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Review Article

Early Childhood Caries: Etiology and Management

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ABSTRACT

Early childhood caries (ECC) is a dietary induced disease depicted by early onset and rapid progression and destruction of deciduous teeth accompanied by pronounced concern from the parents and the dentist as it leads to functional, esthetic and psychological disturbances of the child. The importance of early identification and intervention for infants and toddlers at high risk for dental caries and primary care health provider-delivered anticipatory guidance during well-childcare visits cannot be overestimated. Hence, in this article, etiology, preventive measures and treatment modalities are discussed and laid emphasis that preventive methods as well as treatment could be successful only if parents and caregivers follow and adhere to the being recommended.

KEYWORDS: Early Childhood Caries; Maxillary Anterior Caries; Nursing Bottle Caries.

INTRODUCTION

Early childhood caries (ECC) is a major public health problem, being the most common chronic infectious childhood disease, which is difficult to control.[1] In these caries, there is early carious involvement along with gross destruction of the maxillary anterior teeth.[2] ECC can be a particularly virulent form of caries, beginning soon after dental eruption, developing on smooth surfaces, progressing rapidly, and having a lasting detrimental impact on the dentition. Children experiencing caries as infants or toddlers have a much greater probability of subsequent caries in both the primary and permanent dentitions.[3] As a result of gross destruction of tooth structure, there occurs difficulty in speech, development of abnormal tongue habits, decreased masticatory efficiency and consequent malocclusion and psychological problems if esthetics are compromised.[2] While not life-threatening, its impact on individuals and communities is considerable, resulting in pain, impairment of function, deleterious influence on the child's growth rate, body weight, and ability to thrive, thus reducing quality of life.[1]

It is a bacterial transmissible infection and since it may lead to significant oral and systemic complications, it is an important public health issue internationally.[4] The various terms used interchangeably are nursing caries, baby bottle tooth decay, early childhood caries, rampant caries in preschool children, labial caries, maxillary anterior caries, and nursing bottle caries.[5]

Decomposition of tooth in infants associated with baby drinks is referred as Baby bottle-fed tooth decay.[6] In rampant caries, there is early pulp involvement and gross destruction of the maxillary anterior teeth as well as posterior teeth.[7] It is a disease that can never be eradicated because of the complex interaction of cultural, social, behavioral, nutritional, and biological risk factors that are associated with its initiation and progression.[1]

There are two approximate yet distinct descriptions for ECC and Severe Early Childhood Caries (S-ECC) in the literature. ECC is described as the existence of one or more decayed, missing (due to caries) or restored tooth surfaces in a child of 71 months of age or younger. While any sign of smooth surface caries in children younger than 3 years of age is indicative for S-ECC.[4] The restoration of severely decayed primary incisors is often a difficult procedure that presents a special challenge to dentists.[2]

ETIOLOGY

Significant percentages of preschool child populations are affected by ECC today, with the disease concentrating disproportionately in deprived families.[8] Dental plaque is a risk factor of dental caries severity among preschool children. It concludes that children with higher dental plaque index have times greater risk of suffering severe dental caries than children with low

dental plaque index.[9] ECC is attributed to a heavy infection of MS in the oral environment. [10] Early colonization by mutans streptococci is correlated with increased ECC development, with bacteria being transmitted in both vertical and horizontal ways. [8]

The decay-producing capabilities of certain foods can be influenced by eating habits. When a habit of frequent nocturnal bottle or breast feeding is maintained beyond a year of age, the potential for gross dental decay in very young children is established.[11] Inappropriate bottle and breast-feeding behaviors also increase the risk, without showing a direct causal relationship. High risk children belong to ethnic minority groups and to low-income families with poor parental behaviors and attitudes.[8] Bovine milk, milk formulas and human breast milk have all been implicated in the condition of "nursing bottle caries," because of their lactose content. [11] Milk was reported to be the liquid most often used in the bottle.[12] Additional sweeteners in the nursing bottle, the use of fruit juices or the use of honey-dipped pacifiers can also cause "nursing bottle caries." [11]

Dietary factors related to sugar consumption predispose to early MS colonization and establishment and increase the risk for ECC development, being part of the causal chain.[8] Wheeler K et al[13] demonstrated a logistic regression model that yielded that children who eat more than 2.5 pieces of candy per day have at least twice the odds of dental decay compared to children who eat less candy.

MANAGEMENT

Parent Counselling

"Nursing bottle caries" can be prevented through a timely educational program to new parents. Prevention is particularly applicable in young children, since a healthy oral condition promotes good nutrition, a healthy state and normal growth.[11] The patient compliance to maintain ideal preventive measures are questionable. [10]

Preventive Care

To prevent ECC by home-care approaches, brushing by caregivers using a small quantity of fluoride-containing toothpaste is essential and should start as soon as teeth erupt. Secondly, CPP-ACP nanocomplexes are casein-derived peptides in which ACP is stabilized by CPP. These nanocomplexes act as a calcium and phosphate reservoir when incorporated into the dental plaque and on the tooth surface.[14] CPP-ACP has been shown to reduce demineralization and promote remineralization of carious lesions both *in vitro* as reported by Yamaguchi K et al[15] and *in situ* as reported by Iijima Y et al.[16]

Treatment

The purpose of restoring carious primary incisors is to allow the patient retain these teeth until natural exfoliation. [17] In the past, the only treatment option would have been to extract the affected teeth and replace them with prosthetic substitutes. With the introduction of new adhesive systems and restorative materials, alternative approaches in treating these teeth have been proposed. [18]

Restoration Material:

The choice of restoration materials used includes glass ionomer cements (GICs), compomers and composite resins.[17] The performance of amalgam restorations with extension for prevention would be more suitable than preventive resin restorations in occlusal surfaces of primary molars. [10]

Post Restorations:

Composite post restorations, fiber post restorations, and reversed post restorations are various methods for restoration of maxillary primary incisors with extensive carious lesions.[19] Metha D et al[18] described the rehabilitation of primary anterior teeth in a 5-year-old patient using glass fiber reinforced composite resin as an intracanal post. Bayrak S et al[20] reinforced root canal treated primary maxillary central and lateral incisors using polyethylene fiber-reinforced composite resin short posts and restored using celluloid strip crowns. Eshghi A et al[19] compared clinical success rates of these three methods in pulpectomized, severely decayed maxillary primary teeth affected with early childhood caries and found that the metal post technique is acceptable for the restoration of severely damaged primary anterior teeth.

Crowns in Restoring Primary Teeth:

The bonded resin composite strip crown technique has been used to restore primary incisors with extensive and multisource decay. The time for restoration placement is reasonable and the cost of materials (strip crown kit) is affordable. The technique proves simple to use by dentists, provides great parent and patient satisfaction due to very good esthetics and it is easy to repair in case of breakdowns. However, it may be easily fractured by trauma/traumatic occlusion, it is technique-sensitive, requires good tooth isolation from moisture, needs adequate tooth structure for retention and also patient cooperation.[17] Furthermore, in primary molars with occlusal carious lesions and demineralized smooth surfaces, the placement of stainless steel crowns instead of occlusal restorations would be a more appropriate treatment.[10]

The Restoration of Severely Decayed Primary Teeth in an Uncooperative Child

The restoration of severely mutilated deciduous teeth in an emotionally immature patient is conducted under general anesthesia.[7]

CONCLUSION

Clinicians should recognize the factors contributing to caries balance and process of enamel demineralization and remineralization that comprises dental caries process. It is crucial to identify early and intervene for infants and toddlers who are at high risk for dental caries

and the patient and parent compliance to maintain ideal preventive measures are essential to decrease the burden of ECC.

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