Comparative Evaluation of Smile Esthetics in Extraction and Non-Extraction Subjects

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Abstract: Although orthodontic treatment is based primarily on occlusal relationships, greater attention is now paid to enhancing dentofacial characteristics to produce optimal facial esthetics. The purpose of this study was to compare smile esthetics among pre and post (extraction and nonextraction) photographs of the patients and assess smile esthetics.

Keywords: Smile Esthetics

INTRODUCTION

Orthodontists are considered as the smile architects and have long been interested in the esthetics of the smile. Recently, the topic is holding a great significance for orthodontists because more orthodontic patients evaluate the outcome of treatment by their smiles and the overall enhancement in their facial appearance. Although orthodontic treatment is based primarily on occlusal relationships, greater attention is now paid to enhancing dentofacial characteristics to produce optimal facial esthetics.[1]

Current knowledge suggests that favorable treatment changes are significant to patients, parents, and friends, and are important aspects of orthodontic therapy. Thus, it seems worthwhile to outline the common denominators of an esthetically pleasing smile, which is often a primary reason for seeking orthodontic care.

The literature contains noteworthy studies [2-9] describing the esthetic elements of the dentition and the surrounding soft tissues during smiling that can be evaluated on a 3-dimensional canvas. Sarver and Ackerman [10,11] published instructive data about dynamic smile visualization, quantification, and relevant treatment strategies. They suggested that the orthodontist should add another dimension—time—in evaluating smiles (how smiles change over time because of aging).

Various studies [12-15] have evaluated the treated smiles by judgments of specialists and laypeople, but none have documented the differences among pre and post treatment following extraction and non-extraction protocols of same subjects. Thus, the main purpose of this study was to compare the esthetics of the smile in extraction and non-extraction patients.

MATERIAL AND METHODS

Frontal and three-quarter view smiling photographs, direct biometric measurements, and cephalometric data were collected from 20 extraction patients, 20 nonextraction retention patients. The mean ages were 17 ± 3 years. The sex distributions for the 2 groups were the same.

The treatment groups had Angle Class I malocclusions before treatment. None of the treated subjects had a severe craniofacial anomaly, and all were treated with standard 0.022X 0.028-in MBT appliances.

The average treatment times were 2 years for both the non-extraction group and extraction group.

Facial photographs were taken of each participant during smiling, including frontal and three-quarter views. All photographs were taken by the same investigator at a constant object-to-lens distance with a Frankfort plane parallel to the horizontal, teeth in centric occlusion, and lips relaxed. The evaluators panel consisted of 10 orthodontists, 10 dental
specialists, 10 general dentists.

**STATISTICAL ANALYSIS**

One-way analysis of variance (ANOVA) was used to compare smile esthetics and differences among the groups. The level of significance was established as \( P < .05 \) for all statistical tests.

**RESULTS**

According to the 1-way ANOVA, the 2 groups did not differ statistically in mean esthetic score, as evaluated by the 6 panels. The subjects with the highest and the lowest scores were in the non-extraction group. However, according to descriptive statistics, there were no significant differences in the distributions of the highest, lowest, and moderate esthetic scores among the 2 groups. This finding clearly shows that not only were the mean scores similar, but also the distributions of subjects with low and high scores were alike in the extraction and non-extraction groups. Repeated-measure ANOVA showed significant differences in the mean ratings for the whole sample among the panel.

**Table-1: Distribution of highest, lowest, and moderate scores among 3 groups**

<table>
<thead>
<tr>
<th>Categories</th>
<th>20% highest scores n = 10</th>
<th>60% moderate scores n = 40</th>
<th>20% lowest scores n = 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extraction</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within group</td>
<td>5</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>20%</td>
<td>20%</td>
<td>56%</td>
<td>24%</td>
</tr>
<tr>
<td>33.3%</td>
<td>31.1%</td>
<td>40%</td>
<td></td>
</tr>
<tr>
<td>Nonextraction</td>
<td></td>
<td></td>
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<tr>
<td>Within group</td>
<td>5</td>
<td>10</td>
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</tbody>
</table>

**DISCUSSION**

Standards of beauty vary tremendously among persons and racial groups, and according to socioeconomic mores. [16] However, the results in present study groups were not differentiated in smile esthetics. The numbers of subjects with high, moderate, and low scores had similar distributions in each group. This is a logical expectation because, in any group of subjects, there is individual variability—shape of the teeth, curl of the lips, and mouth expression—that would lead the smile to be perceived as esthetically pleasing or not.

Hulsey [17] stated that the mean rated smile scores of orthodontically treated subjects were significantly poorer than the mean rated smile scores of the subjects with normal occlusions. Because the art of esthetics lies in the clinicians’ hands and new technologies have been developed to better visualize and treat patients, it is not surprising to find no difference in smile esthetics among untreated people with ideal occlusions and patients treated either with or without extractions.

Many studies [3,6,18,19] have evaluated the perceptions of different panels for dentofacial esthetic discrepancies. Orthodontists on the average were found to be more critical of dental esthetics than laypeople in detecting minor discrepancies. Boley et al [20] stated that orthodontic students and general dentists could not identify the treatment modality when assessing facial photographs.

Of all the factors related to a balanced smile, easily controlled variable is the maxillary incisor position. These teeth should be angulated and also positioned most favorably in their anteroposterior and vertical relationships to all facial structures to ensure maximum facial harmony. [21] For instance, the use of a high-torque bracket system particularly in non-extraction treatment with anterior crowding can be used.

Overexpansion of the maxillary dental arch with increased maxillary incisor torque might flatten the smile arc, which is best described by the relationship of the curvature of the incisal edges of the maxillary incisors and the canines to the curvature of the lower lip. [5,9] and lead to negative esthetic consequences.

This study revealed that there was statistically no significant differences in smile esthetics among subjects treated with or without extractions. Each subject has different problems, and, to create natural dental esthetics, the entire dentition must be carefully considered.

**CONCLUSIONS**

Subjects treated with or without extractions were not differentiated in smile esthetics by 6 panels of judges. Maxillary gingival display and the ultimate positions of the anterior teeth have definite effects on smile esthetics.
REFERENCES

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