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

Originating Council
Council on Clinical Affairs

Review Council
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Adopted
2000

Revised
2003, 2007, 2008, 2011, 2014*

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, including the need for advanced preventive, restorative, and behavioral guidance techniques.

Methods

The proceedings of the Conference on Early Childhood Caries held in Bethesda, Md., in October 1997[1] were reviewed. The update of this policy used electronic and hand searches of English written articles in the dental and medical literature within the last 10 years using the search terms infant oral health, infant oral health care, and early childhood caries. When data did not appear sufficient or were inconclusive, recommendations were based upon expert and/or consensus opinion by experienced researchers and clinicians.

Background

ECC is highly prevalent and increasing in poor and near poor US preschool children.[2] In the US and most other countries, this disease is largely untreated in children under age three.[3] Those children with caries experience have been shown to have high numbers of teeth affected. Consequences of ECC include a higher risk of new carious lesions,[4,5] increased treatment costs and time,[6] risk for delayed physical growth and development,[7-9] loss of school days and increased days with restricted activity,[10,11] diminished ability to learn,[12] diminished oral health-related quality of life,[13] and hospitalizations and emergency room visits.[14-16]

Because of the aggressive nature of ECC, areas of demineralization and hypoplasia can rapidly develop cavitation. If untreated, the disease process can rapidly involve the dental pulpal tissue leading to dental infection and possibly life-threatening fascial space involvement. Such infections may result in a medical emergency requiring hospitalization, antibiotics, and extraction of the offending tooth.[17]

Prevention of ECC begins during the prenatal and perinatal periods.[18] Women should be advised to optimize nutrition during their pregnancy and the infant's first year, when enamel is undergoing maturation. Enamel defects are common in children with low birthweight or systemic illness or undernutrition during the perinatal period.[19,20]

Although enamel hypoplasia is a risk factor because the teeth are not as well formed, the etiology of ECC is bacterial. Mutans streptococci (**MS**) is the group of microorganisms most studied regarding the pathogenesis of ECC.[21] Children at high caries risk are colonized early by MS[22] that is transmitted most frequently from caregiver to child through salivary contact. The bacteria also can be transmitted between other members of a family or other children.[23] In association with the microbial etiology, high frequency sugar consumption is a caries risk factor. Caries-conducive dietary practices, including prolonged and/or frequent bottle or training cup feeding with sugar-containing drinks and frequent in between meal consumption of sugar-containing snacks or drinks (eg, juice, formula, soda), increase the risk of caries.[24]

Those children at risk for ECC should have care provided by a practitioner who has the training, experience, and expertise to manage both the child and the disease process. The use of anticariogenic agents, especially twice daily brushing with fluoridated toothpaste and the frequent application of fluoride varnish, may reduce the risk of development and progression of caries. Using no more than a 'smear' or 'rice-size' amount of fluoridated toothpaste for children less than three years of age may decrease risk of fluorosis. Using no more than a 'pea-size' amount of fluoridated toothpaste is appropriate for children aged three to six.[25] When determining the risk-benefit of fluoride, the key issue is mild fluorosis versus preventing devastating dental disease. Interim therapeutic

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restorations (**ITR**), using materials such as glass ionomers that release fluoride, are efficacious in both preventive and therapeutic approaches.[26,27]

Stainless steel crowns often are indicated to restore teeth with large carious lesions and extensive white spot lesions and, at this early age, are less likely than other restorations to require retreatment.[28,29] 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.[30]

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 safely, effectively, and efficiently, 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, and general anesthesia may provide better conditions to perform restorative procedures. General anesthesia, under certain circumstances, may offer a cost-saving alternative to sedation for children with ECC.[31]

Policy statement

The AAPD recognizes the unique and virulent nature of ECC. Non-dental health care providers who identify ECC should either provide therapy or refer the patient to a licensed dentist for treatment and establishment of a dental home.[32] 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 professional visits with regimented applications of topical fluoride, and full crown coverage often are necessary. The dentist 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.

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

Originating Group

A collaborative effort of the American Academy of Pedodontics 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 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 document is a revision of the previous policy, last revised in 2008. The update used electronic and hand searches of English written articles in the dental and medical literature within the last 10 years, using the search terms infant oral health, infant oral health care, and early childhood caries. When data did not appear sufficient or were inconclusive, recommendations were based upon expert and/or consensus opinion by experienced researchers and clinicians.

Background

In 1978, the American Academy of Pedodontics 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 two 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 ECC to reflect better its multifactoral etiology.

Dental caries is a common chronic infectious transmissible disease resulting from tooth-adherent specific bacteria, primarily Mutans Streptococci (**MS**), that metabolize sugars to produce acid which, over time, demineralizes tooth structure.[3] The disease of ECC is the presence of one or more decayed (noncavitated or cavitated lesions), missing (due to caries), or filled tooth surfaces in any primary tooth in a child under the age of six. In children younger than three years of age, any sign of smooth-surface caries is indicative of severe early childhood caries (S-ECC). From ages three through five, one or more cavitated, missing (due to caries), or filled smooth surfaces in primary maxillary anterior teeth or a decayed, missing, or filled score of greater than or equal to four (age 3), greater than or equal to five (age 4), or greater than or equal to six (age 5) surfaces also constitutes S-ECC.[4]

Epidemiologic data from national surveys clearly indicate that ECC is highly prevalent and increasing in poor and near poor US preschool children and is largely untreated in children under age three.[5] Those children with caries experience have been shown to have high numbers of teeth affected. Consequences of ECC include a higher risk of new carious lesions in both the primary and permanent dentitions,[6,7] hospitalizations and emergency room visits,[8,9] increased treatment costs,[10] risk for delayed physical growth and development,[11,12] loss of school days and increased days with restricted activity,[13,14] diminished ability to learn,[15] and diminished oral health-related quality of life.[16]

Dental caries is a transmissible infectious disease and understanding the acquisition of cariogenic microbes improves preventive strategies. Microbial risk markers for ECC include MS and Lactobacillus species.[17] MS maybe transmitted vertically from caregiver to child through salivary contact, affected by the frequency and amount of exposure. 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.[18] Horizontal transmission (eg, between other members of a family or children in daycare) also occurs.[18] Eliminating saliva-sharing activities (eg, sharing utensils, orally cleansing a pacifier) may help decrease an infant's or toddler's acquisition of cariogenic microbes.[18]

** The 2014 revision is limited to use of fluoride toothpaste in young children.*

Newly-erupted teeth, because of immature enamel, and teeth with enamel hypoplasia may be at higher risk of developing caries. Current best practice includes twice-daily brushing with fluoridated toothpaste for all children in optimally fluoridated and fluoride-deficient communities. When determining the risk-benefit of fluoride, the key issue is mild fluorosis versus preventing devastating dental disease. A 'smear' or 'rice-size' amount of fluoridated toothpaste (approximately 0.1 mg fluoride; see Figure 1) should be used for children less than three years of age. A 'pea-size' amount of fluoridated toothpaste (approximately 0.25 mg fluoride) is appropriate for children aged three to six.[19,20] 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.[21]

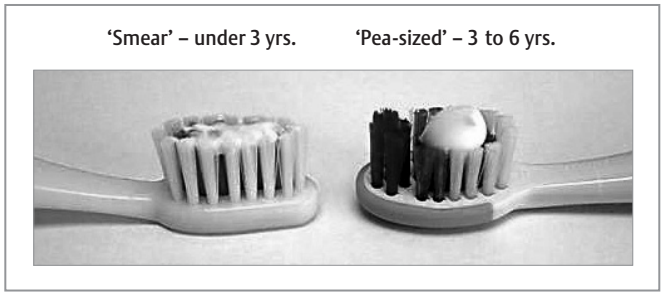

Figure 1. Comparison of a 'smear' (left) with a 'pea-size' (right) amount of toothpaste.

