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Maxillary Incisor Inclination and Lower Facial Height Effects on Facial Attractiveness: A Comparative Evaluation

Maksiller Kesici Eğim ve Alt Yüz Yüksekliğinin Yüz Çekiciliği Üzerindeki Etkileri: Karşılaştırmalı Bir Değerlendirme

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ABSTRACT

Objectives: Facial attractiveness plays a significant role in social interactions and self-esteem. This study aimed to investigate the influence of different maxillary incisor inclinations and lower anterior facial heights on the perception of beauty, as well as to identify the threshold at which these variables begin to affect facial attractiveness.

Materials and Methods: A smiling extraoral profile photograph of a patient with ideal skeletal and dental relationship, an ideal overjet, and overbite was digitally altered to create three different lower-anterior-facial-height variables and combined with seven different maxillary-incisor-inclinations. These modified images were evaluated by three different groups: orthodontists (OR), clinicians (CL), and laypeople (LP), using a Likert-type scale. Statistical analysis was conducted using SPSS® version 25 (IBM®, New York, NY), with a significance level at $p<0.05$.

Results: For normal, reduced, and increased lower-facial-height LP and CL preferred 5º retroclined maxillary incisor, while OR preferred normal inclinations (87º). All groups displayed greater criticality toward reduced lower-facial-height when scoring incisor inclination. The most significant difference ($p=0.000$) among the groups was observed in the reduced lower-facial-height alteration with +5º incisor inclination. Most of OR (60%) and half of CL (50%) rated it as average, whereas half of LP (50%) as unattractive.

Conclusion: OR favoured normal and slightly labial (+5º) crown-torque, while showing resistance towards lingual crown-inclination across all variables of lower-facial-height. LP and CL exhibited more tolerance towards lingually-inclined-incisors, contributing to a more feminine appearance. These findings can assist clinicians in making informed decisions during treatment planning, leading to improved patient satisfaction.

Keywords: *Esthetics, Orthodontics, Incisors, Torque*

ÖZET

Amaç: Yüz çekiciliği, sosyal etkileşimlerde ve özsaygıda önemli bir rol oynar. Bu çalışma, farklı maksiller kesici eğimlerinin ve alt ön yüz yüksekliklerinin güzellik algısı üzerindeki etkilerini araştırmayı amaçlamaktadır. Ayrıca, bu değişkenlerin yüz çekiciliğini etkilemeye başladığı eşikleri belirlemeyi hedeflemektedir.

Gereç ve Yöntemler: İdeal iskelet ve dişsel ilişkisi ile birlikte ideal overjet ve overbite'a sahip bir hastanın gülümseme ağız-dışı profil fotoğrafı üç farklı alt-ön-yüz-yüksekliği değişkeni oluşturmak için dijital olarak değiştirilmiştir. Her değişken, yedi farklı maksiller kesici eğim ile birleştirilmiştir. Bu değiştirilmiş görüntüler daha sonra üç farklı grup (ortodontistler [OR], klinisyenler [CL] ve bağımsız kişiler [LP]) tarafından bir Likert tipi ölçek kullanılarak değerlendirilmiştir. İstatistiksel analiz, SPSS 25 (IBM, New York, NY) sürümü kullanılarak anlamlılık düzeyi $p<0.05$ düzeyinde gerçekleştirilmiştir.

Bulgular: Normal, azaltılmış ve artırılmış alt-yüz-yüksekliği için, LP ve CL grupları 5º retrokline maksiller kesici eğimini daha estetik olarak tercih ederken, OR grubu normal eğimleri (87º) tercih etmiştir. Tüm gruplar, kesici eğimi değerlendirirken azaltılmış-alt-yüz-yüksekliğine karşı daha büyük bir eleştirellik sergilemiştir. Gruplar arasındaki en önemli fark ($p=0.000$), +5º kesici eğimli azaltılmış-alt-yüz-yüksekliği değişikliğinde gözlenmiştir. Burada, OR'nin çoğu (%60) ve CL'nin yarısı (%50) bunu ortalama olarak değerlendirmiştir, LP'nin yarısı (%50) ise çekici bulmamıştır.

