Parents’ perceptions of oral health conditions depicted in photographs of anterior permanent teeth

ABSTRACT

The aim of this study was to evaluate parents’ perceptions of dental fluorosis and other oral health conditions depicted in photographs of anterior teeth.

Study Design and Methods The sample comprised 120 parents (average age 39.3 years) whose children were undergoing dental treatment at the School of Dentistry of the Federal University of Minas Gerais. Seven photographs were selected: P1, open bite; P2, dental fluorosis TF=1 associated with open bite; P3, dental fluorosis TF=1; P4, midline deviation and crowding; P5, dental hypoplasia; P6, teeth without oral problems; P7, dental fluorosis TF=3. All photographs were randomly shown to all the parents, who classified the conditions observed based on a numeric scale: 0-19 (very unsatisfactory), 20-39 (unsatisfactory), 40-59 (neutral), 60-79 satisfactory and 80-100 (very satisfactory). The reasons for dissatisfaction and the possible treatment choice were examined.

Results P6 (normal teeth) was the most satisfactory photograph according to the parents (mean= 61.2), and all photographs were statistically significantly different from one another (Mann-Whitney test, p < 0.05), except the following pairs: P1 (mean=52.9) and P7 (mean=50.2) (p= 0.537); P2 (mean=32.6) and P3 (mean=39.0) (p = 0.073); and P5 (mean=18.9) and P4 (mean=18.4) (p = 0.923). Alignment and crowding were considered the most prevalent problem in all cases (27.5 to 90.8% of parents) and orthodontic treatment was the most frequently cited option for treating all conditions (34.2 to 89.2% of parents).

Conclusion In general, parents were dissatisfied with the oral conditions depicted in all photographs. Midline deviation associated to crowding (P4) and dental hypoplasia (P5) were considered the most unsatisfactory conditions. The most frequently cited oral problems by the parents were alignment and crowding. Orthodontic treatment was considered the best option by the majority of parents.

Keywords: Oral health; Aesthetics; Dental fluorosis; Malocclusion; Perception; Photography; Tooth crowding.

Introduction

There is a concern whether dental fluorosis is a public health problem that merits further attention on the part of public healthcare services. Although the prevalence of dental fluorosis has increased in recent decades, some investigations report that fluorosis goes unnoticed by most people [Bowen, 2002]. When considering their own child, parents have been found to consider the appearance of their child’s teeth either pleasing [Clark et al., 2006; Martins et al., 2009] or unpleasing [Woodward et al., 1996; Lalumandier and Rozier, 1998]. However, their judgment of their own child’s teeth may affect their responses and they may judge the teeth to be more pleasing than they actually are.

Photographs have been used to avoid this tendency. Studies have used photographs of teeth with dental fluorosis and other oral conditions to investigate the concerns of people regarding dental appearance. Some studies have found that a mild degree of fluorosis is not a cause of concern [Hawley et al., 1996; Menezes et al., 2002; Williams et al., 2006; Meneghim et al., 2007], while others found that it is [Mcknight et al., 1998; Edwards et al., 2005; Lawson et al., 2008] and increasing degrees of fluorosis and dental caries are more associated with dental dissatisfaction [Clark et al., 1995; Ellwood and O’Mullane, 1995; Hawley et al., 1996; Edwards et al., 2005; Williams et al., 2006]. Other oral problems can also become a major concern for parents.

In pediatric dentistry, parents are usually the primary decision-makers on matters affecting their children’s healthcare. The aesthetic perception of teeth may differ between patients, laypersons, dental students and dental professionals [Clark et al., 1995; Ellwood and O’Mullane, 1995; Clark and Berkowitz et al., 1997; Levy et al., 2002; Shulman et al., 2004]. Deciding on treatment based solely on the dentist’s opinion can lead to divergences from what parents desire for their children. It is important to consider the perception parents have regarding oral health conditions in order to plan an individualised treatment for the child that is not only based on the generalised opinions of professionals. Moreover, this could help dentists obtain the family’s cooperation in carrying out preventive measures at home during the curse of the treatment and afterward.

