

# Gum Disease May Contribute to Alzheimer's

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## STORY AT-A-GLANCE

- › Porphyromonas gingivalis, a type of pathogenic bacteria that causes gum disease, has been identified in the brains of people who died of Alzheimer's disease
- › When there's infection in your oral cavity, the pathogens also infect the endothelial cells protecting the blood-brain barrier. This allows them to spread through cranial nerves or by infecting monocytes – white blood cells – that then travel to your brain
- › Among U.S. adults 30 years old or older, 42.2% had total periodontitis – 34.4% with nonsevere periodontitis and 7.8% with severe periodontitis – and many people who have it do not experience any symptoms until the disease has progressed
- › Prevention is your best defense. If you take proper measures early, you can maintain optimal oral health and avoid the onset of these conditions, ultimately reducing your risk of Alzheimer's and other chronic diseases

The importance of good oral hygiene has been instilled in us ever since we were children. Brushing after meals, flossing and going to the dentist for regular checkups are crucial to keeping your teeth and gums optimally healthy.

But did you know these habits can have profound effects later in life? In particular, practicing good oral hygiene can help protect you from Alzheimer's disease in your senior years. Studies<sup>1,2</sup> have explored this connection before, but now there's a more definitive explanation as to how these two areas of your health are linked.

# Gum Disease Pathogens Found in the Brains of Alzheimer's Patients

A 2019 study<sup>3</sup> published in the Science Advances journal found that Porphyromonas gingivalis, a type of pathogenic bacteria that causes periodontitis, has been identified in the brains of people who died of Alzheimer's disease. Toxic proteases from P. gingivalis called gingipains were also discovered in these Alzheimer's patients. Gingipains are linked to tau protein and ubiquitin, both of which are markers of the disease.

While this wasn't the first instance linking periodontitis to Alzheimer's, this featured study went further and conducted more animal studies to look for evidence of causation. According to Science Alert:<sup>4</sup>

*"In separate experiments with mice, oral infection with the pathogen led to brain colonization by the bacteria, together with increased production of amyloid beta (A $\beta$ ), the sticky proteins commonly associated with Alzheimer's."*

The researchers also conducted in vivo and in vitro studies, and discovered that gingipains were neurotoxic and damaging to tau, which is essential for normal neuronal function.

But what's even more compelling is that the researchers found gingipains in the brains of deceased people who were never diagnosed with the disease. This means that if they had lived longer, there's a high chance that they would develop Alzheimer's late in life. They concluded:<sup>5</sup>

*"Our identification of gingipain antigens in the brains of individuals with AD and also with AD pathology but no diagnosis of dementia argues that brain infection with P. gingivalis is not a result of poor dental care following the onset of dementia or a consequence of late-stage disease, but is an early event that can explain the pathology found in middle-aged individuals before cognitive decline."*

# Having an Unhealthy Mouth Can Shrink Your Brain

Failing to practice good oral hygiene can result in gingivitis, a type of inflammatory disease that develops when plaque (bacteria) accumulates on your teeth. Gingivitis can cause bleeding gums and, if left untreated, can lead to periodontitis. This more severe infection can result in the loss of teeth.

So how does *P. gingivalis* travel to your brain? The featured study provides a helpful explanation, suggesting that when there's infection in your oral cavity, the pathogens also infect your endothelial cells protecting the blood-brain barrier. This allows them to spread through cranial nerves or by infecting monocytes – white blood cells – that then travel to your brain.

*"After entering the brain, we suggest that P. gingivalis may spread slowly over many years from neuron to neuron along anatomically connected pathways, similar to what has been demonstrated for vascular cell-to-cell transmission of P. gingivalis,"* the study authors explained.

This isn't the first study suggesting periodontitis as a risk factor for Alzheimer's. In 2015, research published in the British Dental Journal noted that "periodontal pathogens are possible contributors to neural inflammation and SLOAD [sporadic late-onset Alzheimer's disease]."<sup>6</sup>

More recently, a 2023 study published in the journal *Neurology*<sup>7</sup> found that gum disease can lead to brain changes – more specifically, hippocampal atrophy or the shrinking of the hippocampus,<sup>8</sup> which is a marker of Alzheimer's disease.

The study involved participants aged 55 years old and above who did not have any cognitive decline. The researchers then conducted dental exams and memory tests, then measured the participants' hippocampus at the start of the study and then four years later.

