

A Survey of Patient Opinions on Fixed vs. Removable Retainers

ROBERT CERNY, BDS, MDS
DEBORAH COCKRELL, PHD, BDS, FDS RCPS
DEBORAH LLOYD, PHD, BA(Hons), Dip Ed

As many as two-thirds of all patients will demonstrate moderate-to-severe relapse within 10 years after orthodontic treatment.¹ As a result, patients are becoming both more aware and more accepting of the need for long-term retention.¹⁻³ Although many orthodontists have promoted the need for permanent retention,^{3,4} few investigators have assessed the opinions and preferences of patients regarding the use of permanently bonded retainers (PBRs) as opposed to removable retainers (RRs).^{5,6} The present survey, part of a long-term retrospective study, solicited the views of post-retention patients on the relative merits of fixed vs. removable retainers.

Methodology

The University of Newcastle, Australia, granted approval for this study. All patients had completed comprehensive orthodontic treatment, including both extraction and nonextraction therapy, with Dr. Cerny before 1993. Of 671 randomly selected potential participants, we had valid telephone numbers for 236. Of these, 61 agreed to participate, for a response rate of 25.8% of the patients who could be located, or 9.1% of the initial sample.

The RRs prescribed were maxillary Hawley plates and mandibular spring aligners. The PBRs were typically fabricated from .018" round Wilcock* Regular Plus stainless steel wire bonded to all the anterior teeth⁷; in nine cases, only the mandibular canines were attached to .025" stainless steel round wires. The adhesive used was Silux** composite.

Each patient who responded to the invitation

*Registered trademark of A.J. Wilcock, 45 Yea Road, Whittlesea, Victoria 3757, Australia; www.ajwilcock.com.au.

**Registered trademark of 3M Unitek, 2724 S. Peck Road, Monrovia, CA 91016; www.3Munitek.com.

was asked to complete a questionnaire that included the following items:

- Demographics: sex, age, and education
- General health, including smoking habits
- Dental health practices: brushing, flossing, toothpick use, and frequency of dental visits and cleanings
- Comfort, oral hygiene, and impact on quality of life of retainers
- Perceived results of retainer wear: straightness of teeth, overall outcome, bite comfort, and TMD
- Reasons for discontinuing use (if applicable)
- Any relapse noted

Dr. Cerny reviewed the questionnaire with each patient to ensure completion. Some sections were left blank because of uncertain patient recall. The data were then transferred to a spreadsheet for analysis.

We assumed that 20% more of the patients who had worn both PBRs and RRs would rate the PBRs as better in terms of comfort, oral hygiene, and impact on quality of life. Under that assumption, at least 44 treated patients (PBR and/or RR) and 15 control patients (RR only) would be needed to demonstrate a statistically significant difference ($p < .05$), as indicated by a power of .8 in chi-square testing.⁸

After completing the questionnaire, each patient underwent clinical examination, facial and intraoral photography, and panoramic radiography. Based on this evaluation, Dr. Cerny rated each patient's relapse as minimal (1-3mm), moderate (4-6mm), or severe (7-9mm), according to the Little Irregularity Index scale.⁹

Results

The study group consisted of 46 patients who had worn 55 PBRs (41 maxillary, 14 mandibular, nine in both arches; Table 1) and 28 RRs (four

Dr. Cerny is in the private practice of orthodontics at Hunter Valley Orthodontics, 139 Scott St., Newcastle, New South Wales 2300, Australia; email: rcerny48@gmail.com. Dr. Cockrell is an Associate Professor and Head of Discipline of Oral Health, and Dr. Lloyd is a Consultant in Medical Research and Medical Education and Conjoint Academic, School of Medicine and Population Health, Faculty of Health, School of Health Sciences, University of Newcastle. This research was part of Dr. Cerny's doctoral study for the Discipline of Oral Health, University of Newcastle.



Dr. Cerny



Dr. Cockrell



Dr. Lloyd

**TABLE 1
PERMANENTLY BONDED
RETAINERS IN SAMPLE**

	No. Bonds	No. Patients	Total Bonds
Maxilla			
3-3	6	20	120
2-2	4	16	64
1-1	2	5	10
Mandible			
3-3	6	5	30
3-3	2	9	18
Totals		55*	242

*9 patients had bonded retainers in both upper and lower arches.