Professionally-applied topical fluoride treatments also are efficacious in reducing prevalence of ECC. The recommended professionally-applied fluoride treatments for children at risk for ECC who are younger than six years is five percent sodium fluoride varnish (NaFV; 22,500 ppm F).[22] An associated risk factor to microbial etiology is high frequency consumption of sugars. Caries-conducive dietary practices appear to be established by 12 months of age and are maintained throughout early childhood.[23,24] Frequent night time bottle feeding with milk and ad libitum breast-feeding are associated with, but not consistently implicated in, ECC.[25] Night time bottle feeding with juice, repeated use of a sippy or no-spill cup, and frequent in between meal consumption of sugar-containing snacks or drinks (eg, juice, formula, soda) increase the risk of caries.[26] 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.[27] Frequent consumption of between-meal snacks and beverages containing sugars increases the risk of caries due to prolonged contact between sugars in the consumed food or liquid and cariogenic bacteria on the susceptible teeth.[28] The American Academy of Pediatrics has recommended children one through six years of age consume no more than four to six ounces of fruit juice per day, from a cup (ie, not a bottle or covered cup) and as part of a meal or snack.[29]

Evidence increasingly suggests that preventive interventions within the first year of life are critical.[30] This may be best implemented with the help of medical providers who, in many cases, are being trained to provide oral screenings, apply preventive measures, counsel caregivers, and refer infants and toddlers for dental care.[31]

Policy statement

The AAPD recognizes caries as a common chronic disease resulting from an imbalance of multiple risk factors and protective factors over time. To decrease the risk of developing ECC, the AAPD encourages professional and at-home preventive measures that include:

1. Reducing the parent's/sibling's MS levels to decrease transmission of cariogenic bacteria.
2. Minimizing saliva-sharing activities (eg, sharing utensils) to decrease the transmission of cariogenic bacteria.
3. Implementing oral hygiene measures no later than the time of eruption of the first primary tooth. Toothbrushing should be performed for children by a parent twice daily, using a soft toothbrush of age-appropriate size. In all children under the age of three, a 'smear' or 'rice-size' amount of fluoridated toothpaste should be used. In all children ages three to six, a 'pea-size' amount of fluoridated toothpaste should be used.
4. Providing professionally-applied fluoride varnish treatments for children at risk for ECC.
5. Establishing a dental home within six 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.
6. Avoiding high frequency consumption of liquids and/or solid foods containing sugar. In particular:
   - Sugar-containing beverages (eg, juices, soft drinks, sweetened tea, milk with sugar added) in a baby bottle or no-spill training cup should be avoided.
   - Infants should not be put to sleep with a bottle filled with milk or liquids containing sugars.
   - 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 between 12 to 18 months of age.[32]
7. Working with medical providers to ensure all infants and toddlers have access to dental screenings, counseling, and preventive procedures.

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Guideline on Periodicity of Examination, Preventive Dental Services, Anticipatory Guidance/Counseling, and Oral Treatment for Infants, Children, and Adolescents

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Purpose
The American Academy of Pediatric Dentistry (**AAPD**) intends this guideline to help practitioners make clinical decisions concerning preventive oral health interventions, including anticipatory guidance and preventive counseling, for infants, children, and adolescents.

Methods
This guideline is an update of a document previously revised in 2009. The update used electronic database and hand searches of articles in the medical and dental literature using the following parameters: Terms: periodicity of dental examinations, dental recall intervals, preventive dental services, anticipatory guidance and dentistry, caries risk assessment, early childhood caries, dental caries prediction, dental care cost effectiveness children, periodontal disease and children and adolescents US, pit and fissure sealants, dental sealants, fluoride supplementation and topical fluoride, dental trauma, dental fracture and tooth, nonnutritive oral habits, treatment of developing malocclusion, removal of wisdom teeth, removal of third molars; Fields: all; Limits: within the last 10 years, humans, English, and clinical trials; birth through age 18. From this search, 3,418 articles matched these criteria and were evaluated by title and/or abstract. Information from 113 articles was chosen for review to update this document. When data did not appear sufficient or were inconclusive, recommendations were based upon expert and/or consensus opinion by experienced researchers and clinicians.

Background
Professional dental care is necessary to maintain oral health.[1,2] The AAPD emphasizes the importance of initiating professional oral health intervention in infancy and continuing through adolescence and beyond.[1-3] The periodicity of professional oral health intervention and services is based on a patient's individual needs and risk indicators.[4-7] Each age group, as well as each individual child, has distinct developmental needs to be addressed at specific intervals as part of a comprehensive evaluation.[8-11] Continuity of care is based on the assessed needs of the individual patient and assures appropriate management of all oral conditions, dental disease, and injuries.[12-18] The early dental visit to establish a dental home provides a foundation upon which a lifetime of preventive education and oral health care can be built.[19-21] Anticipatory guidance and counseling are essential components of the dental visit.[8-10,19-26]

Recommendations
This guideline addresses periodicity and general principles of examination, preventive dental services, anticipatory guidance/counseling, and oral treatment for children who have no contributory medical conditions and are developing normally. An accurate, comprehensive, and up-to-date medical history is necessary for correct diagnosis and effective treatment planning. Recommendations may be modified to meet the unique requirements of patients with special health care needs.

Clinical oral examination
The first examination is recommended at the time of the eruption of the first tooth and no later than 12 months of age.[19-21] The developing dentition and occlusion should be monitored throughout eruption at regular clinical examinations.[26] Early detection and management of oral conditions can improve a child's oral health, general health and well-being, and school readiness.[22,28-31] Delayed diagnosis of dental disease can result in exacerbated problems which lead to more extensive and costly care.[7,28,32-35] Early diagnosis of developing malocclusions may allow for timely therapeutic intervention.[9,26]

Components of a comprehensive oral examination include assessment of:

- General health/growth.
- Pain.
- Extraoral soft tissue.
- Temporomandibular joint.
- Intraoral soft tissue.
- Oral hygiene and periodontal health.
- Intraoral hard tissue.
- Developing occlusion.
- Caries risk.
- Behavior of child.

