A MORPHOMETRIC STUDY OF NASAL INDEX IN ADULT HUMAN DRY SKULLS OF NORTH INDIAN POPULATION

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ABSTRACT

Introduction: Nasal Index is very useful in anthropology and it is one of the clinical anthropometric parameters recognized in nasal surgical and medical management. Nasal index is the most common nasal parameter which may be related to regional and climatic differences so that it would be further useful as an essential tool to the researchers, clinicians, rhinoplastic and facial reconstructive surgeons and forensic experts related to this field. The present study was designed to provide a normative data of nasal index and to classify their nose type and comparison of data with other studies.

Material & Methods: The study was conducted on 200 human dry skulls of north Indian population in Department of Anatomy, S.N. Medical College, Agra. The measurements were taken using digital vernier caliper. Nasal Index was calculated by measuring nasal height and nasal width in order to determine the nasal type.

Results: In the present study, mean nasal height was 49.25 ± 3.68 mm whereas mean nasal width was 24.63 ± 2.90 mm. Mean nasal index was calculated as 51.00 ± 0.09 .

Conclusion: The findings of our study suggest that according to the nasal index, the studied population of North India belongs to Platyrrhine type.

Keywords: Nasal index, human dry skulls, digital vernier caliper.

INTRODUCTION

Anthropometry provides scientific methods and techniques for taking various measurements and observation on the living man and the skeleton [1]. Nasal anthropometry is the study concerned with the measurements of the proportion, size and shape of the human nose [2]. The importance of the nose is so great in determining regional, climatic differences and facial reconstructive surgery that one might label it "Nasal science" [3].

Nasal index is a sensitive anthropometric index. It is the most common nasal parameter which may be related to regional and climatic differences [4]. Before changing the state of the nose, analysis of the nasal index is the initial step a specialist takes before performing rhinoplasty.

It is useful in various branches of medicine such as reconstructive surgery, in forensic medicine for medicolegal assessment of individuality and race [5]. Nasal index is also useful in the analysis and classification of fossil remains as well as the study of living population [6].

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MATERIAL AND METHODS

The present study was conducted on 200 human dry skulls in Department of Anatomy, S. N. Medical College, Agra out of which 125 skulls were from S. N. Medical College, Agra and 75 were taken from G.S.V.M. Medical College, Kanpur.

Nasal height and nasal width were measured with the help of digital vernier caliper (with an accuracy of 0.01 cm). All the measurements were taken thrice to minimize measurement error and mean of the three obtained value was used. After data collection, results were prepared in terms of mean and standard deviation using software SPSS version 23.0.

Measurements

In each skull following measurements were taken:

Nasal Height (NH): Nasal Height was measured from the nasion (where the internasal suture touches the frontal bone) to a point just at the base of nasal spine (Fig.1).

Nasal Width (NW): Nasal Width is the greatest breadth of nasal aperture (Fig. 2).

Nasal Index (NI): Nasal Index is calculated by the following

$$\frac{\text{Nasal Width} \times 100}{\text{Nasal Height}}$$

Above measurements were compared with studies of different authors as anthropometric measurements are different in different population and geographical areas.

Fig. 1: Measurement of Nasal Height
(A-B: Distance from the nasion (where the internasal suture touches the frontal bone) to a point just at the base of the nasal spine)

Fig. 2: Measurement of Nasal Width
(A-B: Maximum distance on the nasal opening in the skull)

OBSERVATIONS AND RESULTS

The maximum, minimum and mean value of Nasal height was 59.27 mm, 38.26 mm and 49.25 ± 3.68 mm respectively. The maximum, minimum and mean value of Nasal width was 36.22 mm, 17.46 mm and 24.63 ± 2.90 mm respectively (Table 1).

The maximum value of Nasal Index was 72.00, minimum value 40.00 and mean value was 51.00 ± 0.09 (Table 1, Fig. 3).

Table 1: Showing Nasal Height, Nasal Width & Nasal Index in 200 Human Dry Skulls

Parameters	Sample (human dry skulls)	Maximum	Minimum	Mean	SD
Nasal Height	200	59.27mm	38.26mm	49.25mm	3.68mm
Nasal Width	200	36.22mm	17.46mm	24.63mm	2.90mm
Nasal Index	200	72.00	40.00	51.00	0.09

Fig. 3: Bar diagram showing Nasal Height, Nasal Width & Nasal Index

DISCUSSION

Nose is very important in racial determination [7]. The classification of nose into different categories is a function of Nasal Index in anthropology as it is applied in differentiating racial and ethnic variations. Based on nasal anthropometric parameters, nose has been classified into following types by Martin & Saller [8] as:

Leptorrhine: Moderately narrow nose with nasal index ≤ 47 .

Mesorrhine: Moderate or medium size nose with nasal index 47-50.9.

Platyrrhine: Moderately wide nose with nasal index 51-57.9.

Hyperplatyrrhine: Very wide nose with nasal index ≥ 58 .

Number of studies has indicated racial and ethnic differences in nasal index amongst different populations. Leptorrhine with a nasal index below 48 as in mixed Europeans, ancient egyptians, American Indians; Mesorrhine with an index ranging from 48 to 53 as in Chinese, Japanese, Malays; Platyrrhine with an index above 53 as in Australians, Negroes, Kaffirs, Zulus etc. [9].

Present study shows the comparison of Nasal Height and Width between different population groups (Table 2).

Table 2: Showing comparison of Nasal Index between different population

Study	Population	Nasal Index
Abdelkader et al. (2005) [11]	European	47.8- 69.8
	Alaskan	47.8- 69.8
	African	38.0-59.0
Kulkarni (2010) [5]	South Indian	53.3 $\pm$ 5.3
Howale et al. (2012) [10]	Maharashtra	54.30
Padala & Khan (2017) [12]	South Indian	51.95 $\pm$ 7.20
Present study (2019)	North Indian	51.00 $\pm$ 0.09

According to the classification of Martin and Saller (1957) [8], Nasal Index was 51.00 $\pm$ 0.09 in present study which clearly revealed that North Indians belongs to Platyrrhine Type of Nose (Table 2).

CONCLUSION

The present study is designed to provide a normative data of nasal index in north Indian population and to classify their nose type and comparison of data with other studies, so that it would be further useful as an essential tool to the researchers, clinicians, rhinoplastic and facial reconstructive surgeons and forensic experts related to this field.

Data collected in the present investigation could serve as data base for the quantitative description of human nasal morphology during normal growth and development considering region and race related variation. Findings of the present study are useful for quantification of the nasal features of north Indian population. The findings of our study suggest that Nasal Index of North Indian population belongs to Platyrrhine category.

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