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An assessment of perception of attractive profiles after altering tooth inclination and mandibular anterior repositioning on the photographs

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ABSTRACT

Facial profile disharmonies in the anteroposterior (AP) position of the mandible is among the most frequent reasons that patients seek orthodontic treatment. Although previous studies of profile esthetics have mainly focused on the position or the inclination of the maxillary incisors in profile views with normal mandibular positions, to our knowledge, no studies have yet evaluated the esthetic effects of maxillary incisor inclination in relation to different mandibular positions in male and female individuals for smile profile. The objective of this study is to evaluate the significant relationship between preferred tooth position in relation to different mandibular positions in male and female subjects' smile profiles. A right lateral profile and frontal view photograph with the patient in a natural head position. Smile parameters will be evaluated and recorded. These smiling photographs will be altered using a commercially available image editing software program (Adobe Photoshop CS, version 8.0; Adobe Systems). The number of photographs that will be available after alteration and given to the judges to rate the attractiveness of each. The data thus obtained will be put to significant statistical analysis and the results thus obtained will be carried out to achieve the aim and objective of the study.

1. Introduction

The concept of beauty is wide and individual; therefore, the assessment of beauty is extremely subjective. Esthetics play a substantial role in people's lives, and facial appearance has a deep influence on personal attractiveness and self-esteem. The human face is considered the most important individual factor concerning attractiveness.[1] The criteria to determine the esthetics as acceptable or unacceptable varies according to social and cultural values, and this standard has changed across history.[2] It is important to understand that the perception of dentofacial esthetics should consider the esthetic parameters of the patients and the society in which they belong.[3,4] This appreciation of beauty is also influenced by individual factors, such as sex, ethnicity, education, and the influence of marketing and media.[5,6]

In recent years, increased emphasis has been placed on esthetics in dentistry.[7] The quest for excellent dentofacial esthetics is a reality in contemporary society.[8] There is evidence to support the notion that the aesthetics of the mouth has a significant effect on the way we develop a first impression of another person.[9] Social attractiveness is influenced by a variety of different smile-related factors, hence the smile is one of the most essential human facial expressions that enhance the reward value of an attractive face. In esthetic viewpoint, the profile and frontal views of the same smile were not rated similarly; the former was rated higher than the later.[10] Labio-lingual inclination of the

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maxillary incisors also plays a major role in profile smile attractiveness. Facial profile disharmonies in the antero-posterior (AP) position of the mandible are among the most frequent reasons that patients seek orthodontic treatment. [11]

2. Aim

To evaluate the esthetic effects of maxillary incisor inclination with regard to different mandibular position in male and female subject's smile profile.

3. Objectives

To determine the preferred tooth position in the smile profile of subject with regard to different mandibular positions in male and female and to elucidate whether the profession and sex played a role in the assessment of the preferred maxillary incisor inclination in growing and non-growing individual.

4. Materials and Method

4.1. Inclusion criteria

1. Class I canine and molar relationship with adequate overjet and overbite.
2. Well positioned maxillary incisors according to cephalometric standards.
3. Normal facial convexity angle with vertical height ratio as described by legan and burstone.
4. Normal soft tissue cephalometric analysis.

4.2. Exclusion criteria

1. Presence of midline diastema or spacing in the anterior segment.
2. Presence of crowding in the anterior segment.
3. Excessive gingival display during smiling.
4. Increased buccal corridor.
5. Acute and chronic periodontal disease, gingival recession.
6. Presence of caries, trauma, restoration and prosthesis in the anterior teeth.

A right lateral profile and frontal view photographs with the patient in natural head position with white background at a distance of 1.5 m from the camera were taken. The first image was taken with a neutral facial expression. The second image was taken with the subject in a posed smile. Smile parameters will be evaluated and recorded. These smiling photographs were altered using a commercially available image editing software program (Adobe Photoshop CS, version 8.0; Adobe Systems).

The photographs were divided into 3 profiles.

