

Regular supervised fluoride mouthrinse use by children and adolescents associated with caries reduction

Abstracted from

Marinho VC, Chong LY, Worthington HV, Walsh T.

Fluoride mouthrinses for preventing dental caries in children and adolescents.

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Question: What is the efficacy and safety of fluoride mouthrinses for caries prevention?

Data sources Cochrane Oral Health Group's Trials Register, the Cochrane Central Register of Controlled Trials (CENTRAL), Medline, Embase, CINAHL, LILACS, BBO, Proquest Dissertations and Theses, Web of Science Conference Proceedings, ClinicalTrials.gov and the WHO International Clinical Trials Registry Platform.

Study selection Randomised or quasi-randomised controlled trials where blind outcome assessment was stated or indicated, comparing fluoride mouthrinse with placebo or no treatment in children up to 16 years of age with a duration of at least 12 months.

Data extraction and synthesis A least two reviewers independently selected studies, abstracted data and assessed risk of bias.

Results Thirty-seven trials involving 15,813 children and adolescents were included. Supervised rinsing in schools was tested in all trials. Twenty-eight studies were at high risk of bias, nine at unclear risk. Thirty-five trials (15,305 participants) contributed data on permanent tooth surface for meta-analysis and found a prevented fraction for D(M)FS = 27%(95%CI 23% to 30%; $I^2 = 42%$) (moderate quality evidence). Meta-regression showed no significant association between estimates of D(M)FS with baseline caries severity, background exposure to fluorides, rinsing frequency or fluoride concentration. The pooled estimate of prevented fraction from 13 studies for D(M)FT = 23% (95%CI, 18% to 29%; $I^2 = 54%$). There was limited information on possible adverse effects or acceptability of the treatment regimen in the included trials.

Conclusions This review found that supervised regular use of fluoride mouthrinse by children and adolescents is associated with a large reduction in caries increment in permanent teeth. We are moderately certain of the size of the effect. Most of the evidence evaluated use of fluoride mouthrinse supervised in a school setting, but the findings may be applicable to children in other settings with supervised or unsupervised rinsing, although the size of the caries-preventive effect is less clear. Any future research on fluoride mouthrinses should focus

on head-to-head comparisons between different fluoride rinse features or fluoride rinses against other preventive strategies, and should evaluate adverse effects and acceptability.

Commentary

Fluoride mouthrinses have been used extensively for the past forty years to prevent dental caries in children, but doubts regarding their effectiveness began in the mid-1980s. This review was also identified as a priority topic by paediatric experts as part of a Cochrane prioritisation exercise.

Dental caries affects 60–90% of school aged children,¹ which makes prevention a priority, as this would not only decrease prevalence of caries over time but also be more cost effective than treatment. However, with the increased use of fluoride toothpastes at home, it is important to see if topical fluoride application is still beneficial.

Two authors independently performed study selection and data extraction with authors being contacted for additional information whenever required. The electronic databases were searched extensively with no restrictions on language, date of publication or publication status. Reference searching was also carried out. Journal articles which were thought to contain important studies regarding the topic were hand searched (*Community Dentistry and Oral Epidemiology, British Dental Journal, Journal of Dental Research, Journal of Public Health Dentistry, European Journal of Oral Science*). Personal contact was made by writing letters to authors from the 1980s–1990s for any unpublished data and contact was also made with fluoride rinse manufacturers for any unpublished trials. This made sure that the studies included were important and relevant.

Out of the 37 trials included in the review, all were parallel group RCTs with the exception of one which was a cluster design RCT. The duration of the studies was no less than one year and up to three years. The age of children at the start of the trials ranged from five to 14 years. Any study which had open outcome assessment or if blind outcome assessment was not reported was excluded. Using the GRADE approach (<http://www.gradeworkinggroup.org/>) they were able to classify the data related to primary outcome as moderate quality because of limitations with the study designs, and that of the secondary outcomes as low quality. Most of the studies included were found to have a high risk of bias according to this approach. Sensitivity analysis for the meta-analysis was carried out for the uncertainty of imputation of missing standard deviations and inclusion of trials at high risk of bias. No reporting bias was seen.

This paper is based on a Cochrane Review published in the Cochrane Library 2015, issue 3 (see www.thecochranelibrary.com for information). Cochrane Reviews are regularly updated as new evidence emerges and in response to feedback, and the Cochrane Library should be consulted for the most recent version of the review.

Prevented fraction was used as a primary outcome measure. Thirty-seven trials reported the DMFS and 13 trials reported DMFT. There was a reported a 27% decrease in the DMFS and a 23% decrease in the DMFT in permanent teeth with fluoride mouthrinses. This reduction falls within narrow confidence intervals (ie 23%–30%).

One of the limitations is that the review gives little knowledge of tooth staining and other adverse effects of fluoride application such as acute toxicity, due to incomplete reporting. In addition, the bulk of the studies included in the review are from the 1960–70s when fluoridated toothpaste was not widely available. However, the authors note that the eight studies from the 1980–90s did not show smaller treatment effects. Most of the included studies involved supervised mouth rinsing so a similar effect size may not be seen

with unsupervised use. Similarly, there is no information available on the effect of fluoride mouthrinses on deciduous teeth.

The review provides evidence for the effectiveness of supervised fluoride mouthrinse for the reduction of caries in permanent teeth of children and adolescents. Further research involving direct head-to-head comparisons of different rinse application dosages and frequencies and other preventive strategies would be helpful.

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