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FACIAL SOFT TISSUE THICKNESS FROM LATERAL CEPHALOGRAM IN YOUNG ADULTS AND CORRELATION WITH GENDER AND SKELETAL CLASSES

Dental Science

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ABSTRACT

Aim: To analyse facial soft tissue thickness from lateral cephalogram in young adults and to correlate possible variation with gender and skeletal classes

Material And Method: This study was conducted in the Department of Oral Medicine and Radiology among 54 pretreatment lateral cephalograms of adult male and female subjects between 18 to 25 years with different sagittal skeletal malocclusion. Using a millimeter ruler the facial soft tissues thickness were measured to the nearest 0.5 mm at 11 points: Glabella, Nasion, Rhinion, Subnasale, Labrale superius, Stomion, Labrale inferius, Labiomentale, Pogonion, Gnathion and Menton. After adding magnification factor to the obtained linear measurements final values were recorded and were entered into an Excel spreadsheet.

Results: Mean facial soft tissue thickness was found to be greater for males as compared to female subjects at all the points. However, statistically significant difference was observed at points Rhinion, Subnasale, Labrale superius, Labrale inferius and Labiomentale in skeletal Class I. In skeletal class II difference were found at Nasion, Subnasale, Labrale superius, Labrale inferius.

Conclusion: Facial soft tissue thickness varies considerably among different population groups, sex and sagittal relationship of jaws.

KEYWORDS

Face, Soft Tissue, Cephalogram

INTRODUCTION:

A harmonious and balanced face (having normal soft tissue proportion and adaptation) with optimal functional occlusion are the primary and secondary goals of contemporary orthodontic and orthognathic treatment respectively. Considering this new "Soft Tissue Paradigm", an increased emphasis is given on soft tissue evaluation during diagnosis and treatment planning of patients requiring orthodontic treatment and/or orthognathic surgeries[1]. A difference in facial soft tissue thickness among different sagittal skeletal malocclusion has been observed in previous studies[2-6]. Hence, availability of a population specific measurement data for facial soft tissue thickness can be very useful.

Hence, the present study was undertaken to obtain facial soft tissue thickness of adult male and female subjects seeking orthodontic treatment at a tertiary level hospital, study sexual dimorphism and evaluate variation in facial soft tissue thickness among different sagittal skeletal malocclusion using lateral cephalogram.

MATERIAL AND METHOD:

This study was conducted in the Department of Oral Medicine and Radiology among 54 pretreatment lateral cephalograms of adult male and female subjects between 18 to 25 years with different sagittal skeletal malocclusion [Skeletal Class I: 18 (Male-9; Female-9), Skeletal Class II: 18 (Male-9; Female-9), Skeletal Class III: 18 (Male-9; Female-9). Good quality cephalograms of healthy subjects with normal growth pattern (SN-MP=32±5 degree), having lips in relaxed position with Frankfort plane parallel to horizontal, teeth in centric occlusion and ANB angle were included in the study. Cephalograms of patients having any known genetic/craniofacial abnormalities, growth related disorders, with history of facial trauma and or who had undergone orthodontic treatment/craniofacial surgery and cephalograms of patients with positional errors as reflected by ear rod markers were excluded from the study.

Calibration of the actual size of each image in millimeters was done based on measurement of the known distance (10 mm) between the two fixed points of the ruler on the cephalogram. Using a millimeter ruler the facial soft tissues thickness were measured to the nearest 0.5 mm at 11 points: Glabella, Nasion, Rhinion, Subnasale, Labrale superius, Stomion, Labrale inferius, Labiomentale, Pogonion, Gnathion and Menton. After adding magnification factor to the obtained linear measurements final values were recorded and were entered into an Excel spreadsheet. To avoid intraobserver bias all the assessments (tracing as well as measurement) were done by a same investigator. To evaluate the errors due to landmark identification, tracing and measurement 15 cephalograms were randomly selected. After three weeks gap, all the landmarks were replotted. Manual tracing and measurements were repeated on these cephalograms.

Statistical Analysis:

The data was collected, tabulated and analysed using SPSS software version 24.

RESULTS:

The mean age of subjects was (21.92±1.92) years. For Class I it was (21.29±1.83) years, for Class II (21.18±1.82) years and for Class III (20.44± 2.51) years. Similarly, mean age for male subjects was (21.08± 2.09) years and for female subjects was (21.27±1.82) years.

