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Study On Measurement Of Facial Index To Determine The Type Of Face In Healthy Population In Vidarbha Region Of Central India

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Abstract:

Introduction: Face is a pleasant and beautiful asset of any individual. The type of face may be determined by facial index. The determination of facial index may be of immense utility to forensic experts, physical anthropologists, Anatomists and plastic surgeons for reconstructive surgery. It may also be very useful for physician to diagnose any disease which is affecting face. There is dearth of data pertaining to facial anthropometry which is of concern as far as population of central India is taken into account. So it is thought pertinent to conduct this study. Facial index is calculated by dividing the morphological facial height by facial width and multiplying the value with 100. **Material and Methods:** The study is performed in 200 individuals without any sexual dimorphism with age variation of 18yrs to 65yrs.Anthropometric parameters were measured with reference to standard landmarks by using spreading calliper with attached scale, Vernier digital calliper and metallic measuring tape. **Results:** Face types found in central Indian population are Hypereuroproscopic (35%) Europroscopic (28.5%), Mesoproscopic (16.5%), Leptoproscopic (11.5%) and Hyperleptoproscopic (8.50%). Conclusion: The predominant face type in central Indian population is Hypereuroproscopic followed by Europroscopic, Mesoproscopic, Leptoproscopic and least found face type is Hyperleptoproscopic.

Key words: Facial index, Facial anthropometry, Hypereuroproscopic, Hyperleptoproscopic, Leptoproscopic, Mesoproscopic, Europroscopic.

INTRODUCTION

Human is the most beautiful creation of God. Everyone is unique in this world. India is a nation which is composed of various ethnic populations. Various studies have been conducted to determine race and ethnicity all over the world but very limited studies have been conducted in India. Face is a pleasant and beautiful asset; it can be liable to a therapist.[1]

Facial anthropometry is an interesting subject for an anthropologists, anatomist, plastic surgeon and artist. It also has an important role in race and ethnicity, so it is an important component for the forensic experts in identification and reconstructive surgery. Facial anthropometry is a branch of Anthropometry.[2]

Anthropometry has an ancient origin. Let us see the mirror of some contour from the history of Anthropometry. "Anthropometry ' was first invented by a German physician, J. Sigismund ElshwItz (1623-88) in the seventeenth century. He first used the Anthropometry for his thesis, entitled "Anthropometria.

Anthropometer was also invented by him. Peter Camper studied the facial profile or facial form in the seventeenth century.[2]

Anthropometry is a biological anthropology or art of science used for the measurement of soft tissue and body proportions for the study of human evolution. It is impossible to measure angular measurements for facial proportions because error might be found but significant degree of accuracy is there. Anthropometric measurements are used eventually for various medical researches. Anthropometry is a branch of morphometry which is the study of size and shape of biological components and their variations in population.[2]

Morphometrics has gone under revolution in the last two decades as numerous new techniques have been produced to address shortcomings in the traditional multivariate analysis of linear distances, angles and indices. Morphological studies are helpful in providing data to compare various races. Analysis of face is not only useful for identification, sports medicine and telecommunication but also has got a clinical application. Physical anthropometry probably started for racial classification. Racial classification deals with measurement of human body dimensions. Determination of dimension depends upon various ecologic, ethnic and geographical factors. Craniometry is done by calculating various indices such as facial index, cephalic index, etc.

Facial index is morphological facial height divided by facial width, multiplying the value with 100. Therefore the equation is, Facial index=Morphological facial height/facial width×100.[2]

The aim of our study was to determine the type of face in central Indian population whereas measuring facial height, facial width and calculating facial index using aforementioned formula were the objectives of our study.

MATERIALS AND METHOD:

After granting approval of Institutional Ethics committee, we selected 200 subjects with age varying from 18 to 65yrs without any sex variation from the patients coming in GOPD of our college. We have taken written consent from each and every subject after proper explanation of the procedures. We have prepared a proforma for each and every one to get proper information of particulars and it was to be confidentially kept. The person having any deformity of face, congenital anomalies, diabetes mellitus, hypertension, kidney disease or someone who has undergone any facial or orthodontic trauma or surgeries were excluded from our study.