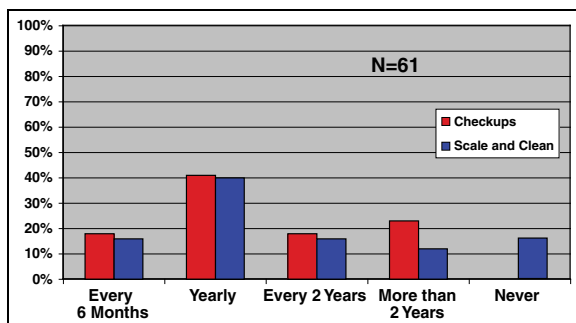


Fig. 1 Patient-reported frequency of dental visits, prophylactic scaling, and cleaning.

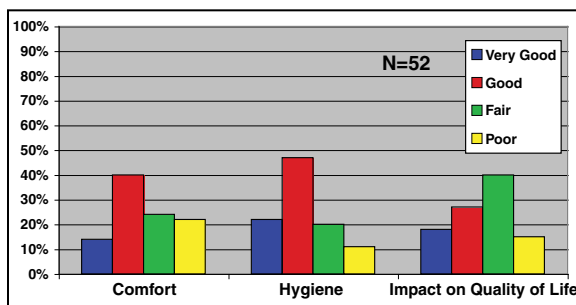


Fig. 2 Patient ratings of removable retainers.

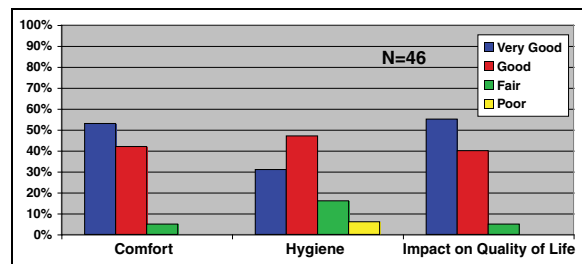


Fig. 3 Patient ratings of permanently bonded retainers.

maxillary, 24 mandibular). The control group included 15 patients who had worn 27 RRs (14 maxillary, 13 mandibular). Because Dr. Cerny did not routinely prescribe PBRs upon completion of active treatment before 1993, 30 of the 46 patients had been fitted with PBRs after initially wearing RRs in the same arches.

Overall, 75% of the patients were female, 65% were under age 40, 45% held a university degree or higher, 98% reported good or very good health, and 46% were current or former smokers. The time elapsed since active treatment ranged from 15 to 22 years, with a mean of 17.3, for the PBR group and from 16 to 28 years, with a mean of 19.3, for the RR group. All patients reported brushing their teeth daily, and 33% flossed daily. Although 72% of the patients visited a dentist more often than every two years, usually involving prophylactic scaling and cleaning, 16% reported that they had never had professional cleaning (Fig. 1).

The proportions of patients who rated the RR as good or very good were 54% for comfort, 69% for hygiene, and 45% for impact on quality of life (Fig. 2). Ratings of good or very good for the PBR totaled 95% for comfort, 78% for hygiene, and 95% for impact on quality of life (Fig. 3). The differences among the two groups were not statistically significant.

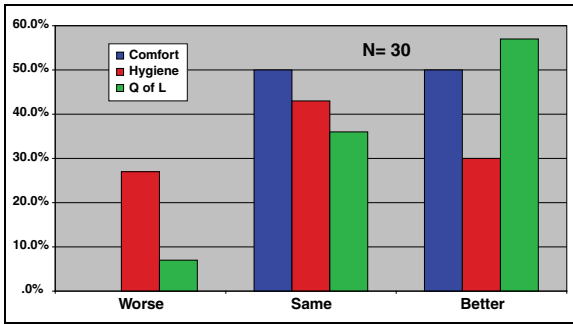


Fig. 4 Comparison of permanently bonded retainers to removable retainers among patients who wore both types.

