Attitude Toward Malocclusion and Desire for Orthodontic Treatment among 9-17 Year-Old Saudis

By Hoda M.A. Abdellatif,* Sulaiman E.S. Al-Emran**

Abstract
The objective of the study was to determine the attitude to malocclusion and the desire for orthodontic treatment among 9-17 year-old Saudis. A cross-sectional epidemiologically study was carried out in a sample of 1459 pre-adolescent and adolescent Saudi subjects aged 9 to 17 years. To measure the attitude toward malocclusion and the desire for orthodontic treatment, a questionnaire based on an orthodontic attitude survey was used. The findings revealed that 31% of the subjects were dissatisfied with their dental appearance. Children below the age of 10 years were the most dissatisfied. The results indicated a positive attitude towards various aspects of orthodontic treatment such as braces’ appearance and tolerance. However, 17% of the subjects felt that orthodontic braces were ugly and only 20% thought treatment could be quite painful. While a high percentage of the subjects (92%) agreed that proper occlusion is important, only 69.4% of them agreed on the importance of correcting malocclusion. Almost 52% of the subjects indicated a demand for orthodontic treatment. In analysis across age groups, no discernible pattern or statistically significant difference was detected. The majority of the subjects were concerned regarding their malocclusion and showed a desire for orthodontic treatment mainly for esthetic improvement.

Introduction
During the last 20 years the Kingdom of Saudi Arabia has had a marked increase in population and a massive development in various aspects of life.(1) Consequently, an increase in the demand for health services including oral health became evident. As growing public interest in oral health increased the demand for orthodontic treatment also became more noticeable in dental practices. Demand for orthodontic therapy may be influenced by a patient’s perceived need for treatment and by the anticipated improvement in self-image.(2,3) Social pressures as well as cultural and socio-economic background have been reported as reasons for initiating orthodontic treatment.(4) Thus, knowledge about a lay person’s attitude to malocclusion is becoming increasingly important in the context of providing orthodontic treatment. Lew(5) has stated that “practitioners should focus their attention beyond the orthodontic mechanism to the more subjective aspects of patient discomfort and attitude towards treatment.”

Several studies have concentrated on clarifying the role of malocclusion on an individual’s perception and satisfaction with dental or facial appearance.(6-8) Enhancing appearance and improving psychosocial status have been identified as important motivating factors behind the decision to initiate orthodontic treatment.(9-14) Most of these studies investigated the attitudes of adults or adolescents. Less research on the psychosocial attitude toward malocclusion has been conducted on pre-adolescent children and how this compares with adolescents attitudes.

Knowledge about orthodontic attitudes in pre-adolescents would be beneficial especially since early orthodontic treatment could be advantageous in preventing further malocclusion complications. Furthermore, knowledge about age-related patient concerns may guide and assist the orthodontist in educating potential patients and their parents and in providing advice. A review of the literature has revealed several studies that investigated the prevalence and severity of malocclusion for specific ethnic groups, age distributions and country-specific populations including Saudi Arabia.(15-17)
However, no study has yet concentrated on addressing the attitude toward malocclusion and the desire for orthodontic treatment among pre-adolescent and adolescent Saudi subjects. Furthermore, utilization of health services is a matter of concern not only to the providers but also to the planner of health care delivery. Accordingly, estimates of both population perception need and utilization of such services are required. This study was undertaken to determine the attitude towards malocclusion and the desire for orthodontic treatment among 9 to 17-year-old Saudis.

MATERIAL AND METHODS
An epidemiological study on a subpopulation of Riyadh City, specifically Saudis aged 9 to 17 years, was conducted. A total sample of 1459 subjects was selected from Riyadh public schools from fifth through eleventh grades. A list of all public schools in Riyadh was provided by the Ministry of Education. Together with each school name was included the name of the precinct where the school was located, the number of fifth through eleventh grade classes, the number of the corresponding students, and the school identification number. A systematic random sampling selection was done to ensure a representation which reflected gender, geographic area and class grades. Two formulated lists, one for boys and one for girls classes within each school were sorted by grade and geographical location. Then proportionately sub-samples were taken from each stratum. For logistical reason, no sub-sampling within class was carried out, as all students from selected classes were taken into the sample.

