



## DENTAL CARIES AND PREVENTIVE STRATEGIES

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### Abstract

Dental caries is the most common infectious disease in the world. So we should educate our students and children about causes and how to protect themselves. There are various causes of tooth caries such as the daily diet habit and oral hygiene. The morphology of the tooth also plays an important role in the formation of caries. It is known that when carbohydrate consumed in daily diet with the help of bacteria the sugar is fermented and lactic acid is formed. Consequently the pH of the environment decreases which will lead the dental caries formation. The main idea of this review is to give a comprehensive look at dental caries in terms of microbiology, daily diet, oral hygiene and its preventive by professionally and socially.

**Key Words:** Dental caries, oral hygiene and diet.

### INTRODUCTION

#### Caries

Caries are the localized destruction of the tissues of the tooth by bacterial action. Either enamel or cementum is demineralized by microbial acids. The initial caries lesion is sub-surface, due to acid diffusion. The primary lesion that is detectable clinically is known as a white spot and can be reversed by re-mineralization and re-growth of hydroxyapatite crystals, a process enhanced by fluoride. Advanced caries results in cavitation, and can progress to the dentin and into the pulp chamber ultimately causing necrosis and periapical abscesses (Lakshman, 2006).

The disease is the most prevalent of the chronic diseases affecting the human race. The original still-prevailing theory explaining the disease process implicates carbohydrates, oral microorganisms, and acids as the main factors in the caries process. a chemico-parasitic process consisting of two stages, the decalcification of enamel, which results in its total destruction, and the decalcification of dentin (Selwitz, Ismail & Pitts (2007).

Untreated dental caries can affect body weight, growth and quality of life in preschool children (Li 2002). Caries experience in early childhood has been linked to caries experience in the permanent dentition in several studies (Alm, Wendt, Koch & Birkhed (2007). (Skeie, Raadal M, Strand & Espelid (2006) and (Powell 1998). The burden of dental caries lasts a lifetime because once the tooth structure is destroyed it will usually require restoration and on-going maintenance throughout life (Tove, Wigen, Nina & Wang, 2012).

Today, mutans streptococci are considered to be the main aetiological microorganisms in caries disease, with lactobacilli and other microorganisms participating in the disease progression. Recent evidence also has supported the role of yeast (*Candida albicans*) as a member of the mixed oral microbiota involved in caries causation (Klinke, Kneist, Soet, Kuhlisch, Mauersberger & Forster 2009).  
[http://jada.ada.org/content/140/suppl\\_1/25S.full-ref-20](http://jada.ada.org/content/140/suppl_1/25S.full-ref-20)

Virulence factors of mutans streptococci are prevalent plaque adhesin-like cell surface proteins, acid tolerance, acid production, and production of glucosyl transferases, mutacin and intracellular polysaccharides. The mutans streptococci ferment many different sugars, and they appear to metabolize sucrose to lactic acid more rapidly than other oral bacteria.

The major factors that involve the aetiology of caries are: host factors (tooth, saliva and diet )

## HOST FACTORS

### Tooth

The structure is important: some areas of the same tooth are much more susceptible to carious attack than others, possibly because of differences in mineral content (especially fluoride).

### Saliva

The mechanical washing action of saliva removes food debris and unattached oral microorganisms. It has a high buffering capacity which tends to neutralize acids produced by plaque bacteria on tooth surfaces, and it is supersaturated with calcium and phosphorus ions, which are important in the remineralization of white-spot lesions. Saliva also acts as a delivery vehicle for fluoride.

### Diet

There is a direct relationship between dental caries and the intake of carbohydrates. The most cariogenic sugar is sucrose. Sucrose is highly soluble and diffuses easily into dental plaque, acting as a substrate for the production of extracellular polysaccharides and acids.

Cariogenic streptococci produce glycan (water-insoluble) from sucrose, which in addition to facilitating initial adhesion of the organisms to the tooth surface serve as a nutritional source and a matrix for further plaque development.

Recent data indicate that high lipid content in saliva enhances caries activity. On the other hand, it is demonstrated that a cariogenic diet becomes less cariogenic when it is combined with cheese or milk products, probably because of the content of calcium phosphate in these products ( Johansson et al., 2009).

