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Evaluation of Various Esthetic Parameters Differences Between Posed and Spontaneous Smiling: A Cross-sectional Study

Poz ve Spontan Gülümseme Arasındaki Çeşitli Estetik Parametrelerin Farklılıkların Değerlendirilmesi: Kesitsel Araştırma

Çağla UYGUR GÜLDEREN[a], Merve ÜNAL[b], Ahmet Tunahan TOK[c]

[a]Uşak Oral and Dental Health Center, Department of Orthodontics, Uşak, Türkiye
[b]Uşak University Faculty of Dentistry, Department of Prosthetic Dentistry, Uşak, Türkiye
[c]Uşak University Faculty of Dentistry, Department of Orthodontics, Uşak, Türkiye

ABSTRACT Objective: The aim of this study is to evaluate the differences between posed and spontaneous smiles in terms of lip position, tooth visibility and smile width. **Material and Methods:** A total of 102 participants, 48 female and 54 male, between the ages of 18-23, were included in the study. For a posed smile, each of the participants was instructed to exhibit their teeth. A comedy film was then displayed on the screen in front of the participant to elicit a spontaneous smile; the participant chuckled on multiple occasions. To determine spontaneous smiling, the photograph with the widest smile width and smile line height was chosen from among these numerous images. Photo editing software was used to assess the smile line heights, dental appearance, smile width, buccal corridor evaluation, lower lip-upper incisal edge contact status and smile arc. Comparative statistical analyses were conducted on posed and spontaneous smile measurements. **Results:** When posed and spontaneous smile measurements were compared, statistically significant differences were determined between height of smile line, total of visible upper teeth and smile width measurements ($p<0.001$). When the differences in smile width measurements between posed and spontaneous smiles were compared according to gender, a statistically significant relationship was determined between the measurement differences of men and the measurement differences of women ($p=0.016$). **Conclusion:** Differences were observed in the measurements of various esthetic parameters in posed and spontaneous smile. As a result, it might be recommend supplementing captured posed smiles with spontaneous smiles during the diagnosis process.

Keywords: Esthetics; diagnosis; orthodontics; smiling

ÖZET Amaç: Bu çalışmanın amacı; dudak pozisyonu, diş görünürlüğü ve gülümseme genişliği açısından poz ve spontan gülümseme arasındaki farklılıkları değerlendirmektir. **Gereç ve Yöntemler:** Çalışmaya, 18-23 yaş aralığında 48 kadın, 54 erkek olmak üzere toplamda 102 katılımcı dâhil edildi. Pozlu bir gülümseme için katılımcıların her birine dişlerini göstermeleri talimatı verildi. Daha sonra katılımcının önünde kendiliğinden bir gülümseme yaratmak için ekranda bir komedi filmi gösterildi; katılımcı birçok kez güldü. Kendiliğinden gülümsemeyi belirlemek için bu çok sayıda fotoğraf arasından gülümseme genişliği ve gülümseme çizgisi yüksekliği en fazla olan fotoğraf seçildi. Gülümseme çizgisi yüksekliklerini, diş görünümünü, gülümseme genişliğini, bukkal koridor değerlendirmesini, alt dudak-üst kesici kenar temas durumunu ve gülümseme arkını değerlendirmek için fotoğraf düzenleme yazılımı kullanıldı. Pozlanmış ve spontan gülümseme ölçümleri üzerinde karşılaştırmalı istatistiksel analizler yapıldı. **Bulgular:** Pozlanmış ve spontan gülümseme ölçümleri karşılaştırıldığında, gülümseme çizgisi yükseklikleri, görünen dişlerin sayısı ve gülümseme genişlikleri ölçümleri arasında istatistiksel olarak anlamlı farklılıklar belirlendi ($p<0,001$). Cinsiyetlere göre pozlu ve spontan gülümsemeler arasındaki gülümseme genişliği ölçümlerindeki farklılıklar karşılaştırıldığında, erkeklerin ölçüm farkları ile kadınların ölçüm farkları arasında istatistiksel olarak anlamlı ilişki belirlendi ($p=0,016$). **Sonuç:** Pozlanmış ve spontan gülümsemede çeşitli estetik parametrelerde yapılan ölçümlerde farklılıklar gözlenmiştir. Sonuç olarak, tanı sürecinde yakalanan poz gülümsemelerinin spontan gülümsemelerle desteklenmesi önerilir.

