Orthodontic treatment motivation and cooperation: A cross-sectional analysis of adolescent patients’ and parents’ responses

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Introduction: Orthodontic patients’ cooperation determines their treatment outcomes. Our objectives were to compare orthodontic treatment motivation of child and adolescent patients and their parents at an initial screening appointment with the responses of patients in treatment and their parents. Furthermore, we explored the association between participants’ levels of treatment motivation and treatment cooperation.

Methods: Data were collected from 227 child and adolescent patients (50.2% boys, 49.8% girls; average age, 13 years; age range, 7.11-16.11 years) and their parents. Of the respondents, 144 (63.4%) were in orthodontic treatment (71 boys, 73 girls), and 83 (36.6%) (43 boys, 40 girls) were surveyed at their initial orthodontic screening appointment.

Results: Parents reported greater motivation for their children to have orthodontic treatment than did the children. This was especially true among patients who were already in treatment. The higher the patients’ treatment motivation, the more they reported that they cooperated with their orthodontists’ treatment recommendations. However, the parents’ motivation for their child to have orthodontic treatment was not significantly correlated with their children’s treatment cooperation.

Conclusions: Although parents reported greater motivation levels than their children, the patients’ levels of motivation to receive orthodontic treatment were found to determine their reported cooperation with their orthodontists’ treatment recommendations. (Am J Orthod Dentofacial Orthop 2009;136:780-7)

Patient cooperation is an essential factor in the timely, successful outcome of orthodontic treatment. A lack of cooperation with treatment has a significant effect on the length of time a patient must wear orthodontic appliances. Research concerning cooperation with several aspects of orthodontic treatment (eg, headgear, rubber bands) showed significant differences in patients’ levels of cooperation. In 2005, Larsson and Bergstrom surveyed 151 Swedish adolescents and found that 52% admittedly did not follow all treatment recommendations from their orthodontist. Most patients reported pain, discomfort, and dislike of their appliances (eg, headgear, retainers) as significant reasons for not cooperating with their treatment. Examples of patient uncooperation have been commonly demonstrated in the literature. In 1 study, patients reported wearing their headgear only 50% of the time prescribed by their orthodontist. In another representative study, over one third of the patients who were instructed to wear headgear significantly exaggerated the amount of time they reported wearing it to their orthodontist. Agar et al found that, even though there were significant differences between patients in terms of headgear usage, the patient’s age and sex did not influence their cooperation with treatment. This finding contradicts previous studies that found patient age as a predictor of cooperation.

Factors that might significantly predict an orthodontic patient’s cooperation with treatment include the patient’s attitude toward the treatment immediately before and during the treatment and the ability to cope with any discomfort during treatment. In clinical practice, orthodontists generally try to enhance cooperation by verbally praising patients when they cooperate with treatment (positive reinforcement). However, research has shown that reward systems designed to enhance patient cooperation might not work to motivate patients who need it most—the below-average compliers. Previous researchers have struggled to address the issue of...
low orthodontic treatment cooperation among young patients. Additionally, a comprehensive model predicting the child or adolescent patient’s future cooperation with orthodontic treatment remains to be developed.

In this study, we took a broader approach to understanding patient cooperation by focusing on a combination of child and parent factors that might help to predict treatment cooperation. It was further hypothesized that the interaction effect between child and parental factors might be different based on whether the patient has not yet had orthodontic treatment or whether he or she is currently in treatment. It is not surprising that previous behavioral research has largely focused on the factors of treatment motivation and cooperation associated with adolescents, since orthodontic treatment typically occurs about the time permanent teeth have finished erupting into occlusion (11-13 years of age), and this time period coincides with children’s stronger orientation toward their peers. Despite this developmental trend, the centrality of the parent-child bond and its impact on treatment motivation and cooperation should not be underestimated. It was therefore hypothesized that examining both the patients’ and their parents’ motivations for their child to receive orthodontic treatment would provide a more comprehensive representation of the factors influencing treatment cooperation.

Motivation for orthodontic treatment is important when attempting to better understand patients’ overall treatment cooperation. Previous research demonstrated that lack of motivation in adolescents is significantly associated with their discontinuation of orthodontic treatment. Prior research also demonstrated that parental influence is instrumental to treatment motivation even when a child first expresses interest in receiving treatment. In 1 study, parents desired orthodontic treatment for their children more than the children wanted it for themselves. In addition, many parents and children desired treatment for the child regardless of need. Research also has shown that a mother’s influence is more instrumental to treatment motivation than a father’s. Finally, researchers have demonstrated that parents perceive a greater need for orthodontic treatment for their children than do the children. There is also a significant association between parents’ desire for orthodontic treatment for themselves and the degree of need they perceive for their children to have orthodontic treatment. Parents who desired orthodontic treatment for themselves perceived a 3 times greater need for their children to have orthodontic treatment compared with parents who did not desire treatment. Pietila and Pietila showed that, although there was no statistical association between parents’ opinions of their personal dental appearance and perceptions of their child’s orthodontic treatment need, parents who desired orthodontic treatment for themselves or had already had orthodontic treatment were more likely to approve of treatment for their children.

