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Perceptions of orthodontic appliances among Grade Seven students and their parents

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A survey of 468 Grade Seven students and 437 parents in the North Brisbane region was undertaken to determine perceptions of orthodontic appliances. Based on responses to statements on the survey, a Perception Score was created for both students and parents in relation to both fixed and removable appliances. Both students and parents had more negative perceptions of fixed appliances than of removable appliances. Fixed appliances were perceived to attract more teasing, to cause more problems in the maintenance of oral hygiene and to be more painful than a removable plate. Respondents also felt that children would have to be more careful about what they eat when wearing fixed appliances. Approximately forty per cent of students and parents did not know whether teeth could be damaged by orthodontic appliances nor whether the appliances would cause discomfort. Parents had significantly more negative perceptions of both types of orthodontic appliances than did the students. The Perceptions scores were not significantly influenced by whether the students attended a private or public sector dentist, the frequency of dental visits, any history of orthodontic treatment, nor by the parents' level of education and their occupations. A forewarning about experiences of orthodontic appliances would better prepare patients and assist operators in providing the community with a more comprehensive orthodontic service.
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Introduction

Many people seek orthodontic treatment motivated by the possibility of improvement to their appearance;[1,2] however, a number of factors may act as a deterrent. Many children regard orthodontic appliances as troublesome, find treatment stressful, and fear being excluded from their social group for wearing appliances.[3] Pain is the most common cause for concern among patients, and problems with speech, eating and appearance also cause anxiety.[4,5,6] Parents express concern about the length of treatment, damage to the teeth during treatment, and stability after treatment.[4]

Concern about appliances appears to be greater for fixed appliances than for removable appliances, for both boys and girls. Fixed appliances are reported to cause more discomfort but to interfere less with speech than removable appliances.[4,5,6] Patients undergoing fixed appliance therapy are also more likely to be subjected to teasing.[5]

Adult patients also have pronounced attitudes to the type of appliances they are wearing.[7] Headgear is viewed most negatively; removable appliances and elastics are viewed negatively. Removable appliances were reported to cause speech, eating and hygiene difficulties, their only positive aspect being that they can be removed (some adults considered this a disadvantage in that succumbing to the temptation to remove them may extend treatment time). Adult orthodontic patients also identified time commitments, negative peer reaction[7] and embarrassment[2] as negative or discouraging aspects of treatment.

Studies have confirmed that attitudes to orthodontic treatment play a role in determining cooperation during treatment. Patients who describe themselves as having negative attitudes to treatment have been shown to be less compliant.[8] Adolescents

Table I. Survey items assessing perceptions of orthodontic appliances.

Children cannot play sport if they are wearing braces. Children cannot play sport if they have a removable plate.
Wearing braces makes it more difficult to keep teeth clean. Wearing a removable plate makes it more difficult to keep teeth clean.
Children have to be careful of what they eat when wearing braces. Children have to be careful of what they eat when wearing a removable plate.
Teeth can be damaged by braces. Teeth can be damaged by a removable plate.
Wearing braces is painful. Wearing a removable plate is painful.
Children wearing braces are teased. Children wearing a removable plate are teased.

Response Choices: AGREE DISAGREE DON'T KNOW

Table II. Sample characteristics and mean Perception Score in relation to fixed and removable appliances.

	%	n	MEAN PERCEPTION SCORE FIXED	MEAN PERCEPTION SCORE REMOVABLE
STUDENTS				
Male	48.5	227	0.15	2.8
Female	51.5	241	0.48	2.6
TOTAL		**468**	**0.31**	**2.7**
PARENTS				
Mother	82.1	359	-0.08	2.4
Father	8.9	39	-0.59	1.9
Both	6.9	30	-0.63	2.4
Guardian	2.1	9	0.44	3.0
TOTAL		**437**	**-0.15**	**2.3**

whose parents have negative attitudes to 'braces' demonstrate reduced levels of compliance during treatment.[9]

Discontinuation of orthodontic treatment has been related to the type of appliance worn, although findings are not conclusive. Some researchers report that a dislike of fixed appliances may cause some patients to discontinue treatment;[10] others find no increase in the number of patients failing to complete treatment despite an increase in the use of fixed appliances.[11] In contrast, Murray[12] found that patients who failed to complete treatment were more likely to have been treated with removable appliances. Brattstrom *et al.*[13] found no relation between the type of appliance worn and discontinuation rates.

