

How Does Xylitol Work?



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Every day in dental practices around the world, dentists and hygienists work together to diagnose and plan effective treatment for their patients. To bolster this natural collaboration, feature stories, content from the message boards of Hygienetown.com and Perio Reports research summaries are presented in every issue of Dentaltown Magazine. The goal of this section is to present topics that will create discussions between dentists and hygienists to ultimately improve dental hygiene outcomes.

It's hard to grasp the idea that chewing gum and eating candy, which are both typically considered "bad" for teeth, can now be beneficial when xylitol is the sweetener. This goes against conventional wisdom, but it's true. Xylitol is the good sugar and we can now treat dental disease with candy and chewing gum.

We know that chewing xylitol at least five times a day, after meals and snacks will reduce plaque biofilm accumulation. According to the research, eating xylitol-sweetened candies over four days with no oral hygiene leads to a 50 percent reduction in plaque. Recommending candy and gum as a first-line approach to the prevention of caries and periodontitis rather than focusing on toothbrushing will be a stretch at first, but when you look at the evidence, you're likely get better results with xylitol than with toothbrushing instruction.

Caries research shows the addition of xylitol several times each day can produce reductions in the need for restorative care by 70 percent compared to controls. This level of caries reduction is also seen when mothers chew xylitol-sweetened gum which changes the oral flora they pass on to their children.

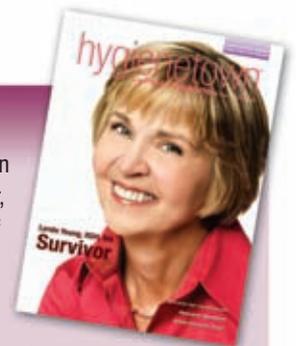
Clinical results are impressive, but just how xylitol works to accomplish this is even more interesting. It all has to do with cell wall transport systems of the bacteria. Normally, sugar molecules enter the periplasmic layer just outside the cytoplasmic membrane of the bacterial cell. Transferring through the next, more protective membrane only happens if the molecule has the right molecular structure for the transport system. If not, the bacteria must use energy to push the xylitol molecule out. Since xylitol is a five-carbon sugar, it's smaller than six carbon sugars like sorbitol, and manitol. This smaller molecular size allows it to pass through the outer cell wall more easily, however, it doesn't have the right molecular structure to pass through the next membrane and must be pumped back out. Repeating this pumping function over and over expends valuable energy, with no return for the bacterial cell.

As more research is done in this area, we could learn that the xylitol has a greater impact than simply diverting energy from the cell and preventing acid production. This action could in fact alter other functions of the membrane transport mechanism and perhaps block the ability of the bacteria to communicate with other bacteria in order to form the structure of a biofilm. New research shows illuminated images of altered bacterial biofilm organization when xylitol is introduced into the culture medium. Who thought gum and candy would be so helpful for oral health?! ■

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Cover photograph by Trelevan Photography