Original Article

Perception of Laypeople and Dental Professionals of Smile Esthetics

Aida Saffarpour [1]☞, Maryam Ghavam [2], Anna Saffarpour [3], Rozita Dayani [4], Mohammad Javad Kharazi Fard [5]

[1] Assistant Professor, Operative Dentistry Department, Dental Faculty, Tehran University of Medical Sciences (International Campus), Tehran, Iran
[2] Associate Professor, Department of Operative Dentistry, School of Dentistry, Tehran University of Medical Sciences, Tehran, Iran
[3] Assistant Professor, Periodontics Department, Dental Faculty, Tehran University of Medical Sciences (International Campus), Tehran, Iran
[4] Dentist, Tehran, Iran
[5] Epidemiologist, Dental Research Center, Dentistry Research Institute, Tehran University of Medical Sciences, Tehran, Iran

Abstract

Objectives: This study aimed to assess and compare the perception of laypersons and dental professionals of smile esthetics based on two factors namely gingival display and alignment of teeth.

Materials and Methods: A total of 32 females were randomly selected among dental students in the International Campus of School of Dentistry, Tehran University of Medical Sciences (Tehran, Iran) with no previous history of esthetic dental work. Frontal photographs were obtained and cropped from the subnasal to menton areas of subjects to standardize the size of pictures. Three series of slides were prepared of the pictures using Microsoft PowerPoint software. The first series of slides were shown to familiarize the observers with the images. The second and third series were displayed for the observers and they were then asked to fill out a questionnaire. The group of observers included 10 dental specialists and 10 laypersons. Each observer was given a visual analog scale (VAS) chart for scoring (1-10). After completion of the questionnaires, data were transferred to a computer and the differences in judgments of professionals and laypeople were analyzed using the Mann Whitney test.

Results: No significant difference was found in the judgments of professionals and laypeople on evaluating overall smile esthetics, gingival display and alignment of teeth except for the slide showing a reverse smile arc.

Conclusions: Laypeople and professionals had similar perceptions of smile esthetics. Thus, it appears that clinicians can rely on the judgment of laypersons in esthetic dental treatments.

Keywords: Smiling; Perception; Esthetics, Dental

Journal of Dentistry, Tehran University of Medical Sciences, Tehran, Iran (2016; Vol. 13, No. 2)

☞Corresponding author:
A. Saffarpour, Department of Operative Dentistry Dental Faculty, Tehran University of Medical Sciences, Tehran, Iran

aidasfp@gmail.com

Received: 4 July 2015
Accepted: 27 December 2015

INTRODUCTION

A beautiful smile plays a fundamental role in facial beauty. At present, many patients demand a beautiful smile and it is among the most important reasons for patients seeking esthetic dental treatments. With advances in dental science and the decreased prevalence of dental caries, the demand for esthetic dental treatments has greatly increased. In order to provide esthetic dental treatments, clinicians should have adequate knowledge of the principles of orofacial and dental esthetics. However, it should be noted that the principles of beauty vary depending on the culture and ethnicity [1]. Also, since the anterior teeth are often the center of attention and judgment of patients and dentists, restoration of the anterior teeth is very important [2].

Dental researchers have proposed several definitions and concepts for beauty and esthetic proportions especially for the anterior teeth since these teeth play a critical role in smile esthetics. Several components play a role in creation of a beautiful smile including a proper smile arc, the status of buccal corridors, the golden ratio and the proportionality and symmetry of the smile components [3,4].

On the other hand, esthetic criteria and perception of beauty vary from one person to another and are influenced by the social characteristics as well as the professions of

individuals [2]. Furthermore, esthetic treatments are subject to constant changes. Many studies have identified and discussed the factors that play a role in an attractive smile [3-6]. It seems that the size of teeth and their alignment, visibility of teeth and the upper lip position have the greatest effect on creation of an attractive smile [2]. In addition, minimal gingival display while smiling is assumed more esthetic than excessive showing. Geron and Atalia [7] reported that maxillary gingival exposure of up to 1 mm was regarded as attractive. Kokich et al, [8] reported that the laypeople and orthodontists rated a 3 mm distance from the gingiva to the lips as unattractive. Another important factor is the parallelism of the maxillary anterior incisal curve and the lower lip and its asymmetry [2,3]. Moreover, it appears that laypersons are also capable of recognizing the characteristics of an ideal smile [9]. However, many specialists do not pay much attention to unnecessary correction of small asymmetries or dissimilarities since they believe that most patients cannot detect them [10].