Based upon the visual examination, the dentist may employ additional diagnostic aids (eg, radiographs, photographs, pulp vitality testing, laboratory tests, study casts).[7,36]

The most common interval of examination is six months; however, some patients may require examination and preventive services at more or less frequent intervals, based upon historical, clinical, and radiographic findings.[5,7,16-18,37-42] Caries and its sequelae are among the most prevalent health problems facing infants, children, and adolescents in America.[1,43] Carious lesions are cumulative and progressive and, in the primary dentition, are highly predictive of caries occurring in the permanent dentition.[44-46] Reevaluation and reinforcement of preventive activities contribute to improved instruction for the caregiver of the child or adolescent, continuity of evaluation of the patient's health status, and repetitive exposure to dental procedures, potentially allaying anxiety and fear for the apprehensive child or adolescent.[47]

Caries-risk assessment

Risk assessment is a key element of contemporary preventive care for infants, children, adolescents, and persons with special health care needs. Its goal is to prevent disease by identifying and minimizing causative factors (eg, microbial burden, dietary habits, plaque accumulation) and optimizing protective factors (eg, fluoride exposure, oral hygiene, sealants).[48] Caries risk assessment forms and management protocols simplify and clarify the process.[24,49,50]

Sufficient evidence demonstrates certain groups of children at greater risk for development of early childhood caries (**ECC**) would benefit from infant oral health care.[22,28,51-53] Infants and young children have unique caries-risk factors such as ongoing establishment of oral flora and host defense systems, susceptibility of newly erupted teeth, and development of dietary habits. Children are most likely to develop caries if mutans streptococci are acquired at an early age.[51,54] The characteristics of ECC and the availability of preventive approaches support age-based strategies in addressing this significant pediatric health problem.[54] ECC can be a costly, devastating disease with lasting detrimental effects on the dentition and systemic health.[22,28-35]

Adolescence can be a time of heightened caries activity due to an increased intake of cariogenic substances and inattention to oral hygiene procedures.[9,55,56] Risk assessment can assure preventive care is tailored to each individual's needs and direct resources to those for whom preventive interventions provide the greatest benefit. Because a child's risk for developing dental disease can change over time due to changes in habits (eg, diet, home care), oral microflora, or physical condition, risk assessment must be documented and repeated regularly and frequently to maximize effectiveness.[11,23]

Prophylaxis and topical fluoride treatment

The interval for frequency of professional preventive services is based upon assessed risk for caries and periodontal disease.[4,5,7,11,23,37,49-51] Gingivitis is nearly universal in children and adolescents[41]; it usually responds to thorough removal of bacterial deposits and improved oral hygiene.[41,57,58] Hormonal fluctuations, including those occurring during the onset of puberty, can modify the gingival inflammatory response to dental plaque.[41,42] Children can develop any of the several forms of periodontitis, with aggressive periodontitis occurring more commonly in children and adolescents than adults.[41,42,58]

Caries risk may change quickly during active dental eruption phases. Newly erupted teeth may be at higher risk of developing caries, especially during the post-eruption maturation process. Children who exhibit higher risk of developing caries would benefit from recall appointments at greater frequency than every six months.[4,5,7,11,23,50] This allows increased professional fluoride therapy application, microbial monitoring, antimicrobial therapy reapplication, and reevaluating behavioral changes for effectiveness.[50,59,60] An individualized preventive plan increases the probability of good oral health by demonstrating proper oral hygiene methods/techniques and removing plaque, stain, and calculus.[4,42,61]

Professional topical fluoride treatments should be based on caries risk assessment.[23,24,62-64] Plaque and pellicle are not a barrier to fluoride uptake in enamel.[65-67] Consequently, there is no evidence of a difference in caries rates or fluoride uptake in patients who receive rubber cup prophylaxis or a toothbrush prophylaxis before fluoride treatment.[65,66] Precautionary measures should be taken to prevent swallowing of any professionally-applied topical fluoride. Children at moderate caries risk should receive a professional fluoride treatment at least every six months; those with high caries risk should receive greater frequency of professional fluoride applications (eg, every three to six months).[63,67-72] Ideally, this would occur as part of a comprehensive preventive program in a dental home.[19]

Fluoride supplementation

Fluoride contributes to the prevention, inhibition, and reversal of caries.[64,72-74] The AAPD encourages optimal fluoride exposure for every child, recognizing fluoride in the community water supplies as the most beneficial and cost-effective preventive intervention. Fluoride supplementation should be considered for children at moderate to high caries risk when fluoride exposure is not optimal.[72] Supplementation should be in accordance with the guidelines recommended by the AAPD[72] and the American Dental Association (**ADA**)[75].

Anticipatory guidance/counseling

Anticipatory guidance is the process of providing practical, developmentally-appropriate information about children's health to prepare parents for the significant physical, emotional, and psychological milestones.[8,9,19,20,76] Individualized discussion and counseling should be an integral part of each visit. Topics to be included are oral hygiene and dietary habits, injury prevention, nonnutritive habits, substance abuse, intraoral/perioral piercing, and speech/language development.[8,9,15,19,20,26,76-80]

Oral hygiene counseling involves the parent and patient. Initially, oral hygiene is the responsibility of the parent. As the child develops, home care is performed jointly by parent and child. When a child demonstrates the understanding and ability to perform personal hygiene techniques, the health care professional should counsel the child. The effectiveness of home care should be monitored at every visit and includes a discussion on the consistency of daily preventive activities.[4,5,9,23]

Caries-conducive dietary practices appear to be established early, probably by 12 months of age, and are maintained throughout early childhood.[81-83] Dietary practices, including prolonged and/or frequent bottle or training cup with sugar-containing drinks and frequent between-meal consumption of sugar-containing snacks or drinks (eg, juice, formula, soda), increase the risk of caries.[83,84] The role of carbohydrates in caries initiation is unequivocal. Acids in carbonated beverages and sports drinks can have a deleterious effect (ie, erosion) on enamel.[85-87] Excess consumption of carbohydrates, fats, and sodium contribute to poor systemic health.[88-90] Dietary analysis and the role of dietary choices on oral health, malnutrition, and obesity should be addressed through nutritional and preventive oral health counseling at periodic visits.[25] The US Department of Agriculture's Food Plate[91] and Center for Disease Control and Prevention/National Center for Health Statistics' Growth Charts[92] provide guidance for parents and their children and promote better understanding of the relationship between healthy diet and development.

Facial trauma that results in fractured, displaced, or lost teeth can have significant negative functional, esthetic, and psychological effects on children.[93] Practitioners should provide age-appropriate injury prevention counseling for orofacial trauma.[15,76] Initially, discussions would include advice regarding play objects, pacifiers, car seats, and electrical cords. As motor coordination develops, the parent/patient should be counseled on additional safety and preventive measures, including use of athletic mouthguards for sporting activities. The greatest incidence of trauma to the primary dentition occurs at two to three years of age, a time of increased mobility and developing coordination.[94] The most common injuries to permanent teeth occur secondary to falls, followed by traffic accidents, violence, and sports.[95-98] Dental injuries could have improved outcomes if the public were aware of first-aid measures and the need to seek immediate treatment.

