



## The Perception Of Smile Attractiveness Among Gulbarga Population

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### ABSTRACT

**Introduction:** Orthodontic treatment is based on occlusal relationships, but with the changing paradigm, the concern of smile and in turn facial esthetics has gained importance. For patients, to a large extent, the expectations after orthodontic treatment depend on the perception of their own dentofacial esthetics and on the constant judgement by their peers. The objectives of this study were to compare smile esthetics among extraction and non-extraction patients and a control group.

**Materials and Methods:** 60 subjects (20 treated with extraction, 20 treated with non-extraction, 20 in control group). Frontal and three-quarter view photographs in unforced were taken and evaluated by a panel of 20 orthodontists, 50 dental professionals & 50 lay persons. Each panel members rated the attractiveness of the smile on a 5- point esthetic scale.

**Results:** The mean esthetic scores for the Extraction, Non-extraction, and Control groups showed no significant differences in over all scores given by the three panels. In intra-group comparison there was significant difference among Orthodontists and Dental professionals, Dental professionals and Laypersons in rating the non-extraction group. There was also significant difference among Orthodontists and Laypersons in rating the control group.

**Conclusion:** Subjects with ideal occlusions and Class I patients treated with or without extractions were not differentiated in smile esthetics by 3 panels of judges.

**KEYWORDS :** Perception, Smile Esthetics, Extraction, Non-Extraction, Control.

### INTRODUCTION

From ancient societies and cultures to our modern society, a great emphasis has been placed on facial esthetics and physical attractiveness. The concept of esthetics is subjective, so it is very hard to determine objective criteria for defining the concept of beauty.

Ethnic and racial differences play a major role in diversifying esthetic preferences.

Several factors such as sex, age, education, socioeconomic status, and geographic location also affect the esthetic preferences of the public.<sup>1</sup>

Smile, defined as a facial expression characterized by upward curving of the corners of the mouth, is often used to indicate pleasure, amusement, or derision. The smile, which is essential to express friendliness, agreement, and appreciation, and to convey compassion and understanding, should not be ignored in diagnosis and treatment planning. The goal of modern orthodontics is to establish the best possible occlusal relationship between the maxillary and mandibular dentition while maintaining or enhancing facial esthetics.<sup>2</sup>

### OBJECTIVES OF THE STUDY

1. To evaluate the differential perception of smile esthetics among Lay persons, General Dentists and Orthodontists.
2. To compare the smile esthetics in extraction and non-extraction patients with the control group (untreated patients).

### METHODOLOGY

Subjects were collected from the Department of Orthodontics and

Dentofacial orthopedics, HKE's SN DENTAL COLLEGE, GULBARGA. The total sample size of 60 subjects, consisted of 20 extraction treated retention patients, 20 non-extraction treated retention patients and 20 untreated subjects (control). Informed consent forms were signed and obtained from each subject before taking their photograph with posed smiles (because posed smiles are the most repeatable).

### Armamentarium used for the study (Figures 1):

1. Digital camera; Nikon, (Model: DSLR 5300)
2. Tripod (Model: NIKON MX-2100)
3. Problitz secondary flash (Model: 300D)

### Photographic set-up

The photographic set-up consisted of a tripod (HARISON MEGA MX-2100) that held camera (Nikon, DSLR P5300) with a built-in flash. Another element of the set-up was a secondary flash (Problitz secondary flash, model 300D), placed on side of the subject.

### Record-taking:

Frontal and three-quarter view unforced, natural smiling photographs were taken. It was taken in natural head position. Two smile photographs were taken for each subject i.e. frontal and oblique view (Figure.1).

The smile photographs were taken from an angle and a close-up of frontal smile was taken. The images were cropped (Adobe Photoshop), based on vertical (nose tip to soft-tissue pogonion) and transverse (perpendicular drawn downwards from the zygomatic prominence) limits. These images were converted into black and white images for the power point slide show (Figure.1).

These images were evaluated by a panel group consisting of 20 orthodontists, 50 dental professionals & 50 lay persons.. Each panel member rated the attractiveness of the smile on a 5- point esthetic scale with, (1) poor, (2) fair, (3) good, (4) very good and (5) excellent.