Anahtar Kelimeler: Estetik; diagnoz; ortodonti; gülümseme

Orthodontic treatment not only targets functional occlusion but also contributes to the psychosocial well-being of individuals by significantly improving their smile esthetics.[1,2] Various malocclusions not only affect functions such as chewing and speaking, but can also negatively affect the appearance of the smile, reducing an individual's self-confidence.[3] The height of the upper lip during smiling determines the

Correspondence: Çağla UYGUR GÜLDEREN
Uşak Oral and Dental Health Center, Department of Orthodontics, Uşak, Türkiye
E-mail: caglauygur1@hotmail.com

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amount of teeth and gums visible, which plays an important role in the esthetic value of the smile.[4] While it is generally considered esthetic for the gums to be visible between 0-4 mm for an ideal smile, more or less gum visibility can lead to esthetic problems.[3] An ideal smile is a combination of factors such as the position of the lips, gum visibility, alignment of the teeth and harmony with other esthetic elements of the face (nose, chin, forehead, etc.).[5,6] By taking these facial parameters into account when planning treatment, orthodontists aim to ensure that patients have not only an ideal occlusion but also an esthetically pleasing and attractive smile.[4]

Two different types of smiles require assessment in individuals: posed smiles and spontaneous smiles. The "Duchenne smile" is another name for the spontaneous smile that develops in response to emotion. In particular, the activity of the muscles in the periphery of the eye is greater than when smiling.[7] A posed smile is an intentionally displayed social smile by individuals. The emotional state of the individual affects this pose smile, and there are doubts about the repeatability of this smile. With the expectation that its repeatability will be less susceptible to variation, spontaneous smiling is considered a more realistic mode of expression.[8] Recent study show that spontaneous smiles are perceived as more attractive than posed smiles and are even considered more esthetic by dentists and orthodontists.[9] A diagnostic approach by Walder et al. has shown that spontaneous smiles provide more accurate results in dentistry.[10] In addition, the social environment of the patients perceives spontaneous smiles as more obvious and they are used more frequently than posed smiles. For most patients, dentofacial aesthetics are a priority over occlusion and chewing function.[11]

Considering the above, the main rationale of this study is that smile analysis in dentistry is generally based on posed static images and the dynamic structure of spontaneous smiles is not sufficiently evaluated. However, it is supported by increasing evidence that spontaneous smiles reflect emotional states more realistically, are perceived more clearly in the social environment and are found more esthetically attractive. The clinical contribution of this study is to provide orthodontists and other dentists with the opportunity to evaluate patient smiles from a more comprehensive and natural perspective, thus helping to achieve more predictable and patient-satisfied treatment outcomes. In this context, the alternative hypothesis of this study is that esthetic parameters such as teeth, gingival display, lip line height during spontaneous smile will differ significantly compared to those exhibited during posed smile. This study will contribute to the development of patient-centered and esthetic-focused treatment approaches by revealing the potential of spontaneous smiles in clinical practice.

MATERIAL AND METHODS

The research proposal received approval from the Non-Interventional Research Ethics Committee (date: December 14, 2023; no: 263-263-30). Participants' informed consent was obtained in regard to the guidelines set forth by the aforementioned board. This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors. And this research was conducted in accordance with the principles of the Declaration of Helsinki. In this research, using the "G. Power-3.1.9.2" program, the standardized effect size was obtained as 0.399 from Table 1 in a similar study at a 95% confidence level (α=0.05) and the minimum sample size was calculated as 98 with a theoretical power of 0.80 using the chi-square test.[12,13] Sample included participants aged 18-23 years. Exclusion criteria included loss of anterior teeth, previous periodontal surgery, orthodontic or facial plastic surgery, anterior prosthetic crowns and bridges or removable dentures on the upper anterior teeth; severe periodontal disease affecting the upper anterior teeth; limitation of facial movements; severe dentofacial malformation; perioral botulinum toxin application to the area; and history of orthodontic treatment. Individuals who volunteered to participate in the study and who did not have communication problems that could perceive verbal warnings and who did not have existing problems in the exclusion criteria were included.

