



POLICY STATEMENT

Maintaining and Improving the Oral Health of Young Children

abstract

FREE

Oral health is an integral part of the overall health of children. Dental caries is a common and chronic disease process with significant short- and long-term consequences. The prevalence of dental caries for the youngest of children has not decreased over the past decade, despite improvements for older children. As health care professionals responsible for the overall health of children, pediatricians frequently confront morbidity associated with dental caries. Because the youngest children visit the pediatrician more often than they visit the dentist, it is important that pediatricians be knowledgeable about the disease process of dental caries, prevention of the disease, and interventions available to the pediatrician and the family to maintain and restore health. *Pediatrics* 2014;134:1224–1229

INTRODUCTION

Dental caries is the most common chronic disease of childhood. Twenty-four percent of US children 2 to 4 years of age, 53% of children 6 to 8 years of age, and 56% of 15-year-olds have caries experience (ie, untreated dental caries, filled teeth, teeth missing as a result of dental caries).¹ For children 5 to 19 years of age, children from poor and racial or ethnic minority families have higher rates of untreated dental caries than do their peers from nonpoor and nonminority families.² For some age groups, the incidence of dental caries has decreased or stayed the same, but for the youngest children, it has increased.³ Among 6- to 8-year-olds and 15-year-olds, caries experience and untreated dental decay remained mostly unchanged between 1988–1994 and 1999–2004.¹ In children 2 to 4 years of age, the caries experience increased significantly, from 19% to 24%, during that same time period. The increase in the caries experience and untreated caries was statistically significant in children from poor families.

THE ETIOLOGY AND PATHOGENESIS OF DENTAL CARIES

A dynamic process takes place at the surface of the tooth that involves constant demineralization and remineralization of the tooth enamel (the caries balance).^{4,5} Multiple factors affect that dynamic process and can be manipulated in ways that tip the balance toward disease (demineralization) or health (remineralization). These factors include bacteria, sugar, saliva, and fluoride. Because these factors can be

SECTION ON ORAL HEALTH

KEY WORDS

dental, fluoride, oral health, pediatrician, teeth

ABBREVIATION

AAP—American Academy of Pediatrics

This document is copyrighted and is property of the American Academy of Pediatrics and its Board of Directors. All authors have filed conflict of interest statements with the American Academy of Pediatrics. Any conflicts have been resolved through a process approved by the Board of Directors. The American Academy of Pediatrics has neither solicited nor accepted any commercial involvement in the development of the content of this publication.

Policy statements from the American Academy of Pediatrics benefit from expertise and resources of liaisons and internal (AAP) and external reviewers. However, clinical reports from the American Academy of Pediatrics may not reflect the views of the liaisons or the organizations or government agencies that they represent.

The guidance in this statement does not indicate an exclusive course of treatment or serve as a standard of medical care. Variations, taking into account individual circumstances, may be appropriate.

All policy statements from the American Academy of Pediatrics automatically expire 5 years after publication unless reaffirmed, revised, or retired at or before that time.

www.pediatrics.org/cgi/doi/10.1542/peds.2014-2984

doi:10.1542/peds.2014-2984

PEDIATRICS (ISSN Numbers: Print, 0031-4005; Online, 1098-4275).

Copyright © 2014 by the American Academy of Pediatrics

manipulated, it is possible for pediatricians and families to prevent, halt, or even reverse the disease process.

Different oral structures and tissues have different and distinct microbial communities (microbiomes).⁶ The oral microbiome at the surface of the tooth is referred to as dental plaque. During the disease process of dental caries, bacteria that are aciduric and acidogenic predominate in the dental plaque. *Streptococcus mutans* is most strongly associated with dental caries, although other bacterial species have these capabilities and thus can also be pathogenic. When environmental factors make it possible to select for these pathogenic bacteria in dental plaque, the disease process begins.

A key environmental factor that allows for selection and proliferation of these pathogenic bacteria is dietary sugar intake. Because these pathogenic bacteria have the ability to ferment sugars, produce acid, and decrease the pH of the dental plaque, they make possible the selection of other aciduric, acidogenic bacteria that will contribute to disease. As more bacteria produce more acid, the pH at the surface of the tooth decreases. This process causes the demineralization of the tooth enamel. Unimpeded, these long periods of low pH and demineralization will result in cavitation.