Our first objective was to investigate levels of treatment motivation among child patients and their parents before orthodontic treatment and compare these ratings with levels of treatment motivation among child patients and their parents during treatment. Our second objective was to explore how patients’ and parents’ levels of treatment motivation influenced the patients’ reported orthodontic treatment cooperation. No studies were found that investigated future orthodontic patients’ and their parents’ motivations for treatment and how these levels of motivation differ before and during treatment. This study therefore compared the levels of child and adolescent patient and parent motivation for having orthodontic treatment at a screening appointment before treatment with the responses of patients and parents who were undergoing orthodontic treatment. By collecting data at 2 times (different samples), inexperienced patients’ and parents’ initial motivation and intended treatment cooperation could be compared with patients’ and parents’ motivation and actual cooperation during treatment. Our findings offer further insight into the complex dynamics of orthodontic treatment motivation and cooperation.

MATERIAL AND METHODS

This study was approved by the Institutional Review Board for the Health Sciences at the University of Michigan in Ann Arbor.

Data were collected from 227 orthodontic child patients (114 boys, 113 girls) and their parents or legal guardians at the Graduate Orthodontic Clinic at the University of Michigan. The inclusion criteria were (1) patients less than 17 years of age; (2) their parent or guardian gave written consent, and the patients gave written assent; (3) the patients and parents or guardians could read and understand English; and (4) the patients having orthodontic treatment had fixed appliances or braces on their anterior maxillary teeth. Of these 227 patients, 144 (63.4%) were undergoing orthodontic treatment, and 83 (36.6%) were surveyed at their preorthodontic screening appointment. The patients’ ages ranged from 7 years 11 months (95 months) to 16 years 11 months (203 months) (average, 13.1 years, or 157 months). Ethnically, the child and adolescent sample was relatively homogenous with 184 (81.1%) participants identifying as white, 15 (6.6%) as Hispanic, 10 (4.4%) as black, 5 (2.2%) as biracial,
RESULTS

The child patients’ treatment motivation was assessed with 2 items, “How much would you like/did you want to have braces?” (item 1) and “It is very important for me to have braces” (item 2). The parents’ motivation was assessed with 2 items, “How much would you like/did you want to have braces for your child?” (item 1) and “It is very important for my child to have braces” (item 2). All answers were given on 5-point rating scales from 1 (for item 1), “not at all” or (for item 2), “disagree strongly,” to 5 (for item 1), “very much” or (for item 2), “agree strongly.” Overall, parents had significantly higher levels of treatment motivation than did their children (item 1: parents: mean = 4.46, SD = 0.91; child patients: mean = 3.28, SD = 1.22; P < 0.001; item 2: parents: mean = 4.24, SD = 0.97; child patients: mean = 3.75, SD = 1.15; P < 0.005). When asked what was the most important reason for seeking orthodontic treatment, 91.6% of the parents and 93.4% of the children rated esthetic concerns as the most important. To determine whether levels of treatment motivation among child patients and their parents before treatment differed from those of children currently in treatment and their parents, a 2 (child or parent) by 2 (before or during treatment) MANOVA was conducted with treatment motivation as the dependent variable. Parents of children undergoing orthodontic treatment reported greater levels of treatment motivation than did parents at the screening appointment (item 1: mean = 4.57, SD = 0.74 vs mean = 4.26, SD = 1.13; P = 0.013; item 2: mean = 4.33, SD = 0.82 vs mean = 4.07, SD = 1.17; P = 0.05). The children’s responses did not differ between those surveyed at their screening appointment and those surveyed during treatment (item 1: mean = 3.36, SD = 1.32 vs mean = 3.22, SD = 1.19; P = 0.415; item 2: mean = 3.80, SD = 1.13 vs mean = 3.72, SD = 1.16; P = 0.586).