On the other hand, the results of some previous studies on the perception of attractiveness of smile by laypeople and professionals have been controversial. Krishnan et al, [11] found no difference in the perception of specialists and laypeople of smile arc and buccal corridor measurement. Parekh et al, [12] assessed the variations in the acceptability of smile arc and buccal corridor space and reported no significant difference in the preferences of laypeople and orthodontists in this regard. Barros et al, [13] assessed the perception of orthodontists and laypersons of a gradual decrease in tooth and gingival display when smiling and reported no significant difference in esthetic perception of the examiners. Talic et al, [14] showed that dentists gave a lower score to crown length and crown width discrepancies, midline deviation and change in the gingiva to lip distance compared to laypersons. Abu Alhaija et al, [15] revealed a significant difference in the judgment of professionals and laypeople. Mcleod et al, [5] showed that Canadian laypeople were much more sensitive than Americans in detecting deviations from an ideal smile and concluded that cultural differences related to smile characteristics definitely exist.

Many factors can influence the formation of esthetic beauty standards including culture [16]. Although some previous studies on the role of buccal corridor and golden proportion in smile attractiveness have been performed [5,14,15], there was no published paper comparing the perception of smile esthetics among the Iranian laypeople and dental specialists. With this background, the aim of this study was to evaluate and compare the esthetic perception of frontal view of smiles among the Iranian dental specialists and laypersons based on overall smile evaluation, gingival display, asymmetric smile arc and alignment of teeth.

MATERIALS AND METHODS

A total of 32 females in the age range of 20-30 years were randomly selected among dental students attending the dental clinic of International Campus, School of Dentistry, Tehran University of Medical Sciences, Tehran, Iran in academic year of 2013-2014, with no history of esthetic dental work. The inclusion/exclusion criteria were as follows [11]:

1. No history of orthodontic or orthosurgical treatment
2. Having a complete dentition (except for third molars)
3. Overjet and overbite of 2-5mm
4. No history of periodontal disease or periodontal treatment (scaling and root planning)
5. Normal height of the upper lip
6. No craniofacial anomaly
7. No malocclusion
8. No canting of maxillary occlusal plane
9. Absence of moderate/severe dental crowding

These subjects had completely sound anterior

Fig. 1: Ideally esthetic smile

Fig. 2: Gummy smile pose

teeth with no wear, restoration, spacing or orthodontic problems. Photographs were obtained of the posed smiles of these patients under standard, equal conditions. Subjects had no makeup on when taking the pictures. Written informed consent was obtained from all subjects. The slides only showed the subnasal to menton area and the subjects' face could not be seen on the photographs. Photographs were taken by a Canon PC 468 zoom lens 14×15 (Canon, Tokyo, Japan) digital camera from 2 meters distance in such a way that the lens was at the level of the subject's mouth. Photographs were taken while the subjects were looking straight ahead. The distance of all subjects from the camera was the same. Photographs were taken by a professional photographer in a sunny day at noon, under adequate light while subjects were seated upright on a chair. The photographs were transferred to a computer and cropped by Adobe Photoshop 11:06 software (Microsoft Corporation, Washington, USA) to standardize the size in such a way that the pictures showed only the subnasal to menton area.

