Healthy Gums, Healthy Life:

Understanding Gum Disease and How It Affects the Rest of Your Body

Foreword

Your dental team does more than clean your teeth and freshen your breath. They also monitor the front lines of your body's overall health. Bacteria from an infection in the mouth can enter your bloodstream and affect your body's most critical systems, including your heart, brain and lungs.

In fact, studies have found that the same bacteria present in periodontal (gum) infections are also present in heart disease, Alzheimer's disease, and respiratory disease. This booklet examines the connection between your oral health and the rest of your body.

The common link is inflammation, which is the body's normal response to an infection. It can happen anywhere in your body. The initial stage of inflammation signals the immune system to act, but when the inflammation does not resolve and becomes chronic, it can lead to tissue damage and additional complications.

It's important not only to address the infection but also the underlying causes of chronic inflammation. Gum disease is one of the most prevalent infectious and inflammatory diseases in the world. Learning more about it is an important first step to combating it, and both your dentist and your physician will be glad to know you're fully informed of the risks.

Eric Goulder, MD

Dr. Eric Goulder, MD, is a cardiologist who is board certified in both medicine and cardiovascular disease. Dr. Goulder has an interest in preventive cardiology and practices with his wife, Dr. Barbara McClatchie, DDS. As a team, they use an oral-systemic approach to address some of the underlying oral causes of arterial inflammation and heart disease.

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It's Time to ***Take Your Oral Health Seriously!***

Our goal with Perio Protect is to put gum disease—gingivitis or periodontitis—into remission and prevent its reoccurrence. Perio Tray™ therapy from Perio Protect empowers you with effective, non-invasive homecare to complement the expert care provided by the dental team.

If you have gingivitis, our goal with Perio Tray™ therapy is to get your gums so healthy that you don't lose any bone and become a periodontal patient who needs cleanings every three months.

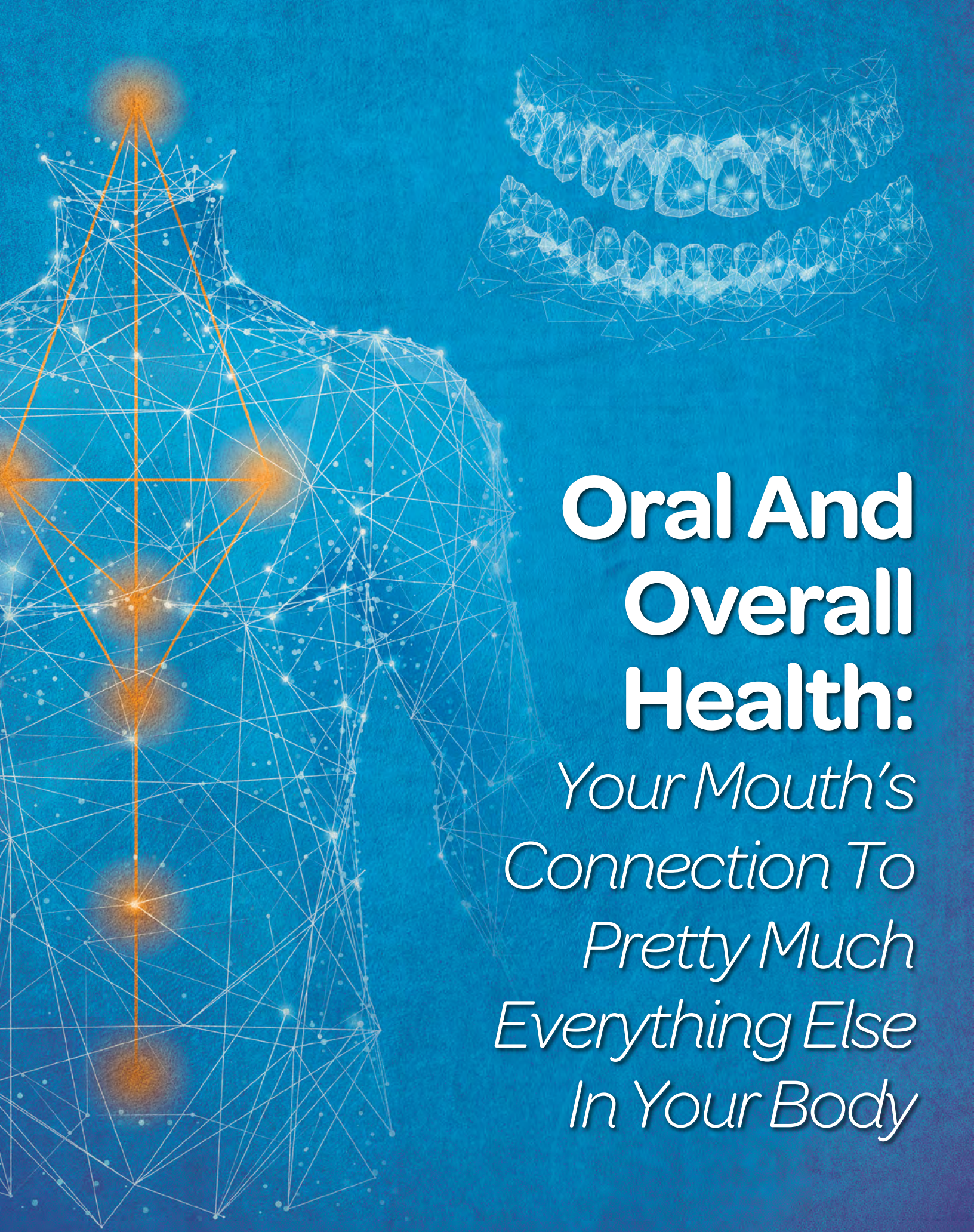
If you have been diagnosed with early stages of periodontitis, Perio Tray™ therapy can improve and maintain your gum health so that you can avoid repetitive scaling procedures and keep your teeth for life.

