



FACIAL INDEX IN WESTERN MAHARASHTRA STUDENTS

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ABSTRACT

Background: Growth and development of facial and skull bones can be studied by anthropometry. Personal identification is one of the important fields in forensic medicine, where facial measurements play a valuable role, especially in different techniques of facial reconstruction where these measurements may help forensic artist to make out final face irrespective of the method used. They are important for determining various face shape.

Objective: Objective of this study is to measure facial index and classification of face into different types according to facial index.

Materials And Methods: In the present study, 308 students (Male: 111 and Female: 197) students of our university were studied. We measured facial length, facial breadth and calculated facial index.

Results: We observed the very long face is the dominant form in both and the least common was very broad face in these students. The mean facial index that was 95.56 ± 9.534 in males and in females it was 99.88 ± 12.187 . The minimum facial index was 73 and maximum was 127.27 in males. In females, the minimum facial index was 81.818 and maximum was 150.

Conclusion: This data will be helpful for dentists, orthodontists and maxillofacial surgeon's anthropologist, forensic medicine and genetics experts. Also, it will serve as basis of comparison for future studies on Western Maharashtra population.

KEYWORDS : Facial Index, Facial Length, Facial Breadth, Forensic Medicine, Western Maharashtra

INTRODUCTION:

Anthropology is one of the branches of anatomy and it measures various quantitative dimensions of human organs (1,2,3). Growth and development of facial and skull bones can be studied by anthropometry (3). Personal identification is one of the important fields in forensic medicine, where facial measurements play a valuable role, especially in different techniques of facial reconstruction where these measurements may help forensic artist to make out final face irrespective of the method used (4). Different persons have different physical dimensions due to their differences in genes, race, age, ecological factors, nutrition, environment and sex. Therefore, anthropometric studies in one part of the world cannot be applied to other regions. However, it can be used in comparative studies and this shows the necessity of these types of studies (2). Study of geometrical variability helps to understand the variations in the body measurements in different populations along with it to prepare a data base which will be available to help automate the process of various features with computer based animation technologies (5,6).

Various ethnic groups and races can be distinguished due to use of anthropometric methods into clinical practice to assess changes in craniofacial framework (7,8). In the era of computer several new techniques are designed to computerize anthropometric measurements (5,6) yet direct anthropometry is still be the standard technique for assessing the different craniofacial morphology (8). Results obtained by direct anthropometry and the different digital 2D and 3D photogrammetric systems did not show significant difference and direct anthropometry is reliable, inexpensive and noninvasive procedure which is very commonly used for sex and racial determination (9,10, 11).

Basciftel et al concluded that it is very essential to established anthropometric standards for the formation of deviations in craniofacial morphology, for that particular population (12). These population-specific craniofacial standards may be used in the designing of various equipment, clothing and work spaces for both men and women (13). Jasuja et al. studied the comparison of Indian and Turkish cephalo-facial measurements and observed

that for facial reconstruction climatic adaptations and nutritional factors are found to be having undesirable effect on body shape and size (14).

Facial measurements are important for determining various face shape (3). A clue to genetic transmission of inherited characters can be assess by doing the comparison of changes in facial index between parents, offspring and siblings (15). To diagnose the genetic and acquired anomalies along with morphometric investigations it is essential to have knowledge of facial analysis (16). Considering the clinical importance of this topic we studied this topic.

MATERIAL AND METHODS:

Present study was carried out on Nursing and Pharmacy college students of our university because most of these students are localized (i.e. from Western Maharashtra) and easy availability. Total 308 students (Male: 111 and Female: 197) were included in this study. The age of the students ranged from 18-24 years. Purpose of the study was explained to each participant and prior consent was obtained. The subjects were apparently healthy and without any cephalo-facial deformity. Subject with history of plastic, maxillofacial or reconstructive surgery and any accidental facial injury were not included in this study. The facial index was measured using Montague A. MF method (17). Study was carried out after ethical clearance from our institutional ethical committee. We measured facial length with the help of Sliding caliper and breadth using a spreading caliper with round edge. Both measurements were taken when the subjects are in relaxed, sitting position and head in anatomical position.

Measurements:

Facial Length:

It is straight distance from the nasal root i.e. nasion to the lowest point on the lower border of the mandible in the mid sagittal plane i.e. gnathion.

Facial Breadth:

It is the maximum breadth of the face extended transversely between the most lateral point on surfaces of the two

zygomatic arches.

Facial Index=

FacialHeight/FacialWidth× 100 and classified into different types as given in Table 1.

