

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

Review Council

Council on Clinical Affairs

Adopted

1978

Revised

1993, 1996, 2001, 2003, 2007, 2008

Purpose

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

Methods

This policy revision is based on a review of the current pediatric dental, medical, and public health literature related to ECC, including proceedings of the 2005 Symposium on the Prevention of Oral Diseases in Children and Adolescents, Chicago, Ill.¹ A MEDLINE search was conducted using the terms “early childhood caries”, “nursing caries”, and “baby bottle caries”. Preventive recommendations were based primarily upon review of published studies and proceedings. In cases where the data did not appear sufficient or were inconclusive, recommendations were based upon expert and consensus opinion.

Background

In 1978, the AAPD released “Nursing Bottle Caries”, a joint statement with the American Academy of Pediatrics, to address a severe form of caries associated with bottle usage.² Initial policy recommendations were limited to feeding habits, concluding that nursing bottle caries could be avoided if bottle feedings were discontinued soon after the first birthday. An early policy revision added ad libitum breastfeeding as a causative factor. Over the next 2 decades, however, recognizing that this distinctive clinical presentation was not consistently associated with poor feeding practices and that caries was an infectious disease, AAPD adopted the term “early childhood caries” to reflect better its multifactorial etiology.

Caries is a common, complex, chronic disease resulting from an imbalance of multiple risk factors and protective factors over time.³ Fundamentally, caries is biofilm (plaque)-induced acid demineralization of enamel or dentin, mediated by saliva.

Given time, the interaction of cariogenic microorganisms and fermentable carbohydrates (sucrose) may induce demineralization, which can progress to loss of tooth structure/cavitation.⁴ The disease of ECC has been 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.^{5,6} 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.⁷

Caries is a transmissible infectious disease; understanding the acquisition of cariogenic microbes is necessary to improving preventive strategies. Vertical transmission is the passing of microbes from caregiver to child, and the major reservoir from which infants acquire cariogenic bacteria [eg, mutans streptococci (MS)] is their mother’s saliva.^{4,8} The success of the transmission and resultant colonization of maternal MS may be related to several factors, including magnitude of the inoculum,⁹ frequency of small dose inoculations,¹⁰ and a minimum infective dose.¹¹ Infants whose mothers have high levels of MS, a result of untreated caries, are at greater risk of acquiring the organism earlier than children whose mothers have low levels.⁹ Suppressing maternal reservoirs of MS via dental rehabilitation and antimicrobial treatments can prevent or delay infant inoculation.^{12,13} Ideally, these interventions would be initiated in the prenatal period.¹⁴ Horizontal transmission (eg, between members of a family or group such as daycare) of MS also occurs.⁸ Eliminating saliva-sharing activities (ie, sharing utensils, orally cleansing a pacifier) may help decrease an infant’s or toddler’s acquisition of cariogenic microbes.

Recent studies have shown that MS can colonize the mouths of preerupted infants.⁸ Oral cleanings following feedings, if not previously implemented, need to begin with eruption of the first primary tooth.¹⁴ Newly-erupted teeth, because of immature

enamel, and teeth with enamel hypoplasia may be at higher risk of developing caries. Current best practice includes recommending twice-daily use of a fluoridated toothpaste for dentate children in optimally fluoridated and fluoride-deficient communities.¹⁵ Therapeutic use of fluoride for children needs to focus on regimens that maximize topical contact, preferably in lower-dose, higher-frequency approaches.¹⁵ Twice-daily use has benefits greater than once-daily brushing.¹⁵ A ‘smear’ of fluoridated toothpaste (see Figure 1) for children less than 2 years of age may decrease risk of fluorosis.¹⁶ A ‘pea-size’ amount of toothpaste is appropriate for children aged 2 through 5 years.¹⁶⁻¹⁸ Parents should dispense the toothpaste onto a soft, age-appropriate sized toothbrush and perform or assist with toothbrushing of preschool-aged children. To maximize the beneficial effect of fluoride in the toothpaste, rinsing after brushing should be kept to a minimum or eliminated altogether.^{16,19}