All recordings from the same participant were taken on the same day, at the same time, in the same photo room, by a single orthodontist. All photographs

were captured using a digital camera (Nikon D7100) mounted on a tripod, with consistent distance and height. To keep the participants' positions consistently, a marker was attached to the ground, and no limiters, including an in-ear cephalostat, were utilized during the photography process. Initially, the participants were instructed to form a posed smile by exposing their teeth. The participant was then photographed repeatedly laughing while a comedy film was shown on a screen, chosen to be appropriate for the region where the study was conducted and the age range of the participants, so that he would smile spontaneously (Figure 1). To determine the spontaneous smile, the photograph with the widest smile width and smile line height (Figure 2 and Figure 3) was selected from these numerous images. In order to ensure calibration between photographs, the width and length of the participants' maxillary incisors were measured in the mouth with the help of calipers. The resulting photographs were edited with the same size, resolution and magnification in photo editing software (Photoshop vCS4; Adobe Systems Inc; San Jose, California; USA) and measurements were made.

FIGURE 1: Examples of a posed **(A)** and a spontaneous **(B)** smile

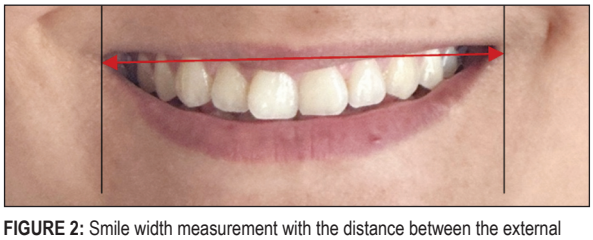

FIGURE 2: Smile width measurement with the distance between the external commissures on the right and left

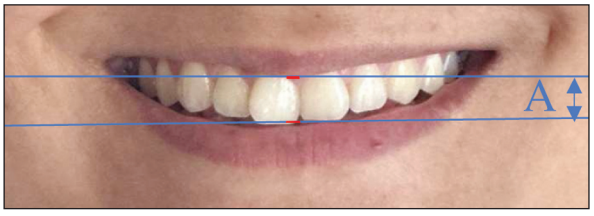

FIGURE 3: A: Height of smile line. Upper line: marking of the lip edge on the central incisor. Lower line: marking of the most incisal point of the central incisor.

The esthetic components of the smile were determined according to the criteria in Table 1.

STATISTICAL METHOD

All analyses were performed in the IBM SPSS 25 program (SPSS Statistics 25.0, Armonk, NY, USA), released in 2017. A significance level of $p<0.05$ was set for all tests.

First, the normality of data distribution of continuous variables was assessed with the Shapiro-Wilk test. For independent groups, the homogeneity of variances was checked with the Levene test before starting the parametric tests.

For comparisons between 2 independent groups:

- If data met normality and homogeneity of variances, we used the independent samples t-test.
- If the normality assumption was violated, we opted for the non-parametric Mann-Whitney U test.

For comparisons within dependent groups with non-normally distributed data, we applied the Wilcoxon signed-rank test.

To examine relationships between categorical variables:

- We used the Pearson chi-square test when the sample size assumption (expected value>0.05) was met.
- If the assumption wasn't met, we employed Fisher's exact test.
- For dependent categorical variables, the McNemar test was used.

To assess the similarity of repeated measurements for the same variables, we used Pearson and Spearman correlations and Kappa test-retests.

