



FACIAL MORPHOMETRY OF ENDOGAMOUS POPULATIONS IN THE SOLAN DISTRICT OF HIMACHAL PRADESH

Anatomy

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ABSTRACT

Morphometric technique is used to determine the facial morphology to identify a race, which can be analyzed by calculating their facial index and nasal index. Present study is done on 800 subjects [400 females and 400 males] aged 18 to 40 years. The type of study is community based anthropometry and the study is done on thakur/ rajput community. Result of study shows that prevalence male facial type is hyperleptoprosopic (very long face) with mean facial index is 100.56, female also shows hyperleptoprosopic type of face with mean facial index is 97.50 and nasal index in male is 91.04, nasal index in female is 79.25.

KEYWORDS

Morphometry, facial index, nasal index

INTRODUCTION: -

Facial appearance plays a major role in human life. Face is the main channel of interaction in humans which shows the expression of person. Face dimensions are mainly affected by defects present with the birth, injuries and others diseases. Face recognition has been used for various types of identifications of documents like passports, identity card, land registration and driving licenses.¹ Today the recognition of face is more important and the data needs to be updated. Facial data is commonly measured by Anthropometric measurement. The study of anthropometry includes the facial height, facial width, facial index and nasal index. Anthropometric measurement is measurement which helps us find out the difference a pure race from other races. Each race or group has its own characters, facial features and own genes that make it different from other race or groups. This will help in forensic medicine, medico-legal cases and cosmetic and plastic surgeries. The nose is become as the best clues to racial origin² The importance of the nose is so great that one might label it "Nasal science".³ The features of nose can be explained by the basis of Nasal parameters (Nasal height, Nasal width and nasal index); these three categories are commonly accepted.⁴ Nasal examinations is the first step a surgeon takes before performing rhinoplasty.⁵

Materials and Methods: -

The present study conducted on 800 subjects [400 females and 400 males] aged 18 to 40 years. The type of study is community based anthropometry and the study is done on thakur/ rajput community. The inclusion criteria for study are only those who were willing to participate to study, population living in rural areas. Subjects are chosen on simple random basis from tribe. The exclusion criteria for study are individual has congenital cranio-facial abnormalities, facial growth-related disorders and Individual whose parents and grandparents had inter-caste marriages. All measurement is taken manually by sliding Caliper. Position of the subject sit in upright relaxed position, erect posture of shoulders, and head in Frankfurt horizontal plane. The aim of the study to examine the differences in facial morphometry and facial growth patterns in different communities. The study will provide baseline data of facial morphometry in study population, to compare and correlate facial morphometry among these study groups and to find the prevalence of facial type in various group of study population.



Figure 1: shows method for measuring face height.

Anthropometric measurement:

1.1 Facial index is calculated in the subjects by using the following standard formula.

Facial index (FI) = facial height (n-gn) × 100/ mid face width (zy-zy).
Face type are classified according to facial index as per following.

Table 1: classification of face type

S.No	Shape of face	Range of face index
1.	Hyperleptoprosopic(very broad face)	< 79.9
2.	Europrosopic(broad face)	80 to 84.9
3.	Mesoprosopic(round face)	85 to 89.9
4.	Leptoprosopic(long face)	90 to 94.9
5.	Hyperleptoprosopic(very long face)	> 95

Here, n- nasion is root of the nose. gn- ganthion is median point on the lower border of mandible. zy- zygon is most lateral point on the zygomatic arch.

1.2 Nasal index is calculated by using the following formula.

Nasal index (NI) = nasal height (n-pr) × 100/ nasal width (al-al)
Type of nose is classified according to nasal index.

Table 2:- classification of nose type

S.No	Shape of nose	Range of nasal index
1.	Very narrow	< 54.9
2.	Narrow	55 – 69.9
3.	Medium	70 -84.9
4.	Broad	85 – 99.9
5.	Very broad	> 100

Here, n- nasion is root of the nose, pr- pronasal is prominent point on nose tip, al- ala is the distance between two ala.

RESULT AND OBSERVATIONS:-

The result of the present study shows that morphological facial height is varies in male from 10.10cm to 11.70 with mean height is 11.08 cm and in female that varies from 8.20 to 11.60 and mean facial height is 10.15cm. The morphological facial width is varies in male from 10.20 to 11.80cm with mean facial width is 11.02cm and in female that varies from 8.80 to 11.40cm and the mean facial width is 10.40cm. The prevalence male facial type is hyperleptoprosopic (very long face) with mean facial index is 100.56 where minimum facial index is 89.65 and maximum facial index is 110.60. The female also shows hyperleptoprosopic type of face with mean facial index is 97.50 where minimum facial index is 85.45 and maximum facial index is 114.77.