If you have advanced stages of periodontitis, our goals with Perio Tray™ therapy are to avoid repetitive surgical intervention, maintain surgical gains that may be necessary, and keep the gums around your teeth and implants so healthy that you can maintain your natural teeth and implants for life.

The most common side effects with Perio Tray therapy are fresher breath and whiter teeth. ***These results give us confidence to get closer to the ones we love!***

The next step to healthier gums is in your hands!

PerioProtect®



Oral And Overall Health:

Your Mouth's Connection To Pretty Much Everything Else In Your Body

Think of your mouth not only as the entrance ramp to your digestive tract, but also your body's cardiovascular superhighway. What goes into the bloodstream at this entry point has the ability to impact cardiovascular health and the function of most major systems.

Your heart, brain, respiratory system, digestive system, and even your reproductive system are intimately connected to your mouth. We could not survive without the right bacteria needed to help our body function properly. Maintaining a healthy balance of those special bacteria at this critical port of entry has a protective effect on the rest of your body.

Dr. Charles Whitney, a double board-certified physician in Family Medicine and Sports Medicine, has focused his practice on examining the link between oral health and systemic health. "I have seen countless patients significantly improve their blood tests, simply by improving their oral health," says Dr. Whitney, "thus lowering their risk of heart attack and stroke."

When asked about the most common side effect of oral inflammation, Dr. Whitney explains, "Gum bleeding, usually seen as blood in the sink, is a sign of oral inflammation. There is, by definition, an open door to the flow of bacteria from the mouth into the bloodstream and spraying everywhere."

So, the obvious question then becomes, how does bacteria enter in the first place?

The Entry Point: *How Bacteria Enters In The First Place*

The mouth is a fairly busy location for introducing all kinds of foreign substances into your body. Your saliva helps to keep it clean and, of course, brushing, flossing, and rinsing all play their roles.

But how do bacteria infiltrate the bloodstream to cause damage?

It usually starts on the teeth. (So, again, good for you for visiting your dentist.) Bacteria from food, other people, or from the air, cluster together to create colonies. This doesn't take long because bacteria divide and grow rapidly.

The colonies, called biofilm (living film), migrate into the space between the teeth and gums called the sulcus. When these spaces become unhealthy, they are called periodontal pockets, which are the places where all of your dental hygiene practices meet.

Periodontal pockets are also the areas that your hygienist measures during your regular checkups. Any reading over a three is worth investigating. If gum disease is diagnosed, it's important to get treatment as soon as possible.

Bacteria left unattended in these pockets can often cause inflammation, which makes the pockets grow deeper. The bacteria also constantly communicate between themselves, as well as with other, more dangerous bacteria. These more dangerous bacteria join the colonies as the biofilm extends deeper below your gums. As your gums become more and more inflamed, they become tender and susceptible to laceration.

Once the infections in the gums cause an open, bleeding wound, the bacteria easily gain access to the entire cardiovascular system.

Furthermore, the original wound site then becomes a hub for further infection that continues to grow as it releases new bacteria into the rest of your key systems, including other areas of your mouth.

Most patients can't feel gum disease or its effects in the early stages when it is easiest to treat. However, chances are that you have some form of the disease, as most North Americans do. It's been described as a silent epidemic by a U.S. Surgeon General and it's incredibly widespread.

