

COMPARATIVE STUDY OF MIDLINE NASAL ERGONOMICS OF NORTH INDIAN MALES

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ABSTRACT

In the 19th and early 20th century, nasal shape, size and nasal indices were the most commonly measurement to differentiate races. A detailed study has been carried out in a random sample of 180 males in age group 18-24 years to neglect the affect of facial parameters in subject above 18 years of age. The study is aimed to determine a set of comparative standard values of the form of the North Indian young male nose and of its relevance to forensic science and clinical anthropometry. A highly significant comparison was found in the nasal indices of two ethnic groups, in the present study. The data revealed that the M.P. male had leptorrhin nose while U.P. male had mesorrhin nose. Various other parameters were also compared in a sample of 90 Madhya Pradesh and 90 Uttar Pradesh males.

KEY WORDS: Nasal Index, Nasal Indices, Mesorrhin, Leptorrhin, M.P.(Madhya Pradesh), U.P.(Uttar Pradesh), Ethnic Groups.

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INTRODUCTION

Anthropometric studies play an important role in distinguishing a pure race from the local mingling of races. Anthropometric studies have also been found useful in craniofacial surgery, otolaryngology, syndromology [1]. Relevant indices with reference to nose are: nasal index and nasal elevation index: both are good indicators of ethnicity. Nasal index measurement is one of the methods anthropologists have used to differentiate living race and subspecies of man [2]. Where races with different nasal proportions have intermixed, the index marks the degree of crossing that has taken place; it records a large range of variation and it enable us to group types in a serial order corresponding to that suggested by other characters.

For these reasons the nasal index is accepted by all anthropologists as one of the best test of racial affinity. According to Hajnis [3] categorization of various facial indices was introduced by Broca in 1875. On the basis of height and breadth index, the noses are divided by Martin and Saller [4] into the following categories:

Hyperleptorrhin: long narrow nose with nasal index of 40 to 54.9 on living head.

Leptorrhin: long narrow nose with a nasal index of less than 47 on the skull or of less than 70 on the living head.

Mesorrhin: a nose of moderate size with nasal index of 47 to 50.9 on skull or of 70 to 84.9 on living head.

Chamaerrhin: short broad nose with a nasal index of 51 to 57.9 for a skull, and 85 to 99.9 for

a person.

Hyperchamaerrhin: short broad nose with a nasal index of 58 or over for a skull, and 100 or more for a person.

Hajnis [3] states "in medicine it is more appropriate to use categories developed for individuals of the same age, sex, ethnic origin as the patient". He also describes the use of statistics for formulation of categories for each group which is possible if the mean and standard deviation (S.D.) for any particular index for the particular group are available. Thus for nasal index the following values emerge:

-2 S.D. to -1.5 S.D. will be hyperleptorrhin.

-1.5 S.D. to -0.5 S.D. will be leptorrhin.

-0.5 S.D. to +0.5 S.D. will be mesorrhin.

+0.5 S.D. to +1.5 S.D. will be chamaerrhin.

+1.5 S.D. to +2 S.D. will be hyperchamaerrhin.

Given this range for a given age, ethnicity and sex and supplementing with sample photographs of each category the surgeon can display to the patient seeking consultation for rhinoplasty. The choices open to him within his ethnic group. Operative attempts are made by the surgeon to achieve desired nasal shape and post operative index measurement quantities critical assessment needed for follow up. Such normative population data on Indian men and women seems limited. The present study is an afford to provide baseline data on males of the two North Indian communities i.e. from U.P. and M.P. and the comparisons that emerge there in.

MATERIALS AND METHODS

Selection Criteria: In the present study the total no. of 180 subjects were studied. A random sample of male medical undergraduate students, in the age group of 18-24, was selected. This age group was selected, as age negligibly affect the facial parameters in subjects above 18yrs. of age. The selected subjects were from two ethnic communities one from Madhya Pradesh (90 Subjects) and other from Uttar Pradesh (90 Subjects) whose ancestors were the residents of their respective region for atleast two generations.

Subjects who had trauma of the nose, prior plastic or reconstructive surgery of the face or

cleft lips and other congenital facial malformations were excluded in the study.

Four relevant nasal surface landmarks selected were:

Nasion (n): the point on the root of the nose where the mid-sagittal plane cuts the nasofrontal suture.

Subnasale (Sn): the point at which the nasal septum merges with the upper cutaneous lip in the mid-sagittal plane.

