

# Determination of the facial Soft Tissue indices in Iranian population Using Photography and Anthropometry

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## Abstract:

**Background and aim:** This study is aimed at specifying the indices of soft tissues of the face in male subjects 18-25 years old with proportional faces in Yazd, and comparing it to the northern European race using photography and anthropometry.

**Materials and methods:** 80 male individuals in age range of 18-25 were selected from among university students of yazd who had normal occlusion and proportional faces with no background of Truma, mandible-face surgery, rhinoplasty or orthodontic treatment. Standard photography of "natural head position" (NHP) and half face position was shot on subjects. Then the facial anthropometric indices were measured directly using a caliper with long jaws. All the photographs were printed out in color, and facial angles were drawn and measured. Acquired data was analyzed using the statistical software of SPSS II.

**Results:** This study shows that that face form in Iranian race is different from that of northern Europeans. The Ala-Ala, Zy'-Zy', Go'-Go' indices, nasofrontal angle, upper and lower lips' vermilion, facial index, and mandible-face widths were significantly different from the study on northern European race carried out by Farkas

**Conclusion:** Considering less cheek (malar) width and more facial index in our study compared to that of Farkas, Iranian samples were more inclined to the dolichofacial form of the face.

**Key words:** Anthropometry, Soft tissue index

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## INTRODUCTION

Over the years, the concern of beauty has become more and more important to the patients, and nowadays has turned into one of the most important therapeutic goals in orthodontics<sup>(1)</sup>. One of the major objectives of orthodontists is beauty, but most dentists forget that different people have their own criteria that might be different from standards<sup>(2)</sup>.

In order to study beauty, it is necessary to specify the facial proportions. If the proportions are disturbed, then it can be said that beauty is being flawed. Nevertheless, we should keep in mind that a proportional face might not be necessarily beautiful<sup>(3)</sup>.

Anthropometry is derived from the Greek words “anthropos” meaning human and “metron” which is “to measure”; and it is the biologic science of measuring size, weight, and proportions of the body<sup>(4)</sup>. Anthropometry itself divides into three sub-categories: Sonatometry, Osteometry, and Cephalometry<sup>(5)</sup>.

Anthropometry has always been a subject of interest to artists and beauty surgeons, and has multiple uses in different branches of science and service including beauty surgery, orthodontics, legal medicine, orthopedics, pediatrics, diagnosis, and even shoe, clothing and glasses industries<sup>(6)</sup>.

The changes caused to the soft tissues profile of the face as a result of orthodontic therapies, is among important concerns in modern dentistry, but the invented methods to analyze the results of orthodontic treatment on soft tissues of the face, are not very common, maybe because orthodontic therapies are directly and mainly concentrated on hard tissues, and soft tissues are not affected directly. But, since soft tissues of the face reflect the dentoskeletal condition of the patient, and the result of treatment affects these tissues as well, thus more attention should be paid to analysis of soft tissues. Moreover, aesthetic considerations are of special importance in orthodontics, because many patients consider their appearance and facial beauty more important than dental health and occlusion<sup>(2)</sup>.

80 male individuals in age range of 18-25 were selected from among university students of yazd who were approved in terms of having normal occlusion and proportional faces by orthodontic specialist. Then standard photography of “natural head position” (NHP) and half face position with relaxed lips was shot from subjects using Sony 717 digital camera with 400\*600 resolution. To do this, the candidates were asked to stand in front of a 18\*18 inches mirror at 2 meters distance and look at their own eyes in the mirror. Next, the N', Sn, gn', Zy', and go' points on samples' faces were marked using a delicate marker, and then following facial anthropometric indices were measured on faces of all subjects using special caliper with long jaws and a 0.1 mm accuracy:

Face height, Middle face height, Lower face height, Zygomatic widths, Gonial, Upper and lower lip Intercanthal distance, Nasal base plate, Mouth widths, Widths vermilion.

