Impact of Dental Components on Smile Attractiveness – A Perception of Orthodontists, Prosthodontists, Dentists and Layperson

Kalpit Shaha[1], Mukesh Kumar[2], Manish Goyal [3], Ekta Yadav[4], Sumit Kumar[5], Malvika Agarwal[6]

Private Practitioner[1], Professor[2], Principal and HOD[3], Assistant Professor[4, 6], Associate Professor[5]

Department of Orthodontics & Dentofacial Orthopaedics, Teerthanker Mahaveer Dental College and Research Centre, Delhi Road, Moradabad (UP)

ABSTRACT:

Introduction: Facial attractiveness, especially the appearance of one's teeth, has a significant impact on one's whole body image. Aesthetic perception differs from one individual to another and is impacted by personal experience and social milieu. Thus, the aim of our study was to evaluate difference in perceptions of dental professionals and laypersons on variations in different components of smile esthetics.

Method: A frontal smiling photograph was captured. Then, the photograph was altered using Adobe Photoshop CS6 software. 7 esthetic attributes were altered and rated on VAS by 70 orthodontists, prosthodontists, general dentists and layperson.

Results: For orthodontists and prosthodontists, there was a significant intragroup difference in all variables. However, there was no significant intragroup difference in gingival margin of lateral incisors compared to central incisors gingival margin for dentists and laypersons. Furthermore, layperson was unable to detect any differences in the midline shift and width of the lateral incisors.

Conclusion: Layperson accepted a wide range of variations for most characteristics. Before any intervention is considered, the patient's subjective perception of smile aesthetics must be perceived. Orthodontists and prosthodontists were more critical than general dentists and laypersons in rating the various smile esthetic features.

INTRODUCTION

Immanuel Kant (1790), a philosopher, asserted that "The beautiful is that which pleases universally without a concept."[1] Physical attractiveness has a significant impact on an individual's life in many different ways.

Correspondence address: Dr. Ekta Yadav, Department of Orthodontics and Dentofacial Orthopaedics, Teerthanker Mahaveer Dental College and Research Centre, Moradabad, Uttar Pradesh, India.
Email: yadav21ekta@gmail.com

How to cite this article: Shaha K, Kumar M, Goyal M, Yadav E. Impact of Dental Components on Smile Attractiveness – A Perception of Orthodontists, Prosthodontists, Dentists and Layperson. TMU J Dent 2024; 11(1): 10-21.
Submitted: 15 Dec 2023 Revised and accepted: 17 Dec 2023
Doi: https://doi.org/10.58358/tmujd.ort11102o

Furthermore, it has been hypothesized that facial attractiveness is a significantly more powerful indicator of overall attractiveness than physical attractiveness.[2] Facial attractiveness, especially the appearance of one's teeth, has a significant impact on one's whole body image. Not just in adolescence, but also in adulthood, malocclusion can have a negative impact on body image and self-concept.[3] Ratings of personality, intelligence and attractiveness, as well as behavioral intents to engage with others, are impacted by malocclusions. Those lacking a normal occlusion may be at a social

disadvantage and professionally crippled if their judgments are negatively influenced by the effects of malocclusion.[4] Aesthetic perception differs from one individual to another and is impacted by personal experience and social milieu.[5] Several studies show that dental professionals and laypeople have different perspectives on facial aesthetics.[6-8] As a result, dental practitioners must acknowledge their patients' perceptions of smile attractiveness in order to give the most pleasing dental aesthetic treatment.

The fundamental aspect of a smile is a harmonious relation between hard and soft tissues.[9] The shade of teeth, tooth and gingival display, tooth proportionality, gingival aesthetics, smile arc, midline coincidence, presence of buccal corridor space, and cant of the occlusal plane are all evaluated during a smile analysis.[10] Some studies concluded that the buccal corridors have no aesthetic impact on smile appearance[11-12] whereas others concluded that the raters preferred narrow buccal corridor space.[13-16] Consonant smiles were rated as the most attractive in some studies[16-18] while others found no impact of smile arc on attractiveness.[12,19] Gingival display of varying levels were rated as attractive.[20-24] The influence of the maxillary incisors on smile esthetics was demonstrated by many studies with some preferring narrow lateral incisors[25,26] while others broader.[27] The length and width ratio of the central incisors also affected the smile esthetics.[25,28-30]