Saliva is an important factor in buffering the low pH and bringing these demineralization pressures back to a balance with remineralization. In addition to acting as a buffering agent, saliva also flushes the oral cavity of food particles and provides an environment rich in calcium and phosphate to aid in remineralization. When salivary flow is impeded, the pH is able to decrease to a lower level, tipping the scales toward demineralization (disease); in addition, the time it takes to buffer back to a normal pH is longer.⁷

Another important factor that can affect the balance of demineralization

and remineralization is fluoride. More in-depth reviews of fluoride are available elsewhere.^{8–10} It is important, however, for pediatricians and other child health care providers to understand how fluoride influences the caries balance. Fluoride has 3 key effects on the caries balance: (1) inhibition of demineralization at the tooth surface; (2) enhancement of remineralization, which results in a more acid-resistant tooth surface; and (3) inhibition of bacterial enzymes.¹¹ The primary effect of fluoride is topical, via fluoridated toothpastes, mouth rinses, and varnishes, although there is still value in systemic fluoride exposures via fluoridated water and supplements.^{9,11}

PREVENTIVE STRATEGIES

Caries Risk Assessment

Ideally, primary prevention efforts will anticipate and prevent caries before the first sign of disease. Preventive strategies for this multifactorial, chronic disease require a comprehensive and multifocal approach that begins with caries risk assessment. Assessing each child's risk of caries and tailoring preventive strategies to specific risk factors are necessary for maintaining and improving oral health. There is no single test that takes into consideration all risk factors and accurately predicts an individual's susceptibility to caries. However, pediatricians can conduct an excellent risk assessment for caries by focusing on the key risk factors for dental caries that are associated with diet, bacteria, saliva, and status of the teeth (both current status and previous caries experience). The American Academy of Pediatrics (AAP)/Bright Futures Oral Health Risk Assessment Tool can be found at https://www.aap.org/en-us/Documents/oralhealth_RiskAssessmentTool.pdf.¹²

Sugars (but not sugar substitutes) are a critical risk factor in the development of caries. The risk of caries is greatest if sugars are consumed at high frequency and are in a form that

remains in the mouth for long periods of time.¹³ Thus, key behaviors that place a child at high risk of caries include continual bottle/sippy cup use (especially with fluids other than water), sleeping with a bottle (especially with fluids other than water), frequent between-meal snacks of sugars/cooked starch/sugared beverages, and frequent intake of sugared medications.

Early acquisition of *S mutans* is a major risk factor for early childhood caries and future caries experience.¹⁴ Strong evidence demonstrates that mothers are a primary source of *S mutans* colonization for their children.¹⁵ Thus, an important factor associated with caries risk in young children is the recent or current presence of active dental decay in the primary caregiver. Prevention, diagnosis, and treatment of oral diseases are highly beneficial, can be undertaken, and should be encouraged during pregnancy with no additional fetal or maternal risk compared with the risk of not providing care.¹⁶ The most important and predictive risk factor for caries, however, is previous caries experience. This finding is not surprising, considering that the factors which initiated the disease process often continue to exist over time.

Other caries risk factors are associated with salivary flow and the status of the teeth. Diseases (eg, diabetes mellitus, Sjögren's syndrome, cystic fibrosis) and medications (eg, antihistamines, anticonvulsants, antidepressants) that result in xerostomia (decreased salivary flow) reduce the availability of saliva to buffer the acid produced by pathogenic bacteria, thus enhancing their ability to cause damage to the teeth. In addition, the teeth of preterm infants, which frequently have enamel defects, are at increased susceptibility for disease. Older children who have deep pits and fissures in their molars are also at increased susceptibility for disease.

Anticipatory Guidance

With a clear understanding of the etiology of dental caries and the risk factors that lead to and facilitate the spread of this disease, pediatricians can target anticipatory guidance to assist families in preventing it. Because the disease of dental caries is multifocal, the anticipatory guidance should also be multifocal. Pediatricians should concentrate their anticipatory guidance on topics that can affect the risk of disease.