Data Collection
Demographic data such as sex, age, and were recorded. To measure attitudes toward malocclusion and the desire for orthodontic treatment, a questionnaire was used. Some of the questions used in this study were based on the orthodontic attitude survey. The questionnaire included demographic information such as age and sex, and several types of questions measuring a wide spectrum of children’s attitudes to their own occlusal status. Pre-testing early draft of the questionnaire on a group of students, who were not included in the study, was conducted and resulted in adjustments of wording and phrasing of the questions. The questionnaire was administered in the Arabic language. The questionnaires were distributed to all students in class. They were completed in the same setting, and then collected. No students refused to complete the questionnaire.

Data Analysis
To fulfill the purpose of this study the analyses were primarily descriptive in nature, and involved calculating frequency tabulations, and cross-classifications for categorical data. The statistical tests that were carried out were limited to comparisons of proportions with the Chi-Square.

RESULTS
Demographics: The age of the present sample ranged from 9 to 17 years with the median age being 13 years. Table 1 presents the age range, profile categorized into groups, with one-year intervals.

Dental Appearance: As a measure of dental appearance satisfaction, the question “do your teeth prevent you from smiling” was asked. Respondents who answered “yes” were 32.6% indicating that they were dissatisfied with their dental appearance. Satisfaction was also analyzed with respect to age. Table 2 shows that there was a consistent level of dissatisfaction (27 – 44%) in the different age groups. Children below the age group of 10 years reported a higher level (44%) of dissatisfaction and children above 16 years reported 36% dissatisfaction. However there was no significant difference among different age groups (P=0.144).

Response to Orthodontic Braces: Seventeen percent of the subjects felt that orthodontic braces were ugly. When investigating this issue across different age groups, a fairly constant rate was found (13% - 17%) among the various age groups with the exceptions of the 10 - 11 year-old children (20.8%) and those older than the age of 16 (19.9%). Differences observed were not statistically significant (P=0.544). Twenty percent responded that the braces could be quite painful. The results revealed that children at the age of 16 years and above expressed a slightly greater tolerance to braces than other age groups (Table 2).

Thirty-seven percent of the subjects considered having orthodontic braces to correct malocclusion as important as having corrective medical eyeglasses for restoring improper eye vision. The rates across the different age groups were almost similar (Table 2) with no significant statistical differences (P=0.759).

To the question whether braces would not bother them, 45% indicated that braces would not bother them. The rates among different age groups varied considerably with a minimum of 39% (10-11 years old) to a maximum of 52% (13-14 years old). There was no discernible pattern across the age
Table 1. Age distribution of sample

<table>
<thead>
<tr>
<th>Age group</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>9-10</td>
<td>91</td>
<td>6.24</td>
</tr>
<tr>
<td>10-11</td>
<td>210</td>
<td>14.39</td>
</tr>
<tr>
<td>11-12</td>
<td>216</td>
<td>14.80</td>
</tr>
<tr>
<td>12-13</td>
<td>216</td>
<td>14.80</td>
</tr>
<tr>
<td>13-14</td>
<td>170</td>
<td>11.85</td>
</tr>
<tr>
<td>14-15</td>
<td>184</td>
<td>12.61</td>
</tr>
<tr>
<td>15-16</td>
<td>212</td>
<td>14.53</td>
</tr>
<tr>
<td>16-17</td>
<td>160</td>
<td>10.97</td>
</tr>
</tbody>
</table>

