

# Perception of Dentists and Laypeople toward Altered Smile Characteristics in a Sample of Iraqi Adults

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## ABSTRACT

**Introduction:** Smile aesthetic is a crucial component in facial attractiveness. **Objective:** The current study aimed to determine and compare perception of smile aesthetic between two groups of Iraqi population (dentists and laypeople) and to assess gender effect on smile aesthetic perception.

**Methods:** An electronic questionnaire contained six groups of smile images to assess gingival display, Buccal Corridor Space (BCS), unilateral and bilateral lateral incisor crown width, diastema and incisor midline. Each group contained number of images for certain smile feature changed incrementally, responders rated the attractiveness of each image by utilizing a 5-point Visual Analogue Scale (VAS). For each image, the mean and standard deviation was computed, Independent T-test was used to compare between male and female. To compare dentists and laypeople, the Mann Whitney U (MWU) test was utilized.

**Results:** Participants were 330 individuals classified into 185 laypeople (121 female and 64 males) and 145 dentists (83 females and 62 males). No significant difference in aesthetic perception between men and women except in rating 1 mm reduction in lateral incisor crown width unilaterally and 1 mm diastema in dental group and in rating 0.5 mm reduction in lateral incisor crown width unilaterally in laypeople where female rated them significantly poorly. In evaluation perception of dentists and laypeople, significant difference between both groups in rating narrow buccal corridor, bilateral 1.5 mm reduction in lateral incisor width, gingival display of  $\geq 1$  mm, midline shift of  $\geq 2$  mm and 2 mm diastema where dentists rated them significantly poorly.

**Conclusion:** Female are more sensitive to alteration in lateral incisor width and diastema. Dentists perceived smile aesthetic differently in comparison to laypeople. In order to get excellent results, dentists and patients must collaborate in treatment planning.

**Key words:** Smile aesthetic, Dentists, Laypeople, Gender, Visual analogue scale

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## INTRODUCTION

Physical attractiveness is a crucial aspect of social interaction. Attractive individuals enjoy higher academic success and positive assessments than unattractive ones, resulting in increased self-confidence [1]. In most cultures, facial beauty, as a component of physical attractiveness, is an important social concern because it is an important aspect in personality evaluations, performance, and interpersonal success in settings such as school and work. People usually focus on the eyes and mouth of others during interpersonal encounters [2]. After the eyes, the smile is the second most important feature in face attractiveness [3]. Therefore, a beautiful, well balanced

smile is a primary priority for patients and dentists, and Patients seeking orthodontic and cosmetic therapy are more concerned with their appearance and social acceptance than with oral function or general health [4]. Furthermore, the impact of the media, which plays a significant role in increasing patient's awareness of the ideal smile and shifting their perception toward distinct smile features, is one of the primary causes of this increased demand for cosmetic therapy [5].

The analysis of a person's smile is an important aspect of a comprehensive face examination which is done by dental professionals. Assessment the patient's smile aids the clinicians to conduct a suitable treatment plan. The dentist's assessment would be based on objective factors like the Buccal Corridor Spaces (BCS), midline position, existence of a diastema, relationship between the shape and colours of teeth and ratio between the gingiva and lips [6]. On the other hand, subjective smile judgments are affected by a variety of features such as race, region,

culture, media, economic status, age, gender, and other people's perceptions [7-9].

Gender has an impact on how people perceive smile aesthetics [10]. In a study conducted by Ameer AL in 2019, females differ significantly from male in their perception regarding smile arc, gingival display and lateral incisor crown width [11]. Another aspect that influences smile aesthetics perception is age. In study conducted by Sriphadungporn and Chamnannidiadha in 2017, they discovered that various age groups view some anomalies differently, such as gingival smiles and black triangles [12].