Dietary Counseling

Because sugar intake is such an important risk factor for dental caries, pediatricians can incorporate anticipatory guidance associated with preventing dental caries into discussions with families about dietary habits and nutritional intake. Pediatricians should counsel parents and caregivers on the importance of reducing the frequency of exposure to sugars in foods and drinks. To decrease the risk of dental caries and ensure the best possible health and developmental outcomes, pediatricians should recommend that parents do the following:

- Exclusively breastfeed infants for 6 months and continue breastfeeding as complementary foods are introduced for 1 year or longer, as mutually desired by mother and infant.¹⁷
- Discourage putting a child to bed with a bottle. Establish a bedtime routine conducive to optimal oral health (eg, brush, book, and bed).
- Wean from a bottle by 1 year of age.
- Limit sugary foods and drinks to mealtimes.
- Avoid carbonated, sugared beverages and juice drinks that are not 100% juice.
- Limit the intake of 100% fruit juice to no more than 4 to 6 oz per day.
- Encourage children to drink only water between meals, preferably fluoridated tap water.

- Foster eating patterns that are consistent with guidelines from the US Department of Agriculture.

Oral Hygiene

The value of good oral hygiene lies in controlling the levels and activity of disease-causing bacteria in the oral cavity and delivering fluoride to the surface of the tooth. It is important to remember that pathogenic bacteria can be passed from caregiver to child.¹⁸ Thus, anticipatory guidance for both parent and child is important. Key anticipatory guidance points regarding oral hygiene are as follows:

- Parents/caregivers should be encouraged to model and maintain good oral hygiene and a relationship with their own dental provider.
- Parents/caregivers, especially those with significant history of dental decay, should be cautioned to avoid sharing with their child items that have been in their own mouths.
- The child's teeth should be brushed twice a day as soon as the teeth erupt with a smear or a grain-of-rice-sized amount of fluoridated toothpaste. After the third birthday, a pea-sized amount should be used.
- Parents/caregivers should help/supervise a child brushing his or her teeth until mastery is obtained, usually at around 8 years of age.

Fluoride

The delivery of fluoride to the teeth includes community-based options (water fluoridation), self-administered modalities (fluoride toothpaste and supplements), and professional applications (fluoride varnish). Each of these delivery mechanisms is useful in preventing dental caries.

Water fluoridation is a community-based intervention that optimizes the level of fluoride in drinking water, resulting in preeruptive and posteruptive protection of the teeth.¹⁹ Water fluoridation is a

cost-effective means of preventing dental caries, with the lifetime cost per person equaling less than the cost of 1 dental restoration.^{20,21} Most bottled waters do not contain an adequate amount of fluoride.

Fluoride toothpaste is an important way to deliver fluoride to the surface of the tooth. Fluoride toothpaste has been shown to be effective in reducing dental caries in both primary and permanent teeth.^{22,23} It is important to limit the amount of toothpaste used to a smear or a grain-of-rice-sized amount for young children and no more than a pea-sized amount for children older than 3 years.²⁴ Fluoride supplements should be prescribed for children whose primary source of drinking water is deficient in fluoride.²⁵

Fluoride varnish is a professionally applied, sticky resin of highly concentrated fluoride. Two or more applications of fluoride varnish per year are effective in preventing caries in children at high risk of all ages.⁸ In most states, pediatricians can apply and be paid for application of fluoride varnish to the teeth of young children. Application of fluoride varnish is even more effective when coupled with counseling.²⁶ The US Preventive Services Task Force recently published a new recommendation that primary care clinicians apply fluoride varnish to the primary teeth of all infants and children starting at the age of primary tooth eruption (B recommendation).²⁵ More details and recommendations on fluoride can be found in the AAP clinical report "Fluoride Use in Caries Prevention in the Primary Care Setting."¹⁰

Other Important Anticipatory Guidance Topics

A frequent topic of discussion with parents is nonnutritive oral habits, such as use of pacifiers and thumb sucking. AAP policy states that parents consider offering a pacifier at naptime

and bedtime because of a protective effect of pacifiers on the incidence of sudden infant death syndrome after the first month of life.²⁷ Both finger- and pacifier-sucking habits will only cause problems with dental structures if they go on for a long period of time. Evaluation by a dentist is indicated for non-nutritive sucking habits that continue beyond 3 years of age.²⁸