TABLE 1: Parameters evaluated in the comparison of posed and spontaneous smiles

Buccal corridor	By dividing the inter-canine distance by the inter-commissural distance, the buccal corridor evaluation was determined. On the basis of the obtained results, they were categorized as wide, normal, and narrow.[27]
Smile arc	Harmony between the curvature of the lower lip and the line tangent to the incisal edge of the upper anterior teeth was utilized to assess the smile arc. It was categorized as inverted, parallel, and straight.[28]
Smile width	The measurement of the distance between the external commissures on the right and left was used to determine (Figure 2).[29]
Total of visible upper teeth	By counting the teeth seen in the maxillary while smiling, the number of visible upper teeth was determined.
Relationship between the lower lip and the incisal edge	The assessment of the relationship between the lower lip and the incisal edge of the upper anterior teeth was based on the degree of contact or overlap between the 2 elements.[30]
Smile line	The evaluation of the smile line and the position of the upper lip during smiling determined whether the smile was very high (Class 1), high (Class 2), average (Class 3), or low (Class 4).[31]
Height of smile line	Quantitative markings were made at the incisal point of the central upper incisor tooth and the periphery of the upper lip using a horizontal line that was parallel to the pupil line. It was determined the vertical distance between these lines (Figure 3).[32]

RESULTS

As a result of the test-retest analysis conducted between the observers, it was found that the Kappa statistic was between 0.861-1.000. It was determined that the reliability level between measurements was greater than the minimum value of 0.610 and that the reliability between measurements was statistically significant and significantly compatible (p>0.05). Correlation statistics were found to be between 0.700-1.000. It was determined that the reliability level between measurements was greater than the minimum value of 0.700 and that the reliability was statistically significant and significantly compatible (p<0.05).

Comparison with the McNemar test with respect to the buccal corridor, lower lip- upper central incisal contact, smile line, and smile arch is presented in

TABLE 2: Distribution and comparison of participants' posed and spontaneous smile measurements

		Spontaneous									
		Wide			Normal			Narrow			
Posed		**n**	**%P.**	**%S.**	**n**	**%P.**	**%S.**	**n**	**%P.**	**%S.**	**p value**
Buccal corridor	Wide	8	66.7	29.6	4	33.3	5.4	0	0.0	0.0	0.003*
	Normal	19	21.1	70.4	70	77.8	94.6	1	1.1	100	
	Narrow	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	
		Touching			**Not touching**			**Overlap**			
		n	**%P.**	**%S.**	**n**	**%P.**	**%S.**	**n**	**%P.**	**%S.**	**p value**
LL-IC	Touching	7	26.9	58.3	18	69.2	21.4	1	3.8	16.7	0.010*
	Not touching	5	7.4	41.7	63	92.6	75.0	0	0.0	0.0	
	Overlap	0	0.0	0.0	3	37.5	3.6	5	62.5	83.3	
		Parallel			**Straight**			**Inverted**			
		n	**%P.**	**%S.**	**n**	**%P.**	**%S.**	**n**	**%P.**	**%S.**	**p value**
Smile arc	Parallel	80	100	100	0	0.0	0.0	0	0.0	0.0	0.317
	Straight	0	0.0	0.0	17	94.4	100	1	5.6	20.0	
	Inverted	0	0.0	0.0	0	0.0	0.0	4	100	80.0	
		C1			**C2**			**C3**			**C4**			
		n	**%P**	**%S.**	**n**	**%P.**	**%S.**	**n**	**%P.**	**%S.**	**n**	**%P.**	**%S.**	**p value**
Smile line	C1	2	100	13.3	0	0	0	0	0	0	0	0	0	<0.001*
	C2	0	0	0.0	3	100	14.3	0	0	0	0	0	0.0	
	C3	13	14	86.7	18	19.6	85.7	58	63	95.1	3	3.3	60	
	C4	0	0	0	0	0	0	3	60	4.9	2	40	40	

*p<0.05. McNemar test. %P.: Row percentage for posed smile; %S.: Column percentage for spontaneous smile; LL-IC: Lower lip- Incisal contact; C1: Very high; C2: High; C3: Average; C4: Low

Table 2. The participants' posed and spontaneous smiles are also evaluated. The smile line exhibited normal values for posed smiles but demonstrated a predominantly normal and elevated value for spontaneous smiles (p<0.001). There was no relationship between posed and spontaneous smile, smile arch that was statistically significant (p=0.317).