All these studies were carried out using software manipulated images. The modern era of computer-generated photos opens up a lot of doors for orthodontic aesthetic study. Extremely accurate images, indiscernible from true clinical images, can have a single or number of factors adjusted in specific and repeatable ways to allow for a range of variations.[17]

A trained and vigilant eye can easily perceive asymmetry, or what is out of balance and out of harmony with its surroundings.[31] Professional judgments on facial aesthetics may differ from patients' and laypeople's expectation due to specialized training received by orthodontists in observing and evaluating elements that do not appear to have an impact on the general population.[21,32] In prosthodontics, the expressions of aesthetic considerations are broader and also it is crucial to understand the link between dental-facial aesthetics and psychological factors.[33] Thus, we decided to include prosthodontists along with orthodontists, general dentists and layperson in our study. The aim of our study was to evaluate difference in perceptions of orthodontists, prosthodontists, general dentists and laypersons on variations in different components of smile esthetics.

MATERIALS AND METHODS

This comparative and observational study was carried out in the Department of Orthodontics and was approved by the Institutional Ethical Committee (TMDRC/IEC/19-20/OD11). One female student with normal occlusion[34,35] was selected among the post graduate students. Then we captured a smiling picture of the student with a DSLR camera (Nikon D5600 with 105 mm macro lens ISO 250, F stop 32 and shutter speed 1/45). Informed consent was obtained allowing us to digitally modify her smile and use it in this research. To limit the amount of confounding variables on the photos, the nose, ears and chin were deleted.[5,20,23]

Then, the photograph was modified using Photoshop CS6 software (Adobe Systems Inc, USA). Two smile components (buccal corridor and smile arc) were manipulated, as well as two gingival (gingiva to lip distance and gingival margin of lateral incisor compared to central incisor gingival margin) and three dental

components (maxillary midline shift, central incisor crown length and width ratio and width of lateral incisor). For each attribute, two, three, or four progressive deviations from the original images were made, resulting in 28 digitally altered photos. A total of 21 pictures were analyzed including the 7 original images (Table I; Figure 1 - 7).

Table I. Common anterior esthetic discrepancies and number of deviations.

VARIABLE	DESCRIPTION	RANGE	Original + changes
Smile Arc (Figure 1)	The smile arc should be defined as the relationship of the curvature of the incisal edges of the maxillary incisors and canines to the curvature of the lower lip in the posed smile.[36]	Consonant, Flat and Reverse.	1 + 2
Buccal Corridor (Figure 2)	A space between the buccal surface of the last visible posterior teeth and the corner of the lips when the patient smiles.[37]	0 to 4 mm, with 1 mm interval.	1 + 4
Gingiva to lip distance (Figure 3)	Vertical distance from the gingival zenith of the maxillary central incisors to the nadir of the upper lip above these teeth.[18]	- 2 to 4 mm, with 2 mm interval.	1 + 3
Gingival margin of lateral incisor compared to central incisor gingival margin (Figure 4)	Vertical distance between the apex of the maxillary central incisor gingival margin and the apex of the maxillary lateral incisor gingival margin.[18]	Above CI, At CI and Below CI	1 + 2
Midline shift (Figure 5)	The relationship of the maxillary dental midline (measured between the central incisors) to the midline of the face, defined by the center of the philtrum and the facial midline.[38]	0 to 4 mm to right, with 1 mm interval	1 + 4
Central incisor length & width ratio (Figure 6)	Ratio between the width and the height of the maxillary central incisor crown.	10:8, 8:10 and 10:6	1 + 2
Width of lateral incisor (Figure 7)	Width of the maxillary lateral incisor bilaterally.	-2 to 2 mm, with 1 mm interval.	1 + 4

After modification, the images were adjusted to achieve an actual tooth size image. The photos were scored using a 10 cm Visual Analog Scale (VAS) which has been shown to deliver simple, quick, and repeatable outcomes.[11] It was labelled according to attractiveness extremes on both ends. The left border (zero) was deemed the least attractive, while the right border (10-cm) was deemed the most attractive. To allow the evaluators to provide a score on the VAS, the time constraint for viewing and rating each photograph was 20 seconds with a maximum delay of 10 seconds between images.[39] After rating the smiles, scores were calculated using a properly calibrated digital vernier caliper by an operator. (Digimatic Caliper; Mitutoyo).