Table-1 Classification Of Types Of Face According To Facial Index

| Type of face | Males | Females |
|-------------------------------------|-----------|-----------|
| Hypereuryprosopic (very broad face) | <78.9 | <76.9 |
| Euryprosopic (broad face) | 79.0-83.9 | 77.0-80.9 |
| Mesoprosopic (round face) | 84.0-87.9 | 81.0-84.0 |
| Leptoprosopic (long face) | 88.0-92.9 | 85.0-89.9 |
| Hyperleptoprosopic (very long face) | >93.0 | >90.0 |

RESULTS:

Present study was conducted on 309 students of KIMS, DU (i.e. Western Maharashtra students). The mean facial index that was 95.56 ± 9.534 in males and in females it was 99.88 ± 12.187. The minimum facial index was 73 and maximum was 127.27 in males. In females, the minimum facial index was 81.818 and maximum was 150. In our study we observed that Hyperleptoprosopic form was the commonest type of facial form followed by Leptoprosopic, Euryprosopic, Mesoprosopic and Hypereuryprosopic in both male and females (Table 2). We observed the very long face is the dominant form in both and the least common was very broad face in these students.

Table 2: The Percentage Of Different Types Of Facial Forms In Western Maharashtra Students

| Types | Male (n=111) | Female (n=197) | Total (n=308) |
|--------------------|--------------|----------------|---------------|
| Hyperleptoprosopic | 54 (48.64%) | 79 (40.10%) | 133 (43.18%) |
| Leptoprosopic | 33 (29.72%) | 73 (37.05 %) | 106 (34.41%) |
| Euryprosopic | 12 (10.80%) | 21 (10.65%) | 31 (10.06%) |
| Mesoprosopic | 07 (6.30%) | 15 (07.61%) | 22 (7.14 %) |
| Hypereuryprosopic | 05 (4.50%) | 09 (04.56%) | 14 (4.54%) |
| Total | 111(100 %) | 197 (100%) | 308 (100%) |

DISCUSSION:

Facial index is also known as prosopic index which is used to describe the various facial types in anthropometry (18). Anthropologist uses the facial index to describe the facial proportion. Assessment of various facial types is essential for orthodontic surgeon for the planning and prognosis of treatments because facial pattern indicates the direction of growth of craniofacial complex.

Ghosh's and Malik studied the facial index in Santhals of West Bengal and observed the highest percentages of Hypereuryprosopic and Euryprosopic types forms which is different from the present study (19). Shetti et al. observed among Indian males dominant type of face shape was Mesoprosopic in 32% and in females both Mesoprosopic and Euryprosopic highest percent with 32% each respectively. They observed Hypereuryprosopic type was least common type in both males and females respectively. Present study results are different so cannot correlate with this study (15). Another study done by Bhasin among Indians showed the dominant type face shape of Mesoprosopic and observed the mean value of facial index among Indians is 86.34 (20). Ashwini C and Aravind Karinagannavar studied the facial index among north and south Indian students and observed the long face as the dominant form in both the North and South Indian males and females (21). Present study observed very long face in both male and female students. In 2011 Shettiet al. studied facial index of Malaysian and Indian student observed that both belonged to Mesoprosopic face type (15). By comparing obtained data with results of previous studies in different regions it is concluded that there were significant variations

in the facial index between different regions, population which may be due geographical and ethnical factors.

Table 3: Showing A Comparison Of Facial Index In Different Indian Groups

| Group | Authors | Facial Index |
|-------------------------------------|------------------------|--------------|
| Bhils of Madhya Pradesh | Bhargava and Kher (22) | 88.37 |
| Barelas of Madhya Pradesh | Bhargava and Kher(22) | 86.27 |
| Vangara Kayastha | Basu (23) | 84.29 |
| Pushkama Brahmin Bikaner, Rajasthan | Rakesh Mani (24) | 95.86 |
| Western Maharashtra | Present Study | 97.72 |

One of the factors that affect the facial index is age. Toodeh-Zaeim and Ravanmehr concluded that breathing by mouth can cause the face grow vertically and makes it narrower (25). Cakier et al. studied the relationship between craniofacial morphology and obstructive sleep apnea in Whites and in African-Americans Facial form in 2011 and concluded that facial form may be an important factor in increasing susceptibility to obstructive sleep apnea (26). Facial index is important in anthropometry, forensic medicine and genetics and for orthodontic treatment. This data will be helpful for dentists, orthodontists and maxillofacial surgeon's anthropologist, forensic medicine and genetics experts.

CONCLUSION:

Present study observed all five types of facial types in the Western Maharashtra students. Facial index had a high variation in most population therefore different facial types were observed. These differences may be due to race, age, environment, nutrition and sex. Standards of anthropometric measurements should be established for particular population for evaluation of variations in craniofacial morphology. Present study results will serve as basis of comparison for future studies on Western Maharashtra population. Finally, we recommend that future research have to be done in larger sample size, in different age groups and in different races.

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