

Appliance wear: the patient's point of view

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SUMMARY Fifty-two patients (35 female, 17 male) completed questionnaires related to their experiences during the first 7 days of appliance wear (31 fixed, 21 removable) and then after 14 and 90 days. Most problems relating to discomfort and pain resolved within 4–7 days. The problems encountered with fixed appliances were generally more severe than with removable appliances. Swallowing and speech were more difficult with removable appliances and these problems persisted to some degree. Surprisingly, the embarrassment caused by wearing the appliance in public was similar whether it was fixed or removable.

Introduction

Orthodontic treatment may be an uncomfortable process. Orthodontic appliances represent foreign objects inserted in a physically and psychologically sensitive area of the body. That they are being worn is often obvious to others and it is possible that susceptible individuals may be self-conscious about wearing such devices in public. Child patients, in particular, may be subject to social ridicule from their peers. Yet orthodontic patients are expected to remain compliant and co-operative throughout treatment which may last for several years.

The patients' psychological responses to orthodontic treatment and their ability to adapt to appliances are clearly a very significant concern. In the absence of good patient co-operation, there is increased risk of iatrogenic damage to the dentition, the possibility of early discontinuation of treatment and compromised quality of result in both fixed and removable appliance therapy.

Whilst many studies have taken the standpoint of the operator, using professionally orientated variables regarding the co-operation and adaptability of patients towards appliance therapy, patients' own perceptions of their treatment have rarely been sought.

Even most standard undergraduate and postgraduate texts tend to ignore advice to the patient regarding what they are likely to experience in the first days of appliance therapy. Jones (1984), however, investigated the

discomfort experienced by 30 patients in the initial 16 days of fixed appliance wear. The majority experienced moderate to severe discomfort over the first 8 days, but the highest levels were recorded during the first 3 days.

The aim of this study was, firstly, to evaluate the experiences of patients wearing fixed and removable appliances and, secondly, to monitor adaptation to each type of appliance during the first 3 months of treatment.

Subjects

The study sample consisted of 52 Caucasian patients who commenced orthodontic treatment at the Glasgow Dental School between May 1993 and February 1994. They were consecutively enrolled from patients taken from the waiting list by the first two authors during this period. None had received previous orthodontic treatment and all were receiving either two-arch fixed appliance therapy or upper removable (active plate) appliance therapy. Patients requiring headgear or an auxiliary component such as a quadhelix were not included. Details of sample age and sex within each appliance group are given in Table 1.

Method

Patients taking part in this study were being treated by either an undergraduate student, under the supervision of the second author, or

Table 1 Subjects included in the study by appliance type, sex and age.

	Fixed appliance	Removable appliance
Female	22 (71%)	13 (61.9%)
Male	9 (29%)	8 (38.1%)
Total	31	21
Mean age	15.2 years	14.7 years
Standard deviation	3.3 years	4.5 years
Minimum	12.2 years	9.1 years
Maximum	30.5 years	27.7 years

an orthodontic postgraduate student (the first author).

Data collection was by questionnaire. The questionnaires used to record patient experience data were from a series developed by Sergl and Klages (Sergl *et al.*, 1992) adapted for use in this study in collaboration with those authors.

Questionnaires were completed by patients at three points during the early part of appliance therapy:

1. The first week following appliance insertion. This questionnaire comprised seven separate daily record sheets, one for each day of that week, to be completed at the end of the day.
2. At 2 weeks following appliance insertion.
3. At 3 months following appliance insertion.

The questionnaire used a four-point Likert-type scale where each item response is scored 1, 2, 3 or 4 indicating degree of agreement with the statement, i.e. 'Not at all', 'A little', 'Much' and 'Very much'.

The questionnaire comprised 13 statements pertaining to comfort, convenience and self-consciousness in relation to appliance wear (Table 2).

