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Use of Sugar Free Gums to Dwindle Dental Caries

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I. Introduction

According to WHO dental caries is one of the most prevalent infectious diseases[1]. A complex intercourse between a host, a agent and environmental factors results in dental caries. In India the prevalence of dental caries is 60-80% among children[2].

Mutans Streptococcus (Ms) are important agent factors and major causative bacteria implicated in dental caries[3,4]. Many studies show direct relationship between the occurrence of caries lesion and salivary step Mutans Streptococcus (Ms)[5-6].

The lifestyle of people in India has changed drastically over the last few decades. People have very little time for anything. They do not put in thought into what they eat and most of the time is eating junk food. The increase in junk food intake has caused an elevation in dental caries count. This makes it necessary to have adultery methods, which are feasible and economical for all. Present day dentistry has added an alternative to preventive actions: the use of chewing gums[7]. Gums are sweetened by sucrose, which is sugar but causes dental caries. During 1950s, sugar free varieties, sweetened with natural non-cariogenic sweeteners were introduced[8]. Chewing gums are made up of rubber resin and sweeteners, flavoring agents and preservatives[8]. The gums that have a "sugar free" tag, should have a pH level that is above 5.7 on consumption or 30 minutes after consumption[10].

Stimulation Of Saliva And Its Importance:

Saliva is crucial in prevention of dental caries, lack of saliva increases the incidence of dental cries. Studies have proven that elevation of saliva significantly contributes to the oral health by permitting self-cleaning[1,3,11,12].Chewing gums stimulates salivary flow. Saliva improves the remineralization potential of enamel by increasing the PH, which reduces the acidogenicity of bacterial plaque. Chewing gums are used as salivary stimulants in xerostomic patients and in patients with impaired salivary function[11-12]

Oral Hygine:

Plaque-free tooth surface do not cause decay. Daily removal of dental plaque by dental flossing, tooth brushing, and rinsing is the best measure for preventing caries and periodontal diseases.Pit and fissure caries has the highest prevalence of all dental caries. Pit and fissure are not accessible to toothbrush bristles as the orifices have a smaller diameter, and these areas are highly susceptible to dental caries. Chewing gums has a sticky surface causing mechanical force while chewing and increasing the salivary flow which removes the plaque from pit and fissure and other exposed tooth surfaces. Although chewing gums reduces plaque accumulation in predilection sites of dental caries, it has little/ no effect on predilection of gingivitis[13].

Herbal Chewing Gums:

Herbal chewing gums have been increasingly in use. Example- “orbit white” is a herbal chewing gum available in Indian market for the past few years, it contains “pudina” which is nothing but a herbal mint with anti bacterial effects against proteus mirabilis, staphylococcus aures, alcaligenesfecalis and bacillus cerus[14.]

Medicated Chewing Gums:

Chewing gums is a drug delivery system which is going to advance more and more in recent researches, as it can deliver pharmaceuticals which are known as medicated chewing gums (MCG). Medicated chewing gums is suppose to act as an extended release dosage from continuous release of medicine.Advantages of chewing gum over conventional drug delivery system include: Rapid onset of action, high bioavailability, easy consumption without the need of water, higher patient compliance, and fewer side effects like dry mouth and decrease in toxicity.

`Ancient Greeks used to get a chewable resin from a tree called mastic but due to archaeological diggings chewing gum-like substances or masticatory resins back to 5000 years ago. The first MCG was launched in 1924 in United States of America which was called Aspergum® but an admission of chewing gum as a drug delivery system did not gain until nicotine chewing gum was released at the market[15-16]. Due to acceptance of oral drug delivery systems among people, chewing gums soon became friendly to people all around the world because of convenient administration. Besides its enjoyable taste and good feeling, it provides proven health, nutrition, and cognitive benefits[17].

Nicotine Chewing Gums:

Tobacco use through cigarette smoking is the leading avoidable cause of death in the world; it kills almost 4 million people each year. According to the World Health Organization, 10 million smokers will die per year by 2030[18].Nicotine is the main active component in cigarette that reinforces individual smoking behavior.

Nicotine chewing gum has attracted the attention from pharmaceutical industries to offer it to consumers as an easily accessible nicotine replacement therapy product.Nicotine chewing gum is currently available in the market either as 2 or 4 mg preparations. The gums release a controlled amount of nicotine in mouth that is absorbed directly through the buccal mucosa, producing nicotine plasma concentrations which are about half that is produced by smoking a cigarette.

Xylitol:

Xylitol is a natural five-carbon sugar obtained from birch trees. It has been approved by Food Drug and Administration in 1960s and since then has been used as substitute for refined white sugar. Xylitol inhibits the binding of sucrose molecule with MUTANS STREPTOCOCCOUS (MS). Xylitol reduces MS by altering their metabolic pathways and enhancing remineralization, which helps to arrest dental caries[14-15].

It is usually recommended that patient chew a piece of xylitol gums 5-30 minutes after snacking. Reduction in caries rate is great, when xylitol is used as a sugar substitute[20].It has a greater effect in predilection of gingivitis in comparison with the ordinary gum[17,18].

Chewing Gums That Make Teeth Healthier And Whiter:

Extrinsic staining of teeth may result from the deposition of a variety of pigments into or onto the tooth surface, which originate mainly from diet or from tobacco use. More recently, clinical studies have demonstrated the efficacy of some chewing gums in removing extrinsic tooth staining. Teeth whitening can also be used as aauxillary aid in strengthening smokers motivation to quit smoking.

Incorpation Of Active Agents:

Chewing gum represents a useful vehicle for some active agents1,19,12,20,21,22 such as fluorides, bicarbonate, calcium phosphate, sodium trimetaphosphate, casein, urea, chlorhexidine and chitosan, among others. Chlorhexidine has greater inhibitory effect on bacterial plaque[20].

II. Conclusion

From the present review it can be concluded that sugar free chewing gums dwindle dental caries. The observed caries reduction can be ascribed to salivary stimulation throughout the chewing process. Chewing gums have other beneficial effects to which were discussed in detail like when Xylitol sweetened chewing gum when chewed four times a day for 10 min each time for a period 21 days can significantly reduce the salivary *S.* mutans counts which may be beneficial in controlling dental caries among risk patients. Sugar free gums are definitely a preventive measure but it will not substitute to routine mechanical plaque control aids.

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