Nonnutritive oral habits (eg, digital and pacifier habits, bruxism, abnormal tongue thrusts) may apply forces to teeth and dentoalveolar structures.[26] Although early use of pacifiers and digit sucking are considered normal, habits of sufficient frequency, intensity, and duration can contribute to deleterious changes in occlusion and facial development.[26] It is important to discuss the need for early pacifier and digit sucking, then the need to wean from the habits before malocclusion or skeletal dysplasias occur.[26] Early dental visits provide an opportunity to encourage parents to help their children stop sucking habits by age three years or younger. For school-aged children and adolescent patients, counseling regarding any existing habits (eg, fingernail biting, clenching, bruxism) is appropriate.[26]

Speech and language are integral components of a child's early development.[80] Deficiencies and abnormal delays in speech and language production can be recognized early and referral made to address these concerns. Communication and coordination of appliance therapy with a speech and language professional can assist in the timely treatment of speech disorders.[80]

Smoking and smokeless tobacco use almost always are initiated and established in adolescence.[99-101] During this time period, children may be exposed to opportunities to experiment with other substances that negatively impact their health and well-being. Practitioners should provide education regarding the serious health consequences of tobacco use and exposure to second hand smoke.[78,100] The practitioner may need to obtain information regarding tobacco use and alcohol/drug abuse confidentially from an adolescent patient.[9] When substance abuse has been identified, referral for appropriate intervention is indicated.[78]

Complications from intraoral/perioral piercings can range from pain, infection, and tooth fracture to life-threatening conditions of bleeding, edema, and airway obstruction.[79] Although piercings most commonly are observed in the teenaged pediatric dental patient, education regarding pathologic conditions and sequelae associated with these piercings should be initiated for the preteen child/parent and reinforced during subsequent periodic visits.[79]

Radiographic assessment

Appropriate radiographs are a valuable adjunct in the oral health care of infants, children, and adolescents.[38,39] Timing of initial radiographic examination should not be based on the patient's age.[39] Rather, after review of an individual's history and clinical findings, judicious determination of radiographic needs and examination can optimize patient care while minimizing radiation exposure.[38,39] The US Food and Drug Administration/ADA guidelines were developed to assist the dentist in deciding under what circumstances specific radiographs are indicated.[39]

Treatment of dental disease/injury

Health care providers who diagnose oral disease or trauma should either provide therapy or refer the patient to an appropriately-trained individual for treatment.[103] Immediate

intervention is necessary to prevent further dental destruction, as well as more widespread health problems. Postponed treatment can result in exacerbated problems that may lead to the need for more extensive care.[21,2930,,34] Early intervention could result in savings of healthcare dollars for individuals, community health care programs, and third party payors.[21,29,30,34]

Treatment of developing malocclusion

Guidance of eruption and development of the primary, mixed, and permanent dentitions is an integral component of comprehensive oral health care for all pediatric dental patients.[26] Early diagnosis and successful treatment of developing malocclusions can have both short-term and long-term benefits, while achieving the goals of occlusal harmony and function and dentofacial esthetics.[104-108] Early treatment is beneficial for many patients, but is not indicated for every patient. When there is a reasonable indication that an oral habit will result in unfavorable sequelae in the developing permanent dentition, any treatment must be appropriate for the child's development, comprehension, and ability to cooperate. Use of an appliance is indicated only when the child wants to stop the habit and would benefit from a reminder.[26] At each stage of occlusal development, the objectives of intervention/treatment include: (1) reversing adverse growth, (2) preventing dental and skeletal disharmonies, (3) improving esthetics of the smile, (4) improving self-image, and (5) improving the occlusion.[26]

Sealants

Sealants reduce the risk of pit and fissure caries in susceptible teeth and are cost-effective when maintained.[109-113] They are indicated for primary and permanent teeth with pits and fissures that are predisposed to plaque retention.[112] At-risk pits and fissures should be sealed as soon as possible. Because caries risk may increase at any time during a patient's life due to changes in habits (eg, dietary, home care), oral microflora, or physical condition, unsealed teeth subsequently might benefit from sealant application.[109,114] The need for sealant placement should be reassessed at periodic preventive care appointments. Sealants should be monitored and repaired or replaced as needed.[111,112,114]

Third molars

Panoramic or periapical radiographic assessment is indicated during late adolescence to assess the presence, position, and development of third molars.[38,39] A decision to remove or retain third molars should be made before the middle of the third decade.[115] Impacted third molars are potentially pathologic. Pathologic conditions generally are more common with an increase in age. Evaluation and treatment may require removal, exposure, and/or repositioning. In selected cases, long-term monitoring may be needed. Treatment should be provided before pathologic conditions adversely affect the patient's oral and/or systemic health.[108,115,116] Consideration should be given to removal when there is a high probability of disease or pathology and/or the risks associated with early removal are less than the risks of later removal.[14,108,116] Postoperative complications for removal of impacted third molars are low when performed at an early age. A Cochrane review in 2012 reported there was no difference in late lower incisor crowding with removal or retention of asymptomatic impacted third molars.[117]

Referral for regular and periodic dental care

As adolescent patients approach the age of majority, it is important to educate the patient and parent on the value of transitioning to a dentist who is knowledgeable in adult oral health care. At the time agreed upon by the patient, parent, and pediatric dentist, the patient should be referred to a specific practitioner in an environment sensitive to the adolescent's individual needs.[9,27] Until the new dental home is established, the patient should maintain a relationship with the current care provider and have access to emergency services. Proper communication and records transfer allow for consistent and continuous care for the patient.[36]

Recommendations by age

6 to 12 months

1. Complete the clinical oral examination with adjunctive diagnostic tools (eg, radiographs as determined by child's history, clinical findings, and susceptibility to oral disease) to assess oral growth and development, pathology, and/or injuries; provide diagnosis.
2. Provide oral hygiene counseling for parents, including the implications of the oral health of the caregiver.
3. Remove supragingival and subgingival stains or deposits as indicated.
4. Assess the child's systemic and topical fluoride status (including type of infant formula used, if any, and exposure to fluoridated toothpaste) and provide counseling regarding fluoride. Prescribe systemic fluoride supplements, if indicated, following assessment of total fluoride intake from drinking water, diet, and oral hygiene products.
5. Assess appropriateness of feeding practices, including bottle and breast-feeding, and provide counseling as indicated.
6. Provide dietary counseling related to oral health.
7. Provide age-appropriate injury prevention counseling for orofacial trauma.
8. Provide counseling for nonnutritive oral habits (eg, digit, pacifiers).
9. Provide required treatment and/or appropriate referral for any oral diseases or injuries.
10. Provide anticipatory guidance.
11. Consult with the child's physician as needed.
12. Complete a caries risk assessment.
13. Determine the interval for periodic reevaluation.