A sample size (confidence interval - 95%, power - 80%) of 70 individuals per group was estimated.[15] The study included 4 groups: orthodontists, prosthodontists, general dentists and layperson. The dental professionals having a minimum of 7-year clinical experience and graduate layperson without any history of dental treatment were included.

Figure 1. Manipulation of Smile Arc. A. Consonant; B. Flat; C. Reverse

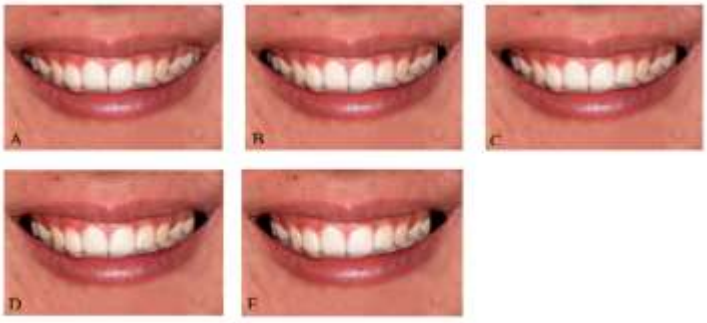

Figure 2. Manipulation of buccal corridor space. A. 0 mm; B. 1 mm; C. 2 mm; D. 3 mm; E. 4 mm.

Figure 3. Manipulation of gingiva to lip distance. A. -2 mm; B. 0 mm; C. 2 mm; D. 4 mm.

Figure 4. Manipulation of gingival margin of lateral incisor. A. Above CI; B. At CI; C Below CI.

Figure 5. Manipulation of midline shift. A. 0 mm; B. 1mm; C. 2mm; D. 3mm; E. 4mm.

Figure 6. Manipulation of central incisor length and width. A. 10:8; B. 8:10 C. 10:6.

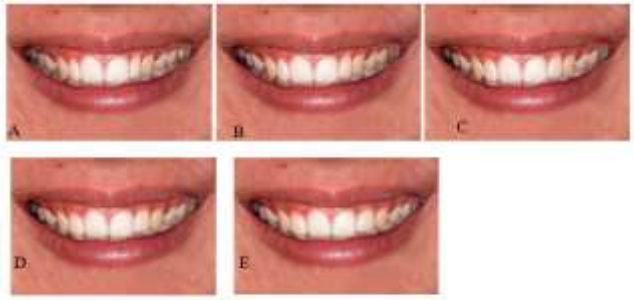

Figure 7. Manipulation of lateral incisor width. A. -2 mm; B. -1 mm; C. 0 mm; D. +1 mm; E.+ 2 mm.

STATISTICAL ANALYSIS

The statistical analysis was performed using Statistical Product and Service Solutions (version 21.0; SPSS Inc., Chicago, Illinois, USA). Intraclass correlation coefficient was used to estimate the intrarater reliability of the esthetic perceptions, 30 raters from each group were randomly selected for re-evaluation after a period of 2 weeks.

Data normality was assessed by Kolmogorov-Smirnov test and the distribution was normal. Levene's test showed that the sample was homogenous. The individual VAS score for each parameter between four groups were assessed and the mean and standard deviation was calculated for all the parameters. Repeated measures one-way Analysis of Variance was used to compare the differences in scores within the four groups for different parameters followed by Tukey's HSD post hoc test. One-way Analysis of Variance with post hoc Tukey's HSD test was applied to compare the difference between the groups. For all tests $p \leq 0.05$ was considered as statistically significant.

RESULTS

There was no significant difference in mean age and gender between the groups (Table II) indicating an even distribution of the sample. The intraclass correlation coefficient (ICC) showed high reliability with value of 0.84 - 0.91. The measurement reproducibility was analyzed by using a paired t test after an interval of 2 weeks and no systematic error was detected ($p > 0.05$).

Table II. Demographic data of the participants

Group	Male	Female	Mean Age	P^x value
Orthodontist	36	34	45.18 ± 6.99	> 0.05
Prosthodontist	36	34	44.96 ± 6.32	> 0.05
Dentist	37	33	41.78 ± 7.72	> 0.05
Layperson	35	35	42.39 ± 5.62	> 0.05
P^y value	> 0.05	> 0.05	> 0.05	

Px – represents intragroup male, female and mean age significant difference

Py- represents intergroup male, female and mean age significant difference

The mean VAS values for the smile arc are shown in Table III and Figure 8. The intergroup comparison showed a significant difference

between laypersons and the dental professionals (orthodontist, prosthodontist, and dentist) for a flat smile arc, while there was no significant difference for consonant and reverse smile arcs between the groups. The intragroup comparison shows that the consonant smile arc received the highest ratings from all the groups and the least by the reverse smile arc. For dental professionals, a significant difference between consonant, flat, and reverse smile arc is seen, while for layperson, no significant difference is seen between consonant and flat smile arc.