1. Normal mandible
2. Retruded mandible
3. Protruded mandible

In the next step, each profile group was further divided into 5 subgroups based on tooth position. The number of photographs that were available after altering the above-mentioned parameters is 15 for each subject, in total 30 photographs for each rater. Each series of images were printed separately on Digital Printing Paper with a Photo Smart printer in a 15x20cm format and then was placed randomly in a binder. The rating panel comprised 100-200 raters including orthodontists and laypersons. Each judge was given a set of profile photographs to rate the attractiveness of each photograph. All raters were asked to evaluate the profile images of each set to score them from 1 to 5:

1. Very un-attractive
2. Un-attractive
3. Neither attractive nor un-attractive
4. Attractive
5. Very attractive

4.3. Statistical analysis

Table 1: Each profile with its corresponding mandibular position and labiolingual inclination of maxillary incisors

Image	Position of m andible	Angulation of incisors	Inclination of incisor
I A	Protruded (+4mm)	-10degree	Palatal
I B	Protruded (+4mm)	-5 degree	Palatal
IC	Protruded (+4mm)	0 degree	Normal
I D	Protruded (+4mm)	+5 degree e	Labial
IE	Protruded (+4mm)	+10 degree	Labial
2A	Normal	-10 degree	Palatal
2B	Normal	-5 degree	Palatal
2C	Normal	0 degree	Normal
2D	Normal	+5 degree	Labial
2E	Normal	+10 degree	Labial
3A	Retruded (-4mm)	-10 degree	Palatal
3B	Retruded (-4mm)	-5 degree	Palatal
3C	Retruded (-4mm)	0 degree	Normal
3D	Retruded (-4mm)	+5 degree c	Labial
3E	Retruded (-4mm)	+10 degree	Labial

5. Result

One hundred sixty-two assessors participated in this study. The statical analysis showed there was significant difference.

Comparison between male and female, female rated high mean of 2.7+/- 0.8 with significant difference P>0.031.

Comparison between the responses on male and female subjects in the first set which is protruded mandible, it was found that ID has significant difference with P=0.002.

Fig. 1: Three sets of altered images with different mandibular positions and maxillary incisors inclination in female.

Fig. 2: Three sets of altered images with different mandibular positions and maxillary incisors inclination in male.

Overall comparison between male and female

Participants	Mean	SD	P value
Male	2.6	0.7	0.031*
Female	2.7	0.8	

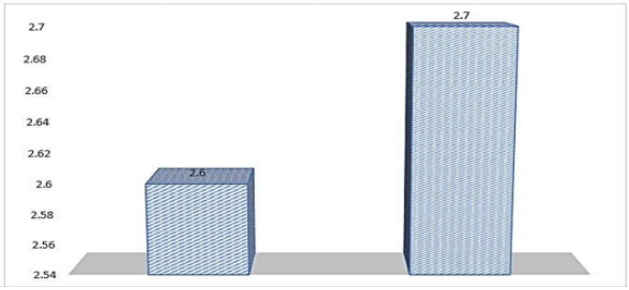

Diagram 1: Overall comparison between male and female

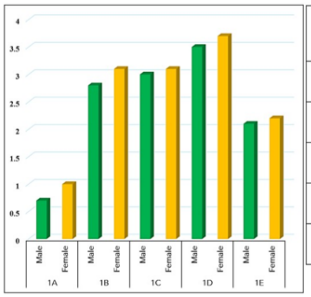

Image	Gender	Mean	SD	P value
1A	Male	0.7	0.1	0.229
	Female	1.0	0.2	
1B	Male	2.8	0.4	0.079
	Female	3.1	0.3	
1C	Male	3.0	0.4	0.307
	Female	3.1	0.2	
1D	Male	3.5	0.3	0.002*
	Female	3.7	0.4	
1E	Male	2.1	0.1	0.131
	Female	2.2	0.2	

Diagram 2: Comparison between the responses on male and female participants for diagram 2

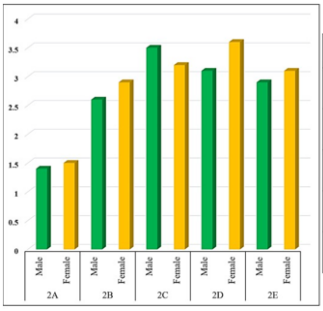

Image	Gender	Mean	SD	P value
2A	Male	1.4	0.1	0.306
	Female	1.5	0.2	
2B	Male	2.6	0.4	0.118
	Female	2.9	0.2	
2C	Male	3.5	0.4	0.040*
	Female	3.2	0.3	
2D	Male	3.1	0.1	0.011*
	Female	3.6	0.1	
2E	Male	2.9	0.1	0.242
	Female	3.1	0.1	

Diagram 3: Comparison between the responses on male and female participants for diagram 3

