Research Article

Orthodontic Assessment of Lip Prominence in Pakistani population

Dr. Faisal Rasheed[1], Dr. Asia Khalid[2], Dr. Zubair Hassan Awaisi[3], Dr. Abid Hussain Kanju[4],
Dr. Farhan Ali[5], Dr. Saad Amin Malik[6]

[1,2,5,6] BDS, PGR, Nishtar Institute Of Dentistry,
[3] FCPS, Associate Professor, HOD, Nishtar Institute Of Dentistry, Multan
[4] FCPS, Assistant Professor, Nishtar Institute Of Dentistry, Multan

Corresponding author: Dr. Faisal Rasheed; Email: m.f.bds07@gmail.com

ABSTRACT

Introduction: Many reference planes are being used to determine prominence of upper and lower lip for orthognathic face profile. E-line and S-line are being used to determine lip position in local popuation of Multan city of Pakistan.

Materials and Method: Execution of present study was done in Nishtar Institute of Dentistry, Multan during the period of November 2019-March 2020. 300 (112 Males and 188 Females) subjects were selected for this study from all provinces of Pakistan. Their radiographic records (Lateral cephalograms) were taken from radiographic department of related institution. Acetate matte sheets were used to construct reference planes by using 3H pencil. Steiner's E-line and Rickett's S-line were used to find Upper and Lower lip position from these reference lines. SPSS was used to analyze data after applying independent t-test.

Result: Mean Upper and lower lip position from E- line was -1.74mm & -0.33mm and from S-line was 0.82mm and 1.47mm

Conclusion: Cephalometric lip morphology assessment in Multan, Pakistani adults by using Steiner's and Ricketts reference planes on lateral cephalogram is slightly different as compare to other populations

KEYWORDS: Assessment, Cephalometric lip morphology, Malocclusion, Ricketts E-plane, Steiner's S-plane.

INTRODUCTION

Relative ratio of different parts of face is of great interest for aesthetic conscious people, orthodontist, and plastic surgeons. Increased inter labial gap is a source of complain about their profile and consultation with orthodontist for treatment. Soft tissue mask of face depicts underlying bony framework of face and its related musculature. Skeletal Class II malocclusion makes upper jaw more prominent and increases inter labial gap. This skeletal pattern (Class II) causes shortening in the size of mandible and it becomes V-shaped[1]. Lip position plays important role in success of treatment. Pretreatment and post treatment lip position is an integral part of orthodontic philosophy which should be communicated in patient-doctor discussion[2]. Extraction of upper first bicuspids causes straight profile and dished in face which leads to retrusion of face and gives older appearance[3,4]. Orthognathic surgery for orthodontic patients need extensive radiographic investigations and analysis because it has detrimental effect on final lip position[5]. In a local study, it was found that local population has lip position within normal range such as the upper lip was protrusive (+1.3±0.885 mm) and lower lip is retrusive (-0.71±1.105 mm) in relation to E line[6]. It is important to develop cephalometric reference line for assessment of lip positon in different populations with standard methods. It is purpose of determining lip position in orthodontics to get successful esthetic outcomes[7].

MATERIALS AND METHOD

300 patients from all provinces of Pakistan were selected for the present study and their lateral cephalograms were taken from orthodontic radiographic department of

respective institution. Present study was accomplished in Nishtar Institute of Dentistry after taking approval by institutional ethical review committee. Span of this study was 6 months (Nov 2019-Apr 2020). Patients were selected based on following criteria:

1. No past orthodontic treatment
2. No past cosmetic procedure
3. No skeletal deformity
4. Age groups (12-18) & (19-24)
5. Gender: male and females

Reference lines proposed by Steiner and Ricketts were used to draw and interpret the results. E-plane was constructed from tip of nose to anterior most point of chin (pogonion). Upper lip that should be (3-4 mm) and lower lip should be (1-2 mm) positioned from E-line. S-line should be drawn from base of nose to pogonion (pog) point of chin. Normal value for upper lip should be 1-2mm and lower lip 1-2mm from S-line[8,9]. (fig.1). 3H pencil was used to produce reference lines on matte sheets. Illuminator was used to draw planes and was cross checked by an examinor. SPSS was used interpret the data by applying independent t-test. Data was stratified into overall population, skeletal class I, II & III, gender and age group distribution. Data was presented in tabulated form.

Figure 1 S & E lines

RESULT
Mean lip position of upper and lower lip from reference planes was calculated as following: Table 1.
1. UL was positioned by-1.74mm±3.65mm from E-line
2. LL was positioned by -0.33mm±3.98mm from E-line.
3. UL was positioned by 0.82mm±2.81mm from S-line.
4. LL was positioned by 1.47mm±3.64mm from S-line.

Gender distribution of UL & LL (Upper Lip & Lower lip) position of given sample was -2.043mm, -0.609mm, 0.598mm, 1.154mm in females and -1.241mm, 0.122mm, 1.201mm, 2.009mm in males. Table 2.