Table III. Mean VAS values smile arc with intergroup and intragroup comparisons.

SMILE ARC					
Changes	Orthodontist (G1)	Prosthodontist (G2)	Dentist (G3)	Layperson (G4)	P^x
Consonant	8.29^{aA}	8.28^{aA}	8.63^{aA}	8.7^{aA}	> 0.05
Flat	5.93^{aB}	6.11^{aB}	6.32^{aB}	8.28^{bA}	< 0.05*
Reverse	1.1^{aC}	1.33^{aC}	1.41^{aC}	1.48^{aB}	> 0.05
P^y	< 0.05*	< 0.05*	< 0.05*	< 0.05*	-

[x] Intergroup comparison- reperesented by lower case alphabets

[y] Intragroup comparison- reperesented by upper case alphabets similar alphabets represents no significant difference is present

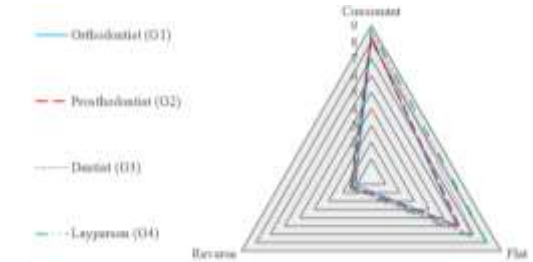

Figure 8. Mean VAS score for smile arc.

Intergroup comparison shows a concord between all the groups for 1 mm of buccal corridor space. There was a significant difference between prosthodontists and other groups for smile with no buccal corridor space. A significant difference was also seen between orthodontist and other groups for 2mm of buccal corridor space. The intragroup comparison showed a significant difference between the variations in each group as the buccal corridor space increased. Prosthodontists rated buccal corridor space of 2mm and 1mm as the most attaractive, while for orthodontists, a decrease in attaractiveness score is seen with an increase in buccal corridor space. The dentists and layperson rated buccal corridor space up to 2 mm as more attractive (Table IV and Figure 9).

Table IV. Mean VAS values for buccal corridor space with intergroup and intragroup comparisons.

BUCCAL CORRIDOR					
Changes	Orthodontist (G1)	Prosthodontist (G2)	Dentist (G3)	Layperson (G4)	P^x
0 mm	8.48^{aA}	7.31^{bA}	8.31^{aA}	8.32^{aA}	<0.05*
1 mm	8.26^{a} A	8.13^{a} B	8.24^{a} A	8.25^{a} A	>0.05
2 mm	7.05^{a} B	8.37^{b} B	8.13^{b} A	8.05^{b} A	<0.05 *
3 mm	4.01^{a} C	4.17^{a} C	4.76^{a} B	6.36^{b} B	<0.05 *
4 mm	3.85^{a} C	3.41^{a} D	3.67^{a} C	6.15^{b} B	<0.05 *
P^y	<0.05 *	<0.05 *	<0.05 *	<0.05 *	

[x] Intergroup comparison- reperesented by lower case alphabets

[y] Intragroup comparison- reperesented by upper case alphabets similar alphabets represents no significant difference is present

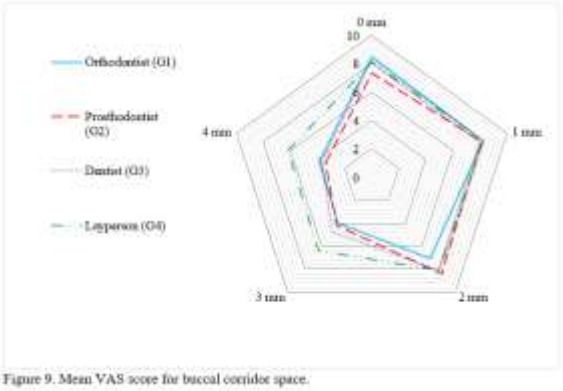

Figure 9. Mean VAS score for buccal corridor space.

