

Whitening Strips or Soda? Which Is Worse for Your Teeth?

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✓ Fact Checked

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STORY AT-A-GLANCE

- › Research finds teeth whitening products containing hydrogen peroxide damage the proteins in your teeth, while inexpensive baking soda is safe and effective against bacteria-causing periodontal disease, and in removing plaque and whitening teeth
- › Your teeth are damaged by sweetened beverages, leading to dental decay. Poor oral health increases your risk of Type 2 diabetes, Alzheimer's disease and heart disease
- › In addition to oral care, baking soda is effective at relieving itching from insect bites, as an invigorating foot soak and enhancing sports performance

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Brushing your teeth is an indispensable health habit affecting more than just your mouth. Regardless of your age or the number of years you've been using a toothbrush, it's important you address all aspects of dental health as it plays a role in optimizing your overall health and well-being.

You may easily avoid bad breath, plaque, yellow teeth and tooth decay when you adopt an effective oral care routine. It is unfortunate how many fail to appreciate how this simple strategy affects your overall health. In addition to affecting your health, oral care affects the delicate balance of bacteria in your mouth, which may be as important to your health as your gut microbiome.

For instance, periodontal disease, which may impair your immune system, and dental caries, have both been linked to specific bacteria. Type 2 diabetes and periodontal disease are strongly connected, and research shows those who fail to brush their teeth at least once a day increase their risk of dementia by as much as 65%, compared to those who brush three times a day.^{1,2}

Over the past two decades, tooth whitening has become a popular aesthetic dental treatment.³ Home care kits have taken the place of in-office treatments. In 2020, the global market for tooth whitening products was \$6.4 billion, and is forecasted to grow to \$8.2 billion by 2026.⁴

Awareness of teeth whitening across the world is considered one of the future growth opportunities of the market. However, recent research finds whitening kits damage your teeth and scientists are unsure if the damage is permanent.^{5,6,7,8}

Anatomy of Your Teeth

Your teeth are among the hardest substances found in your body. They are crucial for chewing, and play an important part in speech and in maintaining the shape of your mouth. You have 32 permanent teeth that begin erupting at age 6 and finish at around 21 years.⁹

The anatomy of the tooth consists of the root hidden under the gums and the crown of the tooth visible to the naked eye. Both parts are covered with hard tissue. The exterior of the visible tooth (crown) is made of enamel mostly composed of calcium phosphate.¹⁰

The enamel doesn't contain living cells and is unable to repair from decay or from wear. The hard portion of the root is covered by cementum, which is softer than enamel but still hard.¹¹ Under the enamel and cementum is dentin.

While a hard substance, dentin is porous and contains tubules allowing nutrients to be transported through the tooth layers. It has high levels of protein, most of it collagen.¹²

Beneath the dentin is the pulp tissue encased in a pulp cavity where it is fed with a rich blood and nerve supply essential for the health of your teeth.¹³

The root is embedded in your jaw bone and covered in gingival tissue. Your gingiva is also called your gums, designed to protect the roots of your teeth. The part of the pulp cavity inside the root is called the root canal, all of which are held in place with your periodontal ligament.¹⁴ This is a system of collagenous connective tissue connecting the root to the socket.

Data Show Whitening Strips Damage Your Dentin

Undergraduate researchers working in the laboratory of Kelly Keenan, Ph.D., associate professor of chemistry at Stockton University in New Jersey, presented three poster presentations at an annual meeting of the American Society for Biochemistry and Molecular Biology.¹⁵

In the press release,¹⁶ the researchers wrote Americans spend more than \$1 billion on teeth whitening products each year and while these products may make smiles brighter, data demonstrate the products may also cause damage.

Many of the at-home teeth whitening products use hydrogen peroxide. Past studies established hydrogen peroxide penetrates the enamel and dentin. It has also found collagen in the dentin layer decreases when teeth are treated with whitening strips. Keenan commented on the intent of the study:¹⁷

"We sought to further characterize what the hydrogen peroxide was doing to collagen. We used entire teeth for the studies and focused on the impact hydrogen peroxide has on the proteins."

In the most recent study, researchers showed the major protein in dentin is broken into small fragments when treated with hydrogen peroxide. Additionally, pure collagen treated with hydrogen peroxide in concentrations similar to those found in whitening strips made the "original collagen protein disappear, which is presumably due to the formation of many smaller fragments."¹⁸

While the study was focused on over-the-counter teeth whitening kits, Keenan was also concerned products used in dental offices may have the same effect, saying,¹⁹ "Whether you buy over-the-counter or go to a dentist, it's the same ingredient – it's hydrogen peroxide. I don't know of a safer alternative for whitening teeth."

The results of the study did not address whether in their natural state teeth may be able to regenerate protein after exposure to hydrogen peroxide. Dr. James Sconzo, chief of dental medicine at New York Methodist Hospital, who has whitened teeth with hydrogen peroxide, believes this may happen, as "dentin is a live cellular matrix."

He also claims he's not seen any clinical evidence to suggest harm is being done by tooth whitening.²⁰ Still, until more research is done, that question remains unanswered.

