

Patients' and parents' concerns and decisions about orthodontic treatment

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Objective: Patients' and parents' expectations are important in orthodontic treatment decision making. The literature generally demonstrates the perceived benefits of orthodontic treatment, but patients' and their parents' concerns about orthodontic treatment have not been investigated comprehensively. The aim of this study was to identify patients' and parents' concerns about orthodontic treatment and compare them according to sex, age, and treatment demand level. **Methods:** One hundred and eighty-nine children and their parents were interviewed about concerns related to orthodontic treatment. Patients and parents were asked about orthodontic treatment decisions. Answers were recorded as "yes," "no," or "don't know." Chi-squared and Fisher's exact tests were used to compare concerns between age groups, sexes, and treatment demand levels. Kappa statistics were used to assess agreement between patients and their parents. **Results:** Concerns about orthodontic treatment were gathered under 10 items as follows: "feeling pain," "the appearance of braces," "being teased," "avoiding smiling," "speech problems," "dietary changes," "problems with transportation," "economic problems," "long treatment duration," and "missing school." There was no statistically significant difference in concerns between the sexes or age groups. Some concern items and treatment demand were inversely related in patients. **Conclusions:** The results of this study demonstrate patients' and parents' concerns about orthodontic treatment. Differences between the concerns of patients with different treatment demands imply that children might reject orthodontic treatment because of their concerns. Appropriate consultation of patients addressing their concerns may help reduce anxiety and improve the acceptance of treatment.
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INTRODUCTION

Malocclusion is not a disease-itself, but rather a state of being different from societal norms, which may cause anxiety about one's dentofacial appearance and functional problems.¹ Sari et al.² have shown that patients with malocclusion have high anxiety levels. Concern is a cognitive activity that accompanies anxiety about future events.³ Concern is defined as an attempt to mentally solve problems related to issues that have indefinite consequences, but may produce one or more negative consequences.⁴

Families, and especially mothers, are known to be influential in orthodontic treatment decision making.^{5,6} Patients' and parents' expectations regarding orthodontic treatment are known to be enhancement of dentofacial esthetics,⁷ oral health, and self-esteem.⁸ Moreover, it is known that there are some negative expectations about orthodontic treatment.

Bennett et al.⁸ investigated parents' and orthodontists' beliefs about orthodontic treatment. They conducted a factor analysis on item pools generated from open-ended interviews. Four of the factors identified were benefits, long-term risks, short-term risks, and inconvenience. It is noteworthy that three of these factors may cause concerns for parents. At the same time, Sayers and Newton⁹ investigated patients' and parents' expectations regarding orthodontic treatment and found that some had negative expectations regarding pain, discomfort, embarrassment from wearing orthodontic appliances, and problems with speaking, eating, and cleaning teeth.

It is important to identify factors that may influence patients' treatment uptake decisions. However, there is no study in the literature that has investigated concerns about orthodontic treatment. It is also unknown whether patients' concerns about orthodontic treatment are related to their treatment demands. Therefore, the aim of this study was to qualitatively identify patients' and parents' concerns about orthodontic treatment and to investigate relationships according to orthodontic treatment demand.

MATERIALS AND METHODS

A cross-sectional study was conducted. One hundred and eighty-nine patients (115 girls and 74 boys) and their parents who arranged for orthodontic consultation participated in the study. Inclusion criteria for participation were defined as: patients undergoing orthodontic consultation for the first time; patients 8–18 years old; patients with no history of orthodontic treatment; patients with no sibling who previously underwent orthodontic treatment; and both the patient and their parents provided consent.

Exclusion criteria were defined as patients with syndromes or clefts.

Semi-structured interviews were conducted. The interviews took place in a non-clinical setting with no time limitation. The interviewing doctor introduced himself as a dental researcher. Patients and parents were interviewed separately. First, patients and their parents were asked whether they wanted to undergo orthodontic treatment. Then, open-ended questions were asked of all participants regarding any concerns about orthodontic treatment. Responses were recorded as written notes.

Assessments of the notes from the interviews were carried out using guidelines for qualitative research by Mays and Pope.¹⁰ First, two researchers assessed the notes separately and identified items related to concerns with regard to the relevant literature. Then, the two researchers' conclusions about the items and the individual participants' concerns were compared, and differing opinions among the researchers were resolved by discussion until consensus was reached.

