Dr. Jonathan V. Wright's

NUTRITION & HEALING

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Learn how this natural sugar, already found in your body, can...

Fight tooth decay and dramatically slash or even eliminate dental cavities for a lifetime!

By Jonathan V. Wright, M.D.

If you're a label reader you've probably noticed the ingredient Xylitol in many toothpastes, "breath mints," and chewing gums. Xylitol, and products with xylitol in them, have been sold in natural food stores for years And as a reader of *Nutrition & Healing*—you very likely already know that xylitol is a powerful tool for preventing tooth decay.

That's why it's so sad that the medical and dental "mainstream", as well as public health "authorities" are ignoring...or are simply ignorant of...all of the solid research on xylitol and its tremendous and inexpensive potential to reduce, and in many cases actually entirely eliminate, tooth decay. In fact, the New York Times recently published (March 6, 2012) an article titled *Preschoolers in Surgery for a Mouthful of Cavities.* The opening paragraph described a 2½ year old boy with cavities in 11 of 20 baby teeth. He was having a root canal surgery and two extractions at the Center for Pediatric Surgery at Seattle Children's Hospital.

The article went on to say that *los federales* Centers for Disease Control "noted an increase in the number of preschoolers with cavities in the study five years ago," and that "dentists nationwide say they are seeing more preschoolers at all income levels [Just a note: I didn't realize that pre-schoolers are earning money now!] with 6 to 10 cavities or more." It would appear that the CDCP is quite unaware of xylitol's scientifically proven ability to prevent and even eliminate tooth decay.

The rest of the New York Times article notes the alarming and growing use of general anesthesia in treating dental cavities in preschoolers. One center in Columbus, Ohio reportedly used general anesthesia for dental surgery in roughly 2,205 children in 2011 alone. The average age of the patients was four, most of the children had decay in six to eight teeth, and the most severe cases had twelve to sixteen decayed teeth.

Although risks were noted in the article...including nausea, vomiting, and "in very rare cases" brain damage or death... I don't think nearly enough emphasis was put on them. The fact is, risk of death from tooth decay treatment, rare as it may be, is totally unacceptable when there is a proven natural preventive for the problem. The article did carry one dentist's lament that fluoride toothpaste isn't being used. But fluoride *is not* the most effective tooth decay preventer, and there was not a word about xylitol, which solid research has shown to prevent tooth decay more effectively than fluoride!

Natural sugar proven to drive away tooth decay

First of all: What is xylitol? It's a natural sugar (for the technically inclined, a "sugar alcohol", a "polyol"). Human metabolism produces very small amounts of xylitol, which is also found in fruit, berries, vegetables, birch wood, corn residues, straw, seed hulls, and nutshells, but we can't eat enough of these foods to get

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Nutrition & Healing is dedicated to helping you keep yourself and your family healthy by the safest and most effective means possible. Every month, you'll get information about diet, vitamins, minerals, herbs, natural hormones, natural energies, and other substances and techniques to prevent and heal illness, while prolonging your healthy life span.

A graduate of Harvard University and the University of Michigan Medical School (1969), Dr. Jonathan V. Wright has been practicing natural and nutritional medicine at the Tahoma Clinic in Renton, Washington, since 1973. Based on enormous volumes of library and clinical research, along with tens of thousands of clinical consultations, he is exceptionally well-qualified to bring you a unique blending of the most up-to-date information and the best and still most effective natural therapies developed by preceding generations.

Nutrition & Healing cannot improve on these famous words:

"We hold these truths to be self-evident, that all men are created equal, that they are endowed by their creator with certain unalienable rights, that among these are life, liberty, and the pursuit of happiness."

The inalienable right to life must include the right to care for one's own life. The inalienable right to liberty must include the right to choose whatever means we wish to care for ourselves. In addition to publishing the best of information about natural health care, *Nutrition & Healing* urges its readers to remember their inalienable rights to life, liberty, and freedom of choice in health care. This information is published to help in the effort to exercise these inalienable rights, and to warn of ever-present attempts of both government and private organizations to restrict them.

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the amount of xylitol needed to help prevent tooth decay.

