

SMILE PERCEPTION: A COMPARISON BETWEEN DENTAL PROFESSIONALS AND LAYPERSONS

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Article Received on
13 Nov. 2017,

Revised on 04 Dec. 2017,
Accepted on 25 Dec. 2017,

DOI: 10.20959/wjpr20181-10585

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ABSTRACT

Aim: To evaluate and compare the perceptions of asymmetric and symmetric anterior dental discrepancies by dental professionals and laypersons. **Methods:** One image of a woman's smile was intentionally altered with a software-imaging program. The alterations involved crown length, crown width, midline diastema, papilla height, and gingiva-to-lip relationship of the maxillary anterior teeth. These altered images were rated by groups of dental professionals and

laypersons using a visual analogue scale. The responses were statistically analysed and resulted in the establishment of threshold levels of attractiveness for each group. **Results:** Dental professionals were more critical than laypersons when evaluating asymmetric crown length discrepancies. Crown length discrepancy and a midline diastema were identified by both groups. Crown width discrepancy is identified by dental professionals and not by laypersons. Discrepancy of 0.5 mm in unilateral and bilateral papillary height reductions and gummy smile was not identified by dental professionals, whereas laypersons have not identified any difference. **Conclusions:** Asymmetric alterations make teeth more unattractive to not only dental professionals but also to the laypersons.

KEYWORDS: Esthetics, Dental Professionals, Laypersons.

INTRODUCTION

A beautiful smile is a harmonious relationship between the soft tissues of the face and the dentition – both playing an equally important role. Attractiveness of an individual is usually rated by the smile and it leaves a long lasting impression on the observer. Apart from attractiveness, emotions are also invariably expressed by the way an individual smiles.

People are increasingly getting more conscious about appearances and beauty, healthy dentition being a part of it. A beautiful smile depends on the size, shape, alignment of the dental elements, midline and gingiva-to-lip relationship. There is a wide variation in the balance of the teeth with the facial structures, which might affect the esthetic appearance of the smile.

According to Miller, the trained and observant eye readily detects what is out of balance, out of harmony with its environment, or asymmetric.^[1] But the question is whether these imbalances are equally detected by the laypersons as well? Do asymmetric alterations in tooth shape and alignment affect the perception of anterior dental attractiveness differently from symmetric alterations? This question was explored in this investigation. The purpose of this study was to determine the perceptions of the dental professionals and laypersons towards minor variations in anterior tooth size and alignment, as well as their relationship to the teeth and the supporting gingiva.

MATERIAL AND METHODS

Two groups of raters were used in this study: dental professionals and laypersons. The dental professionals were graduates, postgraduates and staff of NIMS Dental College, Jaipur. The laypersons group consisted of people without dental backgrounds. One image of a woman's smile was intentionally altered with a software-imaging program. The alterations involved crown length, crown width, midline diastema, papilla height, and gingiva-to-lip relationship of the maxillary anterior teeth. These altered images were rated by the groups of dental professionals and laypersons using a visual analogue scale.

Variables and measurements

The 2 groups rated 7 esthetic discrepancies to test the hypotheses. The questionnaire consisted of 5 variations of 7 separate smiling photographs of a woman. The total number of images in the survey was 35. Each smile was intentionally altered with 1 of 7 common anterior esthetic discrepancies. The alterations were made incrementally. Four of the 7 (crown length; crown width with and without altered crown length; and papillary height: unilateral/asymmetric) were altered asymmetrically. These alterations were chosen based on their frequency and clinical significance to the smile. They included variations in crown length; crown width, without altered crown length and with proportionally altered crown length; midline diastema; papillary height, with unilateral asymmetry and bilateral symmetry; and gingiva-to-lip distance.

To reduce the number of confounding variables, nose and chin were eliminated from the images and only one female smile was used. Each esthetic characteristic was altered with 4 progressive variations of the original smile with Adobe Photoshop (Adobe Systems Inc., San Jose, CA). Each esthetic characteristic was altered in varying increments; some were altered asymmetrically, but all were altered in 0.5- or 1.0-mm increments.

The smiles were grouped randomly for each variable. A 0-5 rating appeared under each image in the questionnaire and was used for the ratings. It was labelled at both ends according to extremes of attractiveness, from zero as “least attractive” and 5 as “most attractive”. Each rater gave one score between 0-5 according to his or her perception of dental esthetics.

Crown length (Fig. 1): The crown length of the maxillary left central incisor was decreased in 0.5 mm increments. Most superior points on the labial gingival margin of patient’s adjacent lateral and central incisor were used as a reference point.



