

Original Article

Anthropometric analysis of lip-nose complex in Indian population

B. Khandekar, S. Srinivasan, N. Mokal, M. R. Thatte

Department of Plastic, Reconstructive Surgery and Burns, B.J. Wadia Hospital, Parel, Mumbai, India

Address for correspondence: M. R. Thatte, Department of Plastic, Reconstructive Surgery and Burns, B.J. Wadia Hospital, Parel, Mumbai, India

ABSTRACT

One hundred normal individuals of different age groups from Mumbai (India) were included in this study. Various dimensions of lip-nose complex were measured. The results were compared with the available data for blacks, Caucasians and Chinese. In the population under study lip-nose complex measurements differ in all dimensions with blacks and Caucasians and show resemblance to the Chinese. The analysis of the data does not simply indicate the differences in the measurements but also points out change in growth patterns which will have a clinical significance.

KEY WORDS

Anthropometry, lip-nose complex, Indian population

INTRODUCTION

Lip-nose complex anthropometry at various ages provides measurements that serve as a guideline for reconstruction of various deformities of these structures especially in bilateral conditions (bilateral cleft lip).

Anthropometry of lip-nose complex has been extensively studied for European population.¹⁻⁶ However, corresponding studies in case of Indian population are very scarce.³⁻⁹ Hence Anthropometric study of lip-nose complex was undertaken. This study involve comparison with available data from literature.

MATERIALS AND METHODS

The procedure of measuring the lip-nose complex was explained to each individual resulting in the accurate

measurements due to lack of anxiety on the part of individual. Since this was not possible in the case of neonates and children the population of neonates and children undergoing surgery other than facial surgery were chosen and the measurements were taken under anesthesia for accurate assessments.

A sample of 100 normal individuals categorized into four groups-Neonates, at 1 year, at 12 years and in adults were chosen for the study. Each group consisted of 25 normal individuals. The measurements were repeatedly taken for each individual to ensure the accuracy.

The following points of lip-nose complex were marked using marking pen and the linear measurements were taken using caliper. [Figure 1].

1. Vertical height of the lip (columellar base to cupid's bow peak). This parameter was chosen against base of columella to tubercle since it has significance in cleft

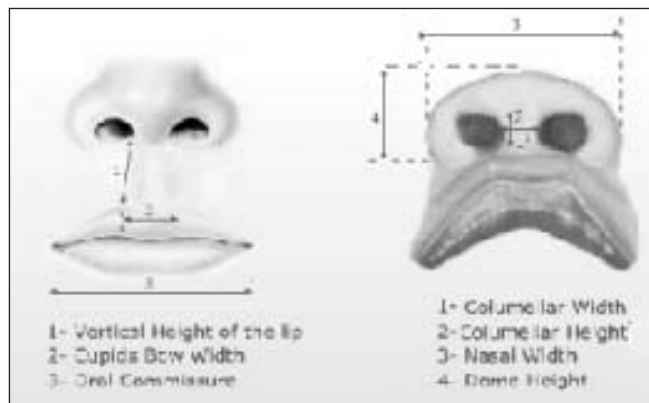


Figure 1: Diagram for measurements

- lip surgery.
2. Cupid's bow width (philtrum peak to peak)
3. Total width of mouth (commissure to commissure distance)
4. Columellar height
5. Columellar width
6. Nasal Width
7. Dome height

RESULTS

The measurements were statistically analysed (arithmetic mean and standard deviation were calculated) and tabulated. [Table 1 and 2]. The results were compared with available data for Caucasians, blacks and Chinese [Table 3 and 4].

DISCUSSION

The normal individuals who were included in this study were inhabitants of a particular geographic region of India (western part of India). The present study establishes the basal values for various parameters of lip-nose complex of the local population of this region. Since standard deviations for Caucasians and blacks being not available only mean values are compared. The present study reveals that Columellar height is more amongst Indian males compared to females in neonates as well as in adults. The same pattern is seen with Caucasians and blacks. Columellar height is more in male as well as in female adult Caucasians compared to Indians and blacks. Indian male and female neonates have larger columellar height compared to Caucasians but the corresponding adults have the lowest values. This indicates that male as well as female Indians show a similar growth pattern amongst them but show a change in growth pattern compared to Caucasians. Columellar height is lowest amongst Chinese compared to other races. It was very interesting to note that the current sample significantly differs in columellar height and nasal width as well from South part of India.⁹