Gum Disease Happens: *It's More Common Than You Think*

Half of American adults have the chronic form of gum disease called periodontitis and more than 80% have early-stage gum disease called gingivitis.

These numbers may sound surprising, but keep in mind that many people don't know they have it or think it is serious, while others are embarrassed about it or are afraid of treatment. In the past, we didn't have very effective ways to address the bacterial communities short of scraping them off the teeth and surgically removing infected tissue.

Now there is so much more that we can do to put a stop to the disease and prevent its recurrence. Today, we know that this treatment is not just for the health of your mouth but also for the health of your body.

In the following pages, we will help you understand gum disease, its link to other diseases, and how you can treat it safely and effectively. There's a correlation between healthy gums and the health of the rest of your body. Congratulations on taking an important first step toward improving your health!

All About Gum Disease:

The Causes, Symptoms, and Implications

Where you are on the spectrum of gum disease depends on when and where it is detected. As is the case with most diseases, the earlier symptoms are detected and potential causes are addressed, the better and the easier they are to treat.

So, it's a good thing you're thinking about this as you prepare to sit down with your dentist and hygienist.

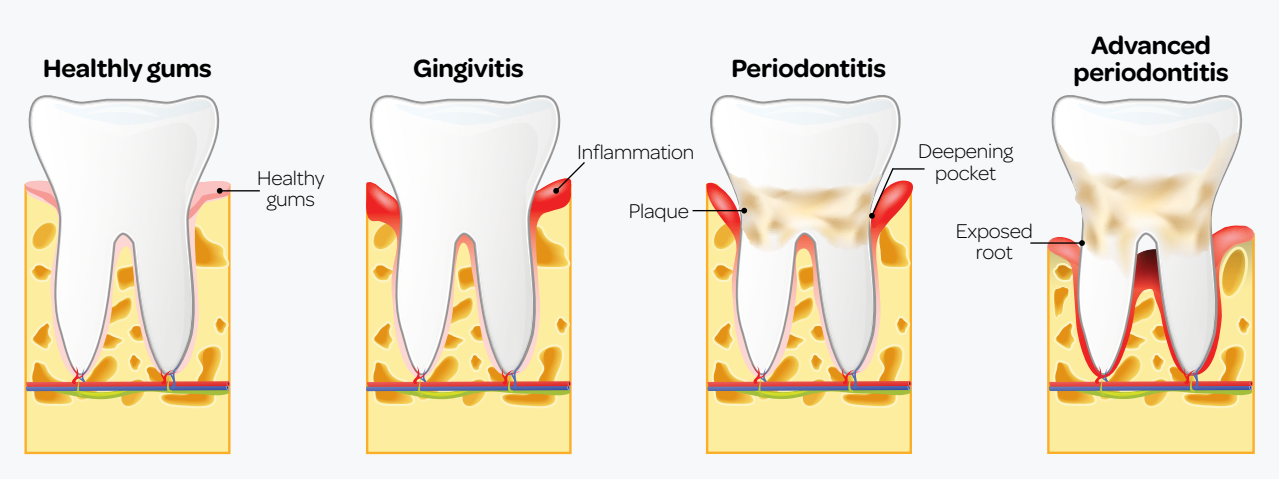
Gingivitis is the most widely known form of gum disease and it is also the most common version people experience. Gingivitis is recognized as inflammation of gum tissues. The most common symptoms include bad breath, redness in the gums, and bleeding gums.

When gum disease goes untreated, it can progress to **periodontitis**, a more severe form of the disease that affects deeper tissue and bone. Once bone is lost, the condition becomes chronic and requires additional treatment every few months.

Ultimately, inflammation is at the core of any form of this very common ailment. This can affect other parts of your body, so it's important to understand its symptoms and causes.

The Causes and Contributing Factors

Some factors contributing to gum disease are beyond our control, but knowing what they are can help initiate corrective

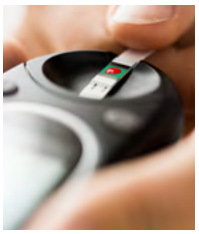


action when needed. They can also tell us where to look for possible issues before they become larger problems for your oral and overall health.

Common factors associated with gum disease include:

Genetics: If you've seen periodontal disease in your family tree, it's worth alerting your dental team so that you can detect any symptoms early.

Smoking: Introducing toxins into the gums with tobacco and nicotine products not only harms your gums and general health, but it also works against disease treatment.



Diabetes: Inflammatory diseases, such as type 2 diabetes, affect the function of your immune system and can make it harder for your body to fight infections.

Poor Dental Hygiene: Inconsistent brushing and flossing can allow bacteria to take hold and progress into disease-causing biofilms. Once the infections extend deep below the gums (in pockets>3mm), it is almost impossible to address the infections with brushing, rinsing, or flossing.

