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Dental caries in early childhood: A literature review

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ABSTRACT
Early childhood caries, an extremely serious dental condition, can impact children between the ages of 0 and 12. This problem is characterized by the presence of one or more compromised teeth and results from a multifactorial interaction between several elements, such as diet, oral microbiota, and lack of hygiene over time. The objective of this study was to review the literature on dental caries in early childhood. The preventive approach to this condition begins with the first dental visit around 6 months of age, requiring the active and careful involvement of the parents. Negligence in the treatment of this condition can have significant consequences on the child's quality of life, manifesting itself not only as a dental problem, but also influencing their overall development. The untreated presence of caries can generate negative impacts, triggering pain and discomfort due to the lesions. Thus, it is imperative to identify the etiological factors involved and promote changes in habits, which is the key to effective and early treatment. Additionally, in cases where the lesions are already established in the oral cavity, the determination of the best course of treatment will depend on the extent of the lesions, the child's age, and individual behavior. Comprehensive oral health care from childhood is crucial not only to prevent caries, but also to ensure healthy and complication-free development at this crucial stage of life.

Keywords: Epidemiology, Caries, Child, Treatment.

1 INTRODUCTION

Tooth decay is a multifactorial oral health condition, caused by a combination of factors such as poor hygiene, diet, microbiota, and time. This condition causes progressive and localized destruction of the tooth, resulting from demineralization caused by cariogenic bacteria. The demineralization process occurs when there is the presence of biofilm on the surface of the tooth, which contains acidogenic carbohydrates. The continuous permanence of this biofilm on the tooth surface can evolve to the development of caries. If not properly treated, caries can cause pain, impact growth, generate speech difficulties, compromise chewing, and cause damage to the permanent dentition (THAM *et al*., 2015; VAN MEIJEREN-VAN LUNTEREN *et al*., 2021).

Early childhood caries is a serious dental condition that impacts more than half of children aged 0-12 years (FELDENS *et al*., 2018). This condition manifests itself through one or more affected primary teeth, and may present as white spots, cavitated lesions, absence of teeth (due to caries) or

restorations. It is characterized by a rapid progression, which can result in the total destruction of the teeth (FISHER-OWENS *et al*., 2007). Clinical signs include white, dull, and brown patches, indicating demineralization. As the condition progresses, cavitated areas appear, often with brownish hues and rough texture, being more common on the cervical surfaces, grooves and fissures, where there is greater accumulation of biofilm. These injuries, if left untreated, have the potential to lead to the complete destruction of the dental crown (WAGNER & HEINRICH-WELTZIEN, 2017; DA SILVA, *et al*., 2021).

The prevention of dental caries in early childhood should be started from 6 months of age, through the first visit to the dentist, who will provide guidance and family education. It is recommended that children avoid falling asleep while ingesting fluids containing carbohydrates. In addition, after the first tooth erupts, it is essential to brush during the day, especially before going to bed. Crucial elements for prevention include restricting sucrose consumption, optimizing the application of topical fluoride to prevent demineralization, and assessing the infant's or child's caries risk level (ZAURA & TEN CATE, 2015; SUKUMAR *et al*., 2023).

The therapeutic approach begins with the modification of eating habits, improvement of oral hygiene and the application of fluorotherapy, which seeks to remineralize the teeth and stop the advance of white spots. In the presence of cavities in the dentin, the treatment becomes restorative. In situations of dental infections, the intervention aims to eliminate the foci of infection, which may involve procedures such as pulpectomy or extraction. It is crucial to design a treatment plan that evaluates the activity of caries lesions, always prioritizing conservative approaches (STEIN *et al*., 2018; DUANGTHIP *et al*., 2017; GRIGALAUSKIENĖ *et al*., 2015).

The purpose of this literature review was to address the origin of caries in early childhood, highlighting its definition and elucidating the first signs and clinical aspects. The focus included consideration of the impact of this condition on children's quality of life, as well as the crucial elements that influence the clinical decision to restore or extract primary teeth affected by carious lesions.

2 MATERIALS AND METHODS

A computerized search was conducted in several sources, such as PUBMED, SCIELO, GOOGLE SCHOLAR, technical books and publications of international organizations. The selection included scientific articles that address caries in early childhood. Specific keywords were used, such as "Early caries", "Dental caries", "Early childhood caries", "dental caries" and "early childhood caries".

3 LITERATURE REVIEW

When bacteria attach themselves to the surface of the teeth, it leads to mineral loss in the teeth. In response, the body initiates a natural process of tooth repair known as remineralization, which occurs with the presence of fluoride in saliva. Fluoride adsorbs minerals, restoring pH balance. For the disease to develop, it is necessary for the demineralization process to occur repeatedly, overcoming the capacity for physiological tooth remineralization. This results in the first phase of the carious lesion, known as the white spot (MACHIULSKIENE *et al*., 2020; MARTIGNON *et al*., 2021; AMARASENA *et al*., 2019).

The clumping of microorganisms that adheres to the teeth is known as biofilm, and is commonly found in rough areas of the dentition, such as the cervical surfaces, grooves, and fissures. These regions make plaque removal more difficult, facilitating the accumulation of bacterial colonies and promoting faster replication (O'TOOLE *et al*., 2000; TOLKER-NIELSEN, 2015; HALL *et al*., 2017; ROY *et al*., 2018). The cariogenic bacteria present in the biofilm include Streptococcus mutans (which comprises the Streptococcus mutans and Streptococcus sobrinus species) and Lactobacilli, which are acidogenic and ferment glucose, fructose, and sucrose in the oral cavity. This fermentation results in a reduction in pH for approximately 45 minutes, leading to loss of minerals (O'TOOLE *et al*., 2000; TOLKER-NIELSEN, 2015).