Although the public is generally aware of orthodontic treatment, few studies have investigated the community's perceptions of, and attitudes to it, and specifically to the different types of appliance. These attitudes have been investigated in a study of secondary school children, the majority of whom had never undergone orthodontic treatment.[14] Children from a similar home background with similar patterns of dental attendance, were found to vary appreciably in their attitude; and the prospect that an orthodontic appliance may have to be worn appeared to be a much greater deterrent to treatment than did the need to have teeth extracted. In general, respondents of both sexes were more reluctant to wear an extra-oral appliance than a fixed appliance, girls indicating a greater willingness than boys to accept all forms of treatment.

The authors' study was undertaken to determine how orthodontic appliances are perceived by a group of Grade Seven students and their parents. Because little is known about the factors determining these perceptions, an analysis of the possible relation between perceptions and selected socio-demographic variables was undertaken.

Materials and Methods

Nineteen schools in the North Brisbane region were approached to participate in this cross-sectional survey. Schools were selected on the basis of approval being granted by the Department of Education and the presence of a dental clinic on site. Of the nineteen schools approached, sixteen agreed to participate. Teachers at the participating schools were asked to distribute a letter which explained the purpose of the study, and a consent form to be completed by the parents of all Grade Seven students (n=1074), of whom 437 gave their consent.

Table III. Distribution of students' responses (%) to survey statements.

	AGREE*	DISAGREE	DON'T KNOW
Children cannot play sport if they are wearing braces.	5.8	86.3	7.9
Children cannot play sport if they have a removable plate.	10.7	77.6	11.7
Wearing braces makes it more difficult to keep teeth clean.	51.7	20.9	27.4
Wearing a removable plate makes it more difficult to keep teeth clean.	7.7	75.9	16.4
Children have to be careful of what they eat when wearing braces.	74.4	12.4	13.2
Children have to be careful of what they eat when wearing a removable plate.	34.1	46.2	19.7
Teeth can be damaged by braces.	9.6	50.0	40.4
Teeth can be damaged by a removable plate.	7.9	52.4	39.7
Wearing braces is painful.	20.9	39.3	39.7
Wearing a removable plate is painful.	6.4	57.5	36.1
Children wearing braces are teased.	49.8	34.0	16.2
Children wearing a removable plate are teased.	25.6	55.6	18.8

* Negative response

Table IV. Distribution of parents' responses (%) to survey statements.

	AGREE*	DISAGREE	DON'T KNOW
Children cannot play sport if they are wearing braces.	5.7	81.7	12.6
Children cannot play sport if they have a removable plate.	5.7	79.2	15.1
Wearing braces makes it more difficult to keep teeth clean.	60.0	25.4	14.6
Wearing a removable plate makes it more difficult to keep teeth clean.	5.5	80.8	13.7
Children have to be careful of what they eat when wearing braces.	70.7	11.0	18.3
Children have to be careful of what they eat when wearing a removable plate.	38.5	37.5	24.0
Teeth can be damaged by braces.	12.8	46.0	41.2
Teeth can be damaged by a removable plate.	7.3	46.7	46.0
Wearing braces is painful.	28.1	32.1	39.8
Wearing a removable plate is painful.	11.2	48.3	40.5
Children wearing braces are teased.	60.4	26.3	13.3
Children wearing a removable plate are teased.	33.6	43.5	22.9

* Negative response

Survey

The survey comprised a student-version and a parent-version. Statements on both versions were chosen to represent inquiries commonly made by prospective orthodontic patients and their parents, and to allow comparisons with previous research. Respondents were not required to identify themselves, but both surveys were coded to allow a comparison of the responses of the parents with that of their own child.

The parent-survey comprised an introductory section seeking demographic data which included a dental history (public or private sector dentist and frequency of dental visits), an orthodontic history, and the parents' education level and their occupations. Using the Australian Standard Classification of Occupations,[15] each family was classified into one of eight major groups.

Twelve items common to both survey forms were used for the assessment. Respondents were required to indicate agreement or disagreement with 'factual' statements related to either fixed or removable appliances. A 'Don't Know' option was provided for all items (Table I).