Figure 9. Mean VAS score for buccal corridor space.

The gumminess of the smile is decided by the distance between the upper lip and gingival zenith. In this study, 0 mm of gingiva to lip

distance was rated as the most attractive by the orthodontists and prosthodontists. The general dentists and layperson gave highest rating to the smile with 2 mm of gingival show. The intragroup comparison showed that the 4 mm variation received the lowest ratings in all groups. Although the difference was significant yet there was a little difference between the mean values for all variations among layperson (Table V and Figure 10).

Table V. Mean VAS values for gingiva to lip distance with intergroup and intragroup comparisons.

GINGIVA TO LIP DISTANCE					
Changes	Orthodontist (G1)	Prosthodontist (G2)	Dentist (G3)	Laypersson (G4)	P^x
-2 mm	6.43^{aA}	7.43^{bA}	7.57^{bA}	7.98^{bA}	<0.05*
0 mm	8.15^{aB}	8.48^{aB}	7.31^{bA}	8.14^{aB}	<0.05*
2 mm	7.1^{aC}	6.23^{bC}	8.4^{cB}	8.43^{cB}	<0.05*
4 mm	3.13^{aD}	3.68^{aD}	4.31^{bC}	6.71^{cC}	<0.05*
P^y	<0.05*	<0.05*	<0.05*	<0.05*	-

[x] Intergroup comparison- reperesented by lower case alphabets
[y] Intragroup comparison- reperesented by upper case alphabets
similar alphabets represents no significant difference is present

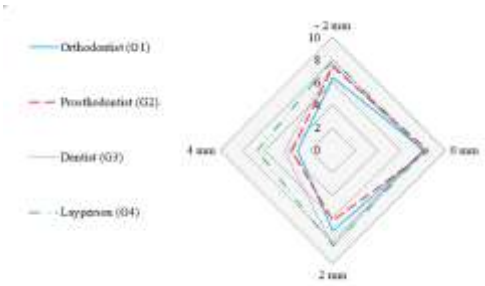

Figure 10. Mean VAS score for gingiva to lip distance.

Although all the groups have given the lowest scores to the position of the gingival margin of lateral incisors above the central incisors, the intergroup comparison shows a significant difference between groups for the gingival margin of lateral incisors compared to the central incisors. In intragroup comparison, no significant difference for any position of gingival margin of lateral incisors compared to central incisors was seen for dentists and laypersons, while orthodontists and prosthodontists show significant differences for different levels of gingival margin of lateral incisors compared to central incisors (Table VI and Figure 11).

Table VI. Mean VAS values for gingival margin of lateral incisor compared to central incisor gingival margin with intergroup and intragroup comparisons.

GINGIVAL MARGIN OF LATERAL INCISOR					
Changes	Orthodontist (G1)	Prosthodontist (G2)	Dentist (G3)	Laypersson (G4)	P^x
Above CI	1.1^{aA}	1.33^{aA}	7.95^{bA}	8.41^{bA}	< 0.05*
At CI	8.13^{aB}	7.92^{aB}	8.27^{abA}	8.68^{bA}	< 0.05*
Below CI	8.29^{aB}	8.28^{aC}	8.43^{aA}	8.7^{aA}	> 0.05
P^y	< 0.05*	< 0.05*	> 0.05	> 0.05	-

[x] Intergroup comparison- reperesented by lower case alphabets
[y] Intragroup comparison- reperesented by upper case alphabets
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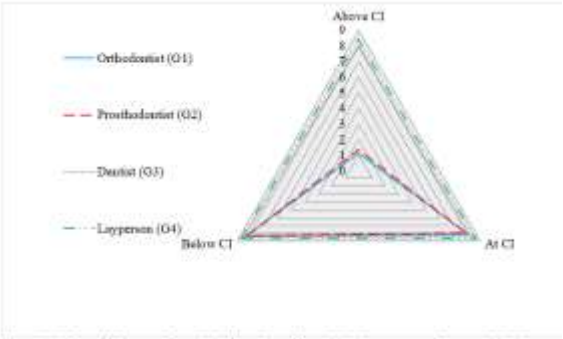

Figure 11. Mean VAS score for gingival margin of lateral incisor compared to central incisor gingival margin.

