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Review Article

Promotion of Oral Health Care in Infants - A Preventive Strategy to Reduce the Burden of Early Childhood Caries

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Abstract

Infant oral health care is the foundation on which a life time of preventive education and dental care can be built in order to help acquire optimal oral health in a child. The purpose of an infant oral health program is to improve access to oral health care and to provide counseling and anticipatory guidance in oral hygiene for children aged 6 months to 5 years. The first step of infant oral health care is the preventive oral health behavior of parents since they would influence their children's behavior in adapting to the preventive oral health practices as they grow along. Early dental interventions present an opportunity to educate parents about the medical, dental and cost benefits of preventive care which is effective in reducing early childhood caries. A comprehensive infant oral care program includes risk assessments at regularly scheduled dental visits, preventive treatments such as fluoride varnishes or sealants, parental education on the correct methods to clean the baby's mouth and establishment of dental home and use of anticipatory guidance. The present article highlights the important guidelines of infant oral health care.

Keywords: Infant Oral Health Care; Dental Home; Anticipatory Guideline; Early Childhood Caries; Prenatal Counseling

Abbreviations

ECC: Early Childhood Caries; *S. mutans: Streptococcus mutans*; AAP: American Academy of Pediatrics; AAPD: American Academy of Pediatric Dentistry; DMFS: Decayed Missing Filled Score

Introduction

The first year of life after birth is called infancy. In the beginning stage of infancy, there is presence of gum pads and in the later stages, eruption of primary teeth is observed in the oral cavity. Preventive dental care plays a major role in determining the child's future oral health.

Since an infant is completely dependent on the parents for their most basic needs, the role of a pediatric dentist at this stage is to educate and motivate the parents to maintain good oral hygiene of the infant. Thus, the entire responsibility of preventive care for optimal oral health lies in the hands of the infant's parents/ caregivers [1].

Importance of infant oral health care

Education and motivation regarding oral hygiene and preventive dental care should be focused upon to ensure that an infant has the possibility of a lifetime devoid of preventable dental diseases. The care of the oral cavity and monitoring the development of teeth is included as one of the features of infant oral health. Infant oral health is an integral part of general well being of an infant as he or she increases in age. Unfortunately, timely and accurate education regarding preventive oral health care is not given to pregnant women, parents and caregivers of infants [1].

Role of infant oral health care in preventive dentistry

Infancy is the best time to initiate measures to prevent the onset of dental diseases. The most common dental disease which occurs

during this period is early childhood caries (ECC). Since parents and caregivers look after every need of the infant, it is imperative to provide them with knowledge on the promotion of oral health care in their children. Various strategies are available which would help in establishing good oral health in an infant. Some of the preventive care measures are based on the following reasons:

- An environment promoting the colonization of cariogenic bacteria such as *Streptococcus mutans* is created in the infant's mouth. The eruption of a tooth in an infant's mouth is in an environment which promotes demineralization.
- Early identification and appropriate intervention can be planned for infants who have a high risk of ECC due to improper feeding practices and poor oral hygiene.
- Good oral health care practices should be provided to parents/caregivers to maintain the infant's mouth in a state of good dental health.
- Undesirable consequences of poor dental health such as pain and poor nutrition can be avoided in infants with ECC.
- The psychological health of the child should be maintained as unesthetic appearance of the teeth has a negative role in the psychology of the child [2].

Microbial status of an infant's oral cavity

During pregnancy, women tend to experience more oral problems due to the changes in hormonal levels and variations in intraoral flora. Early acquisition of transmitted microorganisms such as *Streptococcus mutans* (*S. mutans*) from the mother to the infant is frequently observed leading to dental decay in the infant [3]. The transmission of *S. mutans* from the mother to the infant is known as vertical transmission. The transmission of *S. mutans* which occurs by sharing of spoons, glasses and by interpersonal contact between the infant and other members is known as horizontal transmission [4]. Development of an approach which targets the infectious element plays an effective role in the prevention of ECC at an early age of infancy. This can be done by preventing or delaying the acquisition of *S. mutans* by the suppression of these microorganisms in the mother's womb [5]. Therefore, consultation with a dentist before conception would help in reducing the transmission of cariogenic bacteria to the infant.

Concept of dental home

A creation and maintenance of dental home is the first step which helps in the promotion of good infant oral health. The concept of dental home was derived from the establishment of medical home by the American Academy of Pediatrics (AAP) in 1992. In a dental home, the child is the focus of attention and receives utmost care from the parent and the pediatric dentist [6]. The following features are the characteristics of an ideal dental home:

1. **Accessibility**: This implies that dental care should be made reachable to the infant and family.
2. **Family Centered:** The importance of the family is recognized and behavior management techniques acceptable to the family are utilized.
3. **Continuous:** A dental home should be designed to look after the needs of a child from infancy through adolescence continuously so that care may be provided to the infant at all stages of development.
4. **Comprehensive:** A dental home should be able to provide perpetual care for a child inclusive of primary, secondary and tertiary care for the infant.
5. **Coordinated:** Healthy relations should be established between the infant's family and the pediatric dentist so that information may be shared for the benefit of the child.
6. **Compassionate:** A concerned and empathetic approach should be established while providing dental care to the child's family and community receiving dental care.
7. **Culturally competent:** A dental home comprises of children from varying backgrounds and cultures, hence the dentist recognizes and respects the values of the different cultures and ethnic backgrounds.