All the student-surveys were administered directly, and a researcher was available to clarify any interpretation difficulties.

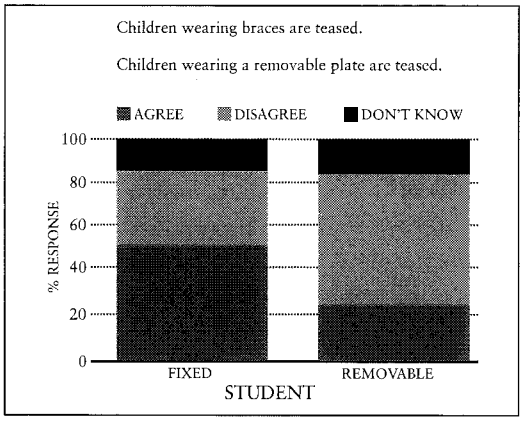

Figure 1a. Student response distributions to statements about teasing.

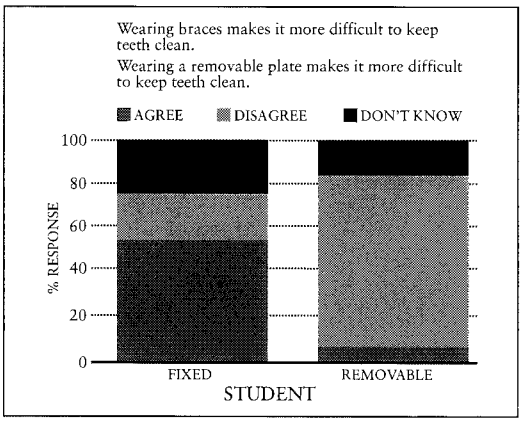

Figure 2a. Student response distributions to statements about maintenance of oral hygiene.

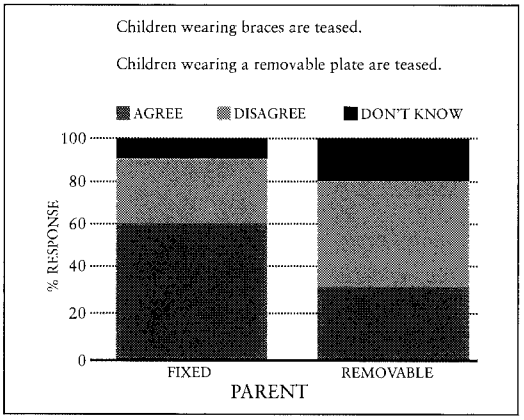

Figure 1b. Parent response distributions to statements about teasing.

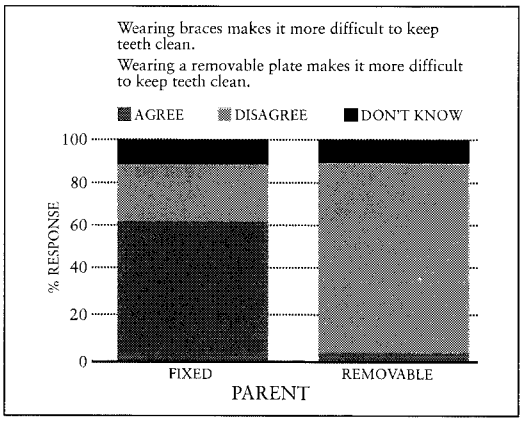

Figure 2a. Parent response distributions to statements about maintenance of oral hygiene.

The parent-version of the survey was issued to participating students for delivery to their parents. Instructions were given that the parent-survey should be completed without consultation with the child, and an addressed reply-paid envelope was provided for the return of the completed forms. Those who did not respond were mailed a reminder letter and another copy of the survey. Telephone calls were also made as a follow-up. Data collection was carried out over a twelve-month period.

Statistical examination

A Perception Score was created for both students and parents in relation to both fixed and removable appliances. If the response indicated a negative perception of the appliance it was allocated a -1 score; positive perceptions were allocated a +1 score; a "Don't Know" response was allocated a score of 0, indicating neither a negative nor a positive perception. Perception Scores could range from -6 (indicating a negative response for all six statements) to +6 (indicating a positive response for all statements).

