

The
Metrolina Perio



PerioDontaLetter

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Matthew D. Ficca, D.M.D., M.S.D., *Periodontics and Implant Dentistry*

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From Our Office to Yours....

It is vital that we clinicians treat periodontal disease promptly.

Treating periodontal disease is not just about ensuring our patients have healthy mouths, but also about safeguarding their overall health.

Harmful bacteria in the gums, can find their way into the bloodstream, posing risks to other parts of the body.

Former U.S. Surgeon General C. Everett Koop said, "Your overall health is closely tied to the health of your mouth."

*This spring issue of **The PerioDontaLetter** reviews the latest research on some of the many systemic health issues that have been scientifically connected with inflammatory periodontal diseases.*

This research underscores the need for dentists to reevaluate our role in the overall health and well-being of our patients, and the critical importance of preventing and treating periodontal disease.

As always, we welcome your comments and suggestions.

Treating Periodontal Disease: Why It's Crucial to Preventing Other Systemic Diseases

No fewer than 57 systemic conditions have been scientifically linked to periodontal diseases. Research has shown periodontitis is the most common inflammatory disease. It affects up to 50 percent of the world's population. When it becomes chronic, it damages the supporting structures of the teeth and can lead to tooth loss.

But the impact and implications of periodontal inflammation are not necessarily limited to the mouth.

Microorganisms can travel from the oral cavity to other parts of the body, eliciting inflammatory responses at those sites.

From cardiovascular diseases to cancer, diabetes, Alzheimer's, rheumatoid arthritis, pregnancy issues and beyond, new research has scientifically linked inflammatory periodontal disease and many prominent systemic health issues.

Here are eight which are particularly deserving of attention.

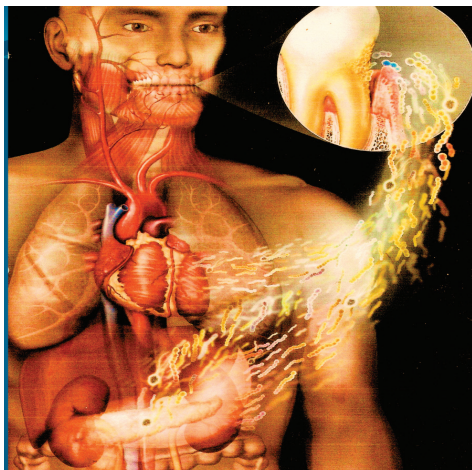


Figure 1. Millions of bacteria from infected periodontal pockets spread throughout the body many times a day, increasing the risk of many systemic diseases — from cardiovascular diseases to cancer, diabetes, Alzheimer's, rheumatoid arthritis and beyond.

Matthew D. Ficca, D.M.D., M.S.D.
Diplomate, American Board of Periodontology

3325 Springbank Lane, Suite 140 • Charlotte, NC 28226 • (704) 544-2224
Fax: (704) 544-2259 • www.metrolinaperio.com
email: drficca@metrolinaperio.com



Figures 2 and 3. Periodontal disease in the presence of diabetes. They are interactive, each contributing to the severity of the other disease.

kidney cancer and 30 percent more likely to develop blood cancers.

Diabetes

Diabetes is a well-recognized risk factor for the development, progression, and severity of periodontitis. And periodontitis is commonly accepted as the sixth chronic complication of diabetes mellitus.

Pathak A K et al, showed that of 300 individuals with diabetes, 68.7 percent exhibited clinical gingivitis, and 25.3 percent exhibited periodontitis both clinically and radiographically.

Various studies have shown that periodontal disease is one of the etiological factors in poor glycemic control. Because of the metabolic disturbances that characterize diabetes, the host immune response to periodontal pathogens seems to cause a hyper-inflammatory state which initiates and exacerbates the breakdown of periodontal tissues.

This may also make it more difficult for people who have diabetes to control their blood sugar, increasing the risk for diabetic complications.

Conversely, poorly-controlled blood glucose is a risk factor for the progression of periodontal inflammation, and there is some evidence that periodontitis might even contribute to the development of new cases of diabetes.

Inflammation is central to this vicious cycle since it has a direct effect on insulin resistance, which causes blood glucose levels to rise.

The mechanisms by which diabetes affects periodontal health show many similarities with those of other chronic diabetic complications, such as cardiovascular disease, nephropathy, neuropathy and retinopathy.

These complications are the result of damage to the large and/or small blood vessels, and are mainly driven by inflammation.

Cardiovascular Disease

Cardiovascular disease (CVD) is the leading cause of death in the world, and accounts for 20 per cent of all deaths in the United States. Research has long shown a significant link between periodontal disease and heart health.

