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[Intervention Review]

Fluoride toothpastes for preventing dental caries in children and adolescents

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ABSTRACT

Background

Fluoride toothpastes have been widely used for over 3 decades and remain a benchmark intervention for the prevention of dental caries.

Objectives

To determine the effectiveness and safety of fluoride toothpastes in the prevention of caries in children and to examine factors potentially modifying their effect.

Search methods

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

Selection criteria

Randomised or quasi-randomised controlled trials with blind outcome assessment, comparing fluoride toothpaste with placebo 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 collection and analysis

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 caries increments between the treatment and control groups expressed as a percentage of the increment in the control group. Random-effects meta-analyses were performed where data could be pooled. Potential sources of heterogeneity were examined in random-effects metaregression analyses.

Main results

Seventy-four studies were included. For the 70 that contributed data for meta-analysis (involving 42,300 children) the D(M)FS pooled PF was 24% (95% confidence interval (CI), 21 to 28%; $P < 0.0001$). This means that 1.6 children need to brush with a fluoride toothpaste (rather than a non-fluoride toothpaste) to prevent one D(M)FS in populations with caries increment of 2.6 D(M)FS per year. In populations with caries increment of 1.1 D(M)FS per year, 3.7 children will need to use a fluoride toothpaste to avoid one D(M)FS. There was clear heterogeneity, confirmed statistically ($P < 0.0001$). The effect of fluoride toothpaste increased with higher baseline levels of D(M)FS, higher fluoride concentration, higher frequency of use, and supervised brushing, but was not influenced by exposure to water fluoridation. There is little information concerning the deciduous dentition or adverse effects (fluorosis).

Authors' conclusions

Supported by more than half a century of research, the benefits of fluoride toothpastes are firmly established. Taken together, the trials are of relatively high quality, and provide clear evidence that fluoride toothpastes are efficacious in preventing caries.

PLAIN LANGUAGE SUMMARY

Fluoride toothpastes for preventing dental caries in children and adolescents

Children who brush their teeth at least once a day with a toothpaste that contains fluoride will have less tooth decay.

Tooth decay (dental caries) is painful, expensive to treat and can sometimes lead to serious damage to teeth. Fluoride is a mineral that prevents tooth decay. The review of trials found that children aged 5 to 16 years who used a fluoridated toothpaste had fewer decayed, missing and filled permanent teeth after three years (regardless of whether their drinking water was fluoridated). Twice a day use increases the benefit. No conclusion could be reached about the risk that using fluoride toothpastes could mottle teeth (fluorosis), an effect of chronic ingestion of excessive amounts of fluoride when children are young.