Dental injuries are common. Twenty-five percent of all schoolchildren experience some form of dental trauma.²⁹ Pediatricians can help prevent such trauma by encouraging parents to cover sharp corners of household furnishings at the level of walking toddlers, recommend use of car safety seats, and be aware of electrical cord risk for mouth injury. Pediatricians can also encourage mouthguard use during sports activities in which there is a significant risk of orofacial injury.³⁰ More information on dental trauma is available in the AAP clinical report "Management of Dental Trauma in a Primary Care Setting."³¹

COLLABORATION WITH DENTAL PROVIDERS

The AAP, the American Academy of Pediatric Dentistry, the American Dental Association, and the American Association of Public Health Dentistry all recommend a dental visit for children by 1 year of age. Although pediatricians have the opportunity to provide early assessment of risk for dental caries and anticipatory guidance to prevent disease, it is also important that children establish a dental home. A dental home is the ongoing relationship between the dentist and the patient, inclusive of all aspects of oral health care delivered in a comprehensive, continuously accessible, coordinated, and family-centered way.³²

Unfortunately, little is known about pediatric health care providers' dental referral behaviors and patterns. Al-

though 1 study found that children 2 to 5 years of age who received a recommendation from their health care provider to visit the dentist were more likely to have a dental visit,³³ the US Preventive Services Task Force found no study that evaluated the effects of referral by a primary care clinician to a dentist on caries incidence.³⁴ It is also noteworthy that preschool-aged children covered by Medicaid who had an early preventive dental visit by 1 year of age were more likely to use subsequent preventive services and to have lower dental expenses.³⁵

With early referral to a dental provider, there is an opportunity to maintain good oral health, prevent disease, and treat disease early. Establishing such collaborative relationships between physicians and dentists at the community level is essential for increasing access to dental care for all children and improving their oral and overall health.

CONCLUSIONS

Oral health is an integral part of the overall health and well-being of children.³⁶ A pediatrician who is familiar with the science of dental caries, capable of assessing caries risk, comfortable with applying various strategies of prevention and intervention, and connected to dental resources can contribute considerably to the health of his or her patients. This policy statement, in conjunction with the oral health recommendations of the third edition of the AAP's *Bright Futures: Guidelines for Health Supervision of Infants, Children, and Adolescents*, serves as a resource for pediatricians and other pediatric primary care providers to be knowledgeable about addressing dental caries.³⁷ Because dental caries is such a common and consequential disease process in the pediatric population, it is essential that pediatricians include oral health in their daily practice of pediatrics.

SUGGESTIONS FOR PEDIATRICIANS

1. Administer an oral health risk assessment periodically to all children.
2. Include anticipatory guidance for oral health as an integral part of comprehensive patient counseling.
3. Counsel parents/caregivers and patients to reduce the frequency of exposure to sugars in foods and drinks.
4. Encourage parents/caregivers to brush a child's teeth as soon as teeth erupt with a smear or a grain-of-rice-sized amount of fluoride toothpaste and a pea-sized amount at 3 years of age.
5. Advise parents/caregivers to monitor brushing until 8 years of age.
6. Refer to the AAP clinical report, "Fluoride Use in Caries Prevention in the Primary Care Setting," for fluoride administration and supplementation decisions.
7. Build and maintain collaborative relationships with local dentists.
8. Recommend that every child has a dental home by 1 year of age.

LEAD AUTHOR

David M. Krol, MD, MPH, FAAP

SECTION ON ORAL HEALTH EXECUTIVE COMMITTEE, 2012–2013

Adriana Segura, DDS, MS, FAAP, Chairperson
Suzanne Boulter, MD, FAAP
Melinda Clark, MD, FAAP
Rani Gereige, MD, FAAP
David M. Krol, MD, MPH, FAAP
Wendy Mouradian, MD, FAAP
Rocio Quinonez, DMD, MPH, FAAP
Francisco Ramos-Gomez, DDS, FAAP
Rebecca Slayton, DDS, PhD, FAAP
Martha Ann Keels, DDS, PhD, FAAP, Immediate Past Chairperson