Student Perception Scores for both types of appliances were analysed for gender differences using the Kolmogorov-Smirnov test. The Kruskal-Wallis test was used to identify any differences in the parents' Perception Scores resulting from whoever had completed the survey form. The relation between Perception Scores and various independent variables was assessed using the Kruskal-Wallis test.

Results

The final sample was derived from sixteen schools and comprised 468 students. Of the 468 parent-survey forms issued, 437 were returned (a 93.4 % response rate). The children ranged in age from 11 to 13 years and 95 per cent were Caucasian. Sixty-one of the 437 students (13.9%) had undergone, or were undergoing, orthodontic treatment.

Table II displays the sample characteristics and mean Perception Scores for both students and parents. Parents are categorised according to whoever completed the survey. Female students (51.5%) represented a slightly larger

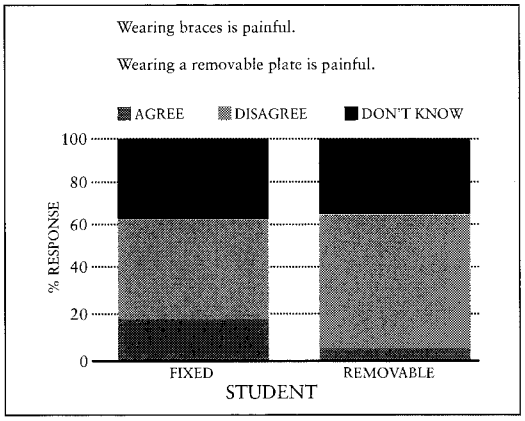

Figure 3a. Student response distributions to statement about discomfort from orthodontic appliances.

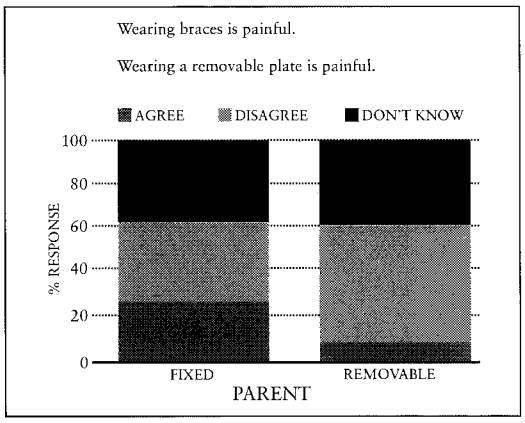

Figure 3b. Parent response distributions to statement about discomfort from orthodontic appliances.

proportion of the sample than males (48.5%). Over eighty per cent (82%) of the parent-surveys were completed by mothers. Female students and guardians had more positive perceptions of braces than did other respondents; male students and guardians had more positive perceptions of removable appliances. These differences did not reach significance and therefore all further analysis was performed on data pooled to give: 1. Student Responses and 2. Parent Responses.

A significant difference was noted between Perception Scores for fixed and removable appliances. Both students and parents displayed a more positive perception of removable appliances ($p<0.001$). Parents had significantly more negative perceptions of both types of orthodontic appliances than did students ($p<0.01$).

Specific items

The questions underlying the Perception Score and the distribution of the responses are presented in Tables III and IV. Figures 1 to 3 depict the distribution of the responses of students and parents to selected statements from the survey.

When assessed individually the responses to specific questions offer additional insights into the perception of orthodontic appliances. In response to the statement: 'Children wearing braces are teased', nearly fifty per cent (49.8%) of students agreed; only half as many (25.6%) thought teasing occurs when a removable plate is worn. The same trend is noted in the parents' responses: sixty per cent of parents thought children are teased if they are wearing braces, while only one-third of parents thought children are teased if wearing a plate (Figure 1). Just over half of the student-sample students agreed that braces would make it more difficult to keep the teeth clean; three-quarters of them did not believe that wearing a removable plate would make cleaning the teeth difficult (Figure 2) (a trend which was more marked in the parental responses).