The type of face is determined by facial index which is calculated as morphological facial height/facial width×100

MK Bhasin defines[2] morphological facial height and facial width as following:

Morphological facial height: It measures the straight distance between nasion and gnathion where nasion is the point on the nasal root intersecting by midsagittal plane and gnathion is the lowest point on the lower margin of the lower jaw intersected by the midsagittal plane.

Facial width: It measures the straight distance between the two zygia which are the most lateral points on the zygomatic arch. The greatest breadth of the arch is usually found near the ear not on the cheek.

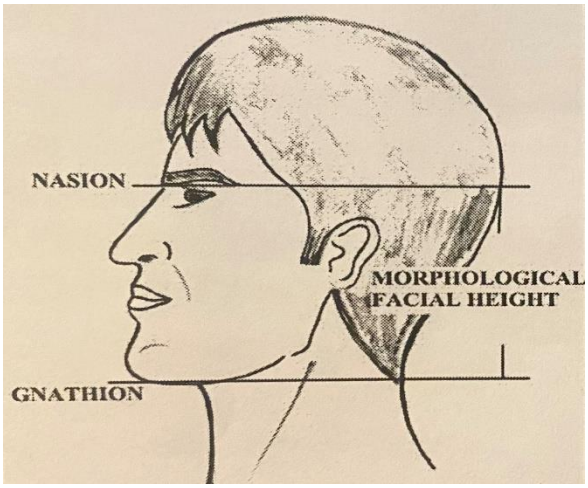

Figure I: Morphological facial height

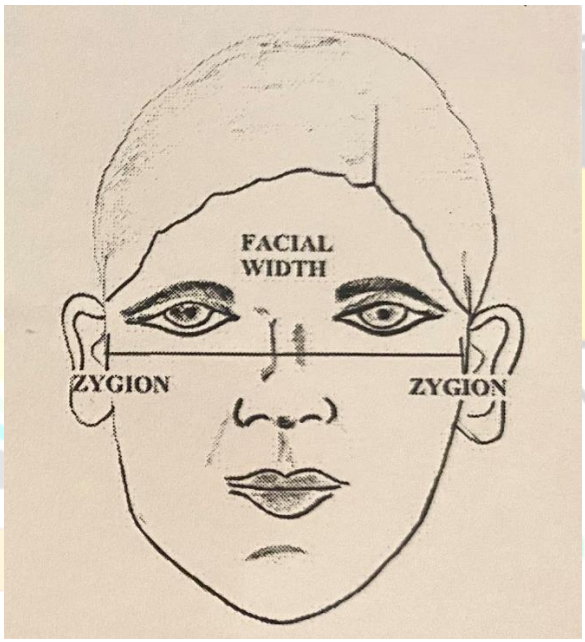

Figure II: facial width

Range variation of morphological facial height and facial width were determined according to Lebzelter and Saller.[2]

Table I: Range-variation of Morphological Facial Height (Lebzelter and Saller)[2]

	Male(mm)	Female(mm)
Very low	≤111	≤102
Low	112-117	103-107
Medium	118-123	108-113
High	124-129	114-119
Very high	≥130	≥120

Table II: Range-variation of Facial Width (according to Lebzelter and Saller)[2]

	Male (mm)	Female(mm)
Very narrow	≤127	≤120
Narrow	128-135	121-127
Medium	136-143	128-135
Broad	144-151	136-142
Very broad	≥152	≥143

Instruments which were used are 1) Spreading calliper with attached scale for Bizygomatic breadth 2) Digital Vernier calliper for Facial length 3) Metallic measuring tape 4) Metallic scale.

Subjects were directed to keep the face in neutral expression. Every measurement is taken twice to avoid maximum error. Measurements were taken in proper daylight. After collecting all the measurements we have calculated the facial index. The data thus obtained were fed in excel sheets. The data was analysed using statistical s/w (Epi info). Graphs were also obtained from the findings thus obtained.

