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Original Article

Anatomy Section

Variation in Facial Index and Nasal Index in Western Maharashtrian Males- An Anthropometric Study

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ABSTRACT

Introduction: Facial anthropometry had proved its great importance in the field of facial reconstructive surgery as well as in the field of forensic science. Specific face types and nose types provides us important information about specific types of races.

Aim: To study the morphometric variation in facial index and nasal index as well as different types of faces and types of noses in the Western Maharashtrian males.

Materials and Methods: An observational study was carried out in the five cities- Sangli, Kolhapur, Islampur, Karad and Satara of Western Maharashtra, India. Total 535 male students of different colleges between the age group of 18-20 years were selected and measurements were taken with the help of Digital Vernier Calliper in the sitting position after due approval from Institutional Ethical Committees and informed consent. The methodology adopted for the measurements was taken from the guidelines given by Farkas LG in his book-"Anthropometric facial proportions in Medicine".

Results: The mean facial index of Western Maharashtrian males was 89.51 with standard deviation 4.26 and dominant face type was leptoprosopic which was 46.73% and rare type of face was hypereuriprosopic which was 0.19%. Mean nasal index of Western Maharashtrian males was 72.84 with standard deviation 6.86 and dominant nose type was mesorrhine which was 63.74%.

Conclusion: Certain facial and nasal features are common in particular racial group. Its detection can be helpful in reconstructive facial surgeries.

Keywords: Anthropometry, Face types, Morphometric variation, Nose types

INTRODUCTION

Anthropometric study of human beings had its roots in ancient days still it is used commonly all over the world as it has proven its importance in the field of cosmetic surgery, facial reconstructive surgery, and dental treatments and also in forensic science [1]. Anthropometric studies are scientific methods and techniques for displaying different measurement and observation on the human being as well as skeleton. Anthropometric studies are very important area for craniofacial surgery and syndromology [2]. Study of nose is also useful in the determination of race and sex of individual or group whose identity is unknown [3]. Facial index in general and nasal index in particular are useful in forensic investigations [4]. Facial index and nasal index provides us an important information about race and ethnicity. By knowing nasal index and type of nose it can be concluded about climatic condition. According to theory of natural selection, people who lives in cold and dry weather possesses long and narrow type of nose and who lives in warm and moist weather possesses broad nose [5]. With this background, the present study was conducted with an aim to study different facial and nasal parameters in adult male population of Western Maharashtra, India.

MATERIALS AND METHODS

This was an observational type of study carried out from March 2018 to January 2020 over 535 male students of following colleges as shown in [Table/Fig-1]. After getting due approval from both the Institutes: Prakash Institute of Medical Sciences and Research, Urun-Islampur (Ref No.-PSM/PIMSR/24013/2018) and Sumandeep Vidyapeeth University, Vadodara, Gujarat, India (SVIEC/IN/MEDI/PHD/18004) the study was conducted. NOC letter was obtained from Dean/Principal of respective college. The procedure and purpose of the study was explained to the participants and then written consent was obtained from them.

Sr. No.	Region	College name	No. of students
1	Islampur	Prakash Institute of Medical Sciences and Research, Urun- Islampur	93
		Loknete Rajaram Bapu Patil Ayurvedic Medical College	30
2	Kolhapur	Dr JJ Magdum College of Engineering, Jaysingpur	52
		Dr JJ Magdum Homoeopathic Medical College, Jaysingpur	27
		Dr JJ Magdum Ayurvedic Medical College, Jaysingpur	22
3	Sangli	Hon. Shri Annasaheb Dange Ayurvedic Medical College, Post Gradute and Research Centre, Ashta	38
		Hon. Shri Annasaheb Dange College of Pharmacy (B.Pharm)	46
		Hon. Shri. Annasaheb Dange College of Pharmacy (D.Pharm)	27
4	Satara	Gourishankar Institute of Pharmaceutical Education and Research, Limb	45
		Mahalaxmi Institute of Pharmacy (D. Pharm), Raigaon	28
		Late. Narayandas Bhawandas Chhabada Institute of Pharmacy, Raigaon	25
5	Karad	Krishna Institute of Medical Sciences "Deemed To Be University" Karad	84
		Krishna Institute of Nursing Science, Karad	18

[Table/Fig-1]: Number of students recruited from different cities and colleges.