Sweetened Beverages Damage Your Teeth

Damage to your teeth may occur from several products and foods you eat, not the least of which are sugar sweetened beverages.²¹ Several different studies have demonstrated a positive association between sugar consumption, especially sugary beverages, and dental decay.

In one study²² published in the International Journal of Clinical Pediatric Dentistry, researchers strongly suggest dentists and pediatricians play a pivotal role in patient education and counseling on diet and health.

The researchers wrote there is clear and extensive evidence proving a correlation between frequency and amount of sugar and the severity of dental erosion.²³

Carbonated drinks have a pH of 2 to 3, triggering marked loss of tooth structure and evidence strongly suggests these beverages are a marker of an unhealthy lifestyle and an increased risk of Type 2 diabetes.²⁴

After consuming sugar, pH in the mouth rapidly falls below 5 by the production of acids in bacterial metabolism. This may enhance growth or colonization of bacterial species normally absent in dental plaque, thus increasing the risk of tooth erosion and caries.²⁵

Another study found chronic and regular consumption of cola drinks encouraged the erosion of teeth. According to the researchers:²⁶

"The loss of anatomy and sensitivity are direct results of acid cola dissolving coronal tooth material. Under the influence of coca cola, a change of crystal structure and nanomorphology on enamel surface occurs."

In a study published in the Journal of Public Health,²⁷ researchers used longitudinal survey data to predict dental decay by age 5 in children eating sweets or chocolate and brushing their teeth at least once a day. The data found toothbrushing only slightly reduces the association between snacking and sugar consumption on dental decay outcomes.

What Effect Does Baking Soda Have on Tooth Enamel?

Tooth discoloration may be caused from intrinsic or extrinsic staining. In one study,²⁸ published in the Journal of the American Dental Association, researchers reviewed in vitro and clinical studies on stain removal using dentifrices – a paste or powder for cleaning teeth – containing baking soda.

They concluded the literature indicated these products were effective and safe for stain removal and whitening using a manual toothbrush. They found it to be a desirable alternative or an additional measure for stain removal.

In a meta-analysis of five controlled clinical studies²⁹ using 270 subjects, researchers evaluated the ability of baking soda to efficiently remove plaque. They found baking soda dentifrices were more effective to a "significantly greater extent" than non-baking soda dentifrice products in removing plaque.

Another study concluded,³⁰ "the baking soda dentifrice was more effective than the non-baking soda, antimicrobial dentifrice in plaque removal after a single tooth brushing, and in maintaining significantly lower plaque levels during a four-week period of twice daily, unsupervised tooth brushing."

A recent supplement published in the Journal of the American Dental Association³¹ evaluated past studies on dentifrices as they recognized they were important to prevent caries and periodontal disease, but also serve to deliver agents to reduce sensitivity and for esthetic benefits. They found:³²

- Despite the vigor a patient may use during brushing, baking soda provides a measure of safety to the enamel and dentin. Despite low abrasive quality, dentifrices with baking soda were more effective in stain removal and whitening than some non-baking soda products, which are more highly abrasive.
- When plaque pH falls below 5.1 demineralization of the teeth occurs, leading to dental caries. When the pH returns to normal the teeth tend to remineralize. Baking soda is shown to be effective in reducing the acidity of plaque and the impact on remineralization is significant.
- Periodontal pathogens were susceptible to baking soda and it could rapidly immobilize oral spirochetes and motile rods.
- Beneficial effects on gingival health were found by researchers in three- to six-month clinical studies using baking soda dentifrices compared to placebo.
- Dentifrices containing baking soda have been extensively studied and found to be safe, do not contribute to root sensitivity and may be safe for those on low-salt diets.

Additional Benefits of Baking Soda

Baking soda is 100% sodium bicarbonate. Egyptians used baking soda in its natural form as a soap for cleansing purposes, but it wasn't until 1846 the compound was sold as the product we know.³³

One box is sold for under \$1, making it one of the least expensive home remedies to keep on hand. In addition to using it in oral care, it could become a part of your regular hygiene and house cleaning routine. Baking soda is an excellent way to avoid parabens and aluminum found in deodorants and antiperspirants, for example.

A paste may be applied to relieve itching from insect bites and poison ivy and 3 tablespoons in a tub of warm water make an invigorating foot soak.

Importance of Oral Health

Your oral microbiome has a significant impact on your overall health. In fact, it's difficult to achieve high level physical health when your oral health is ignored. Inflammation is known to be a disease-causing trigger in many chronic illnesses.

Gum disease and other oral diseases produce chronic low-grade inflammation that may have a negative effect on every major organ system in your body. It may contribute to Type 2 diabetes,³⁴ heart disease^{35,36} and Alzheimer's disease.³⁷

Achieving oral health is about promoting balance in your oral microbiome. Contrary to popular belief, antimicrobial agents and alcohol mouthwashes do far more harm than good. Consider making your own toothpaste at home to improve your oral health. Two sample recipes using baking soda and coconut oil are available at the website, Mountain Rose Herbs.³⁸

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