

The Study of Total Facial Index in Living Subjects in Gujarat Region

Dr. Sapana Shah*, Dr. Parth Pandya*, Dr. Jignesh Vadgama*, Dr. Sanjay Chavda**,
Dr. S. P. Rathod ***, Dr. S. V. Patel ****

*Tutor, **** Professor and Head, ** Resident, Department of Anatomy, Govt. Medical College, Bhavnagar 364 001, ***Professor and Head, Department of Anatomy, P.D.U. Medical College, Rajkot 360 001(Gujarat, India).

Abstracts: Background and objectives: The total facial index exhibits sexual differences and different shapes of face. This information will be highly important for Plastic surgeons, Forensic Scientists, Anatomists, Human Biologists, Criminologists & Physical Anthropologists. Method: The present study was performed on 510 living subjects of Gujarat (243 male and 267 female) of 18 to 30 years in the year of 2011 with the objective to study the sex differences in total facial index. Total facial index was investigated with the help of face height and width with the use of sliding caliper. Result: The study showed that mean face height and width were higher in males than in females, and mean total facial index was also higher in males than in females. Interpretation and conclusion: Predominant face type in males was mesoprosopic while in females was euriprosopic and there was statistically highly significant gender difference. [Shah S et al NJIRM 2012; 3(4) : 95-97]

Key Words: bizygomatic distance, total facial index, mesoprosopic,

Author for correspondence: Dr.Sapana Shah, Department of Anatomy, Govt. Medical College, Bhavnagar, Gujarat- 364001. e- mail: drsapnashah@yahoo.co.in

Introduction: Anthropometric characteristics have direct relationship with sex, shape and form of an individual and these factors are intimately linked with each other and are manifestation of the internal structure and tissue components which in turn, are influenced by environmental and genetic factors¹. Measurement of total facial index is important for studies of human growth, population variation and aesthetic surgery. The importance of seeing the face 'in proportions' has been emphasized by many surgeons. All medical specialties interested in improving facial appearance need to measure the face to quantify the desired facial changes.

The most important facial dimensions are height and width (bizygomatic distance) of face that determine the total facial index. This is used by western and also by Indian researchers in their studies. Total facial index is calculated as Maximum face height / Maximum face width x 100. This provides a data base of craniofacial measurements useful for orofacial surgeons in craniofacial reconstruction.

In the present study, we have calculated total facial index in the persons from Gujarat.

Material and Methods: The present study has been carried out on a total of 510 (243 males & 267 females) living subjects in areas of Gujarat region. The permission from ethical committee and consent of subjects were taken. The subjects

taken for study were medical students, students of other faculties, staffs, patient's relatives from Sir T. Hospital, Bhavnagar and other persons belonging to different regions of Gujarat. The participants who volunteered in the study were healthy and without any obvious craniofacial abnormalities like congenital, developmental or acquired through any form of trauma and had no history of plastic or reconstructive surgery. The age group of 18-30 years was selected.

The method used for assessing the total facial index in this study is in accordance with Hooten's². The subject was asked to sit in a chair in a relaxed position keeping the mouth closed and teeth in central occluded position and head in anatomical position. Measurements which have been taken are, face width (bizygomatic distance) & face height. All the measurements were taken with sliding caliper. Face width was taken on the zygomatic arches where they project most laterally. Face height was taken from nasion, the point just above the deepest depression of the nasal root in the median sagittal plane, to gnathion (menton), the point on the lower border of the mandible in the median sagittal plane.

Result: Study was done on 510 living subjects. The gender wise distribution of facial parameters and total facial index is shown in table-1.

Table-1 Gender - wise distribution of facial parameters and total facial index

Parameters (cm) & index	Mean		Standard Deviation		p value
	M (243)	F (267)	M (243)	F (267)	
Face Width	12.09	11.70	0.69	0.67	0.000*
Face Height	10.84	10.17	0.69	0.55	0.000*
Total Facial Index	89.86	87.06	6.52	5.47	0.001*

(*p < 0.01 – Highly significant statistically, (M = Male, F = Female)

Table – 1 shows the highly significant difference in face width and height in both sex, and also in total facial index. With the help of total facial index the study group is divided into different phenotypes of face. Based on this index, the types of face shapes are categorized according to Banister’s classification.^{3,4}

Hypereuriprosopic = up to 79.9 = very short faced
 Euriprosopic = 80 – 84.9 = short/ broad faced
 Mesoprosopic = 85 – 89.9 = moderate facial form
 Leptoprosopic = 90 – 94.9 = long/ narrow faced
 Hyperleptoprosopic >= 95 = very long narrow face

Tabel – 2 shows the different face shapes according to total facial index. This shows in present study the mesoprosopic face shape is predominant in female as compared to male. In female, most predominant type is euriprosopic and in male is mesoprosopic. This difference is statistically highly significant.

Discussion: Racial and ethnic differences in craniofacial traits of various races have been reported by many researchers.^{5,6,7,8} One of the biggest comparative data on various ethnic groups/races in the world was published in 2005 by the late Professor Farkas.⁵ In present study, we found mesoprosopic (32.75%), euriprosopic (25.49%), leptoprosopic (24.31%), hyperleptoprosopic (11.96%) and hypereuriprosopic (5.49%) types of face (Table –

2). The difference between both genders is statistically highly significant.

