Xylitol gum chewing in mothers leads to reduction in mutans streptococci

Does chewing xylitol gum result in suppression of mutans streptococci?

Solderling E, Isokangas P, Pienihakkinen K, Tenovu J, Alanen P. *Influence of maternal xylitol consumption on mother-child transmission of mutans streptococci: 6-year follow-up. Caries Res 2001; 35:173-177*

Design Randomised controlled trial using a health-centre population in Finland.

Intervention 195 pregnant women with high mutans streptococci counts were randomised into three groups, xylitol (X; $n=127$), chlorhexidine varnish (CHX; $n=32$) or fluoride varnish (F; $n=36$). In group X, mothers were recommended to chew xylitol gum two to three times per day, starting at 3 months from delivery and continuing until their child was 3 years of age. The CHX- and F-group mothers received chlorhexidine or fluoride varnish at 6, 12 and 18 months after the birth of the child. Children received routine dental care (oral hygiene instruction, dietary advice fluoride treatment and restorative treatment) where necessary. Standardised plaque and salivary sampling was undertaken.

Outcome measure Mutans streptococcus levels in plaque and saliva. **Results** Loss to follow-up was 19% at 3 years and 25% at 6 years. The reported proportion of the children who were colonised by mutans streptococci are shown (see Table 1) with a calculated worst-case scenario analysis assuming the best possible outcomes for groups CHX and F and the worst for group X. Numbers-needed-to-treat are presented comparing groups X and F.

Conclusions Chewing xylitol gum by mothers who have high mutans streptococcus counts results in long-term suppression of the bacterium in their offspring.

Commentary

This study is the third in a series describing a longitudinal study exploring the effects of xylitol consumption by mothers on mother-child transmission of mutans streptococci (MS). The rationale for the study is that children whose teeth are colonised by MS at an early age have more caries than those colonised later or not at all. There is evidence that most children acquire these microorganisms from their mothers. Previous research has demonstrated short-term reduction of plaque and salivary MS levels with habitual consumption of xylitol. The authors previously demonstrated a reduced probability of mother-child transmission at 2 years of age in the xylitol group.

This study reports on MS levels in plaque and saliva of the children at 3 and 6 years of age respectively. Microbial counts were conducted using standard microbiological techniques. The number of children colonised with MS increased in all groups. At age 3, the risk of children being colonised was two- to threefold greater in the F group than the X group and the difference was statistically significant. Although the proportion of the children colonised at age 6 had increased further, it was still possible to demonstrate significantly lower levels of MS in the X group compared with the F group.

The study is sound from a microbiological perspective but more mothers (120) were assigned to the X group than to either the CHX or F group (32 and 36 respectively). The outcome measure was plaque and salivary counts of MS which implies a reduced risk of

Table 1. Presence of mutans streptococci (MS) in children of mothers assigned to xylitol, chlorhexidine or fluoride groups.

Treatment	Baseline (n)	Children (%)			
		Colonised with MS 3 years		Colonised with MS 6 years	
		Reported	Calculated worst-case scenario	Reported	Calculated worst-case scenario
Xylitol	127	27.6	44.1	51.6	64.6
Chlorhexidine varnish	32	37.0	31.3	86.4	59.4
Fluoride varnish	36	64.5	58.3	83.9	72.2
NNT (95% CI)		3 (2-6)	7 (3-25)	3 (2-6)	13 (4-∞)

NNT, Numbers-needed-to-treat; CI, confidence interval.

the children developing dental caries. No caries data are presented for the children at age 3 or 6, however.

Also mothers were prescreened and were high levels carriers of MS at the outset. Interestingly, when the children were aged 3 years, no significant differences could be detected in the salivary levels of the bacterium in the mothers. This indicates that there were no long-term benefits to the mothers in terms of reduced MS levels. Presumably they would have benefited from the increased salivary stimulation occurring when they were chewing the gum, although no mention of this is made in the paper.

Dental caries is of course multifactorial in origin and factors such as exposure to fluoride and the amount and frequency of sugar consumption are key determinants of caries susceptibility. As a clinical caries-preventive strategy, it is unclear how much benefit will be obtained from mothers chewing xylitol gum two to three times a day, in comparison with other health education and prevention messages. As this study only included those mothers who were high carriers at the outset it limits the ability to generalise. A further complication is that by the age of 6 years, around one third of the children in each of the groups chewed xylitol gum themselves so the 6-year data as presented are invalid. Although this study provides evidence that xylitol gum chewing by mothers with high MS counts results in long-term suppression of the bacterium in their offspring, there is insufficient evidence in this paper to demonstrate a significant clinical impact in terms of reduced dental caries incidence.

Practice points

- Chewing xylitol gum by mothers with high mutans streptococci produces long-term suppression of MS in their children.
- This may have value as a part of a preventive programme but clear clinical impact has yet to be demonstrated.

Ivor Chestnutt

Dental Public Health Unit, Dental School, University of Wales College of Medicine, Cardiff, UK

Address for correspondence: Eva Söderling, Institute of Dentistry, University of Turku, FIN-20520, Turku, Finland. E-mail: eva.soderling@utu.fi.

Evidence Based Dentistry (2003) **4**, 8.
doi:10.1038/sj.ebd.6400154