Sonuç: Ortodontistler normal ve hafif labial (+5º) kron-torkunu tercih ederken, alt-yüz-yüksekliği değişkenlerinin tümünde lingual kron eğimine karşı direnç gösterdi. Bununla birlikte, bağımsız kişiler ve klinisyenler, feminen bir görünüm sağlayan lingual eğimli kesicilere karşı daha fazla beğeni sergilemişlerdir. Bu bulgular, klinik uzmanlara daha bilinçli kararlar ile tedavi planlaması yaparak ve artmış hasta memnuniyetine ulaşmalarına yardımcı olacaktır.

Anahtar Kelimeler: *Estetik, Ortodonti, Kesici diş, Tork*

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Introduction

When assessing overall attractiveness, facial features tend to be more reliable predictors than bodily attributes. Facial attractiveness has long been recognized as a crucial factor in human interactions, influencing social perception, self-confidence, and overall well-being.[1] The harmonious balance of facial features, including the position and inclination of maxillary incisors, contributes significantly to facial aesthetics and attractiveness.[2] Understanding the impact of different maxillary incisor inclinations and lower anterior facial heights on facial attractiveness can aid in the development of evidence-based treatment protocols in orthodontics and aesthetic dentistry.[3] In modern orthodontics, facial aesthetics have become a paramount treatment goal, with many patients seeking orthodontic interventions primarily for improving their facial appearance. However, facial beauty is a multifaceted construct, resulting from the interplay of numerous characteristics and variables, requiring a comprehensive understanding for a thorough grasp of its dynamics. Generally, there are many characteristics that influence facial beauty as well as many variables that might change how attracted someone is to a certain face. Understanding how these many elements interact with one another will lead to a more complete understanding of facial beauty. Despite achieving a technically perfect and aesthetically pleasing orthodontic result, patient satisfaction might not always align with the orthodontist's perception, leading to frustration for both parties involved.[4] Therefore, the aim of this paper is to investigate the perceptions of facial beauty among patients, orthodontists, and clinicians when observing models with altered incisor inclination and lower facial heights, and to identify the threshold at which these variables impact attractiveness. The null hypothesis posits that orthodontists' perception of the effect of discrepancies is more meticulous than laypeople and clinicians.

Materials and Methods

A standardized methodology was employed to examine the relationship between maxillary incisor inclination, lower anterior facial height, and facial attractiveness. A smiling extraoral profile photograph of a 30-year-old female patient, who had not received any orthodontic or prosthetic treatment, with a Class I dental relationship, an ideal overjet (2 mm) and overbite (2 mm), an orthognathic profile, an ideal smile in both frontal and lateral views, and normally shaped and sized maxillary incisors and canines served as the baseline image. Relevant cephalometric measurements based on Steiner analysis were recorded and presented in Table 1.[5]

During extraoral profile photography, natural head posture was established by using a technique suggested by Bass to prevent the face from tilting upwards or downwards while looking straight forward.[6] The lateral profile photograph was taken with a digital camera equipped with a 6D Mark II lens (24-105 mm Image Stabilizer Ultrasonic, Full Frames 77 mm, Canon Inc.) at 1.5 meters from the model, maintaining the Frankfort horizontal plane and pupillary horizontal plane parallel to the ground, and capturing a sociable smile that exposes the distal end of the canines.

Subsequently, the smiling lateral profile photograph was digitally altered using a photo editing software (Adobe Photoshop Program, USA, version 2020). The alterations included three variations of lower anterior facial height: reduced, normal, and increased, along with seven different maxillary incisor inclinations for each facial height variable. The aesthetic horizontal line (Hr) served as a constant reference unaffected by orthognathic or orthopedic treatment.

Table 1. Cephalometric measurements of the model

Parameter	Measurement	Normal Mean±SD
SNA	80	82.0±2.0
SNB	78	80.0±2.0
ANB	2	2.0±2.0
U1-NA (mm)	4	4
U1-NA (degree)	25	25
L1-NB (mm)	5	4
U1-NB (degree)	26	25
Holdaway difference	2	0
U1/L1	129	131
Occlusal plane/SN	13	14
GoGn/SN	28	32
S line/U-L lip	-1/0	0/0

The initial alteration step was carried out in the incisor area. Incisors angles were altered by increasing and decreasing two angles, Tg/Hrº and Tg/Sn-Pgº, which were created by the following procedures: (1) tracing the Sn-Pg and Hr lines through the mid-third, (2) locating the prominent point on the labial surface of the maxillary central incisor and (3) a contiguous (Tg) extending through this point (Figure 1). Tg/Hrº represents the angle produced between the incisor inclination and the aesthetic horizontal, and Tg/Sn-Pg, represents the angle between the incisor inclination and the lower facial third. The measured values of Tg/Hrº and Tg/Sn-Pgº of the model were 87º and 3º respectively. During alterations of these two angles, a positive value was assigned when the structure moved forward, whereas a negative value was assigned when it moved backward. Each incremental and decremental was made in 5 degrees as -5º, -10º, -15º, +5º, +10º, and +15º.