The aim of this study was to evaluate the perception of parents about dental fluorosis and other oral health problems depicted in photographs of anterior teeth in children.

Materials and methods

Sample

The sample comprised 120 parents (mean age 39.3 years, minimum of 21 years and maximum of 72 years) whose children were undergoing treatment at the Orthodontic and Paediatrics Clinics of the School of Dentistry of the Federal University of Minas Gerais, Belo Horizonte, MG, Brazil. Data was collected from August to December 2007 over the course of an entire academic semester. All parents whose child was being treated were
contacted in the waiting room. In general, each parent responded for one child attended at the dental clinics. All parents and children were Brazilians. The Ethics Committee of the Federal University of Minas Gerais approved the protocol for this study. The parents who agreed to participate in the study signed an informed consent. Among the parents contacted, only one refused to participate.

Photograph selection

Seven images were selected out of the 49 photographs taken in a previous prospective study on dental fluorosis [Martins et al., 2008; Martins et al., 2009]. The children in these photographs were 7 to 9 years old and lived in two Brazilian cities with optimally fluoridated water (Ibá, MG and Piracicaba, SP, 0.6 to 0.8 ppm F). The photographs were taken with lip retractor in place and children were asked to maintain edge-to-edge contact of the teeth. The images showed the mandibular and maxillary anterior teeth from canine to canine, allowing the viewer to see only the teeth. Thus, the face was not revealed and the children could not be identified from the photos [Martins et al., 2009]. The images were printed in the same laboratory (21 x 15 cm) for use in the present study.

The 49 photographs were shown to a team of five dentists who were asked to select the seven best photographs that represented the following oral problems: open bite; dental hypoplasia, dental fluorosis in mild and moderate degrees, and teeth with two associated oral problems. A photograph with teeth without oral problems was selected to serve as control. The most voted photographs by the five dentists were included in the study. If two photographs received the same number of votes, three authors decided which to include. The photographs are described in Table 1 (P1-P7). The authors decided to select only seven photographs in order to avoid lengthy interviews that might bore the participants. The photographs were shown to the parents in random sequence. All seven photographs were shown to all participants.

Images of dental fluorosis included degrees TF=1 and TF=3, as defined by Thysstrup and Fejerskov [1978]. Severe degrees with loss of the enamel structure (above TF=5) were not included because this is not a common oral health problem among the population of Belo Horizonte, which is a city with an optimally fluoridated public water supply (0.7 ppm F). The decision was made not to include the intermediate degree TF=2, as it is very similar to TF=1 and TF=3. Thus, photos with more diverse degrees were used.

Interview

Parents were interviewed in the waiting room of the Paediatric Orthodontic Clinic by a single trained examiner (NBF), while their children were undergoing treatment. The standardisation process was performed by means of meetings with the team of researchers in order to analyse the test administration criteria, followed by a pilot study.

The interview included gathering information on the age and educational level of the parent being interviewed as well as the monthly household income. The parents were asked to classify the photographs according to a scale ranging from 0 to 100 (arranged in intervals of 10). The scale was shown to the parents, who were asked to pick a number on the line [Meneghim et al., 2007]. Unlike Meneghim et al. [2007], who used letters, the decision was made to use numbers in the present study in order to facilitate the classification. The values determined by the parents were grouped into five categories: 0-19= very unsatisfactory; 20-39= unsatisfactory; 40-59= neutral; 60-79= satisfactory; and 80-100= very satisfactory.

The following questions were posed to all parents for each photograph: “How do you classify the teeth in the photograph?” (using the scale from 0 to 100), “Why, do you see any problem?” “Do you think these teeth need treatment?” and “What kind of treatment?” The aim was to investigate the condition perceived in the photograph and the perceived need for treatment. The questions were open-ended and parents were not given response options. Thus, they were free to give more than one reason. The interview took about 15 minutes to evaluate the seven photographs.

