

## The other fluoride: For millions with dry mouth, this cousin keeps decay at bay

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Just 40 years ago, more than half of American kids had at least one untreated cavity. That statistic now stands at less than 25 percent, according to the Centers for Disease Control and Prevention (CDC). Most kids today can expect to keep their teeth well into their retirement years.

"The major reason for the drop in cavities throughout the world has been the use of [fluoride](#) in toothpaste," says Athena Papas, J66, the Erling Johansen Professor of [Dental Research](#) at Tufts. Fluoride prevents decay by attaching onto the [tooth surface](#) and fortifying the enamel against acid erosion produced by bacteria in the mouth. It also repairs and remineralizes weak spots caused by acid damage.

But for [cancer patients](#) and others with complex medical issues, the [sodium fluoride](#) found in most toothpastes isn't enough to prevent decay, says Papas, who specializes in treating medically compromised patients, including those undergoing radiation treatment for cancer and those with [dry mouth](#), or [xerostomia](#).

For these patients, Papas recommends toothpaste or mouthwash containing stannous fluoride, first introduced in the 1950s and later replaced by the better-tasting and less expensive sodium fluoride. Both kinds of fluoride prevent decay by strengthening and repairing enamel weakened by acids.

But stannous fluoride has a major advantage over its more common

cousin, Papas says, because it's also antimicrobial: It kills bacteria in the mouth by interfering with the microbes' [metabolic processes](#), of which cavity-causing acid is the main byproduct. Fewer bacteria mean less acid.

Any time you eat or drink something containing sugar, Papas says, "you produce acid for at least five minutes." With stannous fluoride, however, "the pH in the mouth doesn't drop as low and comes back up sooner," she says. "You can see it even in my high-risk xerostomic patients."

Patients with xerostomia don't produce a lot of saliva, which helps neutralize acid and mitigate any damage it causes. That's why people who suffer from dry mouth are at increased risk for cavities. That includes the 3.1 million Americans who, according to a 2008 CDC study, suffer from Sjögren's syndrome, an autoimmune disease that causes the salivary glands to malfunction.

It also includes head- and neck-cancer patients whose salivary glands stop working as a result of radiation treatment—as many as 34,000 people per year, according to Papas.

Many prescription drugs also cause dry mouth, including medications for high blood pressure, high cholesterol, depression and attention deficit disorder. Nearly half of all Americans take prescription medicine, and more than three quarters of them take at least one that lists dry mouth as a potential side effect, according to a 2010 CDC report.

Patients with dry mouth are also more prone to developing periodontitis, the chronic bacterial infection of the gum tissue. Again, stannous fluoride appears to help. In a two-year randomized clinical trial, Papas and her colleagues, including Mabi Singh, DI07, an associate professor in the department of public health research and oral medicine, found that stannous fluoride performed as well as toothpaste containing the

antibiotic triclosan in preventing gum disease in people with medication-induced dry mouth.

The study evaluated 334 patients with progressive periodontitis. Over the course of the first year, participants' gum recession increased by nearly a millimeter. During the second year, both substances reversed gum recession by about three-quarters of a millimeter. The research, funded by Procter & Gamble, which makes toothpaste containing stannous fluoride, appeared in the *Journal of Periodontology* in 2007.

"You can see my patients aren't the healthiest of people. They have very dry mouths, a lot of gum recession, but they certainly did improve," Papas says.

If stannous fluoride can stave off cavities, reverse gingivitis and prevent plaque buildup, why haven't most consumers heard of it? The first formulations of stannous fluoride toothpaste contained tin and were chemically unstable, degrading when exposed to water. The toothpaste had a metallic taste and a gritty feel. Worse, the tin would often stain teeth, so dentists used stannous fluoride as a last-resort treatment for patients at high risk for tooth loss.

"For some 20 years, dentistry walked away from stannous fluoride, even though it had been very efficacious," says Papas. "I remember having to mix stannous fluoride and then use it right away on my radiation patients."

Then Procter & Gamble developed a new way to formulate the stannous fluoride molecule, which it patented in 2004. While the specifics are proprietary, the novel technique produces stannous fluoride that is more palatable and less likely to cause staining. Several over-the-counter products containing the new stannous fluoride received FDA approval for their ability to prevent cavities and reduce plaque and gingivitis and

have been widely available since 2006.

But that doesn't mean you should toss your sodium fluoride toothpaste. For most, sodium fluoride will help prevent [cavities](#). Brushing regularly at all ages is what's important, says Papas, because "you never outgrow your need for fluoride."

Provided by Tufts University

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