Pronasale (Pr): the point at the tip of nose.

Alare (al): the point at the most prominent side wall of the nose.

All the measurements were taken with the subject sitting on a chair in a relaxed condition with the head in the anatomical position. The facial muscles were relaxed in order not to alter the size of the nose. The measurement was done by one observer to prevent inter observer error.

The following nasal indices were calculated for each community:

Nasal Index (Nix)= Nasal breadth (N.B.) * 100 / Nasal height (N.H.).

Nasal Elevation Index (NEIx)= Nasal depth (N.D.) * 100 / Nasal breadth (N.B.).

The data so obtained was computed, tabulated and statistically analyzed with the purpose of obtaining variation in means of the North Indian males of two ethnic groups. The data obtained were compared with the measurements of other population in literature.

All the parameters in the study were marked with removable micropore on faces of selected subjects (Fig. 1 and 2).

Fig. 1: Points from above downwards indicate Nasion(n), Pronasale (pr) and subnasale(sn).



Fig. 2: Point on the right ala indicate Alare (al).



Measurement Procedure: The following projective measurements (shortest distance between two points) of the nose were taken with a sliding caliper.

Fig. 3: Measurement of Nasal height– This distance was measured from nasion to subnasale.



Fig. 4 : Measurement of Nasal length– This distance was measured from nasion to pronasale.



Fig. 5: Measurement of Nasal breadth– This distance was measured from alare to alare.



Fig. 6: Measurement of Nasal depth– This distance was measured from pronasale to subnasale.



RESULTS

The present study was carried out to compare the nasal indices of M.P. and U.P. males. A highly significant comparison was found in the nasal indices of two ethnic groups, in the present study. Various other parameters were also compared.

Nasal breadth: tabulated in table no. 1.

Table 1: Nasal Breadth of North Indian Male Ethnic groups.

Statistic	Males (M.P.)	Males (U.P.)
Range	2.8cm -4.5cm	2.5cm -4.1cm
Mean	3.77cm	3.50cm
S.D.	0.42cm	0.36cm
Variance	0.176	0.129
p Value	< 0.05	
Significance	Highly Significant	

The nasal breadth of M.P. and U.P. males is compared in the above table. The 'p' value was found to be < 0.05. Thus the difference of means of nasal breadth is highly significant. A nasal breadth varied more in M.P. males than in U.P. males i.e. a M.P. male had broader nose than U.P. male.

Nasal height: tabulated in table no. 2

Table 2: Nasal Height of North Indian Male Ethnic groups.

Statistic	Males (M.P.)	Males (U.P.)
Range	4.5cm-6.3cm	4.2cm-5.8cm
Mean	5.42cm	4.54cm
S.D.	0.34cm	0.36cm
Variance	0.116	0.129
p Value	< 0.005	
Significance	Highly Significant	

In the above table comparison between the nasal height of M.P. and U.P. males is done. The value of 'p' was computed to be < 0.05 thus

showing that the means were significantly variable. The difference was found statistically significant. The mean nasal height varied more in M. P. males.

Nasal length: tabulated in table no. 3.

Table 3: Nasal Length of North Indian Male Ethnic groups.

Statistic	Males (M.P.)	Males (U.P.)
Range	3.9cm-5.5cm	3.5cm-5.2cm
Mean	4.64 cm	4.27cm
S.D.	0.31cm	0.41cm
Variance	0.096	0.168
p Value	< 0.05	
Significance	Highly Significant	

The difference between the two means was compared and was found to statistically significant. The study revealed that a M. P. male had longer nose than U. P. male.

Nasal depth: tabulated in table no. 4.

Table 4: Nasal Depth of North Indian Male Ethnic groups.

Statistic	Males(M.P.)	Males(U.P.)
Range	1.3cm-2.4cm	1.2cm-2.0cm
Mean	1.80cm	1.54cm
S.D.	0.25cm	0.19cm
Variance	0.063	0.036
p Value	<0.05	
Significance	Highly Significant	

The difference between the two means was compared and was found to statistically significant. A M.P. male had significantly protruded nose than U.P. male.

Nasal index: tabulated in table no. 5.

Table 5: Nasal Index of North Indian Male Ethnic groups.

