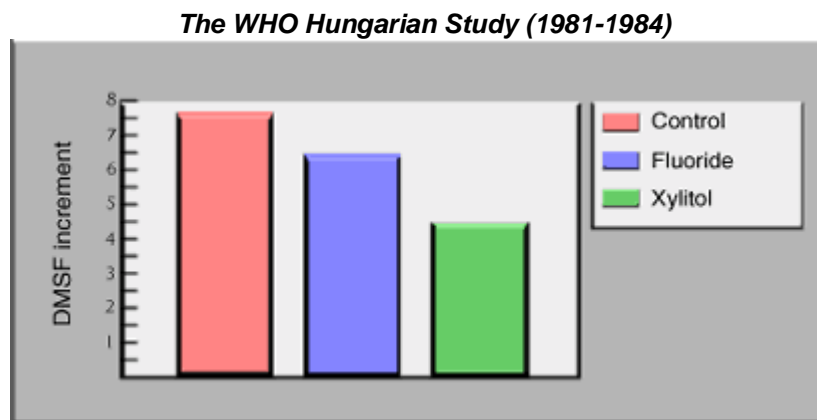


A new method for Preventing Childhood Tooth Decay

Reduces the number of new cavities when used as a partial sugar substitute

A three-year field study on 690 Hungarian school children used a control group with normal diet and oral hygiene, including fluoridated toothpaste. The xylitol group received in addition 20g per day of xylitol in the form of candies. For comparison, the third group received fluoridated milk. The results showed a lower caries increment for the xylitol group than the control and fluoride groups, and indicate that peroral xylitol has a cariostatic effect.

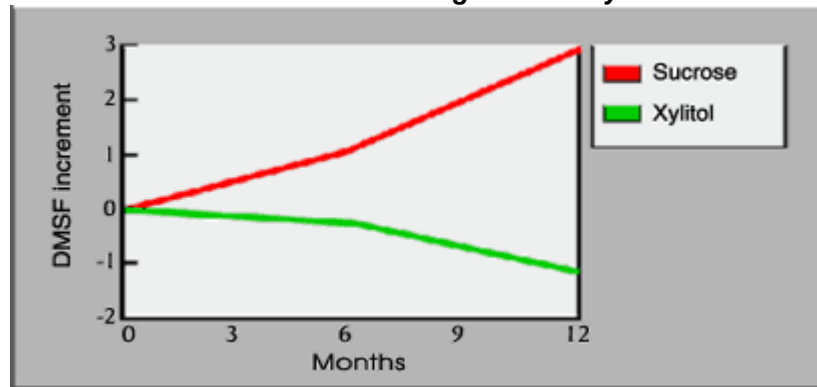


Ref: Scheinin, A., Banoczy, J., Szoke, J., Esztari, I., Pienihakkin, K.,
Scheinin, U., Tieskso, J., Zimmerman, P., & Hadas, E.
Aca Ondontol. Scand. 1985; 43: 321

Improves oral hygiene when given as chewing gum after meals

This study compared the effects on dental caries of regular use of sucrose- and xylitol -sweetened chewing gum respectively, in conjunction with a normal diet. After one year, the group using sucrose gum had a mean DMFS increase of 2.92, compared with an actual decrease in the xylitol group. The xylitol group also had marked reductions in plaque formation and in the count of oral micro-organisms.

The Turku Chewing Gum Study

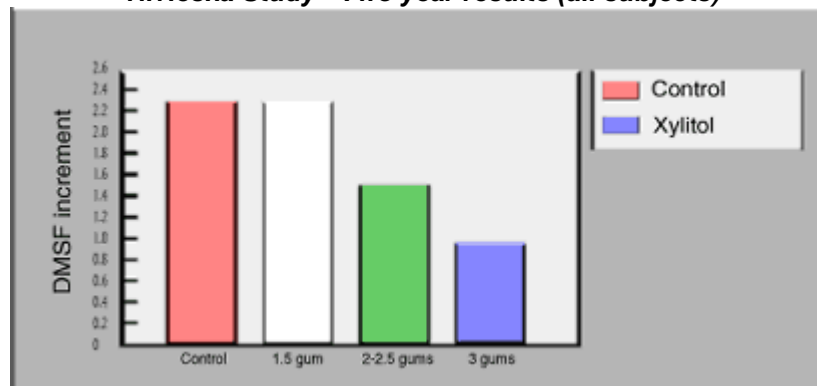


Ref: Scheinin, A., Makinen., K.K., Tammissalo, E., & Maari, R.
Acta Odontol. Scand. 1975; 33: 269

Reduction of caries related to frequency of xylitol use

In the Ylivieska study, 172 children (initially 11-12 years old) used one, two or three xylitol chewing gums daily (maximum dose 10g xylitol/day). In the children who used two and three gums a day, caries reductions of 30% and 60% respectively were achieved compared with 152 subjects who received no gum. In a sub-group with high caries activity, reductions of 50% and 80% were achieved with two and three gums a day.