Appliances were not reactivated at the 2 week appointment but were subsequently reactivated, as appropriate, at 1 and 2 months following insertion. The 90 day questionnaire was completed prior to any adjustment being made on that session.

Table 2 Statements upon which the subjects were asked to grade their agreement.

I find the appliance comfortable
My appliance exerts tension
My appliance exerts pressure
My appliance feels tight
My appliance interferes with speaking
My appliance interferes with swallowing
My appliance interferes with breathing
My appliance interferes with sleeping
My appliance makes me feel disgusted
My appliance increases saliva flow
My appliance makes my teeth feel sensitive
My appliance causes pain
I feel bad about wearing my appliance in public

Analysis

Statistical analysis of the data was performed with the Minitab Version 9 (Minitab Inc., 3081 Enterprise Drive, State College, PA, USA) computer package.

A two-sample *t*-test was performed for the difference in mean age of subjects between the fixed and removable appliance groups. No statistical difference in age was demonstrated.

No significant difference was found on χ^2 testing between groups in terms of the distribution of male and female subjects. Males and females, therefore, were combined in order to increase sample group sizes. Differences in response between the sexes were not investigated in view of the relatively small number of males in the sample.

χ^2 tests were performed on the medians of the response scores to each of the 13 patient experience statements. For χ^2 testing of differences between groups, cells with small expected values were amalgamated with their neighbours.

Mann-Whitney *U*-tests were performed on the response score medians to compare the fixed and removable appliance groups in terms of changes in patient perceptions from day 1 to day 7, day 7 to day 14 and day 14 to day 90.

For each of the 13 experience statements, a plot was made of mean response score against time. A plot of the median scores was recognized to be the most appropriate manner to present ordinal data; however, plotting mean values was

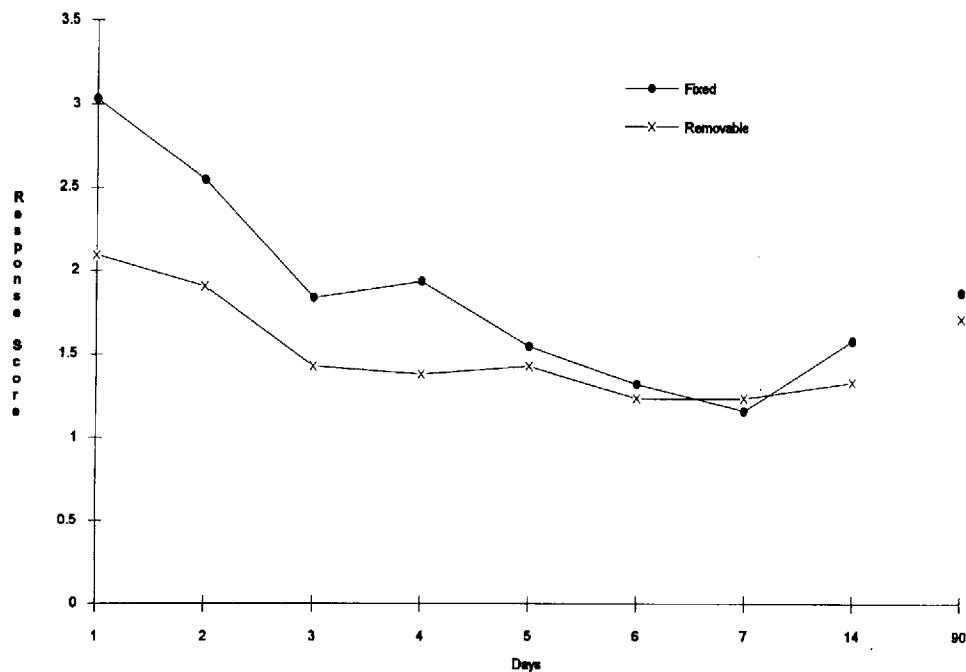


Figure 1 Mean response to the statement 'My appliance feels tight': 1 = 'not at all'; 2 = 'a little'; 3 = 'much'; 4 = 'very much'.