Even though as a *Nutrition & Healing* reader you (and apparently not the medical/dental mainstream and public "health" authorities)probably know something about preventing tooth decay with xylitol, you may not know the details about just how effective it can be. Or that xylitol can actually help *reverse* tooth decay in its early stages. In fact, with regular use, xylitol can actually eliminate tooth decay *for an entire lifetime!*

Cavities and decay are virtually stopped in their tracks

Scientific research evaluating the systematic use of xylitol chewing gum and other products in the prevention of dental decay dates back more than 30 years. The initial studies were conducted under the auspices of the University of Turku in Finland. Since then numerous studies from Finland, Hungary, and other countries have been virtually unanimous in their conclusion that xylitol...and to a lesser extent, other sugar alcohols...reduces the incidence of dental cavities both in children and adults. Let's review a few of these studies.

One Finnish study evaluated xylitol in 10- to 11-year-old school children, who had been participating in a rigorous dental hygiene program that included regular brushing and flossing, dietary instruction, systematic checkups, and use of fluorides. Because this program was so intense, the local dental and school authorities believed that the addition of xylitol to this regimen would have little or no benefit. They couldn't have been more wrong! The children who chewed xylitol gum daily significantly decreased tooth decay, by nearly 50%. Permanent teeth that erupted during the time the children were chewing the xylitol gum were especially well protected.[1]

In a double-blind study conducted in Belize, 1,277 school children stopped everything several times each day to chew gum. Some of the children chewed ordinary gum sweetened with sucrose, while others chewed gum sweetened with either xylitol or sorbitol. After up to 40 months of daily gum chewing (including weekends and vacations), the xylitol group experienced 73% fewer cavities, compared with a reduction of 26% in the sorbitol group, and an *increase* of 120% in the sucrose group.[2] (For the technically inclined, that's extremely significant with a $p<0.0001$)

Further studies in other countries have yielded similar findings. For example, researchers in Estonia evaluated the use of xylitol gums and candies in 10-year-old school children. Overall, 3 years of xylitol gum chewing, compared to a no-gum control group, resulted in a 53.5% reduction in tooth decay, while sucking on xylitol candy led to a 33% to 59% reduction.[3]

Most xylitol research has been done on gums or candies, but one study from Costa Rica compared xylitol-sweetened toothpaste with "control" toothpaste. Both products contained fluoride. After 3 years of twice-daily brushing, the xylitol group had statistically significantly fewer cavities (10.5%-12.3%), depending on the tooth surface examined.[4]

Could avoiding the dentist's drill really be as easy as chewing gum?

Yes, xylitol definitely prevents tooth decay! But now let's cover some research-proven facts about xylitol's abilities when it comes to *reversing* tooth decay. There's a common belief that once a cavity gets going, the only solution is a dentist's drill. Not true! Research has shown that xylitol can arrest the progress of tooth decay and eventually restore their enamel coating, *actually healing the cavity!*[5]

This was clearly demonstrated in another study in Belize school children. The xylitol group had the highest percent of arrested tooth decay at 27%, compared with the sorbitol group at 7%, and the no-gum control group at 9%.[6] This particular research paper carried a particularly interesting title, starting with "*Stabilization of rampant caries....*", which of course means the dental cavities were getting out of control before xylitol stopped and even reversed them.

Steven Steinberg D.D.S. (at that time at the Harvard Dental School) wrote: "The anti-cariogenic effects of xylitol are well-documented. In some studies, not only were there decreases in the rate of new caries, but caries reversal also was noted-there was evidence of remineralization."[7] In other words Dr. Steinberg confirms that xylitol has the ability to not only halt tooth decay, but also to reverse it by restoring lost enamel.

So powerful you may be able to "cavity-proof" your teeth for life

The truth is Xylitol is *so* effective that if you use it for long enough—perhaps two or three years—then even if you stop using it, you might never have another cavity for the rest of your life! This is especially true of small children. How can this be?

Are dental cavities an STD?

Young women might have another good reason to delay that first kiss with a new young man. Unless he's been brushing with xylitol toothpaste, or chewing xylitol gum for awhile, she might be putting herself at risk for "catching cavities." (Of course, the same applies to a young man contemplating kissing a young woman, even though by Nature young men may be in so much of a hurry that they don't think of tooth decay—or anything else besides kissing—at that moment!) See below (page 3) for more on tooth decay as an "infectious disease."

