Caries preventive effects of xylitol-based candies and lozenges: a systematic review

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CRD summary
This review concluded that three unclear-quality trials suggested that xylitol-based sweets could reduce the incidence of caries for a wide population, but not for proximal surfaces. Well-designed randomised trials were needed. These conclusions were appropriately cautious, and seem likely to be reliable.

Authors' objectives
To assess the effects of xylitol-based lozenges or sweets, for the prevention of caries.

Searching
PubMed, LILACS, Web of Science, and The Cochrane Library were searched for studies published up to November 2009. A search strategy was reported. Selected articles were handsearched.

Study selection
Controlled trials, lasting at least one year and studying the efficacy of xylitol sweets, for preventing caries, in any population, were eligible. Control groups had to receive no intervention, placebo (such as sorbitol), or any preventive procedure, such as sealant, supervised tooth brushing with fluoride dentifrices, or oral health instruction. Trials had to report the increased percentage of dental caries, using decayed, missing, and filled surfaces (DMFS) scores. Trials with co-interventions of other xylitol products, such as chewing gum, were excluded.

The number of sweets taken, in the included trials, ranged from three to eight per day. The percentage of xylitol content ranged from 42 to 49. Two trials had three or more groups, which investigated additions to xylitol; one added maltitol or polydextrose, and the other added sodium fluoride. The participants in two trials received other co-interventions, such as sealants. Few details were provided on the control conditions. Two trials were of young people at a high risk of caries; one was of children at any risk of caries. One trial was of physically disabled people (aged 10 to 27 years) who were unable to perform normal oral hygiene; the other two trials were of children aged between 10 and 12 years. Initial DMFS scores ranged from 1.5 to 9.8. The trials were performed in Estonia, Sweden, or Kuwait.

Two reviewers independently selected trials for inclusion, with disagreements resolved by a third reviewer.

Assessment of study quality
Two types of assessment were made. One assessed the quality of randomisation, allocation concealment, initial assembly of groups, blinding, and calibration of examiners. The other assessed the risk of bias from representativeness, randomness of participant selection, blinding of outcome assessors, level of confounding, and drop-out similarity between groups.

Trials were given an overall classification of adequate, unclear or inadequate quality; and high, low or moderate risk of bias. Two reviewers performed these assessments, which were checked by a third reviewer.

Data extraction
The data were extracted to calculate the DMFS prevented fraction – the difference between control group incidence, and experimental group incidence, divided by the control group incidence – and 95% confidence interval.

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Methods of synthesis
The results were tabulated, and synthesised in a narrative. Heterogeneity was evaluated using $\chi^2$.

Results of the review
Three trials, with 947 young people, were included; one was non-randomised, one was randomised by school, and the other was randomised by individual. All trials were considered to be at a high risk of bias, and all were classed as being
of unclear quality. The rate of drop-outs ranged from 9% to 29%, and varied across groups in two trials. Two trials had confounding factors.

Two trials reported a lower caries increment following xylitol intervention; one had a probability of less than 0.001 after 1.5 years, and the other reported no statistical analysis at the three-year time point.

The third trial reported no significant differences between groups for the incidence of proximal enamel lesions and the total proximal DMFS scores after two years.

The test for heterogeneity across groups was highly statistically significant; the prevented fractions in the intervention groups ranged from -0.59 (not significant) or 0.37 to 1.34.

Authors' conclusions
The results from three unclear-quality trials suggested that xylitol-based sweets could reduce the incidence of caries for a wide population, but not for proximal surfaces. Well-designed randomised trials were needed.

CRD commentary
The review question and eligibility criteria were clear and reproducible. Several relevant databases were searched for relevant trials, but the restriction to published trials means that some relevant evidence may have been missed. Suitable methods were employed to reduce the risks of reviewer error and bias throughout the review.

Trial quality was assessed and the results were used for interpreting the trial results. Trial details were provided, but little detail was given on the control conditions. All participants were blinded, suggesting the use of placebo. The choice of a narrative synthesis appears to have been appropriate, given the clinical variation and different methods across trials.

The authors' conclusions were appropriately cautious, and are likely to be reliable.

Implications of the review for practice and research
Practice: The authors did not state any implications for practice.

Research: The authors stated that, to reduce bias and improve the quality of the evidence, CONSORT guidelines should be followed in future clinical trials.

Funding
Not stated.

Bibliographic details

PubMedID
21774134

DOI
10.1111/j.1752-7325.2010.00208.x

Original Paper URL

Indexing Status
Subject indexing assigned by NLM

MeSH
Candy; Cariostatic Agents/administration & dosage; Controlled Clinical Trials as Topic; DMF Index; Dental Caries/prevention & control; Disease Progression; Humans; Randomized Controlled Trials as Topic; Sweetening Agents
Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.