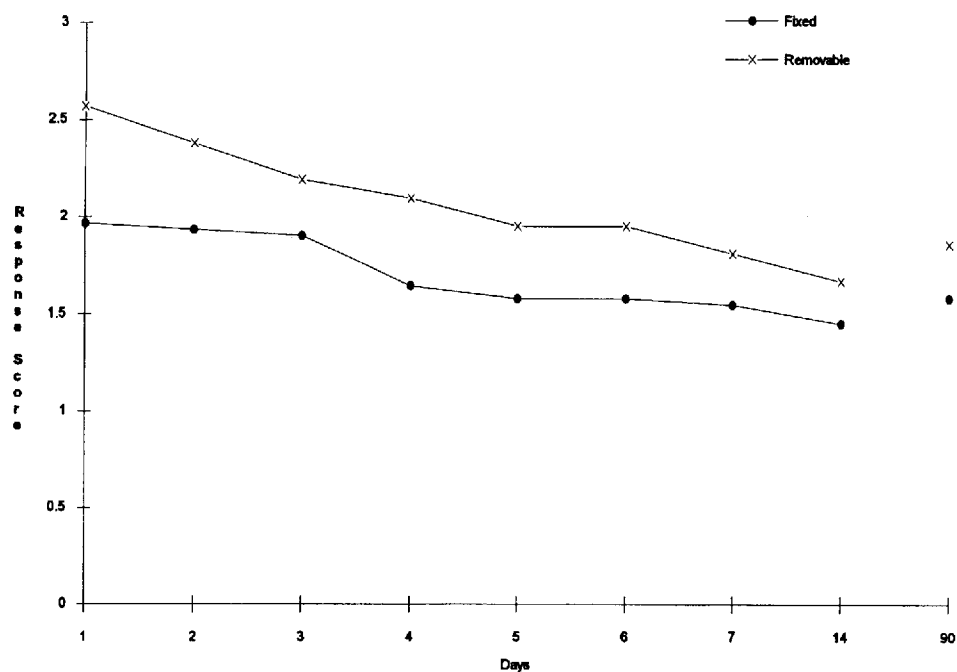


Figure 2 Mean response to the statement 'My appliance increases saliva flow': 1 = 'not at all'; 2 = 'a little'; 3 = 'much'; 4 = 'very much'.

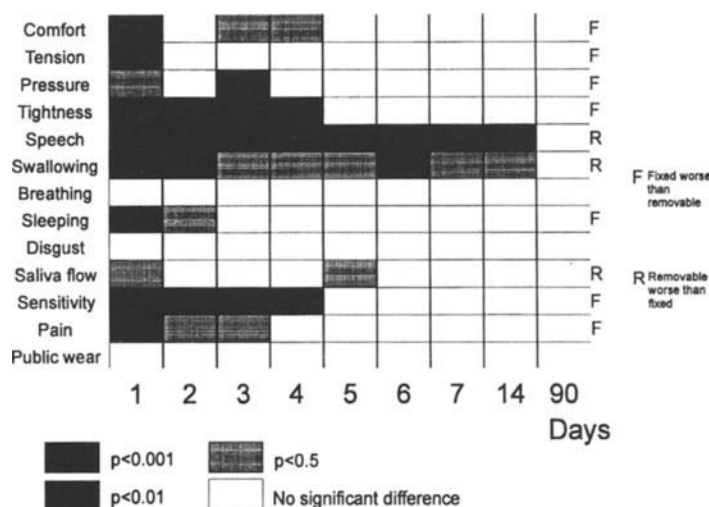


Figure 3 Significant differences between fixed and removable appliances for the 13 statements shown in Table 2 from days 1–90.

more useful in illustrating trends in adaptation to appliances although the actual mean values are artificial.