The type of face is defined according to Banister classification[2] which are
1. Hypereuroproscopic (very broad face) <79.9
2. Europroscopic (broad face) 80-84.9
3. Mesoproscopic (round face) 85-89.9
4. Leptoproscopic (long face) 90-94.9
5. Hyperleptoproscopic (very long face) >95

RESULTS:

Table III: Age & sex distribution

Age	Gender		Total
	Male	Female	
18-36	4	6	10
	2.5%	3.5%	6.0%
37-54	32	42	74
	16.1%	21.1%	37.2%
55-65	66	48	113
	32.7%	24.1%	56.8%
Total	103	97	200
	51.3%	48.7%	100%

Table IV: Bizygomatic Breadth in Male & Female

Type	Range		N		%	
	Male	Female	Male	Female	Male	Female
Very narrow	<127	<120	15	20	15.46	19.41
Narrow	128-135	121-127	37	23	38.15	22.34
Medium	136-143	128-135	38	43	39.18	41.75
Broad	144-151	136-142	4	9	4.12	8.74
Very Broad	>152	>143	3	8	3.09	7.76
Total			97	103	100	100

Table V: Morphological Facial Height in males & females

Type	Range		N		%	
	Male	Female	Male	Female	Male	Female
Very low	<111	<102	42	38	43.29	36.89
Low	112-117	103-107	36	23	37.12	22.33
Medium	118-123	108-113	12	31	12.38	30.10
High	124-129	114-119	4	9	4.12	8.73
Very high	>130	>120	3	2	3.09	1.95
Total			97	103	100	100