The American Academy of Pediatric Dentistry (AAPD) has recommended the first dental visit of an child within 1 year of age. This concept helps in early recognition of risk factors which favors the pediatric dentist to plan appropriate intervention depending on the knowledge, attitude and prevalence of infant feeding practices and oral hygiene suggested to the parents/caregivers. It helps in tailoring a personalized preventive strategy to suit the specific oral health needs of a child at every stage [7].

Anticipatory guidance

The dental home provides scope for anticipatory guidance at every stage of a child's development. 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]. Anticipatory guidance encompasses 3 types of responsibilities: (1) gathering information, (2) establishing a therapeutic alliance and (3) providing education and guidance [9].

Anticipatory guidelines for pregnant mothers are:

1. Educating, motivating and instilling preventive attitudes among pregnant mothers.

2. Maintenance of oral hygiene by brushing twice daily using fluoridated toothpaste and toothbrush and flossing regularly.

3. Eating healthy foods such as fruits, vegetables, grain products (especially whole grain) and dairy products (milk, cheese) during meals and snacks.

4. Eating foods containing only sugar at mealtimes in limited quantities and not in between meal snacking.

5. Not smoking cigarettes or chewing tobacco [4].

Prenatal oral health counseling

Prenatal oral health counseling for parents is the first and foremost step taken to bring about good oral health in infants. A mother's Decayed Missing Filled Score (DMFS) scores, education and feeding habits are strong risk indicators for the colonization of caries-related microorganisms and ECC [10]. Therefore, the aim of prenatal oral health counseling is to generate awareness among expectant mothers about dental disease, its prevention and the means to promote good oral health in the infant. The counseling begins prenatally and continues until the eruption of the first tooth in the infant's oral cavity [11]:

1. Infants with low birth weight and malnourished infants: They have a higher chance of development of enamel hypoplasia. It results in the formation of rough enamel surface which makes the tooth more prone to plaque accumulation and thereby resulting in caries. Therefore, expecting mothers should be advised to optimize nutrition during the third trimester as it correlates with the phase of enamel maturation in the infant's oral cavity [12].
2. The relationship between periodontitis in the mother and preterm birth [13].
3. The interrelation between *S. mutans* levels in mothers and caries experience in their children [14].

The oral status of the expectant mothers should be evaluated on a regular basis. Counseling regarding their diet and nutrition, oral hygiene practices and infant feeding practices should be administered to them. The effects of poor oral hygiene, improper feeding practices and its role in promoting early caries experience in the child should be stressed upon to the mother [9]. A dental home can address these needs, if developed at the prenatal stage itself. A multidisciplinary approach comprising of pediatric dentists, pediatricians and nutritionists should be employed to provide prenatal counseling to the mother with an ultimate goal of providing good oral and general health to the infant. Regular monitoring of these parents ensures effective oral hygiene and dietary habits through pre-and perinatal parent counseling.

Infant feeding related behavior

Infant feeding practices related to breastfeeding, bottle feeding and their timing of cessation must be given importance. Infant formulas are acidogenic and possess cariogenic potential.

Awareness about unfavorable consequences of inappropriate infant feeding practices on infant oral health should be generated through prenatal and postnatal counseling. Some of the recommendations for appropriate infant feeding practices to be followed are given below [15]:

1. Infants should not be put to sleep with a bottle containing fermentable carbohydrates.
2. Following the eruption of the first primary tooth and the introduction of dietary carbohydrates, at-will breastfeeding should be avoided.
3. Infants should be encouraged by the parents to drink from a cup as they approach their first birthday.
4. Infants should be weaned from the bottle at 12 to 14 months of age.
5. Consumption of any liquid containing fermentable carbohydrates at intermittent intervals from a bottle or training cup should be avoided.
6. Between-meal snacks and prolonged exposures to foods and juice or other beverages containing fermentable carbohydrates should be avoided [16].

Oral hygiene for the infant

Oral hygiene measures must be implemented no later than the time of eruption of the first primary tooth. These measures include the following:

- If an infant falls asleep while feeding, the gum pads should be cleaned using gauze pads before placing the infant in bed.
- Tooth brushing 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 and perform or assist with their child's tooth brushing [16,17].

Fluoride supplementation

Fluoride is a well-known agent which has promising results in the control of caries. As per the AAPD, primary preventive procedure is carried out by exposing children to fluoride daily.

The exposure of fluoride in drinking water is dependent on the infant's access to the community fluoridated water supplies as well as well water. In a country like India which has high and low fluoride concentrations in different regions, it is important to have a knowledge of the fluoride distribution. Prescription of dietary fluoride containing 0.25 mg fluoride per day is recommended for infants older than 6 months of age who are exposed to fluoridated water with a concentration less than 0.3 ppm fluoride. Prescription of supplements rich in fluoride should not be given for infants whose age is less than 6 months [18].

First dental visit: timing and its relevance

AAP and AAPD recommended the first dental visit of a child to be by the age of 1 year to help in promoting the early detection of dental caries and to establish a dental home. The AAPD recommends that the first oral evaluation visit should occur within 6 months of the eruption of the first primary tooth and no later than 12 months of age [19]. A dental care regime comprising of the establishment of dental home during the initial stages of infancy can lead to benefits of oral health in the long run as *S. mutans* colonization starts occurring even prior to tooth eruption in an infant.

Conclusion

The foundation for good oral health in the lifetime of a child relies on the management of oral health in an infant. Efforts should be taken for the prevention of dental caries, especially ECC by promoting oral health practices in the initial stages of infancy. A dental home must be developed for each child, which provides anticipatory guidance from infancy through adolescence. Maternal education and emphasis on good maternal oral health should also be encouraged at pre-and perinatal stages to further prevent early colonization of cariogenic microorganisms [20].

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