

Does chewing sucrose-free chewing gum after meals reduce the development of carious lesions?

Trial: Szöke J, Bánóczy J, Proskin HM. *Effect of after-meal sucrose-free gum-chewing on clinical caries. J Dent Res 2001; 80: 1725-1729.*

Question

Can a regimen of chewing sucrose-free gum after meals reduce the incidence of caries and remineralise white spot lesions (demineralised and non-cavitated incipient caries) in a population with a moderate incidence of caries?

Trial details

Design: A cluster-randomised controlled trial with two arms.

Setting: Elementary schools in Budapest, Hungary, where water was not fluoridated at the time of the study.

Participants: 583 schoolchildren aged 8–13 years (mean age, 9.6 years). Participants and their parents or guardians were required to sign an informed consent form. Non-participation rates and profiles were not reported, and inclusion and exclusion criteria were not specified.

Interventions: The intervention group chewed sucrose-free gum (65% polyols [sorbitol and mannitol], 30% gum base and 5% sweeteners and flavours) for 20 minutes after meals, three times a day; the control group did not chew gum. Two meals a day were available at the schools, facilitating supervision of gum chewing. Other chewing sessions were unsupervised. After baseline clinical examination, classes within grade levels were randomly assigned to either arm, provided that each grade level had more than one class with sufficient participants available. No significant differences in baseline caries scores were detected between the intervention and control groups. No modifications were made to the oral hygiene and dietary practices of participants.

Main outcome measures: Participants were examined at 1 and 2 years by a single blinded examiner, using a mouth mirror, explorer and transillumination to aid diagnosis of interproximal caries. Drying of teeth and radiographs were not used. Clinical examination results were expressed as World Health Organization (WHO) DMFS (decayed, missing and filled surfaces) scores or Radicke scores. WHO DMFS scores include a category for incipient carious lesions, and are commonly used caries experience indices, quantifying decayed, missing and filled surfaces.

Main results: 1-year and 2-year scores for DMFS increment were adjusted for by baseline DMFS scores. Using the Radicke DMFS scores, reductions in caries increment for the intervention group were in the order of 43.6% ($P=0.008$) and 38.7% ($P=0.018$) at 1 and 2 years, respectively. Using the WHO DMFS scores (inclusive of incipient lesions), reductions in caries increment for the intervention group were in the order of 41.7% ($P=0.028$) and 33.1% ($P=0.008$) at 1 and 2 years, respectively.

Conclusions: The authors concluded that chewing sucrose-free gum after meals provided a positive anti-caries effect.

Commentary

Rationale for the trial

To confirm previous trials reporting positive anti-caries effects of sucrose-free gum chewing.¹⁻⁵ Whereas most previous trials were

conducted in populations with a high incidence of caries, the authors sought to investigate within an industrialised population with moderate caries incidence.

Trial methods

As no intervention was elected for the control group, participant blinding was not feasible. Thus, the authors did not offer alternative explanations for the positive result. The intervention may have initiated different preventive oral hygiene and dietary practices between groups. Also, the intervention group may have been less likely to seek confectionery, and hence a less cariogenic diet, compared with the control group.

Participant flow was poorly reported, obscuring potential sources of bias. Follow-up was excellent, with 93.8% presenting for 2-year clinical examination. However, this follow-up rate was not broken down between intervention and control groups. It is feasible that this rate may have been lower in the more procedurally demanding intervention group, and those not presenting for follow-up may represent participants with less concern for their oral health. Reporting of withdrawal after randomisation (of particular interest to the intervention group) was also poor.

Mechanisms for capturing adverse events were not described. No adverse events were reported, except for one that was not related to the chewing gum, but resulted in withdrawal. There is concern that adverse events not related to the chewing gum were not adequately monitored.

Compliance, especially for out-of-school chewing, is a challenge in a trial such as this. School chewing compliance was reported as unproblematic, but the method of monitoring was not described. Out-of-school chewing compliance was assessed by gum wrapper return (93% of students returned more than 90% of wrappers). This does not accurately reflect if gum was chewed and by whom. The authors recognised that gum chewing could not be accurately assessed in the control group. However, prohibition of gum chewing in schools was described.

New information

This study suggests a positive anti-caries effect of chewing sucrose-free chewing gum after meals within an industrialised population with moderate caries incidence. To confirm such an effect, the role of bias would require greater attention.



Implications for clinical practice

The authors advise that sucrose-free gum-chewing be considered on an individual and organisational level. From the perspective of a cost-benefit analysis, this is premature. The gum-chewing regimen described is expensive and needs to be considered against other preventive measures, such as fluoride gels and mouth rinses, before the authors' recommendations can be embraced. The evidence for the superior efficacy of chewing gum sweetened with

xylitol over that sweetened with sorbitol is not unanimous.³⁻⁵
Budapest may benefit more from fluoridation of its water supply.

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References

- 1 Beiswanger BB, Boneta AE, Mau MS, et al. The effect of chewing sugar-free gum after meals on clinical caries incidence. *JADA* 1998; 129: 1623-1626.
- 2 Kandelman D, Gagnon G. A 24-month clinical study of the incidence and progression of dental caries in relation to consumption of chewing gum containing xylitol in school preventive programs. *J Dent Res* 1990; 69: 1771-1775.
- 3 Machiulskiene V, Nyvad B, Baelum V. Caries preventive effect of sugar-substituted chewing gum. *Community Dent Oral Epidemiol* 2001; 29: 278-288.
- 4 Mäkinen KK, Bennett CA, Hujouel PP, et al. Xylitol chewing gums and caries rates: a 40-month cohort study. *J Dent Res* 1995; 74: 1904-1913.
- 5 Mäkinen KK, Hujouel PP, Bennett CA, et al. Polyol chewing gums and caries rates in primary dentition: a 24-month cohort study. *Caries Res* 1996; 30: 408-417.

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Competing interests: None identified