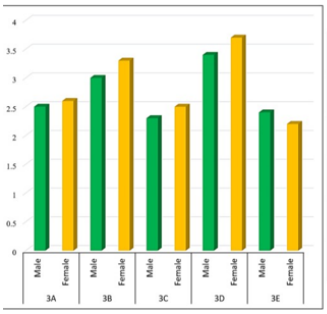

Image	Gender	Mean	SD	P value
3A	Male	2.5	0.3	0.446
	Female	2.6	0.3	
3B	Male	3.0	0.3	0.021*
	Female	3.3	0.5	
3C	Male	2.3	0.2	0.004*
	Female	2.5	0.3	
3D	Male	3.4	0.1	0.037*
	Female	3.7	0.1	
3E	Male	2.4	0.3	0.099
	Female	2.2	0.2	

Diagram 4: Comparison between the responses on male and female participants for diagram 4

(Diagram 1), Where in female 1D rated most pleasant profile with the mean value of 3.7+/-0.4 rated high.

Comparison between the responses on male and female subjects in the second set which is normal mandible, it was found that 2C, 2D have significant difference with P=0.040 & P=0.011 respectively. (Diagram 3), Where in Male 2C rated most pleasant profile with the mean value of 3.5+/-0.4 rated higher than female with the mean value 3.2+/-0.3.

Female rated most pleasant profile in 2D with mean value of 3.6+/-0.1 than male with mean value of 3.1+/-0.1.

Comparison between the responses on male and female subjects in the third set which is retruded mandible, it was found that 3B, 3C & 3D have significant difference with P=0.021, P=0.004 & P=0.037 respectively. (Diagram 4),

Where in female 3D rated most pleasant profile with the mean value of 3.7+/-0.1 rated higher than male with mean value of 3.4+/-0.1.

6. Discussion

Esthetically pleasing faces generally have good proportions, facial balance, and harmony, and yet differences often emerge in the interpretation of these concepts.[12–14] Smile attractiveness is a multifactorial process that can easily be achieved by proper positioning of the maxillary incisors. Both the inclination and the bodily position of these teeth should be favorable to ensure maximum facial harmony. In this study, we developed a series of facial profile photographs based on the original ideal profile of growing and non growing subjects to be evaluated by different groups of orthodontists, dental professionals and lay people. By altering the mandibular position and the maxillary incisor inclination in the smiling profiles, we tried to determine the most desirable and the least favorable of the forementioned combinations as a whole and to elucidate whether the mandibular position and the rater's professions are the key factors in ranking the preferred incisor inclination.

There were significant differences between the male and female subjects' perception of facial profiles and dental esthetics. A straight profile was preferred in male subjects, and a mild convex profile was preferred in the female subjects. (Diagrams 2, 3 and 4).

People who subscribe to traditional sex stereotypes tend to assume that women with a mild convex profile are more beautiful, kind, naïve, and weak, and less socially dominant. By contrast, people tend to see men as more firm, alert, strong, and coordinated. Many studies have suggested that masculinity and femininity are significantly shaped by culture.[15,16]

In the study of Ghaleb et al, dentists, orthodontists, and laypeople preferred an increase of 5^0 in a labial direction in the smiling profile; this agrees with the ratings of the orthodontic and other panel members in our study. On the other hand, photographs with 10^0 and 15^0 of lingual inclination had the lowest scores in all panels in the study of Ghaleb et al; this is comparable to the results of our study panels. For the extreme lingual inclinations (15^0 and 10^0), the orthodontists gave significantly lower scores than did the dentists and laypeople. The image with the 15^0 labial inclination was deemed esthetically acceptable only by the orthodontists. These results agree with our study in which the panel members gave the lowest scores to the extreme lingual inclination.[17]

In our study inclination of maxillary teeth rated differently in all three sets of photographs. Labial inclination of 5^0 higher than the lingual inclination. Lingual and labial inclination with 10^0 rated low in both subjects.

7. Conclusion

In this study women with a mild convex profile are more beautiful and men with straight profile consider to be esthetically more pleasant and the effects of mandibular position on the preferred incisor inclination was assessed, labial inclination was considered as attractive as compared with lingual inclination; In a patient with mandibular deficiency where camouflage treatment is indicated, a lingual inclination of the maxillary incisor can compromise esthetics and should be avoided by maintaining appropriate torque during incisor retraction.

8. Conflict of Interest

The authors declare that they have no conflict of interest.

9. Source of Funding

None.

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