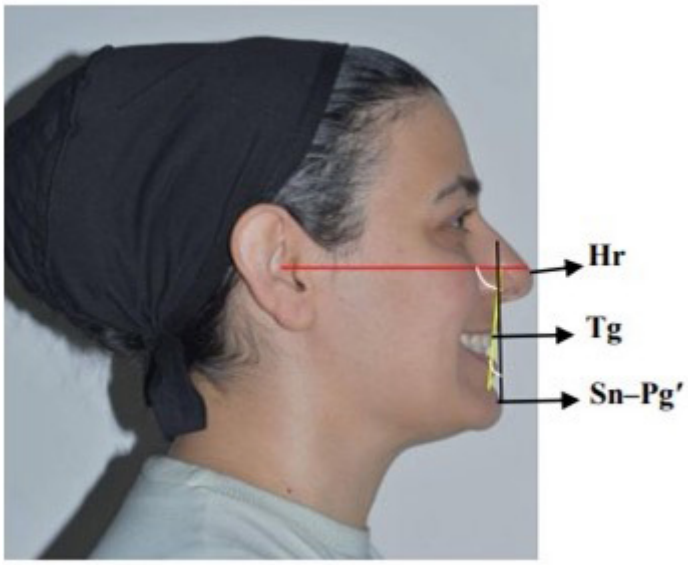

Figure 1. Angular measurement for incisor inclination modification.

Second step of image alterations was to stretch and depress the photo at the soft tissue sites subnasale and soft tissue pogonion to adjust the anterior vertical height of the female subject's facial profile. The soft tissue outlines both above and below the columella and below soft tissue pogonion were not changed and were same in all photos. The original LAFH/TAFH (Lower Anterior Facial Height/Total Anterior Facial Height) ratio of 55% (Normal lower facial height) was raised and reduced by 8% to produce short lower anterior facial height (47% LAFH/TAFH) and long lower anterior facial height (63% LAFH/TAFH). The modified images were then evaluated by three distinct groups each of 30 participants between the ages of 30 and 45 as orthodontists (OR), dentists (DE), and laypeople (LP). Modified images rated by the observers are shown in Figure 2.

The gender distribution within the entire sample indicated that 32.22% were male, with 33% identified as laypeople, 33% as clinicians, and 30% as orthodontists. Among females, who constituted 67.78% of the sample, 67% were categorized as laypeople, 67% as clinicians, and 30% as orthodontists. All raters were informed about the aim for the data collection and purpose of usage. All raters were asked to sign a written consent form or an e-consent form.

The online survey, conducted using Google Forms, comprised two sections. The first section (Demographics data) of the online survey was composed of several questions about personal information gender, age, and educational level as well as two questions about the assessment of importance of smile and the point that evaluators pay the most attention. The second section (evaluations of images) included 21 multiple choice questions about the facial attractiveness. The randomized photos were rated using a Likert-type scale, which has been widely dependable in the psychology research as the most advantageous rating approach.[8] All evaluators rated the photos according to Likert-scale of attractiveness as the very unattractive, unattractive, moderate, attractive, and very attractive in a period of three months.

The collected data were subjected to statistical analysis using SPSS® version 25 (IBM®, New York, NY), and the significance level was set at $p<0.05$.

Descriptive statistics were specified in the analyses, and comparison regarding different lower anterior vertical facial height and alteration of maxillary incisors of the different panels (orthodontists, clinicians and laypersons) and gender were made with the "Chi-Square" analysis.