Table 2. Responses of questionnaires according to age distribution

<table>
<thead>
<tr>
<th>Questions</th>
<th>Age group (9-10)</th>
<th>Age group (10-11)</th>
<th>Age group (11-12)</th>
<th>Age group (12-13)</th>
<th>Age group (13-14)</th>
<th>Age group (14-15)</th>
<th>Age group (15-16)</th>
<th>Age group (16-17)</th>
<th>Total</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dissatisfied with dental appearance</td>
<td>36 (44%)</td>
<td>53 (28%)</td>
<td>56 (30%)</td>
<td>58 (30%)</td>
<td>45 (29%)</td>
<td>53 (31%)</td>
<td>54 (27%)</td>
<td>53 (36%)</td>
<td>408</td>
<td>0.144</td>
</tr>
<tr>
<td>Agree that braces look ugly</td>
<td>11 (12.6%)</td>
<td>43 (20.8%)</td>
<td>34 (15.9%)</td>
<td>30 (14.6%)</td>
<td>24 (14.6%)</td>
<td>30 (15.8%)</td>
<td>33 (19.0%)</td>
<td>30 (16.6%)</td>
<td>235</td>
<td>0.544</td>
</tr>
<tr>
<td>Agree that could not tolerate braces</td>
<td>22 (25.0%)</td>
<td>45 (21.8%)</td>
<td>34 (15.9%)</td>
<td>47 (22.8%)</td>
<td>21 (18.5%)</td>
<td>25 (16.3%)</td>
<td>34 (21.7%)</td>
<td>279</td>
<td>0.114</td>
<td></td>
</tr>
<tr>
<td>Agree that braces are similar to glasses</td>
<td>35 (40.2%)</td>
<td>80 (38.3%)</td>
<td>73 (34.3%)</td>
<td>79 (38.2%)</td>
<td>66 (37.1%)</td>
<td>65 (37.1%)</td>
<td>67 (34.6%)</td>
<td>518</td>
<td>0.759</td>
<td></td>
</tr>
<tr>
<td>Agree that braces would not be a bother</td>
<td>36 (41.4%)</td>
<td>81 (39.3%)</td>
<td>101 (47.0%)</td>
<td>103 (49.8%)</td>
<td>86 (52.4%)</td>
<td>75 (42.4%)</td>
<td>88 (44.4%)</td>
<td>638</td>
<td>0.185</td>
<td></td>
</tr>
<tr>
<td>Agree about importance of correcting malocclusion</td>
<td>64 (71.9%)</td>
<td>136 (68.3%)</td>
<td>138 (67.6%)</td>
<td>159 (77.2%)</td>
<td>111 (69.8%)</td>
<td>111 (65.3%)</td>
<td>141 (68.5%)</td>
<td>97 (66.4%)</td>
<td>957</td>
<td>0.783</td>
</tr>
<tr>
<td>Agree about the need for orthodontic treatment</td>
<td>44 (51.2%)</td>
<td>92 (46.0%)</td>
<td>119 (57.5%)</td>
<td>115 (54.8%)</td>
<td>96 (58.5%)</td>
<td>89 (48.9%)</td>
<td>92 (51.3%)</td>
<td>81 (52.6%)</td>
<td>728</td>
<td>0.070</td>
</tr>
</tbody>
</table>

*The upper value of the interval is closed ended (including that number), whatsoever value is open ended (does not include that number).

DISCUSSION

The present sample was randomly selected from the Riyadh public school system through a statistically designed method. The city of Riyadh is the capital of Saudi Arabia and is similar to other capitals of the world where people have migrated from different parts of the country to live in the capital. Therefore, it can be assumed that Riyadh is relatively representative of the whole of Saudi Arabia.

Although age-related changes in malocclusion concerns ideally should be studied longitudinally, the present study allowed comparison between different age groups by means of a cross-sectional study. Such a study can give an indication of changing attitudes toward malocclusion with age. A child’s perception for his or her dental appearance is of considerable importance in determining both treatment demand and the subsequent level of cooperation during treatment. Dissatisfaction with dental appearance was reported by 31% of the sample. This finding is similar to Esplend and Stenvick study, where information was collected on children satisfaction with their dental appearance compared to orthodontic treatment.

Knowledge about age-related attitudes to dental appearance may guide efforts in assisting the education of potential patients. Newman et al. reported in their study that satisfaction was variation in the rates across the different age groups. The most positive response rate was found in the 13-14 year-old age group (58.5%) and the minimum in the 15-16 year-old age group (45.1%). There was an increase in the percentage of positive response in the group of 12-13 year-old children (77.2%) as shown in Table 2. In reviewing the percentages across the age groups, the only detectable trend was that associated with esthetics. The rate increased in the older age groups compared to the younger age groups.