Statistical evaluation of the data was performed using the IBM SPSS Statistics software package ver. 21.0 (IBM Co., Armonk, NY, USA). Chi-squared, Fisher's exact, and Fisher Freeman Halton tests were used to evaluate concerns about orthodontic treatment according to age group, sex, and treatment demand. Chi-squared, and Fisher's exact tests were used to compare patients' and parents' concerns about orthodontic treatment. Kappa statistics were used to evaluate the agreement between all patients' and their parents' concerns. The ethics of the study were approved by the research committee of Yüzüncü Yıl University of Medical Sciences.

Table 1. Distribution of patients according to sex, age and treatment decision (n = 189)

| Variable | Data |
|-----------------------|------------|
| Sex | |
| Girl | 115 (60.8) |
| Boy | 74 (39.2) |
| Age group (yr) | |
| Pre-pubertal (8–11) | 50 (26.5) |
| Pubertal (12–14) | 86 (45.5) |
| Post-pubertal (15–17) | 53 (28) |
| Treatment decision | |
| Yes | 149 (78.8) |
| No | 21 (11.1) |
| Don't know | 19 (10.1) |

Values are presented as number (%).

RESULTS

The distribution of patients according to sex, age group and treatment demand is shown in Table 1. Of the participants, 115 (60.8%) were girls and 74 (39.2%) were boys. According to age group, 50 (26.5%) were pre-pubertal, 86 (45.5%) were pubertal, and 53 (28.0%) were post-pubertal. The number of the patients who wanted to undergo orthodontic treatment was 149 (78.8%), while 21 (11.1%) did not want to undergo treatment, and 19 (10.1%) had no decided if they wanted to undergo treatment.

Patients' and parents' concerns were gathered according to the 10 items shown in Table 2. Related

items are listed near each other for the sake of simplicity. Patients' main concerns about orthodontic treatment were "feeling pain" (17.5%), "the appearance of braces" (15.9%), "being teased" (13.8%), and "long treatment duration" (6.3%). Parents' main concerns about orthodontic treatment for their children were "feeling pain" (14.3%), "being teased" (9.5%), "the appearance of braces" (6.4%), "problems with transportation" (5.3%), and "missing school" (5.3%). Apart from these, there were concerns reported about "economic problems," "avoiding smiling," "problems with speech," and "dietary changes" by both patients and parents.

Results from the kappa analysis assessing the agreement between patients' and their parents' concerns

Table 2. Descriptive statistics and agreement levels for concerns reported by patients and their parents

| Concern item | Patient (n = 189) | Parent (n = 189) | κw | p-value |
|------------------------------|-------------------|------------------|-------|---------------------|
| Feeling pain | 33 (17.5) | 27 (14.3) | 0.446 | 0.0001 [‡] |
| Appearance of braces | 30 (15.9) | 12 (6.4) | 0.162 | 0.012* |
| Being teased | 26 (13.8) | 18 (9.5) | 0.283 | 0.0001 [‡] |
| Avoiding smiling | 2 (1.1) | 1 (0.5) | 0.007 | 0.917 |
| Speech problems | 2 (1.1) | 2 (1.1) | 0.495 | 0.0001 [‡] |
| Diet changes | 7 (3.7) | 3 (1.6) | 0.182 | 0.006 [†] |
| Problems with transportation | 3 (1.6) | 10 (5.3) | 0.025 | 0.680 |
| Economic problems | 1 (0.5) | 5 (2.7) | 0.007 | 0.869 |
| Long treatment duration | 12 (6.4) | 4 (2.1) | 0.033 | 0.599 |
| Missing school | 9 (4.8) | 10 (5.3) | 0.058 | 0.424 |

Values are presented as number (%).

κw, Kappa coefficient.

*p < 0.05, †p < 0.01, ‡p < 0.001; By kappa analysis.