Crown width (Fig. 2): The crown width of the maxillary right lateral incisor was decreased in 1.0 mm increments. The incisal edge was kept at the same level. The alteration was made at the widest part of the crown between the interproximal contact points.



Crown width and length (Fig. 3)

The crown width and length of the maxillary right lateral incisor was decreased in 1.0 mm increments. The incisal edge was kept at the same level. The gingival margin was moved incisally as the width of the right lateral incisor crown was decreased.

**Midline diastema (Fig. 4)**

A midline diastema was created incrementally between the maxillary central incisors by 0.5 mm measured from the interproximal contact point of the central incisor crowns.



Level of the gingival margins of the lateral incisor (Fig. 5): The papillary height between the maxillary left central and lateral incisors was altered progressively by increasing the interproximal contact point between the teeth in 0.5 mm increments in a gingival direction.



Level of the gingival margins of the maxillary anterior teeth (Fig. 6)

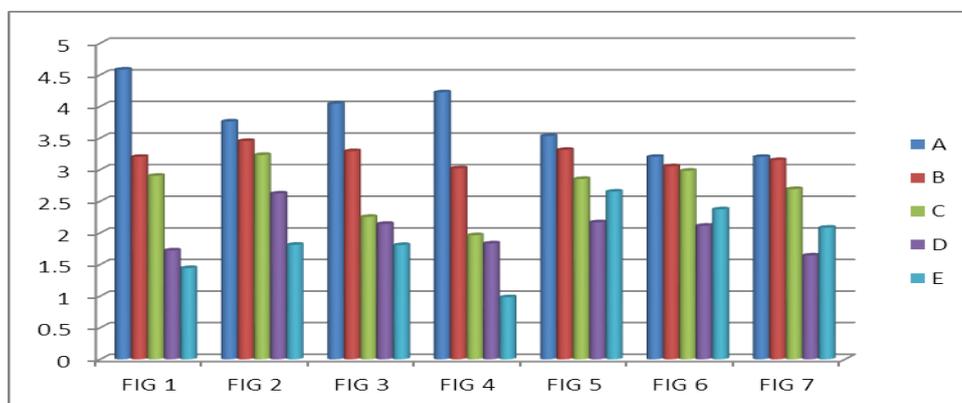
The papillary height between the maxillary anterior teeth was altered by increasing the interproximal contact points between all the maxillary anterior teeth in 0.5 mm increments in a gingival direction.



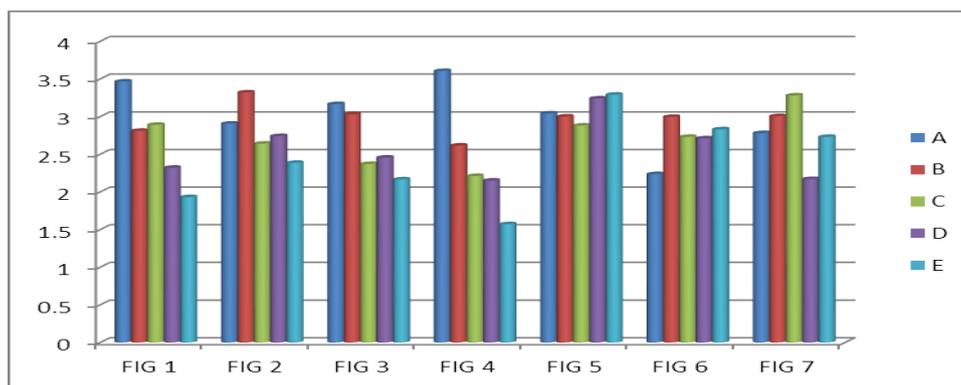
Gingiva show (Fig. 7): The gingiva to lip relationship (gingival show) was increased incrementally by 1 mm, to create a “gummy” smile. Alterations were based on the relationship of the upper lip with the gingival margin of the maxillary incisors.



Analysis of data: Students t test was applied to compare the scores of the two groups.



Graph. 1: Dental professionals.



Graph. 2: Laypersons.

RESULTS

It includes the level of discrepancy between the two groups in distinguishing ideal smiles and deviations from the ideal (Graph 1 and 2).

Dental professionals were more critical than layperson when evaluating asymmetric crown length discrepancies. The dental professional group was able to detect each 0.5 mm decrease in the crown length. The layperson was not able to detect the unilateral crown length discrepancy when the crown length was shortened from 0.5 mm to 1.0 mm.

The dental professional group was able to identify the unilateral crown width discrepancy. The layperson group was not able to detect any discrepancy in the unilateral crown width reduction.

The dental professional group was able to identify the unilateral crown length and width discrepancy. The layperson group was not able to detect any discrepancy in the unilateral crown length and width reduction when 1.0 mm to 1.5 mm of crown length and width was reduced.

