

Sweeteners and Dental Caries

Guy Briche and Stavros T. Plessas

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S U M M A R Y: Dental caries is the progressive destruction, by bacteria and their products, of the calcified tissues of the teeth exposed to the oral environment. Caries can only develop by the favorable confluence of three factors: (1) microorganisms that adhere to the tooth surface, (2) carbohydrates that the microorganisms can readily metabolize to acid, and (3) a susceptible host or tooth surface that will dissolve in the acid. In this dynamic process of demineralization and proteolytic breakdown of the collagen matrix, several bacterial species have been indicated as cariogenic. *Streptococcus mutans* has been especially implicated in the initiation of lesions of the smooth coronal surfaces, *Actinomyces viscosus* and *naeslundii* have been associated with the development of root caries, while lactobacilli appear to be the main organisms involved in dentine caries. Pits and fissures offer a favorable site for colonization of streptococci, actinomyces and lactobacilli; all these microorganisms have been associated with lesions on the occlusal surface. Many fermentable carbohydrates can be metabolized by oral microorganism. Nevertheless, the caries-inducing potential of sucrose is considered higher than that exhibited by any other carbohydrate in the human diet. It is readily diffusible into plaque; it serves as a substrate for acid production; and it is

a precursor of the polyglycans that give the plaque its adherent properties. Dietary habits can influence cariogenicity. The choice of carbohydrate foods whose physical properties make them retentive and frequent snacking are both habits that increase a diet's capability to induce dental decay. Last years caries have been considered as a dynamic process, its phases shifting between demineralization, equilibrium, and remineralization. This recognition resulted in several recently established associations between sweeteners and natural defense mechanisms related to salivary secretion and buffering. A further protective mechanism relates to the maintenance of a concentration gradient advancing the diffusion of calcium and phosphate ions from the saliva into dental enamel. This remineralizing mechanism is enhanced by strong complex formation between calcium ions and polyols, especially mannitol, sorbitol and xylitol. Several studies have shown that little or no pH decrease occurs in dental plaque at exposure to some sweeteners, eg, mannitol, sorbitol, L-sorbose, xylitol and lycasin. In addition, xylitol provokes a direct inhibition of *S. mutans* through degeneration and autolysis of the bacterial cells. On the other hand, adaptation of the oral flora to metabolize xylitol was not shown after a long use of this polyol.