



## ORIGINAL ARTICLE

# Anthropometric Measurements of the Lips in 18-25-year-old Men of Sistani and Baluch Descent

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### ABSTRACT

*Anatomy and dimensions of the facial structures are considered as useful criteria for surgeons undertaking repair and reconstruction of facial deformities to maintain optimal relationships among facial structures. The purpose of this study was to evaluate the morphological changes of the lips in 18-25-year-old men of Sistani and Baluch descent. The subjects of the study were 100 healthy men aged 18-25 from Sistan and Baluch region (n=50 in each group). Subjects with previous history of craniofacial trauma, congenital anomalies as well as previous orthodontic treatment or facial surgery were excluded from the study. The dimensions of the lip and facial on the photos were measured by Digimizer software. To achieve morphological parameters of lips, seven points were determined on photos and indices such as lip index, mouth width; total lip height, total vermilion area along with lower and upper vermilion area were calculated. The present study showed that the lip index was statistically higher in the Sistani than Baluch group (p= 0.00). Total vermilion height in Baluch group was higher, but mouth was wider in Sistani group. The upper lip volume was not significantly different between two groups, but the lower lip volume in the Baluch group was significantly higher. There was no difference between two races in upper, lower and total vermilion area. This study represented a primary database for quantitative description of human lip morphology in Sistani and Baluchmen which is applicable for surgical or orthodontic treatments.*

**Key words:** Anthropometry, Lip morphology, Lip Index, orthodontic treatment, vermilion

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### INTRODUCTION

Facial form is a simple method to distinguish between people [1]. Anthropometry is the study of the measurements of the human body. Measurement of nose and lip proportions is a subdivision of this science [2-4]. Anatomy and dimensions of facial structures are considered as useful criteria for surgeons undertaking repair and reconstruction of facial deformities to maintain optimal relationships among facial structures [3, 5, and 6]. A deep knowledge on the relationships among the or facial structures will allow correct diagnosis and treatment of individuals [7].

Moreover, prior to orthodontic treatment, the clinical assessment should always evaluate the soft tissues (such as lips) at rest and during function, because the morphology of the soft tissues is a major factor in determination of the overall facial profile [8].

The physical appearance of an individual is associated to social acceptance, psychological well-being, and the self-esteem of an individual. It has been established that self-esteem is strongly dependent on facial appearance. Appearance, therefore, is one of the primary characteristics of the face. However, the definition of an attractive and pleasing face is subjective, with many factors involved such as culture, personality, ethnic background and age [9].

Aging and sex particularly affects the lips, with changes in thickness, and in vermilion dimensions, coupled with the distance between the nose and the upper lip vermilion border, and in mouth width [10, 11].

As the morphological changes of lips are applicable in forensics and discrimination between races, this study for the first time evaluated the morphological changes in the lips of 18-25-year-old men of Sistani and Baluch descent.

## MATERIALS AND METHODS

Data on 100 healthy Sistani and Baluch aboriginemen (n=50 in each group) aged 18-25 years were collected. The samples were randomly selected from students of medical sciences at Zahedan University. Subjects with previous history of craniofacial trauma, congenital anomalies as well as previous orthodontic treatment or facial surgery and those with phenotypic similarities to a certain race or ethnicity (e.g., similar to Uzbeks) were excluded from the study. Ethical approvals for recruitment were obtained from National Ethics Committee in Medical Researches. Data of participants were registered in the prepared data sheet after taking an informed consent from all patients and healthy individuals. In this study, 13 parameters on the lip were measured and all procedures were noninvasive. Photos of all participants were taken in a standard anatomical position by a digital camera while eyes were open and the mouths shut.

The dimensions of the lip and facial dimensions were measured on the photos by Digimizer 3.7.1.0 software. First, the anatomical points were determined on photos as below, according to the geometric model of the lips and nose defined by Ferrario *et al*[12] (Figure 1):

- 1 - Sn: The middle point of the base line of nose
- 2 - Ls: The most prominent point of the upper lip
- 3 - Li: The most prominent point of the lower lip
- 4 - Sl: The lower border of the lower lip or the upper border of the chin
- 5 - Chr: right lip corner
- 6 - Chl: left lip corner
- 7 - Sto: Distinguishing spot between lower and upper lip

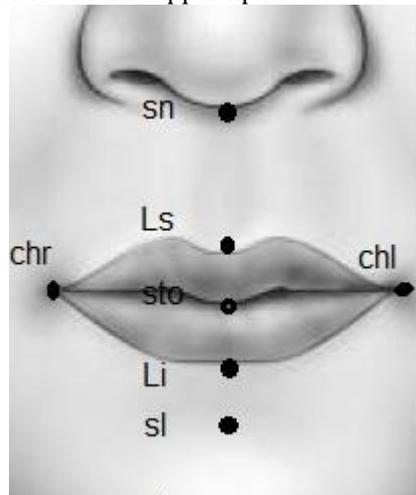


Figure 1- Data points were indicated as calculations references.

Then following distances were measured using defined points:

- 1 - chl-chr
- 2 - Ls-Li
- 3 - sn-sl
- 4 - sn-Ls
- 5 - Li-sl
- 6 - sn-sto

Using these parameters, the Lip index, surface area and volume of the lips were obtained according to the formulas.