Ylivieska Study - Two year results (all subjects)



Ref: Isokangas, P. Institute of Turku Academic Dissertation, 1987

A new method for

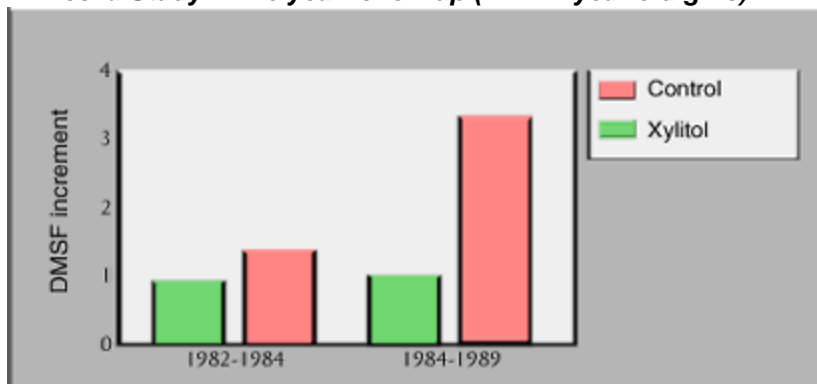
Preventing Childhood Tooth Decay

The long term benefits

A follow up in 1989 to the original Ylivieska study demonstrated the longer term benefits of chewing xylitol containing gums. The overall advantage for the xylitol group had actually increased from 45% to greater than 75% a further 5 years after the end of the 2-year period during which xylitol gum was used. Whilst

these figures relate to the better standards in total dentition, it is probably the additional protection afforded to newly erupted teeth of xylitol participants which accounts for the greater proportion of continued improvement.

Ylivieska Study - Five year follow up (11 - 12 year old girls)



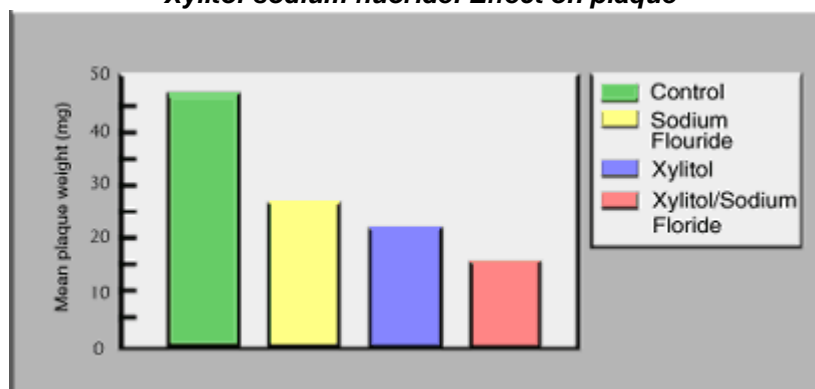
Isokangus, P., Makinen, K.K., Tiesko, F., A Alanen, P.
Caries Research 1991; 27; 495

Adds to the benefits of a fluoridation programme

In the WHO and Ylivieska studies, it was demonstrated that the consumption of small quantities of xylitol in addition to a normal sucrose-containing diet enhanced the effects of an existing fluoridation programme, resulting in a reduction in new caries.

Similar trends are also observed when xylitol is applied topically, for example in a mouth rinse, resulting in a reduction in plaque weight.