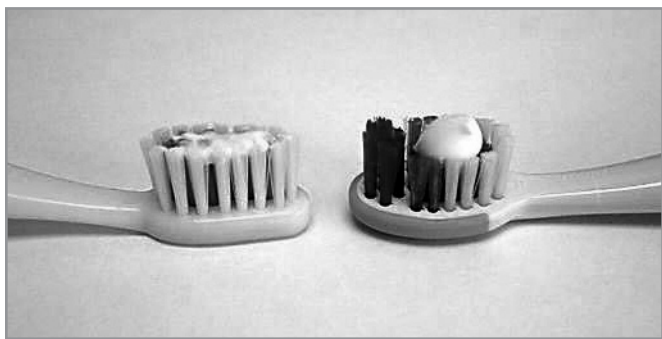


Figure 1. Comparison of a smear (left) with a pea-sized (right) amount of toothpaste.

In addition to the establishment of oral flora, infants and young children have other unique caries-risk factors including development of dietary habits and childhood food preferences. High-risk dietary practices appear to be established early, probably by 12 months of age, and are maintained throughout early childhood.^{20,21} The role of carbohydrates in caries initiation is unequivocal. Frequent bottle feeding at night, breast-feeding ad libitum, 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 breast milk alone, breast feeding in combination with other carbohydrates has been found in vitro to be highly cariogenic.²³ Frequent consumption of between-meal snacks and beverages containing fermentable carbohydrates (eg, juice, milk, formula, soda) increases the risk of caries due to prolonged contact between sugars in the consumed food or liquid and cariogenic bacteria on the susceptible teeth.²⁴ The American Academy of Pediatrics has recommended children 1-6 years of age consume no more than 4-6 ounces of fruit juice per day, from a cup (ie, not a bottle or covered cup) and as part of a meal or snack.²⁵

Children are at varying levels of risk for developing caries throughout life. Evidence increasingly suggests that to be successful at preventing dental disease, dentists must begin preventive interventions within the first year of life.²⁶ Consequences

of ECC include a higher risk of new carious lesions in both the primary and permanent dentitions,²⁷⁻³² hospitalizations and emergency room visits,³³⁻³⁶ increased treatment costs and time,^{37,38} insufficient physical development (especially in height/weight),^{39,40} loss of school days and increased days with restricted activity,⁴¹⁻⁴³ diminished ability to learn,^{41,44-47} and diminished oral health-related quality of life.⁴⁸⁻⁵¹

Policy statement

The AAPD recognizes caries as a common, complex, chronic disease resulting from an imbalance of multiple risk factors and protective factors over time. To decrease the risk of developing ECC, a potentially devastating infectious disease, the AAPD encourages professional and at-home preventive measures including age-appropriate feeding practices that do not contribute to a child's caries risk. These include:

1. Reducing the mother's/primary caregiver's/sibling(s) MS levels (ideally during the prenatal period) to decrease transmission of cariogenic bacteria.
2. Minimizing saliva-sharing activities (eg, sharing utensils) between an infant or toddler and his family/cohorts.
3. Implementing oral hygiene measures no later than the time of eruption of the first primary tooth.
 - If an infant falls asleep while feeding, the teeth should be cleaned before placing the child in bed.
 - Toothbrushing of all dentate children should be performed twice daily with a fluoridated toothpaste and a soft, age-appropriate sized toothbrush. Parents should use a 'smear' of toothpaste to brush the teeth of a child less than 2 years of age. For the 2-5 year old, parents should dispense a 'pea-size' amount of toothpaste and perform or assist with their child's toothbrushing.
 - Flossing should be initiated when adjacent tooth surfaces can not be cleansed by a toothbrush.
4. Establishing a dental home within 6 months of eruption of the first tooth and no later than 12 months of age to conduct a caries risk assessment and provide parental education including anticipatory guidance for prevention of oral diseases.
5. Avoiding caries-promoting feeding behaviors. In particular:
 - Infants should not be put to sleep with a bottle containing fermentable carbohydrates.
 - Ad libitum breast-feeding should be avoided after the first primary tooth begins to erupt and other dietary carbohydrates are introduced.
 - 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.
 - Repetitive consumption of any liquid containing fermentable carbohydrates from a bottle or no-spill training cup should be avoided.
 - Between-meal snacks and prolonged exposures to foods and juice or other beverages containing fermentable carbohydrates should be avoided.

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