Polyol

Case Study

Case Study: Polyol Chewing Gums – A Systematic Review of the International Literature

The effect of polyol containing chewing gums was evaluated in a systematic review published in 2008, in the Journal of the American Dental Association.[1] Eligible studies were retrieved from Medline, Google Scholar and the Cochrane Library and were published mainly from 1980-2001. Comparative studies were included, if they were published in English, in peer reviewed journals, including the evaluated effect of chewing gums containing at least one polyol (xylitol, sorbitol, mannitol or maltitol) on caries development.

Data were extracted by two researchers on clinical and radiographic outcomes from original papers with a priority given to clinical outcomes. The quality of the studies was assessed using the Jadad scale. [2]

The dose of the polyol was combined with the duration of use to produce a variable called poyol load. Preventive fractions were calculated with the following formula: PF= (XC – XE)/XC

XC is the mean caries increment in the control group and XE is the mean caries increment in the group with the polyol-containing chewing gum. There were four groups of studies; 1) xylitol vs. no chewing gum; 2) xylitol and sorbitol vs. no chewing gum; 3) sorbitol vs. no chewing gum and; 4) sorbitol and mannitol vs. no chewing gum.

The original literature search produced 231 articles with 19 deemed appropriate and meeting the study inclusion criteria for the meta-analysis. The studies included school children in the United States, Canada, Finland, Denmark as well as other European countries. The doses of polyols varied across studies as did the dropout rates.
The greatest preventive fraction was seen with xylitol alone; PF = of 58.66 (35.42-81.90) followed by xylitol and sorbitol 52.82 (39.64-66.00, sorbitol alone - 20.01 (12.74-27.77), and lastly sorbitol and mannitol. 10.71 (–20.50-41.93). All preventive fractions were statistically significant with the exception of the sorbitol and mannitol gum. The results of the polyol load demonstrated an increasing preventive fraction with increasing doses of xylitol.

This systematic review demonstrates that chewing gum containing xylitol, alone or in combination with sorbitol, results in significant decreases in the occurrence of dental caries among school children. The effect of sorbitol alone was much lower than when in combination with xylitol indicating that it is the xylitol which accounts for the greatest preventive effect of polyol chewing gums on dental caries.

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References:

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2. Jadad AR, Moore RA, Carroll D, et al. Assessing the quality of reports of randomized clinical trials: is blinding necessary? Control Clin Trials 1996;17(1):1-12.