To examine the relationship between the parents’ motivation for their child to have orthodontic treatment and the children’s motivation for orthodontic treatment, the parents’ and children’s responses were correlated. As can be seen in Table I, the stronger the parents responded affirmatively to the item “How much would you like to have braces for your child?” at the screening appointment and during treatment, the more the patients agreed with the statement that it is important for them to have braces (screening appointment: r = .378; P < 0.001; during treatment: r = .196; P = 0.02), and the more the patients agreed with the statement that it is important for them to have braces (screening appointment: r = .246; P = 0.009; during treatment: r = .195; P = 0.02). However, whereas the parents’ importance rating both at the screening appointment and during treatment correlated significantly with the patients’ responses to item 1 (screening: r = .268; P = 0.014; during treatment: r = .168; P = 0.044), this response only correlated with the children’s importance rating during treatment and not at the screening appointment (screening: r = .107; not significant; during treatment: r = .254; P = 0.002).

As can be seen in Table II, the responses from the children’s and their parents’ responses to questions...
Table I. Correlations between patients’ and parents’ responses about treatment motivation at screening vs treatment appointments

<table>
<thead>
<tr>
<th>Child patients</th>
<th>Type of appointment</th>
<th>Item 1: How much would/did you like your child to have braces?</th>
<th>Item 2: It is very important for my child to have braces.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item 1: How much do/did you want to have braces?*</td>
<td>Screening</td>
<td>.378 (P &lt; 0.001)</td>
<td>.268 (P = 0.014)</td>
</tr>
<tr>
<td>Item 2: It is very important for me to have braces.†</td>
<td>Treatment</td>
<td>.196 (P = 0.020)</td>
<td>.168 (P = 0.044)</td>
</tr>
</tbody>
</table>

NS, Not significant.
*Item 1: 1, “not at all,” to 5, “very much”; †Item 2: 1, “disagree strongly,” to 5, “agree strongly.” The answers were given on 5-point rating scales.

Concerning treatment motivation and cooperation were correlated to investigate the relationships between the children’s motivation for and cooperation with treatment, and the parents’ motivation for their child to have orthodontic treatment and the perceptions of their children’s treatment cooperation. All answers were on 5-point rating scales from 1, “disagree strongly,” to 5, “agree strongly.”

Concerning the relationship between the patients’ treatment motivation and their treatment cooperation, the findings showed that the more motivated the patients were to have braces, the more cooperation they reported in general (“I will do whatever it takes to have a successful treatment”; “I will do what the orthodontist tells me to do”), and the more they said they would cooperate with recommendations for wearing rubber bands and retainers. However, their responses about wearing headgear were not significantly correlated with their treatment motivation (Table II). An analysis of a subgroup of patients—only those in treatment with no surveys at the initial screening—showed that the more motivated they were, the more willing they were to cooperate with headgear use. In addition, an analysis of patients who had actually worn headgear or were currently wearing headgear showed that they were significantly more likely to cooperate with the recommendation to wear headgear compared with patients who had never worn headgear. Interestingly, a different pattern of results was found for patients wearing rubber bands compared with those with no rubber bands. Child patients wearing rubber bands reported that they were significantly less likely to cooperate with rubber band use than those who had never worn rubber bands.

Concerning the parents’ motivation for their children to have braces and their perceptions of their children’s cooperation, several significant relationships were found (Table II). The more the parents were motivated, the more they agreed with the general statement “My child will do whatever it takes to have a successful treatment.” In addition, there were significant correlations between the parents’ motivation and the responses for wearing rubber bands and retainers.

Because of previous research findings about the impact of sex on treatment motivation and cooperation, MANOVA tests were conducted to examine whether there were significant sex differences in the patients’ motivation and cooperation.9-11 With regard to treatment cooperation, the boys reported that they were significantly less willing to cooperate with orthodontic treatment than did the girls (main effect “sex”: mean = 3.99, SD = 0.82 vs mean = 4.26, SD = 0.63; P = 0.008). However, there were no significant sex differences in the patients’ motivation. Female parents or guardians reported significantly more motivation to have braces for their child than did male parents or guardians (main effect “sex”: mean = 4.40, SD = 0.81 vs mean = 4.12, SD = 0.87; P = 0.039), and female parents and guardians reported greater perceived patient cooperation than did male parents and guardians (main effect “sex”: mean = 4.32, SD = 0.72 vs mean = 4.04, SD = 0.75; P = 0.018).

