

Tooth Decay-FAQ

Everyone knows what a cavity is. Most people have had first-hand experience with the drilling-and-filling experience. In spite of this familiarity, many of us still have lots of questions on how to manage this common problem.

What causes tooth decay?

Tooth decay is caused by acid-producing bacteria that live among the nooks and crannies of teeth. The most common such bacteria are found in the Mutans group of Streptococci. These bacteria most likely move into the mouth when the baby teeth are erupting, during the first to second year of life, and once they are established, they are *very* difficult to eliminate.

These bacteria require sugar to make their acid, so when we eat foods containing sugar, the bacteria metabolize the sugar to form acid. This acid then extracts (dissolves) the minerals from the tooth surface. If this loss of minerals is allowed to progress, a hole or “cavity” forms on the tooth surface.

Tooth decay left untreated can progress to the center of the tooth to cause infection, pain, and swelling. In extreme cases, persons have died from severe dental infections.

Is tooth decay inherited?

Kinda. People can inherit tooth shapes from their parents. Tooth shapes that have deep fissures and pits provide a better habitat for the cavity-forming bacteria. However, tooth decay still requires the presence of the acid-forming bacteria.

Can I “catch” tooth decay from someone else?

Kinda. Lots of research has shown that if we get exposed to these acid-producing bacteria while the baby teeth are erupting, then the bacteria will fill the tooth crevices and will probably be with us for life. The most common source for the exposure is the primary care provider for the child, usually the mother. Some researchers go so far as to believe that the child may actually have a preference for the mother’s bacterial flora. So, if the mother is a cavity-former, the likelihood of the child “catching” the acid-producing bacteria is high, especially if there is sharing of eating utensils and drinking cups.

The reverse of this scenario is that, if the child gets exposed to other, non-acid producing bacteria, then the child’s risk of developing decay is much decreased. Once the tooth crevices are inhabited by these ‘safe’ bacteria, it is very difficult for the bad actors to move in.

Am I at risk for tooth decay?

The answer to that is another question, have you ever had a cavity?

If you’ve never had a cavity in your entire life, then you probably have low levels of the cavity-forming bacteria, and so are at low risk of developing cavities in the future.

Many of us had cavities as a child, but then go years without getting any. In this case, you can assume that you have the cavity-forming bacteria, but your recent habits have kept the bacteria at bay. If you maintain these habits, then your risk of forming cavities is probably low.

If you develop a cavity every year or so, your risk of forming cavities in the future is moderate. If you have a cavity nearly every time you go to the dentist, or if you have

certain medical conditions that lead to a dry mouth, then you are at high risk of developing decay in the future.

There are all kinds of tests that dentists have used to try to quantify the risk of forming decay in the future. Measures of bacterial levels and the pH of saliva have all been tried to predict one's risk of developing decay in the future. In some cases these tests may be helpful in managing the disease of tooth decay. However, the most reliable measure of one's risk of developing tooth decay in the future is decay history.

What can I do to prevent tooth decay?

There are two basic strategies for preventing decay: 1) eliminate or weaken the bacteria; and 2) strengthen the tooth.

Eliminate the bacteria-

The primary method to eliminate the bacteria is to remove them daily. Cavity-forming bacteria live on the tooth surfaces, and the more difficult the surface is to clean, the more of them you'll find. Behind the back molars and in-between the teeth are the favorite hangouts for these bad actors. That's why, if you are someone who forms cavities, cleaning in between the teeth is just as important as brushing your teeth.

Another primary method to eliminate the bacteria is to starve them out. Cavity-forming bacteria require sugar to make the acid that damages the tooth surface. And it's not really the amount of sugar that is important. Rather it is the length of time the sugar is in the mouth. For example, if you drink a cup of coffee with sugar mid-morning and drink it right down in five minutes, less damage is done than if you sip on the same cup for the next hour.

When one mouthful of a sugar-containing food or beverage enters the mouth, the bacteria take it up immediately and within minutes produce enough acid to reduce the pH of saliva adjacent to the tooth to levels that can result in tooth demineralization for as long as twenty minutes. If the eating and drinking continue for an hour or so, the saliva will remain acidic for the hour plus.

Obviously, it is impossible to remove sugar from the diet completely; it is in many healthy foods such as fruits and vegetables. However, you can change the length of time sugars are in the mouth.