Results

General trends

The highest mean scores recorded for any question were 3.0 (much) in response to the questions concerning 'tightness' (Figure 1) and 'sensitivity' on day 1, in relation to fixed appliances.

Generally, most aspects of appliance wear became more tolerable with the passage of time. An exception to this rule was 'salivary flow' (Figure 2), which was perceived to be permanently affected 'a little' in both groups.

Fixed versus removable appliances (Figure 3)

Three different patterns of response were seen over 90 days:

1. A steady improvement in both groups with the fixed appliance group experiencing more problems initially, but with no difference after a period of time, e.g. comfort, tension, pressure, tightness, sleeping, sensitivity, pain.

There was a suggestion in both appliance groups that things might get marginally worse

after 7 days with regard to tension, pressure, tightness, sensitivity and pain.

2. A steady improvement in both groups with the removable appliance group experiencing more problems initially, but with no significant difference after a period of time, e.g. salivary flow.
3. Aspects for which there was still a mean difference after 90 days, e.g. speech (Figure 4) and swallowing (Figure 5)—worse, removable appliances.

The significant differences between the two appliance groups are shown in Figure 3.

Discussion

The study verifies a number of long-held beliefs regarding patients' initial feelings and discomfort with removable and fixed appliances. Much of this information about what to expect, particularly in the initial stages of appliance wear, could readily be incorporated into patient information sheets, depending upon the type of appliance to be worn.

Although only two questions elicited mean scores of 3 initially (tightness, sensitivity), a number of patients will experience levels of

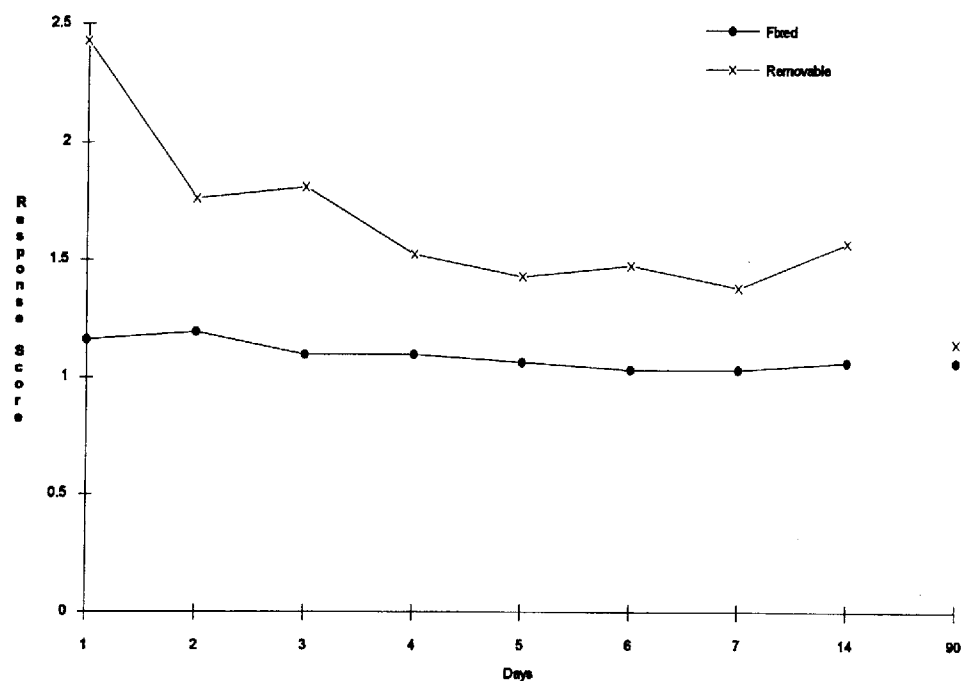


Figure 4 Mean response to the statement 'My appliance interferes with swallowing': 1 = 'not at all'; 2 = 'a little'; 3 = 'much'; 4 = 'very much'.

