

AMERICAN ACADEMY OF PEDIATRICS

POLICY STATEMENT

Organizational Principles to Guide and Define the Child Health Care System and/or Improve the Health of All Children

Section on Pediatric Dentistry

Oral Health Risk Assessment Timing and Establishment of the Dental Home

ABSTRACT. Early childhood dental caries has been reported by the Centers for Disease Control and Prevention to be perhaps the most prevalent infectious disease of our nation's children. Early childhood dental caries occurs in all racial and socioeconomic groups; however, it tends to be more prevalent in low-income children, in whom it occurs in epidemic proportions. Dental caries results from an overgrowth of specific organisms that are a part of normally occurring human flora. Human dental flora is site specific, and an infant is not colonized until the eruption of the primary dentition at approximately 6 to 30 months of age. The most likely source of inoculation of an infant's dental flora is the mother or another intimate care provider, through shared utensils, etc. Decreasing the level of cariogenic organisms in the mother's dental flora at the time of colonization can significantly impact the child's predisposition to caries. To prevent caries in children, high-risk individuals must be identified at an early age (preferably high-risk mothers during prenatal care), and aggressive strategies should be adopted, including anticipatory guidance, behavior modifications (oral hygiene and feeding practices), and establishment of a dental home by 1 year of age for children deemed at risk.

INTRODUCTION

The Centers for Disease Control and Prevention reports that dental caries is perhaps the most prevalent of infectious diseases in our nation's children. Dental caries is 5 times more common than asthma and 7 times more common than hay fever in children.¹ More than 40% of children have tooth decay by the time they reach kindergarten.² Infants who are of low socioeconomic status, whose mothers have a low education level, and who consume sugary foods are 32 times more likely to have caries at the age of 3 years than children in whom those risk factors are not present.³ Decay of primary teeth can affect children's growth, lead to malocclusion, and result in significant pain and potentially life-threatening swelling. Because pediatricians and other pediatric health care professionals are far more likely to encounter new mothers and infants than are dentists, it is essential that they be aware of the infectious pathophysiology and associated risk factors of early childhood dental caries to make appropriate deci-

sions regarding timely and effective intervention. Dental decay can be well advanced by 3 years of age.

BACKGROUND

Dental caries results from an overgrowth of specific organisms that are part of normally occurring human dental flora.⁴ *Streptococcus mutans* and *Lactobacillus* species are considered to be principal indicator organisms of those of aciduric bacteria responsible for caries. Human dental flora is site specific, and an infant is not colonized with normal dental flora until the eruption of the primary dentition at approximately 6 to 30 months of age.^{5,6} The vertical colonization of *S mutans* from mother to infant is well documented.^{7,8} In fact, genotypes of *S mutans* in infants appear identical to those present in mothers in approximately 71% of mother-infant pairs.⁹ Furthermore, evidence suggests that specific organisms exhibit discrete windows of inoculation; the acquisition of *S mutans* occurs at an average age of approximately 2 years.¹⁰

The significance of this information becomes focused when considering 3 points. First, high caries rates run in families¹¹ and are passed from mother to child from generation to generation. The children of mothers with high caries rates are at a higher risk of decay.¹² Second, approximately 70% of all dental caries are found in 20% of our nation's children.¹³ Third, the modification of the mother's dental flora at the time of the infant's colonization can significantly impact the child's caries rate.¹⁴⁻¹⁶ Therefore, an oral health risk assessment before 1 year of age affords the opportunity to identify high-risk patients and to provide timely referral and intervention for the child and allows an invaluable opportunity to decrease the level of cariogenic organisms in the mother with a significant caries risk before and during colonization of the infant.

BASIC PREVENTIVE STRATEGIES

Historically, the approach to preventing the development of dental caries has been to establish and maintain good oral hygiene, optimize systemic and topical fluoride exposure, and eliminate prolonged exposure to simple sugars in the diet. The success of this age-old approach is also the foundation for the ideal standard of establishment of the dental home

by 1 year of age, as endorsed by the American Dental Association, the American Academy of Pediatric Dentistry, supporting organizations of Bright Futures, and numerous other children's health organizations.

Dental caries typically results from diet-mediated shifts in dental bacterial populations that favor acidogenic-aciduric (cariogenic) organisms.¹⁷ The judicious optimization of diet, fluoride intake, and hygiene reverses the aciduric shift, resulting in fewer cariogenic flora and decreased rates of caries. Clinical observations suggest that aciduric shifts are often associated with pregnancy, with return to pre-pregnancy cariogenic-benign flora ratio occurring on the same timeline as the colonization of the infant with dental flora (6 to 30 months of age). The overall strategy is to lower the numbers of cariogenic bacteria in the mother's mouth and delay colonization as long as possible (avoid sharing of spoons, orally cleansing pacifiers, etc).