Certain Medications: Gingival inflammation is a side effect of some medication taken to treat other conditions. Medications that affect the flow of saliva can, in turn, limit your body's ability to clean your mouth.

Pregnancy: The changes in the body during pregnancy often make gums more susceptible to bleeding and tenderness. It's very important to address any concerns because preterm and low birth weight babies are more common in patients with gum disease.

Nutrition Deficiencies: Your body needs vitamins and minerals to maintain health and fight disease. A lack of vitamin D, for example, has been shown to be a significant cause of implant failure. Your doctor may discuss adding vitamins, omega-3s and other supplements, as well as eating more healthful food in order to improve treatment outcomes.

Paying attention to your oral health, maintaining regular checkups, and addressing the causes of disease will help you catch infections early and treat them before they cause more serious damage. Knowing the symptoms will help.

The Symptoms

The easiest and most reliable way to detect early-onset gum disease comes from consistent monitoring by your dentist and hygienist.

At home, you can help guard against the progression of gum disease by monitoring symptoms you may detect, including:

Chronic bad breath: This is something patients and their loved ones notice most frequently. As unpleasant as it is to discuss, it can only get worse if it goes unaddressed.

Pain and Sensitivity: You shouldn't wince while brushing your teeth. Nor should you notice a sharp pain when coming into contact with warm or cold liquids.

Redness: Healthy gums are naturally a light color, most commonly pink. As they become infected, they become darker, more red and inflamed.

Tender, Swollen Gums: These can be hard to detect, especially if the swelling is located around your molars. Swelling can be seen upon close inspection of the gum line where the gums may protrude further up on the tooth's surface than normal.

Bleeding: Another common symptom is blood in the sink. When brushing, if you spit out blood, you may have gum disease. It's not normal for gums to bleed.

If any of these symptoms are present, especially more than one, talk to your dentist immediately and ask for a periodontal (gum) examination.

The results of the examination will help you make a more informed choice about treatment. And treatment is so important because infected gums can have a much wider effect in your body.

The Implications

The links between oral health, inflammation, and your general wellness are still being studied, but some associations are clear.

Studies have shown a correlation between gum disease and the following conditions:

Heart Disease

Gum disease is a leading risk factor for heart disease, stroke, blood clots, chronic inflammation, and atherosclerosis. Inflammation of the arteries is the common denominator. This inflammation can be caused by oral bacteria entering the bloodstream and combining with fat deposits to cause plaque and restrict blood flow. Restricted blood flow can lead to

additional buildup, causing clots that can trigger life-threatening events.

Type 2 Diabetes

Diabetic patients with gum disease have reported higher blood sugar levels than diabetic patients with healthier gums. Further studies have indicated that patients who underwent gum disease treatment needed less costly care to manage their diabetes.

Respiratory Disease

The bacteria present in gum disease has been identified in the lung tissue of patients with lung abscesses. This correlation is being monitored further.

Preterm and low birth-weight babies

Research has shown that pregnant women who have periodontal infections had more than 7 times the risk of preterm delivery of low birth weight infants than women without the infections.

Dementia and Alzheimer's disease

The bacteria associated with Alzheimer's have been isolated in the periodontal pockets and along the nerves from the teeth to the brain tissue. When these bacteria are introduced into brain cultures, beta amyloid is formed, which is the substance associated with Alzheimer's. No causal agent has been identified with dementia, but chronic inflammation in the gums is associated with more rapid progression of dementia.

Colorectal Cancer

A common strain of anaerobic bacteria prevalent in periodontal disease has been identified as a driver of colorectal cancer.

The good news is that treating gum disease has been shown to reduce the risk of all of the above. The question is, how?

Identify The Problem

When it comes to diagnosing gum disease, your dentist will know the tell-tale signs and share the options for treatment if necessary. If you're unsure whether you may be experiencing some of the early symptoms of gingivitis or periodontitis, there is a brief survey below to consider.

Select the answer or answers that best apply to you, and feel free to share your results with your dental care provider.

My gums hurt:

[ ] a little.
[ ] a lot.
[ ] so much I avoid any liquid above or below room temperature.
[ ] not at all.

There's blood in my sink:

[ ] when I brush my teeth.
[ ] when I floss.
[ ] hardly ever.

Gum disease is

[ ] something I've never heard of.
[ ] a topic my dentist or hygienist has mentioned.
[ ] present in members of my family.
[ ] a nuisance I've learned to live with.

My hygienist tells me to floss, but I already do.

[ ] True. [ ] False.

