

An overview on early childhood caries: A literature review

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Abstract

Background: Early childhood caries is highly prevalent in preschool children in many countries. This has been attributed to many factors. The awareness about the disease, dentition, oral health, and preventive measures are generally lacking in communities. **Objective:** Reviewing the current literature on early childhood dental caries, clinical features, etiological factors, management, and prevention. **Methodology:** PubMed database was used for articles selection, and the following keys used in the mesh (“Early Childhood Caries” [Mesh] AND “Diagnosis” [Mesh] AND “Management” [Mesh]). **Review:** In children, there are many risks for teeth decay and most notably of those are infectious causes, poor dietary style and excessive sugar intake. The diagnosis of early childhood caries is a clinical one where the affected teeth are recognized by their dull white enamel. This clinical sign is a manifestation of demineralization after repetitive damage by bacteria, sugar and acidity. **Conclusion:** Management of dental caries are central to clinical dental practice. It is, therefore, necessary to understand the condition and what could be done to prevent its occurrence or progression.

Keywords: Dental caries, Gingival lesions, Early childhood caries, Diagnosis, Management

INTRODUCTION

In dental practice, the early childhood caries is identified by the presence of one or more cavitation lesion, a lost teeth due to caries, and/or a filling in primary teeth of children aged seventy-two months or younger ^[1]. As children grow, the definition of early childhood caries differs slightly. In children younger than three years of age, the dentist should identify smooth-surface caries as this is a pathognomonic sign of early childhood caries. In older children, single or multiple cavitation, lost teeth due to caries, fillings, and/or tooth decay are all considered signs of severe early childhood caries. These caries are prevalent across the globe, in China the prevalence of early childhood caries is around 78% and the severe form reached up to 41%. ^[2] In Qatar, there is also a high prevalence of severe childhood dental caries in preschool children reach as 27%. ^[3] In India’s Himachal Pradesh province, the prevalence of severe early childhood caries is around 20% in pre-school children. ^[4] This condition is highly prevalent in preschool children, potentially reflecting a poor oral health education in the community. ^[5] This oral health literacy is correlated heavily with socio-economic background of the family. ^[6] In this paper, we will review the literature for the relevant causes, clinical features, diagnosis, and management options for this disease.

METHODOLOGY

PubMed database was used for articles selection, and the following keys used in the mesh (“Early Childhood Caries” [Mesh] AND “Diagnosis” [Mesh] AND “Management” [Mesh]). In regards to the inclusion criteria, the articles were selected based on inclusion of one of the following topics: early childhood dental caries, etiological and predisposing factors, diagnosis, clinical features, and management. Exclusion criteria were all other articles which did not have one of these topics as their primary endpoint.

REVIEW

Etiological Factors

In children, there are many risks for teeth decay and the most notable ones are: infectious causes, poor dietary style, and excessive sugar intake. The body is resilient to infections, and

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therefore, another factor is often present before caries arise. This is usually because children are often exposed to higher rate of sugary food and soft drinks, in addition to existing bacterial infestation. There are a number of important organisms, but the most encountered in childhood dental caries is *Streptococcus mutans* [7]. Additionally, *Streptococcus lactobacilli* is implicated as a risk factor for the development of early childhood caries, especially in obese children. [7] Other less commonly implicated bacteria include *Rothia mucilaginosa* and *Veillonella parvula*. [8]

Hence, the pathophysiology is that of bacterial interaction with carbohydrates, combined with the ensuing increased salivary acidity, eventually breaching the protective teeth enamel. This demineralization of teeth enamel inevitably manifests as dental caries. Moreover, children with blood disorders such as beta-thalassemia major are at higher risk of developing both dental caries and gingival inflammation. [9] [10] Children with iron deficiency are also susceptible to severe early childhood caries. [11, 12] These children are often susceptible to bacterial infection of the oral cavity. Furthermore, with the advent of fast-food restaurants and increased sugar placement in many products, children are at increased risk of dental caries.