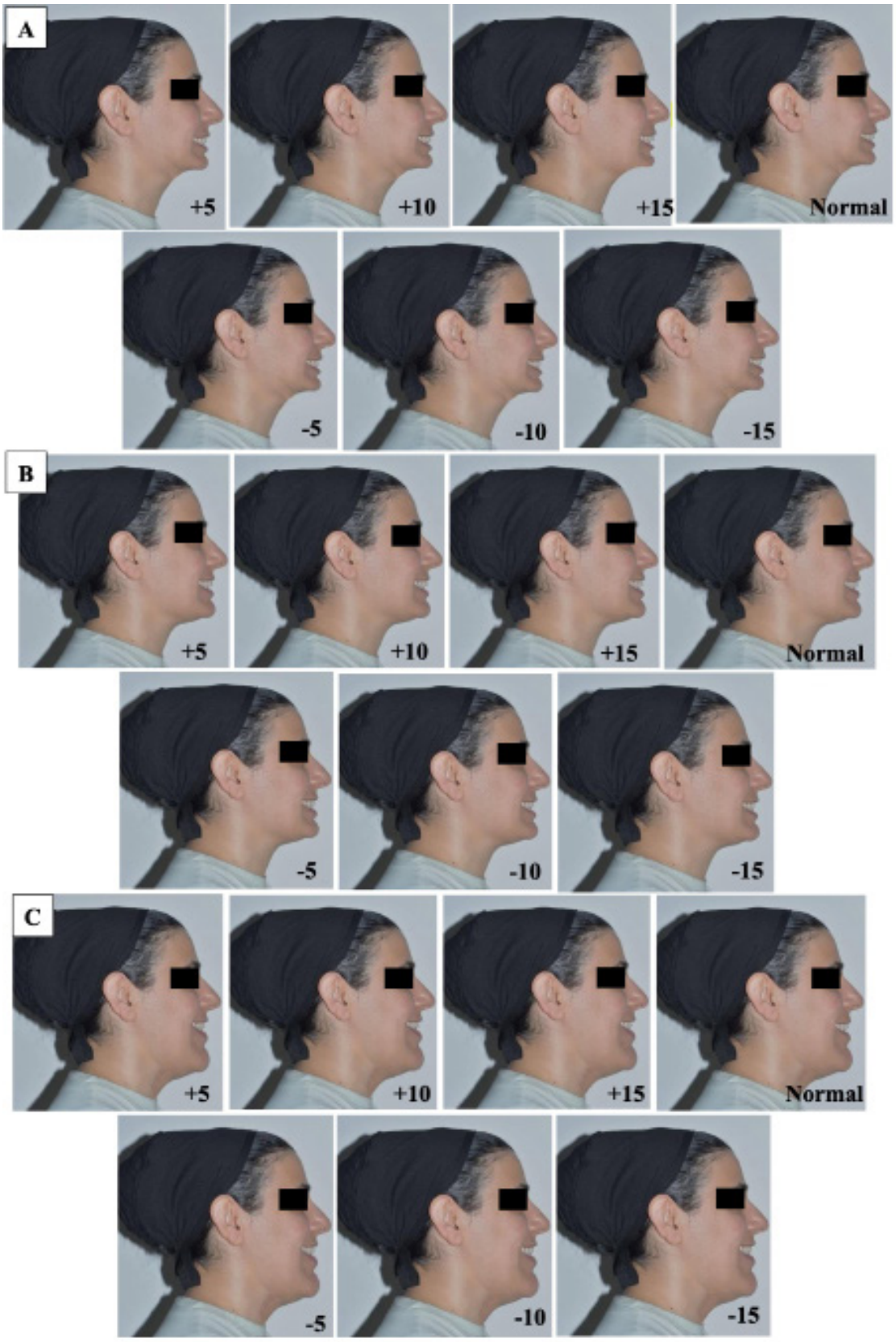

Figure 2. (A) Represent different incisors inclination (+5 º, +10 º, +15º, normal, -5, -10, -15) with 8% reduced lower facial height (LAFH/TAFH: 47%), **(B)** represent different incisors inclination (+5 º, +10 º, +15º, normal, -5, -10, -15) with normal lower facial height (LAFH/TAFH: 55%), **(C)** represent the different incisors inclination (+5 º, +10 º, +15º, normal, -5, -10, -15) with 8% increased lower facial height (LAFH/TAFH: 63%).

Results

The study participants of the present study agreed that smile affects people's impression of looks as very important, important, less important, and unimportant with a percentage of 57.8%, 38.9%, 2.2%, and 1.1% respectively. The results of the evaluation demonstrated variations in preferences for maxillary incisor inclination and lower facial height among the different groups of evaluators. In models with normal, reduced, and increased facial heights, both LP and DE favoured a maxillary incisor inclination of 5 degrees retroclined as the most attractive while OR tended to prefer normal inclinations (87º) across all variables of lower facial height (Table 2, 3 and 4).