Table 3. Comparisons of patients' concerns according to sex and age group

| Concern item | Sex | | | Age group (yr) | | | p-value |
|------------------------------|----------------|--------------|---------|----------------|----------------|----------------|---------|
| | Girl (n = 115) | Boy (n = 74) | p-value | 8-11 (n = 50) | 12-14 (n = 86) | 15-19 (n = 53) | |
| Feeling pain | 22 (19.1) | 11 (14.9) | 0.451 | 11 (22.0) | 15 (17.4) | 7 (13.2) | 0.502 |
| Appearance of braces | 19 (16.5) | 11 (14.9) | 0.761 | 6 (12.0) | 14 (16.3) | 10 (18.9) | 0.629 |
| Being teased | 19 (16.5) | 7 (9.5) | 0.169 | 8 (16.0) | 13 (15.1) | 5 (9.4) | 0.554 |
| Avoiding smiling | 1 (0.9) | 1 (1.4) | 1 | 1 (2.0) | 0 (0) | 1 (1.9) | 0.296 |
| Speech problems | 0 (0) | 2 (2.7) | 0.152 | 0 (0) | 1 (1.2) | 1 (1.9) | 1 |
| Diet changes | 2 (1.7) | 5 (6.8) | 0.113 | 1 (2.0) | 4 (4.7) | 2 (3.8) | 0.887 |
| Problems with transportation | 2 (1.7) | 1 (1.4) | 1 | 1 (2.0) | 2 (2.3) | 0 (0) | 0.619 |
| Economic problems | 1 (0.9) | 0 (0) | 1 | 0 (0) | 0 (0) | 1 (1.9) | 0.50 |
| Long treatment duration | 9 (7.8) | 3 (4.1) | 0.372 | 1 (2.0) | 6 (7.0) | 5 (9.4) | 0.325 |
| Missing school | 5 (4.3) | 4 (5.4) | 0.739 | 0 (0) | 7 (8.1) | 2 (3.8) | 0.094 |

Values are presented as number (%).

p-values were calculated using chi-squared, Fisher's exact, and Fisher Freeman Halton tests.

Table 4. Comparisons of parents' concerns according to their child's sex and age group

| Concern item | Sex | | | Age group (yr) | | | |
|------------------------------|-------------------|-----------------|-----------------|------------------|-------------------|-------------------|-----------------|
| | Girl (n = 115) | Boy (n = 74) | <i>p</i> -value | 8–11 (n = 50) | 12–14 (n = 86) | 15–19 (n = 53) | <i>p</i> -value |
| Feeling pain | 16 (13.9) | 11 (14.9) | 0.855 | 11 (22.0) | 13 (15.1) | 3 (5.7) | 0.058 |
| Appearance of braces | 6 (5.2) | 6 (8.1) | 0.543 | 3 (6.0) | 6 (7.0) | 3 (5.7) | 1 |
| Being teased | 8 (7.0) | 10 (13.5) | 0.134 | 7 (14.0) | 9 (10.5) | 2 (3.8) | 0.194 |
| Avoiding smiling | 1 (0.9) | 0 (0) | 1 | 0 (0) | 1 (1.2) | 0 (0) | 1 |
| Speech problems | 0 (0) | 2 (2.7) | 0.152 | 0 (0) | 2 (2.3) | 0 (0) | 0.501 |
| Diet changes | 1 (0.9) | 2 (2.7) | 0.562 | 2 (4.0) | 1 (1.2) | 0 (0) | 0.347 |
| Problems with transportation | 6 (5.2) | 4 (5.4) | 1 | 3 (6.0) | 4 (4.7) | 3 (5.7) | 0.921 |
| Economic problems | 3 (2.6) | 2 (2.7) | 1 | 1 (2.0) | 3 (3.5) | 1 (1.9) | 1 |
| Long treatment duration | 2 (1.7) | 2 (2.7) | 0.645 | 2 (4.0) | 1 (1.2) | 1 (1.9) | 0.697 |
| Missing school | 6 (5.2) | 4 (5.4) | 1 | 3 (6.0) | 4 (4.7) | 3 (5.7) | 0.921 |

Values are presented as number (%).

p-values were calculated using chi-squared, Fisher's exact, and Fisher Freeman Halton tests.

Table 5. Comparisons of frequencies between patient-reported and parent-reported concerns

| Concern item | Patient (n = 189) | Parent (n = 189) | <i>p</i> -value |
|------------------------------|----------------------|---------------------|--------------------|
| Feeling pain | 33 (17.5) | 27 (14.3) | 0.398 |
| Appearance of braces | 30 (15.9) | 12 (6.3) | 0.003 [†] |
| Being teased | 26 (13.8) | 18 (9.5) | 0.199 |
| Avoiding smiling | 2 (1.1) | 1 (0.5) | 1 |
| Speech problems | 2 (1.1) | 2 (1.1) | 1 |
| Diet changes | 7 (3.7) | 3 (1.6) | 0.2 |
| Problems with transportation | 3 (1.6) | 10 (5.3) | 0.048* |
| Economic problems | 1 (0.5) | 5 (2.6) | 0.215 |
| Long treatment duration | 12 (6.3) | 4 (2.1) | 0.041* |
| Missing school | 9 (4.8) | 10 (5.3) | 0.814 |

Values are presented as number (%).