Columellar width is more in case of Indian female neonates compared to male neonates but in Indian adults the columellar width is same for males and females. Male as well as female Indian neonates have the largest columellar width compared to Caucasians and blacks. However, adult

Table 1: Lip measurements in male and females

	<i>Vertical height of the lip (Columellar base to cupid's bow peak)</i>				<i>Cupid's Bow width (philtrum-peak to peak)</i>				<i>Total width of mouth (commissure to commissure distance)</i>			
	MALE		FEMALE		MALE		FEMALE		MALE		FEMALE	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Neonates	8.5	0.1	8.3	0.1	5.3	0.1	5.0	0.2	23.6	0.1	22.1	0.1
1 year	9.8	0.1	9.6	0.1	8.9	0.1	8.7	0.3	30.0	2.0	29.1	1.2
12 years	13.2	1.2	12.1	0.6	10.0	0.1	9.7	0.5	0.4	0.6	39.5	1.4
Adults	16.2	0.6	14.2	0.7	11.7	0.4	11.8	0.6	53.5	1.0	47.0	0.7

All measurements are arithmetic mean values and are expressed in millimeters.

S.D. – Standard Deviation

Table 2: Nose measurements in male and female

	<i>Columellar Height</i>				<i>Columellar Width</i>				<i>Nasal Width</i>				<i>Dome Height</i>			
	MALE		FEMALE		MALE		FEMALE		MALE		FEMALE		MALE		FEMALE	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Neonates	4.2	0.1	4.1	0.6	4.5	0.3	4.4	0.1	15.5	2.0	14.5	2.1	8.3	2.1	8.3	0.1
1 year	4.7	0.2	4.7	0.1	5.0	0.1	5.0	0.2	18.0	0.2	16.0	0.9	10.5	0.2	12.5	1.0
12 years	7.9	0.6	7.9	0.5	5.7	0.1	5.5	0.1	30.5	0.3	29.6	1.4	16.3	0.7	16.3	0.6
Adults	9.8	0.6	8.6	0.5	5.7	0.1	5.7	0.1	32.3	0.3	30.5	0.8	20.4	1.5	16.9	0.4

All measurements are arithmetic mean values and are expressed in millimeters.

S.D. – Standard Deviation

Table 3: Comparison of normal lip-nose measurements in males and females (neonates) in Indians, Chinese, caucasians, and blacks

	<i>Present Study (West India)</i>		<i>Chinese</i>		<i>Caucasians</i>		<i>Blacks</i>	
	<i>MALE</i>	<i>FEMALE</i>	<i>MALE</i>	<i>FEMALE</i>	<i>MALE</i>	<i>FEMALE</i>	<i>MALE</i>	<i>FEMALE</i>
Vertical height of the lip	8.5	8.3	12.0	12.0	11.0	10.0	11.0	12.0
Cupids bow width	8.5	5.0	7.0	7.0	7.0	7.0	8.0	6.0
Oral commissure	23.6	22.1	33.0	34.0	33.0	35.0	38.0	30.0
Columellar height	4.2	4.1	4.0	4.0	4.0	4.0	5.0	3.0
Columellar width	4.5	5.0	5.0	5.0	4.0	5.0	4.0	4.0
Nasal Width	15.5	14.5	31.0	30.0	22.0	23.0	25.0	24.0
Dome height	8.3	8.3	-	-	-	-	-	-

All measurements are arithmetic mean values and are expressed in millimeters

Table 4: Comparison of normal lip-nose measurements in males and females (adults) in Indians, Chinese, caucasians and blacks