Dental practitioners must comprehend the patient's notion of smile aesthetics in order to provide the best dental aesthetic treatment. When it comes to smile aesthetics, dental experts and the general population have quite diverse views [13,14]. Even within the dental field, specialty and years of professional experience play a role in forming different perceptions; orthodontists are more critical than dental practitioners and laypeople in observing and assessing factors that do not appear to affect general dentists and laypeople [15,16]. In 2006, Kokich presented how orthodontists, dentists, and laypeople in the United States viewed asymmetric and symmetric changes to the teeth and tissues [17]. Similar investigations have been carried out in a number of Middle Eastern countries like Dubai [18] Jordan [19] and Saudi Arabia [20]. On the other hand, Saffarpour in 2016 observed no variations in aesthetic perception between specialists and laypeople in term of smile evaluation [21].

There is a scarcity of data on patients' and dentists' perceptions of various smile features in Baghdad city in Iraq. This study was conducted on the basis that Iraqis' aesthetic standards may differ from those of other countries, So the aims of current study are evaluation the perception of smile aesthetic in Baghdad/Iraq to determine the point at which various factors start to affect smile attractiveness in dental and laypeople groups and to assess if the gender has an effect on perception of smile aesthetic.

## MATERIALS AND METHODS

This questionnaire based study was permitted by the review board of the Dijlah university college. The study carried out between March 2021 and June 2021 among lay people and dentists (practitioners and non-orthodontic specialist).

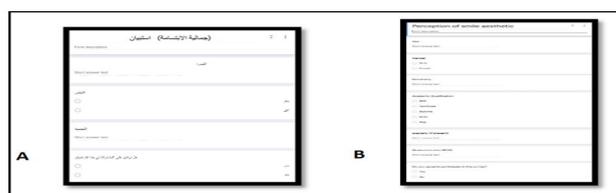
The questionnaire was constructed on a Google platform, and the link was shared by means of WhatsApp, Telegram and Facebook using sponsor ad, the respondents filled up the form anonymously. The questionnaire containing a paragraph where respondents could provide their permission to take part in the study. Any received response that does not contain consent would be neglected.

The target population consisted of Iraqi lay people and dentists. Any responders who are less than 18 years, from another nation, incomplete reply, not gave his/her

consent to participate in study and orthodontists would be discarded.

Validation of the questionnaire was based on previous study conducted by Geevarghese et al. [22]. It was modified and two versions of questionnaire were created: one in English language for dentists and another in native language (Arabic language) for laypeople.

The questionnaire consist of two sections, the demographic part was the first one. The demographic data section was included in both variants of questionnaire, which included age, gender and nationality. The year of graduation and academic qualification have been included in the dental questionnaire form as shown in Figure 1.



**Figure 1: Socio-demographic part of questionnaire; a) Laypeople group version; b) Dental group version.**

The second part of questionnaire includes opinions of the participants in six groups of smile photographs with variable aesthetic characteristics. In each group, there are several photographs one of them representing the control smile which is changed incrementally to create the other photos for certain aesthetic variable. The both groups of raters (dental group and lay people group) evaluate each photograph's attractiveness by using a 5-point numeric rating scale (VAS). The images of this study were obtained by digitally manipulation of female individual smile. A colored image was obtained for the female smile with features near to standard norms using a digital camera (SONY model no. DSC-HX1, Japan) in the frontal position. The photograph was taken by following a standardized method in which the participant was placed 5 feet away from the camera, head in natural position [23]. The photograph was digitally altered with Adobe Photoshop software to achieve the desired aesthetic standards [24]. An ideal control smile was developed to act as a reference and golden model for the remaining photographs [25]. The original smile was used only to create the ideal control smile. The applicant completed a consent form giving us permission to digitally change her smiling image and use it in this inquiry.

Afterward, the control smile was utilized to construct smiles that deviated from esthetic conventions *via* digital modifications. The smile characteristics in the photographs were altered incrementally in order to create discrepancies in smile esthetics.

**Aesthetic variables selected in this study were as follow:**

- **Buccal corridor:** The amount of black space visible between the facial surfaces of the posterior teeth and the mouth's corners, the photograph was modified

bilaterally by increasing (narrow BC) or reducing (wide BC) the number of teeth showing posteriorly as shown in Figure 2.