12 to 24 months

1. Repeat the procedures for ages six to 12 months every six months or as indicated by individual patient's risk status/susceptibility to disease.

2. Assess appropriateness of feeding practices (including bottle, breast-feeding, and no-spill training cups) and provide counseling as indicated.
3. Review patient's fluoride status (including any childcare arrangements which may impact systemic fluoride intake) and provide parental counseling.
4. Provide topical fluoride treatments every six months or as indicated by the individual patient's needs.

2 to 6 years

1. Repeat the procedures for 12 to 24 months every six months or as indicated by individual patient's risk status/susceptibility to disease. Provide age-appropriate oral hygiene instructions.
2. Scale and clean the teeth every six months or as indicated by individual patient's needs.
3. Provide pit and fissure sealants for caries-susceptible primary molars and permanent molars, premolars, and anterior teeth.
4. Provide counseling and services (eg, mouthguards) as needed for orofacial trauma prevention.
5. Provide assessment/treatment or referral of developing malocclusion as indicated by individual patient's needs.
6. Provide required treatment and/or appropriate referral for any oral diseases, habits, or injuries as indicated.
7. Assess speech and language development and provide appropriate referral as indicated.

6 to 12 years

1. Repeat the procedures for ages two to six years every six months or as indicated by individual patient's risk status/susceptibility to disease.
2. Provide substance abuse counseling (eg, smoking, smokeless tobacco).
3. Provide counseling on intraoral/perioral piercing.

12 years and older

1. Repeat the procedures for ages six to 12 years every six months or as indicated by individual patient's risk status/susceptibility to disease.
2. During late adolescence, assess the presence, position, and development of third molars, giving consideration to removal when there is a high probability of disease or pathology and/or the risks associated with early removal are less than the risks of later removal.
3. At an age determined by patient, parent, and pediatric dentist, refer the patient to a general dentist for continuing oral care.

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Guideline on Periodicity of Examination, Preventive Dental Services, Anticipatory Guidance/Counseling, and Oral Treatment for Infants, Children, and Adolescents

Originating Committee
Clinical Affairs Committee

Review Council
Council on Clinical Affairs

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Purpose
The American Academy of Pediatric Dentistry (**AAPD**) intends this guideline to help practitioners make clinical decisions concerning preventive oral health interventions, including anticipatory guidance and preventive counseling, for infants, children, and adolescents.

Methods
This guideline is an update of a document previously revised in 2009. The update used electronic database and hand searches of articles in the medical and dental literature using the following parameters: Terms: periodicity of dental examinations, dental recall intervals, preventive dental services, anticipatory guidance and dentistry, caries risk assessment, early childhood caries, dental caries prediction, dental care cost effectiveness children, periodontal disease and children and adolescents US, pit and fissure sealants, dental sealants, fluoride supplementation and topical fluoride, dental trauma, dental fracture and tooth, nonnutritive oral habits, treatment of developing malocclusion, removal of wisdom teeth, removal of third molars; Fields: all; Limits: within the last 10 years, humans, English, and clinical trials; birth through age 18. From this search, 3,418 articles matched these criteria and were evaluated by title and/or abstract. Information from 113 articles was chosen for review to update this document. When data did not appear sufficient or were inconclusive, recommendations were based upon expert and/or consensus opinion by experienced researchers and clinicians.

Background
Professional dental care is necessary to maintain oral health.[1,2] The AAPD emphasizes the importance of initiating professional oral health intervention in infancy and continuing through adolescence and beyond.[1-3] The periodicity of professional oral health intervention and services is based on a patient's individual needs and risk indicators.[4-7] Each age group, as well as each individual child, has distinct developmental needs to be addressed at specific intervals as part of a comprehensive evaluation.[8-11] Continuity of care is based on the assessed needs of the individual patient and assures appropriate management of all oral conditions, dental disease, and injuries.[12-18] The early dental visit to establish a dental home provides a foundation upon which a lifetime of preventive education and oral health care can be built.[19-21] Anticipatory guidance and counseling are essential components of the dental visit.[8-10,19-26]

Recommendations
This guideline addresses periodicity and general principles of examination, preventive dental services, anticipatory guidance/counseling, and oral treatment for children who have no contributory medical conditions and are developing normally. An accurate, comprehensive, and up-to-date medical history is necessary for correct diagnosis and effective treatment planning. Recommendations may be modified to meet the unique requirements of patients with special health care needs.

Clinical oral examination
The first examination is recommended at the time of the eruption of the first tooth and no later than 12 months of age.[19-21] The developing dentition and occlusion should be monitored throughout eruption at regular clinical examinations.[26] Early detection and management of oral conditions can improve a child's oral health, general health and well-being, and school readiness.[22,28-31] Delayed diagnosis of dental disease can result in exacerbated problems which lead to more extensive and costly care.[7,28,32-35] Early diagnosis of developing malocclusions may allow for timely therapeutic intervention.[9,26]

Components of a comprehensive oral examination include assessment of:

- General health/growth.
- Pain.
- Extraoral soft tissue.
- Temporomandibular joint.
- Intraoral soft tissue.
- Oral hygiene and periodontal health.
- Intraoral hard tissue.
- Developing occlusion.
- Caries risk.
- Behavior of child.

Based upon the visual examination, the dentist may employ additional diagnostic aids (eg, radiographs, photographs, pulp vitality testing, laboratory tests, study casts).[7,36]

The most common interval of examination is six months; however, some patients may require examination and preventive services at more or less frequent intervals, based upon historical, clinical, and radiographic findings.[5,7,16-18,37-42] Caries and its sequelae are among the most prevalent health problems facing infants, children, and adolescents in America.[1,43] Carious lesions are cumulative and progressive and, in the primary dentition, are highly predictive of caries occurring in the permanent dentition.[44-46] Reevaluation and reinforcement of preventive activities contribute to improved instruction for the caregiver of the child or adolescent, continuity of evaluation of the patient's health status, and repetitive exposure to dental procedures, potentially allaying anxiety and fear for the apprehensive child or adolescent.[47]

Caries-risk assessment

Risk assessment is a key element of contemporary preventive care for infants, children, adolescents, and persons with special health care needs. Its goal is to prevent disease by identifying and minimizing causative factors (eg, microbial burden, dietary habits, plaque accumulation) and optimizing protective factors (eg, fluoride exposure, oral hygiene, sealants).[48] Caries risk assessment forms and management protocols simplify and clarify the process.[24,49,50]

Sufficient evidence demonstrates certain groups of children at greater risk for development of early childhood caries (**ECC**) would benefit from infant oral health care.[22,28,51-53] Infants and young children have unique caries-risk factors such as ongoing establishment of oral flora and host defense systems, susceptibility of newly erupted teeth, and development of dietary habits. Children are most likely to develop caries if mutans streptococci are acquired at an early age.[51,54] The characteristics of ECC and the availability of preventive approaches support age-based strategies in addressing this significant pediatric health problem.[54] ECC can be a costly, devastating disease with lasting detrimental effects on the dentition and systemic health.[22,28-35]