A recent study by the American Heart Association showed that individuals with gum disease have a 28 percent higher chance of a first heart attack.

Recently, the European Federation of Periodontology and the World Heart Federation issued a joint consensus report that there is strong and convincing evidence for a significant association between periodontitis and CVD.

The periodontal pathogens *Porphyromonas gingivalis*, *Tannerella forsythia*, and *Actinobacillus actinomycetemcomitans* have been identified as causative agents in periodontal disease.

These pathogens are also found in atherosclerotic plaques, where they most likely contributed to the inflammatory processes that cause the formation of these plaques.

Noack et al found the level of C-reactive protein high in patients with periodontitis. C-reactive protein is also found to be an independent risk factor for the development of cardiovascular disease.

Cancer

A study published recently in Oxford's *Journal of the National Cancer Institute* found a 24 percent increase in the relative risk of developing cancer among participants with severe periodontitis, compared to those with mild to no periodontitis. The highest risk observed was for lung cancer, followed by colorectal cancer.

Another oral microbe, *Fusobacterium nucleatum*, has long been suspected of initiating colon cancer, the second leading cause of cancer death in the United States.

F. nucleatum is well known for its adhesiveness and its role in dental plaque formation. But high levels of the microbe have often been found in colon cancer tissues — and are linked to more aggressive cancer, metastasis to other organs, and a poor prognosis.

Furthermore, in 2013, researchers discovered that *F. nucleatum* produces a protein called FadA adhesin that caused inflammation and spurred the growth of cancerous cells.

Periodontal disease poses a risk for other types of cancer as well. Research has shown a 55 percent greater chance of pancreatic cancer in individuals with periodontal disease.

Men with periodontal disease were 49 percent more likely to develop

Alzheimer's Disease

Every 65 seconds, someone in the United States develops Alzheimer's. By 2050 the number of Americans with the disease, currently six million, is expected to double or triple. It is urgent new approaches are found to fight this fatal disease.

A wave of new studies suggests that Alzheimer's may develop in tandem with periodontal disease, which affects half of adults over 30. The pathogens that cause these chronic bacterial infections burrow below the gumline, can invade the bloodstream, and travel into the brain through bleeding gums, thus contributing to Alzheimer's.

A study from Taiwan's Chung San Medical University that followed more than 27,900 people over ten years found that people with periodontal disease faced up to 70 percent greater risk for developing Alzheimer's compared to those with healthy gums.

Another 2016 study found that among people who already have the disorder, cognitive decline progressed six times faster in those with oral infections.

More recent studies have strengthened the case by proposing a mechanism by which gum infections could affect the brain. Brushing, flossing and chewing food often cause gums to bleed.

This allows oral bacteria, including the leading pathogen in the disease, *P. gingivalis*, to enter the bloodstream through tiny tears in bleeding or inflamed gums.

The oral microbes can then cross the blood-brain barrier. This tissue normally functions as a strict gatekeeper that regulates which substances enter the brain, but it becomes more permeable in Alzheimer's and other dementias.

A study published in the *Journal of Neuroinflammation* reported a staggering 90 percent of individuals with Alzheimer's had periodontal spirochetes in their brains.

In a comprehensive literature review published in 2020, Kamer et al showed that the relative risk for dementia was 22 percent higher in patients with severe periodontal inflammation, and 26 percent higher in toothless patients.

Rheumatoid Arthritis

Over the past decade or so, evidence has begun to mount for the connection between chronic periodontitis and rheumatoid arthritis.

People with rheumatoid arthritis are far more likely to have infected gums than those who don't, suggesting that oral infections may drive, and worsen, rheumatoid arthritis.

A recent study showed rheumatoid arthritis patients were more than 20 times more likely to have infected gums than patients without the disease. In addition, the more advanced the periodontal disease, the more severe the rheumatoid arthritis.

Researchers have developed a 'two-hit' model to explain how periodontitis could potentially cause the joint disease. The first hit is chronic inflammation — a prolonged immune response to periodontal bacteria in the mouth and bloodstream leading to systemic inflammation. This is followed by the second hit, trauma to the joints.

This double whammy seems to spark the development of autoimmune antibodies that attack the body's joints and tissues -- which in turn leads to debilitating rheumatoid arthritis symptoms, such as painful swelling, joint deformity and damage to a wide range of the body's tissues, including the heart, skin, eyes and arteries.

The suspected pathogen is *P. gingivalis*, which also seems to make joint tissue more susceptible to the new antibodies. It produces an enzyme that partially alters proteins by converting the amino acid arginine into citrulline, a process known as citrullination. Researchers say this alteration labels the protein as potentially foreign, causing the antibodies in rheumatoid arthritis to mount an attack on the body's own proteins.