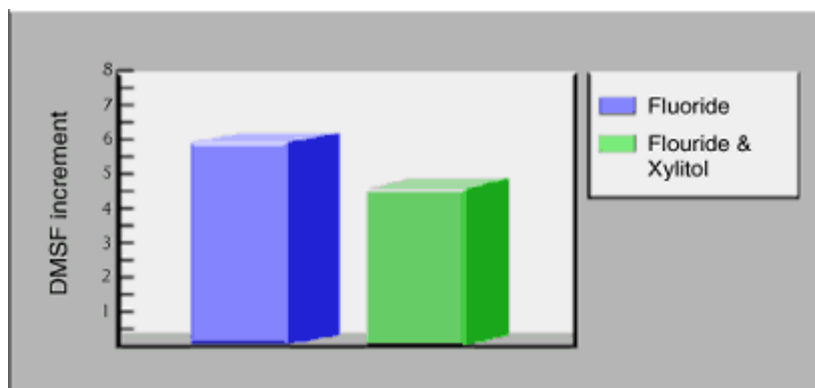
Xylitol-sodium fluoride: Effect on plaque



Ref. Cobanera, A., Morrasso, A., White, E., Cuevas, R., Espinosa, R.,
Journal of Dental Research 1987; 66: 814

Furthermore, in a very large three-year study involving 2,630 initially 8-10 year old Costa Rican children, it was demonstrated that the inclusion of xylitol as well as fluoride in toothpaste achieved an additional 12.3% improvement over fluoride only treatment.

Addition of 10% xylitol enhances anti-caries effect of a sodium fluoride/silica dentifrice (Comparative results after three years)



Addition of 10% xylitol enhances anti-caries effect of a sodium fluoride/silica dentifrice
(Comparative results after three years)

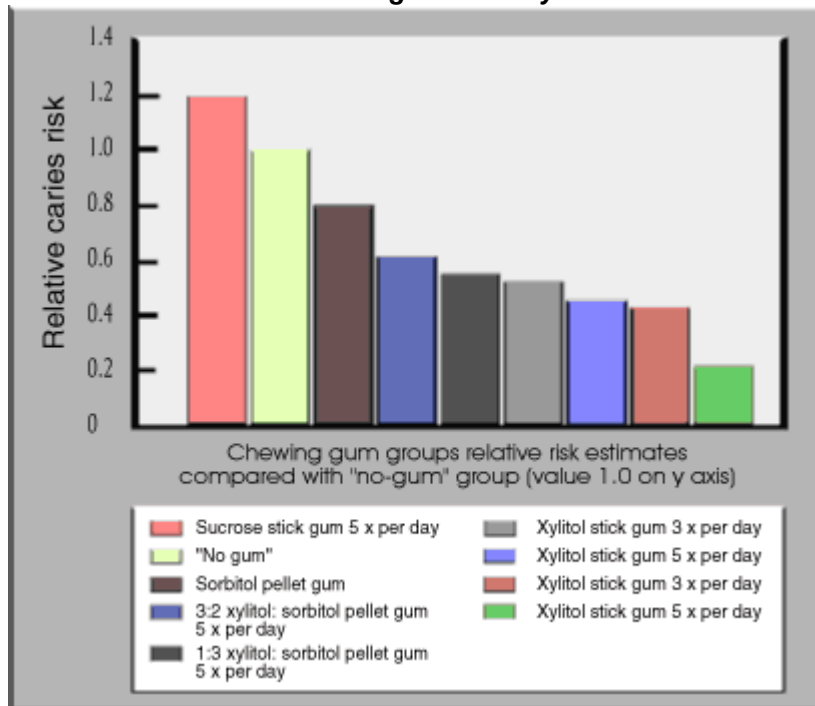
Cariostatic rather than non-cariogenic

A recent comprehensive clinical study involving 1,277 (initially 9-10 years old) Belize school children, has not only confirmed previous observations for the effectiveness of xylitol in reducing caries risk, but has also clearly demonstrated a cariostatic advantage for xylitol over the non cariogenic polyols, sorbitol. Children assigned to the xylitol chewing gum group showed a 50% lower caries risk than those in the sorbitol group.

Chewing of gum containing xylitol at various concentrations produced noticeably fewer caries onsets over the 40-month study period. For instance there was an average of only 1.4 caries onsets per child assigned 100% xylitol pellet gum compared to 6.2 caries onsets for the group using 100% sucrose gum. The chewing of sucrose gum on a regular basis appeared to have no benefit in preventing dental caries when comparing the results for all chewing gum groups to the "no gum" baseline, as illustrated in the accompanying chart.

From these results there is also an apparent advantage for pellet gums coated with xylitol in addition to the benefits achieved with the familiar stick gum. This may be attributable to the higher initial concentration of xylitol making more effective contact with the affected areas in the oral cavity.

The Belize Chewing Gum Study 1989-1993



Ref: Makinen, K.K., Bennett, C.A., Hujoel, P.P., Isokangas, P.J., Isotupa, K.P., Pape, H.R. (Fr.), Makinen, P.L. Journal of Dental Research 1995; 74(12): 1904