Adolescence can be a time of heightened caries activity due to an increased intake of cariogenic substances and inattention to oral hygiene procedures.[9,55,56] Risk assessment can assure preventive care is tailored to each individual's needs and direct resources to those for whom preventive interventions provide the greatest benefit. Because a child's risk for developing dental disease can change over time due to changes in habits (eg, diet, home care), oral microflora, or physical condition, risk assessment must be documented and repeated regularly and frequently to maximize effectiveness.[11,23]

Prophylaxis and topical fluoride treatment

The interval for frequency of professional preventive services is based upon assessed risk for caries and periodontal disease.[4,5,7,11,23,37,49-51] Gingivitis is nearly universal in children and adolescents[41]; it usually responds to thorough removal of bacterial deposits and improved oral hygiene.[41,57,58] Hormonal fluctuations, including those occurring during the onset of puberty, can modify the gingival inflammatory response to dental plaque.[41,42] Children can develop any of the several forms of periodontitis, with aggressive periodontitis occurring more commonly in children and adolescents than adults.[41,42,58]

Caries risk may change quickly during active dental eruption phases. Newly erupted teeth may be at higher risk of developing caries, especially during the post-eruption maturation process. Children who exhibit higher risk of developing caries would benefit from recall appointments at greater frequency than every six months.[4,5,7,11,23,50] This allows increased professional fluoride therapy application, microbial monitoring, antimicrobial therapy reapplication, and reevaluating behavioral changes for effectiveness.[50,59,60] An individualized preventive plan increases the probability of good oral health by demonstrating proper oral hygiene methods/techniques and removing plaque, stain, and calculus.[4,42,61]

Professional topical fluoride treatments should be based on caries risk assessment.[23,24,62-64] Plaque and pellicle are not a barrier to fluoride uptake in enamel.[65-67] Consequently, there is no evidence of a difference in caries rates or fluoride uptake in patients who receive rubber cup prophylaxis or a toothbrush prophylaxis before fluoride treatment.[65,66] Precautionary measures should be taken to prevent swallowing of any professionally-applied topical fluoride. Children at moderate caries risk should receive a professional fluoride treatment at least every six months; those with high caries risk should receive greater frequency of professional fluoride applications (eg, every three to six months).[63,67-72] Ideally, this would occur as part of a comprehensive preventive program in a dental home.[19]

Fluoride supplementation

Fluoride contributes to the prevention, inhibition, and reversal of caries.[64,72-74] The AAPD encourages optimal fluoride exposure for every child, recognizing fluoride in the community water supplies as the most beneficial and cost-effective preventive intervention. Fluoride supplementation should be considered for children at moderate to high caries risk when fluoride exposure is not optimal.[72] Supplementation should be in accordance with the guidelines recommended by the AAPD[72] and the American Dental Association (**ADA**)[75].

Anticipatory guidance/counseling

Anticipatory guidance is the process of providing practical, developmentally-appropriate information about children's health to prepare parents for the significant physical, emotional, and psychological milestones.[8,9,19,20,76] Individualized discussion and counseling should be an integral part of each visit. Topics to be included are oral hygiene and dietary habits, injury prevention, nonnutritive habits, substance abuse, intraoral/perioral piercing, and speech/language development.[8,9,15,19,20,26,76-80]

Oral hygiene counseling involves the parent and patient. Initially, oral hygiene is the responsibility of the parent. As the child develops, home care is performed jointly by parent and child. When a child demonstrates the understanding and ability to perform personal hygiene techniques, the health care professional should counsel the child. The effectiveness of home care should be monitored at every visit and includes a discussion on the consistency of daily preventive activities.[4,5,9,23]

Caries-conducive dietary practices appear to be established early, probably by 12 months of age, and are maintained throughout early childhood.[81-83] Dietary practices, including prolonged and/or frequent bottle or training cup with sugar-containing drinks and frequent between-meal consumption of sugar-containing snacks or drinks (eg, juice, formula, soda), increase the risk of caries.[83,84] The role of carbohydrates in caries initiation is unequivocal. Acids in carbonated beverages and sports drinks can have a deleterious effect (ie, erosion) on enamel.[85-87] Excess consumption of carbohydrates, fats, and sodium contribute to poor systemic health.[88-90] Dietary analysis and the role of dietary choices on oral health, malnutrition, and obesity should be addressed through nutritional and preventive oral health counseling at periodic visits.[25] The US Department of Agriculture's Food Plate[91] and Center for Disease Control and Prevention/National Center for Health Statistics' Growth Charts[92] provide guidance for parents and their children and promote better understanding of the relationship between healthy diet and development.

Facial trauma that results in fractured, displaced, or lost teeth can have significant negative functional, esthetic, and psychological effects on children.[93] Practitioners should provide age-appropriate injury prevention counseling for orofacial trauma.[15,76] Initially, discussions would include advice regarding play objects, pacifiers, car seats, and electrical cords. As motor coordination develops, the parent/patient should be counseled on additional safety and preventive measures, including use of athletic mouthguards for sporting activities. The greatest incidence of trauma to the primary dentition occurs at two to three years of age, a time of increased mobility and developing coordination.[94] The most common injuries to permanent teeth occur secondary to falls, followed by traffic accidents, violence, and sports.[95-98] Dental injuries could have improved outcomes if the public were aware of first-aid measures and the need to seek immediate treatment.

Nonnutritive oral habits (eg, digital and pacifier habits, bruxism, abnormal tongue thrusts) may apply forces to teeth and dentoalveolar structures.[26] Although early use of pacifiers and digit sucking are considered normal, habits of sufficient frequency, intensity, and duration can contribute to deleterious changes in occlusion and facial development.[26] It is important to discuss the need for early pacifier and digit sucking, then the need to wean from the habits before malocclusion or skeletal dysplasias occur.[26] Early dental visits provide an opportunity to encourage parents to help their children stop sucking habits by age three years or younger. For school-aged children and adolescent patients, counseling regarding any existing habits (eg, fingernail biting, clenching, bruxism) is appropriate.[26]

Speech and language are integral components of a child's early development.[80] Deficiencies and abnormal delays in speech and language production can be recognized early and referral made to address these concerns. Communication and coordination of appliance therapy with a speech and language professional can assist in the timely treatment of speech disorders.[80]

Smoking and smokeless tobacco use almost always are initiated and established in adolescence.[99-101] During this time period, children may be exposed to opportunities to experiment with other substances that negatively impact their health and well-being. Practitioners should provide education regarding the serious health consequences of tobacco use and exposure to second hand smoke.[78,100] The practitioner may need to obtain information regarding tobacco use and alcohol/drug abuse confidentially from an adolescent patient.[9] When substance abuse has been identified, referral for appropriate intervention is indicated.[78]

Complications from intraoral/perioral piercings can range from pain, infection, and tooth fracture to life-threatening conditions of bleeding, edema, and airway obstruction.[79] Although piercings most commonly are observed in the teenaged pediatric dental patient, education regarding pathologic conditions and sequelae associated with these piercings should be initiated for the preteen child/parent and reinforced during subsequent periodic visits.[79]