A total of 32 pictures of 32 patients taken under the same conditions were arranged in three series of slides using Microsoft PowerPoint 2007 software (SPSS Inc., IL, USA) [11]. In the first series of slides, the pictures were arranged randomly. The objective of showing the first series of pictures was to familiarize the observers with the pictures and obtaining an overall assessment. In the second series, the pictures were arranged randomly from #1 to #32. The objective of showing the second series was to answer the general question of the questionnaire. In the third series, the arrangement of pictures was changed, e.g. from #15 to #32, and then from #1 to #15, and the observers were again asked to answer the questions after watching the third series. Also, the observers were allowed to take notes and mention their opinions about each answer in the questionnaire. The observers consisted of 20 subjects including 10 specialists (2 orthodontists, 2 prosthodontists, 2 periodontists, 2 operative dentists and 2 general dentists) and 10 laypeople (randomly selected from patients presenting to the clinic of dental school.) The laypeople did not have any previous knowledge about the proposed criteria for an esthetic smile [11]. In the first series of slides (aiming to familiarize the subjects with the pictures), the time allocated for viewing each slide was 15 seconds. In the second series of slides, 15 seconds of time was allocated to answer the first question of the questionnaire. Each subject was given a VAS chart with a 1-10 rating scale (1 indicated very bad and 10 indicated very good) [11]. This chart was for the first question of the questionnaire. Images had to be scored. Slides were shown on a large screen using a slide projector (Philips Multimedia Projector No.LC 3631/40; Philips, Amsterdam, Netherland) under similar conditions in terms of distance and lighting. The distance of all observers from the screen was 3 meters and each subject looked at the screen right in the middle. After answering the first question, a 5-minute

Fig. 3: Reverse smile arc pose

Fig. 4: Minimal show of dental papilla pose

break was given. If subjects gave a score of less than 8 (in terms of esthetics) to any smile picture, they were asked to answer the three questions following viewing the third series of slides (Figs. 1 and 2).

The third series were shown to the observers and 45 seconds of time was allocated for viewing each slide. It should be mentioned that the slides in the third series were also coded but did not follow the same sequence as in the second series. Also, when showing the third series, the observers were allowed to write down the reason why they believed a certain smile was not beautiful in their opinion next to each question. After filling out the questionnaires, the data were transferred to a computer and analyzed using SPSS software (SPSS Inc., IL, USA) and Mann Whitney test. The difference in the judgment of professionals and laypersons was analyzed as well [11].

RESULTS

Descriptive statistics are shown in Table 1. In assessment of the slides, no significant difference was found in the opinions of the laypeople and dental professionals regarding overall smile evaluation, gingival display and alignment of teeth except for the slide #21 (P=0.09) showing a reverse smile arc and slide #32 (P=0.017) indicating minimal show of dental papilla (Figs. 3 and 4).

DISCUSSION

The current study aimed to assess to what extent dental professionals in Iran can rely on the esthetic judgment of laypersons since these subjects are the seekers of esthetic treatments provided by dentists. We aimed to assess and compare the esthetic perception of laypeople and professionals of the frontal smiling view of subjects and the level of agreement between them. The results of this study showed no significant difference in perception of professionals and laypersons of smile esthetics.

Esthetic perception is a subjective experience and may change based on the common beliefs and standards of a community. Based on the results of the current study, no significant difference was observed between the perspectives of the laypeople and dental professionals except for the slide #21 (P=0.09) showing a reverse smile arc and slide #32 (P=0.017) indicating minimal show of dental papilla. In this study, we randomly took photographs of smiles of 32 subjects. In some previous studies, smiles were digitally modified; however, this may result in artificial smiles and influence the results [8,11,13,15-19]. On the other hand, we asked the laypersons to judge the images. Even first and second year dental students (who had yet to learn the principles of esthetics) were not included since they may have encountered esthetic issues via their family, field of education, etc. We focused on general questions, which are more important from the viewpoint of operative dentists including:

1. Gingival display and its effect on smile esthetics

Table 1. Scores given by the laypeople and dental professionals to pictures of posed smiles and the related P-values