In Table 3, dependent sample t and Wilcoxon sign rank tests were used to compare the posed and spontaneous smile of the participants in relation to smile width, smile line height, and total visible teeth measurements. The measurements of smile width, smile line height, and total visible teeth were found to be higher in spontaneous smiles compared to posed smiles (p<0.001).

In Table 4, the gender of the participants influences the difference between posed and spontaneous smiles; Pearson chi square and Fisher's exact tests were used to compare the buccal corridor, lower lip-incisal contact, smile line, and smile arch. The findings showed that the participants were predominantly male when lower lip-incisal contact was present in spontaneous smile, whereas the participants were predominantly female when such contact did not exist (p=0.015). There were no relationships between gender and buccal corridor, smile arc, smile line of posed/spontaneous smile. And no statistically significant differences were found between gender and lower lip-incisal contact of posed smile (p=0.120).

TABLO 3: Distribution and comparison of differences between participants' posed and spontaneous smile measurements

	Posed smile $\bar{X}$±SD (M.)	Spontaneous smile $\bar{X}$±SD (M.)	p value
Smile width	66.26±6.38 (65.77)	70.06±6.99 (69.8)	<0.001*
Height of smile line	8.64±1.98 (8.7)	10.86±2.61 (10.87)	<0.001*
Total of visible upper teeth	11.09±1.02 (12)	11.75±0.76 (12)	<0.001*

*p<0.05. Wilcoxon sign ranked test. Dependent sample t-test. SD: Standard deviation; M: Median.

TABLE 4: Distribution and comparison of participants' posed and spontaneous smile measurements according to the gender

		Females			Males			
		n	%	%G.	n	%	%G.	p value
Posed smile-buccal corridor	Wide	6	50.0	12.5	6	50.0	11.1	0.828
	Normal	42	46.7	87.5	48	53.3	88.9	
	Narrow	0	0.0	0.0	0	0.0	0.0	
Spontaneous smile-buccal corridor	Wide	14	51.9	29.2	13	48.1	24.1	0.574
	Normal	33	44.6	68.8	41	55.4	75.9	
	Narrow	1	100	2.1	0	0.0	0.0	
Posed smile-lower lip- incisal contact	Touching	12	46.2	25.0	14	53.8	25.9	0.120
	Not touching	35	51.5	72.9	33	48.5	61.1	
	Overlap	1	12.5	2.1	7	87.5	13.0	
Spontaneous smile-lower lip-incisal contact	Touching	2	16.7	4.2	10	83.3	18.5	0.015*
	Not touching	45	53.6	93.8	39	46.4	72.2	
	Overlap	1	16.7	2.1	5	83.3	9.3	
Posed smile-smile arc	Parallel	40	50.0	83.3	40	50.0	74.1	0.489
	Straight	7	38.9	14.6	11	61.1	20.4	
	Inverted	1	25.0	2.1	3	75.0	5.6	
Spontaneous smile-smile arc	Parallel	40	50.0	83.3	40	50.0	74.1	0.597
	Straight	6	35.3	12.5	11	64.7	20.4	
	Inverted	2	40.0	4.2	3	60.0	5.6	
Posed smile-smile line	Very high	1	50.0	2.1	1	50.0	1.9	0.756
	High	1	33.3	2.1	2	66.7	3.7	
	Average	45	48.9	93.8	47	51.1	87.0	
	Low	1	20.0	2.1	4	80.0	7.4	
Spontaneous smile-smile line	Very high	9	60.0	18.8	6	40.0	11.1	0.602
	High	11	52.4	22.9	10	47.6	18.5	
	Average	26	42.6	54.2	35	57.4	64.8	
	Low	2	40.0	4.2	3	60.0	5.6	