The smile with a coinciding midline and a 1 mm deviation showed no significant intergroup difference, whereas midline shift of 2mm, 3mm and 4mm showed significant intergroup difference. In intragroup comparison, maxillary midline shift was another variable which the layperson could not identify and showed no intragroup significant difference between all the midline shift variations. On the other hand, prosthodontists clearly down rated the midline shift beyond 1 mm and orthodontists beyond 2 mm (Table VII and Figure 12).

Table VII. Mean VAS values for maxillary midline shift with intergroup and intragroup comparisons.

MIDLINE SHIFT					
Changes	Orthodontist (G1)	Prosthodontist (G2)	Dentist (G3)	Layperson (G4)	P[x]
0 mm	8.2^{aA}	8.47^{aA}	8.11^{aA}	8.31^{aA}	>0.05
1 mm	7.98^{aA}	8.08^{aA}	8.26^{aA}	8.43^{aA}	>0.05
2 mm	7.36^{aA}	2.9^{bB}	8.18^{cA}	8.43^{cA}	<0.05*
3 mm	3.03^{aB}	2.78^{aB}	7.11^{bB}	8.31^{cA}	<0.05*
4 mm	2.85^{aB}	2.51^{aB}	6.81^{bB}	8.2^{cA}	<0.05*
P[y]	<0.05*	<0.05*	<0.05*	>0.05	-

[x] Intergroup comparison- reperesented by lower case alphabets
[y] Intragroup comparison- reperesented by upper case alphabets
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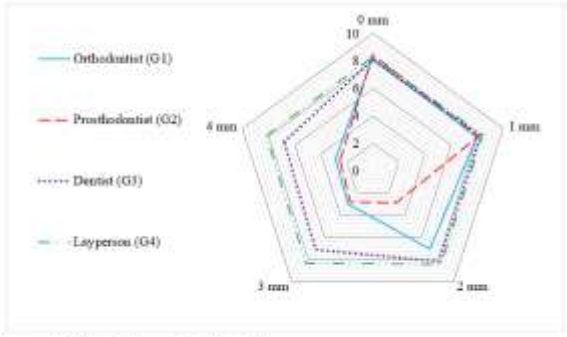

Figure 12. Mean VAS score of midline shift.

The intergroup comparison for changes in the width of lateral incisor up to ± 1 mm was insignificant for all dental professionals. Any variation beyond 1 mm was significantly unattractive for orthodontists, prosthodontists and general dentists. The layperson rated all the variations in lateral incisor width more or less the same with insignificant intragroup difference (Table VIII and Figure 13).

Table VIII. Mean VAS values for changes in lateral incisor width with intergroup and intragroup comparisons.

LATERAL INCISOR WIDTH					
Changes	Orthodontist (G1)	Prosthodontist (G2)	Dentist (G3)	Layperson (G4)	P[x]
-2 mm	6.26^{aA}	4.43^{bA}	7.93^{acA}	8.26^{cA}	<0.05*
-1 mm	8.41^{aB}	7.91^{aB}	8.21^{aA}	8.43^{aA}	>0.05
0 mm	8.75^{aB}	8.26^{aC}	8.13^{aA}	8.66^{aA}	>0.05
1 mm	8.13^{aB}	8.35^{aC}	7.88^{aA}	8.21^{aA}	>0.05
2 mm	4.01^{aC}	6.28^{bD}	7.57^{cA}	8.46^{dA}	<0.05*
P[y]	<0.05*	<0.05*	<0.05*	>0.05	-

[x] Intergroup comparison- reperesented by lower case alphabets
[y] Intragroup comparison- reperesented by upper case alphabets
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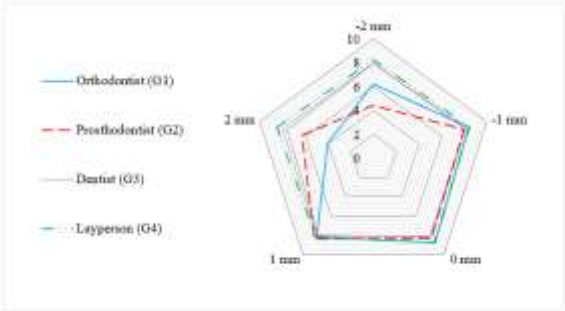

Figure 13. Mean VAS score of variations in lateral incisor width

There was no significant difference in ideal length to height ratio between any of the groups. The orthodontists' ratings for 10:8 and 10:6 were similar. While prosthodontists' ratings were similar for 10:8 and 8:10. A layperson could not identify any changes in the ratio. The general dentists rated 10:8 and 10:6 as more attractive than 8:10, but the difference in the rating was very small. (Table IX and Figure 14).

