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DETERMINATION OF SEXUAL DIMORPHISM OF UPPER AND LOWER LIP VOLUMES AND ITS IMPLICATION IN LIP AUGMENTATION.

Dr. Uzma Rasool[1], Dr. Nowsheeba Khurshid[1]*, Dr. Manmeet Kour[1] Dr. Arish Nazir Shora[2], Dr. Ghulam Mohammad Bhat[1]

[1]Department Of Anatomy Government Medical College Srinagar, Jammu And Kashmir, India.
[2]Department Of Anatomy Government Medical College Handwara, Jammu And Kashmir, India.

Abstract:

Introduction: The anthropometry of Lip- Nose complex at different ages provides measurements which serve as guidelines for reconstruction of various deformities of these structure. The ideal lip has to be full and there should be a correct balance between upper and lower lip and vermilion border should be well defined . **Material and Method**: The present study was conducted in Government Medical College Srinagar, on 150 subjects [75 females and75 males] aged 18 to30 year. Upper lip volume , lower lip volume and total lip volumes were calculated using different somatometric measurements .**Result and discussion:** All lip volumes were significantly more in males as compared to females. Lip volumes are significantly more in North Italians as compared Indians. **Conclusion:** Males have more voluminous lips as compared to females. Racial differences were seen when compared Caucasians and Indians lips.

Keywords: Lip volume, augmentation, somatometric measurements.

Introduction: The Lips are the key features of the lower third of the face and are discrete from the surrounding skin. The anthropometry of Lip- Nose complex at different ages provides measurements which serve as guidelines for reconstruction of various deformities of these structures [1-4]. The lip region is very important area when facial aesthetic enhancement is considered and currently lip augmentation has become common in esthetic plastic surgeries, it is possible to change the appearance of the lips in various ways. The ideal lip has to be full and there should be a correct balance between upper and lower lip and vermilion border should be well defined and ideal lip ratio should be 1:1:6, which means 40% of lip volume should be in upper lip and 60% of lip volume should in lower lip.

During thirties and forties lips start to shrink, aging changes manifest in three ways in lips: The distance between columellar base and upper lip vermilion border is longer, Exposed vermilion is less (thin lips), Vermilion bulk (pout) is relatively lost .There is decrease in the structural component which leads to decreased pouting, Ptosis and inversion of vermillion . As the time passes photo damage, smoking , other hereditary factors leads to loss of lip volume.[5-8] Aesthetic desires vary with emerging fashion trends and differ among cultures. Lip augmentation is requested by the patients with aging changes, aesthetic reconstruction of lip is also required in cases with cleft lip and palate.

Material and Method:

- The present study will be conducted in the Department of Anatomy, Government medical College Srinagar ,on 150 subjects [75 females and75 males] aged 18 to30 year.
- Subjects were chosen on simple random basis.
- Prior informed consent for this study was obtained from the subjects.
- Subjects with anomaly of lips and inflammation, trauma, malformations, deformity and surgical scars (for example for operations for cleft palate) were excluded because of their unsuitability for this research.

SOMATOMETERIC LANDMARK

- SUBNASALE (sn)-It is point where the lower margin of nasal septum meets the cutaneous part upper lip .This point should be sought where the tangent drawn to the nasal septum meets the upper lip.

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- CHEILION(ch)-It is the point on the mouth opening where the lateral margins of upper and lower lips meet i.e. corners of lips.
- LABIALE SUPERIOR (ls)- It is the point on the upper margin of upper lip in mid sagital plane cut by a tangent drawn at the highest elevation of the upper margin of the integumental lip.
- LABIALE INFERIOR (li)- It is the point on the lower margin of lower lip in the mid sagital plane.
- STOMION (sto)-It is the point where the slit of mouth with close lips cut the mid sagital plane.
- SUB LABIALE (sl)-Mid point of horizontal labiomental skin ridge the division between lower lip and chin is evident. If the chin contour is flattened ,th sub labiale can be identified by inserting a spatula to the bottom of the vestibule and gently elevating the skin surface.

SOMATOMETERIC MEASUREMENTS

- Mouth width (chr-chl) :

It measures the straight distance between the chelion i.e. corners of mouth . Caliper kept horizontal

- Rt. Cheilion-Labialesuperius (chr-ls):

It measures the distance between the right chelion to labialissuperior ,

- Lt. Cheilion-labialesuperius (chl-ls):

It measures the distance between the left chelion to labialissuperior

- Medial vertical height of cutaneous upper lip (sn-ls) :

It measures the straight distance between subnasale and labiale superior

- Height of upper vermilion (ls-sto) :

It measures the straight distance between labialie superior and stomion

- Rt. Cheilion-Labialeinferius (chr-li):

It measures the distance between Right cheilion to labialeinferius

- Lt. Cheilion-Labialeinferius (chl-li):

It measures the distance between Left cheilion to labialeinferius

- Medialvertical height of cutaneous lower lip (li-sl):

It measures the straight distance between Labiale inferior and sublabiale

- Height of lower vermilion (li-sto):

It measures the straight distance between stomion and labiale inferior

INDICES :

- Upper lip Volume: was approximated from the volumes of 2 irregular tetrahedral:

The first tetrahedron had the plane chr, chl, ls as its base and vertex is sn.

The second tetrahedron had the plane chr, chl, ls as its base and vertex in sto.

- Lower lip Volume : was approximated from the volumes of 2 irregular tetrahedral:

The first tetrahedron had the plane chr,chl, li as its base and vertex is sl.

The second tetrahedron had the plane chr, chl,li as its base and vertex is sto.