Pilot study

Prior the main study, a pilot study was carried out in

<table>
<thead>
<tr>
<th>Photograph</th>
<th>Oral problem</th>
</tr>
</thead>
</table>
| P1         | Malocclusion alone (open bite)  
Open bite of 4 mm due to sucking habits. |
| P2         | Dental fluorosis associated with malocclusion  
(TF=1 and open bite)  
Narrow white lines corresponding to perikymata on central and lateral maxillary and mandibulary incisors, covering 1/4 incisal of the teeth.  
Open bite of 4 mm due to sucking habits. |
| P3         | Dental fluorosis alone (TF=1)  
Narrow white lines corresponding to perikymata on central and lateral maxillary incisors, covering 1/4 incisal of the teeth. |
| P4         | Two types of associated malocclusions - anterior midline deviation associated to crowding)  
Unilateral left posterior crossbite, which caused deviation of mid line; and crowding of the two central incisors. |
| P5         | Dental hypoplasia alone  
Round marked and isolated hypoplasia, white coloured and covering about 90% of the vestibular face of teeth #21, 32, 42. |
| P6         | Normal (dental arcade without oral problem) |
| P7         | Dental fluorosis alone (TF=3)  
Accentuated drawing of perikymata visible and merging and irregular cloudy areas of opacity on maxillary and mandibulary central and lateral incisors, covering more than 1/2 of the teeth. |

TABLE 1 - Photographs shown to parents.
order to help the researcher not to influence the parents’ responses and to evaluate the effectiveness of the interview. Twenty parents (not included in the main study) were interviewed by one of the researchers. The interviews were evaluated and the proper corrections and clarifications were made. The first interview had closed-ended questions with several options for the parents to choose. As it was determined that the options influenced the parents’ responses, the decision was made not to give response options and to use open-ended questions.

Data analysis
The data were entered into the Software Package for Social Sciences (SPSS for Windows, version 12.0, SPSS Inc, Chicago, IL, USA) and statistical descriptive analysis was performed. The overall mean classification was calculated for each photograph based on the values of the scale ranging from 0 to 100. The Mann-Whitney test was used to analyse statistically significant differences between the means of the photographs (p < 0.05) and Pearson’s correlation coefficient was calculated for gender and parents’ opinions.

Results

One hundred twenty parents were contacted in the waiting room and agreed to participate. Only one parent refused to participate and was not included in the results. Only one parent per child was invited to participate. For two cases in which a couple was accompanying their child, they were asked which of the two wanted to be interviewed. In both cases, the mother volunteered.

Table 2 shows the demographic features of the study population. The majority of parents interviewed were female (79.2%), with a complete middle school education (74.2%), and a monthly household income of less than US$700 (45.0%). There was no statistically significant difference between gender and parents’ opinion regarding aesthetics (p > 0.05).

![Alternative text for image](image-url)

**Table 2** - Demographic features of the parents interviewed.

<table>
<thead>
<tr>
<th>Demographic feature</th>
<th>N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender of parents</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>25 (20.8)</td>
</tr>
<tr>
<td>Female</td>
<td>95 (79.2)</td>
</tr>
<tr>
<td>Instruction level</td>
<td></td>
</tr>
<tr>
<td>Illiterate or incomplete elementary education</td>
<td>9 (7.5)</td>
</tr>
<tr>
<td>Complete elementary education</td>
<td>89 (74.2)</td>
</tr>
<tr>
<td>Complete high school</td>
<td>6 (5.0)</td>
</tr>
<tr>
<td>Complete university</td>
<td>14 (11.7)</td>
</tr>
<tr>
<td>Did not answer</td>
<td>2 (1.6)</td>
</tr>
<tr>
<td>Monthly household income (US$)</td>
<td></td>
</tr>
<tr>
<td>≤ US 300</td>
<td>24 (20.0)</td>
</tr>
<tr>
<td>From US 300 to US 700</td>
<td>30 (25.0)</td>
</tr>
<tr>
<td>From US 700 to US 1,000</td>
<td>24 (20.0)</td>
</tr>
<tr>
<td>≥ US 1,000</td>
<td>20 (16.7)</td>
</tr>
<tr>
<td>Did not answer</td>
<td>22 (18.3)</td>
</tr>
</tbody>
</table>

