

Policy on Early Childhood Caries (ECC): Unique Challenges and Treatment Options

Originating Council

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Purpose

The American Academy of Pediatric Dentistry (AAPD), to promote appropriate, quality oral health care for infants and children with early childhood caries (ECC), must educate the health community and society about the unique challenges and treatment options of this disease. This policy will not attempt to duplicate information found in the AAPD's Guideline on Infant Oral Health Care.¹

Methods

The proceedings of the Conference on Early Childhood Caries held in Bethesda, Maryland in October, 1997 were reviewed. A MEDLINE search was conducted using the terms "early childhood caries", "nursing caries", and "bottle caries". Recommendations were based primarily upon review of those proceedings and published studies. In cases where the data did not appear sufficient or were inconclusive, recommendations were based upon expert and consensus opinion.

Background

Caries is biofilm (plaque)-induced acid demineralization of enamel or dentin, mediated by saliva. The disease of 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 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.²

While the collective oral health of children has improved over the past several decades, between 1988-1994 and 1999-2004, prevalence of caries in primary teeth increased for youths aged 2 to 11 years.³ For 2 to 5 year olds, the prevalence increased from approximately 24% to 28%.³ ECC, a serious

public health problem, is prevalent in low socioeconomic groups, but also is found in the general population.^{3,4}

ECC can be a particularly virulent form of caries, beginning soon after dental eruption, developing on smooth surfaces, progressing rapidly, and having a lasting detrimental impact on the dentition. Children experiencing caries as infants or toddlers have a much greater probability of subsequent caries in both the primary and permanent dentitions.⁵⁻⁸ Not only does ECC affect teeth, but consequences of this disease may lead to more widespread health issues.^{9,10} Infants with ECC grow at a slower pace than caries-free infants. Some young children with ECC may be severely underweight because of associated pain and the disinclination to eat. ECC also may be associated with iron deficiency.¹⁰

Prevention of ECC begins with intervention in the pre-natal and perinatal periods.¹¹ Women should be advised to optimize nutrition during the third trimester and the infant's first year, when enamel is undergoing maturation. Enamel hypoplasia is common in children with low birthweight or systemic illness in the neonatal period.^{12,13} There is considerable presumptive evidence that malnutrition/undernutrition during the perinatal period causes hypoplasia.¹⁴ A consistent association exists between clinical hypoplasia and ECC.^{12,15} Cariogenic bacteria (specifically mutans streptococci) may be transmitted to the child; decreasing the mother's/primary caregiver's/sibling(s)' mutans streptococci levels may decrease the child's risk of developing ECC.^{9,16-19}

Motivational interviewing may help direct parents to improve home oral health habits.^{20,21} Frequent bottle feeding at night, ad libitum breast-feeding, and extended and repetitive use of a no-spill training cup are associated with, but not consistently implicated in, ECC.²² While ECC may not arise from breastmilk alone, breast-feeding in combination with other carbohydrates has been found to be highly cariogenic.²³ The severity of ECC is associated with poor feeding habits.²⁴ Because poor feeding practices alone will not cause caries, previously used terms such as "baby bottle tooth decay", "bottle

mouth”, and “nursing decay” are misleading. ECC is a term that better reflects the multifactorial etiologic process.

When very young children have not been the beneficiaries of adequate preventive care and, subsequently, develop ECC, therapeutic intervention should be provided by a practitioner with the training, experience, and expertise to manage both the child and the disease process. Because of the aggressive nature of ECC, treatment should be specific for each individual patient. Areas of decalcification and hypoplasia can rapidly develop cavitation. The use of anticariogenic agents may reduce the risk of development and progression of caries. Interim therapeutic restorations (ITR), using materials such as glass ionomers that release fluoride, are efficacious in both preventive and therapeutic approaches.^{25,26} Stainless steel crowns are indicated to decrease the number of tooth surfaces at risk for new or secondary caries and are less likely than other restorations to require retreatment.^{27,28} Low levels of compliance with follow-up care and a high rate of children requiring additional treatment also can influence a practitioner’s decisions for a more definitive restorative management of ECC.²⁹

The extent of the disease process as well as the patient’s developmental level and comprehension skills affect the practitioner’s behavior guidance approaches. To perform treatment effectively and efficiently while instilling a positive dental attitude, the practitioner caring for a child with ECC often must employ advanced behavior guidance techniques. These may include protective stabilization and/or sedation or general anesthesia. The success of restorations may be influenced by the child’s level of cooperation during treatment. General anesthesia may provide optimal conditions to perform restorative procedures. General anesthesia, under certain circumstances, may offer a cost-saving alternative to sedation for children with ECC.³⁰

Policy statement

The AAPD recognizes the unique and virulent nature of ECC. Health care providers who diagnose ECC should either provide therapy or refer the patient to an appropriately trained individual for treatment. Immediate intervention is medically necessary to prevent further destruction, as well as more widespread health problems. Because children who experience ECC are at greater risk for subsequent caries development, preventive and therapeutic measures such as optimizing home care, ITR, more frequent visits with regimented applications of topical fluoride, and full crown coverage often are necessary. The dental care provider must assess the patient’s developmental level and comprehension skills, as well as the extent of the disease process, to determine the need for advanced behavior guidance techniques such as protective stabilization, sedation, or general anesthesia.