*p<0.05. Pearson's chi-squared test. Fisher's exact test. %C.: Column percentage for gender

TABLE 5: Distribution and comparison of between posed and spontaneous smile measurements according to the gender

Differences between posed-spontaneous smiling	Female $\bar{X}$±SD (M.)	Male $\bar{X}$±SD (M.)	p value
Smile width	3.37±2.83 (2.14)	4.96±3.63 (3.79)	0.016*
Height of smile line	2.07±1.45 (1.6)	2.37±1.87 (1.61)	0.656
Total of visible upper teeth	0.6±0.87 (0)	0.72±0.94 (0)	0.539

*p<0.05. Mann Whitney U test. SD: Standard deviation; M: Median

Table 5 presents the Mann-Whitney U test findings for a comparison of the posed and spontaneous smiles of the participants, categorized by gender, in relation to smile width, smile line height, and total visible teeth measurements. The results showed that males smile width measurement differences are higher than females (p=0.016).

DISCUSSION

This study aimed to analyze the differences in various esthetic parameters between spontaneous and posed smiles with the hypothesis that esthetic parameters such as teeth, gingival display, and lip line height would differ significantly between the 2 smile types. In order to avoid the natural consequences of aging, the study was conducted within a narrow age range of 18-23 years. The finding of our study reveals statistically significant differences in the relationship between smile width, height of smile line, and total of visible tooth between posed and spontaneous smiles, as described in Table 3. Therefore, the portion of our hypothesis related to these specific esthetic parameters is accepted. These findings support the premise that spontaneous smiles, driven by genuine emotion, involve distinct facial muscle activity, leading to variations in smile characteristics compared to posed smiles. While previous research has also highlighted the differences between posed and spontaneous smiles, our study further elucidates the specific nature of these differences in terms of smile arc, lip-to-incisal edge relationship, and total of visible upper teeth.[3,14] Recognizing the dynamic differences between smile types can aid in achieving more predictable and natural-looking treatment outcomes, ultimately enhancing patient satisfaction.

In line with previous research, such as the investigation by Devkota et al. our study demonstrates significant differences between posed and spontaneous smiles, highlighting the potential limitations of relying solely on posed smiles for orthodontic diagnosis and treatment planning.[3] As shown in Table 3, our findings show that there are significant differences between the height of smile line measurements in spontaneous and posed smiles, with spontaneous smile measurements being higher than posed smile measurements. This is consistent with the observation that in the case where the lower lip-incisal contact is touching and not touching in the posed smile, it is mostly found to be not touching in the spontaneous smile. The clinical impact of this difference is significant, underestimating the smile line height in posed smiles may lead to inadequate treatment planning, especially in patients with gummy smiles, where adequate gingival display is of great importance for esthetic purposes.

In parallel with the prior investigation studied by Van Der Geld et al. that they compared the parameters of spontaneous and posed smiles, the results of the present study demonstrate that a posed smile recording displays numerous fundamental differences from a spontaneous smile recording.[11] Therefore, the traditionally used posed smile poses some risks in the diagnosis and predictability of orthodontic treatment and multidisciplinary approaches. As an illustration, the results of this research showed that posed smiling exhibited a considerably reduced lip line height in comparison to spontaneous smiling (refer to Table 3). The parallel findings were that contact was detected in the incisal edge of the lower lip during a posed smile, but not during a spontaneous smile. When the smile line in the posed smile was found to be normal, it was also observed that the smile line in the spontaneous smiles was either normal or high (Table 2). As a result, the smile line height to be measured with a posed smile might be shorter in clinical practice. Undermeasurement of the height of the smile line, particularly in patients with gummy smiles characterized by active upper lip movement, fails to satisfy the esthetic standards intended for the treatment.[15] In addition, smile line height is a significant consideration when prosthetic restorations should be used following

multidisciplinary orthodontics. When this occurs, it may be critical to properly evaluate the smile line.[16]