**Figure-1: Photograph of frontal smile and three-quarter smile view and Cropped black and white images used for esthetic scoring.**

**Result and Observation**

One-way analysis of variance (ANOVA) was used to compare smile esthetics and differences among the 3 groups. According to the one way ANOVA, mean esthetic scores as evaluated by 3 panel groups for extraction treated, non-extraction treated and control group were 2.93, 2.98 and 2.80 respectively (Table 1 and Gaph 1).

Mean scores given by Orthodontists in groups for Extraction, Non-extraction and Control group were 3.07, 2.86 and 2.69 respectively. The differences in esthetic scores between these three groups were statistically highly significant. (p < 0.001) (Table. 1, Graph 1)

Mean scores given by general dentist for Extraction, Non-extraction and Control group were 2.78, 3.08 and 2.718 respectively (Graph.2). Esthetic scores between these three groups were statistically highly significantly. (p < 0.001) (Table. 1, Graph. 1)

Mean scores given by Laymen for Extraction, Non-Extraction and Control group were 2.90, 2.96 and 2.88 respectively. Differences in esthetic scores between these three groups were statistically non significant (p > 0.05). (Table. 1, graph. 1)

The comparison of mean esthetic scores in extraction group by orthodontist and general dentist is done by unpaired t-test and the value is 2.1 and is significant. The mean esthetic scores of non extraction by orthodontist and general dentist is 2.095 and is significant. The mean esthetic scores of controls by orthodontist and general dentist is 0.103 and is not significant. (Table. 2, Graph. 2)

The comparison of esthetic scores in extraction group by orthodontist and laymen by unpaired t test is 1.85 and is not significant. The mean esthetic scores of non extraction by orthodontist and laymen is 0.76 and is not significant. The mean esthetic scores of control group by orthodontist and general dentist is 1.05 and is not significant. (Table. 3, Graph. 3)

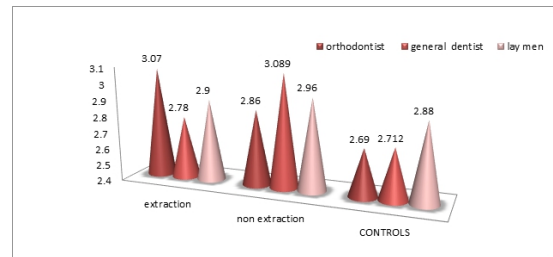
The comparison of esthetic scores in extraction group by general dentist and lay men by unpaired t test is 0.78 and this is not significant. The mean esthetic scores of non extraction group by general dentist and laymen is 1.5 and is significant and control is 0.84 and that is significant. (Table. 4, Graph. 4)

The mean esthetic score of comparison by orthodontist and general dentist of (treated extraction and non extraction) and untreated(control) group is highly significant and that to laymen is not significant. (Table. 5, Graph. 5)

**Table-1: Comparison of mean esthetic scores of extraction, non extraction and control groups by three panels-Orthodontists, General Dentists and Laymen.**

Panel	Extraction	Non extraction	Control	Anova test	P-value significance
Orthodontists N=20	3.07±0.025	2.86±0.42	2.69±0.66	F=38.3 4	P<0.001 VHS
General Dentists N=50	2.78±0.55	3.089±0.25	2.718±0.68	F=30.6 3	P<0.001 VHS

Laymen N=50	2.96 ± 0.28	2.90 ± 0.41	2.88 ± 0.53	F=10.2	>0.05, NS
Mean	2.93±0.28	2.98±0.36	2.76±0.62	F=16	P>0.05 NOT SIGNIFICANT

