Policy on Early Childhood Caries (ECC): Classifications, Consequences, and Preventive Strategies

Originating Group
A collaborative effort of the American Academy of Pediatric Dentistry and the American Academy of Pediatrics

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Purpose

The American Academy of Pediatric Dentistry (AAPD) recognizes early childhood caries (ECC; formerly termed baby bottle tooth decay) as a significant public health problem.[1] The AAPD encourages oral health care providers and caregivers to implement simple preventive practices that can decrease a child's risks of developing this devastating disease.

Methods

This policy is based on a review of the current pediatric dental, medical, and public health literature related to ECC, including the proceedings of the 1997 Conference on Early Childhood Caries, Bethesda, Md.[1]

The literature includes studies that used sound scientific methodology, were reported in refereed journals, and are accepted by the dental profession as state of the art in caries causes and prevention. The literature on the consequences of ECC is based on both prospective and retrospective clinical studies that followed accepted clinical protocols.

Background

ECC is defined as "the presence of 1 or more decayed (noncavitated or cavitated lesions), missing (due to caries), or filled tooth surfaces" in any primary tooth in a child 71 months of age or younger.[2,3] In children younger than 3 years of age, any sign of smooth-surface caries is indicative of severe early childhood caries (S-ECC). From ages 3 through 5, 1 or more cavitated, missing (due to caries), or filled smooth surfaces in primary maxillary anterior teeth or a decayed, missing, or filled score of ≥4 (age 3),≥5 (age 4), or ≥6 (age 5) surfaces constitutes S-ECC.[4]

Carious lesions are produced from the interaction of 3 variables: (1) cariogenic microorganisms (mutans streptococci); (2) fermentable carbohydrates (sucrose); and (3) teeth (nonshedding tooth surfaces).[5] Given the proper time, these variables induce incipient carious lesions that continue to progress.[5] Frequent consumption of liquids containing fermentable carbohydrates (eg, juice, milk, formula, soda) increases the risk of caries due to prolonged contact between sugars in the consumed liquid and cariogenic bacteria on the susceptible teeth.[6] Frequent bottle feeding at night, breast-feeding on demand, and extended and repetitive use of a no-spill training cup are associated with, but not consistently implicated in, ECC. The major reservoir from which infants acquire mutans streptococci is their mother's saliva.[5,7] The success of the transmission and resultant colonization of maternal mutans streptococci depends largely on the magnitude of the innoculum.[8] Infants and toddlers whose mothers have high levels of mutans streptococci, a result of untreated caries, are at greater risk of acquiring the organism than children whose mothers have low levels. Consequently, it has been shown that suppressing maternal reservoirs of mutans streptococci via dental rehabilitation and antimicrobial treatments can prevent or delay infant inoculation.[9]

Consequences of ECC include a higher risk of new carious lesions in both the primary and permanent dentitons,[10-15] hospitalizations and emergency room visits,[16-19] increased treatment costs and time,[20,21] insufficient physical development (especially in height/weight),[22,23] loss of school days and increased days with restricted activity,[24-26] diminished ability to learn,[24,27-30] and diminished oral health-related quality of life.[31-34]

Policy statement

The AAPD recognizes a distinctive pattern of caries, known as ECC, associated with frequent or prolonged consumption of liquids containing fermentable carbohydrates. To decrease the risks of this potentially devastating pattern of caries, the AAPD discourages inappropriate feeding practices of infants and toddlers and encourages appropriate preventive measures. These include:

1. Infants should not be put to sleep with a bottle. Ad libitum nocturnal breast-feeding should be avoided after the first primary tooth begins to erupt.
2. Parents should be encouraged to have infants drink from a cup as they approach their first birthday. Infants should be weaned from the bottle at 12 to 14 months of age.

3. Repetitive consumption of any liquid containing fermentable carbohydrates from a bottle or no-spill training cup should be avoided.
4. Oral hygiene measures should be implemented by the time of eruption of the first primary tooth.
5. An oral health consultation visit within 6 months of eruption of the first tooth and no later than 12 months of age is recommended to educate parents and provide anticipatory guidance for prevention of dental disease.
6. An attempt should be made to assess and decrease the mother's/primary caregiver's mutans streptococci levels to decrease the transmission of cariogenic bacteria and lessen the infant's or child's risk of developing ECC.