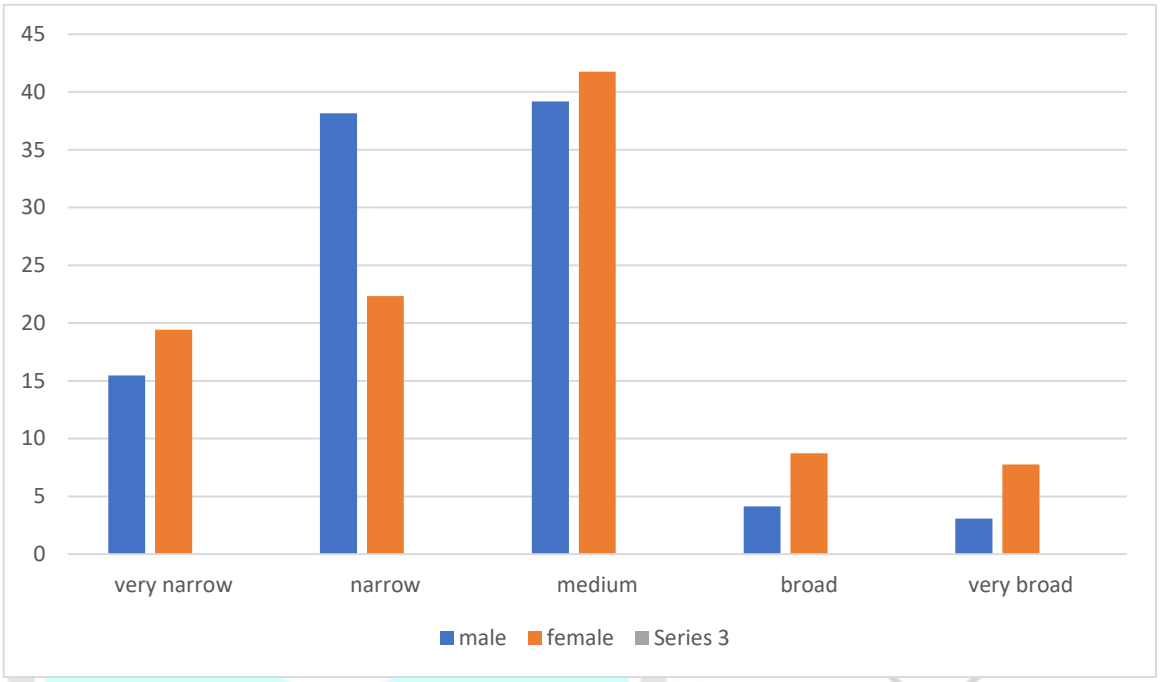

Figure III: facial width among males & females

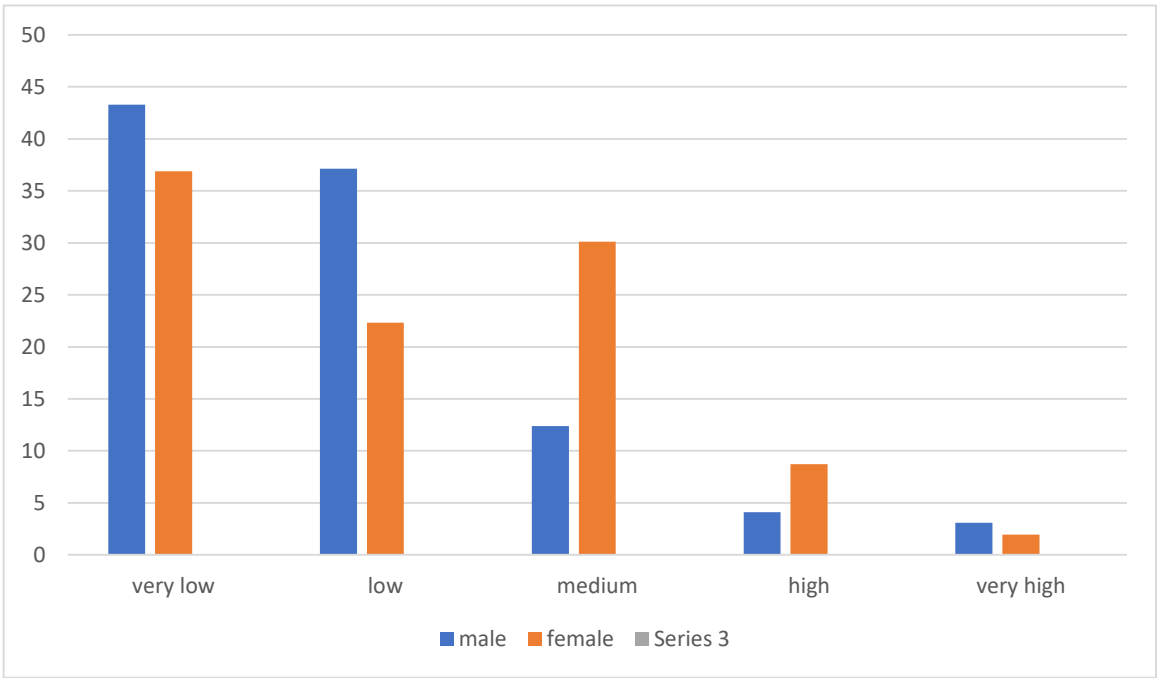

Figure IV: Morphological Facial Height among Males & Females

Table VI: Face type in study population and distribution among males and females

Type	Range	N	%	Distribution		
Hypereuryproscopic	<79.9	70	35	**Male**	32	45.71%
				Female	38	54.28%
Euryproscopic	80-84.9	57	28.5	**Male**	26	45.61%
				Female	31	54.38%
Mesoproscopic	85-89.9	33	16.5	**Male**	17	51.51%
				Female	16	48.48%
Leptoproscopic	90-94.9	23	11.5	**Male**	17	73.91%
				Female	6	26.08%
Hyperleptoproscopic	>95	17	8.5	**Male**	5	29.41%
				Female	12	70.58%
Total		200	100	200		

