

The impact of gingival display in smile Esthetic perception among dental professionals and laypeople.

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Abstract

Perception of smile esthetics has long been a matter of debate among dentists. The smile is an important aspect of facial esthetics. Therefore, orthodontists incorporate facial esthetics into their treatment planning to achieve a beautiful and youthful smile. However, beauty truly is in the eye of the beholder. The patient's personal experience and social environment affect their preference towards smile esthetics more highly than the ‘dentists or orthodontists ’opinion does. In addition, an individual’s Esthetic evaluation is considerably impacted by factors such as education level, social status, and cultural differences. Mass media play an important role in the perception of beauty in modern culture. One of the contributing features to smile esthetics is a gingival display, hence evaluating the amount of gingival display in the Esthetic zone is crucial. The optimal correlation of the upper lip to the maxillary central incisors and

gingiva on smiling differ significantly between orthodontists and patients.

The present study assessed the impact of gingival display on smile attractiveness among trained dental professionals and laypeople. One female smiling photograph was digitally altered to produce a gingival display of 2mm increments (-4mm, -2mm, 0mm, 2mm, 4mm, and 6mm). The altered images were then evaluated by a group of dental professionals and laypeople. The results were then compared to determine the smile Esthetic perception.

Keywords: smile esthetics, perception, facial esthetics

Introduction

The term esthetics comes from the Greek word “aisthesis”, which means perception or sensation.¹The increasing entertainment media has set Esthetic standards for viewers by subjecting them to wonderful

faces and dazzling smiles.²This has led to an emphasis on facial esthetics as an indicator of social worth.³

Patients' perception and social surroundings affect their expectations in the direction of smile esthetics more exceedingly than the 'dentists or orthodontists' opinion.⁴

Also, a person's Esthetic assessment is considerably affected by factors like education level, economic wellbeing as well as cultural differences.⁵ Hence, what is excellent and alluring for the orthodontist might not be what the patient comprehends as wonderful, appealing, and as an acceptable clinical outcome. Thereby patients' assumptions and expectations about their appearance play a vital role in orthodontic treatment planning.⁶

Factors like Tooth size, shape, position, and colour along with the extent of gingival display and framing of the lips alter the smile esthetics. All these factors should form a symphonious and harmonic balance for a pleasant smile.⁷

One of the components that contribute to the esthetics of the smile is gingival visualization, so it is important to assess the extent of gingival presentation. The optimal correlation of the upper lip with the upper central incisors and the gingiva in smiling differs significantly between orthodontists and patients.⁸

In 1992, Peck et al concluded from their study that a gummy smile is perceived to be unappealing for orthodontists⁹, and gingival display of more than 2mm was reported to be unesthetic by Frecker in 1998.¹⁰

Numerous studies about Esthetic perceptions revealed that orthodontists are less tolerant than the layperson for some dental conditions¹¹⁻¹⁵, therefore they might overestimate the need for orthodontic treatment.¹¹

Although, tremendous work has been done, no definite evidence has been established in the literature about the boundaries of facial esthetics in context to a layman's perception. Therefore, this study was done to determine

the perception of smile esthetics by laypeople, and dental professionals using digitally modified images, in relation to the amount of gingival display. In this way, the treatment can be planned to obtain a smile that can meet the patients' expectations.

Material and methodology

The present study was conducted in the post-graduate department of Orthodontics and Dentofacial Orthopedics, Maharishi Markandeshwar College of Dental Science and Research, Mullana, Ambala.

A smiling photo of a 21-year-old lady was used in this study. The patient had no dental spacing or crowding, no apparent loss of tooth structure due to fracture, attrition, restoration, or caries, and no pathology of periodontal or gingival tissue. The patient had a 4 mm gingival display while smiling. (Fig 1)



Figure 1: original smiling photograph

The gingival presentation of the original photograph was digitally altered using

Adobe Photoshop CS6 (Adobe Systems Inc, San Jose, CA, USA) to generate a set of 6 photographs with different levels of gingival presentation, ranging from 6 mm to -4mm of the gingival display. (Fig 2)



Figure 2: digitally manipulated photographs.

As the perception of esthetics is affected by eyes, chin, and nose these features were removed from the photographs to avoid confounding factors. All images were developed into 4x6 inch prints.

