Dental caries: a nation divided


Health Canada

Background and epidemiology: Dental caries is a chronic, infectious disease caused by bacterial by-products that dissolve the enamel surface of teeth.[1] The interaction of 3 factors allows this to happen: a susceptible tooth surface, specific bacteria in dental plaque (e.g., *Streptococcus mutans*, *Lactobacillus*) and a diet rich in fermentable carbohydrates, particularly sugars.

If left unchecked, the bacteria can penetrate the underlying dentin and infect the soft pulp tissue, causing excruciating pain and possibly resulting in pulpal necrosis, tooth loss and systemic infection. The impact of dental caries extends beyond health: oral pain may affect speech, eating, sleeping, swallowing and breathing, and the altered appearance it causes can undermine self-image, self-esteem and social acceptance.[2]

Dental health is measured by 2 main indices: the DMF (decayed, missing or filled teeth) in adults and the DF (decayed or filled teeth) in children. The prevalence of dental caries has declined steadily over the last half of the 20th century, thanks in large part to the widespread adoption of community water fluoridation and the addition of fluoride to toothpaste and bottled beverages.[2] Despite these advances, however, profound disparities in oral health and rates of dental caries exist among specific populations.

The burden of oral disease is carried by poor children, people without dental insurance, homebound elderly people, developmentally disabled people, medically compromised people, Aboriginal children, homeless people, HIV-positive people and new immigrants. In a survey of 13- and 14-year-old Toronto children, only 3.5% of those born in Canada needed dental restorations, as compared with 23% of those whose family had immigrated here in the last 2 years.[3]

There are also regional differences. In one study, a group of 6-year-old Manitoba children from a northern community without fluoridated water experienced on average 82% more decay per child than children from southern communities with fluoridated water. On closer examination, children of middle-to-high income families in the north experienced 24% more decay than children of families in the same income group in the south, whereas children of middle-to-low income families in the north experienced 124% more decay than their southern counterparts. The authors concluded that, although the risk of dental caries is associated with geographic location, socioeconomic factors may play a greater role.[4]

Dental care is not covered under most provincial health care plans. According to the 1996/97 National Population Health Survey, only 53% of the population aged 15 or older reported having dental insurance and only 59% reported visiting a dentist in the past year.[5]

Clinical management: Physicians who see patients from high-risk populations might take the opportunity to counsel them on preventing dental caries. According to the Canadian Task Force on Preventive Health Care, there is good evidence that fluoridation of drinking water is the most effective preventive tool for reducing dental caries; everyone should use a fluoride toothpaste daily, and daily fluoride supplementation will reduce caries in areas where fluoride levels in drinking water are suboptimal.[6] As well, fluoride mouth rinses and the professional application of topical fluorides will prevent caries in people with active decay, and fissure sealants will prevent caries in children at high risk. On the cautionary side, excess fluoride supplementation increases the risk of fluorosis, an excess of exogenous fluoride that causes mottling of teeth. Young children should use children's toothpaste and be supervised when brushing their teeth to prevent the swallowing of excess toothpaste.

Prevention: At the turn of the millennium, the US Centers for Disease Control and Prevention identified water fluoridation as one of the top 10 achievements of public health over the last century.[1] Its effectiveness was discovered serendipitously when a lower prevalence of dental caries was observed in populations experiencing fluorosis from naturally high levels of fluoride in the drinking water. Fluoride inhibits the demineralization of sound enamel and enhances the remineralization of demineralized enamel. Since the introduction of water fluoridation in the 1950s, the availability of fluoride from other sources, such as toothpastes, mouthwashes and bottled beverages, has exploded. This has led some to argue that fluoridation of the water supply is no longer needed and that exogenous excess poses a health risk. Proponents of continued fluoridation argue that long-term population-based studies suggest that the health benefits outweigh the risks and that fluoridation of community drinking water delivers a degree of social equity to an otherwise inequitable disease.

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