	<i>Present Study (West India)</i>		<i>Indians (South Indians)</i>		<i>Chinese</i>		<i>Caucasians</i>		<i>Blacks</i>	
	<i>M</i>	<i>F</i>	<i>M</i>	<i>F</i>	<i>M</i>	<i>F</i>	<i>M</i>	<i>F</i>	<i>M</i>	<i>F</i>
Vertical height of the lip	16.2	14.2	17.0	16.0	16.0	13.0	22.0	15.0	21.0	21.0
Cupids bow width	11.7	11.8	13.0	11.0	12.0	11.0	15.0	13.0	12.0	13.0
Oral commissure	53.5	47.0	52.0	48.0	56.0	53.0	63.0	57.0	72.0	57.0
Columellar height	9.8	8.6	12.0	10.0	6.0	5.0	13.0	11.0	10.0	9.0
Columellar width	5.7	5.7	6.0	6.0	6.0	7.0	8.0	6.0	9.0	7.0
Nasal Width	32.3	30.5	43.0	37.0	43.0	39.0	36.0	33.0	44.0	45.0
Dome height	20.4	16.9	-	-	-	-	-	-	-	-

Indian males as well as females have lowest columellar width compared to Caucasians and blacks, which again indicates a change in growth pattern. There is a resemblance in columellar width between Chinese and Indians Nasal width is more amongst Indian males compared to Indian females at all the age groups. Nasal width is maximum amongst blacks compared to Indians and Caucasians at all the ages.

Indian males have larger values for columellar height and columellar width in neonates as well as in adults.

Vertical height of the lip is more amongst Indian males compared to females at all the age groups. Adult Caucasians have more vertical height of the lip compared to Indians and blacks and Indian males and females have the lowest vertical height of the lip at all the ages.

Cupid's bow width is same amongst adult Indian males and females whereas Indian male neonates have wide Cupid's bow compared to female neonates. Cupid's bow width is more in Indian male neonates compared to Caucasians and blacks whereas in adult male Indian males and in females this is smallest. Cupid's bow width is maximum amongst Caucasians and adults compared to Indians and blacks. Further analysis on growth patterns for Indians it was found that the maximum growth in the Cupids bow width occurs during the first year of life.

Indian males have wide oral commissure compared to females at all age groups. Oral commissure is smallest amongst Indian males and females at all age groups compared to Caucasians and blacks. Adult male and female blacks have wide oral commissure compared to Caucasians and blacks.

Dome height is more in Indian adult males compared to females but in neonates it is same. The data was not available for Caucasians and blacks for comparison.

Indian males and females differ significantly in certain parameters from that of Caucasians and blacks but shows resemblance to Chinese.

This difference is not restricted only to measurements but also indicates difference in growth patterns for Indians as against that for Caucasians and Blacks. Maturation age of a particular anatomical structure decides the time of surgical repair for that structure and the maturation age of the structure is decided by the growth pattern. Study of these age related morphological variations within the nose and upper lip region is not available for Indians. For years together the anthropometric measurements for surgical reconstructions are based on basic values for western population resulting in the time of surgical repair being based on western growth patterns, which actually differs

for Indians. This has not been given a serious thought. Our study has been conducted to generate our own data.

REFERENCES

1. Farkas LG, Lindsay, Cleft Craft, 1976;1:36-8.
2. Farkas LG, Cheung GCK. Nostril asymmetry: Microform of cleft lip palate ? An anthropometrical study of healthy North American Caucasians. Cleft Palate J 1979;16 :351.
3. Shah M, Verma IC, Mahadevan S, Puri RK. Facial anthropometry in Newborns in Pondicherry. Indian J Paediatrics 1991;25:259-63.
4. Farkas LG, Posnick JC, Hreczko, T.M., and Pron, G.E. Growth patterns of the nasolabial region : A morphophetric study. Cleft Palate Craniofac J 1992;29:318.
5. Farkas LG, Hajnis K, Posnick JC. Anthropometric and anthroposcopic findings of the nasal and facial region in cleft patients before and after primary lip and palate repair. Cleft Palate Craniofac J 1993;30:1.
6. Farkas LG. Anthropometry of the Head and Face, 2nd Ed. New York : Raven Press 1994.
7. Farkas LG, Tompson B, Philips J, Katic M, Cornfoot L. Comparison of Anthropometric and Cephalometric Measurements of the adult Face. Cleft Palate Craniofac 1999;5:10-8.
8. Mulliken JB, Burvin R, Leslie G, Farkas LG, Repair of bilateral complete cleft lip: Intraoperative Nasolabial Anthropometry, Plastic and Reconstructive Surgery 2001;107:307-14.
9. Prasad NN, Reddy D. Anthropometry: Lip-Nose Complex. Indian Journal of Plastic Surgery 2001;34:3-8.