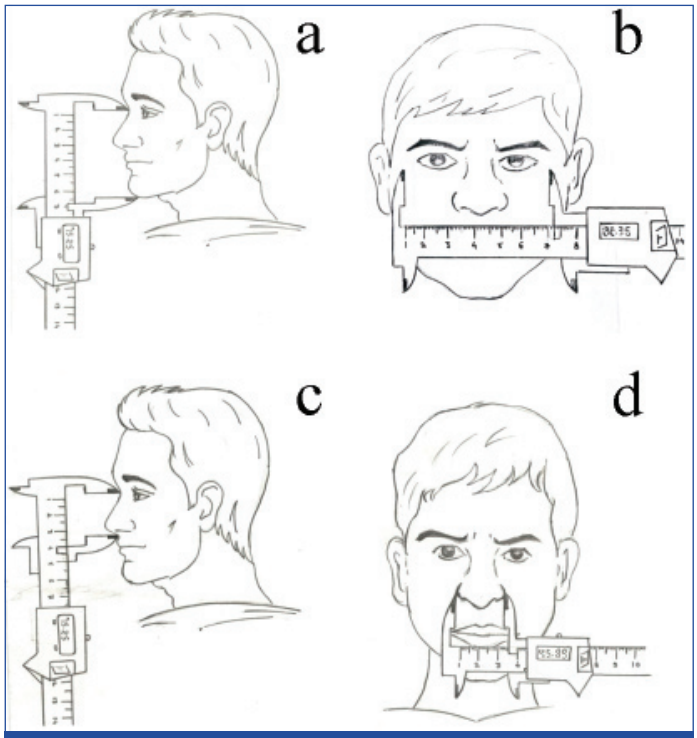
Inclusion and Exclusion criteria: All the participants were residing in the respective city from their forefathers, after taking personal and family history in brief with an age range of 18-20 years were included. This age group was selected because development of face has been completed at 18 years. Students who were not

resident of Western Maharashtra were excluded from the study. Individuals with normal craniofacial configuration were selected and those who were having background of genetically transmitted disorders like cleft lip, cleft palate were also excluded from the study.

Calibrated Standard Vernier calliper (30 centimetre length with accuracy of 0.01 mm) was used to take facial measurements. All the facial soft tissue landmarks were first marked with the help of skin marking pencil and then the measurements were taken in sitting position by the author by standing in front of the participants. Keeping the left hand on the head of the subject and holding the tip of upper arm of the calliper with thumb and index finger on the marked point of face and sliding the lower arm of calliper in upward direction up to desired marking so that the tip just touches the desired point. Participants were asked to remain quiet with erect neck with gently closed lips and avoid talking or laughing while taking measurements. All the facial measurements were taken in millimetres.

The following facial measurements were taken-

2a) Facial Height/length (n-mn/gn)- distance between nasion (n) to menton (mn/gn); 2b) Facial width/breadth- distance between right and left zygion (zy-zy); 2c) Height/Length of nose (n-sn)- distance between nasion (n) to subnasale (sn); 2d) Width of nose (al-al)- distance between right and left alar of nose [Table/Fig-2a-d].



[Table/Fig-2]: a) Showing measurement of face height (n-mn); b) Showing measurement of face width (zy-zy); c) Shows height of nose (n-sn); d) Shows width of nose (al-al).

Facial index: Face length (n-mn/gn)/Face width (zy-zy)×100.

It is called as prosopic facial index and different face types were categorised according to Banister classification [6] in the text book of medical anthropometry by Farkas LG in Anthropometric facial proportion in Medicine [7] which are as follows:

1) Hypereuriprosopic (very broad face)- when the facial index is lesser than or equal to 79.9 [Table/Fig-3].
2) Euriprosopic (broad face)- when the facial index is between 80 to 84.9 [Table/Fig-4].
3) Mesoprosopic (round face)- when the facial index is between 85 to 89.9 [Table/Fig-5].
4) Leptoprosopic (long face)- when the facial index is between 90 to 95 [Table/Fig-6].
5) Hyperleptoprosopic (very long face)- when the facial index is above 95 [Table/Fig-7].

Nasal index: Width of nose (al-al)/Length of nose (n-sn)×100.

[Table/Fig-3-7]: Different types of faces. (Image from left to right)

Paul Topinard (1830-1911) defined the nasal index [8]. On the basis of this index, the following three types of noses were categorised:

1] Leptorrhine (long nose)- when the nasal index <70.
2] Mesorrhine (medium nose)- when the nasal index is between 70 to 84.9.
3] Platyrrhine (flat nose)- when the nasal index is >85.

STATISTICAL ANALYSIS

All the collected data were subjected to appropriate statistical analysis (mean, standard deviation). It was analysed by using descriptive statistics. Software used was R statistical software with 3.5 version.

RESULTS

Mean face height (142.54 mm), face width (125.85 mm), nose height (52.76 mm) and nose width (38.27 mm) are shown in [Table/Fig-8] with standard deviation. The study results showed that mean facial index in Western Maharashtrian males was 89.51 with standard deviation 4.26 and mean nasal index was 72.84 with standard deviation 6.86 [Table/Fig-9].

Variable	Mean (mm)	Standard deviation
Face length	142.54	6.68
Face width	125.85	5.52
Nose length	52.76	4.04
Nose width	38.27	2.72

[Table/Fig-8]: Mean- facial length, facial width, nose length, nose width with standard deviation.

Variable	Mean	Standard deviation	Minimum	Maximum
Facial index	89.51	4.26	89.47	91.39
Nasal index	72.84	6.86	55.74	89.74

[Table/Fig-9]: Mean, standard deviation, maximum and minimum values for facial and nasal index.

