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ORIGINAL RESEARCH

Evaluating the knowledge of general dentists regarding smile aesthetic indices in Isfahan

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Abstract

Background: With a proper understanding of smile esthetic indices and criteria, dentists can provide patients with the best diagnosis and treatment plan or refer them to relevant specialists. Thus, This study aimed to evaluate the knowledge of general dentists in Isfahan regarding smile aesthetic indices and criteria.

Materials and methods: In this descriptive cross-sectional study a questionnaire was administered to 105 general dentists in Isfahan City, consisting of questions about demographics, awareness of smile aesthetics indicators, and the impact of training and occupational therapy on their knowledge. The questionnaire included 11 pictures of smiles, each with a single beauty indicator that varied from ideal, with options for desired indicators listed for each photo. The data was analyzed using T-tests and Mann-Whitney statistical tests (α=0.05).

Results: The results showed that the level of knowledge about smile esthetic indices among general dentists was varied. Among participants, 56.2% and 1.0% showed the highest and lowest level of knowledge, respectively. Age showed a reverse relation to knowledge (P=0.040, r= -0.201) even though no correlation between gender and beauty retraining courses to knowledge was found (p > 0.05).

Conclusion: The level of knowledge of dentists participating in the study of smile esthetic indices was good.

Keywords: knowledge, Smiling, Esthetics, Orthodontics

Introduction

Today, smile appearance is a prime priority for people seeking orthodontic treatment. They understand that evenly balanced and attractive smiles can enhance their attractiveness, intelligence, and social appeal (1). Smiling is crucial to human communication and can profoundly impact social interactions. However, what constitutes an appealing smile can vary depending on geography, race and culture (2). Patients requesting aesthetic treatments aim to achieve a visually appealing or, at the very least, a normal-looking set of teeth. Thus, it is influential to identify and eliminate any unwanted features in the patient's smile and facial structure. With the growing demand for aesthetic dentistry, having a deep understanding of aesthetic standards can significantly enhance the appearance of the mouth and face (3).

Most of the studies so far have examined the perceptions of separate groups of smiles, and the focus of these studies has been generally on ranking smile attractiveness without determining and defining variables that would effectively jeopardize smile attractiveness (4).

Different factors that affect the aesthetics of a smile include the position, shape, and color of teeth, the alignment of teeth (especially anterior teeth), the position of the upper lip, the display of incisors and anterior or posterior teeth, the dental midline, the length and dimensions of teeth, the zenith points, the axial inclination of teeth, the contact area, interdental contact points, and incisal embrasures, along with soft tissue components including gum health, gingival surfaces, and their harmony, interdental embrasures and the smile line, as well as personality, age, and gender.

Studies have evaluated the perception of smile aesthetics among dentists and the public. Most of these studies have concluded that these groups differ in their expectations of smile aesthetics (7, 8). Among different specialties of dentistry, orthodontists are more sensitive

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about facial aesthetics than other dentists.
Pizzo Reis et al (9) conducted a study on the aesthetic impact of diastema and concluded that closing maxillary midline diastema was a significant aesthetic improvement for patients. In the study by Althagaf (10), the fifth-year dentistry students had a greater understanding of the aesthetic components of a smile compared to their fourth-year counterparts, and female dentistry students were superior to their male counterparts.
Dentists who are knowledgeable in aesthetic indicators and criteria can provide the most effective treatment plan to improve a patient's smile. Even if the treatment required isn't within a general dentist's area of expertise, they can refer patients to specialists who can help. Studies have shown that dentists who are aware of smile aesthetics are better equipped to understand their patients' problems and desires, leading to more accurate diagnoses and treatment plans. This awareness can also improve satisfaction levels among both patients and dentists and reduce complaints resulting from mistakes made due to a lack of knowledge. This study aimed to measure the familiarity of smile aesthetics indices among general dentists in Isfahan City.

Materials and methods

In this descriptive-cross-sectional study with the ethical code of IR.IAU.KHUISF.REC.1400.173), 105 general dentists from Isfahan City were enrolled (62 females and 43 males).
Dentists were given a questionnaire based on a study conducted by Al-Saleh et al. (4). This questionnaire collected demographic information and examined the relationship between age, gender, participation in retraining courses, personal studies, and occupational therapy on awareness of smile aesthetic treatments. The questionnaire included 11 smile images, each with one aesthetic index deviating from the ideal characteristics and a flawless image. Below each picture, there were multiple-choice options to identify intended indices. The chosen images met aesthetic and credible standards. (11-17) (Figure 1).



