

A Novel Use of Xylitol Sugar in Preventing Acute Otitis Media (EAR Infections)

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Abstract

Background. Xylitol, a commonly used sweetener, is effective in preventing dental caries. As it inhibits the growth of pneumococci, we evaluated whether xylitol could be effective in preventing acute otitis media (AOM).

Design. Altogether, 857 healthy children recruited from day care centers were randomized to one of five treatment groups to receive control syrup ($n = 165$), xylitol syrup ($n = 159$), control chewing gum ($n = 178$), xylitol gum ($n = 179$), or xylitol lozenge ($n = 176$). The daily dose of xylitol varied from 8.4 g (chewing gum) to 10 g (syrup). The design was a 3-month randomized, controlled trial, blinded within the chewing gum and syrup groups. The occurrence of AOM each time the child showed any symptoms of respiratory infection was the main outcome.

Results. Although at least one event of AOM was experienced by 68 (41%) of the 165 children who received control syrup, only 46 (29%) of the 159 children receiving xylitol syrup were affected, for a 30% decrease (95% confidence interval [CI]: 4.6%-55.4%). Likewise, the occurrence of otitis decreased by 40% compared with control subjects in the children who received xylitol chewing gum (CI: 10.0%-71.1%) and by 20% in the lozenge group (CI: 12.9%-51.4%). Thus, the occurrence of AOM during the follow-up period was significantly lower in those who received xylitol syrup or gum, and these children required antimicrobials less often than did controls. Xylitol was well tolerated.

Conclusions. Xylitol sugar, when given in a syrup or chewing gum, was effective in preventing AOM and decreasing the need for antimicrobials. *Key words:* xylitol, otitis media, prevention, syrup, chewing gum.

During 1990, an estimated 24.5 million visits were made to office-based physicians in the United States at which the principal diagnosis was otitis media, about 2.5 times more visits than in 1975. Otitis media causes significant economic costs both to parents and to the health care system. Recurrent acute otitis media (AOM) may even lead to long-term sequelae in the form of learning difficulties, especially in reading and mathematics. Thus, for children, parents, and society in general, the prevention of recurrent AOM would be more effective than the treatment of each episode separately. Surgery, in the form of tympanostomy and adenoidectomy, is effective in preventing the recurrences. The reported estimates of the efficacy of antimicrobial prophylactics vary.

In addition to the question of efficacy, antimicrobial prophylactics are problematic because of the potential development of resistant bacterial strains. Prophylactic and frequent use of antimicrobials, especially in day care children, is responsible for the spread of nasopharyngeal carriage of penicillin-resistant pneumococci. Otitis media is a separate risk factor increasing the probability carrying resistant

pneumococci on the nasopharynx. Medication is prescribed at ~84% of all visits for otitis media. Because a decrease in the use of macrolide antibiotics resulted in a reduction in streptococcal resistance to it, measures that would decrease the use of antimicrobials and the occurrence of otitis media would most probably inhibit the development and spread of antimicrobial resistant bacteria. A need exists for a simple and safe alternative approach to prevent recurrences of AOM episodes.

Xylitol is a five-carbon polyol that has been used widely as a sweetening substitute for sucrose because **xylitol** has preventive effect on dental caries. This beneficial effect of **xylitol** is mediated by inhibiting the growth of *Streptococcus mutans*, bacteria causing dental caries. We found that adding **xylitol** to the growth media inhibited the growth of *Streptococcus pneumoniae*. This inhibition was statistically significant already when the media contained 1% **xylitol** and increased in the concentrations of 5% **xylitol**. In the mouth, it is easy to achieve these concentrations using chewing gum sweetened with **xylitol**.

In a randomized, controlled, double-blind study comparing **xylitol** chewing gum with sucrose chewing gum, we observed a significant decrease in the occurrence of AOM in those who received **xylitol** chewing gum. In that study, the participating children were older than those at greatest risk for developing AOM because they had to be able to chew gum. Thus, we decided to do a new randomized, controlled trial in which we compared **xylitol** syrup, **xylitol** chewing gum, and **xylitol** lozenges to control subjects who received low doses of **xylitol**.