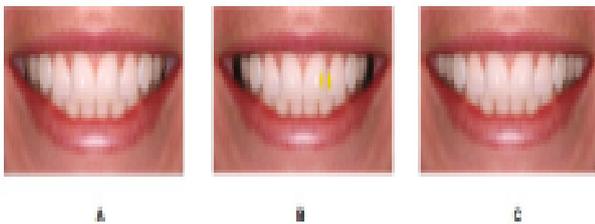


Figure 2: Buccal corridor, A) Normal BC; B) Wide BC; C) Narrow BC.

- **Gingival display:** The level of gingiva-to-lip margin (gingival show) was altered incrementally by 0.5 mm. Modifications were based on the relationship of the upper lip with the gingival margin of the maxillary central incisors when smiling as shown in Figure 3.



Figure 3: Gingival display, A) 0.5 mm below gingival margin; B) Normal (within gingiva); C) 0.5 mm above gingival margin; D) 1 mm above gingival margin; E) 1.5 mm above gingival margin; F) 2 mm above gingival margin.

- **Diastema:** A midline diastema was introduced between the maxillary central incisors by a 0.5 mm increment measured from interproximal contact point of the central incisors as shown in Figure 4.

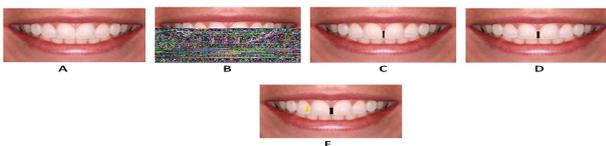


Figure 4: Diastema, A) Normal; B) 0.5 mm; C) 1 mm; D) 1.5 mm; E) 2 mm.

- **Incisor midline:** The relationship between the maxillary dental midline (measured between the central incisors) and the face's midline, as defined by the philtrum's centre. For this variable, the ideal was defined as 0 by definition Figure 5.



Figure 5: Midline, A) Normal; B) 1 mm; C) 2 mm; D) 2.5 mm midline shift.

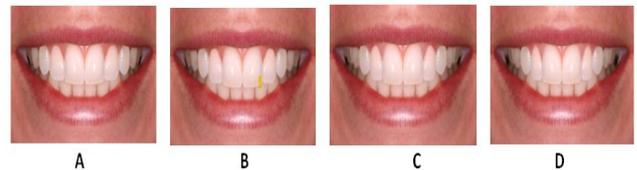


Figure 6: Symmetrical crown width change, A) Normal; B) 0.5 mm; C) 1 mm; D) 1.5 mm maxillary lateral incisor width change.



Figure 7: Asymmetrical crown width change, A) Normal; B) 0.5 mm; C) 1 mm; D) 1.5 mm maxillary lateral incisor width change.

The set of images for each smile characteristic were grouped together in randomized sequences. The raters used a 5 points numeric rating system in evaluating each image, the number one was assigned to the left end of the scale, which was characterized as highly unappealing (least aesthetic), while the right end of the scale was labelled as highly appealing (most aesthetic) and represented by number five as shown in Figure 8.



Figure 8: Numerical rating scale used to score smiles for their aesthetic value.

Each rater was asked to click a number from 1 to 5 according to his/her perception of smile aesthetics for each photograph.

### RESULTS

The web based questionnaire was completed by 330 people over the course of four months, 145 (44%) within dental group and 185 (56%) within laypeople group. In dental group, 83 (57%) female and 62 (43%) male. In lay people group, 121 (65%) female and 64 (35%) male as shown in Table 1.