![Alternative text for image](image-url)

**Table 3** - Frequency of answers regarding oral problems perceived by parents.

<table>
<thead>
<tr>
<th>Photograph N (%)</th>
<th>P1 (open bite)</th>
<th>P2 (TF=1 + open bite)</th>
<th>P3 (TF=1)</th>
<th>P4 (midline deviation + crowding)</th>
<th>P5 (hypoplasia)</th>
<th>P6 (normal)</th>
<th>P7 (TF=3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is the problem with the teeth in the photograph?*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alignment or crowding</td>
<td>104 (86.7)</td>
<td>87 (72.5)</td>
<td>109 (90.8)</td>
<td>85 (70.8)</td>
<td>59 (49.2)</td>
<td>77 (64.2)</td>
<td>33 (27.5)</td>
</tr>
<tr>
<td>Shape or spacing</td>
<td>4 (3.3)</td>
<td>22 (18.3)</td>
<td>8 (6.7)</td>
<td>23 (19.2)</td>
<td>3 (2.5)</td>
<td>11 (9.2)</td>
<td>12 (10.0)</td>
</tr>
<tr>
<td>Caries</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
<td>1 (0.8)</td>
<td>37 (30.8)</td>
<td>1 (0.8)</td>
<td>5 (4.2)</td>
</tr>
<tr>
<td>Staining</td>
<td>1 (0.8)</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
<td>9 (7.5)</td>
<td>1 (0.8)</td>
<td>60 (50.0)</td>
</tr>
<tr>
<td>Gum problems</td>
<td>1 (0.8)</td>
<td>4 (3.3)</td>
<td>1 (0.8)</td>
<td>0 (0.0)</td>
<td>4 (3.3)</td>
<td>4 (3.3)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td>Yellow teeth</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
<td>1 (6.8)</td>
<td>2 (1.7)</td>
<td>2 (1.7)</td>
</tr>
<tr>
<td>Did not know</td>
<td>10 (8.3)</td>
<td>7 (5.8)</td>
<td>2 (1.7)</td>
<td>11 (9.2)</td>
<td>7 (5.8)</td>
<td>24 (20.0)</td>
<td>8 (6.7)</td>
</tr>
</tbody>
</table>

*Parents answered open-ended questions and were free to give more than one reason.
FIG. 1 - Percentage frequency of parents’ opinions regarding the appearance of the teeth in the photographs, considering the scale categories: very unsatisfactory (0-19), unsatisfactory (20-39), neutral (40-59), satisfactory (60-79) and very satisfactory (80-100).

Mean: mean classification of the overall scale considering values from 0 to 100 given by parents. Means followed by different letters are statistically significantly different (Mann-Whitney test, \( p \leq 0.05 \)).

were statistically significant differences between all photographs (Mann-Whitney test, \( p \leq 0.05 \)), except the following pairs: P1 (open bite, 52.9) and P7 (dental fluorosis TF=3, 50.2) (\( p = 0.537 \)); P2 (dental fluorosis TF=1 and open bite, 32.6) and P3 (dental fluorosis TF=1, 39.0) (\( p = 0.073 \)); and P5 (dental hypoplasia, 18.9) and P4 (mid-line deviation and crowding, 18.4) (\( p = 0.923 \)).

When asked to describe the problem with the teeth in the photographs, most parents cited alignment or crowding problems, regardless of whether the teeth were actually affected by these conditions (Table 3). P3 (dental fluorosis TF=1), P5 (dental hypoplasia), P6 (normal teeth) and P7 (dental fluorosis TF=3) were perceived as alignment or crowding problems by 90.8%, 49.2%, 64.2% and 27.5% of parents, respectively. A few parents perceived the teeth as “bigger or wider teeth than those of the primary dentition” and “spaced teeth”. These comments were coded as “shape or spacing” in Table 1. Parents perceived staining as an oral problem only on P7 (dental fluorosis TF=3, 50.0%) and P5 (dental hypoplasia, 7.5%). Dental hypoplasia was also perceived as a caries problem by many respondents (30.8%).