**p* < 0.05, [†]*p* < 0.01; *p*-values were calculated using chi-squared and Fisher's exact tests.

about orthodontic treatment are also shown in Table 2. Patients and parents demonstrated moderate agreement for concerns related to "feeling pain" and "problems with speech" (*p* = 0.0001), fair agreement on "being teased" (*p* = 0.0001), and slight agreement on "the appearance of braces" and "dietary changes" (*p* = 0.012 and *p* = 0.006, respectively).

Comparisons of patients' and parents' concerns about orthodontic treatment according to patient age group and sex are shown in Tables 3 and 4. There was no statistically significant difference in patients' or parents' concerns between female and male patients (*p* > 0.05). Moreover, there was no statistically significant difference

in patients' or parents' concerns between patient age groups (*p* > 0.05).

Chi-squared and Fisher's exact test results for differences between patient-reported and parent-reported concerns are shown in Table 5. Concerns about "the appearance of braces" and a "long treatment duration" were significantly more frequent in patients than in parents (*p* = 0.003 and *p* = 0.041, respectively). Parents reported "problems with transportation" significantly more frequently than patients (*p* = 0.048).

The Fisher Freeman Halton test results for patients' concerns between the treatment demand groups are shown in Table 6. The concern items "feeling pain," "the appearance of braces," and "being teased" were inversely related to treatment demand (*p* = 0.004, *p* = 0.0001, and *p* = 0.0001, respectively). The most frequent concern item among patients who had not made a decision regarding whether to undergo treatment was "dietary changes." Patients who wanted to undergo treatment reported the least percentage of concerns about dietary changes (*p* = 0.005).

Parents' concerns were not examined between the treatment demand groups because only five parents reported that they did not want their child to undergo orthodontic treatment.

DISCUSSION

Research on future orthodontic patients' and their parents' expectations regarding orthodontic treatment has gained popularity in recent years.^{8,9,11} However, we were unable to find any study in the literature that focused on negative expectations about orthodontic treatment. Therefore, this study was conducted to

Table 6. Comparisons of frequencies of patient-reported concerns between treatment demand groups

| Concern item | Yes (n = 149) | No (n = 21) | Don't know (n = 19) | p-value |
|------------------------------|---------------|-------------|---------------------|---------------------|
| Feeling pain | 19 (12.8) | 8 (38.1) | 6 (31.6) | 0.004* |
| Appearance of braces | 11 (7.4) | 12 (57.1) | 7 (36.8) | 0.0001 [†] |
| Being teased | 13 (8.7) | 9 (42.9) | 4 (21.1) | 0.0001 [†] |
| Avoiding smiling | 2 (1.3) | 0 (0) | 0 (0) | 1 |
| Speech problems | 2 (1.3) | 0 (0) | 0 (0) | 1 |
| Diet changes | 2 (1.3) | 2 (9.5) | 3 (15.8) | 0.005* |
| Problems with transportation | 2 (1.3) | 1 (4.8) | 0 (0) | 0.512 |
| Economic problems | 1 (0.7) | 0 (0) | 0 (0) | 1 |
| Long treatment duration | 8 (5.4) | 3 (14.3) | 1 (5.3) | 0.232 |
| Missing school | 6 (4.0) | 2 (9.5) | 1 (5.3) | 0.359 |

Values are presented as number (%).

* $p < 0.01$, [†] $p < 0.001$; p -values were calculated with the Fisher Freeman Halton test.

identify concerns about orthodontic treatment and their possible relationships with treatment uptake decisions.

The patient's and parents' concerns are important factors in making decisions about their child's treatment. Harmsen et al.¹² investigated factors influencing childhood vaccination decisions. According to their results, parents may refuse vaccination because of their concerns about the effectiveness of vaccines, side effects, and the associated disease risk. Orthodontic treatment decisions are also known to typically be a parental issue.¹³ For this reason, we also interviewed parents and evaluated their concerns about orthodontic treatment. Since there is no valid questionnaire evaluating concerns about orthodontic treatment, open-ended questions were used in this study.