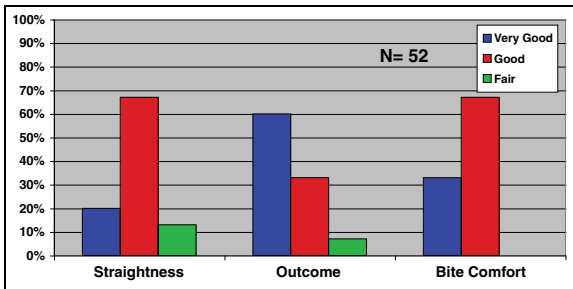


Fig. 5 Patient-reported results of wearing removable retainers.

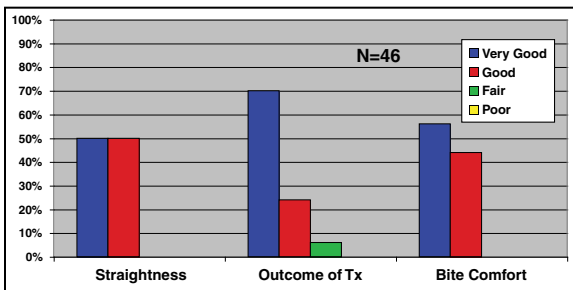


Fig. 6 Patient-reported results of wearing permanently bonded retainers.

Among the 30 patients who had worn PBRs after initial RRs (Fig. 4), 100% rated the comfort of the PBR as the same or better than that of the RR, 73% rated their hygiene as the same or better, and 93% rated the impact on their quality of life as the same or better. Half of these patients thought the PBRs were more comfortable than the RRs, and 57% felt the impact on their quality of life was better with the PBRs. There was no significant difference between the retainer types in terms of oral hygiene.

Among the RR group, 87% rated the straightness of their teeth as good or very good, 93% rated their overall treatment outcomes as good or very



Fig. 7 Two cases of moderate relapse (on the Little Irregularity Index scale⁹) after RR use. Both patients professed to be unaware of relapse.

good, and 100% rated their bite comfort as good or very good (Fig. 5). The corresponding ratings for the PBRs were 100% for tooth straightness, 94% for overall outcome, and 100% for bite comfort (Fig. 6). TMD experiences were similar for the two groups: 80% reported having no TMD, 16% reported clicking symptoms, and 4% reported painful episodes.

Patients stopped wearing their RRs because of discomfort (44%), embarrassment (15%), and other reasons (41%), which included “hearing” that they could stop wearing their retainers after two years. Sixty-three percent of the RR patients had noticed post-treatment relapse. Even among those who had noticed no relapse, however, 56% showed at least moderate relapse in their clinical evaluations (Fig. 7).

Discussion

In this limited study of self-reported treatment outcomes, patient opinions were more favorable overall for PBRs than for RRs with regard to comfort, hygiene, and impact on quality of life. These findings are nearly identical to those of our previous studies of a different sample of patients¹⁰ and a group of practicing dentists.¹¹

The patients most qualified to judge the

merits of both retainer types were the 30 who wore PBRs after initial RR use. Most of these patients preferred the PBRs, especially for comfort and impact on quality of life. These findings corroborate those of our earlier study¹⁰ and another by Wong and Freer.¹²

Signs of TMD occurred in similar proportions of both groups: 16% reported clicking and 4% reported having painful episodes with their joints, corresponding to observations of the general U.S. population.¹³

The dental health practices of our study group were similar to those of an adult sample from the United Kingdom¹⁴: more than half the patients in both studies visited the dentist at least once a year, more than 95% brushed their teeth at least daily, and about a third used dental floss regularly.

Limitations

Like other retrospective studies,¹⁵⁻¹⁷ the present survey displays several known types of bias¹⁸: selection bias, response bias, volunteer bias, non-responder bias, and survivor bias, among others. Because Dr. Cerny had fitted all the retainers and supervised the patients' retention programs, he was aware of their treatment histories during the clinical reevaluations. This could have introduced observer and expectation bias, but it also removed the possibility of interobserver variability.