Radiographic assessment

Appropriate radiographs are a valuable adjunct in the oral health care of infants, children, and adolescents.[38,39] Timing of initial radiographic examination should not be based on the patient's age.[39] Rather, after review of an individual's history and clinical findings, judicious determination of radiographic needs and examination can optimize patient care while minimizing radiation exposure.[38,39] The US Food and Drug Administration/ADA guidelines were developed to assist the dentist in deciding under what circumstances specific radiographs are indicated.[39]

Treatment of dental disease/injury

Health care providers who diagnose oral disease or trauma should either provide therapy or refer the patient to an appropriately-trained individual for treatment.[103] Immediate

intervention is necessary to prevent further dental destruction, as well as more widespread health problems. Postponed treatment can result in exacerbated problems that may lead to the need for more extensive care.[21,2930,,34] Early intervention could result in savings of healthcare dollars for individuals, community health care programs, and third party payors.[21,29,30,34]

Treatment of developing malocclusion

Guidance of eruption and development of the primary, mixed, and permanent dentitions is an integral component of comprehensive oral health care for all pediatric dental patients.[26] Early diagnosis and successful treatment of developing malocclusions can have both short-term and long-term benefits, while achieving the goals of occlusal harmony and function and dentofacial esthetics.[104-108] Early treatment is beneficial for many patients, but is not indicated for every patient. When there is a reasonable indication that an oral habit will result in unfavorable sequelae in the developing permanent dentition, any treatment must be appropriate for the child's development, comprehension, and ability to cooperate. Use of an appliance is indicated only when the child wants to stop the habit and would benefit from a reminder.[26] At each stage of occlusal development, the objectives of intervention/treatment include: (1) reversing adverse growth, (2) preventing dental and skeletal disharmonies, (3) improving esthetics of the smile, (4) improving self-image, and (5) improving the occlusion.[26]

Sealants

Sealants reduce the risk of pit and fissure caries in susceptible teeth and are cost-effective when maintained.[109-113] They are indicated for primary and permanent teeth with pits and fissures that are predisposed to plaque retention.[112] At-risk pits and fissures should be sealed as soon as possible. Because caries risk may increase at any time during a patient's life due to changes in habits (eg, dietary, home care), oral microflora, or physical condition, unsealed teeth subsequently might benefit from sealant application.[109,114] The need for sealant placement should be reassessed at periodic preventive care appointments. Sealants should be monitored and repaired or replaced as needed.[111,112,114]

Third molars

Panoramic or periapical radiographic assessment is indicated during late adolescence to assess the presence, position, and development of third molars.[38,39] A decision to remove or retain third molars should be made before the middle of the third decade.[115] Impacted third molars are potentially pathologic. Pathologic conditions generally are more common with an increase in age. Evaluation and treatment may require removal, exposure, and/or repositioning. In selected cases, long-term monitoring may be needed. Treatment should be provided before pathologic conditions adversely affect the patient's oral and/or systemic health.[108,115,116] Consideration should be given to removal when there is a high probability of disease or pathology and/or the risks associated with early removal are less than the risks of later removal.[14,108,116] Postoperative complications for removal of impacted third molars are low when performed at an early age. A Cochrane review in 2012 reported there was no difference in late lower incisor crowding with removal or retention of asymptomatic impacted third molars.[117]

Referral for regular and periodic dental care

As adolescent patients approach the age of majority, it is important to educate the patient and parent on the value of transitioning to a dentist who is knowledgeable in adult oral health care. At the time agreed upon by the patient, parent, and pediatric dentist, the patient should be referred to a specific practitioner in an environment sensitive to the adolescent's individual needs.[9,27] Until the new dental home is established, the patient should maintain a relationship with the current care provider and have access to emergency services. Proper communication and records transfer allow for consistent and continuous care for the patient.[36]

Recommendations by age

6 to 12 months

1. Complete the clinical oral examination with adjunctive diagnostic tools (eg, radiographs as determined by child's history, clinical findings, and susceptibility to oral disease) to assess oral growth and development, pathology, and/or injuries; provide diagnosis.
2. Provide oral hygiene counseling for parents, including the implications of the oral health of the caregiver.
3. Remove supragingival and subgingival stains or deposits as indicated.
4. Assess the child's systemic and topical fluoride status (including type of infant formula used, if any, and exposure to fluoridated toothpaste) and provide counseling regarding fluoride. Prescribe systemic fluoride supplements, if indicated, following assessment of total fluoride intake from drinking water, diet, and oral hygiene products.
5. Assess appropriateness of feeding practices, including bottle and breast-feeding, and provide counseling as indicated.
6. Provide dietary counseling related to oral health.
7. Provide age-appropriate injury prevention counseling for orofacial trauma.
8. Provide counseling for nonnutritive oral habits (eg, digit, pacifiers).
9. Provide required treatment and/or appropriate referral for any oral diseases or injuries.
10. Provide anticipatory guidance.
11. Consult with the child's physician as needed.
12. Complete a caries risk assessment.
13. Determine the interval for periodic reevaluation.

12 to 24 months

1. Repeat the procedures for ages six to 12 months every six months or as indicated by individual patient's risk status/susceptibility to disease.

2. Assess appropriateness of feeding practices (including bottle, breast-feeding, and no-spill training cups) and provide counseling as indicated.
3. Review patient's fluoride status (including any childcare arrangements which may impact systemic fluoride intake) and provide parental counseling.
4. Provide topical fluoride treatments every six months or as indicated by the individual patient's needs.

2 to 6 years

1. Repeat the procedures for 12 to 24 months every six months or as indicated by individual patient's risk status/susceptibility to disease. Provide age-appropriate oral hygiene instructions.
2. Scale and clean the teeth every six months or as indicated by individual patient's needs.
3. Provide pit and fissure sealants for caries-susceptible primary molars and permanent molars, premolars, and anterior teeth.
4. Provide counseling and services (eg, mouthguards) as needed for orofacial trauma prevention.
5. Provide assessment/treatment or referral of developing malocclusion as indicated by individual patient's needs.
6. Provide required treatment and/or appropriate referral for any oral diseases, habits, or injuries as indicated.
7. Assess speech and language development and provide appropriate referral as indicated.

6 to 12 years

1. Repeat the procedures for ages two to six years every six months or as indicated by individual patient's risk status/susceptibility to disease.
2. Provide substance abuse counseling (eg, smoking, smokeless tobacco).
3. Provide counseling on intraoral/perioral piercing.

12 years and older

1. Repeat the procedures for ages six to 12 years every six months or as indicated by individual patient's risk status/susceptibility to disease.
2. During late adolescence, assess the presence, position, and development of third molars, giving consideration to removal when there is a high probability of disease or pathology and/or the risks associated with early removal are less than the risks of later removal.
3. At an age determined by patient, parent, and pediatric dentist, refer the patient to a general dentist for continuing oral care.