The dominant type of male face was leptoprosopic (46.73%). Similarly, the dominant nose type was mesorrhine (63.74%) followed by leptorrhine (34.02%) [Table/Fig-10,11].

Type of face	No. of subjects	Percent
Euriprosopic	103	19.25%
Hypereuriprosopic	1	0.19%
Hyperleptoprosopic	14	2.62%
Leptoprosopic	250	46.73%
Mesoprosopic	167	31.21%
Total	535	100%

[Table/Fig-10]: Distribution of face types in Western Maharashtrian males.

DISCUSSION

The present study results showed the predominant face type of Western Maharashtrian males was leptoprosopic. It correlates

Type of nose	No. of subjects	Percent
Leptorrhine	182	34.02%
Mesorrhine	341	63.74%
Platyrrhine	12	2.24%
Total	535	100%

[Table/Fig-11]: Distribution of nose types in Western Maharashtrian males.

with study done in South Indian and North Indian population by Ashwini C et al., [9]. It is also in conformity with Uttarakhand males by Ansari S et al., [10]. It contradicts with males in Haryana by Anand S et al., and with Gujarati males by Kanan U et al., [11,12].

From [Table/Fig-12], it was clear that Serbian male (Jeremic D et al.,) showed similar face type with Western Maharashtrian males while Nepali males (Pandey N et al.,), Malay males (Yesmin T et al.,) and Turkish males (Ozsahm E et al.,) were having different face type than males in present study [9-16].

From the above results, it is clear that face types and nose type helps to determine the characteristic racial features. Present study results will help surgeons in facial reconstructive surgery and so, also in rhinoplasty of males.

Limitation(s)

As the study is focussed on only five cities of Western Maharashtra, the results of it cannot be generalised to whole of Western Maharashtra. More extensive work is required for generalisation.

CONCLUSION(S)

Certain human facial features are commonly found among certain racial groups or in any specific geographical place. By finding out such a specific face type will help in reconstructive and facial plastic surgeries. Furthermore, extensive study is required in this field to establish all the parameters of face. From this study, it is concluded that majority of Western Maharashtrian males were having leptoprosopic type of face 46.73% and mesorrhine type of nose (63.74%).

Name of Author	Population	Hypereuriprosopic	Euriprosopic	Mesoprosopic	Leptoprosopic	Hyperletoprosopic
Ashwini C and Karinagannanavar A [9]	South India	9.09	18.18	10.9	40	21.81
	North India	0	14.28	28.57	46.42	10.71
Ansari S et al., [10]	Uttarakhand	4	11	28	37	20
Anand S et al., [11]	Haryana	11	43	53	27	16
Kanan U et al., [12]	Gujarat	35.2	43	18.2	3.6	0
Pandey N et al., [13]	Nepal	13	23	48.66	13.33	2
Jeremic D et al., [14]	Serbia	0	0	17.78	76.67	5.56
Yesmin T et al., [15]	Malay	12	18	45	20	5
Ozsahm E et al., [16]	Turkish	18.1	35.36	33.21	8.7	4.7
Present study	Western Maharashtra	0.19	19.25	31.21	46.73	2.65

[Table/Fig-12]: Shows comparison of male face types with other studies in India in percentage [9-16].

Present study showed the mean nasal index in Western Maharashtrian males was 72.84 and predominant nose type was mesorrhine. It correlates with the males of Sindhis in Rajasthan (Choudhary A and Choudhary DS), of Jammu and Kashmir (Jabeen N et al.,), of Karnataka and Kerala (Shivananad ND et al.,), of Uttar Pradesh (Ray SK et al.,), and Santhals of West Bengal (Shah MRI et al.,) in India whereas contradicts Jats in Rajasthan (Choudhary and Choudhary DS) [2] and Bengalis in West Bengal (Shah MRI et al.,) in India [Table/Fig-13] [2,4,17-21].

The nose of Western Maharashtrian males correlates with Nigerian males (Mohammad I et al.,) but different from Indonesian male nose type Asthuta AR and Pradiptha IPY [20,21].

Author/Year	Population	Nasal index	Predominant type of nose
Shivanand ND et al., (2016) [17]	Karnataka	73.37	Mesorrhine
	Kerala	82.99	Mesorrhine
Jabeen N et al., (2019) [4]	Jammu and Kashmir	72.15	Mesorrhine
Ray SK et al., (2016) [18]	Uttar Pradesh	75.86	Mesorrhine
Choudhary A and Choudhary DS (2012) [2]	Jats	68.09	Leptorrhine
	Sindhis	70.72	Mesorrhine
Shah MRI et al., (2015) [19]	Santhals	80.00	Mesorrhine
	Bengalis	65.90	Leptorrhine
Mohammad I et al., (2018) [20]	Nigeria	74.08	Mesorrhine
Asthuta AR and Pradiptha IPY (2019) [21]	Indonesia	74.08	Platyrrhine
Present study	Western Maharashtra	72.84	Mesorrhine

[Table/Fig-13]: Shows comparison of nose types with other studies [2,4,17-21].

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