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DEN 2300-Literature Response #2

Update on Sugar Alcohols and Their Role in Caries Prevention

Dental caries prevention and reduction remains one of the greatest challenges to the oral health care professional due to its etiology and risk factors. With diet being one of the primary factors, there is a direct correlation between consuming dietary sugars and dental caries. The production of an acidic environment with a lowered pH causes the shift from heterogeneous to homogeneous and the cause of demineralization. These fermentable sugars include sucrose (most cariogenic), glucose and fructose. There has been a shift to substituting traditional sugars with sugar alcohols as they are less cariogenic when metabolized. Because sugar alcohols are rarely metabolized by dental plaque, they are classified as nonacidogenic with almost no extracellular polysaccharide production. Extracellular polysaccharides increase the porosity of the biofilm and allow sugars to diffuse to the microbiota in biofilm. Another benefit in caries prevention is chewing gum that is sugar alcohol based to stimulate salivary secretions. Aside from the mechanical motion of flushing, active saliva will release more calcium and phosphate ions for remineralization. Some of the sugar alcohols mentioned and more commonly used from a marketing stand point are xylitol, sorbitol, erythritol, mannitol, maltitol, isomalt and hydrogenated starch hydrolysate. They are plant derived and found naturally in many fruits and vegetables. Xylitol is the most effective sugar alcohol in reducing caries and most studied, however, there is still question in the roll of caries prevention. When given above 5-6g per day at least three times, xylitol has been proven to be effective against *Streptococcus mutans* and promotes the selection of less virulent bacteria. Sorbitol has the same mechanism of caries reduction and studies have found a greater prevention effect of chewing sorbitol-sweetened gum than none at all. Erythritol candy consumption was also studied in school children and found reduced *Streptococcus mutans* count and acetic acid in dental plaque.Though more evidence needs to be conducted, overall replacement of sugars with sugar alcohols in between meals may help reduce the risk of caries by decreasing the acid zone of oral bacteria and keeping a neutral environment.

Caries remains a relevant topic to the dental hygienist as one of the main two diseases in the oral cavity to prevent, manage and arrest. Likewise, this is a chronic disease in children and an infection that starts with biofilm. Mechanical disruption is critical in preventing mature biofilm to form and become more pathogenic. While assessing the current health and condition of a patient, dietary and nutritional habits are critical in the Dental Process of Care and individualizing the best routine with what has been self-reported under dental care. In terms of sugar alcohols being substituted, when possible, for traditional sugars, the most difficult part is putting into perspective how much sugar is ingested, how many times the patient is eating or snacking and how simple shifts in time of day or amounts in lower frequency exposures can make a difference in allowing for remineralization. This is critical in incipient caries as the formation of caries may take five to seven years to form in a healthy mouth. Describing to the patient that it is both the cariogenic microorganisms and the diet that allows for the formation of caries, allows change in their habits for caries prevention. As mentioned, it is a chronic disease in children and the prevalence must be stressed to the parent and target the same effect to a broad target audience. The sugar alcohols mentioned in this article can be found in products like candy, syrup, chewing gum and toothpaste and the dental hygienist should be aware of the products and ingredients mentioned in the article to make further recommendations to patients.