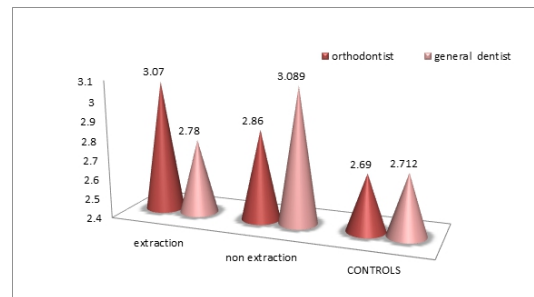


**Graph-1: Bar diagram represents the comparison of mean esthetic scores of extraction, non extraction and control groups by three panels- Orthodontists, General Dentists and Laymen.**

**Table no.2: Comparison of mean esthetic scores of variables among Orthodontists and General Dentists**

Treatment	Orthodontists N=20	General Dentists N=50	Unpaired t-TEST	P-value significance
Extraction	3.01±0.03	2.94±0.55	t=2.168	P>0.05 SIGNIFICANT
Non extraction	2.86±0.42	3.089±0.25	t=2.095	P>0.05 SIGNIFICANT
Controls	2.69±0.66	2.712±0.68	t=0.103	P>0.05 NOT SIGNIFICANT

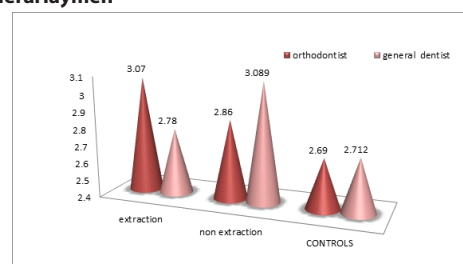
**Graph-2: Multiple bar diagram represents the comparison of mean esthetic scores of variables among Orthodontists and General Dentists**



**Table no.3: Comparison of mean esthetic scores of variables among Orthodontists and Laymen**

Treatment	Orthodontists N=20	General Dentists N=50	Unpaired t-TEST	P-value significance
Extraction	3.01±0.03	2.94±0.55	t=2.168	P>0.05 SIGNIFICANT
Non extraction	2.86±0.42	3.089±0.25	t=2.095	P>0.05 SIGNIFICANT
Controls	2.69±0.66	2.712±0.68	t=0.103	P>0.05 NOT SIGNIFICANT

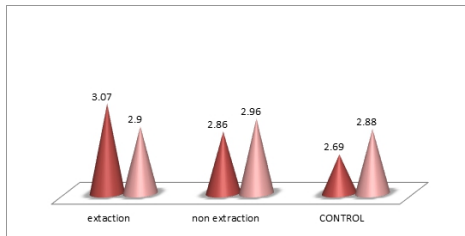
**Graph-3: Multiple bar diagram represents the comparison of mean esthetic scores of variables among Orthodontists and General laymen**



**Table no.4: Comparison of mean esthetic scores of variables among Orthodontists and Laymen**

Treatment	Orthodontists N=20	Laymen N=50	Unpaired t-test	P-value significance
Extraction	3.07±0.025	2.90 ± 0.41	t = 1.85	p>0.05 NOT SIGNIFICANT
Non extraction	2.86±0.42	2.96±0.28	t = 0.76	p>0.05 NOT SIGNIFICANT
Controls	2.69±0.66	2.88±0.53	t = 1.005	p>0.05 NOT SIGNIFICANT

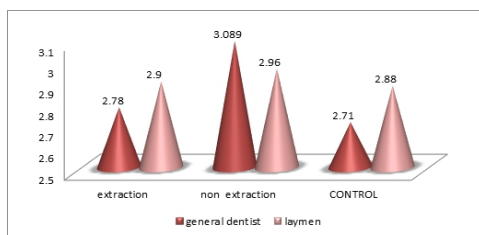
**Graph-4: Multiple bar diagram represents the comparison of mean esthetic scores of variables among Orthodontists and Laymen**



**Table no.5: Comparison of mean esthetic scores of variables among General Dentists and Laymen**

Treatment	General dentists N=50	Laymen N=50	Unpaired t-TEST	P-value significance
Extraction	2.78±0.55	2.90 ± 0.41	t=0.78	p>0.05 NOT SIGNIFICANT
Non Extraction	3.089±0.25	2.96±0.28	t=1.5	p>0.05 NOT SIGNIFICANT
Controls	2.71±0.68	2.88±0.53	t=0.84	p>0.05 NOT SIGNIFICANT