Malnutrition is a strong risk of dental caries development in permanent teeth, fortunately, this is not the case in early childhood as primary teeth are predominant. [13, 14] On the other hand, heavy intake of non-healthy or junk food that is filled with sugar is a known factor in dentition decay. [15] Furthermore, eating heavy amounts of sweets combined with incorrect or sparingly brushing of teeth renders the child susceptible to developing dentition caries. [16] While other causes of poor oral hygiene may play an important role in the development of caries, such as parental incarceration. [17] Moreover, other factors related to mothers of these children have been implicated in the development of disease in the children. These factors range from illiteracy, poor maternal dental health, to prolonged night-time breastfeeding. [18]

Clinical Diagnosis

The diagnosis of early childhood caries is a clinical one where the affected teeth are recognized by their dull white enamel. This clinical sign is a manifestation of demineralization after repetitive damage by bacteria, sugar and acidity. In patients who are left untreated, severe early childhood caries takes place. To diagnose this former condition, there should be at least signs of caries on smooth surfaces of teeth of children younger than three years. There are other criteria that if present indicate severity of the condition. These include presence of decay, missing or filling tooth in deciduous teeth of children aged three–five years. Dentists could utilize the decay-missing-filled index to diagnose the condition according to the age of the affected child (Table 1). However, even with clinical defining early childhood caries they are not distinctively different from dental caries, as these definitions are related more to age rather than specific pathology features. [19]

Table 1: Definitions of Severe Early Childhood Caries at Different Ages

Age in Months	Severe Manifestation of Early Childhood Caries	
<12		
12–23	One or More Decay-missing-filled Surfaces	
24–35		
36–47	One or More Cavities, Filled, or Missing Smooth Surfaces in Primary Maxillary Teeth	Decay-missing-filled surfaces index of >4
48–59		Decay-missing-filled surfaces index of >5
60–71		Decay-missing-filled surfaces index of >6

The clinical progression of early childhood caries is important, as detecting and treating the condition early could prevent unnecessary complications. The demineralization of the teeth enamel would appear as white patch that is progressing over time to blow-out decay. This decay seeps further towards the gingivae, if not fastidiously treated. The occurrence of this condition is not insidious, as many children would present with damage to the anterior maxillary teeth. It is important, thereafter, to examine the gingival areas for spread of the disease, which will be manifested as yellowish brown lesions. The problem becomes more complicated as children age without proper dental follow-up. Children who are not seen until four years of age are at higher risk of dental caries. [20]

Management Approach

The therapeutic approach to early childhood caries includes preventing new caries from developing and protecting the child from potential and known risk factors. This is ideally done when the child is able to annually pay a visit to the dentist for checkup. The dentist should then examine the teeth and perform careful risk assessment in at-risk populations. Children who have mild disease, or are at increased risk of developing the condition, could benefit from preventive dietary and social habit measures. For instance, evidence also shows that dietary modification is effective in preventing development of dental caries. Additionally, it could potentially reverse carious lesions when probiotic milk is used as a dietary supplement. [21] Other children could be discovered to have extensive damage to the teeth enamel, and therefore would benefit from more restorative enamel procedures. In addition to enamel protection, the discovered cavitory lesions should be dealt with. In patients with severe early childhood caries, the management is often more difficult than simple preventive measures. As these children may be a few months old, it is necessary for them to be under anesthesia for the procedure duration. There are evidence-based methods to managing severe childhood caries and these

include either pre-formed stainless steel crowns or atraumatic restorative treatment.

Definitive restoration of cavitated teeth can be achieved using pre-formed crowns, which are malleable and can be suitable for restoring damaged primary molars. In addition to early childhood caries, stainless steel crowns are used in cases of hypoplasia, cervical decalcification, hypocalcification, extensive caries damage beyond gingival angle lines, and also in children with bruxism.^[22] Furthermore, dentist have long used stainless steel crowning as adjunctive post-procedural in pulpotomy, pulpectomy, and in intra-procedural fracture of teeth. The other technique of atraumatic restorative treatment focuses on removing the lesions with instruments that would restore normality by using adhesive materials. While anxiety levels in children are the same as standard methods, namely amalgam, this alternative approach is feasible in primary dental care settings.^[23]

CONCLUSION

The prevalence of early childhood caries is unsurprisingly high, with causes of parents' poor oral health education, and increased sugary drinks and junk food intake. Management of dental caries are central to clinical dental practice. It is, therefore, necessary to understand the condition and what could be done to prevent its occurrence or progression. The management of the disease depends on its severity, for instance, either stainless steel crowning or atraumatic restorative techniques could be used.

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