Tooth decay is a disease that is, by and large, preventable. Because of how it is caused and when it begins, however, steps to prevent it ideally should begin prenatally with pregnant women and continue with the mother and young child, beginning when the infant is approximately 6 months of age. The primary thrust of early risk assessment is to screen for parent-infant groups who are at risk of early childhood dental caries and would benefit from early aggressive intervention. The ultimate goal of early assessment is the timely delivery of educational information to populations at high risk of caries to avoid the need for later surgical intervention.

ORAL HEALTH RISK ASSESSMENT

Every child should begin to receive oral health risk assessments by 6 months of age by a qualified pediatrician or a qualified pediatric health care professional. The Caries Risk Assessment Tool (provided and continually updated by the American Academy of Pediatric Dentistry and available at <http://www.aapd.org/members/referencemanual/pdfs/02-03/Caries%20Risk%20Assess.pdf>) can be used to determine the relative risk of caries of the patient. In the case of the very young patient, a risk assessment to identify parents (usually mothers) and infants with a high predisposition to caries can easily be performed by taking a simple dental history from a new mother. Questions directed at dietary practices, fluoride exposure, oral hygiene, utilization of dental services, and the number and location of the mother's dental fillings can give a relative indication of the mother's baseline decay potential. Frequent sugar intake, low fluoride exposure, poor oral hygiene practices, infrequent utilization of dental services and/or active decay and/or multiple dental fillings in multiple quadrants of the mouth indicates a high caries risk in the mother. Because the dental history of the mother has a direct correlation to that of her infant, it is justifiable and appropriate for the pediatrician to garner permission to examine the mother's dentition and gingival tissues. Additionally, clinical observations suggest that second and third infants tend to be colonized earlier, when the mother's cariogenic flora

is at a higher level. Therefore, the later-order offspring of a mother with mildly to moderately high caries rate may be at higher risk of caries than are offspring born earlier. Unfortunately, the lack of accessible longitudinal dental databases has not yet allowed these observations to be epidemiologically confirmed.

RISK GROUPS FOR DENTAL CARIES

The caries risk potential of an infant can be determined by the use of the Caries Risk Assessment Tool. However, even the most judiciously designed and implemented caries risk assessment tool can fail to identify all infants at risk of early childhood dental caries. If an infant is assessed to be within 1 of the following risk groups, the care requirements would be significant and surgically invasive; therefore, these infants should be referred to a dentist as early as 6 months of age and no later than 6 months after the first tooth erupts or 12 months of age (whichever comes first) for establishment of a dental home:

- Children with special health care needs
- Children of mothers with a high caries rate
- Children with demonstrable caries, plaque, demineralization, and/or staining
- Children who sleep with a bottle or breastfeed throughout the night
- Later-order offspring
- Children in families of low socioeconomic status

Despite all efforts to predict children at high risk of caries, patients can and do fall outside statistical expectations. In these cases, the mother may not be the colonization source of the child's dental flora, the dietary intake of simple carbohydrates may be extremely high, or other uncontrollable factors may combine to place the patient at risk of caries. Therefore, screening for risk of caries in the parent and patient coupled with oral health counseling, although a feasible and equitable approach to early childhood caries control, is not a substitute for early establishment of the dental home. Whenever possible, the ideal approach to early childhood caries prevention and management is the early establishment of a dental home.

ESTABLISHING THE DENTAL HOME

The concept of the "dental home" is derived from the American Academy of Pediatrics concept of the "medical home." The American Academy of Pediatrics states, "the medical care of infants, children, and adolescents ideally should be accessible, continuous, comprehensive, family centered, coordinated, compassionate, and culturally effective. It should be delivered or directed by well-trained physicians who provide primary care and help to manage and facilitate essentially all aspects of pediatric care."¹⁸ Pediatric primary dental care needs to be delivered in a similar manner. The dental home is a specialized primary dental care provider within the philosophical complex of the medical home. Referring a child for an oral health examination by a dentist who provides care for infants and young children

6 months after the first tooth erupts or by 12 months of age establishes the child's dental home and provides an opportunity to implement preventive dental health habits that meet each child's unique needs and keep the child free from dental or oral disease. The dental home should be expected to provide:

- An accurate risk assessment for dental diseases and conditions
- An individualized preventive dental health program based on the risk assessment
- Anticipatory guidance about growth and development issues (ie, teething, digit or pacifier habits, and feeding practices)
- A plan for emergency dental trauma
- Information about proper care of the child's teeth and gingival tissues
- Information regarding proper nutrition and dietary practices
- Comprehensive dental care in accordance with accepted guidelines and periodicity schedules for pediatric dental health
- Referrals to other dental specialists, such as endodontists, oral surgeons, orthodontists, and periodontists, when care cannot be provided directly within the dental home

ANTICIPATORY GUIDANCE AND PARENT AND PATIENT EDUCATION

General anticipatory guidance for the mother (or other intimate caregiver) before and during the colonization process should include the following:

- Oral hygiene—the parent should be instructed to brush thoroughly twice daily (morning and evening) and to floss at least once every day.
- Diet—the parent should be instructed to consume fruit juices only at meals and to avoid all carbonated beverages during the first 30 months of the infant's life.
- Fluoride—the parent should be instructed to use a fluoride toothpaste approved by the American Dental Association and rinse every night with an alcohol-free over-the-counter mouth rinse with 0.05% sodium fluoride.
- Caries removal—parents should be referred to a dentist for an examination and restoration of all active decay as soon as feasible.
- Delay of colonization—mothers should be educated to prevent early colonization of dental flora in their infants by avoiding sharing of utensils (ie, shared spoons, cleaning a dropped pacifier with their saliva, etc).
- Xylitol chewing gums—recent evidence suggests that the use of xylitol chewing gum (4 pieces per day by mother) had a significant impact on decreasing the child's caries rates.¹⁶

General anticipatory guidance for the young patient (0 to 3 years of age) should include the following:

- Oral hygiene—the parent should begin to brush the child's teeth as soon as they erupt (twice daily, morning and evening) and floss between the

child's teeth once every day as soon as teeth contact one another.

- Diet—after the eruption of the first teeth, the parent should provide fruit juices (not to exceed 1 cup per day) during meals only. Carbonated beverages should be excluded from the child's diet. Infants should not be placed in bed with a bottle containing anything other than water. Ideally, infants should have their mouths cleansed with a damp cloth after feedings.
- Fluoride—all children should have optimal exposure to topical and systemic fluoride. Caution should be exercised in the administration of all fluoride-containing products. The specific considerations of the judicious administration of fluoride should be reviewed and tailored to the unique needs of each patient. Review articles with applicable fluoride recommendations and supplementation algorithms are available.^{19–22}

RECOMMENDATIONS

1. Early childhood caries is an infectious and preventable disease that is vertically transmitted from mothers or other intimate caregivers to infants. All health care professionals who serve mothers and infants should integrate parent and caregiver education into their practices that instruct effective methods of prevention of early childhood caries.
2. The infectious and transmissible nature of bacteria that cause early childhood caries and methods of oral health risk assessment, anticipatory guidance, and early intervention should be included in the curriculum of all pediatric medical residency programs and postgraduate continuing medical education curricula at an appropriate time.
3. Every child should begin to receive oral health risk assessments by 6 months of age from a pediatrician or a qualified pediatric health care professional.
4. Pediatricians, family practitioners, and pediatric nurse practitioners and physician assistants should be trained to perform an oral health risk assessment on all children beginning by 6 months of age to identify known risk factors for early childhood dental caries.
5. Infants identified as having significant risk of caries or assessed to be within 1 of the risk groups listed in this statement should be entered into an aggressive anticipatory guidance and intervention program provided by a dentist between 6 and 12 months of age.
6. Pediatricians should support the concept of the identification of a dental home as an ideal for all children in the early toddler years.

SUMMARY

Early childhood dental caries emerges within all cultural and economic pediatric populations; however, it approaches near epidemic proportions in populations with low socioeconomic status. Dental caries is an infectious disease usually passed from mother to child from generation to generation. Judicious optimization of diet, fluoride intake, and hy-

giene can decrease bacterial levels of specific organisms responsible for dental caries residing within normal dental flora. Decreasing the levels of cariogenic flora in the mother before and during the colonization process coupled with counseling directed toward optimal practices of diet, oral hygiene, and fluoride exposure can significantly and positively impact the child's predisposition to early childhood caries.

Pediatricians and pediatric health care professionals should develop the knowledge base to perform oral health risk assessments on all patients beginning at 6 months of age. Patients who have been determined to be at risk of development of dental caries or who fall into recognized risk groups should be directed to establish a dental home 6 months after the first tooth erupts or by 1 year of age (whichever comes first).

The ideal deterrence to early childhood caries is the establishment of the dental home when indicated by the unique needs of the child. Although not always feasible because of manpower and participation issues, best practice dictates that whenever feasible, all patients should have a comprehensive dental examination by a dentist in the early toddler years.