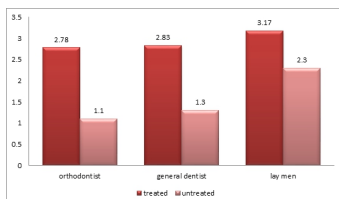
**Graph-5: Multiple bar diagram represents the comparison of mean esthetic scores of variables among General Dentists and Laymen**



**Table no.6: Comparison by three panel groups with treated group (extraction and non extraction) and untreated group (extraction and non extraction)**

Panel	Treated (extraction +non extraction)	(Untreated (controls)	ANOVA Test	P-value significance
Orthodontists	2.78±0.54	1.10±0.24	F=46.27	P<0.001 VERY HIGHLY SIGNIFICANT
General dentists	2.83±0.61	1.33±0.54	F=35.76	P<0.001 HIGHLY SIGNIFICANT
Laymen	3.17±0.72	2.53±1.08	F=7.12	P<0.05 NOT SIGNIFICANT

**Graph-6: Multiple bar diagram shows the comparison by three panel groups with treated group (extraction and non extraction) and untreated group (extraction and non extraction)**



**DISCUSSION**

It is important for orthodontists to make every effort to develop harmonious balance that will produce the most attractive smile possible for each person being treated.<sup>6</sup> Even a well treated orthodontic case which meets every criterion of the American Board of Orthodontics for successful treatment may not produce an esthetic smile perception.<sup>13</sup>

Janzen<sup>11</sup> advised that, a well-balanced smile is the most important treatment objective. Wylie<sup>4</sup> emphasized, "The goal of the orthodontic treatment should be the attainment of best possible esthetic results both dentally and facially".

Over the years, various studies have been done on human faces describing smile esthetics and perception by taking various quantitative and qualitative soft tissue measurements of the face at rest as well as during smile to describe the various parameters influencing subject's smile. Many studies have been carried out in which esthetic perception and comparison of smile has been done. Yet very few studies have been done among the mixed population (rural and urban) of Gulbarga.

Orthodontists rated the Extraction cases as best for smile esthetics, followed by non extraction. The difference between the groups was statistically significant (p>0.05) (Table. I). Dental professionals rated the Non-extraction group as best in smile esthetics and the Control group rated as least attractive and the difference was statistically significant (p<0.05). Laypersons too rated Non-extraction group the best followed by Extraction and Controls. However, the difference was not statistically significant (p>0.05). (Table. I). In our study the orthodontists preferred the smile esthetics of extraction cases while dental professionals and laypersons preferred non-extraction.

In a similar study done by Isiksal et al<sup>6</sup>, Orthodontists gave higher scores to non-extraction, followed by Control and Extraction subjects. Dental Professionals rated the Control group best and Lay persons also rated the control group best showing that they had more similar perceptions as in our present study. In both studies Orthodontists gave the lowest scores indicating a more critical appraisal of smile esthetics. The differences between the mean scores given by the three panels for Extraction, Non-extraction and Control groups were not statistically significant, in contrast with our study where the scores given by dental professionals and orthodontist were statically significant.

Orthodontists and Dental professionals appeared to have more similar perception of smile esthetics and differed from the lay persons. The mean actual esthetic scores showed that Orthodontists in general gave lower scores indicating that they had higher esthetic standards and Dental Professionals gave the highest. In Isiksal's<sup>6</sup> study too, Orthodontists gave lower scores but the lay persons gave the highest scores. These findings agree with those of Isikal<sup>29</sup> but contrast with that of Hulse<sup>7</sup> who reported that lay person had no preference in variables determining smile attractiveness.