Pain also was considered to be a likely outcome of wearing braces by 21 per cent of students and 28 per cent of parents; however, only six per cent and 11.2 per cent of students and parents respectively, believed wearing a plate would be painful. Both students and parents also perceived that more care would have to be taken with the diet of children wearing braces than with those wearing a plate. Forty-six per cent of students and 37.5 per cent of parents did not believe that children wearing a removable plate would have to be careful of what they eat; in contrast, 74.4 per cent students and 70.7 per cent of parents agreed that care would have to be taken when children were wearing 'braces'.

Over three-quarters of the student and parent samples did not believe that either appliance would prevent children from playing sport.

Only approximately ten per cent of students and parents thought that braces or a removable plate would cause damage to the teeth.

Of all the survey items, both students and parents were least likely to have a negative perception of the impact of orthodontic appliances on children's ability to play sport.

A high proportion of "Don't Know" responses was recorded for certain items: approximately 40 per cent of students and parents did not know whether wearing either of the appliances would cause pain or could cause damage to teeth (Figure 3).

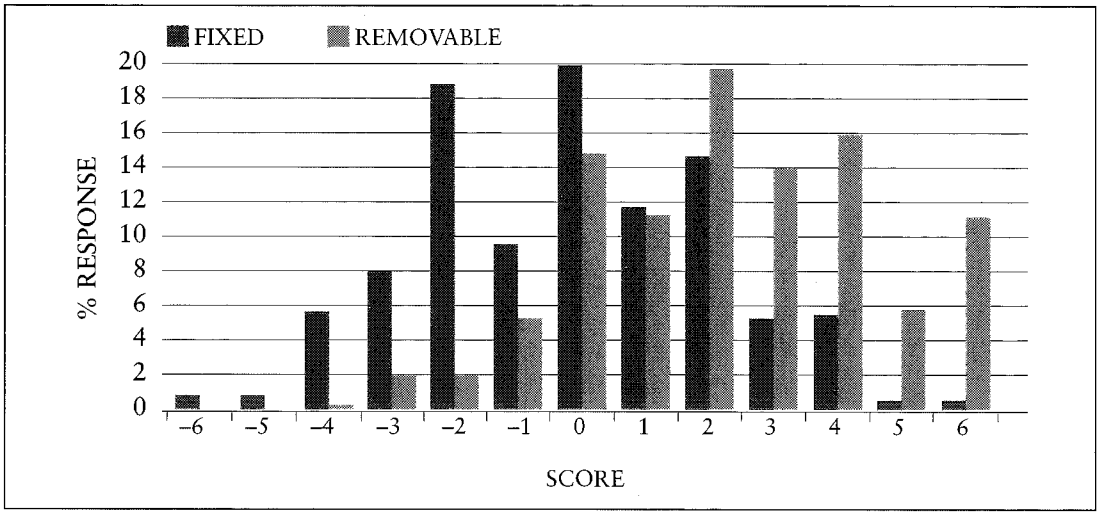

Figure 4. Distribution of Student Perception Scores for fixed and removable appliances.

Perception Scores

The distribution of Perception Scores for students and parents in relation to fixed and removable appliances is shown in Figures 4 and 5.

Less than half (45.3 %) of the students and slightly fewer parents (42.1 %) perceived braces in a positive light (a positive score). In contrast, 84.4 per cent of students and 78.2 per cent of parents perceived a removable appliance positively, Perception Scores for removable appliances being skewed towards the positive end of the scale. Very few parents or students viewed braces in the most positive light: that is, a score of +6.

Factors influencing Perception Scores

Students' and parents' Perception Scores were examined in relation to several demographic variables; however, the type of dentist the child attended (public or private sector), the frequency of dental visits, and the child's orthodontic-treatment history, did not significantly influence the scores for either fixed or removable appliances. One exception was noted: the parents' Perception Scores for removable appliances were significantly different, depending on whether there was a history of orthodontic treatment in the family: if the parents had had experience of orthodontic treatment, they viewed a removable appliance significantly more positively than those whose child had had orthodontic treatment, or than those who had had no orthodontic experience.

Parents' Perception Scores were also examined in relation to their level of education and their occupations; no significant relation was found.

Discussion

This study was prompted by the relative paucity of reports in the literature of how orthodontic treatment and specific appliances are perceived by the public. In order to better gauge these perceptions, the authors' sample was selected to include children of an age at which orthodontic treatment is often considered but undertaken by only a few. However, the sample cannot be considered truly random, and thus generalisations from the findings must be made with caution.

