

COMPARISON OF LIP THICKNESS AMONG DIFFERENT SKELETAL MALOCCLUSION CLASSES

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ABSTRACT

Facial appearance is fundamental for communication and interaction with the environment. In contemporary society, there is a widespread growing interest for facial esthetics. The creation of a harmonic occlusion, within a well-functioning stomatognathic apparatus, must always consider the effect of tooth position on facial soft tissues.

The objective was to evaluate the upper lip thickness in different skeletal classes of malocclusions in patients reporting to Orthodontics, Khyber college of dentistry, Peshawar.

A total of 90 patients 30 from each skeletal class of malocclusion were selected for this study. Lip thickness was measured using lateral Cephalograms. The measurements were: a) the distance between point A and subnasale b) the distance between prosthion and labrale superius c) the shortest distance between the upper incisor and the attachment points of the upper and lower lip d) the distance between infradentale and the vermilion border of the lower lip e) the distance between point B and the deepest point of the labiomental crease f) gnathion and soft tissue menton. The collected data were analysed by SPSS version 17.0. Mean, frequency and standard deviation were calculated for numerical variables. One-way ANOVA test used to made comparison between the skeletal classes.

The largest range was found among skeletal class I, II & III malocclusion patients were the point A to Subnasale distance and gnathion to soft tissue menton distance. The only two variables showing statistically significant difference were i) Distance between point B and deepest point of labiomental crease ii) Shortest distance between upper incisor and attachment of both lips.

Key Words: facial esthetics, lip thickness, occlusion, skeletal malocclusion.

INTRODUCTION

Facial appearance is fundamental for communication and interaction with the environment.¹ In contemporary society, there is a widespread growing interest for facial esthetics.² Esthetic criteria appear to have been defined in almost all cultures,³ even if scientific research on the quantitative, measurable bases of facial attractiveness is still in progress.⁴ Facial esthetics is one of the principal concerns of orthodontists and maxillo-facial surgeons.⁵ The creation of a harmonic occlusion, within a well-functioning stomatognathic apparatus, must always consider the effect of tooth position on facial soft tissues. The clinician therefore should be provided with esthetic guidelines referred to subjects of the same age, sex, and ethnic group of their patients. The guidelines should also be updated, considering the evolution of the esthetic canons within a given society. These guidelines may offer useful indications for the best treatment.⁶

Evaluation of the soft tissues in orthodontics or corrective jaw surgery plays an essential role in both diagnosis and treatment planning. Both hard and soft tissue norms must be considered in establishing harmonious facial aesthetics and optimal functional occlusion.⁷ Cephalometric norms for different racial groups have been established previously in many studies. Most investigators have concluded that there are significant differences among these groups, and many cephalometric standards have been developed for the different groups.^{8,9} Therefore, it is important to develop individual standards for each population. Different racial groups must be treated according to their own characteristics.¹⁰

Previous studies^{11,12} have evaluated facial soft tissue thickness in Japanese children representing several different skeletal classes. Utsuno et al¹¹ reported that measurements greatly varied among these various classes. Several studies have made similar measurements in the Turkish population.^{13,14} Bascitci et al¹⁵ conducted a study to determine Holdaway soft tissue norms in Anatolian Turkish adults and found significant differences between genders for soft tissue chin thickness and upper lip thickness.

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The objective was to evaluate the upper lip thickness in different skeletal classes of malocclusions in patients reporting to Orthodontics, Khyber College of Dentistry, Peshawar.

METHODOLOGY

A total of 90 Cephalograms of patients from the department Orthodontics KCD, Peshawar were selected

for this cross-sectional study. Parental informed consent was obtained for using their cephalograms. Thirty Cephalograms from each skeletal class were included. The inclusion criteria were:

- Pakistani nationals having skeletal malocclusion
- No previous history of orthodontic or prosthodontic treatment