Self-reporting can result in recall, personal assessment, and opinion biases. We attempted to minimize some of these patient-related biases through random selection and by having patients complete the questionnaires before the clinical examinations. The final study group was similar to the overall patient cohort in terms of orthodontic treatments, consisting predominantly of adult women with above-average educational levels¹⁹ who were in good health, but were somewhat more likely to smoke than the general Australian population.²⁰

Conclusion

Maintenance of acceptable oral hygiene with

permanently bonded retainers was not a concern for most of this sample of orthodontic patients. In general, they favored the PBRs over removable retainers for effectiveness, comfort, and impact on quality of life, and they appeared to accept the need to wear and maintain the PBRs indefinitely.

REFERENCES

1. Little, R.M.: Stability and relapse: Early treatment of arch length deficiency, *Am. J. Orthod.* 121:578-581, 2002.
2. Durbin, D.D.: Relapse and the need for permanent fixed retention, *J. Clin. Orthod.* 25:723-727, 2001.
3. Keim, R.G.; Gottlieb, E.L.; Nelson, A.H.; and Vogels, D.S. III: 2008 JCO Study of Orthodontic Diagnosis and Treatment Procedures, Part 1: Results and trends, *J. Clin. Orthod.* 42:625-640, 2008.
4. Lenz, G.: Oral health dental health week: Orthodontics for 18-25 year olds, *NSW ADA News Bull.* 355:20-25, 2007.
5. Wong, P. and Freer, T.J.: Patients' attitudes towards compliance with retainer wear, *Austral. Orthod. J.* 21:45-53, 2005.
6. Littlewood, S.J.; Millett, D.T.; Doubleday, B.; Bearn, D.R.; and Worthington, H.V.: Retention procedures for stabilising tooth position after treatment with orthodontic braces, *Cochrane Database Syst. Rev.* 25:CD002283, 2006.
7. Zachrisson, B.J.: Third-generation mandibular bonded lingual 3-3 retainer, *J. Clin. Orthod.* 29:39-48, 1995.
8. Dupont, W.D. and Plummer, W.D. Jr.: PS power and sample size program available for free on the Internet, *Contemp. Clin. Trials* 18:274, 1997.
9. Little, R.M.: The Irregularity Index: A quantitative score of mandibular anterior alignment, *Am. J. Orthod.* 68:554-563, 1975.
10. Cerny, R.: Orthodontics and "The Pinocchio Factor": Part II, *Australas. Dent.* 25:48-55, 2008.
11. Cerny, R. and Lloyd, D.: Dentists' opinions on orthodontic retention appliances, *J. Clin. Orthod.* 42:415-419, 2008.
12. Wong, P.M. and Freer, T.J.: A comprehensive survey of retention procedures in Australia and New Zealand, *Aust. Orthod. J.* 20:99-106, 2004.
13. Gross, A. and Gale, E.N.: A prevalence study of the clinical signs associated with mandibular dysfunction, *J. Am. Dent. Assoc.* 107:932-936, 1983.
14. Office of National Statistics: *Adult Dental Health Survey: Oral Health in the United Kingdom 1998*, London, 2000.
15. Geangler, P.; Hoyer, I.; and Montag, R.: Clinical evaluation of posterior composite restorations: The 10-year report, *J. Adhes. Dent.* 3:185-194, 2001.
16. Pandis, N.; Vlahopoulos, K.; Madianos, P.; and Eliades, T.: Long-term periodontal status of patients with mandibular lingual fixed retention, *Eur. J. Orthod.* 29:471-476, 2007.
17. Booth, F.; Edelman, J.; and Proffit, W.: Twenty-year follow-up of patients with permanently bonded mandibular canine-to-canine retainers, *Am. J. Orthod.* 133:70-76, 2008.
18. Sackett, D.L.: Bias in analytic research, *J. Chronic Dis.* 32:51-63, 1979.
19. Australian Institute of Health and Welfare: *Australia's Health 2008*, Canberra, Australia, 2008.
20. Australian Bureau of Statistics: *National Health Survey 2007-08*, Canberra, Australia, 2009.