A minimum of 84.2% (P6, normal teeth) to a maximum of 100% (P4, mid-line deviation and crowding) of the parents agreed that all the conditions shown in the photographs needed treatment (Table 4). When asked to explain the appropriate treatment the child in the photograph needed, most cited orthodontic treatment (mentioned by a minimum of 34.2% to a maximum of 89.2% of parents). For photographs 5 and 7, which depicted dental hypoplasia and TF=3 dental fluorosis, respectively, parents chose cleaning (7.5% and 17.5%, respectively) and restorations (15.8% and 18.3%, respectively) as treatment options (Table 3).

Discussion

The present study was conducted with parents because they are the primary decision-makers concerning children’s treatment. Data were collected over the course of an academic semester, involving the total number of patients
admitted to the Paediatric and Orthodontic Clinic. Only one parent contacted refused to participate, and this sample can be considered representative of the parents of children undergoing treatment at the School of Dentistry of the Federal University of Minas Gerais. The majority were mothers (n= 95, 79.2%) and 25 were fathers (20.8%). There was no statistical significant difference between gender and parents’ responses regarding the perception of any photograph (p > 0.05).

Photographs were used in the present study due to their practicality, as they can be shown to a large number of volunteers, ensure patient confidentiality and may minimize bias, as the children evaluated do not belong to the parents making the evaluations. Oral health problems were selected based on the most prevalent aesthetic problems found in the anterior teeth of children [Meneghim et al., 2007; Pereira et al., 2009]. Dental caries was not selected, since it is not an oral health problem commonly found in the anterior permanent teeth of 7-to-9-year-old children, but rather affects the first permanent molars in children [Batchelor and Sheiham, 2004; Pereira et al., 2009].

The majority of parents (respondents) were female with low educational levels and low monthly household income. Except for the parents whose monthly household income was ≥ US $1,000.00 (16.7%) and those who had a complete university education (11.4%), most of the study population had a low socioeconomic status. This confirms the homogeneity of the study population.

The parents tended to be very demanding when scoring the photographs, as the highest overall mean was for P6 (normal) (61.5), which is quite a low score, considering that the teeth exhibited no problems. All mean values of the photographs were statistically different from one another, except for the following pairs (in decreasing order): P1 (open bite, mean= 52.9) and P7 (dental fluorosis TF=3, mean=50.2) (p= 0.537); P2 (dental fluorosis TF=1 associated to open bite, mean= 32.6) and P3 (dental fluorosis TF=1, mean= 39.0) (p= 0.073); and P4 (mid-line deviation associated to crowding, mean= 18.4) and P5 (dental hypoplasia, mean= 18.9) (p= 0.923). This shows that these pairs achieved the same degree of satisfaction or dissatisfaction. The two types of oral associated conditions were expected to account for the most unsatisfactory/very unsatisfactory classifications. However, this only occurred for the midline deviation associated to crowding (P4). Other authors also found that alignment and crowding problems were the main reasons for dissatisfaction [Levy et al., 2005; Menezes et al., 2002; Meneghim et al., 2007]. It is not surprising that hypoplasia (P5) achieved similar results to mid-line deviation associated to crowding (P4), as hypoplasia lesions involved about 90% of the vestibular face of the left maxillary central incisor and both mandibular lateral incisors.