- 1 - Lip Index: The vermilion height to lip width ratio
- 2 - The vermilion height to total length of the lip ratio
- 3 - The area of the vermilion of upper lip
- 4 - The area of the vermilion of lower lip
- 5 - All the vermilion area
- 6 - The upper lip volume
- 7 - Lower Lip volume

The measurements were calculated in centimeter in a normal anatomic position. Data were analyzed using the Statistical Package for Social Sciences (SPSS Version 16.0). Values were expressed as mean  $\pm$  standard deviation (SD). Student t-test was used to compare the results. A p-value below 0.05 was considered statistically significant.

## RESULTS

Table 1 represents the results obtained for both Baluch and Sistani groups. The results indicated that the lip index was statistically higher ( $p = 0.001$ ) and the mouths were wider ( $p = 0.013$ ) in the Sistani men. Oppositely, the total vermilion height ( $p = 0.017$ ) and lower lip volume ( $p = 0.005$ ) in the Baluch group

were significantly larger. However, the upper lip volumes as well as upper, lower and total vermillion area between two groups were not significantly different ( $p > 0.05$ ).

		Baluch (n=50)		Sistani(n=50)		
Groups		Mean	Std. Deviation	Mean	Std. Deviation	P value
<b>Lip Parameters</b>						
Mouth width(chr-chl)	cm	4.77	±0.27	4.90	±0.21	.013
sn-ls	cm	1.33	±0.08	1.30	±0.09	0.10
Total height of upper lip (sn-sto)	cm	1.89	±0.11	1.89	±0.14	0.74
Total vermillion Height (ls-li)	cm	1.53	±1.70	1.40	±2.72	0.017
li-sl	cm	1.68	±0.194	1.83	±0.131	0.001
Total lip height (sn-sl)	cm	4.43	±0.36	4.63	±0.344	0.003
Lip index	%	29.39	±3.0797	31.16	±5.1015	0.001
The vermillion height to total length of the lip ratio	%	31.92	±2.0576	31.94	±3.9295	0.82
Upper vermillion area(svs)	cm <sup>2</sup>	1.34	±.2345	1.39	±.2639	0.20
lower vermillion area( svi)	cm <sup>2</sup>	2.08	±.4824	2.17	±.7128	0.14
Total vermillion area(svt)	cm <sup>2</sup>	3.66	±0.67	3.44	±0.44	0.72
Upper lip volume (vLs)	cm <sup>3</sup>	0.60	±0.13	0.67	±0.11	0.42
Lower lip volume(vLi)	cm <sup>3</sup>	1.41	±0.36	1.19	±0.35	0.005

Table 1: Mean and SD of the lip parameters obtained for both groups

\* P-value more than 0.05 was considered as insignificant

Another parameter in this study was the length and width of the skull between two groups. The results showed that the difference in the skull parameters between two groups ( $p > 0.05$ ) was insignificant. However, the distance between the zygoma (zyzy) in the Sistani men was significantly longer than that of the Baluch group ( $p > 0.05$ ).

Table 2: Skull parameters

	Baluch		Sistani		P value
	Mean	Std. Deviation	Mean	Std. Deviation	
zyzy	11.22	±1.0517	11.74	±1.1328	0.02
Skull width	14.71	±.7895	15.44	±.8767	0.63
Skull height	17.04	±1.46	17.16	±0.93	0.15

\* P value more than 0.05 indicated as not significant

## DISCUSSION

The normal individuals who were included in this study were inhabitants of a particular geographic region of Iran (south-western part of Iran). The present study establishes the basal values for various parameters of lip of the local population of this region.

Numerous studies have examined the morphological difference in several different races [2, 3, 8, 13]. In the present study, racial difference was seen in lip index and mouth width. The results indicated that the lip index was statistically higher and the mouths were wider in the Sistani men. The mean mouth widths in our study in both groups, was smaller than that of 18-30 year-Old Italian and Indian men [14, 10].

Anthropometric data in Caucasian adults were somewhat larger than the current one. It seems that Caucasian men have wider mouth, however the total lip height in this group resemble Sistani group of our study [15].

Data by Sforza on Italian race indicated a smaller lip height (42.8 cm) compared to our findings. They suggested no significant change in the lip height after the age sixteen.

Another parameter in our study was total vermillion Height (ls-li) that differed between two races. This parameter in the Baluch race was similar to those of Italians (1.52 cm) but greater than those of Caucasians men (1.5 cm) and lower than those of Indians (1.62 cm), Chinese (1.60 cm) and Black race (2.1 cm) [14, 16].

Furthermore, the Lip index in the Baluch men was comparable to that of Italian men (29.39% vs. 29.66%) while was greater than that of the Sistani men (31.16%).

It is noteworthy that the prosopic index changes over time. The prosopic index of children is lower than that of adults; while children grow up, they gain a longer and narrower face [17, 13].

A successful outcome in facial surgery requires a comprehensive and accurate preoperative planning, and this is achievable through an objective in mind. The results of this study may be used as a guidance to design a successful restorative surgery of the face, particularly, the nose. Since each racial group and

ethnic population has their own nasal character and anatomical structure, the mean nasal values should be deeply comprehended for each decent and racial group. Since the sample size of our study was 100 (50 in each group), it is quite possible that not all of the human face variations were realized in the Sistani or Baluch men, so the database needs to be expanded in future researches in this field.

## CONCLUSIONS

Since each racial group and ethnic population has their own lip morphology and anatomical structure, the mean lip values should be comprehensively understood for each decent and racial group. The results of the present study represented a primary database for quantitative description of human lip morphology in men subjects of the south-east region of Iran. These data are applicable in surgical or orthodontic treatments. Moreover, the same protocol for data collection and analysis could be applied to normal females, children and adolescents, as well as to elderly, in order to analyze age-related variations of the lip morphometry.

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