The effectiveness of a toothpaste containing triclosan and polyvinyl-methyl ether maleic acid copolymer in improving plaque control and gingival health: a systematic review

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CRD summary
This review compared the effectiveness of triclosan-copolymer and fluoride toothpastes in improving plaque control and gingivitis. The authors concluded that a toothpaste containing triclosan plus copolymer controlled plaque and improved gingivitis more than conventional fluoride toothpaste. There was a lack of information on the individual studies and differences between them were not explored. These limitations weaken the evidence.

Authors' objectives
To compare the effectiveness of triclosan-copolymer and fluoride dentifrices in improving plaque control and gingivitis.

Searching
The Cochrane Controlled Trials Register, MEDLINE (from 1986 to March 2003) and EMBASE were searched; the search terms were reported. Studies published in any language were eligible. In addition, personal files and reference lists of all articles were checked.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials (RCTs) were eligible for inclusion.

Specific interventions included in the review
Studies that compared a dentifrice containing 0.3% triclosan, 2% copolymer and 0.243% sodium fluoride in a silica base (Colgate Total) with a fluoride dentifrice were eligible for inclusion if the interventions lasted at least 6 months. In all studies, the participants were unsupervised and were requested to use the dentifrice twice daily. The participants received prophylaxis at study entry in the majority of the included studies (13 out of 16). The studies were conducted in seven different countries.

Participants included in the review
Studies of adults with plaque and gingivitis were eligible for inclusion.

Outcomes assessed in the review
Studies that assessed plaque or gingivitis were eligible for inclusion. The review assessed plaque using the Quigley-Hein plaque index, the plaque severity index and the Silness and Loe plaque index, and assessed gingivitis using the Loe and Silness gingival index, the gingivitis severity index and the Ainamo and Bay gingival bleeding index.

How were decisions on the relevance of primary studies made?
Two reviewers independently selected studies.

Assessment of study quality
Studies were assessed for random allocation, blinding of the patients and examiners, and a description of drop-outs. Two reviewers independently assessed validity.

Data extraction
Two reviewers independently extracted the data and resolved any discrepancies through discussion.
Methods of synthesis

How were the studies combined?
The studies were grouped by outcome measures and combined in random-effects meta-analyses. Pooled weighted mean differences (WMDs) with 95% confidence intervals (CIs) were calculated for each outcome. Publication bias was assessed using funnel plots and the Egger test.

How were differences between studies investigated?
Statistical heterogeneity was assessed using the chi-squared statistic and meta-analysis graphs were presented. No details of methods used to explore potential reasons for significant heterogeneity were reported.

Results of the review

Sixteen RCTs (n=2,326) were included.

The authors considered all studies to be of a high quality. All studies used randomisation but none reported the methods used. Fifteen RCTs were double-blinded. The drop-out rates ranged from 1 to 13%. Colgate provided toothpaste in all studies and 15 studies received commercial sponsorship.

The triclosan-copolymer dentifrice significantly improved plaque control in comparison with the fluoride dentifrice; the WMD was -0.48 (95% CI: -0.64, -0.32) for the Quigley-Hein index (15 RCTs, n=2,231) and -0.15 (95% CI: -0.20, -0.09) for the plaque severity index (11 RCTs, n=1,605). There was statistically significant heterogeneity (P<0.0001) in both meta-analyses.

The triclosan-copolymer dentifrice significantly reduced gingivitis in comparison with the fluoride dentifrice; the WMD was -0.26 (95% CI: -0.34, -0.18) for the Loe and Silness index (14 RCTs, n=2,179) and -0.12 (95% CI: -0.17, -0.08) for the gingivitis severity index (13 RCTs, n=1,987). There was statistically significant heterogeneity (P<0.0001) in both meta-analyses.

Results were also reported for plaque using the Silness and Loe plaque index (1 RCT), and for gingivitis using the Ainamo and Bay index (1 RCT).

There was asymmetry in the funnel plot of studies using the gingivitis severity index and the Egger test was statistically significant (P=0.016), suggesting the presence of publication bias.

Authors’ conclusions

Triclosan-copolymer dentifrices controlled plaque and improved gingivitis more than conventional fluoride dentifrices.

CRD commentary

The review question was clear in terms of the study design, intervention, participants and outcomes. Three relevant databases were searched and, by including publications in any language, the authors minimised language bias. Appropriate methods were used to assess publication bias, and evidence of publication bias was found for one of the four outcomes. Two reviewers independently selected studies, assessed validity and extracted the data, thus reducing the potential for bias and errors. Validity was assessed using established criteria, though the quality of the individual studies was not reported. No information was given on the characteristics of the individual studies (e.g. age, severity of plaque and gingivitis, and study setting), and it was not reported whether the data were extracted on an intention-to-treat basis.

The studies were combined in meta-analyses and statistical heterogeneity was tested. The presentation of meta-analysis graphs enabled a visual inspection of heterogeneity. Significant heterogeneity was detected in the meta-analysis, although the studies showed a similar direction in effect. This review had several limitations: in particular, heterogeneity was not explored and there was a lack of information on the individual studies. These limitations undermine the strength of the evidence supporting the authors' conclusions.

Two of the three authors are employed by Colgate.
Implications of the review for practice and research
The authors did not state any implications for practice or further research.

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