was taken.

Results

Results of the study are shown in Table I and Figure 2.

The mean ± SD of intercanthal width was 30.28±3.16 mm (range 22.22 - 39.97 mm) and 28.36±3.38 mm (range 17.26 - 36.81 mm) in male and female respectively. The mean intercanthal width was significantly higher (p=0.000) in the male than in the female (Table I).

Table-I
Descriptive statistics of the measured Intercanthal width

Sex	Intercanthal width (in mm)
	Mean ± SD (Range)
Male (n= 100)	30.28±3.16 (22.22-39.97)
Female (n= 100)	28.36±3.38 (17.26-36.81)
P value	0.000**

Figure in parenthesis indicate range
Comparison between sex was done by unpaired Student's 't' test
** = Significant at P < 0.01 (2 tailed)
n= sample size
SD = Standard Deviation

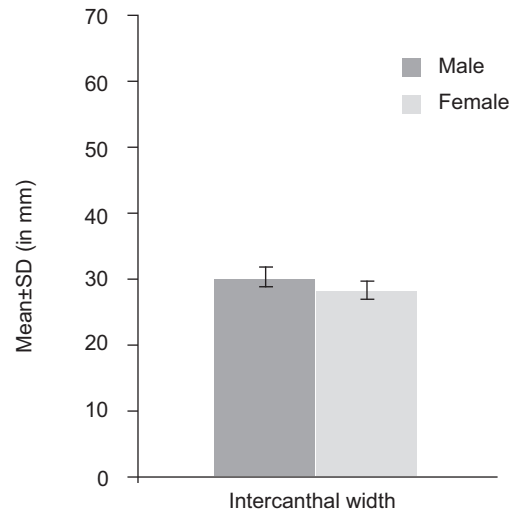


Fig.-2: Bar diagram showing intercanthal width (in mm) in male and female

Discussion and Conclusion

The study showed some similarities as well as dissimilarities with other studies when the mean value of intercanthal width was compared. Similarities were found with the people of India⁵ and Turkey.¹² Dissimilarities was found with the people of Nigeria.¹³ Similarities in findings might be due to almost similar race (mixed) present all over the Indo Bangla sub-continent. Dissimilarities in the findings with other studies might be due to mixture of different races, different climates, dietary habits and different geographical topography.¹⁴ Use of different techniques for measurements might also be an another cause of difference.

Many anthropologists believe that the Bengalis, the people of Bangladesh and West Bengal state of India make a vastly mixed race. The people of Saudi Arabia, Iran, Turkey and Pakistan belongs to Caucasoid race. The people of Nigeria came from Negroid race. Their nutritional habit was also different (more protein than carbohydrate).¹⁵ So, the values of intercanthal width was different than the study subjects.

Conclusion:

The present study was an attempt to construct photo-anthropometric data on different measurements of eye in medical students of Dhaka

city. Intercanthal width of two hundred study subjects aged between 20-25 years were measured from digital photograph of face - frontal view both in opened and closed eyes to serve the purpose. This attempt may provide the direction to construct baseline photographic data of intercanthal width in medical students of Dhaka city.

Result of the present study stated that intercanthal width was found to be significantly higher in the male than in the female and also showed significant sexual dimorphism.

Data of the present study were compared with those of other countries.

This may contribute to the understanding of the relative status of the present study population in the context of the photographic variations of other study population around the world.

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