

Dental Caries and Risk Assessment : A Review of Preventive Strategies and Management

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Abstract

Assessing risk for disease development is an important component of any disease prevention program. Risk susceptibility can be determined on a variety of levels, including community, individual, tooth and tooth surface. Therefore, an oral health risk assessment before 1 year of age affords the opportunity to identify high-risk patients and to provide timely referral and intervention for the child and allows an invaluable opportunity to decrease the level of cariogenic organisms in the mother with a significant caries risk before and during colonization of the infant. Caries risk is not stagnant in a patient and can vary from one point of time in his or her life to another. Such variation in susceptibility requires ongoing monitoring by the oral health care professional, since changes in health status, use of medications and other lifetime events can increase risk. This article reviews risk assessment for dental caries and the implication for developing preventive strategies.

Introduction

Dental problems such as tooth decay, periodontal disease and tooth loss, constitute a major public problem, in the world today.¹ In order to prevent oral health problems, the American Dental Association (ADA) and other organizations recommended that adults should thoroughly brush and floss their teeth at least once a day and get regular oral health check-ups.^{2,3}

A key component of any preventive program is to assess a person's risk of developing a disease. In the case of dental caries, it is suggested that a risk profile be performed on a number of levels: community, individual, tooth and tooth surface.⁴ This expanded approach considers risk implications from various factors that could influence carious activity and may help dental professionals better manage patients from a preventive perspective. More than 40% of children have tooth decay by the time they reach kindergarten.² Infants who are of low socioeconomic status, whose mothers have a low education level, and who consume sugary foods are 32 times more likely to have caries at the age of 3 years than children in whom those risk factors are not present.⁵ The risk for caries development varies significantly for different populations, age groups, individuals, teeth, and surfaces. Therefore caries-preventive measures must be integrated and based on predicted risk from age groups down to the individual tooth surfaces.

Goals

Based on this philosophy and on experiences from continuously ongoing researches evaluating and re-evaluating separate and integrated caries-preventive measures, as well as methods for prediction of caries risk, a needs related caries preventive program for 0- to 19-year-olds was introduced in the county of Varmland in 1979.⁶⁻⁸

The goals for the subjects following the program from birth to the age of 19 years were:

1. To have no approximal restorations.
2. To have no occlusal amalgam restorations.
3. To have no approximal loss of periodontal attachment.
4. To motivate and encourage individuals to assume responsibility for their own oral health.

It was hoped that these goals would be attained for 19- year-old participants by 1999. The effect of the program is evaluated once every year on almost 100% of all 3 to 19-year-olds in a computer-aided epidemiologic program from 1979.^{9,10}

Risk Groups for Dental Caries

Every child should begin to receive oral health risk assessments by 6 months of age by a qualified pediatrician or a qualified pediatric health care professional. In the case of the very young patient, a risk assessment to identify parents (usually mothers) and infants with a high predisposition to caries can easily be performed by taking a simple dental history from a new mother. An infant is assessed to be within 1 year of the following risk groups, the care requirements would be significant and surgically invasive; therefore, these infants should be referred to a dentist as early as 6 months of age and no later than 6 months after the first tooth erupts or 12 months of age (whichever comes first) for establishment of a dental home:

Establishing the Dental Home

The concept of the “dental home” is derived from the American Academy of Pediatrics concept of the “medical home.” The American Academy of Pediatrics states, “the medical care of infants, children, and adolescents ideally should be accessible, continuous, comprehensive, family centered, coordinated, compassionate, and culturally effective. It should be delivered or directed by well-trained physicians who provide primary care and help to manage and facilitate essentially all aspects of pediatric care.”¹¹ Pediatric primary dental care needs to be delivered in a similar manner. The dental home is a specialized primary dental care provider within the philosophical complex of the medical home. Referring a child for an oral health examination by a dentist who provides care for infants and young children.

Oral Health Risk Assessment and the Dental Home

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

The dental home should be expected to provide:

- 1- An accurate risk assessment for dental diseases and conditions
- 2- An individualized preventive dental health program based on the risk assessment
- 3- Anticipatory guidance about growth and development issues (ie, teething, digit or pacifier

- habits, and feeding practices)
- 4- A plan for emergency dental trauma
 - 5- Information about proper care of the child's teeth and gingival tissues
 - 6- Information regarding proper nutrition and dietary practices
 - 7- Comprehensive dental care in accordance with accepted guidelines and periodicity schedules for pediatric dental health
 - 8- Referrals to other dental specialists, such as endodontists, oral surgeons, orthodontists, and periodontists, when care cannot be provided directly within the dental home.

Anticipatory Guidance and Parent and Patient Education

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

Oral hygiene—Parents should be instructed to brush thoroughly twice daily (morning and evening) and to floss at least once every day.

Diet—Parents should be instructed to consume fruit juices only at meals and to avoid all carbonated beverages during the first 30 months of the infant's life.

Fluoride— Parents should be instructed to use fluoride toothpaste approved by the American Dental Association and rinse every night with an alcohol-free over-the-counter mouth rinse with 0.05% sodium fluoride.

Caries removal—Parents should be referred to a dentist for an examination and restoration of all active decay as soon as feasible.

Delay of colonization—Mothers should be educated to prevent early colonization of dental flora in their infants by avoiding sharing of utensils (ie, shared spoons, cleaning a dropped pacifier with their saliva, etc).

Xylitol chewing gums—Recent evidence suggests that the use of xylitol chewing gum (4 pieces per day by mother) had a significant impact on decreasing the child's caries rates.¹²

General anticipatory guidance for the young patient

(0 to 3 years of age) should include the following:

Oral hygiene—the parent should begin to brush the child's teeth as soon as they erupt (twice daily, morning and evening) and floss between the child's teeth once every day as soon as teeth contact one another.

Diet—after the eruption of the first teeth, the parent should provide fruit juices (not to exceed 1 cup per day) during meals only. Carbonated beverages should be excluded from the child's diet. Infants should not be placed in bed with a bottle containing anything other than water. Ideally, infants should have their mouths cleansed with a damp cloth after feedings.

Fluoride—all children should have optimal exposure to topical and systemic fluoride. Caution should be exercised in the administration of all fluoride-containing products. The specific considerations of the judicious administration of fluoride should be reviewed and tailored to the unique needs of each patient. Review articles with applicable fluoride recommendations and supplementation algorithms are available.¹³⁻¹⁶

Recommendations

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

Summary

Dental caries is a bacteria-dependent, multifactorial disease, preventive measures such as sealants, can be implemented once those at risk are identified. Diagnostic tests and preventive therapies will be critical in the dental practice of the future, where health and wellness will be the primary goals. Dental caries is 5 times more common than asthma and 7 times more common than hay fever in children.¹⁷ Early childhood dental caries emerges within all cultural and economic populations. Diagnostic tests and preventive therapies will be critical in the dental practice of the future, where health and wellness will be the primary goals.

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