Lip position in Skeletal Class I cases was -2.762mm, 0.237mm, 0.1mm ,2.025mm, in **Skeletal Class II** was -2.332mm, 0.0534mm, 1.9378mm, 1.8808mm and in **Skeletal Class III** was -9.5185mm, -4.8148mm, -5mm, -3.0741mm. Lip position. Table 4

In **age group** (12y-18y) was -1.895mm, -0.311mm, 0.685mm, 1.486mm. In **age group** (19y-24y) was -1.605mm, -0.358mm, 0.949mm, 1.462mm. Table 3.

Tables are given at the end after conclusion.

DISCUSSION
Improving patient's life by providing better dental, jaw function and dent facial esthetic have been the goal of orthodontic treatment. Presence of any dental problem or irregularity and dent facial defect is source of physical and mental health problem for the patient and appear as trigger for the orthodontic treatment. Facial attractiveness is associated with following elements: Ethnic group, age, sex, region, and professional background. Cultural and related variations play an important part in consultation for orthodontic treatment. Therefore, patient's personal, racial and ethnic preferences should be kept in mind while treating patients by orthodontic treatment.[10,11] It is important to develop reference values for every population to assess lip position by standardized method and to treat orthodontic patients accordingly to provide better esthetic results[12]. In present study of 300 subjects, Mean lip position of Upper lip and Lower lip from S and E recomended planes were calculated as for Upper lip to E line as -1.74mm, -0.33mm for lower lip to E line, 0.82mm for Upper lip to S line and 1.47mm for lower lip to S line. Present study depicted that lip position is not different from normal values. In another local study also showed results within normal range, Antero-posterior prominence of upper and lower lip from E-line was calculated as -1.9mm±3.33 mm -0.4mm±3.24 mm respectively and Antero-posterior prominence of upper and lower lip from S-line was calculated as 3.72mm±2.85 mm and 1.18mm±3.23 mm respectively[13]. In another study, it was determined that the lower lip was positioned from E- line by 2.0 mm in Japanese and −2.0 mm in Caucasians. However morphologically, chin was more anteriorly positioned in Saudi population as compared to Japanese population, and a much high Z-angle in the Saudi population compared to the Japanese population. Results proposed that soft tissue profile of chin in the Japanese females was thick and it reimbursed for the rollbacked chin position. Upper

and lower lip position in Saudi females showed results as given by Ricketts in population of North America[14]. Lip postion of Turkish people also showed retrusive pattern. It is also determined in this study that genetic doiminance controls more soft tissue component than bony achetecture[15]. In another study, it was shown that soft tissue positon has genetic role that affects dent alveolar position and morphology[16]. To treat Class, I malocclusion cases, mechanics should be determined by keeping racial factors in mind that can lead to bite opening. Japanese and Saudi orthodontic patients need more vertical control to prevent opening of facial axis. In short, each region of our country should assess cephalometric lip morphology for appropriate management of malocclusion

CONCLUSION
Cephalometric lip morphology assessment in Multan, Pakistani adults by using Steiner's S-plane and Ricketts E-plane on lateral cephalogram is slightly different as compare to other populations and lies in normal range of reference values.

Table 1. Mean lip position

Measurements of line	Mean	SD
UL to E-plane	-1.74	3.65
LL to E-plane	-0.33	3.98
UL to S-plane	0.82	2.81
LL to S-plane	1.47	3.64

Table 2. gender distribution

Measurements of line	Males		Females		P value
	Mean	SD	Mean	SD	
UL to E-plane	-1.241	3.666	-2.043	3.613	0.065
LL to E-plane	0.122	4.065	-0.609	3.922	0.12
UL to S-plane	1.201	2.802	0.598	2.797	0.07
LL to S-plane	2.009	3.647	1.154	3.611	0.049

Table 3. Age distribution

Measurements of line	Age 12-18		Age 19-24		P value
	Mean	SD	Mean	SD	
UL to E-plane	-1.895	3.699	-1.605	3.606	0.49
LL to E-plane	-0.311	3.674	-0.358	4.260	0.91
UL to S-plane	0.685	2.745	0.949	0.869	0.42
LL to S-plane	1.486	3.392	1.462	3.867	0.954

Table 4. Skeletal class distribution

Measurements of line	Class I		Class II		Class III		P value
	Mean	SD	Mean	SD	Mean	SD	
UL to E-plane	-2.7625	2.3613	-0.2332	2.6761	-9.5185	0.5092	0.000
LL to E-plane	0.2375	3.346	0.0534	3.6743	-4.8148	5.0918	0.000
UL to S-plane	0.1	2.0782	1.9378	2.0682	-5	0	0.000
LL to S-plane	2.025	2.9531	1.8808	3.2714	-3.0741	4.8372	0.000

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