The effectiveness of interproximal oral hygiene aids

Abstracted from

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A network meta-analysis of interproximal oral hygiene methods in the reduction of clinical indices of inflammation.
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Question: What is the comparative effectiveness of interproximal oral hygiene aids?

Data sources Medline, Embase and Web of Science databases. This was supplemented with searches of the journals; *Journal of Periodontology, Journal of Clinical Periodontology, The International Journal of Periodontics and Restorative Dentistry* and *International Journal of Dental Hygiene.*

Study selection Randomised controlled trials assessing interproximal oral hygiene (IOH) aids in physically competent patients reporting gingival inflammation, plaque or probing depth with at least two weeks follow-up were included.

Data extraction and synthesis Study selection and data abstraction were carried out independently by two reviewers. Risk of bias was assessed using the Cochrane tool. The primary outcomes were gingival index (GI) and bleeding on probing (BOP), and a random effects network meta-analysis (NMA) was carried out for each outcome.

Results Twenty-two studies involving a total of 2,030 patients were included. Sample sizes of the studies ranged from ten to 110 patients with follow-up periods of between four to 24 weeks. One study was considered to have a high risk of bias, 17 an unclear risk and four a low risk. A range of interproximal oral hygiene aids were tested including flossing (FL), powered flossing (FL2), toothpicks (TP), toothpicks and intensive oral hygiene instructions (TO), water jet irrigation devices (WJ), interdental brushes (IB), gum massaging devices (MD), toothbrush only (Ctrl), powered, electric, sonic toothbrush (Powered Ctrl) and powered control and water jet (PW). NMA for bleeding on probing saw the greatest reduction with toothpick and intensive oral hygiene instruction (26.4% [95% CI: 7.50, 45.4]); waterjet had the next largest reduction with an average of 19.3% (95% CI: 16.2%, 22.4%) with relatively smaller reductions for floss. The interdental brush was seen to be more efficacious than the majority of the alternative oral hygiene aids with a mean effect of 0.34 reduction in GI as compared with control (95% CI: 0.12, 0.56).

Conclusions In the absence of strong evidence about IOH aids differences in the impact on patients, practitioners should customise IOH aid recommendations and offer alternatives rather than insisting on instruction on the use of a universally recommended cleaning aid. Further well designed and appropriately powered clinical trials are warranted to provide more authoritative guidelines on IOH selection.

Commentary

A good oral hygiene regime is important to maintaining oral health. While twice daily toothbrushing with a fluoridated toothpaste is key element, additional aids may be necessary to remove interdental plaque.

Dental floss has long been recommended as an interproximal oral hygiene aid and a 2011 Cochrane review by Sambunjak *et al.* included 12 randomised controlled trials (RCTs) finding that there was some evidence that flossing in addition to toothbrushing reduced gingivitis compared with toothbrushing alone.[1] They also found very unreliable evidence from ten studies that flossing plus toothbrushing may be associated with a small reduction in plaque at one and three months.

Interdental brushes are another interproximal hygiene aid that has been subject to a Cochrane review.[2] Only seven RCTs were available for that review, with one study providing very low quality evidence that toothbrushing with interdental brushing was better than toothbrushing alone in reducing gingivitis and plaque at one month. There was also low quality evidence that interdental brushing reduced gingivitis compared with flossing at one month.

The aim of this review was to assess the comparative effectiveness of a number of IOH aids. In order to do this, they have undertaken a network meta-analysis (NMA). The advantage of a NMA is that enables both direct and indirect comparison. For example, if there were studies comparing flossing and toothbrushing against toothbrushing alone and trails comparing water jet irrigation and toothbrushing against toothbrushing alone but no direct comparisons between water jet irrigation and toothbrushing and flossing and toothbrushing a NMA would be able to estimate an indirect comparison.

The reviewers have searched three major databases, supplementing this with a hand search of a number of periodontal journals, an approach which should have identified most of the available studies. Four of the included studies were considered to be at low risk of bias and one at high risk, with the remainder being at unclear risk of bias, and while a summary risk of bias table is provided as a supplementary figure it is an overview rather than an individual study risk of bias table which would have provided more information about the domains. The composite table indicated that sequence generation and allocation concealment, important considerations in relation to selection bias, were areas where there was the greatest lack of clarity. While the follow-up period for the trials ranged from four to 24 weeks, a majority (ten) were of four weeks duration with only seven studies of 24 weeks duration.

For the NMA the maximum number of direct comparisons was six with most of the direct comparisons limited to one of two studies at most. The findings suggest the greatest bleeding on probing with toothpick and intensive oral hygiene instruction 26.4% (95% CI: 7.50, 45.4) with the waterjet having the next largest reduction with an average of 19.3% (95% CI: 16.2%, 22.4%) with relatively smaller reductions for floss.

While this NMA shows a benefit from the use of interproximal oral hygiene aids there are concerns at the quality of the studies in relation to reporting of randomisation and the lack of information on the participants' periodontal status. None of the included studies involved patient related outcomes and nine of the included studies received funding from manufacturers. The two Cochrane reviews noted earlier also found that the evidence for two specific interproximal oral hygiene aids, flossing and interdental brushing, was also of limited quality. As the review authors indicate there is a need for appropriately powered, well conducted and reported trials to provide high quality evidence on interproximal oral hygiene aids.

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2. Poklepovic T, Worthington HV, Johnson TM *et al.* Interdental brushing for the prevention and control of periodontal diseases and dental caries in adults. *Cochrane Database Syst Rev* 2013; **12:** Art. No.: CD009857. DOI: 10.1002/14651858.CD009857.pub2.

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