**Table 1: Demographic distribution of the sample.**

Status	Gender		Total
Dentist	Male	62	145
	Female	83	
Lay people	Male	64	185
	Female	121	
Total		330	330

Table 2 demonstrated the most attractive and least attractive variable for smile characteristics perceived by dentist and laypeople expressed in mean and standard deviation for Visual Analogue Scale (VAS) score. For

buccal corridor, dentists consider normal buccal corridor is most attractive, while lay people preferred narrow buccal corridor. For both groups (dentist and laypeople), wide BC is the least attractive.

**Table 2: The most attractive and least attractive variable in dental and lay people groups.**

Variables	Dentist (NO. 145)		Laypeople (NO. 185)	
	Most attractive Mean $\pm$ SD	Least attractive Mean $\pm$ SD	Most attractive Mean $\pm$ SD	Most attractive Mean $\pm$ SD
Buccal corridor	Normal BC 3.469 $\pm$ 0.936	Wide BC 2.517 $\pm$ 1.035	Narrow BC 3.876 $\pm$ 1.113	Wide BC 2.697 $\pm$ 1.114
Width of lateral incisor (unilateral)	Standard 3.572 $\pm$ 1.165	1.5 mm width reduction 2.924 $\pm$ 1.048	Standard 3.753 $\pm$ 1.028	1.5 mm width reduction 3.067 $\pm$ 1.128
Width of lateral incisor (bilateral)	Standard 3.600 $\pm$ 1.151	1.5 mm width reduction 2.786 $\pm$ 1.174	Standard 3.685 $\pm$ 1.151	1.5 mm width reduction 3.084 $\pm$ 1.154
Gingival display	0.5 mm below gingival margin 3.552 $\pm$ 1.111	2 mm above gingival margin 1.552 $\pm$ 0.655	0.5 mm below gingival margin 3.674 $\pm$ 1.034	2 mm above gingival margin 2.635 $\pm$ 1.347
Diastema	Standard 4.503 $\pm$ 0.647	2 mm diastema 1.338 $\pm$ 0.556	Standard 4.208 $\pm$ 0.894	2 mm diastema 1.567 $\pm$ 0.843
Midline shift	Standard 4.414 $\pm$ 0.693	2.5 mm midline shift 1.724 $\pm$ 0.768	Standard 3.764 $\pm$ 0.986	2.5 mm midline shift 2.483 $\pm$ 1.085

The values are given as mean and Standard Deviation (SD).

The remaining smile characteristics, the rating are similar for dental group and laypeople group. For lateral incisor, reduction in crown width for 1.5 mm unilaterally or bilaterally considered the least attractive while lateral incisor with golden proportion (standard) is the most attractive. For gingival show, the upper lip below the gingival margin (incisal to gingival margin) by 0.5 mm is considered the most aesthetic and 2 mm gingival display is the least attractive one. For diastema, no spacing is the most attractive while 2 mm diastema is least attractive one. For midline, no shifting is the preferred one, while 2.5 mm shifting is the least attractive.

Table 3 showed the difference in smile aesthetic perception between men and women for dental and laypeople group. In dental group, the perception of different variables of smile aesthetic characteristics are approximately similar between male and female with a significant difference between male and female in rating unilateral 1 mm reduction in width of lateral incisor crown and 1 mm diastema in which females giving lower score than male. In lay people group, there is a significant difference between male and female in unilateral 0.5 mm reduction in width of lateral incisor crown.