My gums are:

[ ] receding.
[ ] swollen.
[ ] tender.
[ ] red.

My teeth can be described as:

[ ] kind of grungy.
[ ] longer than they should be.
[ ] pretty clean.
[ ] a source of light.

Bad breath is an issue for me.

[ ] True.
[ ] False.
[ ] Unsure, maybe?

When I go to the dentist and they call out the numbers measuring my pockets, they are usually

[ ] between 0 and 3.
[ ] between 4 and 7.
[ ] above 7.
[ ] all over the place.
[ ] I'm not sure I've ever had this done.

I have experienced loose or separating teeth and/or mouth sores/pus.

[ ] Unfortunately, yes.
[ ] Thank goodness, no.

Conventional Treatments of Gum Disease

As recently as twenty years ago, we didn't have effective ways to address the infections at home between office visits. Brushing your teeth, rinsing and flossing don't get deep enough below the gums to keep the pockets clean. Rinses do not penetrate deeply and are washed away almost immediately. After brushing, bacteria repopulate, and the disease cycle continues. A patient's best option was to come to the dental office every 2-3 months for periodontal cleanings and hope to avoid surgery.

Thankfully, we have better options now.

Scaling and Root Planing

The physical removal of biofilm and calcified bacterial communities below the gums is called scaling and root planing. The goal is to remove as much of the infection-causing material as possible, but it's impossible to get all of the bacteria out of the pocket and the community grows back. In just hours, the biofilm begins to reform. This is why at least 4 cleanings per year are recommended.

Surgery and Gingival Grafts

When the disease progresses so far that bone is lost and pockets are deeper than 5mm, surgery may be needed. Typically, the dental team will try to exhaust your non-surgical options first, but if bacteria get inside the cells of your gingival tissue, that tissue must be removed before healing can occur.

In other cases, the bacteria may build up between the roots of your molars. It is very hard to access these areas and surgery may be your best option.

Unfortunately, surgical procedures that remove gum tissue may expose root surfaces and increase the possibility of tooth sensitivity. Gingival (gum) grafts may help. Tissue is removed from another area of your mouth, often the top or roof of your mouth, and surgically placed to cover your roots.

It's natural to want to avoid these procedures and your dental team will make every effort to help you do so.

Laser Therapy

Many offices will combine the traditional approaches of scaling or surgery with laser technology. These tools use light waves to kill bacteria and, when necessary, to remove infected tissue. This technology offers many new benefits, but the problem remains that the bacteria repopulate and the cycle of disease continues.

The Post-Antibiotics Age

Antibiotic therapy has been used for years to address bacterial infections, but they often only have a temporary effect and need to be repeated frequently. When you take antibiotics, they circulate through your entire body, not just the area where you want them to work, so the dose you are given is based upon your entire body weight.

Bacteria thrive because they're able to adapt, mutate, and colonize. Because they can never be 100% eliminated with antibiotics, the ones who survive become stronger and the strongest go on to produce more.

Some bacteria have even evolved to resist antibiotic treatment and they can teach or share this resistance with other bacteria. In 2019, the Director of the Center for Disease Control announced that we are in a post-antibiotic age and urged Americans to practice prevention and better antibiotic stewardship.

Antibiotic-resistant germs infect someone in the United States **every 11 seconds** and kill someone **every 15 minutes.**

The 2019 AR Threats Report is available online at www.cdc.gov/DrugResistance/Biggest-Threats.html.

Prescription Perio Tray™ Therapy

Because Perio Tray therapy relies on hydrogen peroxide as the primary antimicrobial, it does not contribute to additional bacterial resistance and remains highly effective. The customized prescription trays offer a comfortable way to deliver and hold hydrogen peroxide deep below the gums to fight infections and maintain gingival health. The treatment takes 15 minutes and is done daily at home. This recent addition to the treatment of periodontal disease is an important supplement to home care. It is based upon our improved understanding of how critical it is to maintain healthy bacteria in our bodies while removing unhealthy bacteria. Combining the bacteria-fighting properties of hydrogen peroxide with the principles of chronic wound care delivers effective treatment. Even better, it can fight the bacteria that causes bad breath.

Treat Your Gums Nicely

We know that 80% of Americans have some form of gum disease. We also know that 100% of them would prefer a non-surgical treatment option.

But for years, that option simply did not exist.

It started when Dr. Duane Keller first introduced Perio Protect to a very sensitive patient, his mother. "I treated her once with the conventional surgical methodology," he explains, "and when we were scheduling her second surgery, she said, 'That's not gonna happen.'"

"She refused additional surgery. So, I went to work."