Table IX. Mean VAS values for changes in central incisor length and height ratio with intergroup and intragroup comparisons.

CENTRAL INCISOR LENGTH AND HEIGHT RATIO					
Changes	Orthodontist (G1)	Prosthodontist (G2)	Dentist (G3)	Layperson (G4)	P[x]
Ideal (10:8)	7.93^{aA}	8.2^{aA}	8.01^{a} A	8.36^{a} A	> 0.05
8:10	5.18^{aB}	7.86^{bA}	7.26^{b} B	8.06^{b} cA	< 0.05*
10:6	7.41^{aA}	5.93^{bB}	7.79^{ac} AB	8.11^{c} A	< 0.05*
P[y]	< 0.05*	< 0.05*	< 0.05*	> 0.05	-

[x] Intergroup comparison- reperesented by lower case alphabets
[y] Intragroup comparison- reperesented by upper case alphabets
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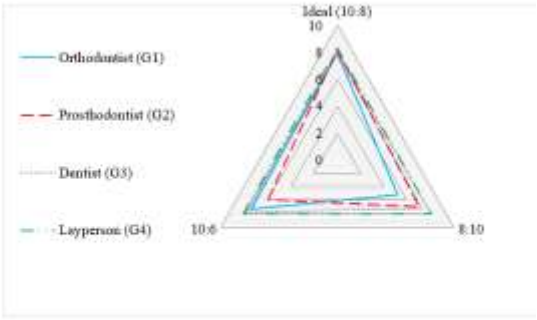

Figure 14. Mean VAS score of variations in central incisor length and height ratio.

DISCUSSION

After consulting with clinically experienced orthodontists, all nine esthetic variables were chosen. These variables were chosen due to their significant prevalence in the community and impact on smile esthetics. Our study is different from others since there are a limited number of studies comparing the difference in opinion between the orthodontists and prosthodontists while there are many comparing each with layperson and general dentist. Thus we tried to present the difference of opinion regarding various features of smile esthetics. In all four groups, both sexes were properly distributed, and the mean ages of the raters were not significantly different. Thus, their mean scores were combined and average was determined for each group.

The smile arc has been evaluated in many researches and the ideal smile arc was rated as the most attractive by orthodontists[16,17,40-42] general dentists[40-42] and layperson[16,17,40,42] alike and the reverse smile arc was rated as least attractive. A similar result was obtained in our study where consonant smile was rated as the most attractive by all the groups. Also the layperson could not identify the difference between the consonant and flat smile arc. These findings suggest that a greater range of deviations are accepted by the layperson than dental professionals, hence the latter must be mindful while pushing their own beauty standards on patients. The reverse smile arc was unattractive for all the groups.

The results of this study shows that the smile with 0 mm of buccal corridor space was rated as the most attractive by the orthodontists, general dentists and layperson while the smile with 2 mm of buccal corridor space was rated as the most attractive by the prosthodontists. A similar result was obtained by the Martin et al,[13] Parekh et al[17] and Abu Alhaija et al[15] in which they found that orthodontists and laypeople both favoured minimal buccal corridor space. In contrast, Oz et al[43] concluded that favourable buccal corridor width by orthodontists is 12 percent, and a buccal corridor width of 0 percent is favoured by prosthodontists, while Roden-Johnson et al[11] and Ritter et al[44] found buccal corridor space to be an insignificant variable.

The gingiva to lip distance is considered to be one of the most important factors in smile esthetics. We found that the 2 mm gingival display was rated as the most attractive by the general dentists and lay person whereas the orthodontists and prosthodontists preferred 0 mm gingiva to lip distance. Öz et al[43] and Kokich Jr. et al[23] also concluded that the 0mm variation was rated most attractive by orthodontists and prosthodontists. This shows that a little gumminess doesn't affect the smile perceptions of layperson. General dentists and layperson in our study rated more or less the same for changes upto ±2mm. This result was in accordance with the study done by Hunt et al[45] and Abu Alhaija et al.[15] Also, some studies found a threshold of 1mm[46], 3mm,[22] 4mm[23] for layperson suggesting that gingiva to lip distance of varying levels are rated attractive thus confirming the fact that esthetic perception differs from one individual to another and is impacted by personal experience and social milieu.[5]