References

1. American Academy of Pediatric Dentistry. Guideline on infant oral health care. *Pediatr Dent* 2006;28(suppl):69-72.
2. Drury TF, Horowitz AM, Ismail AI, Haertens MP, Rozier RG, Selwitz RH. Diagnosing and reporting early childhood caries for research purposes. *J Public Health Dent* 1999;59(3):192-7.
3. Dye BA, Tan S, Smith V, et al. Trends in oral health status: United States, 1988-1994 and 1999-2004. National Center for Health Statistics. *Vital Health Stat* 11(248). Hyattsville, Md; 2007.
4. Tang JM, Altman DS, Robertson DC, O’Sullivan DM, Douglass JM, Tinanoff N. Dental caries prevalence and treatment levels in Arizona preschool children. *Public Health Rep* 1997;112(4):319-29.
5. Proceedings of the Conference on Early Childhood Caries, Bethesda, Md; October 1997. *Community Dent Oral Epidemiol* 1998;26(suppl):1-119.
6. Helfenstein V, Steiner M, Marthaler TM. Caries prediction on the basis of past caries including precavity lesions. *Caries Res* 1991;25(5):372-6.
7. Peretz B, Ram D, Azo E, Efrat Y. Preschool caries as an indicator of future caries: A longitudinal study. *Pediatr Dent* 2003;25(2):114-8.
8. Foster T, Perinpanayagam H, Pfaffenbach A, Certo M. Recurrence of early childhood caries after comprehensive treatment with general anesthesia and follow up. *J Dent Child* 2006;73(1):25-30.
9. Acs G, Lodolini G, Kaminshy S, Cisneros GJ. Effect of nursing caries on body weight in pediatric populations. *Pediatr Dent* 1992;14(5):302-5.
10. Clarke M, Locker D, Berall G, Pencharz P, Kenny DJ, Judd P. Malnourishment in a population of young children with severe early childhood caries. *Pediatr Dent* 2006;28(3):254-9.
11. Ismail AI. Prevention of early childhood caries. *Community Dent Oral Epidemiol* 1998;26(suppl):49-61.
12. Seow WK, Humphrys C, Tudehope DI. Increased prevalence of developmental dental defects in low-birthweight children: A controlled study. *Pediatr Dent* 1987;9(3):221-5.
13. Davies GN. Early childhood caries: A synopsis. *Community Dent Oral Epidemiol* 1998;26(suppl):106-16.
14. Seow WK. Biological mechanisms of early childhood caries. *Community Dent Oral Epidemiol* 1998;26(suppl):8-27.
15. Horowitz HS. Research issues in early childhood caries. *Community Dent Oral Epidemiol* 1998;26(suppl):67-81.
16. 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(1):37-45.
17. Li Y, Caufield PW. The fidelity of initial acquisition of mutans streptococci by infants from their mothers. *J Dent Res* 1995;74(2):681-5.
18. Köhler B, Bratthal D, Krasse B. Preventive measures in mothers influence the establishment of the bacterium *Streptococcus mutans* in their infants. *Arch Oral Biol* 1983;28(3):225-31.

19. Berkowitz RJ. Mutans streptococci: Acquisition and transmission. *Pediatr Dent* 2006;28(2):106-9.
20. Weinstein P, Harrison R, Benton T. Motivating mothers to prevent caries: Confirming the beneficial effect of counseling. *J Am Dent Assoc* 2006;137(6):789-93.
21. Weinstein P. Provider versus patient-centered approaches to health promotion with parents of young children: What works/does not work and why. *Pediatr Dent* 2006;28(2):172-6.
22. Tinanoff N. Introduction to early childhood caries conference: Initial description and current understanding. *Community Dent Oral Epidemiol* 1998;26(suppl):5-7.
23. Erickson PR, Mazhari E. Investigation of the role of human breast milk in caries development. *Pediatr Dent* 1992;21(2):86-90.
24. Hallett KB, O'Rourke PK. Pattern and severity of early childhood caries. *Community Dent Oral Epidemiol* 2006;34(1):25-35.
25. van't Hof MA, Frencken JE, van Palenstein Helderma WH, Holmgren CJ. The atraumatic restorative treatment (ART) approach for managing dental caries: A meta-analysis. *Int Dent J* 2006;56(6):345-51.
26. American Academy of Pediatric Dentistry. Guideline on Restorative Dentistry. *Pediatr Dent* 2008;30(suppl):163-9.
27. Randall RC, Vrijhoef MM, Wilson NH. Efficacy of preformed metal crowns vs amalgam restorations in primary molars: A systematic review. *J Am Dent Assoc* 2000;131(3):337-43.
28. Eidelman E, Faibis S, Peretz B. A comparison of restorations for children with early childhood caries treated under general anesthesia or conscious sedation. *Pediatr Dent* 2000;22(1):33-7.
29. Almeida AG, Roseman MM, Sheff M, Huntington N, Hughes CV. Future caries susceptibility in children with early childhood caries following treatment under general anesthesia. *Pediatr Dent* 2000;22(4):302-6.
30. Lee JY, Vann WF, Roberts MW. A cost analysis of treating pediatric dental patients using general anesthesia vs conscious sedation. *Pediatr Dent* 2000;22(1):27-32.