The results indicate that Grade Seven students and their parents have more negative perceptions of 'braces' than they do of removable appliances: both students and parents perceived braces to attract teasing, to cause more problems in the maintenance of oral hygiene, and to be more painful than a removable plate. Respondents also felt that children would have to be more careful about what they eat when wearing braces. However, the majority of students and parents felt that neither appliance would interfere with sporting activities nor cause damage to the teeth.

Previous research on patients undergoing orthodontic treatment has also noted a greater concern about discomfort[4,5] and teasing[5] associated with fixed appliances than with removable appliances. The findings of the authors' study contrast with those of Tayer and Burek,[7] who reported that removable appliances were considered by their sample to cause speech, eating and hygiene difficulties, their only positive aspect being that they could be removed. The fact that Tayer and Burek's sample comprised adults may explain these differences, and may reflect an adult's poorer

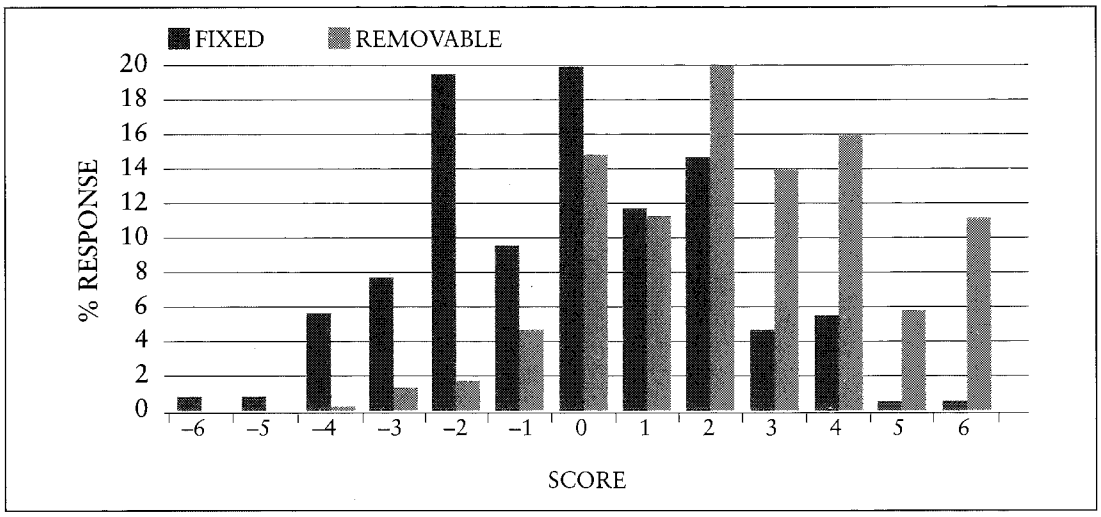

Figure 5. Distribution of Parent Perception Scores for fixed and removable appliances.

capacity to adapt in comparison with that of a child. It could also signal a true discrepancy between perceptions prior to treatment and during treatment, since those in Tayer and Burek's[7] sample were undergoing treatment at the time of the survey. However, the students in the authors' sample who had experienced orthodontic treatment also perceived removable appliances more favourably than they did braces. This appears to indicate that the perceptions students have prior to any treatment are indicative of their perceptions following treatment, as they are not significantly different from those who have worn an appliance.

A previous study has indicated parental concern about damage to the teeth during treatment, and that children wearing braces report pain as one of the main discouraging features of orthodontic treatment;[4] however, it is not a commonly reported problem associated with removable appliance wear.[6] The high proportion of 'Don't Know' responses (approximately 40 %) to the statements: 'Wearing braces/a removable plate is painful' and 'Teeth can be damaged by braces/a removable plate', suggests that, at least in regard to these aspects of treatment, many respondents did not have preconceived ideas. This may reflect a lack of knowledge about the possible sequelae of orthodontic treatment, and stresses the importance of informing patients not only about the benefits of orthodontic treatment, but also about the likelihood of negative outcomes. Only in this way can the patient assess the potential benefits and the various risks[16] and thus make an informed choice about treatment.

