Does tooth brushing influence the development and progression of non-inflammatory gingival recession? A systematic review

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CRD summary
This review evaluated the effect of tooth brushing on the initiation and progression of non-inflammatory gingival recession. The authors found that data to support or refute the association between tooth brushing and gingival recession were inconclusive. The conclusion is likely to be reliable.

Authors’ objectives
To evaluate the effect of tooth brushing on the initiation and progression of non-inflammatory gingival recession.

Searching
MEDLINE, EMBASE, Web of Knowledge, Cochrane Central Register of Controlled Trials, Current Contents Connect databases and Google Scholar were searched between January 1966 and July 2006 without language restrictions. Search terms were reported. Three named periodontal journals and other sources were handsearched. Bibliographies of reviews and selected texts and conference proceedings were handsearched. Editors of selected journals were contacted to identify any additional papers.

Study selection
Randomised controlled trials (RCTs), experimental studies without randomisation and observational studies without control groups were eligible for inclusion. Most of the included studies were observational/cross-sectional. Studies that evaluated clinical examination to determine the extent of gingival recession and/or tooth brushing practice or an evaluation of gingival recession and an evaluation of factors that might be associated with the development and/or progression of gingival recession were eligible for inclusion. Studies that investigated gingival abrasion or erosion (rather than recession), toothbrush comparison studies, studies of children, studies of patients with periodontal disease, commercially sponsored studies that compared the efficacy of different toothbrushes with regard to plaque removal and gingivitis resolution and histological studies (including scanning electron microscopy) were excluded. The included studies assessed gingival recession incidence correlation with tooth brushing practices using a number of different techniques. All studies used clinical examination and many used a questionnaire or interview to collect information about tooth brushing habits. Participants were aged between 15 and 67 years old where reported.

Three reviewers independently selected papers. Disagreements were resolved through discussion.

Assessment of study quality
Methodological quality of RCTs was assessed according to the following criteria: method of randomisation; allocation concealment; blinding; follow-up; and intention to treat analysis. Observational studies were assessed with respect to: representativeness of cohort; definition of population; inclusion/exclusion criteria; calibration of examiners and reproducibility of results; completeness of follow-up; statistical methods used; and methods of assessment.

The authors did not state how the validity assessment was performed.

Data extraction
The relationship between tooth brushing frequency, tooth brushing technique, bristle hardness, frequency of changing tooth brush, tooth brushing force, duration of tooth brushing and gingival recession were extracted. The data were extracted into a data extraction form designed for the review. The authors did not state how many reviewers performed the data extraction.

Methods of synthesis
The studies were combined in a narrative synthesis. Tables of primary studies were available for examination.
**Results of the review**

Eighteen studies (n=4,457) were included in the review: one RCT (n=109); one cohort study (n=25); and 16 cross-sectional studies (n=4,323).

Use of both powered and non-powered toothbrushes was associated with a significant decrease in recessions on buccal tooth surfaces (reported in the RCT). Eight studies reported an association between tooth brushing frequency and gingival recession; one study reported a significantly increased likelihood of development of gingival recession in participants that brushed more than once a day compared to less frequent brushing (odds ratio was 2.1). One study reported that participants that brushed for more than three minutes had a mean severity of gingival recession twice that of those who brushed less than one minute. Two studies found that force was significantly associated with gingival recession. Higher standards of hygiene (three studies), hardness of brush or toothbrush bristles (four studies) and frequency of changing toothbrush (three studies) were associated with development of gingival recession.

Two studies found no association between tooth brushing frequency and gingival recession. One study was inconclusive that toothbrushing was an indirect aetiological factor for gingival recession.

**Authors' conclusions**

The data to support or refute the association between tooth brushing and gingival recession were inconclusive.

**CRD commentary**

The review question was clear and inclusion criteria were described for participants, intervention, outcomes and study design. The authors attempted to identify published and unpublished studies without language restrictions, thus reducing the possibility of language and publication bias. The methodological quality of the primary studies was assessed appropriately and taken into consideration. The processes of study selection and validity assessment were performed by multiple reviewers, thus reducing the risk of reviewer error and bias. Data were extracted into a standardised form, but the process was not described so it was not known whether the authors took steps to reduce error and bias. Narrative synthesis was suitable because of the heterogeneity of the studies. Higher quality RCT results were highlighted in the text. The quality of the primary studies was generally poor and this was taken into consideration by the authors. The authors' conclusions are likely to be reliable.

**Implications of the review for practice and research**

**Practice:** The authors stated that tooth brushing duration and frequency should be assessed, including technique, bristle hardness and frequency of changing the toothbrush. Clinicians should continue to inform patients that lesions seen in gingival recession may be stabilised but not necessarily resolved by modifying tooth brushing behaviour.

**Research:** The authors stated that an RCT designed to evaluate one or more tooth brushing factors in the development of and progression of gingival recession while controlling for confounding factors would contribute better evidence. Factors associated with tooth brushing would need to be evaluated while controlling for other factors.

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