The study included two groups of evaluators: Group 1 laypersons (n=70), and Group 2 dental professionals (n=70). Group 1 consisted of people without dental backgrounds from Maharishi Markan deshwar University, Mullana, and Group 2 consisted of the dentist from Markan deshwar University, Mullana. Both groups had an equal number of male and female participants. The photographs were displayed in a predetermined sequence to the raters. The raters were shown the images separately and for not more than a minute they were also not allowed to compare between the images.

Both the groups rated their perception of shown images using a 5-point numerical rating scale (NRS), with 0 being the least appealing rating and 4 being the most appealing rating.

Inclusion criteria

- Participants who gave consent to be a part of the study.
- Participants between the age groups of 20 to 40 years for both the groups.
- Graduating or graduated population for laypeople.

- Individuals working in professions other than dentistry for the laypeople.

Exclusion criteria

- Participants who refused to give consent.
- Laypeople who have undergone orthodontic treatment.
- People related to dentistry were not allocated to the group of laypeople.
- Dental professionals other than general and specialized dentists

Statistical analysis

Differences in ratings between photographs within a given set were assessed using the Friedman test and the Wilcoxon signed-rank test for pairwise comparisons. Differences in results between laypersons and dentists were assessed using the Mann-Whitney U test. All tests were performed with a significance level of 0.05.

Results

- There was a significant difference in the scores given by laypeople and dental professionals. The laypeople tend to give higher ratings compared to dental professionals. The highest rating was given to +2mm (fig C) gingival display by both the groups and lowest to +6mm (fig A).
- There was no significant difference in rating between laypeople and dentists in 4mm (fig B), -2mm (fig E), 2mm (fig C), and 6mm (fig A) gingival display. But there was a significant difference in rating between laypeople and dentists in pictures with 0mm (fig D) and -4mm (fig F) gingival display. 0 mm (fig D) gingival display was given a higher rating by the dentist and -4 by laypeople.

Raters	Image 1	Image 2	Image 3	Image 4	Image 5	Image 6
	0mm	-4mm	+4mm	-2mm	+2mm	+6mm
Lay people(n=70)	3.91	4.21	2.21	3.68	4.87	2.11
Dentist(n=70)	4.60	3.13	2.29	3.76	4.94	2.29

Table 1:

Discussion

According to Dale Carnegie easiest way to win friends and influence people is to smile.¹⁶ In the late 1990s due to the reemergence of the soft tissue paradigm, evaluation of smile esthetics became an integral part of orthodontics for clinical assessment.¹⁷ Therefore it is crucial to understand the pursuit for better appearance in the new age. An appealing smile is always considered as a precious personal asset, which further influences the perception of the overall personality of an individual.

Sarver and Ackerman reported that smile analysis and quantification cannot be done with the standard extra-oral facial photographs so to evaluate smile, closeup photographs of profile smile, oblique smile and frontal smile are mandatory.¹⁸ Hence for our study we preferred the frontal smile closeup view for analyzing smile perception.

We used the Numeric Rating Scale (NRS) in our study to rate the smile perception. This scale is a simple, rapid, valid, and reliable method for raters to judge attractiveness.¹⁹

This study focused on how smile esthetic perception is impacted by the gingival display by laypeople and dental professionals. Raters from different backgrounds and socioeconomic levels were selected to examine the effect of these variables on rating smile attractiveness. There was a significant difference between the dentist and layperson in their evaluation of different aspects of the altered gingival display the findings of our study are in concordance with studies done by Vercelino P et al, Taki

et al and Kokich V et al.²⁰⁻²² There was a significant difference in the assessment of various aspects of altered gingival display between dentists and laypeople with laypeople having more acceptance rate towards the photograph with -4mm gingival display and dentist toward 0mm gingival display. An attractive smile is an essential part of self-confidence and thus influences social interaction. In this study, laypeople rated the influence of gingival presentation on an attractive smile significantly higher than dentists. This demonstrates the importance that the general population places on smile aesthetics.

Conclusion

The appearance of the gingival presentation has an impact on the perception of smile aesthetics among laypeople and dentists. An ideal smile based on academic reasoning may not be perceived as the most attractive by laypeople. Due to the different aesthetic perceptions of each person, the involvement of dentists and patients in decision-making and treatment planning is crucial to achieving successful outcomes.

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