LIAISONS

Joseph Castellano, DDS — American Academy of Pediatric Dentistry
Sheila Strock, DMD, MPH — American Dental Association Liaison

STAFF

Lauren Barone, MPH

REFERENCES

1. Dye BA, Thornton-Evans G. Trends in oral health by poverty status as measured by Healthy People 2010 objectives. *Public Health Rep.* 2010;125(6):817–830
2. Dye BA, Li X, Beltran-Aguilar ED. Selected oral health indicators in the United States, 2005–2008. *NCHS Data Brief.* 2012;(96):1–8
3. Beltrán-Aguilar ED, Barker LK, Canto MT, et al; Centers for Disease Control and Prevention (CDC). Surveillance for dental caries, dental sealants, tooth retention, edentulism, and enamel fluorosis—United States, 1988–1994 and 1999–2002. *MMWR Surveill Summ.* 2005;54(3):1–43
4. Featherstone JD. The caries balance: the basis for caries management by risk assessment. *Oral Health Prev Dent.* 2004;2(suppl 1):259–264
5. Siqueira WL, Custodio W, McDonald EE. New insights into the composition and functions of the acquired enamel pellicle. *J Dent Res.* 2012;91(12):1110–1118
6. Aas JA, Paster BJ, Stokes LN, Olsen I, Dewhirst FE. Defining the normal bacterial flora of the oral cavity. *J Clin Microbiol.* 2005;43(11):5721–5732
7. Englander HR, Shklair IL, Fosdick LS. The effects of saliva on the pH and lactate concentration in dental plaques. I. Caries-rampant individuals. *J Dent Res.* 1959;38:848–853
8. American Dental Association Council on Scientific Affairs. Professionally applied topical fluoride: evidence-based clinical recommendations. *J Am Dent Assoc.* 2006;137(8):1151–1159
9. Rozier RG, Adair S, Graham F, et al. Evidence-based clinical recommendations on the prescription of dietary fluoride supplements for caries prevention: a report of the American Dental Association Council on Scientific Affairs. *J Am Dent Assoc.* 2010;141(12):1480–1489
10. Clark MB, Slayton RL; Section on Oral Health. Fluoride use in caries prevention in the primary care setting. *Pediatrics.* 2014;134(3):626–633
11. Task Force on Community Preventive Services. Recommendations on selected interventions to prevent dental caries, oral and pharyngeal cancers, and sports-related craniofacial injuries. *Am J Prev Med.* 2002;23(suppl 1):16–20
12. Brightening Oral Health Expert Group; American Academy of Pediatrics, Section on Oral Health. Oral health risk assessment tool. Available at: https://www.aap.org/en-us/Documents/oralhealth_RiskAssessmentTool.pdf. Accessed October 28, 2013
13. Tinanoff N, Palmer CA. Dietary determinants of dental caries and dietary recommendations for preschool children. *J Public Health Dent.* 2000;60(3):197–206, discussion 207–209
14. Berkowitz RJ. Mutans streptococci: acquisition and transmission. *Pediatr Dent.* 2006;28(2):106–109, discussion 192–198
15. Douglass JM, Li Y, Tinanoff N. Association of mutans streptococci between caregivers and their children. *Pediatr Dent.* 2008;30(5):375–387
16. Oral Health Care During Pregnancy Expert Work Group. *Oral Health Care During Pregnancy: A National Consensus Statement.* Washington, DC: National Maternal and Child Oral Health Resource Center; 2012
17. Section on Breastfeeding. Breastfeeding and the use of human milk. *Pediatrics.* 2012;129(3). Available at: www.pediatrics.org/cgi/content/full/129/3/e827
18. Köhler B, Bratthall D, Krasse B. Preventive measures in mothers influence the establishment of the bacterium *Streptococcus mutans* in their infants. *Arch Oral Biol.* 1983;28(3):225–231
19. Singh KA, Spencer AJ. Relative effects of pre- and post-eruption water fluoride on caries experience by surface type of permanent first molars. *Community Dent Oral Epidemiol.* 2004;32(6):435–446
20. Centers for Disease Control and Prevention. Recommendations for using fluoride to prevent and control dental caries in the United States. *MMWR Recomm Rep.* 2001;50(RR-14):1–42