Dental caries cannot occur in the absence of dietary fermentable carbohydrates and, therefore, it has been characterized as a "dietobacterial" disease ( Bowen & Birkhed, 1986) .Since the original observations of Miller, (1902) researchers have recognized fermentable carbohydrates as the "fuel" for the caries process, and in the 1940 and 1944 Stephan demonstrated the relationship between caries and sugar exposure, leading to the acidification of dental plaque. Moreover, Weiss and Trithart 1960 reported a direct relationship between caries experience and the frequency of between-meals consumption of sweet snacks, which findings supported those of the earlier Vipeholm study in Sweden (Gustafsson et al., 1954).

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## PREVENTIVE STRATEGIES

Dairy products have properties that protect teeth against caries (Harper , Osborn , Clayton & Hefferren 1987), and eating cheese after exposure to sugar rapidly neutralizes plaque acidity (Schachtele & Jensen, 1984).

A wide range of sugar substitutes have low or no cariogenic potential (Zero, 2008). For example, sucralose is a high-intensity non-cariogenic sweetener (Bowen , Young , & Pearson ,1990), and xylitol has been reported to have anticariogenic properties. Chewing sugar-containing gum increases caries risk (Burt, 2006). but chewing sugar-free gum after meals can reduce caries risk (Glass, 1981). Some food additives may have protective properties that reduce cariogenicity; for instance, cranberries can reduce bacterial adherence and glucosyltransferase activity of *S. mutans* (Stookey, 2008), and tea extracts inhibit salivary amylase activity (Koo , Nino , Schobel , Vacca, & Bowen, 2006).

The conventional approach to the treatment of dental caries was to remove and replace diseased tissue with an inert restoration. This approach made no attempt to cure the disease and the patient often returned some months later Arje, & Odont, Am, 1987).

Dental caries is a dynamic dietomicrobial disease involving cycles of demineralization and remineralization. The early stages of this process are reversible by modifying or eliminating etiologic factors (such as plaque biofilm



and diet) and increasing protective factors (such as fluoride exposure and salivary flow). This approach manages dental caries by means of prevention and cure, reserving surgical approaches for those whose disease severity and tissue loss leave no other option ( Domenick).

Our understanding of caries has changed markedly in the last century. A National Institutes of Health consensus statement Domenick (2009) acknowledged that tooth restoration does not stop the caries process and emphasized the need for improved diagnosis, prevention and management of caries in its early (that is, noncavitated) stages. Still, dental practitioners and researchers alike have an incomplete understanding of the natural history of caries. Cognizant of the limitations of current clinical diagnostic methods and concerns about potential disease progression, dentists tend to err on the side of more aggressive operative treatment than often might be warranted.

Parents and cariers should be advised that cheese is a good high energy food for toddlers as it is non-cariogenic and may be actively protective against caries.

Children should have their teeth brushed with fluoride toothpaste. Toothbrushing should commence as soon as the primary teeth erupt.

Children's teeth should be brushed last thing at night, before bedtime and on at least one other occasion. Eating directly after brushing should be avoided, to prevent fluoride from being washed out of the mouth prematurely. Flossing can remove plaque from approximal tooth surfaces and may have a role in reducing caries. A combination of brushing with fluoride toothpaste and flossing is more efficient, especially if regular flossing is carried out by an adult. Flossing on its own cannot be recommended for the prevention of dental caries in pre-school children without the associated application of fluoride to the dentition (A national clinical guideline, 2009).

## CONCLUSION

In conclusion, tooth decay is one of the significant and costly diseases in the world. Thus, strategies to reduce the risk of dental caries are vital. These strategies usually involve decreasing the growth or activity of bacteria especially *S. mutans*. We should modify daily diet. Parents should advise children to avoid eating between meals especially food containing carbohydrate containing food. Correct method and frequency of brushing should be followed—in the morning and before going to bed and preferably after every major meal. The use of various interdental cleaning aids, such as dental floss, interdental brush (Klock and Krasse 1978) should be inculcated. The preventative strategy lies within dietary habits. Therefore, children below certain age must be regularly advised and instructed.

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