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[Intervention Review]

Retention procedures for stabilising tooth position after treatment with orthodontic braces

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ABSTRACT

Background

Retention is the phase of orthodontic treatment that attempts to keep teeth in the corrected positions after treatment with orthodontic braces. Without a phase of retention, there is a tendency for teeth to return to their initial position (relapse). To prevent relapse, almost every person who has orthodontic treatment will require some type of retention.

Objectives

To evaluate the effects of different retention strategies used to stabilise tooth position after orthodontic braces.

Search methods

We searched the following databases: the Cochrane Oral Health Group's Trials Register (to 26 January 2016), the Cochrane Central Register of Controlled Trials (CENTRAL) (2015, Issue 12), MEDLINE via Ovid (1946 to 26 January 2016) and EMBASE via Ovid (1980 to 26 January 2016). We searched for ongoing trials in the US National Institutes of Health Trials Register (ClinicalTrials.gov) and the World Health Organization (WHO) International Clinical Trials Registry Platform. We applied no language or date restrictions in the searches of the electronic databases. We contacted authors of randomised controlled trials (RCTs) to help identify any unpublished trials.

Selection criteria

RCTs involving children and adults who had had retainers fitted or adjunctive procedures undertaken to prevent relapse following orthodontic treatment with braces.

Data collection and analysis

Two review authors independently screened eligible studies, assessed the risk of bias in the trials and extracted data. The outcomes of interest were: how well the teeth were stabilised, failure of retainers, adverse effects on oral health and participant satisfaction. We calculated mean differences (MD) with 95% confidence intervals (CI) for continuous data and risk ratios (RR) with 95% CI for dichotomous outcomes. We conducted meta-analyses when studies with similar methodology reported the same outcome. We prioritised reporting of Little's Irregularity Index to measure relapse.

Main results

We included 15 studies (1722 participants) in the review. There are also four ongoing studies and four studies await classification. The 15 included studies evaluated four comparisons: removable retainers versus fixed retainers (three studies); different types of fixed retainers (four studies); different types of removable retainers (eight studies); and one study compared a combination of upper thermoplastic and lower bonded versus upper thermoplastic with lower adjunctive procedures versus positioner. Four studies had a low risk of bias, four studies had an unclear risk of bias and seven studies had a high risk of bias.

Removable versus fixed retainers

Thermoplastic removable retainers provided slightly poorer stability in the lower arch than multistrand fixed retainers: MD (Little's Irregularity Index, 0 mm is stable) 0.6 mm (95% CI 0.17 to 1.03). This was based on one trial with 84 participants that was at high risk of bias; it was low quality evidence. Results on retainer failure were inconsistent. There was evidence of less gingival bleeding with removable retainers: RR 0.53 (95% CI 0.31 to 0.88; one trial, 84 participants, high risk of bias, low quality evidence), but participants found fixed retainers more acceptable to wear, with a mean difference on a visual analogue scale (VAS; 0 to 100; 100 being very satisfied) of -12.84 (95% CI -7.09 to -18.60).

Fixed versus fixed retainers

The studies did not report stability, adverse effects or participant satisfaction. It was possible to pool the data on retention failure from three trials that compared polyethylene ribbon bonded retainer versus multistrand retainer in the lower arch with an RR of 1.10 (95% CI 0.77 to 1.57; moderate heterogeneity; three trials, 228 participants, low quality evidence). There was no evidence of a difference in failure rates. It was also possible to pool the data from two trials that compared the same types of upper fixed retainers, with a similar finding: RR 1.25 (95% CI 0.87 to 1.78; low heterogeneity; two trials, 174 participants, low quality evidence).

Removable versus removable retainers

One study at low risk of bias comparing upper and lower part-time thermoplastic versus full-time thermoplastic retainer showed no evidence of a difference in relapse (graded moderate quality evidence). Another study, comparing part-time and full-time wear of lower Hawley retainers, found no evidence of any difference in relapse (low quality evidence). Two studies at high risk of bias suggested that stability was better in the lower arch for thermoplastic retainers versus Hawley, and for thermoplastic full-time versus Begg (full-time) (both low quality evidence).

In one study, participants wearing Hawley retainers reported more embarrassment more often than participants wearing thermoplastic retainers: RR 2.42 (95% CI 1.30 to 4.49; one trial, 348 participants, high risk of bias, low quality evidence). They also found Hawley retainers harder to wear. There was conflicting evidence about survival rates of Hawley and thermoplastic retainers.

Other retainer comparisons

Another study with a low risk of bias looked at three different approaches to retention for people with crowding, but normal jaw relationships. The study found that there was no evidence of a difference in relapse between the combination of an upper thermoplastic and lower canine to canine bonded retainer and the combination of an upper thermoplastic retainer and lower interproximal stripping, without a lower retainer. Both these approaches are better than using a positioner as a retainer.

Authors' conclusions

We did not find any evidence that wearing thermoplastic retainers full-time provides greater stability than wearing them part-time, but this was assessed in only a small number of participants.

Overall, there is insufficient high quality evidence to make recommendations on retention procedures for stabilising tooth position after treatment with orthodontic braces. Further high quality RCTs are needed.

PLAIN LANGUAGE SUMMARY

What is the best method for maintaining the correct position of teeth after orthodontic treatment?

Review question

Which approach is most effective at maintaining teeth in their new position after the end of treatment with orthodontic braces?

Background

Once people finish having their teeth straightened with orthodontic braces, the teeth will tend to get crooked again. Orthodontists try to prevent this by using different retention procedures. Retention procedures can include either wearing retainers, which fit over or around teeth, or stick onto the back of teeth, or by using something called 'adjunctive procedures'. Adjunctive procedures either change the shape of the contacts between teeth, or involve a very small procedure to cut the connection between the gum and the neck of the tooth.

Study characteristics

We searched scientific databases to find all the new evidence up to 26 January 2016. This review updates a previous one published in 2006. We included 15 studies that compared different types of fixed and removable retainers and different durations of wear. There were 1722 participants including adults and children. Nine studies took place in a hospital or university setting, five studies in specialist practice and one in a National Health Service Clinic.

The studies evaluated four comparisons: removable retainers versus fixed retainers (three studies); different types of fixed retainers (four studies); different types of removable retainers (eight studies); and one study compared a combination of removable and fixed retainers, use of an adjunctive procedure and a positioner.

We also found four ongoing studies and four studies await classification.

Key results

Most of the evidence was of low quality. One small but well conducted study that compared full-time and part-time wear of thermoplastic retainers did not find evidence of a difference in stability (moderate quality evidence).

Quality of the evidence

There is not enough high quality evidence to recommend any one approach to retention over another. Further high-quality studies are needed.