Abstract

Background and Overview. Dental caries is a bacterially based disease. When it progresses, acid produced by bacterial action on dietary fermentable carbohydrates diffuses into the tooth and dissolves the carbonated hydroxyapatite mineral-a process called demineralization. Pathological factors including acidogenic bacteria (mutans streptococci and lactobacilli), salivary dysfunction, and dietary carbohydrates are related to caries progression. Protective factors include salivary calcium, phosphate and proteins, salivary flow, fluoride in saliva, and antibacterial components or agents can balance, prevent or reverse dental caries.

Conclusions. Caries progression or reversal is determined by the balance between protective and pathological factors. Fluoride, the key agent in battling caries, works primarily via topical mechanisms: inhibition of demineralization, enhancement of remineralization and inhibition of bacterial enzymes.

Clinical Implications. Fluoride in drinking water and in fluoride-containing products reduces caries via these topical mechanisms. Antibacterial therapy must be used to combat a high bacterial challenge. For practical caries management and prevention or reversal of dental caries, the sum of the preventive factors must outweigh the pathological factors.

Although the prevalence of dental caries in children has declined markedly over the last 20 years in most countries in the Western world, the disease continues to be a major problem for both adults and children everywhere.

The trends in caries in U.S. children during the last 30 years were recently summarized on the basis of results of four national epidemiologic studies. By the late 1980s, although approximately 75 percent of children aged 5 to 11 years were caries-free, about 70 percent of the 12- to 17-year-olds still had caries. Approximately 25 percent of children and adolescents in the 5- to 17-year age range accounted for 80 percent of the caries. By age 17 years, however, 40 percent of the population accounted for 80 percent of the caries.

These findings illustrate the need for management of caries by individual risk assessment and for measures more specifically directed to high-risk people and populations.

Although these prevalence rates still leave much to be desired, the overall caries prevalence in children has indeed declined in the United States. Smaller epidemiologic studies in recent years indicate, however, that the decline in caries has not continued during the 1990s and that it may have plateaued.