

Fixed orthodontic treatment has an insignificant effect on clinical attachment level

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A commentary on

Papageorgiou S N, Papadelli A A, Eliades T.

Effect of orthodontic treatment on periodontal clinical attachment: a systematic review and meta-analysis. *Eur J Orthod* 2018; **40**: 176-194. DOI: 10.1093/ejo/cjx052. [Epub ahead of print] PubMed PMID:29106513.

Abstract

Data sources Medline, Embase, Cochrane Central Register of Controlled Trials, Cochrane Database of Systematic Reviews, Scopus, Web of Knowledge, Virtual Health Library, Google Scholar and ISRCTN registry databases.

Study selection Randomised controlled trials (RCTs) and prospective or retrospective non-randomised clinical trials on periodontal healthy human patients receiving comprehensive fixed appliance treatment were considered.

Data extraction and synthesis Two reviewers independently extracted data and assessed risk of bias using either the Cochrane tool for RCTs or the ROBINS-I (Risk Of Bias In Non-randomised Studies – of Interventions) tool for non-randomised studies. A Paule-Mandel random-effects meta-analysis was conducted for clinical attachment loss.

Results Nine prospective non-randomised trials involving a total of 335 periodontally healthy patients were included. The patients' average age was 22.6 years (range 11.4 – 42.1 years). Seven of the nine studies were assessed as being at moderate risk of bias. Orthodontic treatment was associated with a mean clinical attachment loss of 0.11 mm (95 %CI: 0.12 mm gain to 0.34 mm loss; $P = 0.338$, $I^2 = 99.6\%$), which was neither statistically nor clinically significant.

Conclusions The findings suggest that orthodontic treatment might have little or no clinically relevant detrimental effect on the clinical attachment levels of patients.

Commentary

The effect of orthodontic treatment on the patients' periodontal condition has been controversial for decades. Previous studies have shown that fixed orthodontic appliances produce initial gingivitis due to the irritation and the change in the oral microbiota. However, minimal to no effect on the periodontium was reported provided good oral hygiene was maintained during treatment.^{1,2}

The review protocol was registered *a priori*, in PROSPERO (CRD42017057042), with protocol amendments accurately reported and rationalised. The review aimed to evaluate the

Practice point

Very low quality studies suggest that orthodontic treatment has a clinically negligible effect on clinical attachment level.

effect of fixed orthodontic treatment on the clinical attachment level. For the sake of this purpose, the mean difference in CAL before and after braces was collected from relevant articles. The search strategy and data collection were performed in duplicates, but the method by which conflicts were resolved between the authors was not explicitly stated. The authors searched nine databases with no limits being applied, which would decrease the chances of missing relevant articles. A comprehensive search was performed yet the risk of publication bias should not be ruled out.

In their analysis the authors chose a random effects model to dilute the influence of external factors on pooled data. These factors include oral hygiene, different orthodontic appliances used and patient's response to inflammation.

The pooled estimate for clinical attachment loss was one-tenth of a millimetre, which is a clinically negligible orthodontic effect on periodontal tissues. It should be noted that the meta-analysis included two studies where intrusion was performed with an average of 0.63 mm attachment gain. Thus, a sensitivity analysis excluding these intrusion studies is expected to increase the pooled estimate of clinical attachment loss. Nevertheless, the amount of clinical attachment loss following regular orthodontic treatment or clinical attachment gain following intrusion are clinically insignificant according to the European Federation of Periodontology.³

An interesting issue to orthodontists would be whether to select bands or bondable tubes on molars. One study was found favouring the use of bonded tubes with respect to CAL. Overall, the results of this systematic review should be interpreted with caution since all the included studies were non-randomised trials with a lower grade in the hierarchy of evidence. Further, the overall risk of bias, inconsistency and imprecision across studies were serious, requiring the downgrading of the acquired evidence to very low. Similar conclusions were reported in a previous systematic review of controlled trials where the reviewers chose not to pool the data due to high heterogeneity.⁴ Finally, these results are not to be applied to patients with periodontitis as they were excluded from the systematic review.

GRADE rating



References

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