

The Connection Between Gum Disease and Systemic Inflammation

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October 24, 2026

STORY AT-A-GLANCE

- › Gum disease affects an estimated 42.2% of U.S. adults, and nearly 8% have a severe form that may contribute to inflammation beyond the mouth
- › An animal study found that severe gum disease can change immune cells in the bone marrow, increasing inflammation throughout the body and worsening blood sugar control and pancreatic health in diabetic mice
- › A British Dental Journal review found the strongest connection between gum disease and diabetes, while also reporting links to heart disease, stroke, respiratory illness, kidney disease, rheumatoid arthritis, and cognitive decline
- › Treating gum disease may lower inflammation in the bloodstream and modestly improve blood sugar control, showing that healthier gums may support health throughout the body
- › Brushing, flossing, regular dental cleanings, whole foods, better sleep, stress management, and avoiding smoking and vaping may help protect the gums and support efforts to reduce ongoing inflammation

For decades, oral health and overall health were often viewed as two separate concerns. Dentists cared for the teeth and gums, while physicians focused on the rest of the body. But that long-standing divide is beginning to fade.¹ Researchers are increasingly recognizing that the mouth is not an isolated part of the body, but a gateway connected to many of its internal systems.

This shift in thinking is especially important when it comes to gum disease, a condition affecting an estimated 42.2% of U.S. adults, with 7.8% living with a severe form.² As scientists continue to unravel the effects of chronic inflammation, they are asking a question that once received little attention: Could problems that begin in the gums influence health far beyond the mouth itself?

Gum Disease May Affect Inflammation Throughout the Body

Researchers published a study in the International Journal of Oral Science investigating how periodontitis, a severe form of gum disease, affects the immune system beyond the mouth. Scientists have long observed that people with gum disease often have higher rates of inflammatory conditions such as diabetes, but the biological link has remained unclear.^{3,4}

The researchers used mouse models of periodontitis and diabetes, along with HL60 cells, a laboratory-grown cell line commonly used to study immune responses. This allowed them to examine how gum disease influences immune cells in the bone marrow and whether those changes affect other organs.

- **The focal point of the research** — The team focused on neutrophils, a type of white blood cell that serves as one of the body's first responders against infection. They used transcriptomic and metabolomic analyses, techniques that examine gene activity and cellular metabolism, to identify changes occurring inside these immune cells during gum disease.
- **Researchers identified a key inflammatory pathway** — The most significant change involved glutathione (GSH) metabolism. Glutathione is an antioxidant that helps protect cells from damage.

Researchers found that a protein called Chac2, which helps regulate how cells use glutathione, pushed neutrophils into a highly inflammatory "N1" state. These altered immune cells produced higher amounts of inflammatory chemicals, reactive oxygen

species (ROS), and neutrophil extracellular traps (NETs), all of which are associated with tissue damage and chronic inflammation.

- **Scientists discovered what activates the process** — Further experiments revealed that type I interferon (IFN-I), an immune-signaling molecule, acts as the upstream trigger. When researchers blocked IFN-I signaling, Chac2 activation and many of the inflammatory changes disappeared, suggesting this pathway plays a central role in spreading inflammation beyond the gums.
- **The immune changes affected blood sugar control** — In diabetic mice, the effects went far beyond the mouth. Animals with periodontitis had poorer glucose control, worse pancreatic function, and greater infiltration of inflammatory neutrophils into the pancreas compared with diabetic mice that did not have gum disease.
- **Transferring inflammatory immune cells reproduced the damage** — To determine whether the altered neutrophils were responsible, researchers transferred them from mice with periodontitis into diabetic mice. The recipient animals developed worsening blood sugar control and pancreatic dysfunction, providing evidence that the inflammatory immune cells themselves contributed to disease progression.
- **Blocking Chac2 improved health outcomes** — When the researchers used gene-silencing technology to suppress Chac2 activity, diabetic mice with periodontitis showed better blood sugar control and improved pancreatic function within three weeks. These findings suggest that targeting Chac2 may help reduce the bodywide inflammatory effects of gum disease.
- **What the researchers concluded** — The authors concluded that periodontitis reprograms immune cells in the bone marrow through an IFN-I-Chac2-glutathione pathway, creating inflammatory neutrophils that can worsen diseases elsewhere in the body. They identified Chac2 as a promising therapeutic target for reducing the systemic consequences of gum disease and related inflammatory conditions.