Knowledge about age-related attitudes to dental appearance may guide efforts in assisting the education of potential patients. Newman et al. reported in their study that satisfaction was variation in the rates across the different age groups. The most positive response rate was found in the 13-14 year-old age group (58.5%) and the minimum in the 15-16 year-old age group (45.1%). There was an increase in the percentage of positive response in the group of 12-13 year-old children (77.2%) as shown in Table 2. In reviewing the percentages across the age groups, the only detectable trend was that associated with esthetics. The rate increased in the older age groups compared to the younger age groups.
of teeth. Similar findings were reported by Malmgren(25) who
desire orthodontic treatment, perhaps for slight malalignment
ally satisfied with their dental appearance, they still tended to
This finding suggests that, although some subjects were gener-
sity toward orthodontic treatment while only 31% of
subjects reported dissatisfaction with their dental appearance.

Table 3. Response to “choice of orthodontic treatment vs. taking vacation” according to age group

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Vacation</th>
<th>Ortho Tx</th>
</tr>
</thead>
<tbody>
<tr>
<td>9-10</td>
<td>13 15.7%</td>
<td>70 64.3%</td>
</tr>
<tr>
<td>10-11</td>
<td>35 17.2%</td>
<td>168 62.8%</td>
</tr>
<tr>
<td>11-12</td>
<td>60 29.1%</td>
<td>70.9%</td>
</tr>
<tr>
<td>12-13</td>
<td>42 20.5%</td>
<td>146 79.5%</td>
</tr>
<tr>
<td>13-14</td>
<td>53 32.5%</td>
<td>163 79.5%</td>
</tr>
<tr>
<td>14-15</td>
<td>62 35.4%</td>
<td>110 67.5%</td>
</tr>
<tr>
<td>15-16</td>
<td>53 26.2%</td>
<td>113 64.6%</td>
</tr>
<tr>
<td>16-17</td>
<td>31 20.4%</td>
<td>149 73.8%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>13 84.3%</td>
<td>146 84.3%</td>
</tr>
</tbody>
</table>

Table 4. Reasons for selecting orthodontic treatment

<table>
<thead>
<tr>
<th>Reasons</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Esthetics</td>
<td>318</td>
<td>41.3%</td>
</tr>
<tr>
<td>Proper occlusion</td>
<td>240</td>
<td>31.3%</td>
</tr>
<tr>
<td>Able to chew</td>
<td>110</td>
<td>14.4%</td>
</tr>
<tr>
<td>Self-confidence</td>
<td>80</td>
<td>10.5%</td>
</tr>
<tr>
<td>Similar to friends</td>
<td>20</td>
<td>2.6%</td>
</tr>
</tbody>
</table>

P<0.0001

faction with appearance was strongly influenced by age. This
trend was not detected in this study. There was a higher level of
dissatisfaction among 9-10 year-old children. However, it
was not statistically significant. It could be due to “the ugly
duckling stage” as mentioned by Broodbent.(21)

The attitudes of subjects towards various aspects of treatment
such as braces’ appearance and tolerance were assessed. Results indicated a positive attitude towards various
aspects of treatment. This result is in agreement with Gavely
and Orth(22) who reported that students were prepared to
accept treatment and to wear the appliances especially when
treatment level needed increases. A further indication of the
positive attitude of the sample in this study was provided
when the relative value of orthodontic treatment was investig-
ated. Approximately 75% of subjects responded that they
would postpone a vacation in favor of orthodontic treatment
if, for financial reasons, a decision had to be made.

