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CHILDREN'S DIETARY HABITS AND EARLY CHILDHOOD TOOTH DECAY

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Abstract: Early childhood tooth decay is one of the most common dental health problems affecting children worldwide. This study examines the relationship between children's dietary habits and the development of tooth decay in early childhood. Frequent sugar consumption, sticky foods, nighttime sweetened drinks, irregular meal schedules, and insufficient intake of minerals and vitamins were identified as major risk factors. Family feeding practices and parental guidance were found to significantly influence children's eating behaviors and oral health outcomes. Preventive measures such as structured meal times, limiting sugary foods, promoting water intake, mineral-rich diets, regular oral hygiene, and routine dental visits were shown to effectively reduce decay risk. The findings emphasize the importance of scientifically informed dietary regulation and parental involvement as key strategies for maintaining oral health and preventing early childhood tooth decay.

Keywords: Early childhood tooth decay, Children's dietary habits, Sugar consumption, Oral health, Nutritional deficiency, Preventive strategies, Parental guidance, Oral hygiene.

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Аннотация: Ранний кариес у детей является одной из наиболее распространённых проблем стоматологического здоровья среди детей во всём мире. В данном исследовании изучается взаимосвязь между пищевыми привычками детей и развитием кариеса в раннем возрасте. Частое потребление сахара, липких продуктов, сладких напитков перед сном, нерегулярное питание и недостаточное поступление минералов и витаминов были определены как основные факторы риска. Семейные привычки питания и родительское руководство существенно влияют на пищевое поведение детей и состояние их стоматологического здоровья. Профилактические меры, такие как установленные режимы питания, ограничение сладких продуктов, увеличение потребления воды, рацион, богатый минералами, регулярная гигиена полости рта и плановые визиты к стоматологу, показали высокую эффективность в снижении риска кариеса. Результаты исследования подчёркивают важность научно обоснованного регулирования питания и участия родителей как ключевых стратегий поддержания стоматологического здоровья и предотвращения раннего кариеса у детей.

Ключевые слова: Ранний кариес у детей, Пищевые привычки детей, Потребление сахара, Стоматологическое здоровье, Недостаток питательных веществ, Профилактические меры, Родительское руководство, Гигиена полости рта.

Introduction

Early childhood tooth decay is recognized as one of the most significant dental health concerns affecting children under the age of six. This condition is characterized by the early destruction of primary teeth, disruption of the oral environment, and progressive damage to tooth tissues. Scientific literature consistently emphasizes that early tooth decay is closely associated with a child's dietary habits and daily eating patterns. Frequent consumption of foods high in sugar, sticky carbohydrate-rich snacks, sweetened beverages, and uncontrolled snacking between meals weakens the natural protective processes of tooth enamel and increases the risk of dental destruction. A child's eating habits are shaped by family practices, caregiving culture, and daily routines. When eating patterns become irregular or when a child is frequently offered sugary drinks, confectionery products, and high-carbohydrate foods, the oral cavity is exposed to prolonged acidic conditions. This acidic environment enhances the activity of harmful

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microorganisms in the mouth and gradually weakens the enamel structure. Furthermore, insufficient intake of essential nutrients such as calcium, phosphorus, magnesium, and vitamin D slows down the natural mineralization and strengthening of teeth, making them more vulnerable to damage. From a scientific perspective, establishing a proper dietary regimen during early childhood is one of the most important preventive measures for maintaining oral health. Regular mealtimes, controlled sugar consumption, inclusion of nutrient-rich foods, and ensuring proper oral hygiene after meals significantly reduce the risk of early childhood tooth decay. Therefore, this article examines the relationship between dietary patterns and early tooth destruction from a scientific standpoint and provides an overview of theoretical and practical approaches aimed at preventing this condition.

Relevance

Early childhood tooth decay is one of the most widespread dental health problems among children worldwide and holds significant importance due to its impact on physical, psychological, and social development. Improper dietary patterns, frequent consumption of sugary and sticky foods, and uncontrolled family eating habits contribute to the early onset of tooth destruction. The relevance of this topic lies in the fact that diet-related tooth decay not only damages oral health but also affects general well-being by causing pain, poor chewing ability, reduced appetite, sleep disturbances, and slowed growth. Moreover, early destruction of primary teeth increases the risk of long-term complications affecting the health of permanent teeth. Therefore, scientifically grounded organization of children's dietary habits and the development of effective preventive strategies remain a pressing priority in modern pediatric healthcare.

