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Upper lip profile changes

Hussain A Obaidi
BDS, MSc (Prof)

Dept of Pedod, orthod, and Prev Dentistry
College of Dentistry, University of Mosul

Manar Y Abdul–Qadir
BDS, MSc (Assist Lect)

Dept of Pedod, orthod, and Prev Dentistry
College of Dentistry, University of Mosul

ABSTRACT

Aims: To explore the upper lip thicknesses, height and it's relationship to the esthetic line. **Materials and Methods:** The studying sample included 48, 41, 50 and 44 individuals of age 11, 12, 13 and 14 years respectively. The subjects were Iraqi individuals of Class I normal occlusion, who live in center of Mosul City. All subjects were radiographed with lateral cephalometric films, these films were traced, the tracing included the upper lip thickness at skeletal points (A–A´), upper lip thickness at labrale superius (Ls–Ls´), upper lip height at stromion superior to palatal plane and the upper lip relationship to the esthetic line. All these measurements were measured and then subjected to the statistical analysis. **Results:** The results were demonstrated that the upper lip thickness (A–A`) and (Ls–Ls`) were only significant increase at 14 year age groups as compared with 11 years age group in males. In female the upper lip thickness was only significant at 13 years group as compared with 11 years age group, while the upper lip relationship to esthetic line showed only significantly greater value at 14 years age group as compared with 13 years age group. Sex variation appeared a significant greater value in male than female for the (Ls–E line) at 11 years age group, (A–A`) and (Ls–E line) at 12 years age group, (Ls–Ls`) at 13 years age group and upper lip height at 14 years age group and upper lip height at 14 years age group. **Conclusions:** The soft tissue of upper lip profile parameters were increased with increasing age group, and the upper lip significantly larger behind the esthetic line in female than male at 11, 12 and 14 years age groups.

Key words: Endosteal Lip, thickness, height, esthetic.

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INTRODUCTION

The soft tissues might have their inherent architecture, and that the midface soft tissue form and position appear to be less dependent on underlying hard tissue.[1] The thickness of the lips are greater in males than females.[2] Lip thickness is also strongly influence by ethnic characteristics.[3,4] Mean while, the normal lip projection is presented when the lips are inverted relative to their base and affected by lip thickness, dental protrusion or retrusion and maxillo–mandibular protrusion or retrusion.[3] The orthodontic treatment with extraction procedures achieve more important changes in lip profile than in non extraction procedures[5–7], whereas other authors reported that there is very little difference between extraction and non extraction orthodontic treatment on soft tissue profile.[1, 8–9]

The aims of this study were to explore the upper lip profile parameters (upper lip; thicknesses, height and its distance to esthetic line).

MATERIALS AND METHODS

The sample was selected from 20 intermediate schools (11 for girls and 9 for boys) and 16 primary schools (8 for girls and 8 for boys) in the center of Mosul City. The criteria for the sample selected were: Full complement of permanent teeth excluding the third molars, normal occlusion Class I molar and canine relationship[10], normal overjet and overbite (1–4 mm)[11], no detectable crowding and rotation and spacing[12], no apparent facial disharmony, no previous orthodontic treatment or maxillofacial surgery.

The sample subjects met the selection criteria was divided according to age into

four groups; 11 years age group (23 males and 25 females), 12 years age group (19 males and 22 females), 13 years age group (22 males and 28 females) and 14 years age group (22 males and 22 females).

Each subject was radiographed with lateral cephalometric film in the Radiology Center in the Dental School / University of Mosul, with standardized manner for all the individuals. The lateral cephalometric radiographs of the sample subjects were traced. The tracing included: Upper lip thickness at point A (A–A´), upper lip thickness at labrale superius (Ls–Ls`) according to Nanda *et al*.[11], upper lip height as described by Mamandras[13], upper lip relationship to esthetic plane (Ls–E line) as described by Ricketts[14]; Figure (1).

The findings were analyzed by using the descriptive analysis that include: Mean; Standard deviation; Minimum and maximum values; Duncan Multiple Range Analysis of Variance, and Student's T–test analyses at $p \leq 0.05$, to find the difference among the upper lip profile parameters among the age groups and between sexes.

RESULTS

The descriptive statistics of the upper lip profile parameters demonstrated in Table (1), The variance analysis of parameters among the age groups and sex variation explored in Tables (2–5), and Table (6) respectively. The upper lip thickness at (A–A´) and at (Ls–Ls`) showed significant increasing at 14 years age group, as compared with 11 year age group for the males. Where in females, the increased significances appeared at esthetic plane (Ls–E line) for 14 years age group when compared with the 11 years age group.