Our study correlates with the studies done by Prah-Anderson et al<sup>8</sup>, Brisman AS<sup>9</sup>, Tedesco et al<sup>10</sup>, Lundstrom et al<sup>11</sup> and Kerr et al<sup>12</sup> confirming that dentists and laypersons judge esthetics differently. Orthodontists have been sensitized to observe and evaluate features that do not influence the laypersons. Further supporting our study, Kokich<sup>13</sup> et al demonstrated that General Dentists, Orthodontists and Laypersons detect specific dental discrepancies at varying deviations. Dunn et al's<sup>14</sup> findings agree with the present study that, lay persons perception of smile esthetics were relevant just as Moore et al,<sup>15</sup> found that lay persons are able to discriminate between various degree of smile fullness. Erum et al<sup>16</sup> found that Orthodontists, General Dentists and Laypersons share more similarities than the differences, when evaluating dental esthetics, which is similar to the findings in present study. This finding demonstrates the ability of humans to appreciate smile

attractiveness even in the absence of technical knowledge. This shows how important it is to consider the patient perception in the treatment planning.

All the panelists gave lower esthetic scores to the control group than the orthodontically treated groups in our study. The reason for this could be that the control group might have exhibited mild individual tooth variations compared to the well aligned treated occlusions of other two groups, leading to lower scores for control group. In contrast, Isiksal's<sup>6</sup> study showed the control group getting the highest scores. As mentioned earlier however there were no statistically significant differences between the esthetic scores of the three groups in both the studies. Smile esthetics in Extraction cases was almost equally rated by the 3 panel groups, but the difference was not statistically significant ( $p > 0.05$ ). This shows more similar agreement on the esthetics of extraction case among the panelists.

The smile esthetic scores in the Non-extraction group showed variations. Dental Professionals gave highest mean scores followed by Laypersons and least by Orthodontists, again indicating a more critical appraisal by Orthodontist. The difference between the mean scores of Orthodontists and Dental Professionals was highly significant ( $p < 0.001$ ) as, was the difference between Dental Professionals and Laypersons. (Table. II, Graph.3). There was distinct disagreement among the raters.

The Control group also received highest esthetic scores from Layperson, followed by Dental Professionals, and Orthodontists. The difference between the mean esthetic scores given by Dental Professionals and Orthodontists was statistically significant ( $p < 0.05$ ). (Table..II). This data points out important differences among the 3 panel groups. Having a better understanding of these similarities and differences will allow practitioners to design treatment plans that take into account the esthetic preferences of both patient and clinician.<sup>17</sup>

The present study was conducted with a group of skeletal class I cases – treated and untreated. That was possibly the reason why not much difference in smile esthetics and correlation of variables were detected.

In the study by Malkinson et al,<sup>18</sup> smile esthetics were assessed by clinicians who found that excess gingival display influenced smile attractiveness and affected patient's attraction, reliability, intelligence and self-confidence. Their results agree with the present study.

In the present study, samples were restricted to class I subjects for ease of comparison. This study has shown that it is possible to achieve good smile esthetics in class I patients irrespective of the treatment modality.

In clinical practice however we treat the entire spectrum of class I, class II, class III and vertical dysplasia's. Smile esthetics is a goal of orthodontic treatment that should be achieved irrespective of malocclusion. In our study we have considered only subjective parameters which can lead to bias. So more studies with more objective parameters are required.

## CONCLUSION

1. Three panel groups (Orthodontists, Dental Professionals and Layperson) share more similarities than differences when evaluating the smile esthetics. Subjects with ideal occlusions and Class I patients treated with or without extractions group were not differentiated in smile esthetics by 3 panels of judges when overall mean esthetic scores were taken.
2. There was significant difference in mean scoring between Orthodontist and Dental Professionals, Dental Professionals and Laypersons in rating smile esthetics in non-extraction group. There was also significant difference among Orthodontists and Dental Professional in rating the smile

esthetics of control group.

3. Orthodontic treatment procedures did not have detrimental effect on smile esthetics.

Treatment modality alone has no predictable effect on the overall esthetic assessment of a smile. Having better understanding of these similarities and differences allow the practitioners to design treatment plans that take into account the esthetic preferences of the patient and clinician. Even though there were no clear preferences for laypeople as a group, each expressed clear individual preferences. Therefore, treatment must be individualized so that the every patient's unique esthetic preferences can be incorporated into clinical practice.

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