The effect of anti-plaque agents on gingivitis

Question: Are home-use anti-plaque agents effective for managing gingivitis?

Data sources   An electronic search was conducted on PubMed Central. References of retrieved papers and previously published systematic reviews were hand searched.

Study selection   Randomised controlled trials (RCTs) with at least six months follow-up evaluating the use of test products used in mouthrinses, toothpastes or gels as adjuncts to mechanical oral hygiene (including toothbrushing) were considered.

Data extraction and synthesis   Two trained and calibrated reviewers independently assessed the studies for eligibility, with any disagreement being resolved by discussion. Two reviewers under the supervision of a third reviewer extracted data. Risk of bias was evaluated using the Cochrane risk of bias tool and the CONSORT statement. Outcomes were summarised as means and standard deviation (SD) or standard error (SE), the results were pooled and analysed using weighted mean differences (WMD), and heterogeneity among the studies was calculated.

Results   Eighty-seven articles with 133 comparisons were included in the review. A majority of the studies (75) were considered to be at high risk of bias, eight at unclear risk and four at low risk. Fifteen different categories of active agent were used in toothpastes and ten in mouthwashes. The additional effects of the tested products were statistically significant for the Loe & Silness gingival index (46 studies), WMD -0.217, the modified gingival index (23 studies) - 0.415, gingivitis severity index (26 studies) - 14.939% or bleeding index (23 studies) - 7.626% with significant heterogeneity. For plaque, additional effects were found for Turesky (66 studies) WMD - 0.0475, Silness & Loe (26 studies) - 0.109 and for plaque severity (12 studies) - 23.4% indices, with significant heterogeneity.

Conclusions   Within the limitations of the present study, formulations with specific agents for chemical plaque control provide statistically significant improvements in terms of gingival, bleeding and plaque indices.

Commentary

The purpose of this review was to evaluate the efficacy of adjunctive chemical plaque control on gingivitis with in-home use over six months. The authors explained that from the multiple existing systematic reviews each focuses on a specific agent while this one includes a wide variety of agents. The protocol for this review followed the PRISMA statement as needed to correctly conduct a systematic review. Only one electronic database was used for the search.

RCTs with at least six months follow-up on healthy patients with gingivitis were searched in one database followed by hand searching.

Two calibrated reviewers assessed for inclusion and extracted data using gingivitis and bleeding as primary outcome.

The methodological quality of the included studies was evaluated following the Cochrane reviewer's handbook risk of bias criteria and the CONSORT statement. Additional quality measurements were used including source of funding.

Eighty-seven studies were included in a qualitative synthesis with 133 comparisons.

Of those 133 comparisons 63 were on dentifrices, seven on a combination of dentifrices and rinses and 73 were on rinses. The dentifrices group tested 16 different interventions. Thirty-eight out of the 63 comparisons included triclosan in some way. The combination group had two interventions; four out of seven included a fluoride formulation. Of the 73 comparisons in the rinse group 21 used some concentration of chlorhexidine while 15 used essential oils.

The authors reported that 75 of the included studies had conflict of interest and only four were completely independent. Additionally the authors could not provide baseline sample size for 45 studies and went on to report that only nine studies used intent to treat analysis (ITT). The combination of these factors and the use of a single database without at least a trial registry or grey literature search may be enough to question the magnitude of any of the reported findings, regardless of the large number of included studies.

The authors made a great effort in trying to address the monumental amount of variables and clearly listed limitations. It is no surprise they found high heterogeneity in the meta-analyses. The authors performed an impressive amount of subgroup calculations in an attempt to address many of the relevant variables.

Sixty-five studies were included in the meta-analysis and different subgroups were analysed for the different delivery formats such as: mouthrinses, dentifrices, combination, different active agents and formulation.

Results, presented as weighted mean differences, were grouped according to the index used for outcome measures. Using Loe and Silness gingival index the authors calculated an overall improvement of -0.21(CI -0.255, -0.179) p<0.001 based on 46 comparisons. Heterogeneity was calculated and it shows a high heterogeneity among the studies (I^2: 91.5%)

The most commonly used bleeding index, expressed as a percentage, reported an overall improvement of -7.626% based on 23 comparisons. Results were less impressive with other bleeding indices.

The authors went on to compare their outcome results with those from other systematic reviews. This potentially valuable information may be limited by the unknown quality of those reviews, particularly in the case of a review compiled by a single author.

Acknowledging the limitations, the authors concluded that the use of chemical agents provided statistically significant improvement in gingival bleeding and plaque indices and the best results were achieved using mouthrinses.

One can argue that this information is of limited clinical relevance since it only indicates how the interventions are different from placebo and that statistically significant does not always translate to clinical relevance.

Even if a particular regimen seems promising there is no information on the concentration or frequency.

It seems that any product with a chemical plaque control agent is effective in reducing plaque, gingival indices and bleeding.

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