Evaluation of the Perception of Smile Aesthetics by Laypersons, Dental Students and Dental Practitioners

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Abstract

Background and Objectives: Various factors make a Smile attractive. Perception of smile esthetics varies among individuals as well as dental professionals; this can create a barrier of communication between the patient and the dentist. Thus, a database is required to gauge this difference among our local population. This study aims to assess the perception of smile esthetics among laypeople, dental students and dental practitioners.

Methodology: After taking informed consent 261 participants (Male, Female), took participation in this study. These participants were from different groups, Group A (Dental students n=128), Group B (House Officers n=42), Group C (PG's n=30), Group D (lay persons n=61).The study included both genders, students of clinical years, House officers and Lay persons. Students of non-clinical year as well as dentists of basic sciences were excluded.

Results: For subject 1 and 6, the most selected options are C and C (60% and 73.3% respectively) in male lay persons. In female laypersons the subject 2 and 6, the selected options are A and C (73.9% and 60.8% respectively).

Conclusion: The perception of smile esthetics differs hugely for layperson and dental professionals. The dentists must probe thetype of esthetic features the patient prefers.

Keywords: Dental Esthetic Perception, Smile components, Smile Parameters.

Introduction:

In this era of huge social media influences, esthetic smile has become an indispensable feature for increased perceived attractiveness and social interactions.

Many clinicians have worked on extensive studies to investigate the different features that result in an attractive, well-balanced smile to provide a guide during restorative treatment. However, one must keep in mind that beauty is perceived differently from one person to the other.[1]

Evaluation of smile is a standard protocol before any restorative treatment. Different tools have been devised for this purpose e.g. pink and white esthetics, macro and micro components of smile etc.[2]

These tools take the normal smile features as perceived by the dental clinicians. However, perception of patients and their significant others is much more important because perception of beauty is different among dental clinicians and patients.

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A review of the literature revealed that the perception of smile esthetics among lay person and dental clinicians is still controversial. A survey conducted by Flavia et al included six hundred and thirty-four participants (292 laypersons, 241 dental students and 101 practitioners).

They assessed the esthetic perception of smile of 13 altered pictures of the same subject. Laypersons tended to give higher scores and professionals tended to give lower scores to the same subject. (p-value ranged from 0.000 to 0.5 for different subjects).[3] A study by Hooman in which the orthodontists and laypersons had the same perception of midline deviations andvariations in the golden ratio.[4]

A study by Ousehal showed that the perception of smile among dental professional and lay people was different. Dental professionals were more critical of symmetric crown length discrepancies (p=0.001), gingival exposition (p=0.01), and all increments of maxillary midline deviation (p=0.05).[5]

A study by Aida shows that laypeople and professionals had similar perceptions of smile esthetics. Iranian laypeople reliably identified the components of a beautiful smile.[6] Thus, it appears that clinicians can rely on the judgment of laypersons in esthetic dental treatments.

However, their methodology was different. They used different photographs rather than altering the same image. Compunch assessed the effect of age of layperson on perception of smileaesthetics.

Age of the observer impacts smile perception based on

maxillary gingival display and the presence of a black triangle between the maxillary central incisors, but not of the incisal edge position of the maxillary central incisors.[7,19,20]

This study aims to assess the perception of dental surgeons at Fatima memorial Hospital and address the gaps found in the literature. This will aid in better patient and treatment selection for esthetic procedures.

Methodology:

After taking informed consent 261 participants (Male, Female), took participation in this study. Ethical approval was obtained from the Ethical Committee of FMH. These participants were from different groups, Group A (Dental students n=128), Group B (House Officers n=42), Group C (PG's n=30), Group D (lay persons n=61).

The study included both genders, students of clinical years, House officers and Lay persons. Students of non-clinical yearas well as dentists of basic sciences were excluded.

We took a picture of smiling subject and modified it in Adobe Photoshop 21.1.0 .The modification were as Following, Subject 1 (Buccal corridors variations), Subject 2 (Mideline diastema variations), Subject 3 (Gingival levels variations), Subject 4 (Smile line variations), Subject 5 (Mideline shift variations), Subject 6 (Occlusal Cant variations). Each subject had three different pictures to alter the same factor of smile.

These pictures were set on a A4 size a gloss-paper and shown to the participants individually (fig). The response of participants was collected on a response sheet.

After collection of data the statistical analysis were done in SPSS 1.0.0.1275.

