



Influence of certain tooth characteristics on the esthetic evaluation of a smile

Andréa Fonseca Jardim da Motta¹, José Nelson Mucha², Margareth Maria Gomes de Souza³

Objective: To assess the influence of certain dental characteristics on the perception of smile esthetics by undergraduate dentistry students.

Methods: Ten digital photographs of a woman's smile were modified using Adobe Photoshop software. The following changes were performed: stain removal; incisal edge straightening; gingival leveling; closure of black triangles. A group of 60 undergraduate dental students evaluated the original photograph and the altered images using a visual analog scale to evaluate smile esthetics. Intraexaminer agreement was checked for 30 examiners using the Student t test; for casual error, the Dahlberg formula was used. Data were described as means and standard deviations, and reported in tables.

Results: There were no statistically significant differences between the first and second scores assigned by examiners ($p > 0.05$) in any of the comparisons made. The results of systematic error for the method indicated that the measures obtained were reliable. ANOVA was used to test equality of means, and the level of significance was set at 5%. Equality of variances was evaluated using Levene's test, and results revealed that variances were equal. Multiple comparisons using the Tukey's test revealed statistical significance at a 5% level for the presence of black triangular space. No significant values were found for other comparisons.

Conclusions: Some dental characteristics were perceived by undergraduate students, and the black triangular space was classified as the most unfavorable characteristic.

Keywords: Smile. Dental esthetics. Perception.

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» Patients displayed in this article previously approved the use of their facial and intra-oral photographs.

¹ Assistant Professor, Undergraduate and Graduate Program in Orthodontics, Federal Fluminense University (UFF), Niterói, Brazil.

² Head Professor, Orthodontics, UFF. Professor, Specialization Course in Orthodontics, UFF.

³ Head Professor of Orthodontics, Undergraduate and Graduate Program in Orthodontics, School of Dentistry, Federal University of Rio de Janeiro (UFRJ), Rio de Janeiro, Brazil.

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Contact address: Andréa Fonseca Jardim da Motta
Orthodontics department, School of Dentistry, Federal Fluminense University (UFF)
Rua Mário Santos Braga, 30, 2º andar, sala 214 – Niterói/RJ, Brazil
Zip code: 24.020-140 – E-mail: andreamotta@id.uff.br

Editor's abstract

One of patients' main expectations when seeking orthodontic treatment is to have a beautiful smile. Therefore, smile esthetics has become the focus of several studies that aim at defining guidelines so that orthodontists can give patients the ideal smile that they desire. Few studies have investigated how certain dental imperfections are perceived in a smile. This study investigated the effect of tooth stains (Fig 1A), irregular incisal edges (Fig 1B), unlevelled gingival contour (Fig 1C) and open gingival embrasures ("black triangles") (Fig 1D) on smile esthetics. Specific computer resources were used to add these imperfections to the digital photograph of the smile of a woman who had well leveled teeth, and two groups of photographs were produced. The first was called exclusion group, in which the original photograph was kept with all the imperfections mentioned above and four other photos were obtained from the original one, each with the correction of only one imperfection. In the second group,

called inclusion, the original photograph was fully manipulated, and all the imperfections were corrected. Another set of four photos was produced, and only one imperfection was kept in each photo. All photos were randomly evaluated by 60 undergraduate students in the School of Dentistry using a visual analog scale from zero to 100. The assessments scored by students for each photo were measured using a digital caliper. To evaluate intraexaminer agreement, 30 students reevaluated the same photos seven days later. The method error was estimated using paired Student t test and Dahlberg's formula. Analysis of variance followed by the Tukey test for multiple comparisons were used to analyze data ($p < 0.05$). Results revealed that the black triangle between maxillary central incisors was the most unaesthetic characteristic when compared with all others, and differences were statistically significant. The primary cause of black triangles may be the absence of the interdental papilla, root divergence of maxillary central incisors, or the abnormal shape of dental crowns.



Figure 1 - Photographs used in first evaluations. **A**) yellowish stain was removed from mesiobuccal surface of tooth # 26; **B**) incisal edge of tooth # 22 was straightened; **C**) gingival margin height of tooth #12 was leveled; **D**) black triangular space between teeth # 11 and 22 was filled; and **E**) reference photograph without imperfections.