Notably, the evaluators showed heightened criticality towards reduced lower facial height (%47 LAFH/TAFH) when assessing the incisor inclination (Table 2). The most significant statistical differences among the groups were observed in the reduced lower facial height model (%47 LAFH/TAFH) with a -15º incisor inclination, p=0.002 and +5º incisor inclination, p=0.000 (Table 2); and higher facial height model (%63 LAFH/TAFH) with -15º incisor inclination, p=0.009 (Table 4). For the reduced lower facial height with -15º incisor inclination, a majority of orthodontists (56.7%) rated the image for as unattractive, while most dentists (43.3%) and laypeople (60.0%) rated it as average (Table 2). For the reduced lower facial height with +5º incisor inclination a higher percentage of orthodontists (60%) and half of dentists (50%) claimed the profile as average while 50% of the laypeople found the same profile photo as unattractive (Table 2). For the increased lower facial height with -15º, most of the orthodontists (60%) found the profile photo as unattractive while 53.3% of the lay people and 33.3% of the dentists found the same profile photo as unattractive and 33.3% of the dentists as average (Table 4).

Table 2. Differences in preferences between groups (LP, DE, and OR) for reduced lower anterior facial height 47% LAFH/TAFH.

	LP		DE		OR		*p value*	*sig.*
Variables	n	%	n	%	n	%		
Reduced lower anterior facial height with +15° incisor inclination								
Very unattractive	4	13.30%	5	16.70%	8	26.70%	*0.627*	NS
Unattractive	16	53.30%	15	50.00%	15	50.00%		
Average	9	30.00%	8	26.70%	6	20.00%		
Attractive	1	3.30%	0	0.00%	0	0.00%		
Very attractive	0	0.00%	2	6.70%	12	3.30%		
Reduced lower anterior facial height with +10° incisor inclination								
Very unattractive	2	6.70%	1	3.30%	0	0.00%	***0.010***	**
Unattractive	19	63.30%	15	50.00%	7	23.30%		
Average	9	30.00%	10	33.30%	21	70.00%		
Attractive	0	0.00%	2	6.70%	2	6.70%		
Very attractive	0	0.00%	2	6.70%	0	0.00%		
Reduced lower anterior facial height with +5° incisor inclination								
Very unattractive	4	13.30%	1	3.30%	0	0.00%	***0.000***	**
Unattractive	15	50.00%	11	36.70%	6	20.00%		
Average	11	36.70%	15	50.00%	18	60.00%		
Attractive	0	0.00%	0	0.00%	6	20.00%		
Very attractive	0	0.00%	3	10.00%	0	0.00%		
Reduced lower anterior facial height with normal incisor inclination								
Very unattractive	2	6.70%	1	3.30%	0	0.00%	***0.016***	*
Unattractive	14	46.70%	6	20.00%	5	16.70%		
Average	14	46.70%	16	53.30%	15	50.00%		
Attractive	0	0.00%	4	13.30%	8	26.70%		
Very attractive	0	0.00%	3	10.00%	2	6.70%		

Reduced lower anterior facial height with -10° incisor inclination								
Very unattractive	1	3.30%	2	6.70%	3	10.00%	*0.443*	NS
Unattractive	9	30.00%	7	23.30%	9	30.00%		
Average	15	50.00%	12	40.00%	12	40.00%		
Attractive	5	16.70%	6	20.00%	6	20.00%		
Very attractive	0	0.00%	3	10.00%	0	0.00%		
Reduced lower anterior facial height with -15° incisor inclination								
Very unattractive	1	3.30%	1	3.30%	4	13.30%	***0.002***	**
Unattractive	8	26.70%	7	23.30%	17	56.70%		
Average	18	60.00%	13	43.30%	4	13.30%		
Attractive	3	10.00%	6	20.00%	5	16.70%		
Very attractive	0	0.00%	3	10.00%	0	0.00%		

* p<0.05; ** p<0.01; NS: Not significant, LP: Lay people; DE: Dentists; OR: Orthodontists, LAFH: Lower Anterior Facial Height; TAFH: Total Anterior Facial Height.

Table 3. Differences in preferences between groups for normal lower anterior facial height 55% LAFH/TAFH.