**Table 3: The gender differences in dental and lay people groups.**

Variables		Dentist		Lay people	
		Female (NO. 83) Mean $\pm$ SD	Male (NO.62) Mean $\pm$ SD	Female (NO. 121) Mean $\pm$ SD	Male (NO. 64) Mean $\pm$ SD
Buccal corridor	Standard BC	3.43 $\pm$ .913	3.52 $\pm$ .971	3.11 $\pm$ 1.210	3.42 $\pm$ 1.051
	wide BC	2.54 $\pm$ .991	2.48 $\pm$ 1.098	2.69 $\pm$ 1.154	2.69 $\pm$ 1.082
	Narrow BC	3.34 $\pm$ 1.202	3.24 $\pm$ 1.339	3.88 $\pm$ 1.119	3.88 $\pm$ 1.120
Width of lateral incisor (unilateral)	1 mm width reduction	3.08 $\pm$ 1.002	3.48 $\pm$ 1.004*	3.24 $\pm$ 1.140	3.48 $\pm$ .976
	1.5 mm width reduction	2.78 $\pm$ 1.013	3.11 $\pm$ 1.073	3.04 $\pm$ 1.114	3.09 $\pm$ 1.151
	0.5 mm width reduction	3.46 $\pm$ .941	3.61 $\pm$ .930	3.32 $\pm$ 1.066	3.66 $\pm$ 1.027*
Width of lateral incisor (bilateral)	1 mm width reduction	3.34 $\pm$ 1.062	3.50 $\pm$ 1.113	3.42 $\pm$ 1.153	3.67 $\pm$ .993
	0.5 mm width reduction	3.42 $\pm$ .899	3.63 $\pm$ 1.105	3.51 $\pm$ 1.111	3.59 $\pm$ .955
	1.5 mm width reduction	2.71 $\pm$ 1.225	2.89 $\pm$ 1.103	3.11 $\pm$ 1.168	3.13 $\pm$ 1.120
Gingival display	0.5 mm above gingival margin	2.99 $\pm$ 1.174	3.26 $\pm$ 1.070	3.32 $\pm$ 1.178	3.30 $\pm$ 1.178
	0.5 mm below gingival margin	3.59 $\pm$ 1.127	3.50 $\pm$ 1.098	3.60 $\pm$ 1.053	3.78 $\pm$ .983

	2 mm above gingival margin	1.51 ± .669	1.61 ± .636	2.69 ± 1.310	2.58 ± 1.366
	1.5 mm above gingival margin	2.00 ± .911	2.26 ± .991	2.98 ± 1.259	2.81 ± 1.457
	1 mm above gingival margin	2.42 ± 1.117	2.63 ± 1.075	3.19 ± 1.293	3.05 ± 1.338
Diastema	0.5 mm diastema	2.39 ± 1.034	2.56 ± .985	2.63 ± 1.333	2.78 ± 1.263
	1.5 mm diastema	1.58 ± .783	1.76 ± .900	1.97 ± 1.103	1.92 ± 1.028
	1 mm diastema	1.81 ± .876	2.15 ± 1.006*	2.11 ± 1.139	2.23 ± 1.137
	2 mm diastema	1.34 ± .569	1.34 ± .542	1.60 ± .900	1.58 ± .773
Midline shift	2 mm shift	2.22 ± 1.060	2.23 ± .982	2.93 ± 1.119	3.11 ± 1.183
	1 mm shift	3.36 ± .983	3.39 ± .856	3.40 ± 1.158	3.48 ± 1.113
	2.5 mm shift	1.71 ± .741	1.74 ± .808	2.47 ± 1.049	2.52 ± 1.168

(\*) red colour: Significant Difference (p ≤ 0.05)

The values are given as mean and Standard Deviation (SD)

Table 4 showed the differences in smile aesthetic perception between dentist and lay people with a significant difference between dentist and lay people groups in evaluating narrow buccal corridor, 1.5 mm

reduction in lateral incisor crown width bilaterally, gingival display of ≥ 1 mm, 2 mm diastema and midline shift of ≥ 2 mm in which dentist giving lower score when compared to lay people.