The main factors that contribute to the development of tooth decay include the frequency of carbohydrate intake, the prolonged presence of cariogenic bacteria on the tooth surface due to poor hygiene, and salivary dysfunction. To intervene in caries, it is essential to improve the reduction of these pathological factors, through education and care for family oral health, and to strengthen protective factors, especially through the use of fluorides (HOWENSTEIN *et al*., 2015; ALMUTAIRI *et al*., 2022).

Fluoride plays a key role in protecting against tooth decay. The association between fluoride and caries was initially observed by McKay, who noted a lower prevalence of carious lesions in children who consumed fluoridated water compared to those who did not have access to this substance (MATAR *et al*., 2023; AGOUROPOULOS *et al*., 2014). The effectiveness of fluoride has been corroborated by numerous studies around the world, making its use essential in the oral cavity to achieve preventive effects. Topically applied fluoride is absorbed by microorganisms, interfering with their enzymatic activity and intracellular pH control, resulting in reduced acid production (TURSKA-SZYBKA *et al*., 2021).

The high prevalence of caries in early childhood is a global concern, affecting approximately 621 million children worldwide with untreated cavitated caries lesions, constituting a significant public health problem. These data reveal the insufficient attention given to this condition, highlighting the need to emphasize its various implications on children's quality of life (DOS SANTOS *et al*., 2023).

Early childhood caries represents a serious dental condition that impacts more than 50% of children aged 0-12 years (GAO *et al*., 2020; WONG *et al*., 2017). This condition is characterized by the presence of one or more teeth affected by caries, which may present cavitations, white spots, restorations, or even absence of elements due to caries. Its progression is rapid and has the potential to result in the complete destruction of dental crowns (WONG *et al*., 2017; ZHOU *et al*., 2019). When examining risk indicators, it is observed that children in unfavorable socioeconomic status have a greater propensity to develop caries compared to those in less unfavorable situations (GAO *et al*., 2020). Eating practices in childhood are also associated with caries, such as the habit of sleeping with the intake of carbohydrate-rich beverages, along with poor oral hygiene. During the child's sleep, decreased salivary flow increases the risk of demineralization (ZHOU *et al*., 2019; TURSKA-SZYBKA *et al*., 2021).

According to epidemiological data, 27% of children aged between 18 and 36 months already have caries lesions in Brazil. This finding shows that diet and hygiene in this age group play a significant role as etiological factors, especially considering the consumption of milk with high sugar content (MELO *et al*., 2011). Beliefs related to health, diet, disease, hygiene, and the importance of primary teeth in diverse cultures may introduce additional risk factors for oral health through dietary practices and child-rearing habits (ALMUTAIRI *et al*., 2022; HOWENSTEIN *et al*., 2015).

The main effects resulting from this condition include the manifestation of painful symptoms, issues related to occlusion, influence on growth, low weight and stature, difficulties in articulating words, decreased appetite, complications in chewing, difficulty sleeping, and behavioral changes such as irritability. Additionally, caries can trigger problems in the child's social interactions, contributing to cases of bullying, which, in turn, can result in a loss of interest in socializing and adversely impact the entire family environment (HOWENSTEIN *et al*., 2015).

The initiation of caries treatment in early childhood requires the identification of causative factors, along with the gradual elimination of bad habits, including hygiene and feeding practices. The collaboration and commitment of parents play a crucial role in this process, contributing to an effective early treatment of the disease. The selection of the optimal therapeutic approach will depend on the extent of the lesions, the age of the child, and his or her individual behavior (ZAURA & TEN CATE, 2015; SUKUMAR et al., 2023). The initial preference of healthcare professionals is for conservative treatment, and it is essential to determine whether the lesions are active or inactive for an appropriate choice of treatment. In cases of inactive lesions, topical application of fluoride, combined with good hygiene practice, is the most appropriate approach (STEIN et al., 2018; DUANGTHIP et al., 2017; GRIGALAUSKIENĖ et al., 2015).

4 FINAL THOUGHTS

Tooth decay is the most prevalent chronic disease in childhood, but it is possible to prevent and reverse this condition. Its origin is multifactorial, depending on the interaction of various factors over a specific period, including hygiene, diet, microbiota, and time. Caries in early childhood affects more than 50% of children aged 0 to 12 years, and is characterized by the presence of one or more decayed teeth. Its evolution is rapid and can result in the destruction of dental crowns, negatively impacting children's quality of life. Pediatric dental specialists play a crucial role in preventing tooth decay by recognizing the importance of early intervention in children at high risk for tooth decay and providing guidance and family education that is essential for prevention. This can make all the difference in the development and progression of the disease. Despite this, dentistry is often neglected by part of the population, which shows a lack of interest in oral health. Therefore, it is critical to ensure that dental guidance reaches all individuals in an equitable manner, especially those with low incomes. With proper guidance and family education, it is possible to significantly reduce the incidence of caries in early childhood, contributing to the decrease in cases of this disease.

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