- The total lip volume :was calculated by sum of the 4 tetrahedra.
- **Volume =1/3 (Area of Base Traingle)(height)**
- Area of base triangle will be calculated using Heron's formula that says

area = Area = Square root of$\sqrt{s(s - a)(s - b)(s - c)}$,s (semiperimeter) is calculated using another formula s=(a+b+c)/2

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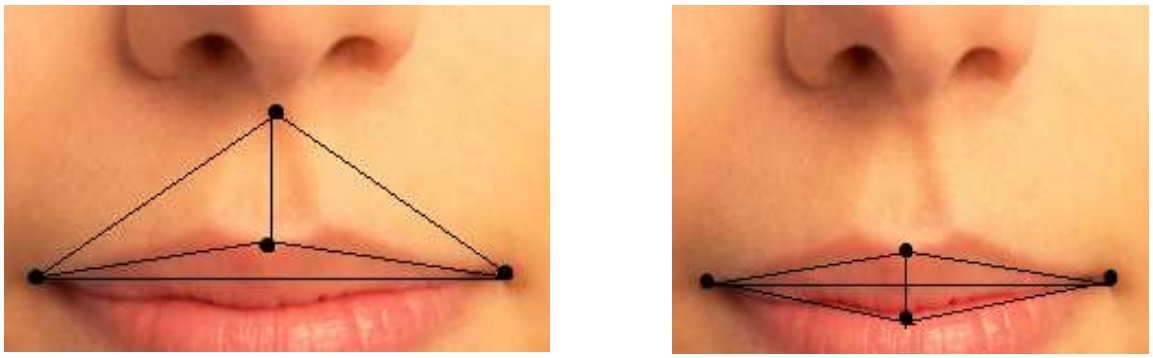

Figure1. Shows lip volume

Results:

Table 1: VARIOUS LIP VOLUMES

S.No	Lip volumes	Female (n=75) Mean (cm) ±S.D	Male (n=75) Mean (cm) ±S.I	p-Value
1	Upper lip volume	2.32±0.42	3.01±0.57	<0.0001***
2	Lower lip volume	1.26±0.32	1.66±0.46	<0.0001***
3	Total lip volume	3.58±0.54	4.67±1.11	<0.0001***

Table 1 Shows mean of various lip volumes i.e. Upper lip volume, Lower lip volume and Total lip Volume All the lip volumes are higher in males when compared to females and the differences are statistically significant .Upper lip volume is more in both males and females when compared to lower lip .

Discussion:

The lip parameters in lower third of face are important in evaluation of facial beauty, lips and chin determine women beauty. The lip morphometry is used while planning lip reconstruction in cleft lip patients, thus the present study might serve as a reference during assessment of patients who request aesthetic lip surgeries. Results of present study for various lip volumes i.e. upper lip volume, lower lip volume and total lip volume are given in table 2 and 3

Table. 2-COMPARISON OF LIP VOLUMES (Males) OF PRESENT STUDY WITH PREVIOUS STUDIES

Lip Volume	Population	Sex	No. Of Subje	Mean ($cm^{3)}$	p-Value
Upper Lip Volume	Indian(present study)	M	75	3.01(0.06)	
	White Northern Italian	M	105	3.15(0.06)	Insignificant

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Lower Lip Volume	Indian(present study)	M	75	1.66(0.05)	
	White Northern Italian	M	105	2.85(0.08)	0.0001***
Total Lip Volume	Indian (present study)	M	75	4.67(0.11)	
	White Northern Italian	M	105	6.00 (0.12)	0.0001***

Table. 3-COMPARISON OF LIP VOLUMES (Females) OF PRESENT STUDY WITH PREVIOUS STUDIES

Lip volumes	Population	Sex	No. Of Subjec	Mean ($cm^{3)}$	p-Value
Upper Lip Volume	Indian (present study)	F	75	2.32(0.04)	
	White Northern Italian	F	96	2.31(0.06)	0.01**
Lower Lip Volume	Indian (present study)	F	75	1.26(0.03)	
	White Northern Italian	F	96	2.15(0.06)	0.0001**
Total Lip Volume	Indian (present study)	F	75	3.58(0.05)	
	White Northern Italian	F	96	4.46 (0.10)	0.0001**

Upper lip volume in present study was statistically higher in males (table 1) this was in line with previous study done on White Northern Italians , which implies that males have more voluminous upper lip.[9] The values of upper lip volume of present study males were similar to values of previous study done on Northern Italian males, while in case of females the values were statistically higher when compared to Northern Italians (Table 2,3), this difference can be attributed to difference in race or due to change in methodology as this study has used photographic method .[9,10]

Lower lip volume in present study was statistically higher in males (table 1) this was in line with previous study done on White Northern Italians , which implies that males have more bulky lower lip when compared to females. The values were significantly higher in Northern Italians (Table 2,3), which implies Caucasian have more voluminous lower lip when compared to Indians , this may be attributed to racial differences and also difference in the study method.[9]

Total lip volume in present study was statistically higher in males when compared to females(table 1) this was similar with previous study done on White Northern Italians , which implies that males have more voluminous and bulky lip when compared to females. Total lip volume in both males and females is higher in case of Northern Italians which may be because their lower lip volume is also more than Indians .

Conclusion:

- Male have more bulky and Voluminous lips as compared to females.

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- Racial differences are seen in various lip volumes between North Italians and Indian , implying Caucasians have more voluminous lips as compared to Indians.

The upper and lower lip proportions would be of great help to evaluate outcome of procedures done on lips such as cleft lip or surgeries for micro and macrostomia . Surgeons might use these values for planning treatment and also measuring the outcome of lip surgeries. Forensic anthropologists may also use the relationship between soft and hard facial tissue as a tool in identification .

Address for correspondence: Dr. Nowsheeba Khurshid MBBS , MD
Lecturer In Department Of Anatomy Government Medical College Srinagar, J&K India.
E-mail: nowsheebakhurshid@gmail.com

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