Then, a 9\*13 cm color print was provided from all photographs, and following points were marked on printed photographs using a delicate maker: N' (Soft tissue Nasion), Sn (Subonasla), LS (Labrale superius), Li (Labrale inferius), ILS (Inferior labial sulcus),(fig 1,2)

## MATERIAL AND METHODS



Fig 1. Frontal soft tissue landmarks

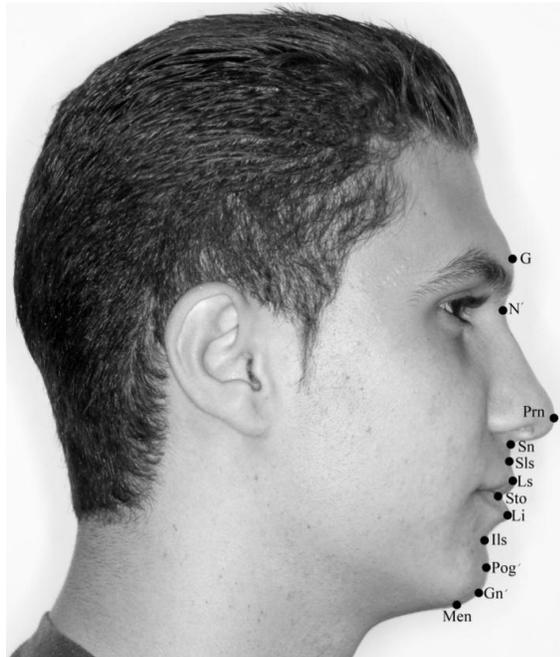


Fig 2. Profile soft tissue landmarks

In next step, the angles of Nasofrontal (NFA), Nasolabial (NLA), Mentolabial (MLA), and Interlabial (ILA) were drawn and measured. Then using facial anthropometric measures acquired by direct method, following facial indices were calculated: Lower face-

face height index, Mandible-face widths index, and Facial index. And at last, mean and standard deviation for above parameters were calculated and compared with Farkas's study on northern European race.

### Data collection and analysis

First, the data were coded and uploaded into the computer, and then analyzed by SPSS II, the statistical software. Mean and standard deviation were calculated for all the variables and then, the data were compared with samples from Farkas's study using Z-test and T-test.

### Result

This study which was carried out to examine and specify the indices of soft tissues of the face in male subjects 18-25 years old with proportional faces in city of Yazd using photography and facial anthropometry, following results were acquired (Tables 1):

Table 1: Comparing mean facial anthropometric indices in Yazd study with Farkas's study

Studied Variable	Yazd mean	Farkas Mean	PV
(N'-Gn')	121.78	121	0.26
Ala-Ala	38.34	35	0
Ch-Ch	52.69	53	0.539
Zy-Zy	130.7	137	0
Sn--Gn'	71.03	72	0.26
N'-Sn	55	-	-
Int-Can	32.4	33	0.449
Go-Go	117.64	97	0
NLA	98.63	99	0.78
NFA	139.8	131	0
MLA	129.16	-	-
ILA	131.53	-	-
Up-Lip	7.26	8.9	0
Low-Lip	9.03	10.4	0
FI	93.61	88.5	0
MFI	90.02	70.8	0
LFI	58.76	2.59	0.449

### DISCUSSION

Anthropologists can re-create the face from a dry skull using society's norms which determine the thickness of the skin in different areas of the face, but the result may just be an overall approximation, because the averages of the society can never conform to delicate topographic

characteristics of an individual in all or even most aspects.<sup>(6)</sup>

In most human societies, either dolichocephalic or brachycephalic forms of head tend to dominate. Few groups are really genetically homogenous, though it is assumed otherwise. Genetic mixtures and blendings of communities have always been there whether in Europe or Asia, new world or elsewhere. Therefore, there is usually a distribution spectrum from one head form or face type to another in every society. Although one side of the spectrum is more prevalent. An intermediate head form is also probable to happen and its facial characteristics tend to be of intermediate nature as well. In northern and eastern margins of Europe, and also in most parts of England, Scotland, Scandinavian countries, northern Africa, and in some countries of near east and middle east like Iran, Afghanistan, India, Iraq, India, and Arabia, dolichocephalic form of head is dominant. In central Europe and far east, the Brachycephalic type is dominant but in many regions of the world, enormous population migrations, wars, and the ease of tourism has led to cluttering of previous distribution of headform types as described before. Since the frame of skull and headform is a pattern which forms the general shape of the face, diversity in face form can be expected <sup>(7)</sup>. In every group of head form, there is typically a range of more or less to demonstrate the characteristics <sup>(6)</sup>. Results from our study also are more or less compatible with what was explained above.