DISCUSSION

Concerning child patient and parental levels of orthodontic treatment motivation before treatment, we found that parents were significantly more motivated for their child to have orthodontic treatment than their children. When comparing parents at the initial screening appointment with parents of children undergoing orthodontic treatment, the level of parental motivation was greater for the parents whose children were undergoing treatment, whereas the already lower level of treatment motivation among the children did not change significantly. One potential explanation for this finding could be that parents were more optimistic about positive treatment outcomes than were their children. Additionally, the increase in parental motivation during
treatment might have been influenced by parental investment (money and time) and optimism, but the lack of increased motivation in the patients might be due to treatment-related factors such as discomfort, pain, and compromised esthetics associated with wearing braces. Prior research showed that pain during orthodontic treatment can diminish patients’ optimism about the success of treatment and ultimately impact their treatment motivation.²⁸,²⁹

We found that 91.6% of the parents and 93.4% of the children rated esthetic concerns as the most important reason for seeking orthodontic treatment. This result lends further support to previous findings concluding that esthetic issues were more important when seeking treatment than functional issues.¹⁸,³⁰-³⁵ Interestingly, the highest percentage of patients in our study reported that their general dentist had motivated them to have braces, and the second highest percentage of patients said that they wanted orthodontic treatment. In contrast, although the highest percentage of parents reported that the general dentists’ recommendation was a reason for seeking treatment for their child, they saw themselves as the next most important reason for seeking orthodontic treatment for their child. There might be various reasons for this incongruence. For example, orthodontic treatment begins during a time when children might distance themselves from their parents, and when peers become a stronger influence on children’s perceptions.³⁶

In an effort to increase autonomy, adolescents might have reported that they, not their parents, were more influential in seeking treatment. Parents of child patients, on the other hand, might still view themselves as the primary figures concerning their children’s oral health issues. In addition, we found that children who reported being the main motivating factor for seeking orthodontic treatment were significantly more motivated for braces than were children who did not report that they were a main motivating factor. This finding might be helpful for future practitioners because it shows a link between child patients’ influence on seeking treatment and treatment motivation.

Concerning treatment cooperation, we found that higher levels of treatment motivation among child patients were correlated with higher levels of patient cooperation in general as well as with wearing rubber bands and retainers. The patients’ treatment motivation was not found to significantly correlate with their willingness to wear headgear. Prior research showed a general dislike for headgear use among orthodontic patients.⁶ One explanation for the lack of a correlation between patient motivation and cooperation with wearing headgear could be that the negative implications can deter even the most highly motivated children from cooperating with the recommendation to wear headgear. An analysis of a subgroup—only patients in treatment with no surveys at the initial screening—showed that

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**Table II. Correlations between child patients’ and parents’ responses concerning treatment motivation and treatment cooperation**

<table>
<thead>
<tr>
<th>Child responses concerning treatment cooperation</th>
<th>Parent responses concerning treatment cooperation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item 1: How much did/did you want these braces?</td>
<td>Item 1: How much did/did you want these braces for your child?</td>
</tr>
<tr>
<td>Item 2: It is very important for me to have braces.</td>
<td>Item 2: It is very important for my child to have braces.</td>
</tr>
<tr>
<td>My child will do whatever it takes to have a successful treatment.</td>
<td>.225 (P = 0.001)</td>
</tr>
<tr>
<td>My child will do what the orthodontist tells me to do.</td>
<td>.147 (P = 0.028)</td>
</tr>
<tr>
<td>If the orthodontist asked me to wear rubber bands, I would do as instructed.</td>
<td>.211 (P = 0.002)</td>
</tr>
<tr>
<td>If the orthodontist asked me to wear headgear, I would do as instructed.</td>
<td>.048</td>
</tr>
<tr>
<td>If the orthodontist asked me to wear a retainer, I would do so as instructed.</td>
<td>.244 (P &lt; 0.001)</td>
</tr>
<tr>
<td>My child will do whatever it takes to have a successful treatment.</td>
<td>.248 (P &lt; 0.001)</td>
</tr>
<tr>
<td>My child will do what the orthodontist tells the child to do.</td>
<td>.059</td>
</tr>
<tr>
<td>If the orthodontist asked to wear rubber bands, my child would do as instructed.</td>
<td>.158 (P = 0.017)</td>
</tr>
<tr>
<td>If the orthodontist asked to wear headgear, my child would do as instructed.</td>
<td>.174 (P = 0.010)</td>
</tr>
<tr>
<td>If the orthodontist asked to wear a retainer, my child would do so as instructed.</td>
<td>.156 (P = 0.002)</td>
</tr>
</tbody>
</table>
the more motivated they were, the more willing they were to cooperate with headgear use. In addition, an analysis of patients who had actually worn headgear or were currently wearing headgear showed that they were significantly more likely to say that they would cooperate with the recommendation to wear headgear compared with patients who had never worn headgear. This finding shows that children with no headgear experience might have a more negative perception of wearing headgear that might explain the lack of correlation between motivation and cooperation.

