Dental Caries and Carbohydrates

Susumu Imai
Department of Oral Health, National Institute of Public Health
2-3-6, Minami, Wako-shi, Saitama 351-0197, Japan

Summary
Dental caries is defined as a destructive phenomenon of the teeth, induced by direct action of oral bacteria and its metabolic products. A large number of observational studies have shown that there is a close correlation between the level of sugar consumption and the prevalence and severity of dental caries. Diet may exert an effect on dental caries by reacting with the enamel surface and serving as a substrate for cariogenic bacteria. In this article, the relationship between dental caries and dietary sucrose is described according to the evidence concerning epidemiological studies and experimental medical studies including animal and human experiments. Interrelationships are examined by systematic review of sucrose consumption and dental caries, especially in the modern age of fluoride exposure. Cariogenicity of sucrose is usually explained by its two major characteristics. Sucrose acts as a substrate for sticky water-insoluble glucan production by glucosyltransferase of mutans streptococci, and as a substrate for organic acid production by mutans streptococci and other oral bacteria. The prevention of dental caries by xylitol is extensively investigated using chewing gum, and the possibility of the prevention of dental caries induction is demonstrated. Recently, two functional carbohydrates, funoran and phosphoryloligosaccharide were developed in Japan. The chewing gums containing these functional carbohydrates are approved as “Foods for specified health use” by the Ministry of Labour, Health and Welfare. These chewing gums promote remineralization of enamel. The caries preventive effect of these functional foods should be examined in future research.