



AESTHETIC VALUES OF NASOFACIAL ANGLES

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SUMMARY : *There is a paucity of anthropometric data, especially in relation to the nose, with regard to Indian population. A study was conducted wherein the nasofacial profile of 120 subjects of both sexes was recorded for measuring nasofrontal, nasofacial, nasolabial and columellar angles. It was found that the nasofrontal angle and nasolabial angle decreased with increase in age in a significant number of cases ($P < 0.01$). It was also found that the columellar - alar angle was significantly more ($P < 0.01$) in males as compared to females, except in younger age groups. The data collected could serve as a guideline during aesthetic surgery.*

INTRODUCTION

The nose is invested with enormous emotional and cultural significance. The nose forms the central focal point of the face but cannot be studied as an isolated structure. In order to construct a well balanced face, the reconstructive facial surgeon must adhere to certain principles of proportion, symmetry and balance. The rhinoplasty surgeon must convert a mental image into a surgical reality by utilizing the three A's of rhinoplasty : aesthetics, anatomy and analysis¹

The biometric patterns for rhinoplasty are built on the basis of a group study of individuals with similar racial backgrounds, environmental conditions and, ideally, among the members of the same sex. Most of the available studies relating to various nasal proportions have been from North American or European populations. The present study aims to determine these measurements in people of both sexes in various age groups belonging to the region of Punjab, Haryana and Chandigarh. At present limited data is available regarding the anthropometric measurements of Indian noses.

MATERIALS AND METHODS

A total of 120 subjects (60 males and 60 females) in the age range of 10-25 years were selected from those attending the Dept. of Otorhinolaryngology of the Post Graduate Institute of Medical Education and Research, Chandigarh. None of the subjects had any evident abnormality, deformity of the nose, face or any prior nasal or facial trauma. The subjects were divided into three groups:

Group I : 10-15 years (20 males and 20 females);

Group II : 15-20 years (20 males and 20 females);

Group III : 20-25 years (20 males and 20 females).

These individuals were photographed using a 35 mm SLR camera (Olympus OM1 with 75-150mm zoom lens). Three views were taken, i.e. frontal, lateral and basal view. For the frontal view, the Frankfurt line, i.e. the line connecting the top of the tragus with the infraorbital rim, was kept in the horizontal plane. The lateral view was taken with the subject turned 90 deg. away from the camera. The basal view was taken with the camera-subject distance of 52 cm. and the subject looking at the ceiling.

Anatomical landmarks needed for measurements (glabella, nasion, subnasale, pogonion, ala and columella) were marked in each individual photograph and the following angles were measured (Fig 1):

- 1. The Nasofrontal angle :** The angle formed by drawing a line tangent to the glabella through the nasion that intersected a line drawn along the nasal dorsum.
- 2. The Nasofacial Angle :** A vertical line connecting the glabella to the pogonion was drawn and its angle with the nasal dorsum was measured.
- 3. The Nasolabial Angle :** The subnasale was marked and one line was drawn from it along the inferior border of columella and a second straight line to the mucocutaneous border of the upper lip. The angle formed was measured.

4. **The Columellar-alar angle:** An angle was drawn with its vertex at the base of the columella and the lateral lines tangent to the caudal ala.

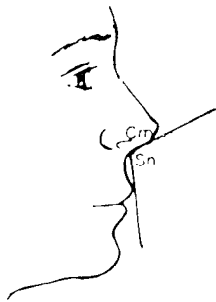
For actual measurements of these angles, a tracing paper was placed over the photographs and various anatomical landmarks identified over them. The angles formed were then measured by using a protractor.



Nasofrontal angle



Nasofacial angle



Nasolabial angle



Columellar-alar angle

(Fig - 1) Diagrammatic representation of different nasofacial angles.

TABLE I - Nasal Angles in different age groups

SEX	STATISTIC	NASOFRONTAL ANGLE AGE GROUPS (YEARS)			NASOFACIAL ANGLE AGE GROUPS (YEARS)		
		10-15	15-20	20-25	10-15	15-20	20-25
Males	Mean	141.3°	137.0°	133.35°	36.70°	36.65°	35.40°
	S.D.	4.93	6.16	6.92	4.12	3.02	3.34
	Range	132-149°	128-149°	124-145°	30-43°	30-43°	31-41°
Females	Mean	139.65°	138.50°	134.85°	36.70°	37.25°	36.55°
	S.D.	7.62	5.49	7.72	3.62	3.63	4.12
	Range	130-154°	132-145°	118-143°	30-46°	30-42°	30-42°

