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Smile esthetics perceptivity among dental practitioners and other professionals

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ABSTRACT

Aim: To evaluate the perception of ten commandments of the smile esthetics among dental practioners and other professionals.
Materials and Methods: The study population consisted of 540 samples (GroupI: 260 dental practitioners and Group II: 280 other professionals). A web based survey was conducted using google forms. Questionnaire was prepared including all the 10 variables determining smile esthetics using various smile photograph. Each questions has 4 options (A- ideal smile esthetics, B- mild deviation from ideal smile esthetics, C - moderate deviation and D- Marked deviation).The participants were asked to select the most attractive smile (the best options) for each of the ten variables that determines the smile esthetics. The rate the attractiveness of different smile variables were assessed by two group of the study population.
Results: Option A received the highest no: of responses for all the components of smile esthetics by both the dental and other professionals except the sixth and eighth smile component (gingival exposure and midline) where more responses received towards mild deviation from ideal by the other professional than the dental professional.
Conclusion: There is no significant difference between the smile esthetic perception betwen the dental professionals and the other professionals. Orthodontist should pay more attention to improve smile esthetics in coordination with other dental speciality in addition to the correction of malocclusion

1. Introduction

An aesthetic smile has a number of components, and it is generally equated to a good dental and facial appearance forming a tool for success in many areas of life. The factors that determine smile aesthetics provide significant cognizance to post-treatment satisfaction and forecast patient's objectives of undergoing orthodontic treatment.[1] Smile becomes paramount element playing a major role in facial aesthetics.

It's no secret that facial appearance can impact career with 'smile' being the most important attribute. Having an exquistic smile is critical for professional success. A smile is a non-verbal dialogue creating first impressions that speak the loudest. It builds in lots of confidence in day-to-day life. A great smile also suggests to have a positive influence in professional office. Researchers found that employers attach positive attributes, like success, wealth, happiness, health, and intelligence, to people with an appealing smile.[2] A study also shows that 75% of people who received orthodontic treatment as adults reported improvements in their careers and attribute this to their improved smile. The person whose smile was considered "more attractive" was perceived to be a better candidate for an eminent position in professional career.[3]

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Smile esthetics is one of the main reasons for patients seeking orthodontic treatment, and a substantial part of the clinical practice of most dental practices is now influenced by esthetic dentistry and more conscious about a beautiful smile.[4] Hence smile esthetics has become a primary goal in orthodontic treatment and orthodontic speciality is now completely governed by soft tissue pattern. Smile analysis is an essential component helps the orthodontist to formulate an accurate treatment plan.[5] To evaluate a smile, it is appropriate to determine those factors that play an important role in overall dental esthetics and smile aesthetics the orthodontic

Orthodontic literature contains more studies on skeletal structure than on soft-tissue structure, and the smile still receives relatively little attention. An understanding of the principles that determine the balance between the knowledge of dental professionals regarding smile aesthetics and patients'(other professional, very much concerned on smile) perceptions is also essential as the perception of smile esthetics is subjective and is influenced by geographical, racial, cultural, and demographic factors. The beauty of an attractive smile truly is in the eye of the beholder. The patients' personal experience and social environment influence smile esthetics exceedingly than the orthodontists' opinion. Hence this study was endeavouring to compare the perceptivity on smile esthetics between the dental practitioners and other professionals.

2. Materials and Methods

This study protocol was reviewed and approved by the Institutional Review Board (IRB). The study design was in accordance with the STROBE statement.[6] The study population consisted of 540 samples (260 dental practitioners and 280 other professionals). The sample size was determined by a previous study by Mora MG et al 2015 was calculated to be

N = 540, with 80% power at 5% α- error. The study sample was divided into two groups, Group I: Dental practitioners, Group II: Other Professionals. Other professionals include people who socialise with others frequently and are more concerned about their smile like teachers, professors, actress, executives, architects etc.,

2.1. Methods

A web based survey was conducted using google forms. Questionnaire was prepared including all the 10 variables determining smile esthetics using various smile photograph. The photographs used for this study were taken from digital library in Department of orthodontics and dentofacial orthopaedics. Photographs were evaluated by the chief doctor and consent for the patient photograph was obtained.