Results:

After applying the inclusion and exclusion criteria the study enrolled 256 participants that had mean age of male (53) is 24.7 and female (203) is 23.5 respectively(Table1).

Table 1: Assessment of age of participants among males and females

Age of participants	n	Range of age in years	Mean age in years	St. Dev. of age in years
Male	53	19-36	24.7	±3.7
Female	203	20-39	23.5	±2.7
Total	256	19-39	23.8	±2.99

The selection of images by participants had influence of their gender, In subject 4 and 6 the most selected options are option B (86.4% and 86.1% respectively) among females.

In subject 1 and subject 5 the most selected options are optionB (26.5% and 33.3% respectively) among males (Table 2).

Table 2: Assessment of perception of smile among males and females

Selected Pictures	Gender	Subject 1	Subject 2	Subject 3
Option A	Male	15(16.4%)	46(21.1%)	31(23.8%)
	Female	76(83.5%)	172(78.9%)	99(76.1%)
	Total	91(34.9%)	218(83.5%)	130(49.8%)
Option B	Male	13(26.5%)	2(22.2%)	17(17.1%)
	Female	36(73.4%)	7(77.7%)	82(82.8%)
	Total	49(18.8%)	9(3.4%)	99(37.9%)
Option C	Male	26(21.4%)	6(17.6%)	6(18.7%)
	Female	95(78.5%)	28(82.3%)	26(81.2%)
	Total	121(46.4%)	34(13%)	32(12.3%)
Selected Pictures	**Gender**	**Subject 4**	**Subject 5**	**Subject 6**
Option A	Male	18(22.3%)	29(16.9%)	10(15.8%)
	Female	61(77.2%)	143(83.1%)	53(84.1%)
	Total	79(30.3%)	172(65.9%)	63(24.1%)
Option B	Male	5(13.5%)	12(33.3%)	5(13.8%)
	Female	32(86.4%)	24(66.6%)	31(86.1%)
	Total	37(14.2%)	36(13.8%)	36(13.8%)
Option C	Male	31(21.5%)	13(24.5%)	39(24.0%)
	Female	113(78.4%)	40(75.4%)	123(75.9%)
	Total	144(55.2%)	53(20.3%)	162(62.1%)

he dental students, HO, PG chose different options in all subjects however, for Subject 2 and Subject 5, the most selected options are option A (89.8% and 90% respectively) (Table 3)

Table 3: Assessment of perception of smile

Qualification of participants related to dentistry	n	Options	Subject 1	Subject 2	Subject 2
Dental Students	128	A	35(27.3%)	115(89.8%)	65(50.7%)
		B	26(20.3%)	3(2.3%%)	51(39.8%)
		C	67(52.3%)	10(7.8%)	12(9.3%)
HO	42	A	17(40.4%)	34(80.9%)	20(47.6%)
		B	7(16.6%)	2(4.7%)	22(52.3%)
		C	18(42.8%)	6(1.4%)	0
PGs	30	A	13(43.3%)	26(86.6%)	23(76.6%)
		B	6(20%)	1(3.3%)	7(23.3%)
		C	11(36.6%)	3(10%)	0
Lay Person	61	A	26(42.6%)	43(70.4%)	22(36.0%)
		B	10(1.6%)	3(4.9%)	19(31.1%)
		C	25(40.9%)	15(24.4%)	20(32.7%)

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Qualification of participants related to dentistry	n	Options	Subject 4	Subject 5	Subject 6
Dental Students	128	A	52(40.6%)	90(70.3%)	44(34.3%)
		B	23(17.9%)	10(7.8%)	16(12.5%)
		C	53(41.4%)	28(2.1%)	68(53.1%)
HO	42	A	5(11.9%)	36(85.7%)	4(9.5%)
		B	0	4(9.5%)	8(19%)
		C	37(88%)	2((4.7%)	30(71.4%)
PGs	30	A	3(10%)	27(90%)	2(6.6%)
		B	1(3.3%)	1(3.3%)	3(10%)
		C	26(86.6%)	2(6.6%)	25(83.3%)
Lay Person	61	A	19(31.1%)	19(31.1%)	13(21.3%)
		B	13(21.3%)	21(34.4%)	9(14.7%)
		C	29(47.5%)	21(34.4%)	39(63.9%)

Lay person choose different options for each subjects however, for subject 2 and 6, the most selected options are A and C (70.4% and 63.9% respectively). The influence post graduate residency is shown in table 4.

