Low-quality evidence for the effectiveness of interdental brushing

Abstracted from

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Question: Is interdental brushing in addition to toothbrushing, more effective than toothbrushing alone for the prevention and control of periodontal diseases, dental plaque and dental caries?

Data sources The Cochrane Oral Health Group's Trials Register, the Cochrane Central Register of Controlled Trials (CENTRAL), Medline, Embase, CINAHL, LILACS, ZETOC Conference proceedings, Web of Science Conference Proceedings, US National Institutes of Health Trials Register and the metaRegister of Controlled Trials.

Study selection Randomised controlled trials (including split-mouth design, cross-over and cluster-randomised trials) that compared toothbrushing and any interdental brushing procedure with toothbrushing only or toothbrushing and flossing.

Data extraction and synthesis Study assessment and data extraction were carried out independently by at least two reviewers. The major outcomes considered were gingivitis, periodontitis, interproximal caries, plaque indices and adverse harms and effects. Standardised mean difference (SMD) and 95% confidence interval (CI) for continuous outcomes where different scales were used to assess an outcome.

Results Seven studies involving 354 patients were included. One study was considered to be at low risk of bias, three at high risk and three of unclear risk. Gingivitis and plaque data were the only clinical outcomes reported. Only one study (high risk of bias) assessed interdental brushing in addition to toothbrushing, as compared with toothbrushing alone. This favoured the use of interdental brushes with a 34% reduction in gingivitis and a 32% reduction in plaque. Seven studies (326 participants) provided data for Interdental brushing in addition to toothbrushing, as compared with toothbrushing and flossing. This showed a reduction in gingivitis in favour of interdental brushing at one month representing a 52% reduction in gingivitis (Eastman Bleeding Index). There was insufficient evidence to claim a benefit for either interdental brushing or flossing for reducing plaque (SMD at one month 0.10, 95% CI -0.13 to 0.33, seven studies, 326 participants, low-quality evidence) and insufficient evidence at three months (SMD -2.14, 95% CI -5.25 to 0.97, two studies, 107 participants very low-quality evidence.

Conclusions Only one study looked at whether toothbrushing with interdental brushing was better than toothbrushing alone, and there was very low-quality evidence for a reduction in gingivitis and plaque at one month. There is also low-quality evidence from seven studies that interdental brushing reduces gingivitis when compared with flossing, but these results were only found at one month. There was insufficient evidence to determine whether interdental brushing reduced or increased levels of plaque when compared to flossing.

This paper is based on a Cochrane Review published in the Cochrane Library 2013, issue 12 (see www.thecochranelibrary.com for information). Cochrane Reviews are regularly updated as new evidence emerges and in response to feedback, and the Cochrane Library should be consulted for the most recent version of the review.

Commentary

Tooth brushing is the most commonly used home-care method for plaque control.[1] However, a toothbrush does not efficiently reach into the interdental areas, resulting in parts of the teeth that remain unclean.[2] These interdental areas require additional conscious and regular cleaning with interdental cleaning aids.[3] There are many interdental oral self-care products available like dental floss, interdental brushes, wooden picks and oral irrigators.

This Cochrane review aimed to evaluate the scientific evidence regarding the efficacy of interdental brushing with tooth brushing (IDB+TB) compared to tooth brushing alone (TB) or with tooth brushing and flossing (TB+F) for prevention and control of plaque, gingivitis/periodontitis and interproximal caries. This review has a well defined research question and had explicit inclusion/exclusion criteria with pre-defined outcomes measures. It is well written and has used a reasonably comprehensive search strategy. Six electronic databases were searched and serious attempts were made to avoid publication bias by using a search strategy not limited to any language or date of publication. Trial registeries and conference abstracts were also searched and authors were contacted to look out for unpublished studies. Even the manufacturers of interdental brushes were contacted to know about any ongoing trials/unpublished studies.

Two review authors were independently responsible for selection of articles based on pre-defined inclusion/exclusion criteria and a total of seven studies were included. The included articles were assessed for risk of bias addressing all the six domains. As patients were using different interdental home care methods blinding of patients was not possible and the authors rightly considered blinding of the outcome assessors for evaluating the risk of bias. To assess selective outcome reporting, attempts were made to find the

protocols and, if required, authors were contacted as well. Among the included studies only one study was found to have low risk of bias, three were unclear while three had high risk of bias. However as only seven studies were included, funnel plot analysis could not be carried out to refute between-study reporting bias.

The outcomes assessed included reduction in periodontal diseases (gingivitis and periodontitis), dental plaque and inter-proximal caries. Authors used standardised mean difference to evaluate the pooled estimates in meta-analysis and GRADE approach to assess the quality of evidence.

Of the included studies, only one study was pertaining to the primary research question that aimed to evaluate the evidence for IDB+TB in comparison to the use of toothbrushes alone, hence meta-analysis was not possible. The study exhibited high risk of bias and revealed very low quality evidence in favour of IDB+TB over TB alone for plaque and gingivitis at one month.

On addressing the second research question, that is, IDB+TB versus TB+F; at the one-month time period, all the seven studies were included in the meta-analysis, and low-quality evidence was seen in favour of using IDB+TB for reduction in gingivitis. However, at the three-month time period, only two of the seven included studies have measured gingivitis and insufficient evidence was found in favour of either of interventions.

For plaque scores, the meta-analysis from all included seven studies at one month and from two studies at three-month recall also revealed low-quality evidence of no difference between the interventions. Periodontitis and interproximal caries were not reported as an outcome in any of the included studies.

Furthermore considerable statistical and clinical heterogeneity was observed among the studies and even with the subgroup analysis for the known parameters (trained vs untrained use of IDB) reliable conclusions to explain the heterogeneity could not be made. Lastly, among the included studies only two reported about the problems faced by the patients using IDB/Floss, three studies reported that no side effects were observed while two studies did not report any data on adverse effects.

Conclusively low quality evidence, lack of long duration trials, clinical and statistical heterogeneity have been appropriately attributed by the authors to be the reasons for conduction of new studies. Moreover there is a clear need for setting the 'core outcomes' so that results from such future studies can be easily compared and compiled to provide reliable pooled estimates. However till then, as rightly suggested in a commentary by Matthews D,[5] we as oral health professionals should not refrain from recommending interdental aids as adjuncts to oral health self-care, as future studies would hopefully improve the scientific evidence helping us to take judicious decision.

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1. Dosumu EB, Lawal FB. Interdental cleaning: A cross-sectional survey of patients attending a tertiary health institution in Nigeria. *Eur J Gen Dent* 2015; **4:** 74–78.
2. Sälzer S, Slot DE, Van der Weijden FA, Dörfer CE. Efficacy of inter-dental mechanical plaque control in managing gingivitis--a meta-review. *J Clin Periodontol* 2015; **42:** S92-105.
3. Berchier CE, Slot DE, Haps S, Van der Weijden GA. The efficacy of dental floss in addition to a toothbrush on plaque and parameters of gingival inflammation: a systematic review. *Int J Dent Hyg* 2008; **6:** 265-279.
4. Matthews D. Weak, unreliable evidence suggests flossing plus toothbrushing may be associated with a small reduction in plaque. *Evid Based Dent* 2012; **13:** 5-6.

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