The ten different smile componentsevaluated for smile esthetics in the study include the following: Smile arc, Maxillary central incisors ratio and symmetry, Anterosuperior teeth ratio, Presence of anterosuperior space, Gingival design, Levels of gingival exposure, Buccal corridor, Midline and tooth angulation, Details — Tooth color and anatomical shape, Lip volume.[7]

Two separate google forms were prepared with same set of questionnaires and circulated among groups. Each questions has 4 options A-D (A- ideal smile esthetics, B- mild deviation from ideal smile esthetics, C - moderate deviation and D- Marked deviation) which is arranged randomly to avoid bias in selection. The participants were asked to select the most attractive smile (the best options) for each of the ten variables that determines the smile esthetics. The rate the attractiveness of different smile variables were assessed by two group of the study population

2.2. Statistical analysis

The data were analyzed using the Statistical Package for the Social Sciences (SPSS) software, version 21.0 (SPSS, Inc., Chicago, IL, USA). For data from the structured questionnaire, descriptive statistics was used. Test of normality was done for the descriptive statistics. The comparison of smile esthetic perception was done using the means of the non parametric Mann Whitney U test. All tests were performed at a 0.05 significance level.

3. Results

In the present study there are totally 240 participants of which 160 participants are dental professionals and 180 participants are other professionals. The group of dental professional was composed of 45.6% of males and 54.4% of females. The group of other professional composed of 47.7% of males and 52.7% of females. The demographic details of the participants were given in Table 1.

Table 2 shows the description of the options given in the questionaire for the ten components of smile esthetics. The options were rearranged in the questionaire in order to avoid bias in selecting the options and Figure 1 shows the photographs used for this study for each of the ten component of smile esthetics and their options. Table 3 shows the total no: of responses registered for each component of smile esthetics under each options and the percentage calculated. The ideal smile esthetics as per literature received the highest no: of responses for all the components of smile esthetics by both the dental and other professionals except the sixth and eighth smile component (gingival exposure and midline) where more responses received towards mild deviation from ideal by the other professional than the dental professional.

hows the results of the Mann whitney U test which is used for comparison between the groups (dental and other professionals) which shows that there is no significant

difference in the perception of smile esthetics between both the groups of professionals. The comparisons of smile perceptions between the two professionals for each options selected for each of the ten components of smile esthetics is shown in Figure 2.

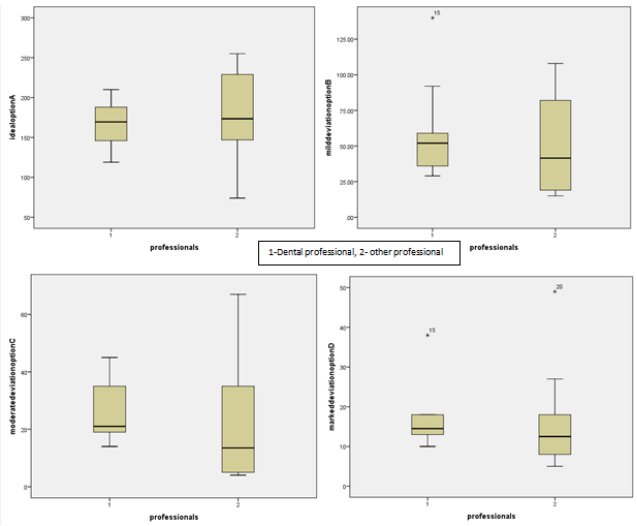

Fig. 1: Photographs used for this study for each of the ten components of smile esthetics and the options.