According to our results, future orthodontic patients and their parents had concerns about orthodontic treatment such as "feeling pain," "the appearance of braces," "being teased," and "missing school." These items are similar to those that emerged from studies by Bennett et al.⁸ and Sayers and Newton.⁹ The patient's age and sex were not related to concerns in either patients or parents. Parents of post-pubertal patients (aged 15–19 years) seemed to be less concerned that their child would experience pain, although the difference was not statistically significant.

This study has shown that patients who rejected orthodontic treatment were more concerned about "feeling pain," "the appearance of braces," and "being teased" (Table 6). This is a novel result in the literature. Parents who visited to our clinic were mostly inclined to arrange treatment their child. This result confirms the deterministic role of parents in orthodontic treatment uptake. Since there were only five parents who rejected orthodontic treatment for their children, a statistical analysis was not performed between treatment demand

groups among parents.

Orthodontic treatment is well known to cause at least some degree of pain.^{14–17} The present results show that both patients and parents were aware of this inevitability. The most prominent concern item for both patients and parents was "feeling pain," and kappa analysis showed that there was moderate agreement between patients' and parents' concerns about "feeling pain" (Table 2). This result is similar to that found by Bennett et al.,⁸ who showed that parents believed that orthodontic treatment might result in pain during and after appointments, and Firestone et al.,¹⁸ who showed that there was a positive correlation between anticipated pain and reported pain. Sayers and Newton⁹ have shown that patients and parents had some expectation of pain associated with orthodontic treatment. However, most patients did not expect to feel pain.

It was reported that the appearance of orthodontic appliances and speech problems may influence the self-confidence of patients.¹⁹ Serogl et al.²⁰ have shown that patients reported impaired speech and a lack of confidence in public after the insertion of orthodontic appliances. The patients in our study were also concerned about the appearance of braces, being teased, avoiding smiling, and speech problems. While concerns regarding speech problems showed moderate agreement between patients and parents, patients were significantly more concerned about "the appearance of braces." However, Sayers and Newton⁹ reported that patients did not expect negative reactions on average. The authors attributed this result to the widespread nature of orthodontic treatment in the Western world. The differences between the results might have emerged because this study was conducted in a recently established dental facility that has been treating patients since March of 2010.

Orthodontic appliances are known to cause dietary changes.^{18,20,21} Sayers and Newton⁹ suggested that patients more frequently expected that orthodontic treatment would prevent the consumption of certain foods and beverages than their parents. Our results showed no statistically significant difference between patients' and parents' concerns about dietary changes, although patients reported this item more frequently. The differences between the results are thought to have been caused by the use of a Likert scale in Sayers and Newton's⁹ study. Bennett et al.⁸ also showed that parents believed that their children would need to change their food intake during orthodontic treatment. This finding is similar to that in the present study.

The present results have shown that parents were significantly more concerned about transportation problems than their children. Bennett et al.⁸ also stated in their study that parents drove an average of 28.8 km to the orthodontic clinic. No statistically significant difference was found between the economic concerns of patients and parents, although this item was more frequently reported by parents. This result was contrary to what was expected, and might be associated with the sample size.

Patients reported concerns about treatment duration significantly more frequently than their parents. Sayers and Newton⁹ have shown that 50% of children had no idea about orthodontic treatment duration and that twice as many children as parents expected orthodontic treatment to be completed within 1 year. Along with this, Sayers and Newton⁹ did not state a negative expectation about treatment duration. The present results have shown that approximately 5% of both patients and parents had concerns about "missing school." This result is similar to that from Bennett et al.,⁸ in which parents stated that their children might miss too much school during treatment.

The main limitations of this study were as follows: the results may not represent the entire population, since this study lacked a control group; the results are likely associated with regional and cultural factors; and a research setting was not appropriate to differentiate between parents with different treatment decisions.

Future studies are needed to develop valid questionnaires to investigate concerns about orthodontic treatment in a more unbiased manner.

CONCLUSION

The results of this study have shown the concerns about orthodontic treatment in patients and parents who have arranged for orthodontic consultation. Patients' treatment demands and concerns about "feeling pain," "the appearance of braces," and "being

teased" were found to be inversely related. Patients were significantly more concerned about "the appearance of braces" and a "long treatment duration" than their parents. In contrast, parents were significantly more concerned about transportation during treatment. Appropriate consultation of patients addressing their concerns may help reduce anxiety and improve the acceptance of treatment.

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