Question	Laypeople	Professionals	P-value
1	6.2±2.2	7.1±0.56	0.36
2	5.8±2.6	6.6±1.07	1
3	7.7±1.8	7.0±1.41	0.165
4	5.7±2.2	6.3±0.67	0.912
5	5.4±2.2	4.4±0.84	0.105
6	4.8±2.1	5.4±1.42	0.73
7	7.2±1.3	6±1.41	0.63
8	4.7±1.2	5.2±0.78	0.43
9	6.8±1.6	6.8±0.78	0.73
10	7.3±1.8	7±1.05	0.43
11	6.7±2.4	6.7±1.2	0.57
12	5.9±2.1	7.5±0.7	0.35
13	6.4±2.4	6.4±1.07	0.39
14	6.3±1.3	6.7±0.82	0.57
15	6.5±1.08	6.4±0.96	0.85
16	6.6±1.2	6.6±1.7	0.79
17	6.7±1.4	7.5±0.84	0.21
18	7.6±1.1	7.5±0.97	0.63
19	6.8±1.6	7.8±0.42	0.165
20	7±1.4	7.1±0.99	1
21	5.8±2.1	6.4±0.69	0.79
22	6.1±1.9	7.9±1.03	0.16
23	7.2±2.4	6.9±0.99	0.24
24	5.6±2.05	6.4±0.69	0.35
25	6±1.7	6.6±0.96	0.52
26	6.1±1.5	6.6±0.96	0.57
27	6.7±1.9	6.8±1.03	0.57
28	7±1.41	5.4±1.7	0.43
29	4.1±1.6	5.9±1.2	0.23
30	6.6±1.2	7.5±1.1	0.123
31	5.1±1.8	4.9±2.2	0.34
32	5.2±2.09	6±1.1	0.43

2. Asymmetric smile and its effect on smile esthetics
3. Leveling and aligning of teeth

Other factors involved in smile esthetics were not considered because by an increase in the number of questions, the risk of errors will increase (due to the tiredness of observers). The opinion of each group of specialists alone was not evaluated in this study and needs to be evaluated in future studies. Krishnan et al, [11] quantified smile characteristics with regard to the smile arc and buccal corridor measurement. Parekh et al, [12] assessed the variations in the acceptability of smile arc and buccal corridor space. Kokich et al, [8] evaluated altered dental esthetics (symmetry and asymmetry) and Barros et al, [13] evaluated the tooth and gingival show when smiling and assessed the difference in the opinions of the professionals and laypersons with regard to smile esthetics. None of the above-mentioned studies found any significant difference in this regard, which confirms our findings.

Abu Alhaija et al, [15] evaluated the role of buccal corridor and gingival show in smile esthetics and Talic et al, [14] evaluated the effect of midline deviation, width and length of crown and gingival display on smile esthetics based on the perspectives of laypeople and professionals. The above-mentioned studies found significant differences between the two groups of laypersons and professionals in this regard; which was in contrast to our findings. Such differences in the results may be due to the effect of cultural differences on esthetic perception. However, a definite conclusion cannot be drawn in this regard because even studies conducted in the same country have shown controversial results. Assessment of the questionnaires filled out by laypersons revealed that the reason for rating the smile in slide #32 (question 1) as unattractive was minimal papilla show in the image. In slide #21 (question 2), asymmetric smile arc (reverse smile arc) was not clearly detectable by the laypeople. The following results were also obtained: Asymmetry of the upper lip in a complete smile was clearly detectable by laypersons and they believed that when smiling, the upper lip must preferably be slightly higher than the gingival line; which confirmed the findings of a previous study [6]. Moreover, in a full smile, upper lip above the gingival line and 2mm or more of gingival show above the

gingival line compromise esthetics. Laypeople believed that gummy smile (more than 2mm of gingival show) in a full smile was completely unaesthetic. They also rated borderline smiles (about 1.5 to 2mm of gingival show) as unaesthetic. It should be noted that smiles in which the gingiva was not seen at all were also rated as unaesthetic. Thus, they believed that in an ideally beautiful smile, dental papilla must be completely seen.

Distal half of the maxillary canines seen in a frontal smiling view is believed to be unaesthetic and when the eye moves laterally, each tooth must look narrower than its mesial neighboring tooth. Also, extrusion of canines or asymmetric canines (bilaterally) are believed to be unaesthetic from the viewpoint of laypersons.

Crowding or asymmetry of the teeth was easily detectable by laypeople in our study and this finding was also in accord with the results of previous studies [11-13]. Also, laypeople had the same esthetic perception as professionals and correctly detected the reason behind an unaesthetic smile to some extent. Therefore, it appears that in esthetic dental treatments, laypeople's judgment can be relied on after all.

CONCLUSION

Within the limitations of this study, laypeople and professionals had similar perceptions of smile esthetics. Iranian laypeople reliably identified the components of a beautiful smile. Thus, it appears that clinicians can rely on the judgment of laypersons in esthetic dental treatments.