That morphological nasal height is varies in male from 3.8cm to 5.1 with mean height is 4.41cm and in female that varies from 3.2cm to 5.1cm and mean facial height is 4.15cm. The morphological nasal width is varies in male from 3.5 to 5.1cm with mean nasal width is 4.02cm and in female that varies from 2.5 to 4.5cm and the mean

nasal width is 3.28cm. The prevalence male nose type is broad nose with mean nasal index is 91.04 where is minimum nasal index is 74.54 and maximum facial index is 110.86. The female nose is medium type with mean nasal index is 79.25 where is minimum nasal index is 64.1 and maximum facial index is 103.12.

Table 3: mean and range of various measurements among male & female

Parameters	Male			Female		
	Mean	Range		Mean	Range	
		Min.	Max.		Min.	Max.
Morphological facial length	11.08	10.1	11.7	10.15	8.20	11.6
Morphological facial width	11.02	10.02	11.8	10.4	8.8	11.4
Facial index	100.56	89.65	110.6	97.50	85.45	114.8
Morphological nasal length	4.41	3.8	5.1	4.15	3.2	5.1
Morphological nasal width	4.02	3.5	5.1	3.28	2.5	4.5
Nasal index	91.04	74.54	110.86	79.25	64.1	103.12

Table 4: comparison in facial index among various populations

S.No	Author	Population	Facial index	
			Male	Female
1	Chakravarthy max et al	Indian Americans of Antigua	94.31	91.13
2	Mahesh et al	Haryanvi Banias	96.68	98.83
3	Sahni et al	Northwest Indians	105.73	105.26
4	Agnihortri et al	Indo-Mauritian populations	109.76	111.11
5	Jagdish et al	Local population of Mangalor	101.09	106.76
6	Tahamida et al	Malay population, Malaysia	90.85	85.86
7	Lc et al	North and south Indian adult	100.65	98.73
8	Present study	Thakur population of Solan, HP	100.56	97.50

Table 5: comparison in nasal index among various populations

S.No	Author	Population	Nasal index	
			Male	Female
1	G. oladipo et al	Yoruba ethnic group of Nigeria	90.02	83.58
2	Oladipo et al	Igbo ethnic group of Nigeria	95.80	90.01
3	Franciscus R. G. et al	Onges ethnic group	72.3-97.7	70.5-97.4
4	Sarun koirala et al	Mangoloid population of Nepal	74.6	75.9
5	Sarun koirala et al	Tharu population of Nepal	83.3	82.4
6	Present study	Thakur population of solan, HP	91.04	79.25

DISCUSSION:

To communication in humans face is an important channel of verbal and non verbal communication, facial anthropometry technique is used to determine facial morphology in field of medicine¹. The nose gives one of the best clues to identify a racial group². The knowledge of nose is necessary in nasal science field³. The mean facial index in thakur male population is 100.56, which is Hyperleptoprosopic (very long face) of face has similar with some previous studied done by other authors in deferent regions. the mean value of present study is more near to study done on north and south Indian adults by LC at el. 2013. The study also shows similar value with study done on Indian population by jagdish Chandra et al, 2012. The mean value of thakur male is near to mean value of northwest Indian population (Shani D et al 2009) and value find in indo-mauritian population by Agnihorti et al. The facial index of male thakur population is higher than Haryanvi banias by Mahesh et al 2013, and also higher than Indian Americans population by Chakravarthy max et al 2015.

The mean facial index in female thakur population is 97.50 is very near

with the north and south Indian population by LC at el. 2013, and study done on Haryanvi banias population by Mahesh et al 2013. Facial index value is differ from the Indian population by jagdish Chandra et al, 2012, and northwest Indian population (Shani D et al 2009), study done on indo-mauritian population by Agnihorti et al. it is also shows significant difference from Indian Americans population by Chakravarthy max et al 2015.

The nasal index of thakur population of in solan is 91.04 for male and 79.25 for female is found. This mean value of male is very near to Yoruba ethnic group of Nigeria by G Oladipo et al. present study has significant difference from onges population (franciscus & long et al) and mongolid population of nepal (sarun koirala et al). The study done on tharu population of Nepal (sarun koirala et al) also differs from present study. The male facial index of igbo ethnic group of nigerien has some similarity with present study.

The facial index of thakur female group is 79.25 which show similar value with tharu group of Nepal and mongoloid group of Nepal (sarun koirala et al). The present study shows significant difference from igbo ethnic group of nigerien (oladipo et al), Yoruba ethnic group of nigererin (G.Oladipo et al) and onges population (franciscus & long et al).

CONCLUSION:-

The face is a important way to communicate with other. The present study shows significant difference in male and female and also from other racial group. The present study on thaku population of solan showed significant difference in facial index and nasal index with previous study. Present study will help in identification of this race and also help in medico legal case and plastic surgeries.

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