References

1. Proceedings. Conference on early childhood caries, Bethesda, Md, October 1997. Comm Dent Oral Epidemiol 1998;26(suppl).
2. Kaste LM, Drury TF, Horowitz AM, Beltran E. An evaluation of NHANES III estimates of early childhood caries. J Public Health Dent 1999;59:198-200.
3. Drury TF, Horowitz AM, Ismail AI, et al. Diagnosing and reporting early childhood caries for research purposes. J Public Health Dent 1999;59:192-197.
4. Ismail AI, Sohn W. A systematic review of clinical diagnostic criteria of early childhood caries. J Public Health Dent 1999;59:171-191.
5. Loesche WJ. Dental caries: A treatable infection. Grand Haven, Mich: Automated Diagnostic Documentation, Inc; 1993.
6. Marino R, Bonze K, Scholl T, Anhalt H. Nursing bottle caries: Characteristics of children at risk. Clin Pediatr 1989;28:129-131.
7. Berkowitz RJ. Etiology of nursing caries: A microbiologic perspective. J Public Health Dent 1996;56:51-54.
8. Berkowitz RJ, Turner J, Green P. Maternal salivary levels of Streptococcus mutans and primary oral infection in infants. Arch Oral Biol 1981;26:147-149.
9. Kohler B, Brathall D, Krasse B. Preventive measures in mothers influence the establishment of Streptococcus mutans in their infants. Arch Oral Biol 1983;28: 225-231.
10. Grindefjord M, Dahllof G, Modeer T. Caries development in children from 2.5 to 3.5 years of age: A longitudinal study. Caries Res 1995;29:449-454.
11. O'Sullivan DM, Tinanoff N. The association of early childhood caries patterns with caries incidence in preschool children. J Pub Health Dent 1996;56:81-83.
12. Johnsen DC, Gerstenmaier JH, DiSantis TA, Berkowitz RJ. Susceptibility of nursing-caries children to future approximal molar decay. Pediatr Dent 1986;8:168-170.
13. Al-Shalan TA, Erickson PR, Hardie NA. Primary incisor decay before age 4 as a risk factor for future dental caries. Pediatr Dent 1997;19:37-41.
14. Gray MM, Marchment MD, Anderson RJ. The relationship between caries experience in deciduous molars at 5 years and in first permanent molars of the same child at 7 years. Comm Dent Health 1991;8:3-7.
15. Heller KE, Eklund SA, Pittman J, Ismail AI. Associations between dental treatment in the primary and permanent dentitions using insurance claims data. Pediatr Dent 2000;22:469-474.
16. Sheller B, Williams BJ, Lombardi SM. Diagnosis and treatment of dental caries-related emergencies in a children's hospital. Pediatr Dent 1997;19:470-475.
17. Majewski RF, Snyder CW, Bernat JE. Dental emergencies presenting to a children's hospital. J Dent Child 1988:55:339-342.
18. Fleming P, Gregg TA, Saunders ID. Analysis of an emergency dental service provided at a children's hospital. Int J Paediatr Dent 1991;1:25-30.
19. Schwartz S. A one-year statistical analysis of dental emergencies in a pediatric hospital. J Can Dent Assoc 1994;60:959-968.
20. Griffin SO, Gooch BF, Beltran E, Sutherland JN, Barsley R. Dental services, costs, and factors associated with hospitalization for Medicaid-eligible children, Louisiana 1996-97. J Pub Health Dent 2000;60:21-27.
21. Ramos-Gomez FJ, Huang GF, Masouredis CM, Braham RL. Prevalence and treatment costs of infant caries in Northern California. J Dent Child 1996;63: 108-112.
22. Acs G, Lodolini G, Kaminsky S, Cisneros GJ. Effect of nursing caries on body weight in a pediatric population. Pediatr Dent 1992;14:302-305.
23. Ayhan H, Suskan E, Yildirim S. The effect of nursing or rampant caries on height, body weight, and head circumference. J Clin Pediatr Dent 1996;20:209-212.
24. Reisine ST. Dental health and public policy: The social impact of disease. Am J Public Health 1985; 75:27-30.
25. Gift HC, Reisine ST, Larach DC. The social impact of dental problems and visits. Am J Public Health 1992;82:1663-1668.
26. Hollister MC, Weintraub JA. The association of oral status with systemic health, quality of life, and economic productivity. J Dent Educ 1993;57:901-912.
27. Peterson J, Niessen L, Nana Lopez G. Texas public school nurses' assessment of children's oral health status. J Sch Health 1999;69:69-72.
28. Schechter N. The impact of acute and chronic dental pain on child development. J Southeast Soc Pediatr Dent 2000;6:16.
29. Ramage S. The impact of dental disease on school performance. J Southeast Soc Pediatr Dent 2000;6:26.
30. National Center for Education in Maternal and Child Health. Oral health and learning. Bethesda, Md. National Center for Education in Maternal and Child Health and Georgetown University; 2001.

31. Low W, Tan S, Schwartz S. The effect of severe caries on the quality of life in young children. Pediatr Dent 1999;21:325-326.
32. Acs G, Pretzer S, Foley M, Ng MW. Perceived outcomes and parental satisfaction following dental rehabilitation under general anesthesia. Pediatr Dent 2001;23:419-423.
33. Thomas C, Primosch R. Changes in incremental weight and well-being of children with rampant caries following complete dental rehabilitation. Pediatr Dent 2002;24:109-113.
34. Filstrup SL, Inglehart MR, Briskie D, daFonseca M, Lawrence L, Wandera A. The effects on early childhood caries (ECC) and restorative treatment of children's oral health-related quality of life (OHRQOL)–The parents'/guardians' and the child's perspective [master's thesis]. Ann Arbor, Mich: The University of Michigan; 2001.