TABLE 1: UPPER AND LOWER LIP THICKNESS (IN MILLIMETERS) IN SKELETAL CLASS I MALOCCLUSION

	Age	Point A to Sn	Prosthion to Ls	Distance b/w and UISto	Distance infra-dentale & vermillion border of lower lip	Point B to Labm	Pog-Pog	Gn-Mn
N	30	30	30	30	30	30	30	30
Mean	18.0667	14.6667	12.8667	3.6000	14.5000	10.8333	10.4000	7.5333
Std. Error of Mean	.81921	.27682	.30223	.22793	.23853	.18621	.23781	.26144
Std. Deviation	4.48702	1.51620	1.65536	1.24845	1.30648	1.01992	1.30252	1.43198
Minimum	11.50	10.00	9.70	3.0	10.00	9.37	5.22	4.765
Maximum	24.00	17.00	16.00	6.00	16.00	13.00	12.00	10.00

TABLE 2: UPPER AND LOWER LIP THICKNESS (IN MILLIMETERS) IN SKELETAL CLASS II MALOCCLUSION

	Age	Point A to Sn	Prosthion to Ls	Distance b/w and UISto	Distance infra-dentale & vermillion border of lower lip	Point B to Labm	Pog-Pog	Gn-Mn
N	30	30	30	30	30	30	30	30
Mean	16.7333	14.1667	14.1667	5.4667	14.5000	12.8000	10.9000	8.3000
Std. Error of Mean	.70781	.34602	.43174	.45418	.27854	.51058	.41895	.47014
Std. Deviation	3.87684	1.89525	2.36473	2.48767	1.52564	2.79655	2.29467	2.57508
Minimum	11.00	11.00	10.00	3.00	11.00	9.00	6.00	5.00
Maximum	26.00	17.00	18.00	10.00	16.00	17.00	14.00	14.00

TABLE 3: UPPER AND LOWER LIP THICKNESS (IN MILLIMETERS) IN SKELETAL CLASS III MALOCCLUSION

	Age	Point A to Sn	Prosthion to Ls	Distance b/w and UISto	Distance infra-dentale & vermillion border of lower lip	Point B to Labm	Pog-Pog	Gn-Mn
N	30	30	30	30	30	30	30	30
Mean	20.1333	15.1667	13.8000	6.2000	14.0000	12.2000	10.2000	7.1000
Std. Error of Mean	1.04357	.43703	.29711	.42182	.39827	.27292	.55585	.37555
Std. Deviation	5.71588	2.39372	1.62735	2.31040	2.18143	1.49482	3.04450	2.05695
Minimum	14.00	11.00	11.00	3.00	11.00	9.00	4.00	4.00
Maximum	35.00	18.00	17.00	10.00	18.00	14.00	14.00	10.00

TABLE 4: COMPARISON OF LIP THICKNESS (MM) AMONG DIFFERENT SKELETAL CLASSES OF MALOCCLUSION

		Sum of squares	DF	Mean square	F	Sig.
Point A to Subnasale	Between Groups	15.000	2	7.500	1.936	.150
	Within Groups	337.000	87	3.874		
	Total	352.000	89			
Prosthion to labrale superioris	Between Groups	26.956	2	13.478	3.682	.029
	Within Groups	318.433	87	3.660		
	Total	345.389	89			
Shortest distance between upper incisor and attachment of both lips	Between Groups	107.822	2	53.911	12.360	.000
	Within Groups	379.467	87	4.362		
	Total	487.289	89			
Distance between infradentale and vermillion border of lower lip	Between Groups	5.000	2	2.500	.853	.430
	Within Groups	255.000	87	2.931		
	Total	260.000	89			
Distance between point B and deepest point of labiomentale crease	Between Groups	60.956	2	30.478	8.241	.001
	Within Groups	321.767	87	3.698		
	Total	382.722	89			
Distance from hard tissue pogonion to soft tissue pogonion	Between Groups	7.800	2	3.900	.721	.489
	Within Groups	470.700	87	5.410		
	Total	478.500	89			
Gnathion and soft tissue menton	Between Groups	22.156	2	11.078	2.574	.082
	Within Groups	374.467	87	4.304		
	Total	396.622	89			

- Having competent lips
- Cephalograms of high clarity.

