

# Fluorides and Other Preventive Strategies for Tooth Decay



Jeremy A. Horst, DDS, PhD<sup>a</sup>, Jason M. Tanzer, DMD, PhD, DHC<sup>b</sup>,  
Peter M. Milgrom, DDS<sup>c,\*</sup>

## KEYWORDS

- Fluorides • Topical • Public health dentistry • Dental caries • Silver diamine fluoride
- Pit and fissure sealants

## KEY POINTS

- Scarce public health resources should be directed toward intensive prevention of dental caries in toddlers and preschool-aged children.
- Expansion of school programs to include more strategies to atraumatically arrest lesions would increase program effectiveness.
- The risk and the need for primary prevention are not static but change across the life course.
- Public water and salt fluoridation, and taxes on sugar consumption are cost-effective approaches to decrease risk and increase resistance. Fluoride toothpaste should be distributed widely.
- Fluoride is not sufficient to control dental caries in high-risk patients. Topical antimicrobial therapies and dietary modifications should be instituted.

This article focuses on strategies to reduce the burden of dental caries across the population, using fluorides and some other dental caries preventive agents. It is imperative to be purposeful about the goals of using the various interventions, and particularly that agents should be targeted by patterns of disease susceptibility, which are

---

Disclosure Statement: J.A. Horst declares no conflict of interest. P.M. Milgrom is a director of Advantage Silver Dental Arrest, LLC, and served as a consultant to Cadbury Ltd and Kraft Foods Inc. J.M. Tanzer has served as a grant reviewer for the Sugar Association and the National Dairy Council and as a consultant for BASF and Advantage Silver Arrest, LLC.

<sup>a</sup> Department of Biochemistry and Biophysics, University of California San Francisco, 1700 4th Street, QB3 Room 404, San Francisco, CA 94158, USA; <sup>b</sup> Section on Oral Medicine, Department of Oral and Maxillofacial Diagnostic Sciences, University of Connecticut Health, University of Connecticut, 263 Farmington Avenue, Farmington, CT 06030, USA; <sup>c</sup> Department of Oral Health Sciences, University of Washington, Box 357475, Seattle, WA 98195-7475, USA

\* Corresponding author.

E-mail address: [dfrc@uw.edu](mailto:dfrc@uw.edu)

Dent Clin N Am 62 (2018) 207–234

<https://doi.org/10.1016/j.cden.2017.11.003>

0011-8532/18/© 2017 Elsevier Inc. All rights reserved.

[dental.theclinics.com](http://dental.theclinics.com)

associated with age. Dental caries in its various forms—early childhood caries (ECC), severe ECC, primary dental caries of the deciduous and permanent dentition, recurrent caries, and root surface caries—are diseases in which the products of sugar metabolism by certain bacteria that populate the tooth surface induce the development and progression of lesions.

These lesions (so-called cavities) are the clinical expression of disease, in which dental plaque bacteria metabolize sugar into polymeric substances that stabilize their adherence to the tooth and into acids that demineralize the hard tissues of the tooth. The term caries lesion includes the spectrum of lost tooth structure ranging from “white spot” enamel demineralizations, through large cavitations that extend into dentin. The bacterial species involved in the disease process are substantially known, but vary among depths and sites of caries lesions. There is little evidence that any interventions currently in use by dentists reduce the incidence of dental caries as a disease. The most effective interventions now known decrease the incidence of new lesions and curtail lesion growth, and these will be a major subject of this article. Dentists, it should be noted, currently spend most of their time dealing with previously treated caries lesions, referred to as recurrent or secondary caries lesions. Population-focused prevention efforts seek to alter the dental plaque biofilm, by reducing dietary sugar exposure, and improving the resilience of the teeth.

In general, primary prevention attempts to address etiology, and secondary prevention aims to stop progress of disease. Confusion arises from failure to distinguish the difference between tooth-level (lesion) versus individual- and population-level (disease) prevention. We do not have adequate, facile means to detect caries activity before lesions have occurred; the apparent breakdown of tooth structures is a result of a disease process that started earlier. The presence of visible lesions is the best available diagnostic for disease and predictor of future disease, so this is what we use. Meanwhile, cure of caries is just as elusive as for most cancers or coronary heart disease; what we presently do is count the years since the last sign of disease, such as the appearance of a new lesion or growth of an existing lesion. Thus, once a person has had any caries lesions it is unclear whether intervention could target primary prevention of disease. The aim in this case is to reduce the impact of the disease, that is, secondary prevention.

This paper focuses primarily on interventions that enhance resistance to disease progress. Enhancing resistance is achieved through the use of various fluorides, sugar substitutes, and mechanical barriers such as pit-and-fissure sealants. Relatively new to the discussion of primary and secondary prevention is the use of antimicrobials. Other key aspects of caries control are behavioral interventions (eg, motivational interviewing) with patients and their caretakers (parents, guardians, grandparents, etc) to promote use of disease transmission-reducing and resistance-enhancing agents. Behavioral intervention is necessary, because the interventions do have to be used to work.

A key means of risk reduction for primary prevention of dental caries on the population level is through a decrease of frequency and duration of exposure to dietary sugar. Such public health efforts—through present and potential government policies and industry food guidelines to improve overall nutrition—need to be part of dental public health practice. The enormous increases in sugars consumption over the past 40 years, and concomitant increase of human metabolic diseases (diabetes, obesity, heart disease, and stroke) demonstrate that people and families generally are not able to control sugar intake on their own, and thus system-wide public health changes are needed. However, efforts of the sugar industry during the 1960s and 1970s resulted in a shift away from research and progress in this field<sup>1</sup>; however, more recently, successful reductions in sugar consumption have been achieved by raising taxes, as in Mexico.<sup>2</sup>

Download English Version:

<https://daneshyari.com/en/article/8697575>

Download Persian Version:

<https://daneshyari.com/article/8697575>

[Daneshyari.com](https://daneshyari.com)