Dr. Duane Keller with his wife, Carol, and mother, Mercedes, who was Perio Protect patient No. 1.

"I had to find a way to deliver treatment where it was needed without causing more pain. After several prototypes and iterations, all of which my mom tried, I created what is now prescribed in dental offices and used in homes across North America—the patented Perio Tray™ medicament carrier."

"The most important design elements are the gasket-like seal and extension system that hold the specially formulated hydrogen peroxide gel deep below the gums, deep in the periodontal pockets," Dr. Keller recalls. "Once we knew the medicine would not be rinsed away, we were able to find the best and simplest medication to use in the trays."

In bacterial tests, Perio Tray™ delivery of low concentrations of peroxide has been proven to reduce the harmful bacteria's ability to repopulate by as much as 99% in just days. The bacteria that do repopulate tend to be species that do not harm the host.

Two controlled clinical trials demonstrated better reductions in bleeding and pocket depths when Perio Tray™ therapy was used at home in conjunction with scaling, as opposed to scaling alone. The longest study evaluating Perio Tray™ usage tracked results for up to 5 years. Patients in this study experienced 75% less bleeding within the first phase of treatment and were able to maintain these healthy conditions with regular tray usage for the duration of the study.

"This may be the most important aspect of Perio Tray™

therapy," says Dr. Keller. "Being able to achieve better oral health is one thing, but maintaining health in the long-term and ending the cycle of the disease, also prevents the potential damage of inflammation to the rest of the body."

How It Works

The innovative prescription tray therapy, called the Perio Protect Method, combines in-office procedures with the non-invasive Perio Tray™ homecare. These customized trays end the cycle of disease, as well as prevent it, by extending treatment from the dental chair to the comfort of your home.

Preventing gum disease requires excellent homecare. Perio Tray™ therapy is easy, leaves your mouth feeling clean, freshens your breath, and whitens your teeth. Prevention could be mistaken for a simple side effect!

Perio Protect is doctor-prescribed and patient-applied. The dental team will take careful measurements of your mouth and capture an impression of your teeth and gums. They will send this information to a laboratory specially trained to fabricate the sealed trays just for your mouth.

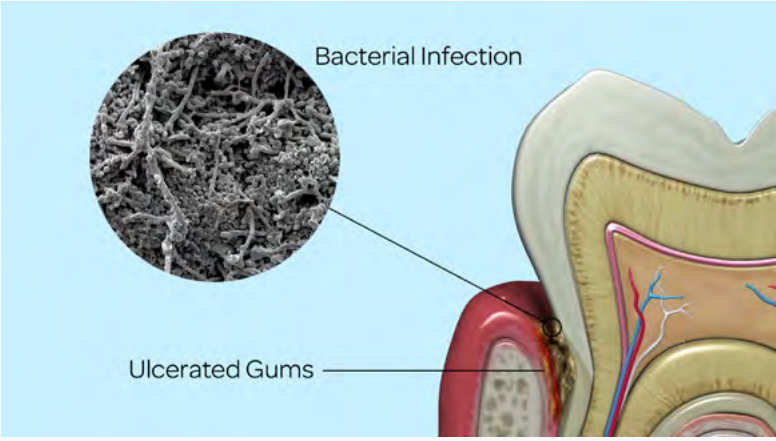
When you receive your custom trays, you will be shown how to place a small amount of medicine in each tray. This is worn for just minutes each day. Your dentist will also design a treatment plan specifically for you, as the duration and frequency varies for each patient until you can drop to once daily usage.

The trays are designed with a patented seal to place and hold medication where it is most effective—at the site of infection deep below the gum line. A low concentration of hydrogen peroxide gently and thoroughly cleanses the periodontal pockets, combats bacteria, whitens your teeth and freshens your breath.

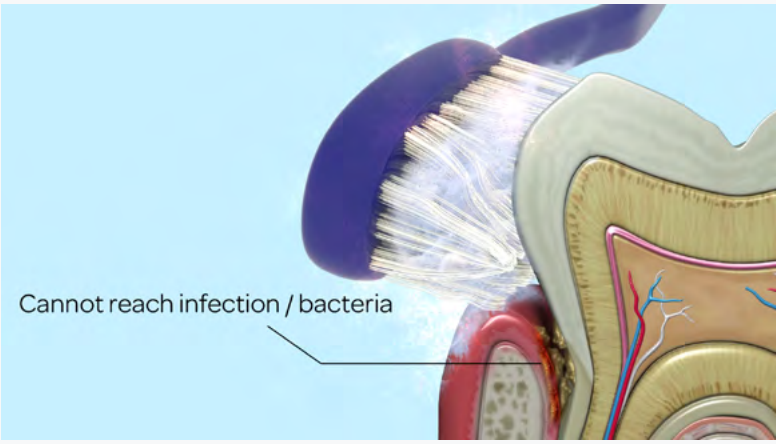
For some patients, the non-invasive Perio Tray™ therapy reduces the need for surgical intervention. For others, it can be a potent compliment to traditional treatment