**Table 4: Differences between dentists and lay people toward altered smile characteristics.**

Variables		Dentist (NO. 145)	Laypeople (NO. 185)	Comparison	
		Mean ± SD	Mean ± SD	MWU-test	P-value
Buccal corridor	Standard BC	3.469 ± 0.936	3.219 ± 1.156	11388	0.058
	wide BC	2.517 ± 1.035	2.697 ± 1.114	11622	0.109
	Narrow BC	3.297 ± 1.259	3.876 ± 1.113*	9492	0
Width of lateral incisor (unilateral)	1 mm width reduction	3.255 ± 1.019	3.326 ± 1.092	12227	0.396
	1.5 mm width reduction	2.924 ± 1.048	3.067 ± 1.128	11896	0.211
	0.5 mm width reduction	3.524 ± 0.936	3.455 ± 1.069	12648	0.747
Width of lateral incisor (bilateral)	1 mm width reduction	3.407 ± 1.083	3.506 ± 1.101	12310	0.459
	0.5 mm width reduction	3.510 ± 0.994	3.551 ± 1.058	12557.5	0.664
	1.5 mm width reduction	2.786 ± 1.174	3.084 ± 1.154*	10982	0.018
Gingival display	0.5 mm above gingival margin	3.103 ± 1.135	3.315 ± 1.185	11518	0.087
	0.5 mm below gingival margin	3.552 ± 1.111	3.674 ± 1.034	12138	0.339
	2 mm above gingival margin	1.552 ± 0.655	2.635 ± 1.347*	6964	0
	1.5 mm above gingival margin	2.110 ± 0.951	2.916 ± 1.340*	8483.5	0
	1 mm above gingival margin	2.510 ± 1.100	3.107 ± 1.313*	9482.5	0
Diastema	0.5 mm diastema	2.462 ± 1.014	2.669 ± 1.305	12007.5	0.268
	1.5 mm diastema	1.655 ± 0.836	1.910 ± 1.054	11406.5	0.052
	1 mm diastema	1.952 ± 0.945	2.096 ± 1.103	12195	0.371
	2 mm diastema	1.338 ± 0.556	1.567 ± 0.843*	11503	0.045
Midline shift	2 mm shift	2.221 ± 1.024	3.006 ± 1.127*	7935	0
	1 mm shift	3.372 ± 0.928	3.433 ± 1.124	12430	0.552
	2.5 mm shift	1.724 ± 0.768	2.483 ± 1.085*	7789.5	0

(\*) red colour: Significant Difference (p ≤ 0.05)

The values are given as mean and Standard Deviation (SD)

### DISCUSSION

In the current investigation, five smile features influencing the attractiveness of the smile that is, gingival display, unilateral and bilateral reduction in lateral

incisor crown width, buccal corridor, diastema, and midline shift were rated by dentist (female NO. 83, male NO. 62) and laypeople (female NO. 121, male NO. 64) To evaluate and compare smile aesthetic perception

between dentist and lay people groups as well as to inspect the impact of gender differences in smile aesthetic perception. A Visual Analogue Scale (VAS) was used to assess smile aesthetic. The VAS has been used as a measuring tool in a number of researches [18,26].

For buccal corridor, dentists gave higher VAS score for normal BC indicating the preferred smile and lay people rate narrow BC as the most attractive, while wide BC was rated as the least attractive by both dentists and laypeople. Wide buccal corridor and less teeth showing posteriorly regarded as unattractive in current research, these findings came in agreement with Martin et al. [27] and Abu Alhaija et al. [19]. In other words, smile fullness with minimizing buccal corridor resulting in maximizing smile aesthetic [28], as perceived by lay people group in our study. However, dental group rate narrow BC as 2<sup>nd</sup> most attractive and preferred normal BC who taking in their consideration certain indications and stability of maximizing maxillary width and achieving narrow BC. Traditionally, expansion of the maxillary arch should be considered only when the upper arch is small in comparison to the mandibular arch. It may also be recommended for patients with significant lingual crown torque of the mandibular molars or mixed-dentition patients with mild to moderate crowding [29,30].