Table-2 Distribution of Total Facial Index (Face Shapes of Present Study)

Phenotype	Sex		Total
	Male	Female	
Hypereuriprosopic	8	20	28
	28.57%	71.43%	5.49%
Euriprosopic	43	87	130
	33.08%	66.92%	25.49%
Mesoprosopic	83	84	167
	49.70%	50.30%	32.75%
Leptoprosopic	66	58	124
	53.23%	46.77%	24.31%
Hyperleptoprosopic	43	18	61
	70.49%	29.51%	11.96%
Total	243	267	510
χ^2	p = 0.001		

(p < 0.01 – Highly significant statistically)

Garba SH, Numan AI, Mishara IG⁷ have found that the dominant type of face shape was the hypereuryprosopic type, which was dominant in Kanuri males (46.7%), Babur/Bura males (43%) and Babur/Bura females.

Golalipour, M.J., Haidari K., Jahanshahi M. & Farahani R.M.³ have found that the dominant and rare types of faces in Fars group were hypereuriprosopic (71.9%) and hyperleptoprosopic (2.5%) and in Turkman group were hypereuriprosopic (36.4%) and hyperleptoprosopic (0.9%) respectively.

Comparison of the facial anthropometric norms between the present study group and previous Indian studies⁵ and Malaysian Indians⁶ is shown in the following Table - 3.

The comparison of mean values of total faial indices between different studies and present study is done in Table – 4.

Table-3 Comparison of the facial anthropometric norms between previous Indian studies and Malaysian Indians and present study:

Parameter	Sex	Present study Mean cms. \pm SD	Indian ⁵ (Farkas's study) Mean cms. \pm SD	Malaysian Indians ⁶ Mean cms. \pm SD
Face width	M	12.0905 \pm 0.68775	13.58 \pm 0.43	13.63 \pm 0.48
	F	11.7054 \pm 0.67121	12.49 \pm 0.84	12.67 \pm 0.39
Face height	M	10.8412 \pm 0.69449	11.55 \pm 0.60	11.64 \pm 0.47
	F	10.1681 \pm 0.54597	10.15 \pm 0.55	10.81 \pm 0.42

(M = Male, F = Female)

Table-4 Comparison of Total facial indices between different studies and present study

Workers	Race	Sample size	Mean total facial index	
			M	F
Ngeow W.C. Aljunid ⁶	Malaysian Indian	100	85.5	85.4
Garba SH, Numan AI, Mishara IG ⁷	Maiduguri, Nigeria (Kanuri) (Bura)	120	Kanuri 83.77 Bura 80.74	Kanuri 82.84 Bura 81.03
Priyanka Singh and Ruma Purkait ⁸	Dangi and Ahirwar (Madhya Pradesh)	245	Dangi 108.0 Ahirwar 81.3	Dangi 106.0 Ahirwar 81.3
Present Study	Gujarati Population	510	89.86	87.06

(M = Male, F = Female)

Conclusion: There is a highly significant difference found between either sex with values being higher for males than for females. Total facial index shows the statistically highly significant values for males as compared to females.

Distribution according to face shape, shows, in female the most predominant type is euriprosopic and in male is mesoprosopic. This difference is statistically highly significant. This study has been conducted on 510 subjects which is the limitation of this study. This study will be

highly important for Plastic surgeons, Forensic Scientists, Anatomists & Physical Anthropologists.

References:

1. Leonardo Da Vinci and Durer quoted by Khandekar B., Srinivasan S., Mokal N., Thatte M.R.. Anthropometric analysis of lip – nose complex in Indian population. Indian J. Plast. Surg July – December 2005; 38(2): 128 – 131.
2. Hooten cited by Kraus Bertram S. The Western Apache some Anthropometric observations 1961.
3. Gosalipour MJ, Haidari K, Jahanshahi M, Farahani RM. The shapes of head and face in normal male newborns in South – East of Caspian Sea (Iran-Gorgan). Journal of Anatomical Society of India 2003; 52 (1): 28-31.
4. Shah Mina, Verma I.C., Mahadevan S. et al. Facial Anthropometry in Newborns in Pondicherry. Indian Journal of Paediatrics 1991; 58: 259 – 63.
5. Farkas L.G. quoted by WC Ngeow, ST Aljunid. Craniofacial Anthropometric norms of Malaysian Indians. Indian J Dent Res 2009; 20 (3): 313 – 18.
6. Ngeow WC, Aljunid ST. Craniofacial Anthropometric norms of Malays. Singapore Medical Journal 2009; 50 (5): 525 – 28.
7. Garba SH, Numan AI, Mishara IG. Craniofacial Classification of Normal Newborns in Maiduguri Metropolis, Nigeria. International Journal of Morphology 2008; 26 (2): 407 – 10.
8. Singh Priyanka, Purkait Ruma. A cephalometric study among sub Caste groups Dangi and Ahirwar of Khurai Block of Madhya Pradesh. Anthropologist 2006; 8(3): 215 –17.