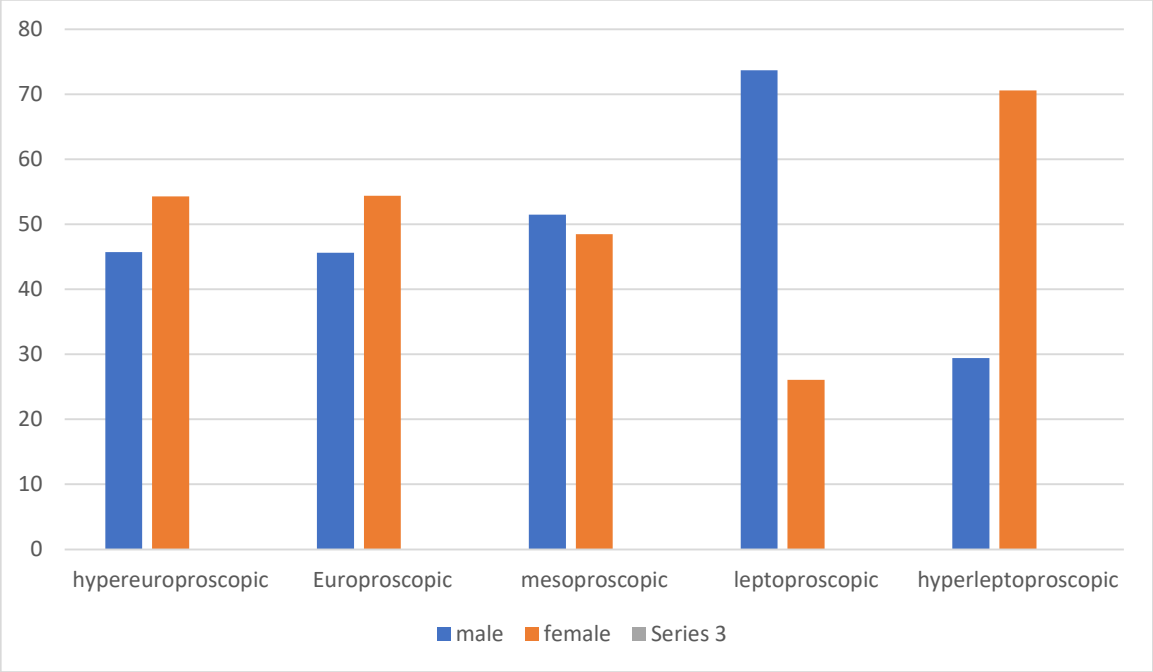

Figure V: Distribution of Face type among males & females

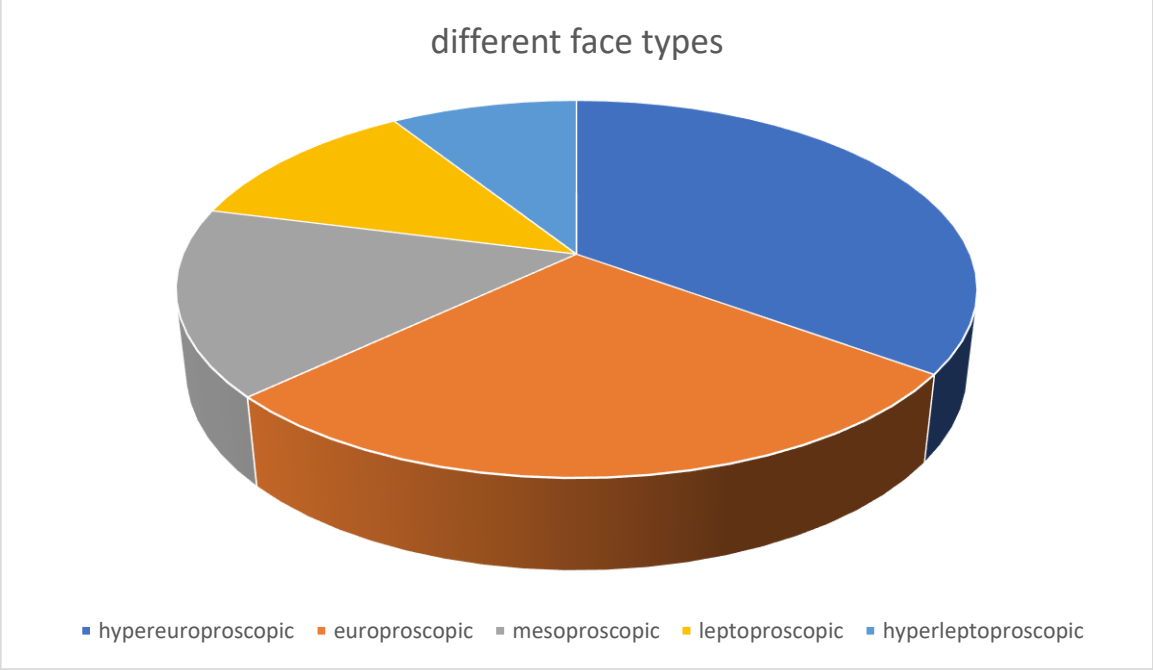

Figure VI: Different face types in study population

DISCUSSION:

The aim of our study was to determine the type of face in central Indian population. Amongst 200 subjects we found 70 subjects having facial index <79.9,57 subjects having facial index 80-84.9,33 subjects having 85-89.9,23 subjects having facial index 90-94 and 17 subjects having facial index >95.Based on Banister classification we found that the type of face of Central India population is predominantly Hypereuroproscopic (35%)followed by Europroscopic(28.5%),Mesoproscopic(16.5%),Leptoproscopic(11.5%)and least found face type is Hyperleptoproscopic(8.5%).

Our study is probably first conducted study on facial index in central India population so far. Study on face types have been done in other various regions in India but very limited studies have been done in facial anthropometry in India.

Singla M et al (2011) in their study found the dominant type of face was europroscopic (39.94%) in Jat Sikhs and Hypereuroproscopic in Bania (44.51%).[5]

Another study by Shah S et al in population of Gujarat in the year 2011, they concluded that the males were mesoproscopic and females were europroscopic predominantly.[11]

Kurnia et al (2012) in China in their study found the type of face is predominantly mesoproscopic with 40% males and 30.30% females.[10]

Doni KP et al in 2013 have done a study in South Indian population and they found the dominant face was hyperleptoproscopic.[6]

In a study done in Haryanvi adults by Kumar M et al (2013) concluded that the male population of Harayana was Mesoproscopic (49.66%) followed by Europroscopic (24%), Lepioproscopic (12.33%), Hyperleptoproscopic (3%). In case of female predominant face type was mesoproscopic.[12]

