

Fixed and removable orthodontic retainers and periodontal health

Abstracted from

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Question: Are fixed orthodontic retainers better than removable retainers in terms of periodontal health, failure rates, patient reported outcomes and cost-effectiveness?

Data sources Medline, PubMed, Cochrane Central Register of Controlled Trials, LILACS and BBO databases with no language restrictions; unpublished literature was searched in Proquest Dissertations and Theses database, clinicaltrials.gov and controlled-trials.com.

Study selection Randomised and nonrandomised controlled clinical trials, prospective cohort studies, and case series (with a minimum sample size of 20 patients) in patients who underwent fixed or removable appliance orthodontic therapy with a minimum follow-up period of six months. The primary outcome was periodontal health; while failure rates, impact of orthodontic retainers on patient-reported outcomes and cost-effectiveness served as secondary outcomes.

Data extraction and synthesis Full texts of relevant abstracts were retrieved and data extracted using pre-piloted data collection forms by two authors. Study quality was assessed with Cochrane Collaboration's Risk of Bias tool (RCTs) and Newcastle-Ottawa Scale (NOS) for non-randomised studies. Only RCTs at low or unclear risk of bias and non-randomised studies of moderate or high methodological quality were included in the meta-analysis (MA). If moderate to high heterogeneity was present ($I^2 > 50\%$), MA was not performed.

Results Out of the 18 included RCTs, 11 were assessed to be of low risk of bias while five out of six prospective cohort studies were considered high quality using the NOS. The authors did not perform MA because of significant heterogeneity that existed among different studies.

With regards to periodontal health, there was no significant difference in probing depth and bleeding on probing between fixed mandibular stainless steel (SS) retainers (bonded to anterior teeth or canines only), fibre reinforced composite retainers or Hawley retainers at three-year follow-up. However, there was increased plaque accumulation around fibre reinforced composite retainers compared to SS retainers. The failure rates of mandibular stainless steel fixed retainers bonded from canine to canine was 0.29 (95 % confidence interval [CI], 0.26, 0.33) over a follow-up period of six to 36 months. The failure risk for mandibular stainless steel fixed retainers bonded to canines only was 0.25 (CI, 0.16, 0.33) over a follow-up period of one to three years. A meta-regression showed that follow-up period was not a predictor of failure rate for mandibular stainless steel fixed retainers. The failure rates of removable retainers (Hawley's or vacuum formed retainers) are lower than the bonded fixed retainers. Removable Hawley's retainer was associated with increased discomfort

as well as higher levels of embarrassment with speech and aesthetics. In terms of cost-effectiveness, vacuum-formed retainers were found to be significantly more cost-effective than Hawley retainers or mandibular stainless steel fixed retainers bonded to canines.

Conclusions There is a lack of high-quality evidence to endorse the use of one type of orthodontic retainer based on their effect on periodontal health, risk of failure, patient-reported outcomes and cost-effectiveness.

Commentary

This review addresses a very important clinical question: 'What are the differences between fixed and removable orthodontic retainers on periodontal health, failure rates, patient reported outcomes and cost-effectiveness?' The outcomes considered were of interest to both dentists and patients.

The reviewers performed a comprehensive search appropriately restricting to RCTs, CCTs, and prospective cohort studies. However, there is no clear justification provided for excluding 849 articles during the screening phase. The authors did however provide rationale for excluding 36 studies at the final stage. The data extraction was done using pre-piloted forms.

The authors used appropriate tools to assess risk of bias in the included RCTs (Cochrane tool) and prospective cohort studies (NOS). By including only RCTs with low or unclear overall bias and cohort studies with moderate or high methodological quality in the MA, the authors attempted to improve the strength and reliability of conclusion of this systematic review.

A major concern is that there is no clarity on the role of the two reviewers in the selection of papers, decision about eligibility, risk of bias assessment and data extraction. If these processes were done independently, the level of agreement should have been reported using Cohen kappa statistic. If the authors worked together in making critical decisions, it would increase the potential bias of the review.

The primary aim of this SR, effect of fixed and removable orthodontic retainers on periodontal health, was evaluated in four RCT and three cohort studies. The authors report that two studies did not report baseline periodontal scores and two other studies did not distinguish between maxillary and mandibular measurements. It is not clear if the reviewers specifically requested these data from the study authors and if they were unsuccessful in accessing the data. MA was not performed on the primary outcome because of multiple outcomes used in the primary studies (plaque index, gingival index, calculus index, bleeding index). This is one of the limitations of the primary evidence.

ORTHODONTICS

One of the major strengths of this review is the comprehensive literature search as well as inclusion of studies with moderate to high methodological quality in the final analysis. Based on the review, available evidence is limited to influence the decision towards fixed or removable retainers following orthodontic treatment.

Practice points

- Removable orthodontic retainers are comparable to lingual bonded retainers with regards to periodontal health. However, they are also associated with self-reported embarrassment and discomfort.
- Bonded lingual retainers are more attractive option for retention because of its esthetics. However, they tend to fail more than removable retainers.
- Patient-specific risk factors for relapse, additional chairside time spent for repairs as well as lab costs should be considered when deciding whether a removable or fixed retainer is prescribed for a patient.

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