The mean of facial index and mandible-face widths index in our research had a significant difference with Farkas's study. This index was more than that of Farkas. The facial index mean in this study was 93.61 percent, and since the face height mean in both studies was alike, it can be said that our study's samples had a slimmer face compared to Farkas's study, and the Zy'-Zy' distance (face width) in our study was significantly different from Farkas's. Regarding the fact that face width in study of Farkas was more than our study, there can be the possibility that the Iranian samples' being dolichocephalic in this study supports the theory that in Iranian race, the face is sensibly longer.

The Mandible-face widths index mean in this study had a significant difference with that of Farkas which can be attributed to the considerable difference in the Go'-Go' distance (lower mandible width) in this study, in such a way that Iranian samples had a larger lower mandible

width, and the mean of this index was significantly more than Farkas's study. The lower face - facial height index mean showed no significant difference.

Although, by checking the above indices, it can be assumed that Iranian samples are more dolichocephalic but some of our studied indices did not correspond with our theory. For example, the Ala-Ala distance or nasal width in our study was significantly more than Farkas's. These findings show that although Iranian samples tended more to dolichocephalic mode, but had bigger noses compared to northern European samples which can be related to racial difference.

The difference between the acquired results in this study and those of Farkas can thus be justified: even in a specific race, the acquired results based on factors like sample selection method, measurement accuracy and so on, can be different. All the samples we examined in this study had characteristics like class I occlusion, proportional face, no deepbite and overbite, minimum crowding, no background of Truma, and mandible-face surgery. But in previous studies, the criterion for sample selection was having proportional face and no previous surgery. In other words in previous studies, individuals with occlusion in horizontal and vertical plans have been selected, which can cause difference in results.

Discrepancy in measurement method can also lead to such differences. Factors like difference in thickness of the soft tissue which can be due to genetic diversities, nutritional diets, and habits, might change the findings resulting from the study of soft tissues. For example, in a person who has a fatter face, the thickness of the soft tissue in Zy' point is more than a thinner person.

Studied persons were in 18-25 range of age. According to studies by Formby who examined a number of men and women with class I occlusion, soft tissue changes in 18-42 age range were studied and it revealed that dimensions of different parts of the face such as nose, pogonion, and lower lip thickness increase in this age range, and the thickness of upper lip decreases.

The difference among people's conceptions toward beauty and a so-called proportional face can also cause difference in specifying standards of beauty. The famous saying "beauty is in the eyes of the beholder" may confirm this. In other words, there might be probable differences –though very small- between samples with

proportional face chosen by us, and those with the same quality in study of Farkas, which depends on selector's criteria in specification of the proportional face.

The nasofrontal angle mean in our study was 139.8 degrees, and 131 in that of Farkas which has a significant difference with our study<sup>(4)</sup>. Measuring angles in study by Farkas was done by special conveyor which took angles directly from the faces; while in our study, measuring angles was carried out by drawing points and lines on color prints with certain dimensions. This might explain the significant difference of this angle in these two studies in addition to the racial effect.

## CONCLUSIONS

Generally, the difference between this study and similar studies can be due to factors like measurement accuracy, sample selection methods based on examiner's viewpoint, individuals' differences in terms of head form and race, difference in soft tissue thickness, measurement methods, and soft tissue examination.

Considering the facial index mean and cheek width in our study compared to that of Farkas, Iranian samples can be said to be more inclined to dolichocephalic form of head.

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