For gingival show, the upper lip below the gingival margin (incisal to gingival margin) by 0.5 mm is considered the most appealing by both dental and lay people groups while 2 mm gingival display was rated the lowest VAS score. However, although earlier research found that as the quantity of gingival show increase, the attractiveness of the smile decreased, the threshold that considered as unattractive varied. Abu Alhaija et al. reported that gingival show of 2 mm or more was regarded unattractive by orthodontist, general practitioner and lay people [19]. Geron S and Atalia W, 2005 found that a gingival display of more than 1 mm was regarded unattractive [31], whereas Kokich et al. found that general practitioners and laypeople did not detect gingival show when smiling until it was at least 4 mm [17]. In the current study, a lip coverage of upper incisors by 0.5 mm is considered the most attractive indicating that absence of gingiva upon smiling boost the smile aesthetic, this finding agree with results obtained by Geron S and Atalia W, 2005 who found that Lip covering of the upper incisors between 0-2 mm was determined to be the most aesthetically acceptable.

For the remaining smile characteristics including lateral incisor crown width, diastema and midline shift, both dental and laypeople groups rated the standard smile as the most aesthetic while the photograph with greatest variation was rated as the least appealing.

For evaluation the impact of gender difference in smile aesthetic perception, there is no significant difference between men and women in dental group at ( $p \leq 0.05$ ) except in rating 1 mm reduction in lateral incisor crown width unilaterally and 1 mm diastema in which female dentists gave a lower VAS score, while in lay people group no significant difference between both genders in their

perception except in rating 0.5 mm reduction of lateral incisor crown width unilaterally in which female rated this variable less aesthetically significantly. These findings indicate that female is more critical and analytical in judging asymmetric alteration in golden proportion of lateral incisor and diastema. Abu Alhaija et al. reported that gender has an effect on rating diastema [19]. Whereas, Ameer AL found that gender of raters affecting their aesthetic perception regarding smile arc, gingival display and lateral incisor crown width [11]. In contrast, in prior studies done by Sijabat et al. [32] and Nurfitriah et al. [33] found that the perception of smile esthetics is unaffected by the gender of dental students. Moore found that lay men and women perceived smile aesthetics similarly [28]. Because the perception is a subjective process, various researches contrasted laypeople's and dentists' assessments of changing different smile features. The results of the present study revealed a significant difference between dental and laypeople groups in perception of narrow buccal corridor in which dentists gave a lower score in comparison to laypeople group which could be attributed to dentists concern about certain indications of expansion maxillary arch and achieving narrow BC and if indicated, stability and possibility of relapse should be taken in consideration, So dentists prefer normal BC over narrow BC. In contrast, laypeople rated narrow BC higher VAS score which could be explained to effect of media when influencers, movie stars, athletes with Hollywood smile (minimal or absent BC) had a great impact on shaping aesthetic perception of public. The results of present study came in agreement with Geevarghese et al. [22]. Who found that dentists were more sensitive to the impact of narrow BCS on the smile esthetics than the general people? However, Rajeev in 2018 observed that there was no variation in perception between dentists and laypeople when it came to evaluating BCSs [34].

The maxillary lateral incisor is the most common tooth that fluctuates in size, becoming diminutive, peg-shaped, or even failing to grow at all in certain cases [35]. Clinicians assess lateral incisor width using one of these methods: A normal sized contralateral tooth provides guidance [36], utilizing the golden ratio in comparison to adjacent teeth [24] and utilizing the average tooth proportions (e.g., the lateral incisor should be 50-74% of the central incisor [37]. In the present study, for unilateral reduction in lateral incisor crown width, there is no significant difference between dentists and lay people perception. However, symmetrical 1.5 mm reduction showing significant difference where dentists rating this variable significantly lower in comparison to lay people at  $p \leq 0.05$ , this could be attributed to scientific background and clinical experience which made dentists more sensitive and judgmental toward crown width change. Talic et al. found that Saudi dentists gave significantly lower VAS score than lay people when the crown width disparity was  $\geq 2$  mm [38].