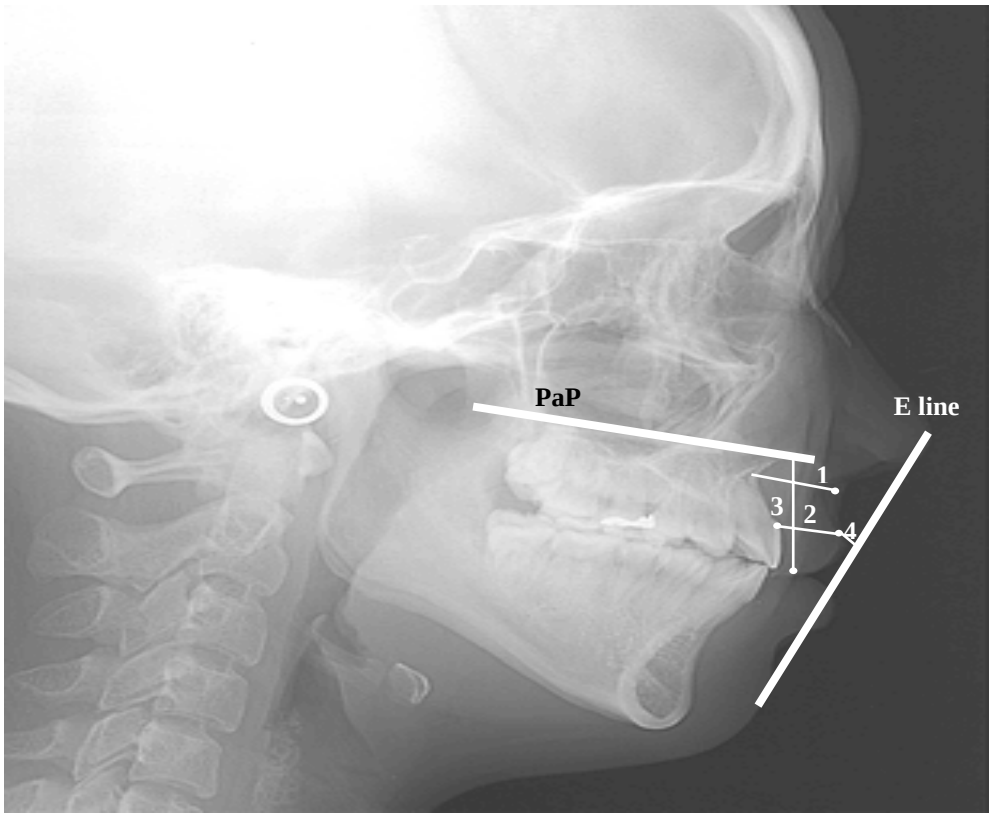

Figure (1): Soft tissue linear measurements.

1: Upper lip thickness at A (A–A`); 2: Upper lip thickness at (Ls–Ls`); 3: Upper Lip Height; 4: Lower superioris point of the upper lip–Esthetic line.

Table (1): Descriptive statistics for the soft tissue variables of males and females, with four age groups.

Age group	Variable	Examination	Number	Minimum	Maximum	Mean	± Sd
11 years	A–A`	Male	23	13	18	15.63	1.04
		Female	25	13	19	15.32	1.32
	Ls–Ls`	Male	23	12	15	13.52	0.96
		Female	25	10	15	13.12	1.39
	Upper Lip Height	Male	23	21.5	27	24.39	1.39
		Female	25	19	27	23.58	2.22
	Ls–E line	Male	23	–5	1	–1.07	1.45
		Female	25	–4.5	1	–2.12	1.40
12 years	A–A`	Male	19	14	19	16.55	1.39
		Female	22	12.5	17	15.39	1.20
	Ls–Ls`	Male	19	11	17.5	14.32	2.00
		Female	22	10	15.5	13.41	1.42
	Upper Lip Height	Male	19	21.5	29	25.39	2.05
		Female	22	20	30	24.45	2.58
	Ls–E line	Male	19	–4	0.5	–1.42	1.30
		Female	22	–6	0.5	–2.93	1.74
13 years	A–A`	Male	22	14	20	16.59	1.69
		Female	28	12	19	15.64	1.68
	Ls–Ls`	Male	22	11.5	18	14.70	1.90
		Female	28	10	18.5	13.41	1.86
	Upper Lip Height	Male	22	21	30	25.50	2.89
		Female	28	22	30	25.68	1.67
	Ls–E line	Male	22	–5.5	1.5	–2.00	1.91
		Female	28	–6	0	–2.88	1.75
14 years	A–A`	Male	22	13	21	17.05	1.98
		Female	22	11	19	16.30	1.97
	Ls–Ls`	Male	22	12	18	15.02	1.78
		Female	22	8	18	14.02	2.22
	Upper Lip Height	Male	22	21	30	26.16	2.56
		Female	22	21	27	24.64	1.60
	Ls–E line	Male	22	–4	0	–1.93	1.17
		Female	22	–7	1	–3.86	1.98

(A–A`): Upper lip thickness; Ls–Ls: Upper lip thickness
`Note: All measurements in mm; Sd: Stander deviation.