Aim

The aim of this study is to examine the scientifically established relationship between children's dietary patterns and early childhood tooth destruction, identify the major risk factors, and develop effective recommendations for prevention. The research seeks to analyze the impact of eating habits, frequency of sugar intake, adequacy of essential nutrients, post-meal oral hygiene, and caregiving practices on dental health. The ultimate goal is to propose scientifically based approaches for preventing early childhood tooth decay through healthy dietary regulation and to develop practical recommendations that contribute to improving children's overall health.

Main part

Early childhood tooth decay is defined as a progressive breakdown of primary tooth tissues influenced by biological, behavioral, and environmental determinants. It develops when cariogenic microorganisms metabolize dietary sugars and produce acids that demineralize enamel over repeated cycles. The condition is not limited to oral health alone; rather, it represents a broader systemic concern due to its impact on nutrition, growth, and psychosocial well-being. Scientific studies demonstrate that early tooth destruction is strongly linked to prolonged acid exposure in the oral cavity, which results from repeated intake of fermentable carbohydrates. In addition, inadequate mineralization of developing teeth during infancy increases the susceptibility of enamel to acidic dissolution. Children with weakened immune responses, frequent infections, or poor general health are also at higher risk because systemic disturbances can impair enamel formation and oral microbiome stability. Furthermore, socio-

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economic disparities significantly intensify the prevalence of this condition, as families with limited access to dental care and nutritional education tend to adopt feeding habits that increase the risk of tooth decay. Altogether, these factors reveal that early childhood tooth destruction is not a simple dental issue but a complex health problem requiring scientific analysis and targeted intervention strategies.

Dietary sugars, particularly sucrose, glucose, and fructose, serve as primary substrates for cariogenic bacteria such as Streptococcus mutans. When these sugars are consumed frequently, bacterial metabolism produces lactic acid, reducing oral pH below the critical level of 5.5 and initiating enamel demineralization. Sticky carbohydrates, including dried fruits, confectionery products, and bakery items, remain on the tooth surface for extended periods, increasing acid exposure. Scientific literature indicates that the frequency of sugar intake is more damaging than the total quantity consumed because repeated acid attacks prevent enamel from undergoing natural remineralization. Sweetened beverages, especially when consumed in bottles or sippy cups, continuously bathe the teeth in sugars and accelerate mineral loss. Additionally, nighttime consumption of sugary liquids is particularly harmful because salivary flow significantly decreases during sleep, eliminating the natural buffering capacity needed to neutralize acids. This prolonged acidic environment encourages bacterial colonization, biofilm maturation, and rapid decay progression. Therefore, controlling the timing, form, and frequency of dietary sugars is essential for reducing enamel destruction in early childhood.

Family feeding practices have a profound influence on the development of children's dietary behaviors and oral health outcomes. Parents often introduce sugary snacks as rewards or pacifiers, which reinforces frequent consumption of cariogenic foods. Bottle-feeding habits, especially prolonged use beyond infancy, are strongly associated with early tooth destruction due to extended exposure to sweetened liquids. In some families, frequent grazing or continuous snacking replaces structured meals, causing uninterrupted acid production in the oral cavity. Cultural food traditions also play a role, as some households regularly use sugary tea, sweetened dairy products, and honey-based foods in daily diets. Furthermore, children imitate the eating habits of caregivers; if adults consume sugary drinks or processed snacks frequently, children are likely to adopt the same patterns. Lack of parental knowledge about dental hygiene and the consequences of improper feeding practices contributes to delayed preventive actions. Scientific data supports that households with inconsistent mealtime routines and unrestricted access to sugary foods experience significantly higher rates of early childhood decay. Thus, improving feeding patterns at the family level is critical for reducing the prevalence of this condition.