Mean facial soft tissue thickness was found to be greater for males as compared to female subjects at all the points. However, statistically significant difference was observed at points Rhinion, Subnasale, Labrale superius, Labrale inferius and Labiomentale in skeletal Class I. In skeletal class II difference were found at Nasion,Subnasale, Labrale superius, Labrale inferius. While, in skeletal class III difference were observed at Glabella, Nasion, Rhinion, Subnasale, Labrale superius, Stomion and Labrale inferius (Table 1).

Table 1: Comparison Of Facial Soft Tissue Thickness Between Male And Female Subjects In Each Sagittal Skeletal Group At Different Points

Points	Group	Gender	Mean	SD	p value
Glabella (G)	Class I	Male	5.91	0.76	0.11
		Female	5.49	0.81	
	Class II	Male	5.56	0.98	0.68
		Female	5.47	0.79	
	Class III	Male	6.27	0.83	0.04*
		Female	5.67	0.88	
Nasion (N)	Class I	Male	6.11	0.8	0.08

		Female	5.69	0.79	
	Class II	Male	6.53	0.95	0.02*
		Female	5.52	0.86	
	Class III	Male	6.84	0.82	<0.01*
		Female	5.28	0.9	
Rhinion (Rhi)	Class I	Male	3.04	0.65	0.03*
		Female	2.38	0.6	
	Class II	Male	2.58	0.75	0.42
		Female	2.45	0.8	
	Class III	Male	3.51	0.81	0.005*
		Female	2.55	0.66	
Subnasale (Sn)	Class I	Male	17.08	1.71	<0.01*
		Female	14.11	1.5	
	Class II	Male	15.55	1.15	<0.01*
		Female	13.33	1.83	
	Class III	Male	17.99	1.38	<0.01*
		Female	15	1.67	
Labralesuperius (Ls)	Class I	Male	15.65	1.78	<0.01*
		Female	12.67	1.53	
	Class II	Male	13.61	1.56	<0.01*
		Female	11.46	1.47	
	Class III	Male	17.93	1.33	<0.01*
		Female	13.72	1.6	
Labraleinferius (Li)	Class I	Male	15.25	1.75	<0.01*
		Female	13.44	1.49	
	Class II	Male	15.61	1.52	<0.01*
		Female	13.46	1.42	
	Class III	Male	14.93	1.37	<0.01*
		Female	12.72	1.26	

***:** Statistically Significant

DISCUSSION:

Measurement of facial soft tissue thickness has become an integral part of diagnosis and treatment planning in contemporary orthodontics and for patients requiring orthognathic surgeries for various craniofacial deformities. In this study, we measured facial soft tissue thickness of adult male and female subjects with three different sagittal skeletal malocclusion at different points.

When facial soft tissue thickness was compared among three sagittal skeletal classes, we found significant differences at points Rhinion, Subnasale, Labrale superius and Stomion in males and at Subnasale, Labrale superius, Stomion and Labrale inferius in females. Kamak and Celikoglu[7] found a significant difference in facial soft tissue thickness at points Labrale superius, Stomion and Labrale inferius in both Turkish males and female orthodontic patients. However, Utsuno et al[3-4] in a study done in the Japanese population reported with a significant difference only at Labrale inferius in males and at Subnasale, Labrale superius, Stomion, Labiomentale and Pogonion in females.

The difference in the findings of these studies and ours might be due to racial/ethnic variation in soft tissue. On the other hand, when facial soft tissue thickness was compared between male and female subjects in each skeletal group, sexual dimorphism was observed with greater mean thickness for male as compared to female subjects with significant differences at Subnasale, Labrale superius, and Labrale inferius in each skeletal Class.

Apart from race/ethnicity, sagittal skeletal relationship of jaws and sex, various other factors have been found that can possibly affect the facial soft tissue thickness i.e. age, vertical growth pattern and body mass index (BMI)[8,9]. However, we could not consider BMI of the subjects in this study because the lateral cephalogram of the subjects included in the study were taken from database of department. Hence, further studies taking BMI of the subjects into consideration are advised.

CONCLUSION:

Facial soft tissue thickness varies considerably among different population groups, sex and sagittal relationship of jaws. Availability of a population specific data can be of great help during diagnosis and treatment planning of patients requiring orthodontic treatment

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