REFERENCES

1- Flores-Mir C, Silva E, Barriga ML, Lagravere MO, Major PW. Layperson's perception of smile aesthetics and facial views. J Orthod. 2004 Sep;31(3):204-9.

2-Dong JK, Jin TH, Cho HW, Oh SC. The esthetics of the smile: a review of some recent studies. Int J Prosthodont. 1999 Jan-Feb;12(1):9-19.

3- Morley J, Eubank J. Macroesthetic elements of smile design. J Am Dent Assoc. 2001 Jan;132(1):39-45.

4- Ackerman MB, Ackerman JL. Smile analysis and design in digital Era. J Clin Orthod. 2002 Apr;36(4):221-36.

5- McLeod C, Fields HW, Hechter F, Wiltshire W, Rody W Jr, Christensen J. Esthetics and smile characteristics evaluated by laypersons. Angle Orthod. 2011 Mar;81(2):198-205.

6- Albino JE, Tedesco LA, Conny DJ. Patient perception of dental-facial esthetics: shared concerns in orthodontics and prosthodontics. J Prosthet Dent. 1984 Jul;52(1):9-13.

7- Geron S, Atalia W. Influence of sex on the perception of oral and smile esthetics with different gingival display and incisal plane inclination. Angle Orthod. 2005 Sep;75(5):778-84.

8- Kokich VO, Kokich VG, Kiyak HA. Perceptions of dental professionals and laypersons to altered dental esthetics: asymmetric and symmetric situations. Am J Orthod Dentofacial Orthop. 2006 Aug;130(2):141-51.

9- Mahshid M, Khoshvaghti A, Varshosaz M, Vallaei N. Evaluation of "golden proportion" in individuals with an esthetic smile. J Esthet Restor Dent. 2004;16(3):185-92.

10- Tjan AH, Miller GD, The JG. Some esthetic factors in a smile. J Prosthet Dent. 1984 Jan;51(1):24-8.

11- Krishnan V, Daniel ST, Lazar D, Asok A. Characterization of posed smile by using visual analog scale, smile arc, buccal corridor measures, and modified smile index. Am J Orthod Dentofacial Orthop. 2008 Apr;133(4):515-23.

12- Parekh SM, Fields HW, Beck M, Rosenstiel S. Attractiveness of variations in the smile arc and buccal corridor space as judged by orthodontists and laymen. Angle Orthod. 2006 Jul;76(4):557-63.

13- Barros ECDS, Carvalho MDOD, Mello KCFR, Botelho P, Normando D. The ability of orthodontists and laypeople in the perception of gradual reduction of dentogingival exposure while smiling. Dental Press J Orthod. 2012 Sep-Oct; 17(5):81-6.

14- Talic N, Alomar S, Almaidhan A. Perception of Saudi dentists and lay people to altered smile esthetics. Saudi Dent J. 2013 Jan;25(1):13-21.
15- Abu Alhaija ES, Al-Shamsi NO, Al-Khateeb S. Perceptions of Jordanian laypersons and dental professionals to altered smile aesthetics. Eur J Orthod. 2011 Aug;33(4):450-6.
16- Oumeish OY. The cultural and philosophical concepts of cosmetics in beauty and art through the medical history of mankind. Clin Dermatol. 2001 Jul-Aug;19(4):375-86.
17- Rosa M, Olimpo A, Fastuca R, Caprioglio A. Perceptions of dental professionals and laypeople to altered dental esthetics in cases with congenitally missing maxillary lateral incisors. Prog Orthod. 2013 Oct 1;14:34.
18- Ker AJ, Chan R, Fields HW, Beck M, Rosenstiel S. Esthetics and smile characteristics from the layperson's perspective: a computer-based survey study. J Am Dent Assoc. 2008 Oct;139(10):1318-27.
19- Chang CA, Fields HW Jr, Beck FM, Springer NC, Firestone AR, Rosenstiel S, et al. Smile esthetics from patients' perspectives for faces of varying attractiveness. Am J Orthod Dentofacial Orthop. 2011 Oct;140(4):e171-80.