TABLE II - Nasal Angles in different age groups

SEX	STATISTIC	NASOLABIAL ANGLE AGE GROUPS (YEARS)			COLUMELLAR ALAR ANGLE AGE GROUPS (YEARS)		
		10-15	15-20	20-25	10-15	15-20	20-25
Males	Mean	109.10°	100.25°	96.25°	158.55°	163.40°	163.30°
	S.D.	5.54	7.01	5.42	5.62	7.93	5.36
	Range	99-119°	92-115°	91-108°	148-170°	142-175°	153-172°
Females	Mean	105.95°	106.30°	100.25°	158.05°	159.80°	155.40°
	S.D.	7.62	8.03	6.79	8.75	6.92	6.18
	Range	92-121°	91-118°	91-110°	140-171°	151-169°	145-170°

RESULTS

The mean values of the nasofrontal angle for the males in various age groups i.e. 10-15, 15-20 and 20-25 years were 141.30 deg., 137.0 deg. and 133.35 deg. and for females it was 139.65 deg., 138.50 deg. and 134.85 deg. respectively. The mean values of the nasofacial angle for the males in various age groups ie 10-15, 15-20 and 20-25 years were 36.70 deg., 36.65 deg. and 35.40 deg. and for females were 36.70 deg., 37.25 deg. and 36.55 deg. respectively (Table I).

Table II shows the mean, standard deviation and the range found in the sample of nasolabial and columellar-alar angles in the various age groups in males and females. The mean values of nasolabial angle for males in the three age groups were 109.10 deg., 100.25 deg. and 96.25 deg. and for females it was 105.95 deg., 106.30 deg. and 100.25 deg. respectively. The mean values of columellar-alar angle of males in the three age groups were 158.55 deg., 163.40 deg. and 163.30 deg. and for females it was 158.05 deg., 159.80 deg. and 155.40 deg. respectively.

It can be seen from the table that the mean values of nasofrontal and nasofacial angles did not differ much in males and females, whereas the nasolabial angle was found to be more in females and the columellar angle was found to be more in males.

DISCUSSION

The nose, with its central position in the face, influences the visual impression of the face. The prerequisites of the "ideal nose" in the past were mainly subjective. Normative data would, therefore, definitely help in the planning of aesthetic surgeries.

The statistical analysis (ANOVA) in males showed that the nasofrontal angle differed significantly in the age groups. The difference between Group I and Group II was significant at 0.05 level whereas the difference between Group I and III was found to be highly significant ($p < 0.01$). The correlation of nasofrontal angle was found to be highly significant ($p < 0.01$) and it was found to have a negative correlation i.e. the value of the nasofrontal angle decreased with increase in age which was not seen among subjects of female sex. Moreover, there was no statistically significant difference in males and females for the nasofrontal angle.

Krugman² reported the normal value of the nasofrontal angle to be 125 deg. in the average Caucasian. Bernstein³ has mentioned that the ideal range for men is between 115 deg. and 130 deg. These values were found to be slightly lesser than those found in the present study.

The analysis of variance of the nasolabial angles revealed that there was a highly significant

difference ($p < 0.01$) for the nasolabial angle amongst the different age groups. There was a significant decrease in the value of the nasolabial angle with increase in age, suggesting a negative correlation in both males and females and the correlation was found to be statistically significant.

Daniel and Farkas¹ found the mean value of the nasolabial angle to be 102 ± 8.2 deg. Our study also revealed a similar range of nasolabial angle, with the angle being more acute in males and obtuse in adult females. This angle is profoundly affected by the inclination of the lips.⁵

In accordance with the findings of Bernstein,³ we also found the value of the nasolabial angle to decrease with increase in age.

The analysis of variance revealed highly significant differences in males and females with regard to the columellar-alar angle ($p < 0.01$). The angle was found to be more in the males as compared to the females except in the younger group (10-15 years), whereas the mean value of columellar-alar angle was found to be nearly the same for both the sexes. The correlation between the males and females were also found to be statistically significant ($p < 0.01$). No statistically significant difference was found in the nasofacial angle between both sexes or among different age groups.

Our study, though limited to a particular region of the country, provides important data, with respect

to the nose. The measurements vary from those of Caucasians, especially the nasofrontal angle. The importance of uniform standards of recording, needs to be underscored. The data could provide valuable input to aesthetic surgeons besides establishing baseline anthropometric data in an Indian population.

References

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