Review Article

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Effect of Cariogens on Primary Teeth

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Abstract

Dental caries occurs in children with high intake of free sugar and not the dietary sugar. Bacteria in mouth metabolize the sugar to produce acid which causes demineralization of enamel and dentin leading to dental caries1. In this article we will focus on how dental caries effects the primary teeth and also the food items that cause dental caries. We will also talk about ways of preventing dental caries in children.

Keywords: Cariogens; Primary Teeth.

Introduction

The normal pH of oral cavity is neutral i.e. 7 [2]. Cariogens are food items or drinks that generally contain fermentable carbohydrates that causes decrease in pH of the oral cavity to less than 5.5 and results in demineralization of the tooth structure .Studies have shown that there is a relationship between the tooth structure, saliva and the food. Primary teeth are generally susceptible to caries known as Early Childhood Caries which is a rampant kind of caries seen in infants and toddlers [3]. It is a complex disease which involves maxillary primary incisors within a month of eruption and spreads rapidly to other primary teeth. It is generally caused by a combination of cariogenic food and lack of oral hygiene [4].

Epidemiology

According to WHO; to study the epidemiology of dental caries, children of 12 years age groups are selected [5]. Dental caries effects 60-90% of school children of 6-12 years of age [6]. To diagnose coronary cavity (located at the crown of the tooth) in permanent teeth, the index used is the sum of the number of decayed teeth (component), missing (component) and restored/filled (component), called DMFT index [1]. Prevalence of Dental caries was 48.11%, 43.34% and 62.02% among 5, 12 and 15 years age group children respectively [6].

In developing countries like India dental carries is a public health problem and the prevalence is quite high in children and adolescents especially in rural areas [7]. Also a recent study has shown that the prevalence of caries is higher in children with lower socio-economic status due to lack of oral hygin [8].

Effect of Cariogens on Primary Teeth

Almost half of worlds population is effected with dental caries making it a prevalent health problem. Though it is seen in every age group, it is most prevalent in children due to increased amount of cariogens [1]. Harm to the tooth surface due to cariogens depends on how much the cariogen stays on the tooth surface, how long the cariogen stays on the tooth surface, frequency and time of intake and type and form of cariogen [9]. In 1960 caries theory was proposed which stated that the pre-requisite for dental caries was tooth, diet and dental plaque which was represented by 3 circle and was called the Keyes triad (Figure 1). Since then a number of modifying factors have been identified such as saliva, immune system, socio-economic status, use of fluorides etc. [3].

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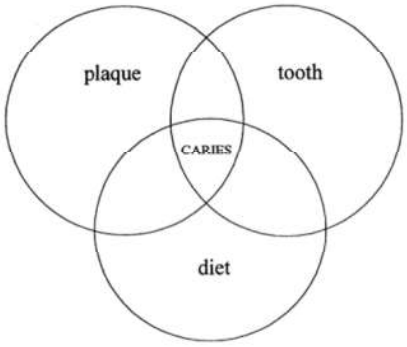

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Fig. 1:

Table 1:

Common Foods and Drinks	Sugar in Teaspoon
Sneaker bar (57.2 g)	6.75
Milk chocolate (49.7 g)	7.50
Pepsi (one can)	8.75
Coke (one can)	8.25

Cariogens play an important role in development of dental caries in children [10]. Some example of cariogens are cakes, biscuits, confectionery, sucrose, honey and sweetened desserts [11]. Diet plays an important role in demineralization of the tooth surface. Diet provides fermentable carbohydrates which are then metabolized by the bacteria in the plaque to produce acid leading to caries [3]. Given below are few cariogenic foods and drinks and the amount of sugar they contain [11]:

Cariogenicity of food depends on [12]

- Content of its fermentable carbohydrate
- Cariostatic factors in food like protein, fat, calcium, phosphate and fluoride
- Food retention
- Eating pattern
- Frequency of eating
- Cooking and processing also effect the carbohydrate content in food
- Other factors like pH, texture and effect of mixing food [12].

The most common effect of these cariogens in children is Early Childhood Caries (ECC). Research have shown that ECC is multi-factorial and is caused by poor oral hygiene, bacterial invasion and bad dietary habits [13]. The most widely accepted theory states that ECC is associated with cariogenic bacteria, Streptococcus mutants [14]. These bacteria are passed through the saliva and can cause damage even before the tooth erupts [15]. ECC has become an epidemic disease which affects the infants and pre-school children. It is prevalent in Asia, Middle East, Africa, North America, and Europe with the highest rate of prevalence in Eastern part of South Asia and Africa [13].

ECC is of three types [4]

1. *Type I ECC (Mild to Moderate)*
   - Seen in 2-5 years of age
   - Involves incisors and molars
   - Caused by combined effect of semisolid and solid cariogenic food and lack of oral hygiene.

2. *Type II ECC (Moderate to Severe)*
   - Seen as soon as the first tooth erupts
   - Causes are poor oral hygiene , feeding bottles and at will breast feeding
   - Involves maxillary incisors and molars, mandibular incisors are unaffected.

3. *Type III ECC (Severe)*
   - Seen in 3-5 years of age
   - Causes are a combination of factors and poor oral hygiene
   - Involves almost all teeth including mandibular incisors [4].

How to Prevent it?

ECC can be primarily prevented by focusing on educational programmes that alter children's feeding, reducing the effect of Streptococci mutants infection level [14]. Also proper timely feeding and cleaning child's mouth prevents dental caries [15]. Population wide universal interventions are available to prevent and treat dental caries. These include fluoride application and comprehensive patient-centered essential oral health care [1]. Utilization of fluorides started in 19th century in dentistry. Fluorides in mouthwash, toothpaste and dental orifice topical fluoride application have shown to reduce dental caries by 70% compared to only 30% reduction in caries without fluorides [13]. Dental caries results in life-long exposure to the risk

factors (cariogens). So reduction of cariogens at an early age can lead to significant reduction in dental caries [1]. Along with this, a proper diet plan, maintenance of oral hygiene and regular visit to the dentist, dental caries can be prevented in children and adolescents.

Conclusion

The primary tooth morphology is such that it attracts more bacteria, but it is the cariogenic food that leads to dental caries. As it is difficult to maintain oral hygiene in kids they are most susceptible to the effect of cariogenic food items. Mild forms of dental caries go unnoticed leading to the severe form in which there is pain, infection and abscess formation. This leads to irritability, loss of weight and malnutrition as the child is not able to eat food. So it is very important to plan regular visits to the dentist (i.e. once in every six months); because early decay can detected and treated. It is also very vital to have a diet plan and everything that a child eats has to be monitored. With all above precautionary measures we can not only reduce the cariogens in food but also prevent dental caries.

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