In this study, the inferior position of gingival margin of the lateral incisor compared to the central incisor gingival margin was rated as the most attractive by orthodontists and prosthodontists, while general dentists and layperson, doesn't seem to get affected by the position of the gingival margin of the lateral incisors. A similar result was obtained by Kokich Jr. et al.[23] Al Taki et al[32] found that a lateral incisor gingival height of -1 mm was rated attractive by orthodontists and layperson. In contrast to this study, Kokich Jr. et al[23] and Ker et al[18] concluded that orthodontists, general dentists and laypeople are unable to discern symmetrically changed gingival margins.

The midline shifts of up to 4 mm were not perceived by the lay person in this study, which is consistent to the findings of Kokich et al,[20] Pinho et al[47] and Geevarghese et al.[22] In contrast, Beyer et al[48] and Johnston et al[49] found that the layperson's midline deviation threshold is 2 mm. The orthodontists and general dentists were able to identify the midline shift at 2mm whereas prosthodontists identified midline shift at 1mm. These findings contrasted with those of Kokich et al,[20] who found that only orthodontists could detect a maxillary dental midline deviation of 4 mm and An et al[50] found that when the midline was changed 3 mm, orthodontists identified the difference while general dentists did not notice a significant difference in aesthetics even with a 4-mm deviation. The micro and mini esthetic concepts were lately introduced in orthodontics in comparison to prosthodontics, which may be one of the contributing factor for the difference between the two in identifying the midline shift at varying distance.

The width of lateral incisor was altered by 2mm in our study which showed that the laypersons were unable to identify the changes but the orthodontists, prosthodontists and general dentist could appreciate. This result was in accordance to the study done Kumar et al[21] and Kokich et al[20] who concluded that the change in width of lateral incisor up to 2 mm and 4 mm was undetectable by layperson. On the other hand, the orthodontists, prosthodontists and general dentists were able to identify the changes more than 1 mm. This result was not similar to the studies done by Kokich et al[20] who showed that the threshold for general dentists and orthodontists was 3mm while Kumar et al[21] found that the change in width up to 2 mm was undetectable by general dentists too. This can be attributed to the amount of clinical experience of the dental professionals. Our study also showed orthodontists and general dentists preferred narrower lateral incisor while it was the other way round for prosthodontists.

The ideal central incisor length to width ratio (10:8) was rated as attractive by all the groups in our study. Brisman et al,[28] Alsulaimani et al[25] and Rosenstiel et al[29] found a similar result while Ong et al[2] found that it was not decisive factor in determining dental attractiveness. Further we observed that the orthodontists and general dentists rated longer centrals as 2nd most preferred (after 10:8) while prosthodontists and layerperson rated broader central incisors. A similar outcome was seen in the study done by Brisman et al[28] in which layperson favored wider centrals while general dentists preferred 75-85% ratio in the study done by Wolfort et al[30] This research also showed that the prosthodontists generally preferred wider central and laterals as compared to other groups included in this study. In comparison to dentists and orthodontists, laymen accept a broader range of variation, according to the findings of this study. As a result, professionals must be cautious about imposing their personal beauty standards on patients when doing aesthetic therapy to achieve a beautiful smile. The type and degree of

deviation from the normal, as well as the patient's viewpoint, must all be considered.

CONCLUSION

1. Layperson accepted a wide range of variations for most characteristics. Before any intervention is considered, the patient's subjective perception of smile aesthetics must be perceived.
2. Orthodontists and prosthodontists were more critical than general dentists and laypersons in rating the various smile esthetic features.
3. The changes in smile arc, buccal corridor space and gingiva to lip distance can be identified by layperson while the changes in gingival margins, midline, width of lateral incisor and central incisor crown length to width ratio cannot be appreciated.
4. The orthodontists and prosthodontists had a common opinion regarding smile arc and gingival margins.
5. The orthodontists preferred longer incisors while prosthodontists preferred wider incisors.
6. Slight buccal corridor space was deemed attractive by prosthodontists while orthodontists preferred fuller smile.
7. General dentists could not perceive the changes in gingival margin of lateral incisor and the midline while they were more critical than layperson in rating the other features.

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