This study indicated that decreasing in smile width in the posed smile might result in a decrease in both the smile line height and the overall number of visible teeth. Such deficiencies in the assessment of smile esthetics could potentially result in misdiagnoses. Dunn et al. reported that, esthetics would be improved by the appearance of additional teeth when smiling.[15] Martin et al. orthodontists perceived a smile with visible molar teeth as more esthetically pleasing, whereas lay peoples tended to find smiles with visible premolar teeth more appealing.[17] It is essential, at the outset of treatment, to ascertain the number of visible teeth the patient possesses and to develop an appropriate treatment strategy. Wider buccal corridors are generally regarded as less esthetic than minimal buccal corridors.[18,19] In this study, buccal corridors did not differ in width, narrowness, and normality in posed and spontaneous smiles.

Differences between genders in smiling are an important issue.[20] In previous studies comparing the smile esthetic parameters of gender, it was reported that women had shorter upper lip length, higher smile line, more upper incisor view, more parallel smile arc and less buccal corridor view.[16,21-23] Peck et al. hypothesized that a distinction exists between the smile lines of males and females, stated that the upper lip line is positioned 1.5 mm higher in females than in males during a maximal smile.[24] Singh et al. reported that as age increased, so did the height of the low smile in males and the medium smile in females.[25] Parallel with previous studies, this study evaluated the correlation between the incisal edge and lower lip during spontaneous smiling. In the study by Mahn et al. comparing spontaneous and posed smiles, women generally had more gums and teeth than men in all evaluated parameters.[4] Similarly, in the study by Devkota et al. the mean dentogingival appearance in posed and spontaneous smiles was greater in female participants than in male participants.[3] The gender-specific finding observed in our study, that contact between the incisal edge and the lower lip during spontaneous smiling is more common in men, while lack of contact is more common in women, is consistent with observations of gender differences in smile dynamics. The greater variation in smile width changes between posed and spontaneous smiles observed in males in our study could be attributed to females' greater ability to reproduce posed smiles, as suggested by Johnston et al.[26] This is supported by studies indicating that women exhibit more facial movements during smiling and that men and women differ in terms of smiling intensity and frequency.

It is important to acknowledge both the strengths and limitations of this study. A key strength lies in its comparative analysis of posed and spontaneous smiles, providing insights into the dynamic differences between the 2. The detailed assessment of various esthetic parameters, including buccal corridor, smile arc, smile line, total of visible upper teeth, height of smile line, lip-to-incisal edge relationship, and smile width, contributes to a more comprehensive understanding of smile esthetics. Furthermore, the consideration of gender-specific differences adds another layer of depth to the analysis. However, the study also has some limitations. The sample size, while adequate, could be larger to enhance the generalizability of the findings. Additionally, the method of eliciting spontaneous smiles, while aiming for naturalness, might still introduce some degree of artificiality. Future studies could explore the use of more ecologically valid methods for capturing spontaneous smiles in real-life social contexts. Finally, while the study examined several key esthetic parameters, other factors influencing smile attractiveness, such as tooth shade and alignment, were not specifically addressed and could be considered in future research.

CONCLUSION

Posed smiles consistently exhibit less dynamic characteristics compared to spontaneous smiles. The reduced smile line, narrower smile width, and fewer visible teeth in posed smiles suggest that relying solely on posed photographs may lead to an underestimation of a patient's natural smile aesthetics. This is particularly relevant in treatment planning for anterior restorations and orthodontic adjustments, where the full, dynamic smile is a crucial consideration for achieving natural-looking and harmonious outcomes.

Gender influences the difference in smile width between posed and spontaneous smiles. The more pronounced reduction in smile width during posed smiling in males compared to females implies that clinicians should be particularly mindful of potential discrepancies when evaluating smile aesthetics in male patients based on posed photographs.

Source of Finance

During this study, no financial or spiritual support was received neither from any pharmaceutical company that has a direct connection with the research subject, nor from a company that provides or produces medical instruments and materials which may negatively affect the evaluation process of this study.

Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

All authors contributed equally while this study preparing.

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