Getting To The Root of The Problem

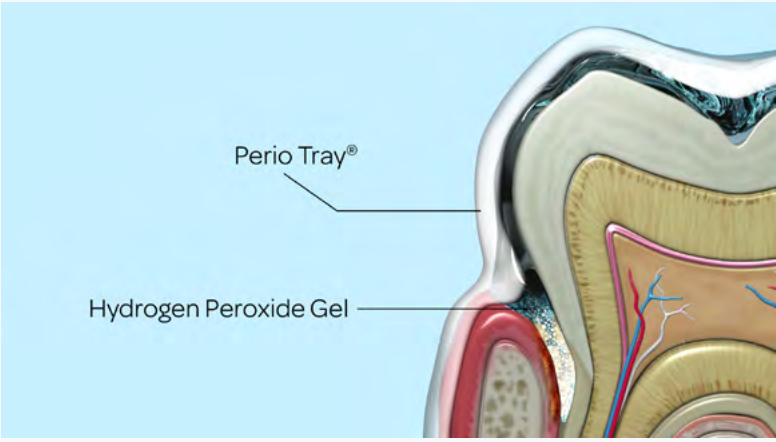
Brushing, rinsing and flossing are important, but fail to reach deep below the gum line where bacteria thrive—in the periodontal pockets. Doctor-prescribed and patient-applied, Perio Protect uses a custom Perio Tray™ designed with a patented seal to place and hold medication where it is most effective—at the site of infection deep below the gum line. A low concentration of hydrogen peroxide gently and thoroughly cleanses the periodontal pockets, combatting the



Bacteria can form a community called biofilm that grows down into the space or pocket between the teeth and gum tissue, protected by a slimy covering.



Brushing and flossing are important, but they just don't get deep enough below the gums to manage the biofilm regrowth.



The Perio Protect approach helps patients address the bacterial regrowth with a comfortable tray delivery of medication below the gum line.

methods, helping to ensure the most successful outcome.

While there is no "cure" for gum disease, it can be managed with daily treatment to prevent pathogenic bacteria from recolonizing. When the desired results have been achieved, your dentist will revise your treatment plan to maintain the results. For most people, this means one 10-15 minute treatment each day.

The Perio Protect Method is also prescribed for patients who have implants. Ideally, the treatment would be used shortly after the implant is placed to prevent infection and pocketing and thus would ensure the success and longevity of the implant.

Why It Works

The Perio Protect Method takes into account that treatment for gum disease is the same as chronic wound care.

Conventionally, gum disease has been treated according to acute care protocols, removing the trauma head-on with interventions like scaling, root planing, and surgery.

Studies indicate that scaling and root planing, the most common treatments of periodontitis that physically remove bacterial colonies called biofilms, leave behind the bacteria that caused the infection in the first place. And worse yet, the pathogens repopulate because it is impossible for the instruments to remove all of the biofilm.

However, if you think of all of the bleeding areas in your gums as chronically infected wounds, meaning that they never completely heal, then chronic wound care makes the most sense. This approach addresses infectious agents first, before wound debridement with scaling or surgery, and follows up after the in-office procedures to continue to address the wounded tissue.

For chronic wounds of the gums, aka periodontal disease, we can prescribe custom sealed Perio Tray™ delivery before scaling or surgery to deliver a low concentration of hydrogen peroxide gel deep below the gums. This establishes an oxygen-rich environment that is toxic to the most damaging bacteria.

The peroxide simultaneously debrides pathogens and encourages wound healing.

Perio Tray™ therapy does more than lock in the treatment. It compresses the wound and increases the oxygen levels below the gums. With the sealed tray, the hydrogen peroxide release of oxygen takes place at the site of the infection.

Peroxide has several advantages over conventional antibiotic therapies.

It's natural because you make peroxide in your liver, and it's in your white blood cells to fight infection.

Peroxide is also a broad-spectrum antimicrobial, whereas several anti-biotics may be needed to treat all the bacterial species in the pockets. And, over time, bacteria become increasingly resistant to antibiotic treatment.

Peroxide performs as an oral debriding agent and oral wound cleanser. Perio Tray™ is important because it keeps the medication deep below the gums where these chronic oral wounds hide from toothbrushes, rinses and floss.

If this all seems revolutionary, it's not.