A midline diastema between the maxillary central incisors was rated as unattractive by the dental professional and the layperson group.

Unilateral papillary height was not noticed by the dental professional group when the papillary height was reduced to 1.5 mm. The layperson group was not at all able to identify any amount of unilateral papillary reduction.

Uniform reduction in papillary height from canine to canine was rated unattractive than ideal smile with normal papillary heights. But it was not noticed by the dental professional group

when the papillary height was reduced from 1.5 mm to 2 mm. In contrast, the layperson group didn't perceive a significant difference in attractiveness even when evaluating the maximum 2 mm deviation in papillary height.

Dental professionals perceived a change in attractiveness when the distance from gingiva to lip was increased but not when it is increased beyond 3mm. In contrast, the layperson group didn't perceive a significant difference in attractiveness even when evaluating the maximum 4 mm increase in the distance between gingiva to lip.

DISCUSSION

Within the auspices of this study, it was found that dental professionals were more critical when evaluating asymmetric crown length discrepancies as compared to the non professionals. Perception of symmetry with regard to crown length discrepancy based on morphometric analysis was more significant with regard to esthetic perception. Professional versus non professional perception of this parameter would vary based on the knowledge of tooth anatomy. The authors therefore conclude that these factors could have an effect on variations in perception of this parameter between the two groups.

Midline diastemas constitute as one of the gross factors in esthetic perception, be it as observed by a dental professional as compared to a non professional. Basic gross abnormalities in the smile corridor would be detected significantly and perceived as unesthetic by both dental professionals as well as non dental professionals.

The importance of pink esthetics in smile perception has been a grey area since time immemorial. The significance of "gingival show" within the limits of the smile corridor plays an important role in perceiving variations in this parameter. The findings of this study showed that unilateral papillary height was not noticed by the dental professional group when the same was reduced by 1.5 mm. However any variations of this parameter above 1.5 mm were perceived as unattractive by the same group. The non dental professionals however were ignorant of even minute changes within this parameter. The ratio of pink to white in perceiving an esthetic smile is an important factor in defining the limits and proportions of an ideal smile. With regard to this parameter, the knowledge of the factors involved in smile designing as well as the importance of the role of the "gingival show" would play an important role in smile perception with regard to dental professionals as compared to non dental professionals.

A uniform reduction in papillary height from canine to canine was rated as unattractive when the same parameter exceeded a dimension of more than 2 mm. This parameter however was perceived only by the dental professionals as compared to the non dental professionals. Uneven papillary heights are normally regarded as unesthetic by non dental professionals due to the fact; the esthetic perception amongst this particular group would be based on symmetry. However dental professionals' lay significant importance to papillary height be it, even or uneven, as this parameter would relate to gingival health as well as pink esthetics.

The distance from the gingival margin to the lip is considered as an important factor in smile design. Dental professionals consider an increased "gingival show" as unattractive. However the non dental professionals did not give significant importance to this factor. In smile perception the degree of gingival show has a significant role. With aging, it was observed that less of the maxillary anterior teeth show, and, with loss of tonicity in the facial muscles the lips are less mobile. Hence, with progressive age the amount of "gingival show" would be considerably less as compared to younger individuals. The non dental professionals however may perceive this parameter as a relative rather than an absolute factor in the perception of smile patterns.

Several studies have been carried out in different parts of the world to compare the perception of smile among dental professionals and laypersons with the conclusion being significant detection of discrepancies by the dental professionals.^[2-5] A study concluded that asymmetric alterations make teeth more unattractive to not only dental professionals but also the lay public.^[6] It was concluded in a Saudi population that crown length and crown width discrepancies, midline deviations, and changes in gingiva to lip distance are significantly scored as less attractive as compared to lay people.^[7]

CONCLUSIONS

In this study, we evaluated the perceptions of dental professionals and laypersons to intentionally altered dental esthetics. We determined the impact of asymmetric alteration of teeth and tissues' on the attractiveness of an individual's smile. We concluded that

1. The dental professional group was able to detect the crown length, unilateral crown width and length discrepancy, unilateral papillary height, the distance from gingiva to lip when it is increased beyond 3mm; whereas the layperson group were not able to detect any of these discrepancies.

2. A midline diastema between the maxillary central incisors was rated as unattractive by both the dental professional and the layperson group. Asymmetric alterations make teeth more unattractive to not only dental professionals but also to the laypersons.
3. It was observed, broadly for a layperson, that the perception of esthetics varies with the individual's liking.

CONFLICTS OF INTEREST

None declared.

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