Limited evidence for preventing childhood caries using fluoride supplements

Abstracted from

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Fluoride supplements (tablets, drops, lozenges or chewing gums) for preventing dental caries in children.
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Question: What is the effectiveness of fluoride supplements (tablets, drops, lozenges and chewing gums) for preventing dental caries in children?

Data sources The Cochrane Oral Health Group's Trials Register, the Cochrane Central Register of Controlled Trials (CENTRAL), Medline, Embase, WHOLIS/PAHO/MEDCARIB/LILACS/BBO and Current Controlled Trials databases. Selected authors were contacted and the reference lists of articles searched.

Study selection Randomised or quasi-randomised controlled trials with a minimum of two years' follow up comparing fluoride supplements (tablets, drops, lozenges) with no fluoride supplement or with other preventive measures such as topical fluorides in children less than 16 years of age at the start were included.

Data extraction and synthesis Eligibility, risk of bias assessment and data abstraction were conducted by two authors independently and in duplicate. Disagreements were resolved by consensus and by consulting a third author. The prevented fraction (PF), defined as the mean caries increment in controls minus mean caries increment in the treated group divided by mean caries increment in controls was used to evaluate efficacy. Random-effects meta-analysis was used where the data could be pooled. Heterogeneity was assessed and adverse effects recorded when reported.

Results Eleven studies (involving 7196 children) were included. In permanent teeth, comparing fluoride supplements with no fluoride supplement, (three studies), supplement use was associated with a 24% (95% confidence interval (CI) 16 to 33%) reduction in decayed, missing and filled surfaces (DMFS). The effect of fluoride supplements was unclear on primary teeth. In one study, no caries-inhibiting effect was observed on deciduous teeth while in another study, the use of fluoride supplements was associated with a substantial reduction in caries increment.

When fluoride supplements were compared with topical fluorides or with other preventive measures, there was no differential effect on permanent or deciduous teeth. The review found limited information on the adverse effects associated with the use of fluoride supplements.

Conclusions This review suggests that the use of fluoride supplements is associated with a reduction in caries increment when compared with no fluoride supplement in permanent teeth. The effect of fluoride supplements was unclear on deciduous teeth. When compared with the administration of topical fluorides, no differential effect was observed. We rated 10 trials as being at unclear risk of bias and one at high risk of bias, and therefore the trials provide weak evidence about the efficacy of fluoride supplements.

This paper is based on a Cochrane Review published in the Cochrane Library 2011, issue 12 (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.

Commentary

Dental caries is one of the most common diseases worldwide which occurs in childhood and adolescence. Consequences of tooth decay lead to pain, infection and loss of teeth. The use of fluoride is an important method in caries prevention and control. Fluoride can be delivered either topically via fluoridated water/salts, or systemically by way of dietary supplements (tablets, drops, lozenges or gums). In communities where water fluoridation is not available, fluoride supplements thus become the primary source of fluoride. The topical effect is now considered to be the main method by which fluoride exerts its effect rather than during tooth development.[3]

Recommendation for use of fluoride supplements varies worldwide and is confusing to many in the health professions. This study aims to evaluate the effectiveness of fluoride supplements in preventing dental caries in childhood. Fluoride supplements in the form of tablets, drops, lozenges or in chewing gums were compared with no fluoride supplement or fluoride supplements with topical fluoride and other preventive methods, in children aged 16 or less at the start of the study, with a follow up period of at least two years. A suitable number of databases, in several languages, were searched from 1950 to 2011. Two authors examined and selected randomised or quasi-randomised controlled trials, with a third reviewer consulted to arbitrate any disputes. References were pursued for additional studies, and authors were contacted for missing information. Eleven studies, published between 1968 and 2008, involving 7169 children, were selected for the review.

The quality of the recording and reporting of data in older studies was not as robust as is required now for publication. Some of the included studies lacked information or methodology of randomisation and process of allocation concealment. These studies lacked evaluation on the efficacy of fluoride supplements, and in many cases, reliability and validity of caries assessment were not ensured. The risks of bias were difficult to evaluate. The overall quality of the

studies was limited due to unclear risk of bias. Due to the small number of studies, it is not possible to assess publication bias. A meta-analysis was performed on these 11 studies. This review suggests that the use of fluoride supplements is associated with a reduction in caries increment when used in permanent teeth and when compared with no other preventive fluoride treatment. Comparing fluoride supplements to topical fluorides or other preventive measures, xylitol lozenges, there was no differential effect. Dental fluorosis was the only adverse effect reported upon, and was only evaluated in one study.

The current American Dental Association Evidence-Based recommendation[4] concludes that dietary fluoride supplements should be prescribed only for children who are at high risk of developing dental caries and whose primary dietary water is deficient of fluoride. This is only to be taken as a recommendation to consider in the clinical decision process. This review was high quality but the evidence was limited.

Practice point

- Fluoride supplements are recommended for use on high caries risk patients where fluoridated water is not available. There is no compelling evidence for supplemental fluoride elsewhere.

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