They discovered that in participants with mild gum disease and fewer teeth, their left hippocampus shrunk faster. Having one less tooth increased brain shrinkage at a rate

equivalent to nearly one year of brain aging. Meanwhile, participants who had more severe periodontitis also had a faster rate of brain shrinkage – every tooth lost was equivalent to 1.3 years of brain aging.<sup>9</sup>

## **Gum Disease Increases Your Risk of Mental Illness and Chronic Diseases**

The impact of gum disease on your brain health cannot be ignored, and Alzheimer's disease is just one of the conditions that can stem from having poor oral hygiene. For example, a U.K. study published in 2021<sup>10</sup> found that people with periodontal disease had a higher risk of developing mental health problems and other chronic illnesses.

The researchers looked at the records of 64,379 patients who had a history of gum disease and compared it to 251,161 patients with no history of gum disease. After adjusting for factors like ethnicity and body mass index (BMI), they found that the individuals who had gum disease have a 37% higher risk of developing mental illnesses like depression and anxiety.

What's more, their risk of other diseases, such as autoimmune diseases (psoriasis and arthritis) and cardiovascular diseases (stroke, heart failure and vascular dementia) also increased by 33% and 18%, respectively. In a Science Daily article,<sup>11</sup> Joht Singh Chandan, Ph.D., co-first author of the study, commented:

*"Poor oral health is extremely common, both here in the U.K. and globally. When oral ill-health progresses, it can lead to a substantially reduced quality of life. However, until now, not much has been known about the association of poor oral health and many chronic diseases, particularly mental ill-health.*

*Therefore, we conducted one of the largest epidemiological studies of its kind to date, using U.K. primary care data to explore the association between periodontal disease and several chronic conditions.*

*We found evidence that periodontal disease appears to be associated with an increased risk of developing these associated chronic diseases. As periodontal diseases are very common, an increased risk of other chronic diseases may represent a substantial public health burden."*

## **Gum Disease Is Now a Growing Epidemic**

Gum disease is a growing health problem, especially in the U.S. According to the National Institute of Dental and Craniofacial Research,<sup>12</sup> among adults 30 years old or older, 42.2% had total periodontitis (this is further divided into 34.4% with nonsevere periodontitis and 7.8% with severe periodontitis). What's worse is that it's a "silent" condition – many people who have it do not experience any symptoms until the disease has progressed.<sup>13</sup>

So what are the telltale signs that you may have gingivitis? In the initial stages, bleeding is the primary symptom, which occurs when you brush your teeth, floss or eat hard food. Swelling and redness in the gums are also signs of gingivitis.<sup>14</sup>

Once the disease progresses, your gums will start to pull away from your teeth – you may notice your teeth seemingly growing longer and they may also become loose. Bad breath, sores in your mouth and pus between your gums and teeth are also common signs that the disease has worsened.<sup>15</sup>

## **Good Oral Hygiene Is the First Step to Prevent Gum Disease**

The good news is that gum disease can be avoided. The U.S. Centers for Disease Control and Prevention (CDC) notes that gingivitis can be reversed, while more severe periodontitis can be managed and slowed down with professional help.<sup>16</sup>

However, prevention is always better than seeking a cure after the fact. If you take proper measures early, you can maintain optimal oral health and avoid the onset of these conditions, ultimately reducing your risk of Alzheimer's and other chronic diseases.

Regular brushing, flossing and tongue scraping, along with getting regular cleanings with a mercury-free biological dentist, can all go a long way toward keeping your teeth and gums healthy. It's also essential to follow a healthy lifestyle that includes a diet composed of fresh, whole foods to help keep your mouth naturally clean.

According to the American Dental Association (ADA), it's best to brush twice a day using a soft bristle brush. Here's the basic step-by-step guide they recommend:<sup>17</sup>

1. *"Place your toothbrush at a 45-degree angle to the gums.*
2. *Gently move the brush back and forth in short (tooth-wide) strokes.*
3. *Brush the outer surfaces, the inner surfaces, and the chewing surfaces of the teeth.*
4. *To clean the inside surfaces of the front teeth, tilt the brush vertically and make several up-and-down strokes."*

Instead of brushing your teeth immediately after finishing a meal, it's best to wait 30 minutes before doing so. Once done brushing, store your toothbrush upright and open to air, allowing it to dry completely. Keeping it in a closed container may lead to bacterial growth. The ADA also advises replacing your toothbrush every three to four months.<sup>18</sup>

Flossing at least once a day<sup>19</sup> can help remove stubborn plaque between your teeth, and in places that your toothbrush may not be able to reach. Just remember to choose dental floss that doesn't contain toxic chemicals like **per- and polyfluoroalkyl substances (PFAS)**, which are added to allow the floss to glide smoothly in between your teeth.