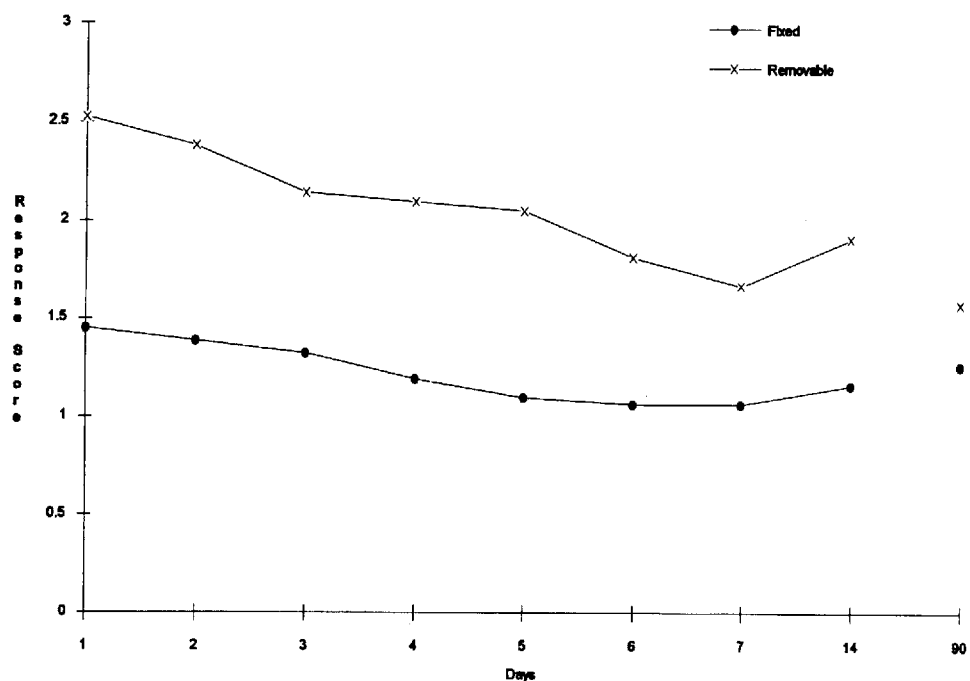


Figure 5 Mean response to the statement 'My appliance interferes with speaking': 1 = 'not at all'; 2 = 'a little'; 3 = 'much'; 4 = 'very much'.

discomfort above the mean. Both types of appliance cause problems, most of which resolve after the first 4–7 days.

Removable appliances are initially less uncomfortable than fixed appliances, but disturb speech and swallowing. Even after 3 months, there is still a perceived influence upon speech.

Fixed appliances generally gave rise to complaints related to tightness, sensitivity and pain. The estimates of the time scale over which discomfort is significant agree well with those reported by Jones (1984). Although the increased discomfort experienced initially with fixed appliances may be the result of many teeth being moved simultaneously under pressure, the possibility that excessive force is being used in many cases must be borne in mind.

Patients had their previous entries available to them when completing the daily questionnaires of the first week. They did not have their previous responses available to them when answering the 14 and 90 day questionnaires, and it is possible that this may have had an influence in that the element of self-calibration may have been lost, making some of the later responses less reliable. Perceptions of tension, pressure, tightness, sensitivity and pain, for example, appeared to increase slightly after 14 and 90 days.

Of interest was the fact that after the first week of wear, fixed appliances are no more socially embarrassing than removable appliances and the difference between the two appliance types never reached the level of statistical significance. This is despite the refusal of some patients to accept

their use on grounds of appearance. This may be, in part, related to the fact that the option of removal of the appliance is not available.

The study confirms that the first 4–7 days are the most critical for the patient in terms of general discomfort and difficulty in performing normal oral functions with an appliance *in situ*. Armed with the above knowledge, it should be possible, by informing patients more reliably about what they may experience, to minimize any anxiety which may be experienced.

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