Comparison of interdental brush to dental floss for reduction of clinical parameters of periodontal disease: a systematic review

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CRD summary
Interdental brushes were an effective alternative to dental floss for reducing bleeding and plaque between four and 12 weeks. Overall, this review was well conducted and benefited from a thorough search, robust review methods and reliable analyses. The findings of this review are likely to be reliable.

Authors’ objectives
To determine the effectiveness of using an interdental brush compared to dental floss in addition to normal teeth brushing and professional debridement in the reduction of gingival bleeding and interproximal plaque.

Searching
PubMed, Cochrane Central Register of Controlled Trials (CENTRAL), CINAHL and LILACS were searched up to 2010. Search start dates ranged from 1966 to 2006 across the databases. Search terms were reported. The searches were not restricted by language or publication status. Additionally, two relevant journals were handsearched for relevant records and pharmaceutical companies were contacted to identify any unpublished or ongoing trials.

Study selection
Randomised controlled trials (RCTs), including split mouth and crossover designs, were eligible for inclusion. Participants had to be 18 years of age or older presenting with clinical signs of gingivitis and some periodontitis, as determined by gingival indices and probing depths. All studies that compared use of interdental brushes to dental floss as adjunctive approaches to toothbrushing were eligible. Interventions were carried out by participants without supervision apart from initial instruction and a mid-study check-up. Participants had to use the intervention for a minimum of four weeks. The eligible primary outcome measure was bleeding, the secondary outcome was plaque indices. Studies were excluded if participants were taking antibiotics or other drugs associated with gingival overgrowth or bleeding, had systemic underlying health conditions like diabetes, had orthodontic appliances, and/or were pregnant.

Where reported, mean age ranged from 32.3 to 43.6 years. All studies included both male and female participants. Two studies included participants with periodontitis, one study with gingivitis, one study included a combination of patients. Several studies used specific oral health parameters to assess the health status of the participants. All studies compared use of interdental brushes to use of dental floss following some initial professional debridement.

Two reviewers independently assessed studies for inclusion. Any disagreements were resolved in discussion.

Assessment of study quality
Study quality was assessed with regards to sequence generation, allocation concealment, blinding, incomplete outcome data, selective outcome reporting and other biases. Studies with no or unclear randomisation were excluded. For crossover designs further specific domains were assessed. Risk of bias was assessed as low, high or unclear for each domain.

Two reviewers independently assessed study quality.

Data extraction
Data to permit calculation of risk ratios and mean differences were extracted to assess presence or absence of bleeding. Mean differences were calculated for plaque indices. Trial authors were contacted for missing data. Individuals, rather than teeth, were used as the unit of analysis.

Two reviewers extracted data. Disagreements were resolved in discussion.

Methods of synthesis
Random-effects meta-analyses were used to synthesise studies with overall low or unclear risk of bias. Other studies were excluded from the synthesis. Relative risks (RR) were calculated with 95% confidence intervals (CI). $X^2$ and $I^2$ tests were used to assess heterogeneity.

**Results of the review**

Seven RCTs were included in the review. Three of these were split mouth RCTs, three used a parallel design and one trial was a cross-over design. In total, 446 participants completed the trials (range 11 to 152). Follow-up times ranged from four to 12 weeks. Overall, included trials were of reasonable methodological quality. The largest risk of bias was in the area of allocation concealment where only two trials were judged to report adequate methods. A detailed quality assessment could be found in the review.

Six studies assessed bleeding as an outcome. However, two of these were excluded from the analyses due to methodological shortcomings. Across the remaining four included studies, the mean difference was 0.08 (95% CI 0.03 to 0.14) which indicated that interdental brushes were more effective in the reduction of bleeding than dental floss. Heterogeneity was observed in this analysis ($I^2=59.72\%$).

There was a statistically significant reduction in plaque for use of interdental brushes compared to dental floss (WMD 0.13, 95% CI 0.02 to 0.25; seven studies). The authors assumed the studies in this analysis were homogenous ($I^2=34.26\%$).

The authors explained that a funnel plot was not used to assess publication bias due to the small number of included studies.

**Authors' conclusions**

Interdental brushes were an effective alternative to dental floss for reducing bleeding and plaque between four and 12 weeks.

**CRD commentary**

The review question and inclusion criteria were clear. A range of relevant sources were searched without language restrictions for both published and unpublished literature. A thorough quality assessment of included was conducted and independent, duplicate processes were in place for all stages of the review process. This minimised the risk of reviewer error and bias.

Appropriate methods were used to synthesise studies and to assess heterogeneity. By excluding low quality studies from the meta-analysis, the reliability of the findings was increased.

Overall, this review was well conducted and benefited from a thorough search, robust review methods and reliable analyses. The findings of this review are likely to be reliable.

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

**Practice:** The authors considered interdental brushes as an effective alternative to dental floss for clients with interproximal gingival inflammation.

**Research:** The authors recommend further research to develop an accurate and reliable dental plaque index, investigate the effectiveness of other interdental aids and study long-term compliance and effectiveness of interdental aids.

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