- o Check the food consistency. Fresh fruits are better than dried fruits because they don't stick to the teeth.
- o Maximize the natural buffering capacity of saliva. Eating sugar-containing foods with meals is better because you produce more saliva when you chew. That's why some dentists recommend sugar-less gums for patients who chew gum. In-between meals, opt for snacks like cheese and nuts, which do not cause the drop in salivary pH. Bedtime is perhaps the worst time to have a sugary snack or beverage as the flow of saliva is diminished while you sleep.
- o Drink plenty of water. Dehydration reduces the amount of saliva available to buffer the acid produced by the bacteria

An excellent sugar-substitute is a naturally-occurring sugar found in fruits and vegetables called xylitol. Xylitol tastes perfectly sweet to us humans, but completely confounds the bacteria so that they are unable to use it to form acid. Xylitol can be found at Ukiah Natural Foods in the food supplement section. Xylitol is also found in some gums and candies. Smints is a Tic-tac-like mint that contains xylitol, and some Trident gums contain xylitol. Check the fine print. Again, Ukiah Natural Foods has a rack of xylitol-containing mints and gums near the cash registers.

One more bit of advice: Many medications contain sugar, Tums and cough drops to name two. When trying to find the sugar-source in your diet, check everything.

In addition to oral hygiene and diet, there is a mouth rinse that can reduce the numbers of acid-forming bacteria. Chlorhexidine (.12%) can be obtained by prescription from your dentist. Chlorhexidine in stronger concentrations has been used in Europe for decades as a cavity-fighting agent. This rinse will *temporarily* reduce the numbers of acid-producing bacteria, with emphasis on temporarily. The only way to obtain a sustained reduction in the numbers of acid-forming bacteria is through good oral hygiene and diet modification.

Most recently an herb, licorice root, has been found to reduce the numbers of cavity-forming bacteria. A microbiologist from UCLA has tested hundreds of Chinese herbs to locate one that affects cavity-forming bacteria. He plans to market a lollipop containing licorice root. Only laboratory studies have been conducted to date, but clinical trials are sure to follow. Hopefully we'll soon have more information as to the clinical effect of this product on people.

Other herbs such as those found in black, green, and oolong teas have been found to have a small effect on acid-producing bacteria. Some studies have found that these teas may affect the ability of bacteria to stick to the teeth. However, other studies suggest that the anti-cavity effect of teas may be related to their tendency to extract fluoride from the soil, in which case, the teas would assist in re-mineralization of the tooth surface. Animal studies suggest that drinking these teas may help to prevent tooth decay.

Other methods to eliminate these bacteria include vaccines. Vaccines have been investigated for decades. To date, there is not an effective vaccine to eliminate acid-producing bacteria found in the mouth.

Dental sealants are a type of white plastic that is applied to the tops of the back teeth to fill in the grooves. Cavity-forming bacteria like to live in the grooves and pits of the teeth because the toothbrush bristles can't get to them when they live there. The sealant "seals" them in so that the sugars in our diet don't reach them, thus they can't produce the acids that cause the tooth to cavitate. There have been some reports that dental sealants contain Bisphenol A, a plastic that has been reported as causing neurological problems in children. Most dental sealants made today do not contain Bisphenol A. If you are concerned, ask your dentist. Dentists are required to keep data sheets on all dental products and can verify that the sealant that they use does not contain Bisphenol A.

Strengthen the tooth-

Minerals on the tooth surface are in a dynamic with the minerals in the saliva. Methods to strengthen the tooth focus on keeping a supply of minerals in the saliva so that these minerals are available to re-mineralize any surface that has been attacked by the acid produced by cavity-forming bacteria.

Fluoride is the most commonly recommended treatment to strengthen the tooth surface. There is some evidence that the tooth surface that has been re-mineralized with fluoride may actually be more acid resistant than the undisturbed tooth surface. We believe now that the primary affect of fluoride is topical, rather than systemic. By that, rinsing with fluoride rinses is probably just as effective as taking fluoride vitamins. For youngsters that aren't able to spit out the rinse, however, the vitamins are safer. We also know that fluoride is beneficial for adults. Most adults experience gum recession, which exposes

the softer root surfaces of the tooth. These root surfaces develop cavities much easier than the enamel-covered surfaces and root cavities can grow at an alarming rate.