Dental therapies, such as scaling, root planing and antibiotic treatment, often make rheumatoid arthritis symptoms much less severe, and evidence suggests that periodontal treatment may slow the progression of rheumatoid arthritis.

Pulmonary Infection

Research has found that bacteria associated with periodontal disease can

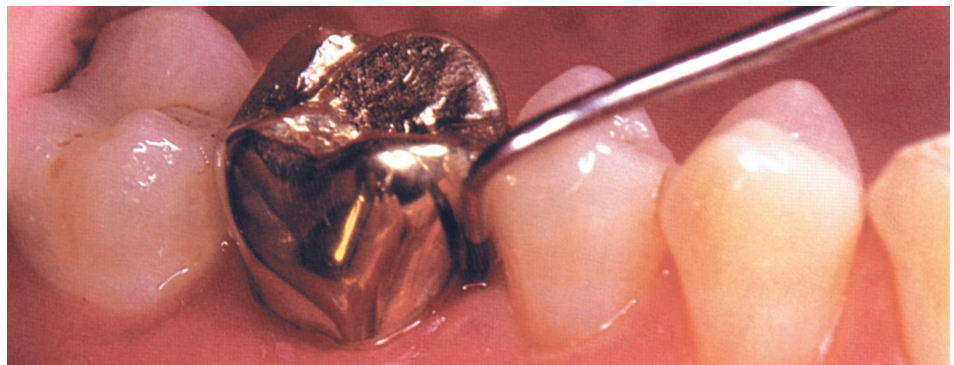


Figure 5.. It is easy to be deceived by the clinical appearance of gingival tissues, which may appear healthy on the surface, but which may have deep pockets which always have subgingival infection. This photo shows bleeding on probing, indicating inflammation and current infection, which could in turn spread throughout the body.



Figure 6. Drug-induced gingival hyperplasia following organ transplant.



Figure 7. Tissue resolution and improved plaque control following periodontal surgery.

be aspirated into the lungs and contribute to respiratory diseases such as pneumonia. In a compromised immune system, periodontal disease can triple the risk of fatal pneumonia — a leading cause of death among those infected with the coronavirus.

Thoden Van Velzen et al showed that 100 million bacteria act as a reservoir for potential pathogens in one cubic millimeter of dental plaque.

Bacteria associated with oral and respiratory diseases share the same mechanism of shedding the bacteria into the saliva in the oral cavity, then aspirating it into the lower respiratory tract, ultimately leading to respiratory tract infection.

According to a study conducted by Monro et al, the load of oral bacterial increases during the time of the intubation, and higher dental plaque increases the risk for the development of pneumonia.

One study also revealed that various periodontal indices for the risk of periodontal infection, along with a papilla bleeding index, show the values of these indexes are higher in patients

suffering from respiratory disease i.e. chronic obstructive pulmonary disease.

Pregnancy Complications

Periodontitis is an exceedingly prevalent condition during pregnancy and creates adverse outcome in terms of pre term delivery, low birth weight, preeclampsia. Empirical observations confirmed by research show 67-100 per cent of pregnant women are likely to develop gingivitis.

Various researchers have shown that when periodontal infection reaches the placenta or the amniotic cavity, this will induce pathology leading to adverse outcomes. A joint consensus report published in 2013 by the American Academy of Periodontology and the European Federation in Periodontology suggests that periodontal infections may increase the risk of pregnancy complications and adverse pregnancy outcomes. These can include preterm births, low birth weights, pre-eclampsia, and even miscarriages.

"New research has scientifically linked inflammatory periodontal disease and many prominent systemic health issues."

There is strong evidence that periodontal pathogens can disseminate to the fetal-placental unit, causing local inflammation, or even infecting the fetus directly. Some studies have demonstrated that treatment of periodontitis in pregnant women may reduce the risk for adverse pregnancy outcomes. These studies emphasize the need for early intervention, or even better, prevention, perhaps as soon as the preconception period.

Stroke

Four studies have found periodontal disease a significant risk factor for stroke. One study found that individuals with periodontal disease had twice the risk of stroke than individuals with healthy gum and bone tissue. In another study, stroke patients had almost twice as much periodontal disease as did patients who had not experienced a cerebral vascular accident.

Two studies raise the possibility that treating gum disease alongside other stroke risk factors might reduce the severity of artery plaque buildup and narrowing of brain blood vessels that can lead to a new or a recurrent stroke.

The Dental Team As Part of the Healthcare Team

Many people tend to think of oral care as distinct and separate from overall well being, but as we can see, this is not the case.

Educating patients about how the health of their mouths directly affects the health of their bodies can be extremely helpful toward solidifying habits, strong relationships, and ultimately better health outcomes.