For gingival display, dentists were more critical of a gummy smile than laypeople in our study. There is a

significant difference between dental and lay people groups in their perception when gingival show is  $\geq 1$  mm where dentists rate gingival exposure of  $\geq 1$  mm significantly poorer when compared to lay people. These findings matched those of a research conducted by Talic et al. when dentists and laypeople in Saudi Arabia noticed a change in aesthetics when the gingiva to lip distance was  $\geq 1$  mm [38]. However, in prior research done by Kokich et al. [17] in USA and Ousehal et al. [39] in Morocco, found that when gingival exposure exceeds 3 mm, there is a noticeable difference between professionals and laypeople. Dentists and laypeople in Iraq tend to have a reduced tolerance for excessive gingiva display when smiling.

For diastema, dentists and general public rated diastema with different increments poorly and considered as unattractive with a significant difference between both groups in rating 2 mm diastema in which dentists gave significantly lower score in comparison to lay people. In contrast, Geevarghese et al. reported that general population were more analytical than the dentists in rating diastema of 23 mm [22]. The results of our investigation confirmed previous findings obtained by Ousehal et al. who reported that dentists rated 2 mm diastema significantly poorer in comparison to lay people [39], Abu Alhaija et al. reported that midline diastema was rated as unattractive by orthodontist, dentist and lay people [19]. Furthermore, Talic et al. found that a slight gap between the maxillary central incisors was regarded unpleasant by both Saudi dentists and lay people with no significant difference between both groups [38].

For midline shift, in the current study, there is a significant difference between dentists and lay people group in rating midline deviation of  $\geq 2$  mm in which dentist are more critical than lay people. These results came in agreement with Talic et al. who found that Saudi dentists gave lower scores than lay people to a midline deviation of  $>1$  mm [38].

The findings of this study provide a broad overview of Iraqi dentists and laypersons perception of smile esthetics which showing that in comparison to dentists, laypeople tolerate a wider range of variance. Although clinicians would always aim for the optimum aesthetic standard in their patients, patients' aesthetic expectations might be met with less than perfect results acquired owing to difficulties and limitations.

A smile's aesthetic value is highly subjective and varies depending on the subject's sensibility. Thus, in order to achieve the greatest treatment outcomes and maximum patient satisfaction, dentists should consider the patient's individual sense of smile esthetics while planning treatment, and dentists should not force their esthetic norms on their patients.

Our study had a few limitations, one of these limitations is the use of a woman's smile as the only model image, since it has been demonstrated that the gender of the model smile image influence smile aesthetic rating [31]. Another limitation is that the dentists-laypeople sample

ratio was not equal; furthermore, inequality in female-male sample ratio in both dental and lay people groups in this study that needed be addressed in the future to confirm our findings

## CONCLUSION

- For evaluation gender effect, no significant differences between male and female in their perception toward altered smile characteristics except in evaluation reduction in lateral incisor crown width and diastema when female rated them significantly poorly in comparison to male.
- For buccal corridor, there is a significant difference between dentist and lay people perception in rating narrow BC which is considered the most attractive by laypeople while, dentists prefer normal BC. Wide BC is rated as least attractive by both groups.
- For gingival display, there a significant difference between dentists and lay people in rating gingival display  $\geq 1$  mm when dentists are more critical than lay people. For both groups, the upper lip below the gingival margin (incisal to gingival margin) by 0.5 mm is considered the most attractive while, 2 mm gingival display is rated as least attractive.
- For lateral incisor crown width reduction, no significant difference between dentists and lay people except in rating bilateral 1.5 mm reduction in which dentist are more critical. For both groups, standard image (no reduction) is rated as most attractive while 1.5 mm reduction scored least.
- For diastema, A significant difference between dentists and lay people in rating diastema of 2 mm in which dentist are more critical. For both dentists and lay people, 2 mm diastema rated least VAS score while standard image (no diastema) scored most attractive.
- For midline shift, A significant difference between dentists and lay people in rating midline deviation  $\geq 2$  mm in which dentist are more critical. For both groups, standard image (no shift) is rated as most attractive while 2.5 mm shift scored least.

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## CONFLICT OF INTEREST

No conflict of interest between us or anyone, and the research was submitted for scientific purpose only.

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