What Previous Studies Reveal About Gum Disease and Overall Health

The featured study focused specifically on periodontitis and uncovered a biological pathway that helps explain how inflammation from the gums can spread throughout the body. However, researchers have also spent years investigating a broader question: What happens to overall health when gum disease becomes a chronic problem?

To answer that question, a 2025 review published in the British Dental Journal examined evidence linking periodontal disease to a wide range of conditions affecting the heart, lungs, kidneys, brain, immune system, and metabolism.^{5,6}

The review highlighted three main mechanisms: Chronic inflammation in the gums can release inflammatory chemicals into the bloodstream, oral bacteria may travel to other parts of the body, and gum disease may disrupt normal immune function. Together, these processes could help explain why periodontal disease is associated with several chronic illnesses.

- **The strongest evidence involves diabetes** — Researchers described a well-established two-way relationship between diabetes and gum disease. Poor blood sugar control increases the risk of periodontal disease, while chronic gum inflammation may make it harder to manage blood sugar levels. Studies reviewed by the authors also showed that treating gum disease can lead to modest improvements in glucose control.
- **Heart and blood vessel health may also be affected** — The review found evidence linking periodontal disease to atherosclerosis, coronary artery disease, stroke, and high blood pressure. Researchers believe oral bacteria and inflammatory chemicals from infected gums may contribute to blood vessel damage and cardiovascular inflammation.

- **Your mouth may influence respiratory health** — Bacteria living in dental plaque can sometimes be inhaled into the lungs, especially in older adults and hospitalized patients. Studies reviewed by the authors found associations between gum disease and respiratory conditions such as pneumonia, chronic obstructive pulmonary disease (COPD), and asthma.
- **Researchers also found links to autoimmune and kidney diseases** — Periodontal disease and rheumatoid arthritis share many of the same inflammatory pathways, and some studies have detected oral bacterial DNA in the joints of people with rheumatoid arthritis. The review also found evidence connecting gum disease to chronic kidney disease, possibly through the effects of long-term inflammation.
- **Brain health may be connected to oral health** — Several studies examined in the review linked periodontal disease to cognitive decline and Alzheimer's disease. Researchers believe chronic inflammation and the movement of oral bacteria may contribute to the buildup of amyloid plaques in the brain, although more research is needed to clarify the relationship.
- **The benefits of carefully-planned gum care** — The review found evidence that periodontal treatment can reduce inflammation markers in the blood and improve some measures of metabolic and cardiovascular health. However, the authors noted that additional research is needed to determine the long-term impact of treatment on disease prevention.
- **Periodontal disease goes beyond the mouth** — The authors concluded that periodontal disease should not be viewed as an isolated dental problem. Evidence suggests that chronic gum inflammation may influence multiple body systems through inflammation, immune dysfunction, and the spread of oral bacteria. Maintaining healthy gums may therefore play an important role in supporting overall health.

7 Ways to Improve Your Oral Health

Whether the goal is protecting your teeth, preserving your gums, or supporting overall health, prevention remains the best strategy. Here are some practical ways to keep your mouth healthy and reduce your risk of gum disease.

1. **Brush the right way, not just often** — **Brushing** twice a day is the standard recommendation, and if you brush after a meal, it helps to wait about 30 minutes and skip acidic foods first, since they temporarily soften your enamel.⁷ Replace your toothbrush every three to four months, or sooner once the bristles fray, because worn bristles clean less effectively.⁸
2. **Floss daily with a clean product** — Flossing at least once a day helps remove plaque and food particles from areas a toothbrush often can't reach.⁹ When shopping for floss, consider choosing a product made without per- and polyfluoroalkyl substances (PFAS), a group of persistent chemicals often referred to as "forever chemicals."

Research has linked the use of some PFAS-coated dental floss products to higher PFAS levels in the bloodstream.¹⁰ **PFAS-free floss** can provide the same cleaning benefits without this potential source of exposure.