	LP		**DE**		**OR**		***p value***	***sig.***
Variables	n	%	n	%	n	%		
Normal lower anterior facial height with +15° incisor inclination								
Very unattractive	4	13.30%	5	16.70%	10	33.30%	*0.320*	NS
Unattractive	19	63.30%	14	46.70%	16	53.30%		
Average	6	20.00%	8	26.70%	3	10.00%		
Attractive	1	3.30%	2	6.70%	0	0.00%		
Very attractive	0	0.00%	1	3.30%	1	3.30%		
Normal lower anterior facial height with +10° incisor inclination								
Very unattractive	3	10.00%	4	13.30%	3	10.00%	*0.804*	NS
Unattractive	16	53.30%	14	46.70%	15	50.00%		
Average	10	33.30%	9	30.00%	8	26.70%		
Attractive	1	3.30%	2	6.70%	4	13.30%		
Very attractive	0	0.00%	1	3.30%	0	0.00%		
Normal lower anterior facial height with +5° incisor inclination								
Very unattractive	3	10.00%	1	3.30%	2	6.70%	*0.160*	NS
Unattractive	13	43.30%	12	40.00%	5	16.70%		
Average	12	40.00%	11	36.70%	14	46.70%		
Attractive	2	6.70%	5	16.70%	9	30.00%		
Very attractive	0	0.00%	1	3.30%	0	0.00%		
Normal lower anterior facial height with normal incisor inclination								
Very unattractive	3	10.00%	2	6.70%	0	0.00%	***0.037***	*
Unattractive	12	40.00%	8	26.70%	5	16.70%		
Average	13	43.30%	12	40.00%	10	33.30%		
Attractive	2	6.70%	7	23.30%	13	43.30%		
Very attractive	0	0.00%	1	3.30%	2	6.70%		
Normal lower anterior facial height with -5° incisor inclination								
Very unattractive	2	6.70%	3	10.00%	4	13.30%	*0.424*	NS
Unattractive	4	13.30%	6	20.00%	6	20.00%		
Average	18	60.00%	13	43.30%	10	33.30%		
Attractive	6	20.00%	4	13.30%	7	23.30%		
Very attractive	0	0.00%	4	13.30%	3	10.00%		

Normal lower anterior facial height with -10° incisor inclination								
Very unattractive	2	6.70%	1	3.30%	2	6.70%	*0.099*	NS
Unattractive	5	16.70%	10	33.30%	14	46.70%		
Average	18	60.00%	14	46.70%	8	26.70%		
Attractive	5	16.70%	3	10.00%	6	20.00%		
Very attractive	0	0.00%	2	6.70%	0	0.00%		
Normal lower anterior facial height with -15° incisor inclination								
Very unattractive	2	6.70%	3	10.00%	4	13.30%	*0.141*	NS
Unattractive	9	30.00%	11	36.70%	18	60.00%		
Average	14	46.70%	10	33.30%	3	10.00%		
Attractive	5	16.70%	5	16.70%	4	13.30%		
Very attractive	0	0.00%	1	3.30%	1	3.30%		

* p<0.05; ** p<0.01; NS: Not significant, LP: Lay people; DE: Dentists; OR: Orthodontists, LAFH: Lower Anterior Facial Height; TAFH: Total Anterior Facial Height.

Table 4. Differences in preferences between groups increased lower anterior facial height (63% LAFH/TAFH).