Table 1. Main Risk Factors Related to Children's Dietary Habits

№	Risk Factor	Scientific Explanation
1	Frequent sugar consumption	Oral pH decreases, causing enamel to demineralize faster.
2	Sticky carbohydrate foods	Remain on tooth surface, increasing acid production.
3	Nighttime sweetened drinks	Reduced saliva at night weakens tooth protection.
4	Irregular eating schedule	Constant acid exposure leaves no time for enamel

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		recovery.
5	Mineral deficiency	Lack of calcium, phosphorus, and vitamin D weakens enamel.
6	Low water intake	Saliva flow decreases, reducing acid neutralization.
7	High processed food consumption	High sugar content increases the risk of caries.
8	Improper family eating habits	Children imitate adults, increasing sugar intake.

Proper mineralization of primary teeth depends on adequate dietary intake of calcium, phosphorus, magnesium, vitamin D, and other essential micronutrients during infancy and early childhood. Calcium and phosphorus form the structural basis of hydroxyapatite crystals that provide strength to tooth enamel. Vitamin D facilitates the absorption and regulation of these minerals, ensuring proper calcification. When a child's diet lacks these nutrients, enamel becomes thin, porous, and more susceptible to acid dissolution. Protein deficiency can also impair enamel matrix formation, reducing tooth resistance to cariogenic challenges. Scientific studies reveal that children experiencing chronic malnutrition or unbalanced diets show higher rates of developmental enamel defects, which act as gateways for rapid decay progression. Moreover, inadequate intake of antioxidant-rich foods weakens the oral mucosa and disrupts the natural defense mechanisms of the saliva. Mineral deficiencies may also affect salivary gland function, decreasing saliva quality and buffering capacity. Consequently, understanding the relationship between nutrient limitations and weakened enamel structure highlights the need for balanced diets as a core strategy in preventing early tooth destruction.

Saliva plays a vital scientific role in maintaining oral homeostasis by buffering acids, cleansing the tooth surfaces, and delivering essential minerals for enamel remineralization. Diet significantly influences salivary composition and flow rate. Frequent consumption of acidic or sugary foods lowers salivary pH and encourages the growth of acid-tolerant bacteria. Children who do not drink enough water often experience reduced salivary flow, which compromises the natural defense against bacterial colonization. Prolonged exposure to acidic beverages such as fruit juices further alters the microbiome balance, increasing the population of cariogenic microorganisms. Scientific findings show that disturbances in the oral microbiome contribute to biofilm maturation and heightened acid production. A diet lacking in fibrous foods also reduces mechanical stimulation of the salivary glands, weakening their protective function. Additionally, illnesses, dehydration, or certain medications may temporarily depress salivary flow, making sugary diets even more harmful during these periods. Therefore, salivary function should be considered a crucial mediator between diet and the development of early childhood tooth destruction.

Socio-economic conditions shape access to nutritious foods, oral hygiene products, and professional dental services. Families with limited financial resources often rely on cheaper, calorie-dense, sugar-rich foods that significantly increase decay risk. Urban environments expose children to aggressive marketing of sugary snacks and beverages, influencing their preferences

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from an early age. In rural areas, limited access to dental care and nutritional guidance contributes to delayed diagnosis and inadequate prevention. Environmental factors such as the availability of fluoridated water also influence enamel resistance to acidic challenges. Children living in areas without fluoridated water supplies have a higher incidence of early enamel demineralization. Moreover, parental work schedules, stress, and lack of education can result in irregular mealtimes and unhealthy convenience-based feeding practices. These conditions collectively highlight that tooth destruction in early childhood is not solely a biological process but is also shaped by broader social and environmental determinants.

Table 2. Key Preventive Measures for Early Childhood Tooth Decay

№	Preventive Measure	Brief Scientific Basis
1	Regular meal schedule	Allows saliva to neutralize acids and restore enamel.
2	Limit sweets	Reduces bacterial fermentation and acid production.
3	Increase water intake	Enhances saliva production and protects teeth.
4	Mineral-rich foods (milk, vegetables)	Strengthens enamel and reduces demineralization risk.
5	Avoid nighttime sweetened drinks	Protects teeth from acid attack during sleep.
6	Regular tooth brushing	Reduces plaque and limits bacterial activity.
7	Parental education	Improves family dietary culture and habits.
8	Regular check-ups with pediatrician and dentist	Allows early detection and timely treatment.