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

Originating Group

A collaborative effort of the American Academy of Pedodontics and the American Academy of Pediatrics

Review Council

Council on Clinical Affairs

Adopted

1978

Revised

1993, 1996, 2001, 2003, 2007, 2008, 2011, 2014*

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 document is a revision of the previous policy, last revised in 2008. The update used electronic and hand searches of English written articles in the dental and medical literature within the last 10 years, using the search terms infant oral health, infant oral health care, and early childhood caries. When data did not appear sufficient or were inconclusive, recommendations were based upon expert and/or consensus opinion by experienced researchers and clinicians.

Background

In 1978, the American Academy of Pedodontics 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 two 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 ECC to reflect better its multifactoral etiology.

Dental caries is a common chronic infectious transmissible disease resulting from tooth-adherent specific bacteria, primarily Mutans Streptococci (**MS**), that metabolize sugars to produce acid which, over time, demineralizes tooth structure.[3] The disease of ECC is the presence of one or more decayed (noncavitated or cavitated lesions), missing (due to caries), or filled tooth surfaces in any primary tooth in a child under the age of six. In children younger than three years of age, any sign of smooth-surface caries is indicative of severe early childhood caries (S-ECC). From ages three through five, one or more cavitated, missing (due to caries), or filled smooth surfaces in primary maxillary anterior teeth or a decayed, missing, or filled score of greater than or equal to four (age 3), greater than or equal to five (age 4), or greater than or equal to six (age 5) surfaces also constitutes S-ECC.[4]

Epidemiologic data from national surveys clearly indicate that ECC is highly prevalent and increasing in poor and near poor US preschool children and is largely untreated in children under age three.[5] Those children with caries experience have been shown to have high numbers of teeth affected. Consequences of ECC include a higher risk of new carious lesions in both the primary and permanent dentitions,[6,7] hospitalizations and emergency room visits,[8,9] increased treatment costs,[10] risk for delayed physical growth and development,[11,12] loss of school days and increased days with restricted activity,[13,14] diminished ability to learn,[15] and diminished oral health-related quality of life.[16]

Dental caries is a transmissible infectious disease and understanding the acquisition of cariogenic microbes improves preventive strategies. Microbial risk markers for ECC include MS and Lactobacillus species.[17] MS maybe transmitted vertically from caregiver to child through salivary contact, affected by the frequency and amount of exposure. 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.[18] Horizontal transmission (eg, between other members of a family or children in daycare) also occurs.[18] Eliminating saliva-sharing activities (eg, sharing utensils, orally cleansing a pacifier) may help decrease an infant's or toddler's acquisition of cariogenic microbes.[18]

** The 2014 revision is limited to use of fluoride toothpaste in young children.*

Newly-erupted teeth, because of immature enamel, and teeth with enamel hypoplasia may be at higher risk of developing caries. Current best practice includes twice-daily brushing with fluoridated toothpaste for all children in optimally fluoridated and fluoride-deficient communities. When determining the risk-benefit of fluoride, the key issue is mild fluorosis versus preventing devastating dental disease. A 'smear' or 'rice-size' amount of fluoridated toothpaste (approximately 0.1 mg fluoride; see Figure 1) should be used for children less than three years of age. A 'pea-size' amount of fluoridated toothpaste (approximately 0.25 mg fluoride) is appropriate for children aged three to six.[19,20] 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.[21]

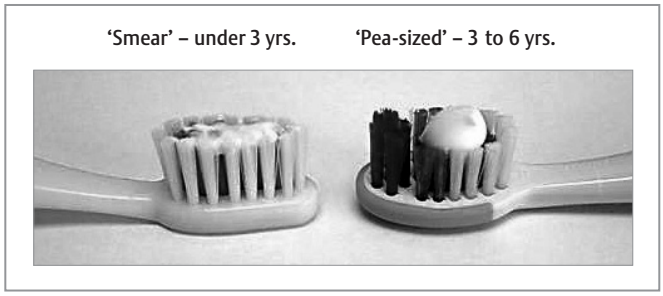

Figure 1. Comparison of a 'smear' (left) with a 'pea-size' (right) amount of toothpaste.

Professionally-applied topical fluoride treatments also are efficacious in reducing prevalence of ECC. The recommended professionally-applied fluoride treatments for children at risk for ECC who are younger than six years is five percent sodium fluoride varnish (NaFV; 22,500 ppm F).[22] An associated risk factor to microbial etiology is high frequency consumption of sugars. Caries-conducive dietary practices appear to be established by 12 months of age and are maintained throughout early childhood.[23,24] Frequent night time bottle feeding with milk and ad libitum breast-feeding are associated with, but not consistently implicated in, ECC.[25] Night time bottle feeding with juice, repeated use of a sippy or no-spill cup, and frequent in between meal consumption of sugar-containing snacks or drinks (eg, juice, formula, soda) increase the risk of caries.[26] 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.[27] Frequent consumption of between-meal snacks and beverages containing sugars increases the risk of caries due to prolonged contact between sugars in the consumed food or liquid and cariogenic bacteria on the susceptible teeth.[28] The American Academy of Pediatrics has recommended children one through six years of age consume no more than four to six ounces of fruit juice per day, from a cup (ie, not a bottle or covered cup) and as part of a meal or snack.[29]

Evidence increasingly suggests that preventive interventions within the first year of life are critical.[30] This may be best implemented with the help of medical providers who, in many cases, are being trained to provide oral screenings, apply preventive measures, counsel caregivers, and refer infants and toddlers for dental care.[31]

Policy statement

The AAPD recognizes caries as a common chronic disease resulting from an imbalance of multiple risk factors and protective factors over time. To decrease the risk of developing ECC, the AAPD encourages professional and at-home preventive measures that include:

1. Reducing the parent's/sibling's MS levels to decrease transmission of cariogenic bacteria.
2. Minimizing saliva-sharing activities (eg, sharing utensils) to decrease the transmission of cariogenic bacteria.
3. Implementing oral hygiene measures no later than the time of eruption of the first primary tooth. Toothbrushing should be performed for children by a parent twice daily, using a soft toothbrush of age-appropriate size. In all children under the age of three, a 'smear' or 'rice-size' amount of fluoridated toothpaste should be used. In all children ages three to six, a 'pea-size' amount of fluoridated toothpaste should be used.
4. Providing professionally-applied fluoride varnish treatments for children at risk for ECC.
5. Establishing a dental home within six 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.
6. Avoiding high frequency consumption of liquids and/or solid foods containing sugar. In particular:
   - Sugar-containing beverages (eg, juices, soft drinks, sweetened tea, milk with sugar added) in a baby bottle or no-spill training cup should be avoided.
   - Infants should not be put to sleep with a bottle filled with milk or liquids containing sugars.
   - 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 between 12 to 18 months of age.[32]
7. Working with medical providers to ensure all infants and toddlers have access to dental screenings, counseling, and preventive procedures.

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