

Summaries of systematic reviews on public health nursing-related issues from the Cochrane Library, Cochrane Nursing Care Field, and other evidence review organizations

Prepared by



Fluoride mouthrinses for preventing dental caries in children and adolescents

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Abstract

The Mission of the Cochrane Nursing Care Field (CNCF) is to improve health outcomes through increasing the use of the Cochrane Library and supporting Cochrane's role by providing an evidence base for nurses and related health care professionals involved in delivering, leading, or researching nursing care. The CNCF produces "Cochrane Corner" columns (summaries of recent nursing-care-relevant Cochrane Reviews) that are regularly published in collaborating nursing-care-related journals. Information on the processes this Field has developed can be accessed at: <http://cncf.cochrane.org/evidence-transfer-program-review-summaries>.

KEYWORDS

adolescent health, child health, dental caries

1 | REVIEW QUESTION

Are fluoride mouthrinses effective and safe for the prevention of dental caries in children and adolescents?

Population: Children or adolescents aged 16 years or younger

Intervention: Fluoride mouthrinses

Comparison: Placebo or no treatment

Outcome: The primary outcome is caries increment. Caries is recorded as the number of decayed, missing, or filled teeth or tooth surfaces. The caries increment measures the change in the number of caries from baseline measurements. Secondary outcomes of interest were the proportion of children who developed new caries or did not remain caries-free, the proportion of children experiencing tooth staining, acute toxicity, mucosal irritation, and dropout (as in indirect measure of unacceptability of treatment).

2 | TYPE OF REVIEW

This is a Cochrane Review including 37 randomized controlled trials totaling 15,813 children and adolescents using fluoride mouthrinses for the prevention of dental caries.

3 | RELEVANCE FOR NURSING

Regardless of age, dental caries is the most common chronic disease. It affects around 60–90% of school-aged children and the vast majority of adults (Marinho, Chong, Worthington, & Walsh, 2016). Dental caries in children are linked to pain, altered eating patterns, poor weight gain, speech problems, and learning difficulties (American Academy of Pediatrics, 2015). One of most common methods for the

prevention of caries is the use of fluoride via brushing, varnishes, gels, or mouthrinses. Nurses have the opportunity to provide education related to oral hygiene at routine and episodic care visits as well as in the school setting. Understanding the safety and efficacy of fluoride mouthrinses is an important step in developing evidence based health promotion activities.

4 | CHARACTERISTICS OF THE EVIDENCE

The studies for inclusion in this systematic review were extracted from nine databases: Cochrane Oral Health's Trials Register, Cochrane Central Register of Controlled Trials (CENTRAL), MEDLINE Ovid, Embase Ovid, CINAHL, EMBASE, Latin American Caribbean Health Sciences Literature (LILACS BIREME), Brazilian Bibliography of Odontology (BBO BIREME), Proquest Dissertations and Theses, and the Web of Science Conference Proceedings. A search of ongoing trials was also conducted by examining the US National Institutes of Health Ongoing Trials Register and the World Health Organization International Clinic Trials Registry. Additionally, references of all eligible studies were reviewed to capture any other potential articles. After eliminating duplicate records, this search strategy yielded 1231 for screening. However, following more detailed review, 1099 records were eliminated due to lack of relevance to the systematic review, and from the 126 reports considered further, 63 were related to 50 excluded trials, one report related to a trial waiting classification, and 62 reports related to the 37 trials included in this systematic review.

All 37 included studies focused on the use of the supervised fluoride mouthrinses in a school-based setting, and two studies also examined the use of supervised fluoride mouthrinses at home.

The majority of included studies utilized sodium fluoride (NaF) as the formulation of choice. Other formulations were used to a lesser extent including acidulated phosphate fluoride (APF), stannous fluoride (SnF₂), sodium monofluorophosphate (SMFP), amine fluoride (AmF), and ammonium fluoride (NH₄F). While strength of fluoride solution and frequency of administration varied among studies, most children had 230 parts per million of fluoride applied daily, or 900 parts per million weekly.