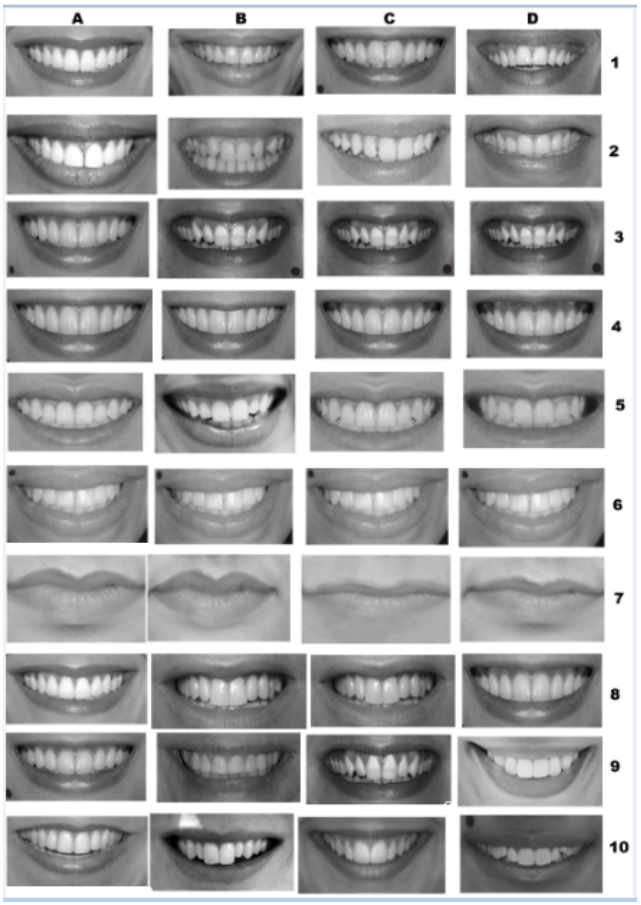

Fig. 2: The comparisons of smile perceptions between the two professionals for each options.

4. Discussion

The smile arc is 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.The ideal configuration of smile arc is described as follows: convex arc, curved arc, consonant arc, deep plate-shaped arc, etc.[8] The other forms of smile arc are plane or straight smile arc in which the incisal edges of teeth in the esthetic zone are nearly at the same level of the edges of posterior teeth, parallel to the ground and nor following the contour of the lower lip. Inverted, reverse or nonconsonant smile arc in which the incisal edges of teeth do not contour the lower lip and have an inverted curvature. Our results are similar to the literature findings where both the dental and the other professionals chose the convex smile arc to be mose esthetic.[9] Hence, it can be corroborated the more arched the incisal edges contour, the younger the smile looks;

The second component of smile is Maxillary central incisors ratio and symmetry.75% W/H ratio widely accepted by women, whereas 85% ratios widely accepted by men and is considered more esthetic. The results of our study clearly shows its revelance to the existing literature view.[10] Any deviation in maxillary central incisor assymmetry was identified as unesthetic by both dental and other professionals. Symmetry between incisal edges is considered to be one of the important factor determining the esthetics.[11]

The 3rd commandment is the proportion between anterosuperior teeth. It is based on the golden ratio initially proposed by Levin in 1978 in which visible lateral incisor width accounts for 62% of central incisor width, while canine width accounts for 62% of lateral incisor width.[12] There seems to exist a strong preference for wider instead of narrower incisors. A narrow lateral incisors do not respect the most esthetically pleasant proportion between anterosuperior teeth. Although, a mild difference in width /height ratio of the anterosuperior teeth remains unnoticed by both dental and other professionals.