Tooth decay is actually an *infectious disease,* caused by a streptococcal bacteria named streptococcus mutans. "*Strep mutans*" is passed from mother (and father) to child, from brother to sister—and from boyfriend to girlfriend, husband to wife, mostly by kissing. The bacteria are almost entirely dependent on carbohydrates, especially sucrose and common starches, for energy production and growth.

In the presence of sucrose, *Strep mutans* bacteria thrive, churning out lots of tooth-dissolving acid and encouraging the reproduction of even more *Strep mutans*. But when *Strep mutans* is presented with xylitol, it treats it as lunch (or maybe breakfast or dinner) and takes it up as it does ordinary sugar. But *Strep mutans* can't metabolize xylitol well at all, in a manner of speaking "gagging" on it. As a result the bacteria, can't grow well at all producing only very small amounts of tooth-enamel destroying acid.

With xylitol, the population of *Strep mutans* goes down, down, down, until it's replaced by other bacteria—there are literally dozens of others in our mouths which aren't bothered in the same way by xylitol, and none of these cause tooth decay! (More on this bacteria-promoting side effect later.) Which means, of course, that to prevent re-infection and protect your teeth for the rest of your life, you...and your whole family for that matter...should be chewing xylitol gum or using xylitol toothpaste or products.

You could cut your risk of cavities by more than half

Long-term xylitol protection against tooth decay was demonstrated most clearly in yet another school-based study in Belize. The children were six years old on average when the study started.[8] For two years, they chewed gum sweetened with either xylitol or sorbitol, while a control group had no gum. Then, *five years later*, their teeth were examined by dentists who did not know which treatment they had received. The xylitol group had a mean of only 1½ new cavities each in those five years, compared with 2½ each for the sorbitol group, and four for the no-gum group. Overall, use of xylitol was associated with a statistically significant 59% reduction in risk of dental cavities.

The long-term protection depended strongly on when the children's permanent teeth erupted. Those teeth that erupted during the second year of xylitol gum chewing were almost completely

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protected from dental cavities (93% risk reduction). Even teeth that erupted after the children stopped chewing xylitol gum had substantial (88%) protection.

This was a very important study, because it showed that, if children get in the habit of chewing xylitol gum...or probably using other xylitol products, as well...at least one year before their permanent teeth erupt they will likely be protected from tooth decay for the rest of their lives.

Dousing dry mouth and tooth decay starts here

Although much research on xylitol has been done with children, adults can benefit as well. Adults at greatest risk of dental cavities are those who have poor oral hygiene due to illness, advanced age, or just bad habits.

Also at risk are some adults who suffer from a condition known as "dry-mouth" syndrome, or *xerostomia*, because their ability to salivate is impaired. People who do not salivate enough are at increased risk for dental cavities, because saliva normally helps neutralize bacterial acids and rinse bacteria and carbohydrates away from the teeth and out of the mouth.

"Dry-mouth" can be a side effect of many medications, and it can also occur as a result of certain diseases, such as Sjögren's syndrome, and radiation therapy to the head or neck. Chewing xylitol gum or sucking on xylitol candy

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Moms can pass the tooth-protecting power of xylitol on to their children

Research performed at the University of Turku in Finland drives home—in a dramatic fashion—the fact that xylitol has the ability to fight person-to-person transmission of tooth decay.[9] The Finnish dental investigators, who have been at the center of xylitol research from the beginning, recruited 169 pregnant women who had high oral levels of the streptococcal bacteria called Strep mutans and placed them all on a standard oral health care program. In addition, the women were divided into three groups:

Xylitol group—These women were given xylitol-sweetened gum and instructed to chew it at least two to three times per day for two years, beginning three months after the delivery of their babies.

Chlorhexidine group—The women in this group received chlorhexidine "varnish" treatments from their dentist at 6, 12, and 18 months after delivery. Chlorhexidine is an antimicrobial substance that has been used to kill oral bacteria for more than 40 years. It is commonly used in mouth rinses and by direct application to the teeth in gels or varnishes.