Table 4. Assessment of perception of smile between post graduate students

Specialty of post graduates Prosthodontics	n	Options	Subject 1	Subject 2	Subject 2
Prosthodontics	6	A	2(33.3%)	6(100%)	5(83.3%)
		B	2(33.3%)	0	1(16.7%)
		C	2(33.3%)	0	0
Orthodontics	5	A	5(100%)	4(80%)	2(40%)
		B	0	0	3(60%)
		C	0	1(20%)	0
Maxillofacial surgery	2	A	1(50%)	2(100%)	1(50%)
		B	1(50%)	0	1(50%)
		C	0	0	0
Operative dentistry and endodontic	9	A	3(33.3%)	8(88.9%)	8(88.9%)
		B	2(22%)	0	1(11.1%)
		C	4(44.4%)	1(11.1%)	0
Periodontics	4	A	0	4(100%)	4(100%)
		B	2(50%)	0	0
		C	2(50%)	0	0
Total	4	A			
		B			
		C			

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Specialty of post graduates Prosthodontics	n	Options	Subject 4	Subject 4	Subject 5
Prosthodontics	6	A	1(16.7%)	5(83.3%)	0
		B	0	0	0
		C	5(83.3%)	1(16.7%)	6(100%)
Orthodontics	5	A	0	4(80%)	0
		B	0	0	2(40%)
		C	5(100%)	1(20%)	3(60%)
Maxillofacial surgery	2	A	1(50%)	2(100%)	0
		B	0	0	0
		C	1(50%)	0	2(100%)
Operative dentistry and endodontic	9	A	1(11.1%)	8(88.9%)	0
		B	0	1(11.1%)	1(11.1%)
		C	8(88.9%)	0	8(88.9%)
Periodontics	4	A	0	4(100%)	1(25%)
		B	0	0	0
		C	4(100%)	0	3(75%)
Total	4	A			
		B			
		C			

All post graduate students have chosen different options in all subjects however, for subject 1 and 6, the most selected options are A and C(100% respectively). Dental fraternity and laypersons with male and female ratio chose different options in all subjects ,however, for subject 2 and 6, the most selected options are A and C(94.8 and 71.7% respectively)in male and dental fraternity. In Female dental fraternity the subject 2 and 5, the most selected options are A and A(85.7 and 78.8% respectively)(table 5).

Table 5: Assessment of perception of smile between dental fraternity and laypersons with male to female ratio

	n	Gender	Options	Subject 1	Subject 2	Subject 3
Dental Fraternity	200	Male	A	12(30.7%)	37(94.8%)	23(58.9%)
			B	10(25.6%)	0	14(35.8%)
			C	17(43.5%)	2(5.1%)	2(5.1%)
		Total		39	39	39
		Female	A	53(32.9%)	138(85.7%)	85(52.7%)
			B	29(18%)	6(3.7%)	66(40.9%)
			C	79(49%)	17(10.5%)	10(6.2%)
		Total		161	161	161
Lay Persons	61	Male	A	3(20%)	9(60%)	8(53%)
			B	3(20%)	2(13%)	3(20%)
			C	9(60%)	4(26%)	4(26%)
		Total		15	15	15
		Female	A	23(50%)	34(73.9%)	14(30.4%)
			B	7(15.2%)	1(2.1%)	16(34.7%)
			C	16(34.7%)	11(23.9%)	16(34.7%)
		Total		46	46	46
0	261					

	n	Gender	Options	Subject 4	Subject 5	Subject 6
Dental Fraternity	200	Male	A	12(30.7%)	26(66.6%)	8(20.5%)
			B	1(2.5%)	3(7.6%))	3(7.6%)
			C	26(66.6%)	10(25.6%)	28(71.7%)
		Total		39	39	39
		Female	A	48(29.8%)	127(78.8%)	42(26%)
			B	23(14.2%)	12(7.4%	24(14.9%)
			C	90(55.9%)	22(13.6%	95(59%)
Lay Persons	61	Male	A	6(40%)	3(20%)	2(13%)
			B	4(26%)	9(60%)	2(13%)
			C	5(33.3%)	3(20%)	11(73.3%)
		Total		15	15	15
		Female	A	13(28.2%)	16(34.7%	11(23.9%)
			B	10(21.7%)	12(26%)	7(15.2%)
			C	23(50%)	18(39.1%	28(60.8%)
		Total		46	46	46
0	261					

For subject 1 and 6, the mosts elected options are C and C(60 and 73.3% respectively), in male by Laypersons.In female laypersons , the subject 2 and 6, the selected options are A and C(73.9 and 60.8%). subject 1 to 6 is shown on figure 1 to 6.