An unexpected finding was that TF=1 dental fluorosis associated to open bite (P2) (two associated oral conditions) received a better classification than midline deviation associated to crowding (P4), with the difference achieving statistical significance (p < 0.05). It is likely that the parents were more concerned with the open bite rather than the dental fluorosis, as 72.5% stated that teeth in this photograph had alignment and crowding problems and no one mentioned stains (0.0%) (Table 3). Moreover, 75.8% of parents said that these teeth needed

### TABLE 4 - Frequency of answers regarding parents’ opinion about the need for treatment.

<table>
<thead>
<tr>
<th>Photograph N (%)</th>
<th>P1 (open bite)</th>
<th>P2 (TF=1 + open bite)</th>
<th>P3 (TF=1)</th>
<th>P4 (midline deviation + crowding)</th>
<th>P5 (hypoplasia)</th>
<th>P6 (normal)</th>
<th>P7 (TF=3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does the child in the photograph need dental treatment?</td>
<td>Yes</td>
<td>111 (92.5)</td>
<td>118 (98.3)</td>
<td>118 (98.3)</td>
<td>120 (100.0)</td>
<td>119 (99.2)</td>
<td>101 (84.2)</td>
</tr>
<tr>
<td>No</td>
<td>9 (7.5)</td>
<td>2 (1.7)</td>
<td>2 (1.7)</td>
<td>0 (0.0)</td>
<td>1 (0.8)</td>
<td>18 (15.8)</td>
<td>7 (5.8)</td>
</tr>
<tr>
<td>What dental treatment does the child in the photograph need*</td>
<td>Orthodontic treatment</td>
<td>104 (86.7)</td>
<td>91 (75.8)</td>
<td>107 (89.2)</td>
<td>92 (76.7)</td>
<td>80 (66.7)</td>
<td>86 (71.7)</td>
</tr>
<tr>
<td>Gum treatment</td>
<td>1 (0.8)</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td>Cleaning</td>
<td>1 (0.8)</td>
<td>1 (0.8)</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td>Surgery</td>
<td>0 (0.0)</td>
<td>6 (5.0)</td>
<td>3 (2.5)</td>
<td>12 (10.0)</td>
<td>2 (1.7)</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td>Restorations</td>
<td>0 (0.0)</td>
<td>1 (0.8)</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td>Dental implants</td>
<td>0 (0.0)</td>
<td>3 (2.5)</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
<td>1 (0.8)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td>Bleaching</td>
<td>1 (0.8)</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
<td>2 (1.7)</td>
<td>10 (8.3)</td>
</tr>
<tr>
<td>Did not know</td>
<td>6 (5.0)</td>
<td>3 (2.5)</td>
<td>8 (6.7)</td>
<td>16 (13.3)</td>
<td>8 (6.7)</td>
<td>4 (3.3)</td>
<td>19 (15.8)</td>
</tr>
</tbody>
</table>

*Parents answered open-ended questions and were free to mention more than one treatment.
orthodontic treatment, whereas few cited cleaning (0.8%) and restoration (0.8%), suggesting that the staining by fluorosis went unperceived or was not perceived as a cause for dissatisfaction (Table 4).

However, comparing dental fluorosis alone, TF=3 (P7) received a significantly higher score than TF=1 (P3) (p < 0.05). There is a lack of consensus in the literature on this issue. Some studies report that dental fluorosis is not cause of concern [Clark and Berkowitz, 1997; Menezes et al., 2002; Shulman et al., 2004; Sigurjóns et al., 2004; Clark et al., 2006; Mene gloves et al., 2007], whereas others report that dental fluorosis is associated with parental dissatisfaction [Laumandier and Rozier, 1998; McKnight et al., 1998; Lawson et al., 2008]. However, when the parents were asked to describe the problem of the teeth shown in the photograph (Table 3), only TF=3 dental fluorosis (P7) and dental hypoplasia (P9) were considered staining problems (50.0% and 7.5%, respectively), whereas TF=1 dental fluorosis was not associated with staining. The parents misjudged some oral problems, such as dental hypoplasia and TF=3 dental fluorosis, as 30.8% and 4.2% of the parents, respectively, believed these alterations were dental caries (Table 3). The same conditions were classified as a need for cleaning, restorations and bleaching by the parents (Table 4). These results suggest that, although parents were dissatisfied with these teeth, they found it difficult to identify the real problem and dental fluorosis does not seem to be a major concern of parents. In a previous study, respondents made social judgments based on the aesthetics of the teeth; severe fluorosis or untreated caries were perceived in other studies as unattractiveness, dirtiness and carelessness [Williams et al., 2006]. A lack of information on oral diseases can lead to a poor judgment and poor decisions concerning oral health and can affect people's well-being.

