



The visible portion of upper anterior teeth at rest

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Abstract

Back ground: Esthetics has become a respectable concept in dentistry. In the past, the importance of esthetics was discounted in favor of concepts such as function, structure and biology. In today's, treatment planning must begin with well defined esthetic objectives. The visibility of upper anterior tooth surface with lip at rest is an important factor in determining prosthodontic outcome. A study was therefore, undertaken to investigate the degree of visibility of maxillary anterior teeth surfaces when the lip at rest.

Materials and method: 140 patients were examined. All the subject had maxillary anterior teeth present with no caries, restorations, sever attrition, mobility, or obvious deformities. The portions of upper anterior teeth that were visible were measured vertically using millimeter ruler.

Results: females showed more of the maxillary central and lateral incisors than males, while the difference in canine was not significant. With increasing age, the amount of maxillary anterior teeth that was visible at rest decreased. Most subjects with shorter upper lips displayed more maxillary anterior teeth than those with longer upper lips.

Conclusion: The degree of visibility of maxillary anterior teeth is determined by muscle position that varies from one person to another. These results provide practical guidelines for vertical positioning of the maxillary teeth.

Key words: Anterior dental esthetics, tooth visibility, lip line

Introduction

The presence of the maxillary anterior teeth plays an important role to the facial appeal. They give each face a unique identity, just as eyes, nose, and skeletal proportions make each face distinctive^(1,2). The amount of visible upper anterior teeth, with lip at rest or during function, is an important esthetic factor in determining the outcome of fixed and removable prosthodontic care, implant dentistry, operative dentistry, and orthognathic surgery⁽³⁾.

The mount of visible portions of upper anterior teeth is influenced by

muscle positions that varies from person to another^(4,5,6). Lip coverage of the maxillary anterior teeth at rest showed sex difference; females displayed more maxillary incisors than males^(7,8). It has also been reported the display of upper anterior teeth tends to decrease with age^(9,10). In addition, individuals with shorter upper lips expose more maxillary incisor surface than people with longer upper lips^(11,12). Patients with complete denture treatment, the maxillary occlusion rims are adjusted to have proposed position of maxillary anterior teeth. Several

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guidelines were suggested to establish the lip length - incisal edge relationship and, accordingly, the visible portion of anterior teeth^(13, 14). One of these guidelines was the vertical length of the maxillary occlusion rim that extends in the anterior region to approximately 2mm below the relaxed lip^(15, 16).

The amount of visibility of anterior teeth can be one of the helpful guidelines for determining the appropriate vertical dimension of occlusion⁽¹³⁾. The number of studies on this desired visibility of maxillary anterior teeth was non sufficient, so the purpose of this investigation was to determine the degree of visibility of maxillary anterior teeth when the lips at rest.

Materials and method

One hundred forty adult subjects [62(%44.28) males and 78(%55.71) females] with ages ranging from (16-70) years were selected randomly from the prosthodontic department in Baghdad University and others from many health centers in Baghdad. All the subject had maxillary anterior teeth present without caries, restorations, appreciable attrition, mobility, extrusion, or obvious deformities. Subjects with lip trauma, facial surgery, or orthodontic treatment were excluded. The measurements were taken by using a millimeters ruler. The portions of anterior teeth that were visible were measured vertically from the lip to the incisal edge for the incisors, and to the cusp tip for the canines, at the midpoint of the tooth when the lips and lower jaw were at rest position (Fig. 1).

The measurement was considered to be zero if the tooth could not be seen. Three measurements for each tooth were taken and then the mean was calculated. The length of the upper

lip was measured from the base of the columella to the tip of the philtrum at the midline of the face (Fig. 2). All the recorded data were statistically analyzed by t – test and the results were obtained.

Results

Tables (1) and (2) were shown the mean and standard deviation of these measurement in millimeters which shown that there is a highly significant differences between the different readings for both males and females. The most significant differences in the visible amounts of the maxillary anterior teeth with lip at rest were between the sexes. The females displayed more of the maxillary central and lateral incisors teeth than males ($P<0.001$), while for the upper canines teeth the difference was non significant ($P>0.05$) table (3).

Table (4) was shown the descriptive of total readings and compartment between the amount of visible portion of teeth with age groups that range from (16-70) years, the amount of maxillary anterior teeth that was visible at rest decreased table (5). Also for lip line, subjects with shorter upper lips displayed more maxillary anterior teeth than subjects with longer upper lips table (6).

Discussion

The degree of visibility of maxillary anterior teeth has been generally overlooked by restorative dentists as an element of esthetic assessment. It is a muscle – determined position that varies from one person to another^(2, 5).

The mean visible amount of maxillary incisors in males was $1.379 \pm 1.405\text{mm}$ and in females was $2.679 \pm 1.802\text{mm}$. These measurements come in agreement with Al – Wazzan 2004,

connor and Moshiri 1985, and Brundo and Vig 1978, with some extent of differences in measurements may due to difference in measuring techniques^(2,9). It was found in the present study females exposed more of the maxillary central incisors than males; contrary to other study by Al – Obaid and Fayyad 1994 who found that there is no statistical significant difference between males and females⁽¹⁷⁾. While for maxillary lateral incisors, the mount of visible surface of teeth was also more in females than in males table (4), and this results dose not agree with the results of Al – Wazzan⁽²⁾ and Brundo and Vig⁽⁹⁾, who found that the males significantly displayed more from the maxillary lateral and canine than the females. The variations may to some extent be explained by ethnic differences between the populations studied.