The 4th commandment is the presence of anteriosuperior spaces. According to our study, mild midline diastema is generally ignored by both dental and other professionals, however, generalised spacing noticed by both the groups. The presence of anteriosuperior spaces seeks the attention of the public to pursue orthodontic treatment.[13]

The fifth component of smile is gingival design. Ideal gingival design is "Canine gingival margin must coincide with central incisors gingival margin, whereas lateral incisors gingival margin must be slightly below this line".[14] Modified gingival design in which the gingival margin of

Table 1: The demographic details of the participants

Dental Professional (160 participants)		**Other Professionals (180 participants)**	
Males	Females	Males	Females
45.6%	54.4%	47.7%	52.7%

Table 2: The description of the options given in the questionaire for the ten components of smile esthetics

Smile Parameters	**Option A**	**Option B**	**Option C**	**Option D**
Smile arc	Convex or curved smile	Straight smile	Flat smile.	Reverse or inverse smile
Maxillary central incisors ratio and symmetry	Width: height maxillary central incisors is normal	Long and narrow incisors	Long central and lateral incisors	Reduced height/ width ratio of incisors
Proportion between Anterosuperior teeth	Normal proportion evincing golden proportion	Normal dental arch with no ideal proportion between teeth	Short lateral incisors with highly placed canine	Peg shaped lateral incisors
Presence of anterosuperior space	Normal maxillary incisors with no spacing	Midline diastema	Generalised mild spacing	Missing lateral incisors
Gingival design	Normal and healthy Gingiva	High gingival line in canine	High gingival line in both the upper lateral incisors	High gingival design over left lateral incisor
Levels of gingival exposure	Smile with gingival exposureof 2mm	Smile with lip covering the cervical portion of anterior teeth	Smile with no gingival exposure	Smile with gingival exposure around 4 mm
Buccal corridor	Normal buccal corridors	Narrow buccal corridor	Very Narrow buccal corridors	Wide buccal corridors
Midline and tooth angulation	Upper midline coincides with lower midline	Upper midline shifted by 2mm	Upper midline shifted by 3 mm	Upper midline shifted by 4+ mm
Details — Tooth color and anatomical shape	Yellowish white	Bright white	Yellowish	Dull greyish white
Lip volume.	Full lips	Thin lips	Heavy lower lip	Thin upper lip

central and lateral incisors coincide and are slightly (0.5 - 1.0 mm) below canines, the gingival margin of central incisors is below canines (0.5 - 1.0 mm) and the gingival margin of lateral incisors is below central incisors (0.5 mm) following the smile arc. Gingival asymmetries not greater than 1.5 - 2.0 mm between central incisors go unnoticed. The results of our study shows that although ideal gingival design is usually preferred among the dental professionals and the other professionals, high gingival line in canine is also preferred by the other professionals.

The sixth component of smile is Gingival tissue exposure at smile.[15] Different smile lines according to Tjan et al.[16] A) high smile, characterized by total exposure of clinical crowns and continuous strip of gingival tissue; B) medium smile, characterized by great (75%) or total (100%) exposure of clinical crowns and interdental or interproximal papillae; C) low smile, characterized by clinical crown exposure not greater than 75% and no gingival tissue. The results of our study shows that the dental professionals prefer tooth exposure and 2mm of gingival exposure during smiling to be more esthetic but the other professionals considers 0 mm display of upper gingiva during smiling was considered attractive.

The seventh component of smile is buccal corridor space. The buccal corridor is more commonly referred by orthodontists as negative space present between the lateral aspects of maxillary posterior teeth and corner of the mouth during smile which appears as a black or dark space.[17,18] There are three types of buccal corridors: Wide, usually followed by narrow maxillary dental arch, Intermediate and Narrow which is associated with severe transverse dental arches.[19] According to our study Intermediate buccal Corridors are ideal, followed by narrow.

The eighth component of smile is midline of the tooth. Maxillary midline position relative to the facial midline is an important diagnostic feature in orthodontic treatment planning. The incisal edge line of central incisors must be parallel to the interpupillary line.[20] While midline deviations are hardly noticed by laypeople. Midline deviation greater than 2.0 mm and any degree of changes in tooth angulation must be corrected.[21] As per the present study, midline deviation is noticed by the dental professioanls and midline deviation equal to 2mm remains unnoticed by the other professsionals

Table 3: Total no: of responses registered for each component of smile esthetics.