Figure 1. Images of smiles where each image contained only one beauty index that deviat

Ten seniors examined the validity of the questionnaire in orthodontics and restoration education groups of Isfahan Azad Faculty of Dentistry. To measure the reliability of the questionnaire internal consistency method and Cronbach-alpha coefficient were used. The alpha coefficient for the entire questionnaire was calculated to evaluate the internal consistency of items and obtained as 0.724, showing the acceptable reliability of the questionnaire.
Instructions were given to dentists on how to complete the questionnaire online and select the most significant aesthetic problems related to smiles:
- Dental midline discrepancy
- Excessive gingival display
- Decreased incisal display
- Dental proportions
- Wide buccal corridor
- Cant of the occlusal plane
- Dental malalignment
- Interdental diastema
- Non-consonant smile arc
- Interdental black trainable
- Problem-free

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Responses were scored to assess awareness of indices (correct=1, wrong=0). Domains were categorized as low (0-2), moderate (3-8), or high (9-11) awareness.
To ensure the normal distribution of data, we used Kolmogorov–Smirnov test. We analyzed the data using a t-test, Mann-Whitney test, Spearman correlation coefficient test, and SPSS 24 software. We considered an error value of 0.05 to be acceptable for this study.

Results

Regarding age, most dentists were 26-30 years (56.2%). Also, 25 subjects (23.8%) of dentists had a history of participating in smile aesthetics retraining courses. Further, 67 subjects (63.8%) had personal studies about aesthetic treatments, and 46 (43.8%) performed therapeutic practice on smile aesthetics.
Among the various indices for assessing smile aesthetics, the detection of interdental diastema had the highest awareness (99.0%), while awareness was lowest for detecting non-consonant smile arc (44.8%) (Table 1).

Table 1. Frequency distribution of general dentists based on the level of awareness of different indicators of smile beauty

Indicator	Correct answer	Wrong answer	total
	No(%)	No(%)	No(%)
Excessive gingival display	99 (94.3)	6(5.7)	105(100)
Wide buccal corridor	56(53.3)	49(46.7)	105(100)
Dental proportions	79(75.2)	26(24.8)	105(100)
Decreased incisal display	68(64.8)	37(35.2)	105(100)
Dental malalignment	83(79.0)	22(21.0)	105(100)
Problem-free	85(81.0)	20(19.0)	105(100)
Cant of occlusal plane	87(82.9)	18(17.1)	105(100)
Dental midline discrepancy	90(85.7)	15(14.3)	105(100)
consonant smile arc-Non	47(44.8)	58(55.2)	105(100)
Interdental diastema	104(99.0)	1(1.0)	105(100)
Interdental black trainable	93(88.6)	12(11.4)	105(100)

The extent of general dentists' awareness of indices related to smile aesthetics was low, moderate, and high in 1 (1.0%), 45 (42.9%), and 59 (56.2%) dentists, respectively.
The results of the Mann-Whitney test showed no significant difference in the awareness scores of male (8.52±2.01) and female (8.44±1.96) general dentists regarding indices related to smile aesthetics.(p=0.779)
Based on the Spearman correlation coefficient test, there was an inverse significant relationship between the age of general dentists and scores of awareness of smile aesthetic indices (p=0.040, r=-0.201). As a person ages, they may become less aware of the importance of smile aesthetics.
The results of the Mann-Whitney test showed awareness about smile aesthetics indices did not differ significantly among dentists regarding the history of participation in aesthetics retraining courses (p=0.541), personal studies on aesthetic dentistry (p=0.299), and working in the aesthetic treatment field (p=0.253) (Table 2).