Parents displayed a less favourable perception of both types of orthodontic appliances than did students. This finding is of interest, as it has been demonstrated that parents' attitudes to orthodontic treatment are significant predictors of their child's cooperation during treatment:[9] adolescents whose parents have negative attitudes to braces, have been reported to demonstrate reduced levels of compliance during treatment. One explanation for a parent's negative perceptions may be that they were formed at a time when orthodontic appliances were less common. In communities where there are comparitively large numbers of children undergoing treatment, the wearing of orthodontic appliances becomes more acceptable.[14] The more positive perceptions of removable appliances held by parents who had themselves undergone orthodontic treatment, supports this hypothesis.

In order to determine factors which may influence perceptions, scores were examined in relation to a number of other socio-demographic variables; however, as no significant relations could be established, it would appear that more complex factors determine an individual's perceptions of orthodontic appliances.

As measures of perceptions are of most interest when examined relative to their effect on the use people make of Orthodontics, the authors' future research will investigate the relation between perceptions, perceived need for, and willingness to undertake, orthodontic treatment.

Conclusion

The results of this study indicate that in the community, there are significantly different perceptions of the appliances used during orthodontic treatment. Grade Seven students and their parents have a more a negative perception of fixed appliances than they do of removable appliances: braces are perceived to attract more teasing, to cause more problems in the maintenance of oral hygiene, and to be more painful than a removable plate. Respondents also feel that children would have to be more careful about what they eat when wearing braces.

The importance of informing patients about the possible negative aspects of orthodontic treatment as well as its benefits are highlighted by this study, indicating that a forewarning about experiences of orthodontic appliances would better prepare patients for treatment, and help practitioners to provide the community with a more comprehensive orthodontic service.

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References

1. Tulloch JFC, Shaw WC, Underhill C, Smith A, Jones G, Jones M. A comparison of attitudes to orthodontic treatment in British and American communities. Am J Orthod 1984; 85: 253-9.
2. Lew KK. Attitudes and perceptions of adults towards orthodontic treatment in an Asian community. Community Dent Oral Epidemiol 1993; 21: 31-5.
3. Maj G, Grilli ATS, Belletti MF. Psychologic appraisal of children facing orthodontic treatment. Am J Orthod 1967; 53: 849-57.
4. Oliver RG, Knapman YM. Attitudes to orthodontic treatment. Br J Orthod 1985; 12: 179-88.
5. Gosney MBE. An investigation into factors which may deter patients from undergoing orthodontic treatment. Br J Orthod 1985; 12: 133-8.
6. Lewis HG, Brown WAB. The attitude of patients to the wearing of a removable orthodontic appliance. Br Dent J 1973; 134: 87-90.
7. Tayer BH, Burek MJ. A survey of adults' attitudes towards orthodontic therapy. Am J Orthod 1981; 79: 305-15.
8. Sergl HG, Klages U, Pempera J. On the prediction of dentist evaluated compliance in Orthodontics. Eur J Orthod 1992; 14: 463-8.
9. Albino JEN, Lawrence SD, Lopes CE, Nash LB, Tedesco LA. Cooperation of adolescents in orthodontic treatment. J Behaviour Med 1991; 14: 53-70.
10. Myrberg N, Thilander B. Orthodontic need of treatment of Swedish schoolchildren from objective and subjective aspects. Scand J Dent Res 1973; 81: 81-4.
11. Cousins AJ, Lewis HG, Viander PH. Changes in orthodontic treatment patterns within one orthodontic practice over a fifteen year period. Br J Orthod 1981; 8: 11-14.
12. Murray AM. Discontinuation of orthodontic treatment: a study of the contributing factors. Br J Orthod 1989; 16: 1-7.
13. Brattstrom V, Ingelsson M, Aberg E. Treatment cooperation in orthodontic patients. Br J Orthod 1991; 18: 37-42.
14. Gravely JF. A study of need and demand for orthodontic treatment in two contrasting national health service regions. Br J Orthod 1990; 17: 287-92.
15. Department of Employment and Youth Affairs and the Australian Bureau of Statistics. Australian standard classification of occupations. Canberra: AGPS, 1986.
16. Jerrold L. Informed consent and Orthodontics. Am J Orthod Dentofac Orthop 1988; 93: 251-8.