After obtaining parental informed consent, lateral cephalometric films were acquired. All the lateral cephalometric radiograph of each individual were taken with a universal counter balancing type of cephalostat at Radiology department of Khyber College of Dentistry, Peshawar in natural head position. Soft tissue and skeletal features were traced on acetate sheets using manual methods. Skeletal type was determined based upon the ANB angle and Wits, which indicates the positional relationship of the maxilla and mandible. The 3 skeletal types were classified as: Class I= ANB angle 1-5 degrees (30 subjects); Class II, =ANB angle greater than 5 degrees (30 subjects); and Class III= ANB angle less than 1 degrees (30 subjects).¹⁶

After measuring ANB to identify the skeletal class, the following anthropological landmarks were plotted: 1. nasion (N); 2. Subnasale (Sn); 3. Labrale superius(Ls); 4. Stomion (Sto); 5. Labrale inferius (Li); 6. Labiomentale (Labm); 7. Pogonion (Pog); and, 8. Gnathion (Gn) 9. Point A 10. point B. The distance between bony and soft tissue was measured for each

of the following anthropological landmarks: a) the distance between point A and subnasale b) the distance between prosthion (lowest point of the alveolar bone between the left and right upper, central incisors) and labrale superioris (vermillion border of the upper lip c) the shortest distance between the upper incisor and the attachment points of the upper and lower lip d) the distance between infradentale (the most anterior point of the alveolar bone between the left and right lower, central incisors) and the vermillion border of the lower lip e) the distance between point B and the deepest point of the labiomentale crease f) gnathion and soft tissue menton.

The collected data were analysed by SPSS version 17.0. Mean, frequency and standard deviation were calculated for numerical variables. One-way ANOVA test was used to make comparison between the skeletal classes.

RESULTS

Thirty four (37.8%) males and 56(62.2%) females were included in the study. The female to male ratio were 1:0.60. The age range was 11 to 35 years (Table 1, 2 & 3). The largest range was found among skeletal

class I, II & III malocclusion patients were the point A to Subnasale distance and gnathion to soft tissue menton distance.(Table 1, 2 & 3)

The only two variables that showed statistically significant difference were i) Distance between point B and deepest point of labiomental crease ii) Shortest distance between upper incisor and attachment of both lips.

DISCUSSION

The patient should be positioned in a relaxed lip position while evaluating the soft tissue profile since this position demonstrates the relationship of soft tissues to hard tissues without muscular compensation for dento-skeletal abnormalities.¹ In a recently published study,² the relaxed lip position was also used for standardization of the method, when taking the cephalograms for accurate assessment of the soft tissues. In agreement with those studies,^{1,2} the relaxed lip position was used in the present study when taking the cephalograms in order to ensure accurate assessment of soft tissue thickness.

Few studies^{11,12} have investigated the soft tissue thickness of patients with different skeletal malocclusions. The published data was for women only-Japanese girls (aged 6-16 years) and women (aged 17-33 years) who had different skeletal malocclusions. Kamac et al¹³ compared the soft tissue thickness in both male and female orthodontic patients with different skeletal malocclusions. The thickness at labrale superius and stomion points among each skeletal type was significantly the greatest in Class III for both males and females. On the other hand, at point labrale inferius, the soft tissue depth was the least in Class III and the greatest in Class II for both males and females. In the current study there were no significant differences among the different skeletal malocclusion classes except the distance between point B and deepest point of labiomental crease and shortest distance between upper incisor and attachment of both lips.

Pithon et al¹³ evaluated the variation in facial soft tissue thickness in young north eastern Brazilian individuals according to gender and skeletal class. Measurements were obtained from digitized telero-diographs of 300 children, aged from 8 to 12 years, using the Sidexis Xg program. Data of mean, standard deviation, maximum and minimum soft tissue thickness values of the faces of Angle's Class I, II and III individuals, were evaluated. The results demonstrated that there was no difference in soft tissue thickness among the skeletal classes for most of anthropological points. For the Class I, statistical differences were found ($P < 0.05$) between the genders in the rhinion point, subnasal and upper lip. It was concluded that there was no difference in soft tissue thickness among the skeletal classes, except for the points: Stomion, Bottom lip and Pogonion, allowing definition of parameters of this population for the purpose of facial reconstruction. The current study differs from Pithon et al in the sense that no comparison were made on basis of genders and

Angle's classification. Pithon's results are in agreement as far as stomion point is concerned. (Table 4)

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