LC P et al (2013) conducted a study in North Indian and South Indian population. They found that the North Indian people had highest facial height and upper facial height. Facial width of South Indian people is more than North Indian.[8]

Sharma K et al in the year 2014, conducted a study on facial index in Kathmandu amongst 300 students. They concluded that the dominant face type was mesoproscopic and least common was hyperleptoproscopic.[9]

Another study by Shetti R et al (2015 conducted in both Indian and Malaysian students. They found Indians have the facial index of 74.82 in males and 71.22 in females. In Malaysian the face length ranged from 10.1 cm to 12.4 in males where as in females 9.4cm to 11.5cm. The face width is 10.9 to 13.9 cm in males and 10.9cm to 13.9cm in females. They concluded that Indians have higher Mean facial index in comparable to Malaysian.[7]

Therefore, the dominant face type of Central India population is Hypereuroproscopic which is similar to the Bania. We have seen that types of face are found in variation in different region of India. This is due to the climatic, geographical or topographical variation.

CONCLUSION:

The data for facial index for both males & females of central Indian population was deduced. Though the study was conducted on small sample size but the findings thus obtained can be utilised by expert of this region. It can also be utilised by surgeons for plastic surgery & Anatomists for academic purpose.

These findings can be utilised by Dental surgeons for their faciomaxillary surgery.
The sample size was smaller because of limited financial resources & smaller duration of time. Further study with larger sample size & longer duration may be carried out in future. **ACKNOWLEDGEMENT:**

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