Table 2. Comparison of the knowledge score of smile beauty indicators of general dentists in Isfahan based on the experience of participating in beauty retraining courses

Variable	Category	No	Mean ± SD	P value
participation in aesthetics retraining courses	Yes	25	8.32±1.93	0.541
	No	80	8.54±2/01	
personal studies on aesthetic dentistry	Yes	67	8.67±1.80	0.299
	No	38	8.16±2.25	
working in aesthetic treatment field	Yes	46	8.76±1.79	0.253
	No	59	8.27±2.11	

Discussion

The study assessed the knowledge of general dentists of aesthetic indices, as they are responsible for enhancing dental aesthetics and correcting smiles. According to the results of the present study, with an increase in age, the awareness of smile aesthetic indicators decreased. In the study conducted by Sriphadungporn et al. (18), the impact of age on smile aesthetic perception was evaluated using three indices: the incisal edge position of maxillary incisors, the maxillary gingival

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display, and the presence of a black triangle between the maxillary incisors. The study found a difference in aesthetic perception between the young and older groups, which is in accordance with the results of the present study. More aged dentists did not receive much education in this regard, and their lack of willingness to update their information might be responsible for the difference observed between age groups.

In examining the dentist for the effect of gender on the level of awareness of indices related to smile aesthetics, the present study results showed that the opinions of female and male participants about the examined indices were similar, which is in line with the results of other studies (4, 19, 20). Nevertheless, Althagaf (10) showed that female dentistry students had a better perception of smile aesthetics compared to males. The impact of gender on dental-facial aesthetic perception is heavily culture-dependent (16). In the study by Abu Alhaija et al. (21), gender affected the smile attractiveness ranking, where females were more sensitive to the presence of gingival display and midline diastema compared to males.

Among different indices of smile aesthetics, interdental diastema had the highest awareness (99.0%), by the results of other studies (4, 9). Thus, dentists, orthodontists, and even individuals with no dental knowledge believe dental diastema is a significant factor in evaluating smile attractiveness and evaluation.

According to the findings of our study, detecting non-consonant smile arcs had the least amount of awareness, with only 44.8% accuracy. Al-Saleh et al. (4) found that reverse smile lines were rated poorly, but they did not explain why. Thus factors that contribute to smile curve aesthetics and their impact on smile aesthetics are not clearly understood.

According to the study, a vast majority of dentists - 94.3% - were familiar with the issue of excessive gingival display. Najafi et al. (19) revealed, smiles with minimal gingival display received the highest scores. Geron and Atalia (22) found that people with excessive gum exposure when smiling are considered less attractive. Results show dentists have a good understanding of the gingival display index. However, the study by Al-Saleh et al. (4) reported that only 50% of participants were knowledgeable about the impact of gingival display on aesthetic smiling, indicating an average level of understanding.

In the present study, 88.6% of the participants had sufficient awareness of the interdental black triangle. Davis (23) mentioned inter-dental black triangle has a high negative impact on smile aesthetics. In the study by Al-Saleh et al. (4), specialized dentists had greater awareness of understanding the interdental black triangle than general dentists, who could only detect the interdental black triangle at a height of more than 3 mm. In the present study in 85.7% of cases, participants diagnosed dental midline discrepancy accurately, showing a higher awareness than in other studies (4, 24). The reason might be a prominent midline deviation in the present study.

In examining the extent of awareness about the occlusal Cant index, 82.9% correct detection was found. In the study by Al-Saleh et al. (4), an image rotated up to 2˚ was acceptable aesthetically. However, only 36% of dentists were able to detect it precisely. In the present study, the extent of occlusal plane Cant was higher than 2˚, and awareness was also higher. The greater awareness of this index in the present study can be due to a higher degree of occlusal Cant.

53.3% of participants made a correct diagnosis of the Wide buccal corridor index. This was by the study by Al-Saleh et al. (4), in which the respondents preferred narrow buccal corridor space to wider spaces. However, it was not considered a major index in evaluating the lack of aesthetics. However, this can be related to participants of that study who mainly were students with naturally a lower awareness of this index (4). In the study by Najafi et al. (19), dental students gave lower scores to smiles with a wide buccal corridor.

The appearance of teeth is a significant factor in determining the attractiveness of a smile. In one study misaligned teeth, disproportionate dental ratios, and decreased display of the front teeth were accurately identified in 79.0%, 76.2%, and 64.8% of cases, respectively. Furthermore, this study found that smiles with dental aesthetic deviations received a lower attractiveness score. However, participants were not always able to detect these deviations. Again lack of awareness can be related to the fact that some participants in that study were students rather than experienced dentists. This information suggests that maintaining proper dental alignment is essential for an attractive smile (4).

Conclusion

Dentists participating in this study showed a high awareness regarding smile aesthetic indices. The most significant amount of awareness was related to detecting the diastema, and the lowest to the smile arc index.

Conflict of Interests: None

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