Alignment and crowding were the most perceived oral problems by the majority of the parents, even when the teeth had no occlusal problems (Table 3). Parents who stated that the permanent teeth were bigger or wider than those of the primary dentition and that there was space between teeth were dichotomized into the variable “shape or spacing”, as this was considered the transition between dentitions. Another study also found that comparisons between the permanent and primary dentition may have confounded the parents’ perception regarding the appearance of teeth, e.g. when they cited the more yellow colour of permanent teeth as a reason for dissatisfaction [Sigurjóns et al., 2004]. Other oral problems were also cited, although they were not present (“gum problems” and “dental caries”).

The majority of the parents agreed that the oral conditions shown in all photographs required treatment (84.2% to 100.0%; Table 4). The desire for treatment did not relate to the acceptability of the appearance. In contrast, a previous study asked volunteers to evaluate photographs with several degrees of dental fluorosis and answer a web-based questionnaire; the appearance of the teeth considered “acceptable” tended to be classified as having “no need for treatment”, whereas the “unacceptable” appearance was most often classified as “needing treatment” [Edwards et al., 2005].

A portion of the parents classified the control image (normal, P6) as satisfactory (23.3%) or very satisfactory (34.7%); however, according to 64.2% of the parents, the teeth in this photo had alignment or crowding problems; 84.2% stated a need for treatment; and 71.7% suggested orthodontic treatment (Tables 3 and 4). Thus, the parents perceived a need for orthodontic treatment even though there was no oral problem in these teeth. The same occurred with the other oral conditions shown in the photographs. The findings of the present study are in agreement with those reported in the literature on teenagers’ self-perception of their teeth appearance. Although 88.0% of the teenagers felt that orthodontic treatment was needed to improve their appearance, only 52.0% were identified through dental examination as actually in need of treatment [Marques et al., 2006]. Apparently, the parents whose children were undergoing treatment tended to believe that every oral condition should be treated. Another study found that parents who desired orthodontic treatment for themselves or who were former orthodontic patients were ten times more likely to approve of orthodontic care in principle and to perceive a need for it in their children. In the study, the parents were recruited at the children’s school rather than at dental clinics. Apart from the effect of parental orthodontic history, the results of the investigation confirmed a high level of approval for orthodontic treatment among parents in general [Pratelli et al., 1998].

In addition to orthodontic treatment, other frequently cited options by parents were bleaching, dental implants and surgery. Many are increasingly demanding with regard to aesthetic treatments. Oddly, preventive measures such as cleaning were barely mentioned. Moreover, brushing, use of dental floss, annual visits to the dentist and fluoride therapy were not cited. These findings could be extrapolated to other populations. Curative dentistry focused on complex, invasive methods was found to be more important to parents than preventive measures, suggesting that more effort should be made to inform the population about the importance of taking preventive measures in oral health, which are inexpensive and can help prevent a number of diseases.

The present study has certain limitations. The fact that the children were undergoing dental treatment may also have influenced the parents’ belief that all of the conditions depicted in the photographs needed treatment. Additional studies are needed to evaluate parents’ perceptions of dental fluorosis and other oral health problems. Furthermore, the evaluation of people or patients not undergoing treatment, e.g., not including patients of dentistry schools or private and public dental services, may have yielded different results.

Conclusion

Based on the results of this study, the following can be concluded.

- Parents tended to be very demanding when classifying all photographs. Two types of associated malocclusions (midline deviation and crowding) and dental hypoplasia were considered the most unsatisfactory conditions by the parents.
Most of parents believed that all conditions needed treatment. The most widely perceived oral problems by parents were alignment and crowding and orthodontic treatment was considered the best treatment option by the majority of parents. The data suggest that parents are concerned with oral problems other than dental fluorosis.

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