Perio Tray™ therapy has been available since 2005 and hundreds of thousands of patients have used the trays. Research and case studies have shown treatment of chronic periodontal

disease with a direct medication delivery method significantly decreases bleeding upon probing and reduces the depth of periodontal pockets.

By creating the right environment for treatment with oxygen, compressing the wound, and addressing the bacterial cause, the chronic wounds can heal. In maintenance, the treatment suppresses damaging bacteria and encourages healthy bacteria to repopulate for healthy gums long into the future.

Where acute care addresses the immediate needs, chronic care—like daily Perio Tray™ delivery—addresses the cause.

Very importantly, the treatment takes into account patient behavior.

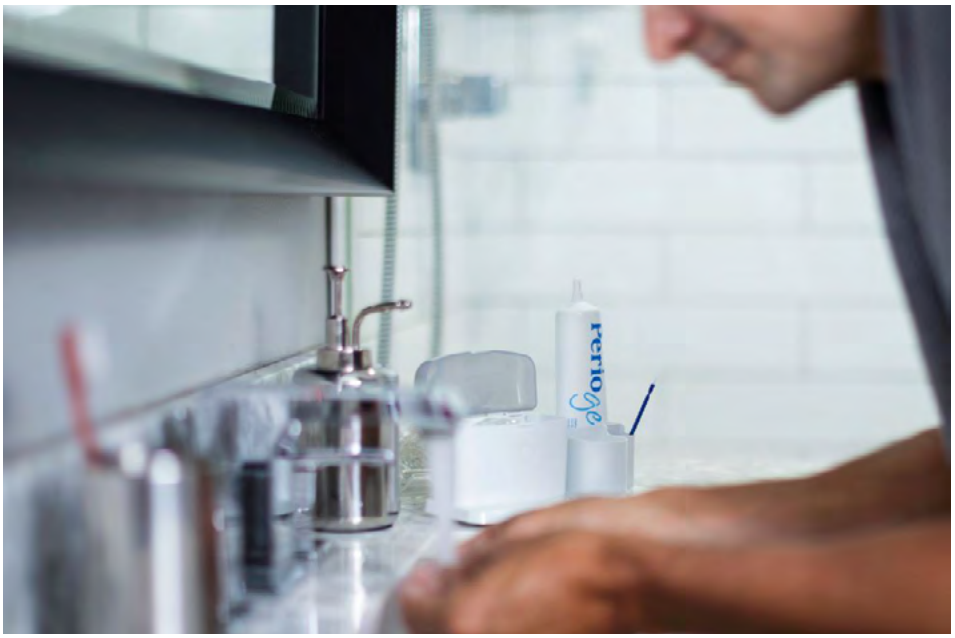
We know that people want easy, comfortable solutions. Remember, that's how this methodology came into existence in the first place. What is easier than patients wearing a tray with medication that fights infections, whitens teeth, and freshens breath in the comfort of their own homes?

You just incorporate it into your routine by, for example, wearing a the trays while taking a shower, folding laundry, or walking the dog. Once you get started, you'll know if you miss a day because you can feel the difference—that's how clean your mouth will feel with Perio Tray™ therapy.

The active ingredient in Perio Gel and Perio GelX (with xylitol) is hydrogen peroxide, which occurs naturally in the body and is also a powerful antimicrobial.

Results

Patients who take their oral health seriously experience the main benefit of better health for the rest of their body's systems.



The gums are a gateway to major organs by way of the circulatory system, and eliminating infections at the source cuts off the pathway to further harm.

In fact, treating gum disease with the Perio Protect Method has been shown to reduce the presence of the most damaging pathogens by up to 90%.

By treating gum disease, you can reduce the risk of heart disease, type 2 diabetes, respiratory disease, Alzheimer's disease, colorectal cancer, and preterm births and low birth weight babies.

Welcome side effects include whiter teeth and fresher breath. By eliminating odor-causing bacteria and plaque, Perio Protect makes a noticeable difference to patients and their loved ones.

You can begin treating gum disease comfortably and effectively by starting a conversation with your provider. If your provider hasn't heard of Perio Protect, it's your chance to make a referral and send them to Providers.PerioProtect.com. Or find a provider near you at PerioProtect.com.

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About the Inventor

DUANE C. KELLER, DMD, FAGD, CSO *invented the Perio Tray as a way to treat his mother and subsequently founded Perio Protect, LLC in 2005 after his Perio Tray was cleared by the FDA for prescription usage. He serves as the Chief Scientific Officer for Perio Protect, LLC. He is a prolific author and speaker. Dr. Keller is recognized by Dentistry Today as a CE Leader.*