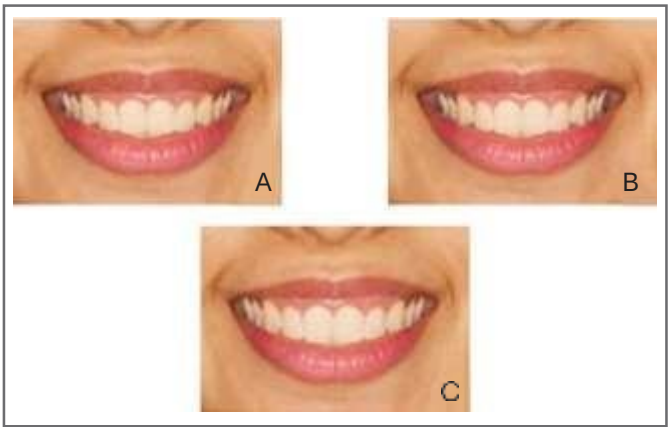

Figure 1: Buccal Corrdior

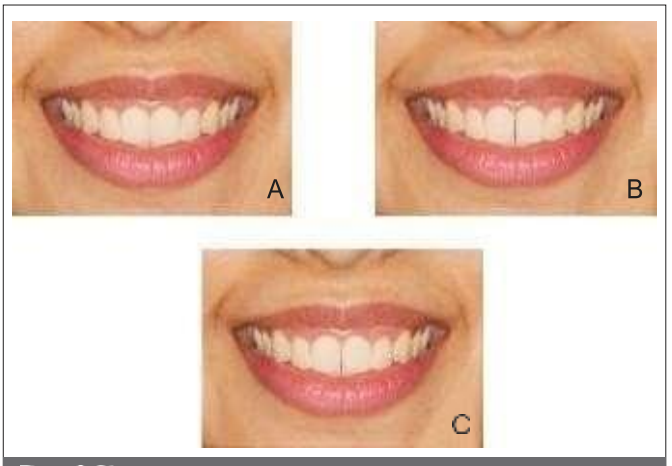

Figure 2: Diastema

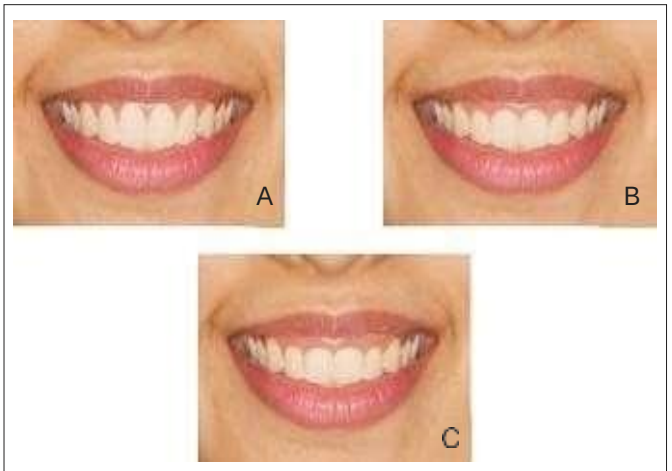

Figure 3: Gingival Levels Subject 3

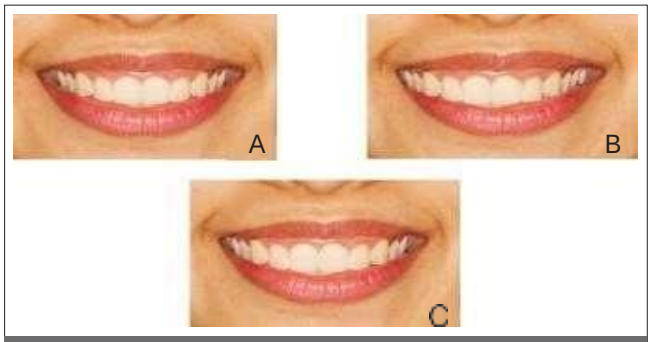

Figure 4: Smile Line Subject 4

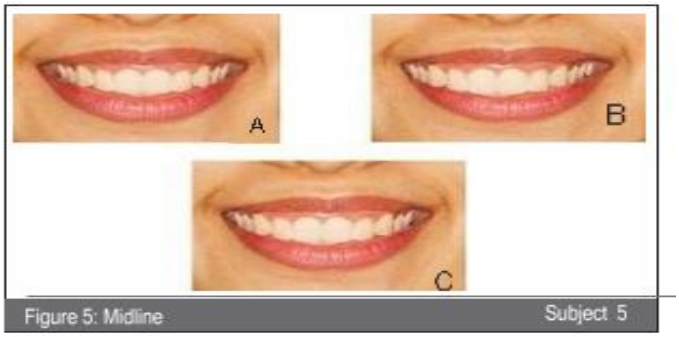

Figure 5: Midline Subject 5

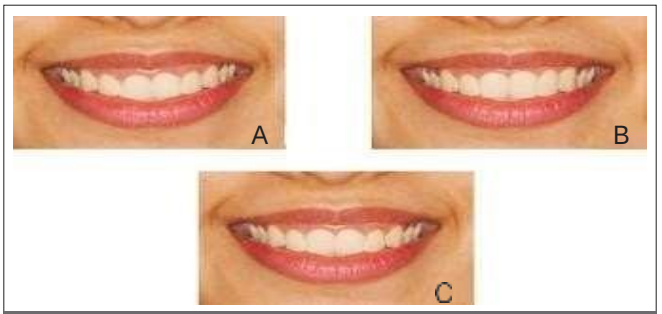

Figure 6: Occlusal Cant Subject 6

Discussion:

This study explored the perception of esthetic standards and perception of laypersons and dental community.[20] These perception play a vital role in the success as well as patient/dentist satisfaction for the esthetic dental procedures.[8]

Smile line is one of the most crucial screening parameters for esthetic procedures. We found out that medium smile was preferred by dentists and laypersons alike. This was in accord with a study carried out by Flavia cracel-Nogueira.[3] Midline diastema is considered to be esthetic in some Middle Eastern and African-American subjects9; however this is not preferredin most parts of the world.

Our study showed that midline diastema was least preferred smile parameter. This was in accord with many studies in literature. Sweta K. Pisulkar reveals that smiles with buccal corridors were judged to be more aesthetics by laypersons,orthodontist,and prosthodontists.[10]

It was assessed that smiles with BCSs were much more pleasing for prosthodontists and orthodontists. Even though laypersons could not appreciate BCSs , they rated smiles with BCSs to be aesthetically more acceptable . This study is in accordance with our study. The important aspect to be highlighted here is that many laypersons do not appreciate the minor aspects of smile.[11] These features may require extensive surgical and restorative features to be corrected, thus the dentist may be too much involved in the smile rehabilitation, whereas the patient might not be able to notice the difference.[12] This was reflected in our study where the dental fraternity found the gummy smile unattractive while the laypersons did not. This was in accordance with our study.