Table (2): Duncan's Multiple Range Test of variance, For A–A` variable, with the four age groups.

Sex	Age Groups	Number	Mean	± Sd	Duncan's Test*
Male	11 Years	23	15.630	1.036	a
	12 Years	19	16.553	1.393	ab
	13 Years	22	16.591	1.688	ab
	14 Years	22	17.045	1.982	b
Female	11 Years	25	15.320	1.322	a
	12 Years	22	15.386	1.204	a
	13 Years	28	15.643	1.682	a
	14 Years	22	16.295	1.968	a

For males: F–value = 3.25, *p*–value = 0.026, Significant at $p \leq 0.05$; For females: F–value = 1.81, *p*–value = 0.151, Not Significant at $p > 0.05$; * Means with the same letters were statistically not significant; Sd: Stander deviation.

DISCUSSION

The soft tissue thickness of upper lip at point A, and at Ls in males showed higher values with increasing age group. Significantly higher values were noticed at 14 years group as compared to 11 years group indicating increasing lip thickness with age. These findings were supported by those of Prahl–Andersen *et al.*[15], who demonstrated a continued increase in upper lip thickness at point A, and at Ls from 9 to 14 years in males. Females also demonstrated higher values for upper lip thickness at point A, and at Ls with increasing age group; With no significant difference noticed among the four age groups. This came in agreement with the findings of Prahl–Andersen *et al.*[15], who showed increased lip thickness in females from 9 to 14 years. In comparing the value for both sexes, males demonstrated higher values than females in the four age groups. This difference reached the level of significance only at 12 years group for (A–A`) dimension, and at 13 years group for (Ls–Ls`) dimension. These findings were consistent with some authors findings [2,15,16], who showed thicker upper lips in males than in females.

Table (3): Duncan's Multiple Range Test of variance, For Ls–Ls` variable, with the four age groups.

Sex	Age Groups	Number	Mean	± Sd	Duncan's Test*
Male	11 Years	23	13.522	0.959	a
	12 Years	19	14.316	2.001	ab
	13 Years	22	14.705	1.900	ab
	14 Years	22	15.023	1.783	B
Female	11 Years	25	13.120	1.387	A
	12 Years	22	13.409	1.420	A
	13 Years	28	13.411	1.861	A
	14 Years	22	14.023	2.217	A

For males: F–value = 3.31, *p*–value = 0.024, Significant at $p \leq 0.05$; For females: F–value = 1.08, *p*–value = 0.360, Not Significant at $p > 0.05$; * Means with the same letters were statistically not significant; Sd: Stander deviation.

Table (4): Duncan's Multiple Range Test of variance, For upper lip height variable, with the four age groups.

Sex	Age Groups	Number	Mean	± Sd	Duncan's Test*
Male	11 Years	23	24.391	1.390	a
	12 Years	19	25.395	2.045	a
	13 Years	22	25.500	2.890	a
	14 Years	22	26.159	2.556	a
Female	11 Years	25	23.580	2.221	a
	12 Years	22	24.455	2.582	Ab
	13 Years	28	25.679	1.668	B
	14 Years	22	24.636	1.605	Ab

For males: F–value = 2.31, *p*–value = 0.082, Significant at $p \leq 0.05$; For females: F–value = 4.72, *p*–value = 0.004, Not Significant at $p > 0.05$; * Means with the same letters were statistically not significant; Sd: Stander deviation.

Table (5): Duncan's Multiple Range Test of variance, For Ls–E line, with the four age groups.

	Age Groups	Number	Mean	± Sd	Duncan's Test*
Male	11 Years	23	–1.065	1.448	A
	12 Years	19	–1.421	1.305	A
	13 Years	22	–2.000	1.909	A
	14 Years	22	–1.932	1.168	A
Female	11 Years	25	–2.120	1.401	A
	12 Years	22	–2.932	1.741	Ab
	13 Years	28	–2.875	1.746	Ab
	14 Years	22	–3.864	1.977	B

For males: F–value = 1.97, *p*–value = 0.125, Significant at $p \leq 0.05$; For females: F–value = 4.02, *p*–value = 0.010, Not Significant at $p > 0.05$; * Means with the same letters were statistically not significant; Sd: Stander deviation.

Table (6): Student's T–test for the soft tissue variables between males and females for the four age groups.