SECTION ON PEDIATRIC DENTISTRY, 2002–2003

Paul A. Weiss, DDS, Chairperson

Charles S. Czerepak, DMD, MS

*Kevin J. Hale, DDS

Martha Ann Keels, DDS, PhD

Huw F. Thomas, DDS, MS

Michael D. Webb, DDS

John E. Nathan, DDS, MDS

Past Executive Committee Member

LIAISON

Ray E. Stewart, DMD, MS

American Academy of Pediatric Dentistry

STAFF

Chelsea L. V. Kirk

*Lead author

REFERENCES

1. US Department of Health and Human Services. *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, National Institutes of Health; 2000
2. Pierce KM, Rozier RG, Vann WF Jr. Accuracy of pediatric primary care providers' screening and referral for early childhood caries. *Pediatrics*. 2002;109(5). Available at: <http://www.pediatrics.org/cgi/content/full/109/5/e82>
3. Nowak AJ, Warren JJ. Infant oral health and oral habits. *Pediatr Clin North Am*. 2000;47:1043–1066
4. Loesch WJ. Clinical and microbiological aspects of chemotherapeutic agents used according to the specific plaque hypothesis. *J Dent Res*. 1979;58:2404–2412
5. Berkowitz RJ, Jordan HV, White G. The early establishment of *Streptococcus mutans* in the mouths of infants. *Arch Oral Biol*. 1975;20:171–174
6. Stiles HM, Meyers R, Brunelle JA, Wittig AB. Occurrence of *Streptococcus mutans* and *Streptococcus sanguis* in the oral cavity and feces of young children. In: Stiles M, Loesch WJ, O'Brien T, eds. *Microbial Aspects of Dental Caries*. Washington, DC: Information Retrieval Inc; 1976:187
7. Davey AL, Rogers AH. Multiple types of the bacterium *Streptococcus mutans* in the human mouth and their intra-family transmission. *Arch Oral Biol*. 1984;29:453–460
8. Berkowitz RJ, Jones P. Mouth-to-mouth transmission of the bacterium *Streptococcus mutans* between mother and child. *Arch Oral Biol*. 1985;30:377–379
9. Li Y, Caufield PW. The fidelity of initial acquisition of *mutans streptococci* by infants from their mothers. *J Dent Res*. 1995;74:681–685
10. Caufield PW, Cutter GR, Dasanayake AP. Initial acquisition of *Mutans streptococci* by infants: evidence for a discrete window of infectivity. *J Dent Res*. 1993;72:37–45
11. Klein H, Palmer CE. Studies on dental caries V. Familial resemblance in caries experience of siblings. *Pub Health Rep*. 1938;53:1353
12. Klein H. The family and dental disease IV. Dental disease (DMF) experience in parents and offspring. *J Am Dent Assoc*. 1946;33:735
13. Kaste LM, Selwitz RH, Oldakowski RJ, Brunelle JA, Winn DM, Brown LJ. Coronal caries in the primary and permanent dentition of children and adolescents 1–17 years of age: United States, 1988–1991. *J Dent Res*. 1996;75:631–641
14. Kohler B, Andreen I, Jonsson B. The effects of caries-preventive measures in mothers on dental caries and the oral presence of the bacteria *Streptococcus mutans* and lactobacilli in their children. *Arch Oral Biol*. 1984;29:879–883
15. Brambilla E, Felloni A, Gagliani M, Malerba A, Garcia-Goday F, Strohmer L. Caries prevention during pregnancy: results of a 30-month study. *J Am Dent Assoc*. 1998;129:871–877
16. Isokangas P, Soderling E, Pienihakkinen K, Alanen P. Occurrence of dental decay in children after maternal consumption of xylitol chewing gum, a follow-up from 0 to 5 years of age. *J Dent Res*. 2000;79:1885–1889
17. Bradshaw DJ, Marsh PD. Analysis of pH-driven disruption of oral microbial communities in vitro. *Caries Res*. 1998;32:456–462
18. American Academy of Pediatrics, Medical Home Initiatives for Children With Special Needs Project Advisory Committee. The medical home. *Pediatrics*. 2002;110:184–186
19. Hale K, Heller K. Fluorides: getting the benefits, avoiding the risks. *Contemp Pediatr*. 2000;2:121
20. American Academy of Pediatric Dentistry. Policy statement on the use of fluoride. *Pediatr Dent*. 2001;23(SL7):14
21. 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
22. The American Dental Association. Caries diagnosis and risk assessment: a review of preventive strategies and management. *J Am Dent Assoc*. 1995;126(suppl):1S–24S

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.