Fluoride, in low concentrations, is recommended for use daily in toothpaste and mouth rinses such as Act. Professional application of more concentrated compounds may be indicated as frequently as four times a year.

Recently other products that supply calcium compounds are becoming available. One such product is called "Recaldent". Keep an eye out for these products formulated into gums, candies, and toothpastes.

Isn't fluoride bad for you?

Whew! Answering that question can be a whole other article. There is a *huge* debate in regard to the use of fluoride to prevent tooth decay. This debate is especially accessible now with the advent of the Internet. Here are a few of the undisputed facts in regard to fluoride:

- Fluoride does encourage re-mineralization of the tooth
- Fluoride is as old as dirt, and is found naturally in dirt as well as water
- Humans have been exposed to naturally-occurring fluoride forever, sometimes at high levels
- Some people are strongly opposed to the use of fluoride to prevent tooth decay

The two sides basically break down like this:

- 1) fluoride is safe-organizations such as the American Dental Association, National Institute of Health, Center for Disease Control, and National Cancer Institute (to name a few) hold this position. Scientists associated with these organizations have reviewed studies conducted over the past 50 years and feel there is no evidence of fluoride causing any major health problem when used as directed.
- 2) fluoride is not safe- holistic and natural practitioners tend to hold this position. Their concern is that fluoride may cause cancer and other maladies related to bone.

Bottom line, know who is espousing their opinion, or better yet, go to the original research sources and form your own opinion. Some experts are more knowledgeable than others. Rely on clinical trials. Clinical trials are the gold standard in determining whether a treatment is effective and safe.

I have actually been asked if I am "pro-fluoride." I scratch my head with this question because the real issue isn't pro- or anti-fluoride. The real issue is anti-cavity. Most dentists see their job as providing you with information so that you can manage your decay problem in the way you see fit. But-one thing to consider-if you are at moderate or high risk of developing tooth decay, fluoride may be the better choice over the other option, which is to fill the tooth. As mentioned above, fluoride has been around as long as we have. Tooth fillings are relatively new compounds, and they aren't found in nature (gold excepted). When deciding the best treatment for you, you should know your decay risk and research all the options. For example, if you do not want to use fluoride, the focus should be on eliminating the bacteria with good home care and diet modification. Tooth decay is like diabetes and high blood pressure. They are diseases that are controlled rather than cured. The key is finding the measures that work for your individual situation.

Are there any natural methods for preventing tooth decay?

Yes, see above section. In short, daily tooth cleaning, dietary modifications, water (drinking and rinsing with), xylitol as a sugar substitute, and perhaps licorice root and teas. And depending upon who you listen to, fluoride.

How frequently do I need to see the dentist?

The current recommendation for a dental examination is, at least, annually for adults and twice a year for children and teens. At the examination the dentist will check visible surfaces for tooth decay, review x-rays, and monitor any changes in health, home care, etc. They also check for gum disease and oral cancer. All of these diseases may be present without any symptoms, so examinations are important in their early detection. More frequent examinations are recommended for youngsters because of their developing dentition, and also because their newly erupted teeth are most susceptible to tooth decay during the first year of two after erupting. A professional cleaning with a dentist or hygienist may need to be more frequent.

Why do I need x-rays?

A common place for cavities to form is between the teeth. These types of cavities can only be seen with radiographic imaging. X-rays also provide information in regard to bone levels, information that is important in managing gum disease, and other types infection that can form around the roots of teeth.

How frequently do I need x-rays?

Depends on your risk of tooth decay. Persons at high risk of tooth decay may need x-rays every six months. Annually is recommended for persons at moderate risk because it can take 12 to 18 months for a cavity to grow to a significant size. The current recommendation for persons of low risk (low risk = no cavities for several years) is every 24 to 36 months. Again, children and teens may need x-rays more frequently because of the susceptibility of newly erupted teeth to tooth decay. Also, persons with periodontal disease or other types of tooth infections may need x-rays more frequently.

In summary, tooth decay is a manageable disease of the teeth. It is important for individuals to know their risk of developing tooth decay in the future, and to take preventive measures in accordance to that risk.

Dr. Virginia Powell is an internationally published dental researcher in dental caries and dental materials. Her academic posts were as Professor at the University of Washington (1986-2000) and Northwestern University (1983-1986). She currently has a private practice in Ukiah where she has practiced for the past 8 years.