3. **Try oil pulling with coconut oil** — This practice involves swishing the oil around your mouth for several minutes, much like a mouthwash, then spitting it out; it should never be swallowed. Research suggests that coconut oil pulling may help reduce harmful bacteria associated with gum disease and support healthier gums, with some findings showing benefits comparable to those of chlorhexidine-based mouthwashes.¹¹
4. **See a dentist regularly** — Plaque can harden into tartar, which cannot be removed by brushing or flossing alone. Once tartar forms, a professional dental cleaning is needed. Regular checkups can help identify gum disease in its early stages, when it is often easier to treat and less likely to cause damage to the gums and supporting bone.¹²

If you prefer to work with a biological dentist, which is a dentist who avoids mercury-containing fillings and takes a whole-body approach to oral health, the following organizations offer directories to help you find one:

- [Consumers for Dental Choice](#)
- [Dental Amalgam Mercury Solutions \(DAMS\)](#) — Email them [here](#) or call 651-644-4572 for an information packet
- [Huggins Applied Healing](#)
- [International Academy of Biological Dentistry & Medicine \(IABDM\)](#)
- [International Association of Mercury Safe Dentists \(IAMSD\)](#)
- [Talk International](#)

5. Limit sugar and focus on nutrient-rich whole foods — What you eat can affect the health of your gums. Diets high in refined sugar can promote inflammation and encourage the growth of harmful bacteria in the mouth, creating conditions that allow gum disease to get worse.¹³

Fresh vegetables, fruits, healthy fats, and fiber-rich whole foods make a better foundation for gum health. Two nutrients are especially worth watching: low vitamin C levels have been linked to bleeding gums,¹⁴ and low vitamin D levels to a higher risk of gum disease.^{15,16}

6. Don't overlook the role of sleep and stress — Your gums don't exist in isolation from the rest of your body. Chronic stress can impair immune function, making it harder for your body to keep harmful oral bacteria in check and increasing your risk of gum disease.¹⁷

Poor sleep may also affect gum health, with research showing that people with more severe gum disease often report lower sleep quality.¹⁸ If you're diligent about brushing, flossing, and other oral care habits but continue to struggle with recurring

gum problems, it may be worth taking a closer look at your stress levels and sleep habits.

- 7. Quit smoking and vaping** — Tobacco products and e-cigarettes can both harm your gums and make it harder for gum disease to heal. Research suggests that people who vape may experience more gum damage and may not respond to treatment as well as nonusers, making vaping a poor substitute for cigarettes.¹⁹

Quitting completely is the most effective option. If quitting all at once feels like too much, cutting back gradually and replacing the habit with something else can help. Emotional Freedom Techniques (EFT), a tapping-based stress-relief method, measurably reduced food cravings in a randomized controlled trial, and is used the same way for managing other cravings.²⁰

This article discusses findings from both clinical research (a human clinical trial on coconut oil pulling) and laboratory/animal research (a mouse and cell-line study on gum disease and inflammation). Findings from laboratory or animal research may not directly apply to human health.

This article is for informational purposes only and does not constitute medical advice. Consult a qualified healthcare provider before making changes to your health regimen.

Frequently Asked Questions About Gum Disease and Systemic Inflammation

Q: How common is gum disease?

A: Gum disease affects about 42.2% of U.S. adults, and nearly 8% have a severe form. Without treatment, inflammation and bacteria from the gums may affect more than the mouth.

Q: How can gum disease cause inflammation elsewhere in the body?

A: Inflamed gums can release bacteria and inflammatory chemicals into the bloodstream. Research also suggests severe gum disease may change immune cells in ways that increase inflammation in other organs.

Q: Is gum disease linked to other health problems?

A: According to the British Dental Journal, gum disease may be linked to heart disease, stroke, lung problems, kidney disease, rheumatoid arthritis, and cognitive decline. These connections may involve chronic inflammation and the spread of oral bacteria.

Q: What is the connection between gum disease and diabetes?

A: Diabetes and gum disease can worsen each other. High blood sugar raises the risk of gum disease, while ongoing gum inflammation may make blood sugar harder to control.

Q: What are the best ways to protect your gums?

A: Brush twice a day, floss daily, get regular dental cleanings, and limit refined sugar. Whole foods, good sleep, stress management, and avoiding smoking and vaping also help support healthy gums.

Sources and References

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