Instead, look for products that use vegan vegetable waxes, which give a smoother glide between your teeth. Look for those without added fluoride; ideally, choose nylon instead of chemically treated silk dental floss. You may also consider using a water flosser, which sprays a powerful jet of water into your mouth. While many choose a water flosser over floss, your best option may be to learn how to use both.

## **Avoid Fluoridated Toothpaste**

Most dentists would suggest fluoride treatment to prevent tooth decay; even though it's added to water supplies and used in many store-bought toothpastes, its purported benefits don't outweigh the dangers. Fluoride is a toxin, and when swallowed, it accumulates in your tissues and can lead to severe neurological impairment<sup>20</sup> and endocrine dysfunction.<sup>21</sup>

Children are particularly vulnerable. In one study from 2017,<sup>22</sup> researchers found that many children are getting too high amounts of fluoride that their teeth are becoming permanently discolored. This condition is called dental fluorosis, wherein the enamel becomes progressively discolored and mottled.

Fluorosis isn't just unsightly, but it can also increase your child's risk of cognitive impairment and lower IQ levels.<sup>23</sup> Instead, I recommend using non-fluoridated toothpaste or making your own toothpaste at home using ingredients like coconut oil. This can clean just as efficiently and is much safer, especially for young children.

## **Have You Tried Oil Pulling?**

Speaking of coconut oil, here's another great way to use it for your oral health — oil pulling. This is simply the act of swishing and rinsing your mouth with oil. In traditional Indian folk medicine, oil pulling has been used to help prevent tooth decay, bad breath and bleeding gums, and to strengthen your teeth and gums.

In the video above, I describe how I use oil pulling in my own oral health practices and the benefits you may experience as well. Measure a tablespoon of coconut oil to pull — this may be too much or not enough, but it's a good place to start. Once you put it in your mouth, the oil (which solidifies in cold temperatures) will liquefy.

Swish the oil around your mouth, using your tongue and cheeks to pull the oil through your teeth. Try to relax your jaw muscles to avoid muscle fatigue. The action is natural and usually won't cause discomfort.

Resist the urge to swallow the oil, and don't use it as a gargle; instead, spit it out. This is because coconut oil breaks down bacteria and incorporates saliva while it's being moved around in your mouth. This causes it to become thick and turn milky white. If you feel the urge to swallow, just spit out the oil and start again.

After 20 minutes, spit out the oil into the garbage bin or in your yard (but not on your plants). Don't spit it in your sink, as it may coat your plumbing and lead to problems.

By increasing the pH in your mouth after pulling you may reduce bacterial growth even further. To do that, mix 1 teaspoon of baking soda in 6 ounces of water and gargle. This will alkalize the pH of your mouth, and since bacteria thrive in an acidic environment, the increased pH will discourage growth.

## **Finally, Monitor Your Levels of These Nutrients**

Getting optimal levels of vitamins D and K2, magnesium and calcium is crucial if you want to maintain good oral health. These nutrients work synergistically to protect your teeth, gums and bones.

Calcium strengthens your bones and enhances overall skeletal health, but only works when it gets to the right place. Vitamin K2 directs calcium into the bone and prevents it from being deposited along blood vessel walls.

According to [holistic dentist Steven Lin](#),<sup>24</sup> vitamin K2 helps mediate gut inflammation in two ways – it decreases fibroblasts that fuel gum disease and activating Matrix GLA protein that prevents calcification of the periodontal ligament and around the body.

As for vitamin D, being deficient in it can increase your risk of inflammatory disease and is linked to a higher risk of periodontal disease.<sup>25,26</sup> Maintaining your vitamin D levels can be as simple as getting sensible sun exposure every day.

In addition to these four nutrients, I also recommend monitoring your vitamin C status. One symptoms of gum disease, bleeding, could mean you are deficient in vitamin C. According to a study from the University of Washington:<sup>27</sup>

*"Gingival bleeding tendency and retinal hemorrhaging coincide with low AA plasma levels and thus may be reflective of a systemic microvascular pathology that is reversible with an increased daily AA [ascorbic acid] intake."*

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