A high percentage of the present sample (92%) agreed that
proper occlusion was essential. However, only 69.4% of them
felt that correcting malocclusion was important. From these
findings, it could be concluded that although the majority of
the subjects had a negative attitude toward malocclusion,
some did not value the importance of correcting malocclusion
when it came to carrying out orthodontic treatment and/or
that the young patient themselves often did not contribute to
treatment decision. This detached opinion and/or lack of con-
cern for correcting malocclusion among children had also
been observed by other investigators.(23,24)

The data revealed that desire for orthodontic treatment among
subjects in the sample was high. Approximately 52% of the
subjects indicated a demand for treatment while only 31% of
subjects reported dissatisfaction with their dental appearance.
This finding suggests that, although some subjects were gener-
ally satisfied with their dental appearance, they still tended to
desire orthodontic treatment, perhaps for slight malalignment
of teeth. Similar findings were reported by Malmgren(25) who
studied 147 children of a comparable age group. He found that

89 children (60.5%) were dissatisfied with their dental appear-
ance, but, 74.8% thought that their teeth needed correc-
tion. Malmgren(25) speculated that this discrepancy between
children dissatisfied with their teeth and those who thought
they required orthodontic treatment might have been due to
either a failure to understand the questions passed or that the
children wanted to be treated even though they were not cer-
tain that there was something wrong with their teeth. In con-
trast to this, Tulloch et al.(26) showed that perception of dental
attractiveness and treatment need were similar. Other stud-
ies(8,27) measuring orofacial perceptions in teenagers or adults
indicated that, while people seemed mostly aware of their mal-
occlusion traits, they did not perceive a need for treatment.

Esthetics was the main reason given in the present study for
justifying the need for orthodontic treatment, followed by
proper occlusion and the ability to chew. This is in agreement
with many investigators who reported that dental appearance
was the main motive for seeking orthodontic care.(11-13)
Salzmann(11) has stated that demand for orthodontic treatment
was motivated primarily by “esthetic values as well as by the
high social premium our society places on well aligned teeth
and attractiveness in general”. Further supportive evidence for
this view is provided by Gochman(13) in his study of 774 school
children aged 8-17 years, where a large proportion of the sam-
ple mentioned social improvements, appearance, and self-con-
fidence as the major benefits of the treatment. Moreover, the
need for treatment to improve esthetics in the present study
was found to increase with age. This is in agreement with that of
Gochman.(13) It appears, therefore, that many people seek
treatment for a mixture of reasons, with the primary motivation
being the need for acceptable dento-facial appearance.

When reviewing the attitude toward malocclusion and the
desire for orthodontic treatment across the different age
groups in this study, some variations in the rate of positive
responses across the different age groups were found. However no discernible pattern or statistically difference
could be detected. Further evidence in this direction is sup-
plied by Gross and Gross(28) who reported that different age
groups did not differ significantly.

No clinical examination was conducted in this study. Thus, no
correlation between satisfaction of dental appearance and
perception of orthodontic treatment needs relative to various occlusal traits was measured. Conflicting results regarding the effects of various occlusal traits on concern for dental appearance have been reported in the literature. For example, Helm et al. (29) found that certain occlusal traits, such as extreme overjet and reverse overjet, were causes for concern. In contrast to this, other studies (8, 24-27) have suggested that self-perception and clinical findings were poorly correlated. These conflicting results mentioned emphasize and highlight the need to establish exactly what the patients dislike most about their appearance. Therefore, further investigations of what clinical parameters and what levels of malocclusion severity lead to demand for orthodontic treatment are needed to have a better understanding of the attitude towards malocclusion and the perception of treatment need. Another issue which should be addressed is the fact that it is usually a parent who brings a child for both dental and orthodontic care. Thus, an understanding of the role of parents’ perceptions of the child’s appearance must be considered from the standpoint of treatment.

ACKNOWLEDGEMENTS
This project (F-1071) was supported by College of Dentistry Research Center (CDRC) King Saud University. The authors would like to express their gratitude to the School Health Services, Riyadh, Saudi Arabia for their valuable assistance in facilitating access to the Riyadh public school system for data collection and would like to thank the principals, teachers, and students of the schools for their understanding and cooperation during this study.

This article was reprinted with permission from the Saudi Dental Journal. Volume 17, No. 1, January - April 2005.

References