Sixteen of the included studies were multitreatment studies that utilized more than one fluoride treatment group compared to a control group. Most trials (32) used a placebo control group—only 5 had “no treatment” controls.

Thirty-five studies provided data suitable for pooling related to the use of fluoride mouthrinses for the prevention of dental caries on permanent tooth surfaces. Based on the results of the meta-analysis, the use of fluoride mouthrinses produced a 27% reduction on average in decayed, missing, and filled permanent tooth surfaces when compared to placebo or no treatment. This finding was not affected by baseline caries severity or other exposure to fluoride such as fluoridated water or toothpaste. There was also no apparent influence of frequency of rinsing or fluoride rinse concentration on the results that indicate that a caries-preventive

benefit is likely if children use either a low fluoride concentration mouthrinse on a daily basis or a stronger one on a weekly basis.

The pooled results in permanent teeth from 13 trials showed findings were similar to those for caries prevention in tooth surfaces. The use of fluoride mouthrinses produced a 23% reduction in decayed, missing, and filled teeth.

No studies provided data related to prevention of caries in deciduous teeth or tooth surfaces.

Only one study reported information related to mucosal irritation or allergic reaction. However, this information was incompletely reported. No conclusions related to mucosal irritation or allergic reaction can be drawn.

Very few studies addressed the potential complication of tooth staining associated with fluoride mouthrinses. Due to incompleteness of the data reporting, no conclusions can be made related to fluoride mouthrinses and tooth staining.

There were no data available on acute fluoride toxicity symptoms.

Few studies reported on dropout, a measure which might indicate unacceptability of treatment, meaning that there were insufficient data to be certain about the effects on this outcome.

The Grading of Recommendations Assessment, Development, and Evaluation (GRADE) system was used to systematically rate the overall quality of evidence for the relevant outcomes (The Grade Working Group, 2016). The evidence presented for dental caries increment in permanent teeth and permanent tooth surfaces in this systematic review was rated to be of moderate quality. This rating indicates that the true effect is likely to be close to the estimate of effect, but there is a possibility that it is different. The authors are moderately confident that the evidence depicts the true effect estimate.

5 | BEST PRACTICE RECOMMENDATIONS

Children being supervised to regularly use fluoride mouthrinse, either at a low concentration on a daily basis or at a stronger concentration on a weekly basis, are likely to have less caries after 2–3 years. The evidence on the likelihood of significant side effects is scarce, and information on acceptability is inconclusive. Although most of the evidence evaluated use of fluoride mouthrinse supervised in a school setting, 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. School nurses are poised to reach a large number of children during the school day. The implementation of fluoride mouthrinses in the school setting has the potential to control childhood dental caries.

6 | RESEARCH RECOMMENDATIONS

Most of the studies included in this systematic review are more than 20 years old. As such, the reporting of the trials often lacked methodological detail necessary to produce high quality recommendations.

When new trials on fluoride mouthrinses for caries control are conducted, these should focus on direct comparisons between different fluoride mouthrinse features or comparisons of fluoride rinses against other preventive strategies, such as tooth sealants.

Since there is also little evidence related to adverse effects of fluoride mouthrinses, additional studies to quantify and describe tooth staining, mucosal irritation, and acute toxicity are warranted.

REFERENCES

American Academy of Pediatrics. (2015). Children's oral health. Retrieved from <http://www2.aap.org/oralhealth/pact/index-cme.cfm>

Marinho, V. C. C., Chong, L. Y., Worthington, H. V., & Walsh, T. (2016). Fluoride mouthrinses for preventing dental caries in children and adolescents (Review). *Cochrane Database of Systematic Reviews*, 7, CD002284. <https://doi.org/10.1002/14651858.CD002284.pub2>

The GRADE Working Group. (2016). What is GRADE? Retrieved from <http://www.gradeworkinggroup.org/>

How to cite this article: Bidwell J. Fluoride mouthrinses for preventing dental caries in children and adolescents. *Public Health Nurs.* 2017;00:1–3. <https://doi.org/10.1111/phn.12364>