Fluoride group—The women in this group, like those in the chlorhexidine group, received topical applications of fluoride from their dentists at 6, 12, and 18 months after delivery. Fluoride is a mineral that helps harden tooth enamel when applied to the tooth surface. In a form not commonly found in Nature (which makes it more hazardous) it is often added to municipal water supplies. It is also is commonly applied directly to teeth by dentists or individuals using fluoride-containing toothpastes and other products. Fluoride is not used to kill bacteria.

The results left no doubt that mothers with Strep mutans in their mouths are capable of passing the bacteria on to their babies, probably through kissing and other normal motherly contact. The researchers reported that maternal chlorhexidine treatments had a small effect, resulting in Strep mutans growing on the teeth of nearly one child in three. By comparison, only one child in ten of the "xylitol moms" eventually came to be infected with Strep mutans. Xylitol use was also much, much better than the fluoride group, where the treatments may have helped the mother some, but were entirely useless for the child.

In a follow-up to this study, the researchers found that this mother-child bacterial reduction led to healthier teeth. They examined the children's teeth each year up to age five. Neither maternal fluoride nor chlorhexidine had any lasting benefit for the children once their mothers stopped using them. However, the children of the mothers who chewed xylitol gum continued to be protected against tooth decay at least through age five, despite using nothing more than normal dental hygiene.[10]

Imagine that! The infants and small children didn't do anything for their own teeth at all, their mothers chewed the xylitol gum, and none of these "preschool children" needed dental surgery, with it's risks of nausea, vomiting, and "rarely" brain damage and death! It's almost scandalous that the medical/dental/public health "mainstream" isn't promoting the results of this well-controlled research. Even though it was done overseas, human infant and pre-school age children's teeth are the same, worldwide!

is an effective and pleasant way to stimulate salivation and has been shown to significantly reduce the incidence of tooth decay in adults who use it regularly[11,12].

While nearly any candy or gum would stimulate saliva just as well, candy or gum containing xylitol has the further advantage of discouraging the growth of *Strep mutans*. This was demonstrated quite clearly in a study published in 2000 in the *Journal of the American Dental Association*[13] in which 151 people, who were first treated with an oral antimicrobial mouth rinse containing chlorhexidine for two weeks, had their oral bacterial levels measured immediately after chlorhexidine disinfection, and again three months later. The participants were randomly assigned to chew either xylitol gum, sorbitol gum, or no gum beginning immediately after disinfection. By three months, bacteria had grown back to their pre-disinfection levels in both the sorbitol and no gum groups, but only to about one-third of their pre-disinfection levels in the xylitol group, a statistically significant difference.

This study was titled "*Maintaining mutans streptococci suppression with xylitol chewing gum*" and appeared in the American Dental Association's own journal 12 years ago! What could be clearer? Suppressing *Strep mutans* with xylitol, proven, in the American Dental Association Journal. Why isn't this information being put to use by public health "authorities" and the medical/dental "mainstream." What could be easier and less expensive health care than chewing xylitol gum? But I digress....

Xylitol sends plaque packing

Some paragraphs ago, you read that *Strep mutans* bacteria can't metabolize xylitol well at all, so their population goes way down, and tooth decay goes down with them. But there's also a second and independent "mechanism of action" for xylitol: this natural sugar-alcohol prevents bacteria from sticking to tooth enamel as well.

When *Strep mutans* causes sucrose or other sugars to ferment, it produces not only lactic acid, which literally "rots teeth", but it also makes a sticky polysaccharide (for the non-technically inclined, a "multiple sugar chain") that glues bacteria together into plaque on the tooth surface. This concentrates acid on the dental enamel surface, making cavity formation progress faster. *Strep mutans* does not—and cannot—ferment xylitol, so the sticky polysaccharide isn't produced, plaque doesn't form to glue *Strep mutans* to dental enamel surfaces, and dental cavities are not promoted.[14]

And that isn't all! Remember earlier I said xylitol promotes the growth of certain bacteria? A third way that xylitol helps reduce or eliminate tooth decay is by promoting the colonization of other non-*Strep mutans* bacteria, which don't cause tooth decay! If the environment becomes less hospitable for one type of bacteria, it may die off or survive with a dramatically smaller population, but other bacteria will move in to take their place. We all know that on planet Earth, there are very few totally germ-free areas—maybe in the exceptionally high temperatures of erupting volcanoes or the exceptionally low temperatures beneath miles of Antarctic ice—but definitely not inside human mouths! So when the *Strep mutans* "gags and chokes" on xylitol and it's population declines, it's quickly replaced by literally dozens, maybe hundreds of other bacteria, none of which are even close to *Strep mutans* in it's ability to rot your teeth!