Evidence-based prevention strategies emphasize structured eating patterns, reduced sugar exposure, and nutrient-rich diets. Establishing regular meal and snack times helps maintain predictable periods of acid exposure and allows saliva to neutralize the oral environment. Replacing sugary beverages with water and limiting fruit juice consumption significantly reduces decay risk. Encouraging the intake of dairy products, leafy vegetables, whole grains, and protein-rich foods supports enamel strength. Scientific recommendations also advocate for minimizing processed snacks and choosing fresh fruits or vegetables as alternatives. Parental education is central to successful prevention, including guidance on reading food labels, understanding hidden sugars, and preparing balanced meals. In addition, promoting breastfeeding and limiting prolonged bottle-feeding play an important role in early protection. Integration of dietary counseling into pediatric healthcare services further enhances preventive outcomes. These strategies demonstrate that controlling diet is essential for maintaining oral health during early childhood.

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Parents and caregivers serve as primary role models in shaping children's dietary behaviors, making their involvement crucial in preventing early tooth destruction. Health professionals must provide clear, accessible guidance on optimal feeding practices, emphasizing the dangers of frequent sugar exposure. Routine dental visits should include personalized dietary assessments and practical advice tailored to each family's lifestyle. Pediatricians and nutrition specialists should collaborate to monitor children's growth, nutrient intake, and oral health risks. Caregivers should be encouraged to adopt consistent mealtime routines, reduce snack frequency, and promote the consumption of mineral-rich foods that support enamel integrity. Additionally, community health programs can raise awareness through workshops, school-based interventions, and public health campaigns. When preventive strategies are widely implemented at home and supported by healthcare systems, the prevalence of early childhood tooth destruction can be significantly reduced. These practical implications highlight the importance of coordinated efforts between families and professionals to ensure healthy early development.

Discussion

The study results indicate that children's dietary habits play a central role in the development of early childhood tooth decay. Frequent consumption of sugar and sticky carbohydrates accelerates enamel demineralization, while nighttime intake of sweetened drinks reduces saliva flow and weakens natural protective mechanisms. Family feeding practices and parental guidance were shown to significantly influence children's eating behaviors. Additionally, deficiencies in essential minerals and vitamins, such as calcium, phosphorus, and vitamin D, contribute to weakened enamel structure and increased susceptibility to decay. Scientific analysis also confirms that establishing regular meal routines, increasing water intake, and providing mineral-rich foods are effective preventive strategies for maintaining dental health. These findings are consistent with previous studies and demonstrate the strong relationship between children's dietary patterns and oral health outcomes.

Results

The study shows that early childhood tooth decay is closely associated with dietary habits. High sugar intake, irregular eating schedules, nighttime sweetened drinks, and low mineral and vitamin consumption increase the risk of enamel destruction. Family feeding practices and parental supervision significantly influence the prevalence of tooth decay. Preventive measures such as structured meal times, limiting sugary foods, ensuring adequate water and mineral-rich food intake, and promoting oral hygiene effectively reduce the risk. Overall, the findings highlight that proper dietary regulation and parental involvement are key strategies in preventing early childhood tooth decay.

Conclusion

Early childhood tooth decay is a multifactorial condition primarily influenced by dietary habits, parental practices, and nutritional status. Frequent consumption of sugary and sticky foods, irregular eating patterns, and inadequate intake of essential minerals and vitamins significantly increase the risk of enamel demineralization. Family feeding practices and parental guidance play a crucial role in shaping children's dietary behaviors and oral health outcomes. Preventive strategies, including regular meal schedules, limiting sugar intake, promoting water

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consumption, and providing mineral-rich foods, effectively reduce the prevalence of early childhood tooth decay. Furthermore, routine oral hygiene and regular dental check-ups enhance protection and allow for early intervention. Overall, scientifically structured dietary regulation and active parental involvement are essential for preventing early childhood tooth decay and promoting long-term oral health.

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