	LP		**DE**		**OR**		***p value***	***sig.***
Variables	n	%	n	%	n	%		
Increased lower anterior facial height with +15° incisor inclination								
Very unattractive	4	13.30%	6	20.00%	7	23.30%	*0.573*	NS
Unattractive	18	60.00%	14	56.70%	18	60.00%		
Average	7	23.30%	6	20.00%	2	6.70%		
Attractive	1	3.30%	2	6.70%	2	6.70%		
Very attractive	0	0.00%	2	6.70%	1	3.30%		
Increased lower anterior facial height with +10° incisor inclination								
Very unattractive	4	13.30%	4	13.30%	3	10.00%	*0.319*	NS
Unattractive	14	56.70%	10	33.30%	14	46.70%		
Average	11	36.70%	11	36.70%	9	30.00%		
Attractive	1	3.30%	2	6.70%	4	13.30%		
Very attractive	0	0.00%	3	10.00%	0	0.00%		
Increased lower anterior facial height with +5° incisor inclination								
Very unattractive	3	10.00%	4	13.30%	1	3.30%	*0.063*	NS
Unattractive	13	43.30%	9	30.00%	5	16.70%		
Average	12	40.00%	8	26.70%	18	60.00%		
Attractive	2	6.70%	8	26.70%	6	20.00%		
Very attractive	0	0.00%	1	3.30%	0	0.00%		
Increased lower anterior facial height with normal incisor inclination								
Very unattractive	3	10.00%	2	6.70%	6	3.30%	*0.210*	NS
Unattractive	10	33.30%	9	30.00%	4	13.30%		
Average	13	43.30%	13	43.30%	13	43.30%		
Attractive	4	13.30%	4	13.30%	11	36.70%		
Very attractive	0	0.00%	1	3.30%	1	3.30%		
Increased lower anterior facial height with -5° incisor inclination								
Very unattractive	3	10.00%	2	6.70%	2	6.70%	*0.729*	NS
Unattractive	4	13.30%	6	20.00%	7	23.30%		
Average	17	56.70%	11	36.70%	12	40.00%		
Attractive	6	20.00%	9	30.00%	8	26.70%		
Very attractive	0	0.00%	2	6.70%	1	3.30%		

Increased lower anterior facial height with -10° incisor inclination								
Very unattractive	2	6.70%	3	10.00%	7	23.30%		
Unattractive	8	26.70%	9	30.00%	12	40.00%		
Average	16	53.30%	12	40.00%	8	26.70%	*0.188*	NS
Attractive	4	13.30%	4	13.30%	3	10.00%		
Very attractive	0	0.00%	2	6.70%	0	0.00%		
Increased lower anterior facial height with -15° incisor inclination								
Very unattractive	2	6.70%	2	6.70%	6	20.00%		
Unattractive	9	30.00%	10	33.30%	18	60.00%		
Average	16	53.30%	10	33.30%	3	10.00%	*0.009*	NS
Attractive	3	10.00%	7	23.30%	3	10.00%		
Very attractive	0	0.00%	1	3.30%	0	0.00%		

* p<0.05; ** p<0.01; NS: Not significant; LP: Lay people; DE: Dentists; OR: Orthodontists, LAFH: Lower Anterior Facial Height; TAFH: Total Anterior Facial Height.

According to the males the most attractive profile photo was rated as normal anterior facial height with normal incisor inclination while female participants preferred the profile photo of reduced anterior facial height with -5º incisor inclination. Besides, statistically significant differences between male and female participants' preferences were observed as follows; for the photo of reduced lower anterior facial height with alteration by +15º in incisor inclinations, most male participants found that the facial appearance was average, while most of female participants agreed that the facial appearance was unattractive, p=0.040. For the photo of reduced lower anterior facial height with normal incisor inclination, most male participants found that the facial appearance was unattractive, while most of the female participants found that the facial appearance was average, p=0.036. As for the rest of the photos no statistically significant differences were observed between males and females (p>0.05).

Discussion

In this study, a female model was specifically selected. Previous literature has consistently shown that both male and female observers tend to place greater emphasis on assessing female facial attractiveness compared to male facial attractiveness.[8] The more attention that is paid to female facial attractiveness, the more accurate the judgements that can be made based on facial appearance. However, in a recent study the authors indicated that gender of raters had no major influence on the facial attractiveness scores.[9] In this study, a statistically significant difference was observed between male and female raters in their evaluations of reduced lower facial height with normal incisor, highlighting a notable controversy. Results of this paper align with previous research that has demonstrated orthodontists' preference for normal and slightly labial crown torque when considering maxillary incisor inclination.[10] According to the results of another research authors concluded that the profile smile corresponding to an increase of +5° in a labial direction had the highest score.[11] Similarly, Devanna in his research in 2013, where he investigated the impact of incisor inclination on treatment planning, reported that orthodontists tend to prefer labial crown torque in comparison with lingual crown inclination.[12] The inclination choices made by orthodontists in this study are consistent with established orthodontic norms and standards, emphasizing the importance of optimal dental alignment and facial aesthetics.[13] Interestingly, the greater tolerance towards lingually inclined incisors demonstrated by dentists and laypeople in this study has been reported in previous literature as well.[12,14] Studies have shown that laypeople tend to perceive lingually inclined incisors as more attractive and feminine.[15,16] Based on this idea this could be the reason why the laypeople rated higher for the lingual crown torque as being more attractive as the model used in the present study was a female model. Besides, female participants preferred slightly negatively inclined incisor (-5º) for a more aesthetic treatment outcome. However, Lamarque obtained a different result in and emphasized that lingual inclination of the upper incisors gives the face an 'old' appearance and has a negative effect on the smile aesthetic.[17] These findings also suggests that the perception of beauty and aesthetics may vary among different stakeholders, highlighting the need for clinicians to consider patient preferences and expectations during treatment planning.

