Anthropometric study of facial index of medical students

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Abstract

Background: The human facial contour has always been an interesting subject for anatomists, anthropologists, plastic surgeons and artists. The purpose of study was to create and evaluate data on face anthropometry.

Objectives: To determine total facial index in medical students and to compare these with the data from other population for use in forensic, archaeological studies, anatomy and plastic surgery.

Methods: This is a descriptive study. A total of one hundred and forty medical students, presently studying at Kathmandu Medical College, aged between eighteen and twenty four years were selected as the subjects for the present study. Among the one hundred and forty students, forty four were female and ninety six were male. Two measurements: morphological facial length and bizygomatic breadth were taken by using spreading calibre.

Results: The mean morphological facial length was 110.7mm with a standard deviation of 5.98mm in males and 102.1mm in females. Bizygomatic breadth was 130.8 mm in males & 123.5mm in females. The facial index (mean) was 86.09 in males and 84.84 in females.

The dominant type of face shape in males was mesoproscopic (48.66%) followed by euriprosopic (23%), leptoprosopic (13.33%), hypereuriprosopic (13%) & hyperleptoprosopic (2%). In females the dominant type of face was also mesoprosopic (37%) followed by hypereuriprosopic (22%), euriprosopic (20.33%), leptoprosopic (19%) and hyperleptoprosopic (1.66%).

Conclusion: The dominant phenotype in the studied population was mesoprosopic. The data obtained may be useful in anthropological research, forensic, genetic research, as well as in medical clinical practice.

Key words: Anatomy, Anthropometry, Bizygomatic breadth, Facial index, Facial length

INTRODUCTION

The facial index is the length of the face from the root of the nose to the bottom of the chin, expressed as a percentage of the greatest breadth across the cheek bones. Humans are different by their overall morphology and body dimensions. The human facial contour has always been an interesting subject for anatomists, anthropologists, plastic surgeons and artists[1]. From the human facial form, it is possible to make an absolute distinction between two ethnic groups[2]. Many facial ergonomics deal with anatomical, physiological and psychological characteristics. It is an important area of anthropometry which has become increasingly important in health assessment across many countries[3]. Cephalometry is one of the important parts of anthropometry, in which the dimensions of the head

and face are measured[4]. The facial index is the ratio of the morphological facial height to breadth of bizygomatic arch multiplied by 100. Based on facial index, the types of face shapes can be classified into the following five groups according to Banister's classification[5] which is tabulated in table 1. Comparison of changes in facial index between parents, offspring and siblings can give a clue to genetic transmission of inherited characters[6].

METHODS

A total of one hundred and forty medical students (forty four female and ninety six male), presently studying at Kathmandu Medical College, and aged between eighteen and twenty four years were selected as the subjects for the present study.

The study was carried out at Department of Anatomy, Kathmandu Medical College, Kathmandu, Nepal, from December 2014 to May 2015. A fixed time 11 am to 4 pm was selected for the physical measurement to eliminate the discrepancies due to diurnal variation. The measurements were taken with the help of a spreading

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caliper**.** Students were informed about the study design, its benefits, privacy of data collected and informed consent was taken. The information regarding the exclusion criteria was collected by eye observation.

Participants with history of oculofacial trauma, craniofacial deformities (congenital or acquired) and abnormal neurological findings affecting the craniofacial dimensions (such as facial palsy, ptosis, and squint) were excluded from the study. Students were asked to sit in a relaxed state, straight and looking forward.

Landmark points used in measuring of the parameters were: nasion-the midpoint of the nasofrontal suture; gnation-in the midline, the lowest point on the lower border of the chin and, zygomatic prominences- the most lateral point on the zygomatic arch.

RESULTS

The conducted research provides important information concerning the total facial index (TFI), face shape, and facial phenotype in the adult population. The mean values of the morphological facial height and facial breadth were, respectively, 109.61mm ± 5.98, 136.41mm ± 4.85 (Table 3), while the values of the parameters obtained in females, respectively were: 101.34 mm ± 6.79, 127.59mm ± 4.90 (Table 4). It has been shown that males in the studied population have significantly higher values of morphological facial height and facial breadth compared to females.The dominant type of face phenotype in the studied population, according to the value of total facial index was mesoproscopic which was 48.66%in males and 37% in females (Table 5).