Remember, one of the research studies reviewed earlier found that when mothers start chewing xylitol gum shortly after giving birth, their children don't get cavities? The reason for this can now be traced to the development and *transmission* of these "friendly" strains of bacteria, instead of transmitting *Strep mutans*, and with it, tooth decay. Once the "friendly bacteria" are well-established in the mother's mouth, she passes them on to her baby. And once established in the baby's mouth, they help to keep the *Strep mutans* from growing in the mouth again, providing their children with potentially permanent protection against tooth decay. While it's true that romantic interludes later in life might re-expose the now-grown child to *Strep mutans* again, continued use of xylitol chewing gum and/or toothpaste will continue to promote protection against dental cavities.

Are you getting the most out of your xylitol?

In addition to chewing gum and toothpaste, there are xylitol candies, breath sprays, breath mints, mouthwashes, and supplements.

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The "delivery systems" that produce the best anti-cavity effects are those that permit xylitol to come in direct contact with the teeth for the longest time. At the top of this list are xylitol chewing gums, especially "pellet-type" gums that have pure xylitol candy coating. Chewy, sticky, hard, or tablet candies made with a large proportion of xylitol are also quite effective. Toothpaste is good too, but few of us brush our teeth for the same length of time that we chew gum.

Studies show that using about 4 to 12 grams of xylitol per day is very effective for reducing cavities. If a piece of gum contains one gram of xylitol, then chewing four pieces per day should do the job. So read product labels carefully, and, when in doubt—because it's so safe—it's best to use a bit more rather than a bit less.

How often we use xylitol products may be more important than how much we use at any particular time. Clinical experience suggests that three times a day provides minimum effectiveness, while five times a day is ideal.

For the best lifetime effect, your mother (and father, too!) should have been chewing xylitol gum when she was pregnant with you! If that didn't happen, to minimize tooth decay in the future, start using xylitol products as soon as you read this! Children should start chewing xylitol gum as soon as they can be trusted not to swallow it or choke on it, but at a minimum one year before their permanent teeth begin erupting. (To make sure, start no later than four to four and a half years of age.) Studies show that teeth treated this way will be strong and have long-lasting protection[7]. In fact, children who use xylitol have just as much protection as that provided by dental sealants.[15]

Adults can achieve the best results by first going to the dentist for a regular oral prophylaxis procedure that includes full mouth disinfection.[16,17] After that, chewing xylitol gum regularly, as described above, can help keep *Strep mutans* bacteria suppressed. Using xylitol immediately after every meal or snack will help even more, and chewing xylitol gum between meals is also recommended. Only about three to five minutes of chewing is required. Beyond that, the xylitol content is generally depleted.

Xylitol works best when it is the *only* sugar present. Thus, it is still best to avoid foods that contain sucrose or a mixture of xylitol and sucrose or other dental-cavity-promoting carbohydrates, like starches, because these serve to dilute its effect. The old advice of limiting sweet between-meal snacks, still applies, as does brushing after every meal and flossing daily. Xylitol is a very effective product, but it's not a guaranteed "get-out-of-dental-cavities-free card."

In the amounts found in (and recommended for) dental health, xylitol is extremely safe. However, if xylitol is consumed in very large amounts (more than 20 grams per meal or more than 60 grams per day), it can cause diarrhea in some sensitive people, but even these people eventually adapt to these high levels. The amounts recommended for dental protection (up to 12 grams per day) should never cause anyone any problems.

There's just no question. If you want to reduce...or even eliminate...dental cavities in the future—and perhaps reverse some just developing now—use xylitol chewing gum, toothpaste, candies, and mints! JVW

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