If the dentists insists on correcting these features and the patient do not appreciate them, this can cause either loss of trust of patient, chances of over treatment or a smile that patient never wanted.[16]

We would like to reflect upon few of our shortcomings, we observed that few participants were distracted by the shade of teeth and skin, thus these variables can be addressed in future studies. The subject was a 2D photograph, perhaps live subjects or use of 3D technology could've helped us get more reliable results that would've been a more realistic clinical scenario.[17,18]

Conclusions:

Based on the findings of our study, the following conclusions were obtained; the dental fraternity has shown their interest more in smile with no buccal corridors while the laypersons have chosen the smile with medium smile buccal corridors. Diastema differences, The perception was the same among dental fraternity and laypersons similarly for subject 3 (Gingival height differences), subject 4 (Smile line), and subject 6 (Occlusal cant differences).

Midline shift differences, the dental fraternity showed more interest in the smile with no midline shift while the laypersons failed to identify the differences in midline shifts and chose the smile with midline shifts. When comes to dental professionals, the orthodontists has chosen the smile with medium buccal corridors while rest of the dental specialists did not identify buccal corridors differences.

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2. Abu Bakar Ameer- Manuscript Writing and Data collection
3. Muhammad Talha Khan- Data Analysis and Interpretation
4. Zahid Iqbal - Critical Analysis and Reviewer
5. Shan e Zohra - Manuscript writing and Interpretation
6. Umair Tariq - Data collection, Paper Writing and Study Design