Age groups	Variable	Examination	Number	Mean	± Sd	T– test	*p* value
11 years	**A–A`**	Male	23	15.63	1.04	0.90	0.37
		Female	25	15.32	1.32		
	Ls–Ls`	Male	23	13.52	0.96	1.16	0.25
		Female	25	13.12	1.39		
	Upper Lip Height	Male	23	24.39	1.39	1.50	0.14
		Female	25	23.58	2.22		
	Ls–E line	Male	23	44.52	2.58	2.08	0.043+
		Female	25	42.94	2.67		
12 years	**A–A`**	Male	19	16.55	1.39	2.88	0.0065+
		Female	22	15.39	1.20		
	Ls–Ls`	Male	19	14.32	2.00	1.69	0.099
		Female	22	13.41	1.42		
	Upper Lip Height	Male	19	25.40	2.05	1.28	0.21
		Female	22	24.46	2.58		
	Ls–E line	Male	19	–1.42	1.30	3.10	0.0069+
		Female	22	–2.93	1.74		
13 years	**A–A`**	Male	22	16.59	1.69	1.98	0.054
		Female	28	15.64	1.68		
	Ls–Ls`	Male	22	14.71	1.90	2.42	0.019+
		Female	28	13.41	1.86		
	Upper Lip Height	Male	22	25.50	2.89	–0.97	0.34
		Female	28	25.68	1.67		
	Ls–E line	Male	22	–2.00	1.91	1.69	0.098
		Female	28	–2.88	1.75		
14 years	**A–A`**	Male	22	17.05	1.98	1.26	0.21
		Female	22	16.30	1.97		
	Ls–Ls`	Male	22	15.02	1.78	1.65	0.11
		Female	22	14.02	2.22		
	Upper Lip Height	Male	22	26.16	2.56	2.37	0.023+
		Female	22	24.64	1.60		
	Ls–E line	Male	22	–1.93	1.17	3.95	0.0003+
		Female	22	–3.86	1.98		

(A–A`): Upper lip thickness; Ls–Ls: Upper lip thickness
Note: All measurements in mm; Sd: Stander deviation; + Significant differences between males and females ($p \leq 0.05$).

In males upper lip height showed higher values with increasing age group with no significance. It can be concluded that upper lip height increased with age and this agreed with the findings of Mamandras[13] and Vig and Cohen[17], who reported a gradual increase in upper lip height from 10 to 14 years in males. Females showed higher value for upper lip height at 12 years group than 11 years group. It was showed higher value at 13 years group than 11 and 12 years group with significant difference noticed between 11 and 13 years group. At 14 years upper lip height value was lower than that at 13 years but larger than the values for 11 years and 12 years groups. Generally, it was noticed that upper lip height increased in females with increasing age group. This came in agreement with the findings of the researchers[13, 17], who showed an increase in upper lip height from 10 to 14 years in females. In comparing the values of males and females, males displayed higher values for upper lip height than females at 11, 12 and 14 years groups with significance noticed at 14 years group. Females, however showed higher value (by 0.18 mm) than males at 13 years group. Generally, this indicates a longer upper lip in males than females which agreed with the findings of Mamandras[13], who showed greater upper lip height in males than females at 10, 12 and 14 years with significance noticed at 14 years. On the other hand, Subtelny[18] showed no difference between male and female subjects relative to this measurement.

An evaluation of the upper lip relative to the esthetic plane in males showed a greater distance of upper lip behind this line from 11 years group to 13 years group. At 14 years group the value was smaller than that at 13 years group by 0.06 mm. No significant difference was noticed among the four age groups. These findings indicated a more posterior position of Ls relative to E–line with increasing age group and this coincided with the findings of Nanda, Bishara and others[11, 19], who showed a gradual retrusion of upper lip relative to this plane from 11 to 14 years in males. In females, upper lip showed greater distance behind the E–line at 12 years group compared to 11 years group. At 13 years group the distance was less than that at 12 years group by 0.05 mm. At 14 years group Ls showed greater distance behind the E–line than the other three groups; With significant difference noticed between 11 years and 14 years groups. These findings indicate a more posteriorly positioned upper lip relative to the esthetic plane with increasing age group. Similar findings were reported by Nanda *et al.* [11] and Bishara *et al.*[20] for females from 11 to 14 years.

The comparison between males and females revealed a greater distance of Ls behind the (E–line) in females than in males in the four groups with significance noticed at 11, 12 and 14 years groups. This indicates a more retrusive upper lips in females than in males relative to this plane and it is consistent with the findings of Bishara *et al.*[19, 20]

CONCLUSIONS

Males and females, showed significantly higher values at 14 years age group for (A–A`) and (Ls–Ls`) than 11 years age group. Sexes variations revealed that the upper lip significantly larger behind the esthetic line in female than male at 11, 12 and 14 years age groups.

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