Interestingly, a different pattern of results was found in patients wearing rubber bands compared with those without rubber bands. Children wearing rubber bands reported that they were significantly less likely to cooperate with rubber band use than those who had never worn them. A potential explanation for this finding might be that patients wearing rubber bands have a more realistic awareness about the social and functional issues associated with rubber bands than those who have not worn them. One clinical implication of this finding might be that orthodontists need to give their patients more information about the inconveniences of rubber bands to better prepare them for these issues.

As in previous research, we found that girls reported greater willingness to cooperate with orthodontic treatment than did boys. Furthermore, mothers reported that their children would be more cooperative with treatment than did the fathers. Mothers were also more motivated for their child to have braces than were fathers. These findings about sex differences in both patients' and parents' attitudes toward orthodontic treatment are consistent with prior research. It seems likely that traditional sex roles cause girls to be more affected by impaired appearance than boys, and this might increase their desire—and the desire of their mothers—to cooperate with the treatment recommendations to improve their appearance.

CONCLUSIONS

We found that parents whose children are currently in orthodontic treatment report greater motivation for their child to have braces compared with parents whose children are not yet in treatment. However, patients' levels of motivation were the same among patients surveyed before and during treatment. One potential strategy to increase children's levels of motivation during treatment is for practitioners to regularly talk about the progress being made during treatment. This feedback could serve as positive reinforcement and might take patients' focus away from factors that impede motivation (eg, discomfort and pain associated with treatment) and focus it on factors that enhance motivation (eg, positive changes after treatment).

We also demonstrated that patients' motivation for orthodontic treatment is positively correlated with their reported cooperation with orthodontists' treatment recommendations. Because of this finding that patients' motivation during treatment did not increase from the initial screening appointment, it might be important for orthodontists to reflect on factors that enhance treatment motivation. Although not expressly examined in this study, some steps that orthodontists could take to increase their child patients' levels of treatment motivation might be to involve them in treatment decisions, to report regularly on the positive treatment changes, and to comprehensively address treatment complications (discomfort, pain, impaired functional ability, and differences in esthetic appearance) before treatment. Future research should test these strategies to determine whether they result in significant enhancement of patients' levels of treatment motivation and cooperation during treatment.

The finding that parents' motivation is not significantly correlated with the children's actual cooperation responses is noteworthy. This might suggest that orthodontists should ask the children and their parents about treatment cooperation. Parents' responses could be influenced by factors such as financial investment in the treatment and lack of awareness of the impact of wearing orthodontic appliances on their children's lives. Parents' lack of awareness of their child's treatment cooperation might translate into lack of parental support and encouragement perceived by the patients. Two suggestions are to give parents additional information about what the child will face and to encourage them to be attentive to their children's orthodontic needs during treatment. Orthodontists could encourage their patient's parents to be actively involved in the treatment process by ensuring that the child has pain medication if needed and regularly asking about the child's concerns regarding treatment.

The data showed that child patients who had some influence over seeking treatment were more motivated to cooperate with their treatment than children who did not participate in the decision to seek treatment. This finding could help orthodontists when developing the treatment plan and comparing options that require more or less patient cooperation. If the orthodontist knows that a patient is less likely to cooperate, a treatment plan can be designed to ensure the best possible treatment regimen for a less-compliant patient.

Although treatment cooperation is a significant issue for orthodontists today, research in this area has been limited because of the lack of standardized treatment
cooperation measures and the limited focus of research by studying only patients who are in treatment.\(^{16}\) Two limitations of this study were that it used an indirect (self-report) method to measure compliance, and thus we might not have captured the full extent of patient cooperation, and that it was a cross-sectional design. Longitudinal studies, assessing the same patients at all stages of treatment, would be more likely to provide greater detail and a more comprehensive understanding of the dynamic interplay of treatment motivation and cooperation. Despite these limitations, our study extends the scope of previous research in 2 ways. First, we included a sample of child patients and their parents who were surveyed before treatment. Data on child patients’ and their parents’ levels of perceived treatment motivation and cooperation before treatment provides a baseline estimate of these psychosocial factors and allows for greater understanding of how these factors can change over time. Second, we compared parental ratings of perceived treatment motivation and perceptions of treatment cooperation with patient-reported treatment motivation and cooperation ratings. By assessing patients and their parents at their initial screening appointment and comparing patient and parental responses to items assessing treatment motivation and cooperation, our study uniquely contributes to better understanding the complex dynamic between treatment motivation and cooperation. We hope that the information in this study will motivate practitioners to consider psychosocial factors such as treatment motivation and cooperation when working with their adolescent patients.

Although this study was cross-sectional, future research in this area should be focused on longitudinal assessment (ie, tracking the same patients and parents during treatment). Only then can changes in patients’ and parents’ motivation and cooperation be modeled more accurately.

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REFERENCES