S.No	Components of Smile	Responses (count and % within response)								P value
		A		B		C		D		
		Professional Dentist	Other Professionals	Professional Dentist	Other Professional	Professional Dentist	Other Professionals	Professional Dentist	Other Professionals	
1.	Smile arc	188 72.3%	229 83%	35 13.5%	24 8.5%	22 8.5%	12 4.3%	15 5.8%	15 5.4%	.001
2.	Maxillary central incisors ratio and symmetry	210 80.8%	231 82.5%	36 12.9%	15 5.8%	21 8.1%	4 1.4%	14 5.3%	9 3.2%	.000
3.	Proportion between Anterosuperior teeth	119 45.8%	149 53.2%	92 35.4%	82 29.3%	35 13.5%	25 8.9%	14 5.4%	18 6.4%	.002
4.	Presence of anterosuperior space	204 78.5%	255 91.1%	29 11.1%	15 5.3%	14 5.4%	5 1.8%	13 5%	5 1.8%	.001
5.	Gingival design	187 71.9%	161 57.5%	41 15.8%	94 33.6%	17 6.5%	9 3.2%	12 4.6%	14 5%	.004
6.	Levels of gingival exposure	146 56.2%	98 35%	53 20.4%	108 38.6%	45 17.3%	67 23.9%	16 6.2%	7 2.5%	.061
7.	Buccal corridor	162 62.3%	214 76.4%	59 22.7%	41 14.7%	21 8.1%	15 5.4%	18 6.9%	11 3.9%	.003
8.	Midline and tooth angulation	140 53.8%	74 26.4%	42 16.2%	140 50%	40 15.4%	39 15%	38 14.6%	27 9.6%	.330
9.	Details — Tooth color and anatomical shape	171 65.4%	186 66.4%	59 22.7%	82 29.3%	20 6.9%	4 1.4%	10 3.8%	8 2.9%	.000
10.	Lip volume.	168 64.6%	147 52.5%	51 18.2%	19 7.3%	19 7.3%	35 12.5%	18 6.9%	49 18.8%	.005

Table 4: The comparisons of smile perceptions between the two professionals (Mann whitney U test)

Options	Professionals	Tests of Normality Kolmogorov-Smirnov [a]			Mann Whitney U		
		Statistic	df	sig	z	Asymp. Sig. (2-tailed)	ExactSig. [2*(1-tailed Sig.)]
A (Ideal)	1 (dental)	.128	10	.200*	-.378	.705	.739[b]
	2 (others)	.147	10	.200*			
B (mild deviation from Ideal)	1 (dental)	.306	10	.009	-.644	.520	.529[b]
	2 (others)	.212	10	.200*			
C (moderate deviation)	1 (dental)	.326	10	.003	-1.249	.212	.218[b]
	2 (others)	.225	10	.164			
D (marked deviation)	1 (dental)	.339	10	.002	-.948	.343	.353[b]
	2 (others)	.249	10	.080			

a. Lilliefors Significance Correction
b. Not corrected for ties
*. This is a lower bound of the true significance.

The nineth component of smile is tooth colour and angulation. These are the minute yet efficient details which have to be considered in smile esthetics. Tooth colour should be pleasing to anyone's eyes.[6,22] Yellowish tint or fluoresced teeth usually seems to be unesthetic.

The tenth component of smile is lip volume. Voluminous lips are the current standard of beauty in smile esthetics.[22,23] The result of our study shows that thin lips are generally not preferred.

5. Conclusion

There is no significant difference between the smile esthetic perception betwen the dental professionals and the other professionals. Orthodontist should pay more attention to improve smile esthetics in coordination with other dental speciality in addition to the correction of malocclusion.

6. Conflicts of Interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

7. Source of Funding

None.

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