Cochrane Library

Cochrane Database of Systematic Reviews

Fluoride toothpastes of different concentrations for preventing dental caries in children and adolescents (Review)

Walsh T, Worthington HV, Glenny AM, Appelbe P, Marinho VCC, Shi X

Walsh T, Worthington HV, Glenny AM, Appelbe P, Marinho VCC, Shi X.
Fluoride toothpastes of different concentrations for preventing dental caries in children and adolescents.
Cochrane Database of Systematic Reviews 2010, Issue 1. Art. No.: CD007868.
DOI: 10.1002/14651858.CD007868.pub2.

www.cochranelibrary.com

WILEY

[Intervention Review]

Fluoride toothpastes of different concentrations for preventing dental caries in children and adolescents

Tanya Walsh[1], Helen V Worthington[2], Anne-Marie Glenny[2], Priscilla Appelbe[1], Valeria CC Marinho[3], Xin Shi[4]

[1]School of Dentistry, The University of Manchester, Manchester, UK. [2]Cochrane Oral Health Group, School of Dentistry, The University of Manchester, Manchester, UK. [3]Clinical and Diagnostic Oral Sciences, Barts and The London School of Medicine and Dentistry, Queen Mary University of London, London, UK. [4]Manchester Metropolitan University Business School, Manchester, UK

Contact address: Tanya Walsh, School of Dentistry, The University of Manchester, Higher Cambridge Street, Manchester, M15 6FH, UK. tanya.walsh@manchester.ac.uk.

Editorial group: Cochrane Oral Health Group.
Publication status and date: Edited (no change to conclusions), published in Issue 2, 2010.
Review content assessed as up-to-date: 25 August 2009.

Citation: Walsh T, Worthington HV, Glenny AM, Appelbe P, Marinho VCC, Shi X. Fluoride toothpastes of different concentrations for preventing dental caries in children and adolescents. *Cochrane Database of Systematic Reviews* 2010, Issue 1. Art. No.: CD007868. DOI: 10.1002/14651858.CD007868.pub2.

ABSTRACT

Background

Caries (dental decay) is a disease of the hard tissues of the teeth caused by an imbalance, over time, in the interactions between cariogenic bacteria in dental plaque and fermentable carbohydrates (mainly sugars). The use of fluoride toothpaste is the primary intervention for the prevention of caries.

Objectives

To determine the relative effectiveness of fluoride toothpastes of different concentrations in preventing dental caries in children and adolescents, and to examine the potentially modifying effects of baseline caries level and supervised toothbrushing.

Search methods

A search was undertaken on Cochrane Oral Health Group's Trials Register, CENTRAL, MEDLINE and several other databases. Reference lists of articles were also searched.

Date of the most recent searches: 8 June 2009.

Selection criteria

Randomised controlled trials and cluster-randomised controlled trials comparing fluoride toothpaste with placebo or fluoride toothpaste of a different concentration in children up to 16 years of age with a follow-up period of at least 1 year. The primary outcome was caries increment in the permanent or deciduous dentition as measured by the change in decayed, (missing), filled tooth surfaces (D(M)FS/d(m)fs) from baseline.

Data collection and analysis

Inclusion of studies, data extraction and quality assessment were undertaken independently and in duplicate by two members of the review team. Disagreements were resolved by discussion and consensus or by a third party. The primary effect measure was the prevented fraction (PF), the caries increment of the control group minus the caries increment of the treatment group, expressed as a proportion

of the caries increment in the control group. Where it was appropriate to pool data, network meta-analysis, network meta-regression or meta-analysis models were used. Potential sources of heterogeneity were specified a priori and examined through random-effects meta-regression analysis where appropriate.

Main results

75 studies were included, of which 71 studies comprising 79 trials contributed data to the network meta-analysis, network meta-regression or meta-analysis.

For the 66 studies (74 trials) that contributed to the network meta-analysis of D(M)FS in the mixed or permanent dentition, the caries preventive effect of fluoride toothpaste increased significantly with higher fluoride concentrations (D(M)FS PF compared to placebo was 23% (95% credible interval (CrI) 19% to 27%) for 1000/1055/1100/1250 parts per million (ppm) concentrations rising to 36% (95% CrI 27% to 44%) for toothpastes with a concentration of 2400/2500/2800 ppm), but concentrations of 440/500/550 ppm and below showed no statistically significant effect when compared to placebo. There is some evidence of a dose response relationship in that the PF increased as the fluoride concentration increased from the baseline although this was not always statistically significant. The effect of fluoride toothpaste also increased with baseline level of D(M)FS and supervised brushing, though this did not reach statistical significance. Six studies assessed the effects of fluoride concentrations on the deciduous dentition with equivocal results dependent upon the fluoride concentrations compared and the outcome measure. Compliance with treatment regimen and unwanted effects was assessed in only a minority of studies. When reported, no differential compliance was observed and unwanted effects such as soft tissue damage and tooth staining were minimal.

Authors' conclusions

This review confirms the benefits of using fluoride toothpaste in preventing caries in children and adolescents when compared to placebo, but only significantly for fluoride concentrations of 1000 ppm and above. The relative caries preventive effects of fluoride toothpastes of different concentrations increase with higher fluoride concentration. The decision of what fluoride levels to use for children under 6 years should be balanced with the risk of fluorosis.

PLAIN LANGUAGE SUMMARY

Comparison between different concentrations of fluoride toothpaste for preventing tooth decay in children and adolescents

Many children experience painful tooth decay which can lead to the tooth/teeth being extracted. Even if teeth are not extracted the tooth decay may be distressing, be expensive to treat and may involve children and their carers having time off school and work.

Another Cochrane review showed that fluoride toothpastes do reduce dental decay, by about 24% on average, when compared with a non-fluoride toothpaste. This review compares toothpastes with different amounts of fluoride.

This review includes 79 trials on 73,000 children. As expected the use of toothpaste containing more fluoride is generally associated with less decay. Toothpastes containing at least 1000 parts per million (ppm) fluoride are effective at preventing tooth decay in children, which supports the current international standard level recommended.

Although none of the trials included in the review looked at fluorosis or mottling of the children's teeth, fluorosis may be an unwanted result of using fluoride toothpaste in young children and a Cochrane review on this topic has also been published. The possible risk of fluorosis should be discussed with your dentist who may recommend using a toothpaste containing less than 1000 ppm fluoride.