Statistic	Males (M.P.)	Males (U.P.)
Range	52.83cm-86.54cm	59.52cm-90.00cm
Mean	68.89cm	77.13cm
S.D.	8.09cm	7.8cm
Variance	65.45	60.84
p Value	< 0.001	
Significance	Highly Significant	

The nasal index of two samples has been compared in the above table. The 'p' value was found to be <0.001, showing that the mean nasal index of M.P. males is significantly differ from that of U.P. males. The data revealed that the M.P. male had leptorrhin nose, while U.P. male had mesorrhin nose.

Nasal elevation index: tabulated in table no. 6

Table 6: Nasal Elevation Index of North Indian Male Ethnic groups.

Statistic	Males (M.P.)	Males (U.P.)
Range	34.78cm-67.65cm	50.98cm-44.15cm
Mean	50.98cm	44.15cm
S.D.	7.33cm	6.1cm
Variance	53.73	37.21
p Value	< 0.001	
Significance	Highly Significant	

Above table compares the nasal elevation index of two samples. The 'p' value is found to be < 0.001. Thus, concluding that the mean nasal elevation index of M.P. males is significantly different from U.P. males.

DISCUSSION

In this study a direct morphometric measurements on 180 young adult North Indian males was carried out. The traditional measurements technique was preferred over other anthropometric measurements because of the reliability and cost effectiveness especially in our environment.

The nose, like the dentition, is more directly regulated by the forces of selection than is true for other aspects of cranial morphology.

The present study established characteristic ethnic markers of nasal ergonomics of each community (M.P. & U.P. males) examined and brought forth some striking features.

Firstly, the nasal breadth of two groups was compared. The mean nasal breadth was found to be 3.77cm for M.P. males, the standard deviation being 0.42cm and variance was 0.176, while the mean nasal breadth was found to be 3.50 cm for U.P. males, the standard deviation being 0.36cm and variance 0.129. The comparison showed that the M.P. males had broader nose (N.B., $p < 0.05$) than U.P. males. In present study, the mean nasal length was found to be 4.64cm for M.P. males, the standard deviation being 0.31cm and variance was 0.096, while the mean nasal length was found to be 4.27cm for U.P. males, the S.D. being 0.41 cm and variance was 0.168. The comparison showed a M.P. male had a longer (N.L., $p < 0.05$) nose than the U.P. male. In the present study, the mean nasal depth was found to be 1.80cm for M.P.

males, the standard deviation was 0.25 cm and variance was 0.063, while the mean nasal depth was found to be 1.54cm for U.P. males, the standard deviation was 0.19cm and variance was 0.036. The comparison showed that M.P. males had significant protruded (N.D., $p < 0.05$) nose than the U.P. males. In the present study, the mean nasal index was 68.89cm for M.P. males, the S.D. being 8.09cm and variance was 65.45. The mean nasal index for U.P. males was 77.13 cm, the S.D. was 7.8cm and variance was 60.84. The study revealed that the U.P. males nose to be significantly less narrow, less elevated than other ethnic group. Nasal index values of M.P. males by various authors cited by Bhasin [5] gave comparable values ranging from 72.92cm to 92.20cm with mean 78.09cm, indicating slightly wider nasal type vis-à-vis the narrower value of 68.89cm obtained in the present study. The U.P. males showed a range of nasal index values from 70.2cm to 76.22cm in surveys of Risley [2] with mean of 72.79 cm, showing slightly narrower nose than that indicated from the average of 77.13cm in U.P. males in the present study. The data given by the study of Bhasin [5] for nasal index of U.P. males ranged from 59.00cm to 86.10cm with mean value 70.13cm. The study conducted by Risley [2] revealed that Indo Aryans had nasal index of 73.25cm and Indian Negroid (Sudroids) had nasal index of 84.10 cm. All authors above agree with racial differences in nasal index.

CONCLUSION

A significant finding which emerged from the present study was that the nasal index appeared to be as good an indicator of ethnicity for Indian males as nasal elevation index. On the other hand, in young North American women the nasal index did not differ significantly and that it was nasal elevation index which was a better indicator of ethnicity [6]. It appeared that, no one index in particular can be categorically declared as the yard stick of ethnicity, which varied with each sample group examined. Incidence of requests for rhinoplasty are increasing worldwide even among orientals since changing cultural attitudes as well as economic status has brought such surgery within their reach. By virtue of this ergonomic study, the

design industry can also benefit and provide better and more comfortable masks, spectacles, nasal spacula etc. This study should be subjected to further investigation because of its relevance to forensic science and clinical anthropometry.

Conflicts of Interests: None

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