Table 1: Variables Studied

Variables	Definition
Morphological facial length	It is the straight distance from the nasal root (nasion) to the lowest point on the lower border of the mandible in the mid sagittal plane (gnathion).
Breadth of the bizygomatic arch	It is the maximum width of the face extended transversely between the outer surfaces of the two zygomatic arches.

Facial index was calculated using the following formula:

Total facial index = nasion- gnathion height / bizygomatic breadth x 100

Table 2: Classification of human face based on facial index

Facial index	
FI range	Scientific term
<79.9	Hyper euriproscopic (very broad face)
80 – 84.9	Euriproscopic (broad face)
85-89.9	Mesoproscopic (round face)
90-94.9	Leptoproscopic (long face)
>95	Hyperleptoproscopic (very long face)

Table 3: Descriptive statistics for measurements for Males

Parameters	Sample size 'N'	Minimum	Maximum	Mean	Std. Deviation
Facial height-mm	96	94	125.0	109.61	5.98
Bizygomatic facial width-mm	96	123	149.0	136.41	4.85
Valid N (List wise)	96				

Table 4: Descriptive statistic for measurements for Females

Parameters	Sample size 'N'	Minimum	Maximum	Mean	Std. Deviation
Facial height-mm	44	84	116.0	101.341	6.79
Bizygomatic facial width-mm	44	118	144.0	127.591	4.90
Valid N (List wise)	44				

Table 5: Classification of students based on total facial index

Face shape	Frequency		% Age	
	Male	Female	Male	Female
Hypereuriproscopic	12	10	13	22
Euriproscopic	22	9	23	20.33
Mesoproscopic	47	16	48.66	37
Leptoproscopic	13	8	13.33	19
Hyperleptoproscopic	2	1	2	1.66

DISCUSSION

In a study by Bhasin MK, Indians showed dominant type of face shape of mesoproscopic which was in correlation with our study[6]. Morphological facial height values obtained in our study (109.61mm ± 5.98, males and 101.34 mm ± 6.79, females) were lower than the values obtained in the population of northeastern part of Nigeria (141.15 mm ± 7.5, males and 141.29 mm ± 7.6, females)[7], the population of India (130.02 mm ± 7.2, males and 125.4 mm ± 6.0, females)[8] and Sri Lanka (140.2 mm ± 10.3, males and 138.8 mm ± 12.9, females)[9].

TFI values obtained in our study were higher in both males and females than the values obtained in the Onge population of India (77.98 male, 75.29 female) [10] and Japanese adult females 82.66 Hossain et al[11].The Andhra Region (India) students show bizygomatic distance of males (mm) to be 124.94 ± 3.85; females (mm) to be 113.53± 4.56 and males& females (mm) to be 119.24 ± 7.10; in our study the values of bizygomatic distance of males(mm)is 136.41±4.85; females(mm)is 127.591±4.90 and males and females (mm) is 133.643 ±6.36[12].

The mean morphological facial height observed in our study (107.01mm ±7.32) was lower than the value obtained in a survey conducted among West Africans (108.4 mm)[13].The data obtained in our study may be useful in anthropologicalresearch, forensics, genetic research, as well as in medical clinical practice (reconstructive surgery).

In our research, according to the value of TFI, the most common facial phenotype was mesoproscopic, which is consistent with the research results of Pavlica et al. conducted among Montenegrins in Vojvodina (Serbia)[14].

In a study by Shetti VR et al, 100 (66 males & 34 females) medical students of Kasturba Medical College and MelalaManipal Medical College, Manipal were measured for facial index. The mean facial index for males and females were 87.19 and 86.75 respectively mesoproscopic[15]. In comparison with table 3 and table 4 both measurements were higher in males than in females.

With the help of above statistics, the sex as well as race of the deceased can be determined accurately and this knowledge can be of immense importance.

CONCLUSION

From our study, we conclude that the dominant facial phenotype in the medical students is mesoproscopic. The data obtained in our study may be useful as a reference for facial analyses that will be further useful in anthropological research, forensics, genetic research,medical clinical practice (reconstructive surgery) and in cosmetology. This study will serve as a basis of comparison for future studies in Nepali population.

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