21. Griffin SO, Jones K, Tomar SL. An economic evaluation of community water fluoridation. *J Public Health Dent.* 2001;61(2):78–86
22. dos Santos AP, Nadanovsky P, de Oliveira BH. A systematic review and meta-analysis of the effects of fluoride toothpastes on the prevention of dental caries in the primary dentition of preschool children. *Community Dent Oral Epidemiol.* 2013;41(1):1–12
23. Marinho VC, Higgins JP, Sheiham A, Logan S. Fluoride toothpastes for preventing dental caries in children and adolescents. *Cochrane Database Syst Rev.* 2003;1(1):CD002278
24. Wright JT, Hanson N, Ristic H, Whall CW, Estrich CG, Zentz RR. Fluoride toothpaste efficacy and safety in children younger than 6 years: a systematic review. *J Am Dent Assoc.* 2014;145(2):182–189
25. US Preventive Services Task Force. Prevention of Dental Caries in Children From Birth Through Age 5 Years: US Preventive Services Task Force Recommendation Statement. Rockville, MD: US Preventive Services Task Force; 2014. Available at: www.uspreventiveservicestaskforce.org/uspstf/uspstdnch.htm. Accessed May 20, 2014
26. Weintraub JA, Ramos-Gomez F, Jue B, et al. Fluoride varnish efficacy in preventing early childhood caries. *J Dent Res.* 2006;85(2):172–176
27. Moon RY; Task Force on Sudden Infant Death Syndrome. SIDS and other sleep-related infant deaths: expansion of recommendations for a safe infant sleeping environment. *Pediatrics.* 2011;128(5):1030–1039
28. Nowak AJ, Warren JJ. Infant oral health and oral habits. *Pediatr Clin North Am.* 2000;47(5):1043–1066, vi
29. Diangelis AJ, Andreasen JO, Ebeleseder KA, et al; International Association of Dental Traumatology. International Association of Dental Traumatology guidelines for the management of traumatic dental injuries: 1. Fractures and luxations of permanent teeth. *Dent Traumatol.* 2012;28(1):2–12
30. ADA Council on Access, Prevention and Interprofessional Relations; ADA Council on Scientific Affairs. Using mouthguards to reduce the incidence and severity of sports-related oral injuries. *J Am Dent Assoc.* 2006;137(12):1712–1720, quiz 1731
31. Keels MA, American Academy of Pediatrics, Section on Oral Health. Management of dental trauma in a primary care setting. *Pediatrics.* 2014;133(2). Available at: www.pediatrics.org/cgi/content/full/133/2/e466
32. American Academy of Pediatric Dentistry. Policy on the dental home. American Academy of Pediatric Dentistry Oral Health Policies Reference Manual. 2013/2014; 35(6):24–25. Available at: www.aapd.org/media/Policies_Guidelines/P_DentalHome.pdf. Accessed October 28, 2013
33. Beil HA, Rozier RG. Primary health care providers' advice for a dental checkup and dental use in children. *Pediatrics.* 2010;126(2). Available at: www.pediatrics.org/cgi/content/full/126/2/e435
34. Chou R, Cantor A, Zakher B, Mitchell JP, Pappas M. Preventing dental caries in children <5 years: systematic review updating USPSTF recommendation. *Pediatrics.* 2013;132(2):332–350
35. Lee JY, Bouwens TJ, Savage MF, Vann WF Jr. Examining the cost-effectiveness of early dental visits. *Pediatr Dent.* 2006;28(2):102–105, discussion 192–198
36. National Institute of Dental and Craniofacial Research. *Oral Health in America: A Report*

of the Surgeon General. Rockville, MD: US Department of Health and Human Services, National Institute of Dental and Craniofacial Research; 2000

37. American Academy of Pediatrics, Bright Futures Steering Committee. Promoting oral health. In: Hagan JF, Shaw JS, Duncan PM, eds. *Bright Futures: Guidelines for*

Health Supervision of Infants, Children, and Adolescents. 3rd ed. Elk Grove Village, IL: American Academy of Pediatrics; 2008: 155–168