In the present study, attractiveness of different incisor inclinations accompanied by short, normal and long

lower facial heights were evaluated on a model presenting skeletal Class I relationship. In a previous study it was emphasized that the examiners showed a preference for the smiling profile image with slightly protruded maxillary incisors (+5 degrees) in a skeletal Class III patient.[18] In another study where slightly lingual inclination in dolichocephalic profiles was rated as more aesthetic, it was concluded that the aesthetic perception of labiolingual inclination differs in different facial types, and this may affect in formulating treatment plans for different facial types.[19] Therefore, patient-centered care and shared decision-making have been emphasized in recent literature as essential components of successful orthodontic treatment.[12,20] The findings of this study underscore the importance of effective communication between orthodontists and patients to align treatment goals and achieve satisfactory aesthetic outcomes. By considering patient preferences while balancing orthodontic principles, clinicians can enhance treatment satisfaction and overall patient experience. Recent studies have further supported the impact of malocclusion and orthodontic treatment need on the quality of life and patient perception. In 2009 Liu et al., conducted a systematic review highlighting the relationship between malocclusion/orthodontic treatment need and quality of life.[21] They concluded that improving malocclusion through orthodontic treatment according to patients' expectations can significantly enhance patients' quality of life. Additionally, in a study conducted by Alhummayani et al., in 2018, the authors found that patients seeking orthodontic treatment and orthodontists in Saudi Arabia shared different perceptions of dental aesthetics, emphasizing the importance of considering cultural and individual variations in treatment planning.[22]

Furthermore, studies have explored the perception of smile aesthetics among different age groups. In 2017 Sriphadungporn and Chamnannidiadha, investigated the perception of smile aesthetics among laypeople of different ages and found that younger individuals tend to have higher aesthetic demands.[23] This suggests that patient age can influence the preferences and expectations regarding dental aesthetics. Therefore, more detailed research should be planned to estimate aesthetic perception of different age groups to reach patient satisfaction in the future. In the present study all participants were in the same age group between 30 and 40 with a mean of 35.3 years old. Therefore, difference of aesthetic perception in different age groups was not evaluated.

While the present study provides valuable insights into maxillary incisor inclination and lower anterior facial height, it is essential to acknowledge the limitations. The specific sample size and population may limit the generalizability of the results. Therefore, caution should be exercised when applying these results universally as different cultures may present different aesthetic perceptions. Further research with larger and more diverse sample sizes is warranted to validate these findings and explore the influence of additional variables that may impact facial attractiveness.

In conclusion, this study sheds light on the preferences of orthodontists, clinicians, and laypeople regarding maxillary incisor inclination and lower anterior facial height. The findings align with previous research, indicating orthodontists' preference for normal and slightly labial crown torque, while revealing the greater tolerance towards lingually inclined incisors among clinicians and laypeople. These findings highlight the importance of incorporating patient preferences and expectations into treatment planning to achieve optimal aesthetic outcomes and patient satisfaction. Planning an orthodontic treatment only according to the orthodontists' norms may not enough for reaching patient satisfaction. Further research in this field will contribute to refining treatment protocols and enhancing our understanding of the complex relationship between dental aesthetics and facial attractiveness.

Conclusion

Based on the findings of this study, orthodontists tend to prefer normal and slightly labial (+5º) crown torque, while displaying resistance towards lingual crown inclination in all variables of lower facial height. In contrast, laypeople and dentists demonstrated greater tolerance towards lingually inclined incisors, perceiving them as contributing to a more feminine appearance for the female model. These insights into the impact of maxillary incisor inclination and lower anterior facial height on facial attractiveness can guide clinicians in making informed decisions during treatment planning, leading to improved aesthetic outcomes and patient satisfaction. Further research in this field is warranted to deepen our understanding and refine treatment protocols to reach satisfactory treatment results in means of aesthetic smile profile for all orthodontic patients.

Conflict of interest

None of the authors of this article has any relationship, connection or financial interest in the subject matter or material discussed in the article.

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