With the increasing age, the amount of maxillary anterior teeth exposed when the lips are at rest decreased from 7mm at age 16 to 0mm at age 70 Table (5). It is clear from this study that the tissue surrounding the mouth sag and similar finding was reported by Vig and Brundo⁽⁹⁾ and Al – Wazzan⁽²⁾. Facial muscle exercises might help in preventing muscle sagging⁽⁵⁾.

Table (6) shows people with short upper lips display the maximum maxillary anterior teeth surfaces, while people with long upper lips display less maxillary anterior teeth. This is in agreement with Al – Wazzan⁽²⁾ and Vig and Brundo⁽⁹⁾.

In prostheses, the visible amount of anterior teeth has been neglected in considering esthetics of complete dentures, that the incisal edges of lower incisors established by positioning the central 0.5mm vertically and 1-2mm horizontally overlap to the maxillary centrals⁽¹⁶⁾. These guidelines do not necessarily

lead to the appropriate amount of visible tooth structure that is compatible with patient's age or upper lip length. The results showed the maxillary central incisors never have SD greater than the means, while for the lateral incisors and canines SD may have larger value than the means. This indicates the maxillary central incisor is superior to the rest of upper anterior teeth in regard to the amount of visible tooth surface.

The results of this study showed the maxillary central incisors is the most prominent tooth in the mouth, accordingly, extra care should be taken when selecting its size, form, and positioning.

Conclusion

Depending on the results of this study it is suggested the amount of visibility of maxillary anterior teeth is affected by the muscle positions that vary from one subject to another. These results give us practical guidelines for the vertical positioning of anterior teeth upper and lower that could be modified according to the clinical situation.

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Table (1): Descriptive statistics and t- test for males (mm)

	Mean	SD	SE	Min	Max
Age	38.24	12.07	1.53	21.0	70.0
Lip line	16.875	2.578	0.327	12.0	32.0
Central length	1.379	1.405	0.178	0.00	6.0
Lateral length	0.653	1.22	0.155	0.00	5.0
Canine	0.145	0.560	0.071	0.00	2.50

Table (2): Descriptive statistics and t- test for females (mm)

	Mean	SD	SE	Min	Max
Age	37.40	12.37	1.40	16.0	70.0
Lip line	15.006	2.596	0.294	9.5	22.0
Central length	2.679	1.802	0.204	0.00	7.0
Lateral length	1.397	1.476	0.167	0.00	5.0
Canine	0.333	0.836	0.094	0.00	5.0

Table (3): Mean amounts of visible tooth for both males and females

	t-test	P-value	Sig
Age	0.41	0.68	NS
Lip line	4.26	0.000	HS
Central length	4.80	0.000	HS
Lateral length	3.27	0.014	S
Canine	1.59	0.11	NS

*P<0.05 Significant , **P>0.05 Non Significant, ***P< 0.001 High significant

Table (4): Descriptive statistics and t-test for both males and females with age (mm).

	Male		Female	
	Mean	SD	Mean	SD
Age	38.24	12.07	37.40	12.37
Lip line	16.875	2.578	15.006	2.596
Central length	1.379	1.405	2.679	1.802
Lateral length	0.653	1.22	1.397	1.476
Canine	0.145	0.560	0.333	0.836

Table (5): Age- group readings for each maxillary tooth (mm)

Age (y)	n	Max. central incisors	Max. lateral incisors	Max. canines
16 – 26	32	(0-7)mm	(0-5)mm	(0-3)mm
27 – 37	38	(0-6)mm	(0-5)mm	(0-2.5)mm
38 – 48	43	(0-2)mm	(0-3)mm	(0-1.5)mm
49 – 59	21	(0-4)mm	(0-2.5)mm	(0-0)mm
60 – 70	6	(0-3)mm	(0-1.5)mm	(0-0)mm

Table (6): Mean amounts of visible tooth surface by upper lip length (mm)

	t-test	P-value	Sig
Lip line & central length	49.9	0.000	HS
Lip line & lateral length	56.84	0.000	HS
Lip line & canine	64.98	0.000	HS

*P<0.001 High significant

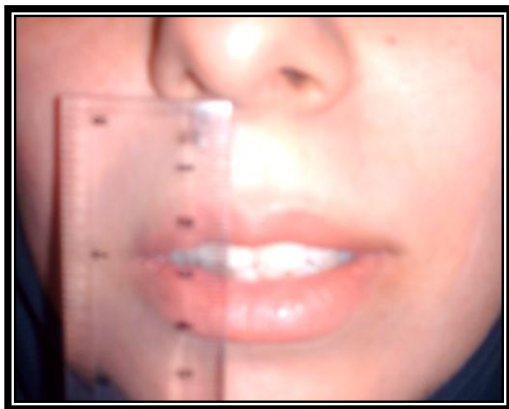


Fig 2. The measurement of the length of the upper lip.

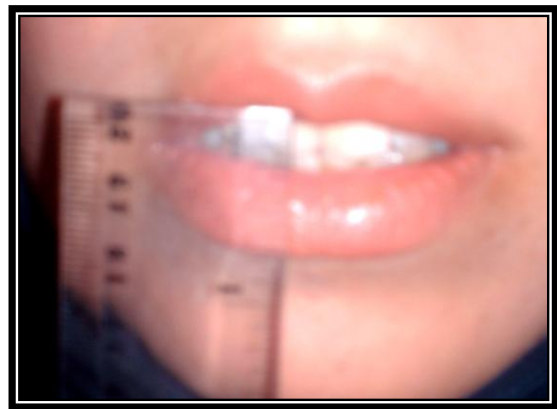


Fig 1. The measurement of the amount of exposure of the maxillary central incisors.