

Topical fluorides provide additional benefit when used with fluoride toothpaste

For the prevention of caries in children is there is a beneficial effect of adding topical fluoride therapy (TFT) in the form of mouthrinse, gel or varnish to fluoride toothpaste?

Marinho VCC, Higgins JPT, Sheiham A, Logan S. *Combinations of topical fluoride (toothpastes, mouthrinses, gels, varnishes) versus single topical fluoride for preventing dental caries in children and adolescents (Cochrane Review).* In: *The Cochrane Library, Issue 1, 2004.* Chichester, UK: John Wiley & Sons, Ltd.

Data sources Cochrane Oral Health Group's Trials Register (May 2000), the Cochrane Central Register of Controlled Trials (CENTRAL) (The Cochrane Library Issue 2, 2000), MEDLINE (1966 to January 2000), plus several other databases. We handsearched journals, reference lists of articles and contacted selected authors and manufacturers.

Study selection Randomized or quasi-randomized controlled trials with blind outcome assessment, comparing fluoride varnish, gel, mouthrinse, or toothpaste in combination with each other in children up to 16 years during at least 1 year. The main outcome was caries increment measured by the change in decayed, missing and filled tooth surfaces (D(M)FS).

Data extraction and synthesis Inclusion decisions, quality assessment and data extraction were duplicated in a random sample of one third of studies, and consensus achieved by discussion or a third party. Authors were contacted for missing data. The primary measure of effect was the prevented fraction (PF) that is the difference in mean caries increments between the 'treatment' and 'control' groups expressed as a percentage of the mean increment in the control group. Random effects meta-analyses were performed where data could be pooled.

Results Eleven of the 12 included studies contributed data for meta-analyses. Nine trials (4026 children) provided data for the main meta-analysis on the effect of fluoride mouthrinses, gels or varnishes used in combination with toothpaste. The D(M)FS pooled PF was 10% (95% CI, 2–17%; $p=0.01$) in favour of the combined regimens. There was no substantial heterogeneity. The estimated benefit equates to a number needed to treat (NNT) of 4 to avoid one decayed, filled or missing tooth surface (DMFS) per year in a child population with a caries increment of 2.5 D(M)FS per year, or an NNT of 13 for children from a population with a caries increment of 0.8 D(M)FS per year.

Meta-analyses of fluoride gel or mouthrinse combined with toothpaste versus toothpaste alone favour the combined regimens, but differences were not statistically significant; the significant difference in favour of the combined use of fluoride varnish and toothpaste accrues from a very small trial and appears likely to be a spurious result. Not all other combinations of possible practical value were tested in the

included studies. The only other statistically significant result was in favour of the combined use of fluoride gel and mouthrinse in comparison to gel alone (pooled DMFS PF 23%; 95% CI, 4–43%; $p=0.02$), based on two trials. No other combinations of TFT were consistently superior to a single TFT.

Conclusions Topical fluorides (mouthrinses, gels, or varnishes) used in addition to fluoride toothpaste achieve a modest reduction in caries compared to toothpaste used alone. No conclusions about any adverse effects could be reached, because data were scarcely reported in the trials.

Commentary

The current review adds to information presented by the same authors on fluoride use for caries prevention. The objective of this review is to determine the relative effectiveness of different topical fluoride application methods for caries prevention in children and adolescents. Given the clear evidence of the beneficial effect of topical fluorides in caries prevention,¹ information about the relative value of different topical application methods could provide a clearer understanding of the most effective topical preventive measure. Unquestionably, fluoride toothpaste remains the most widely accepted topical methodology for caries prevention. This analysis appears to find a similar caries preventive effect between fluoride toothpaste and other topical application methods. Since fluoride varnish appears to provide a safer (less possibility of accidental ingestion) and more readily accepted form of additional topical fluoride application, additional research to evaluate the relative enhancement of the preventive effect of fluoride toothpaste in combination with fluoride varnish would be extremely important for clinicians who are designing programs for caries prevention in children and adolescents.

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1. Marinho VCC, Higgins JPT, Sheiham A, Logan S. Topical fluoride (toothpastes, mouthrinses, gels or varnishes) for preventing dental caries in children and adolescents (Cochrane Review). In *The Cochrane Library, Issue 4.* Chichester, UK: John Wiley & Sons, Ltd; 2003.

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