



▶ Periodontal disease linked to vascular disease in diabetic patients



▶ Periodontal treatment for diabetic patients



▶ What's Clicking? Reducing CVD risk factors

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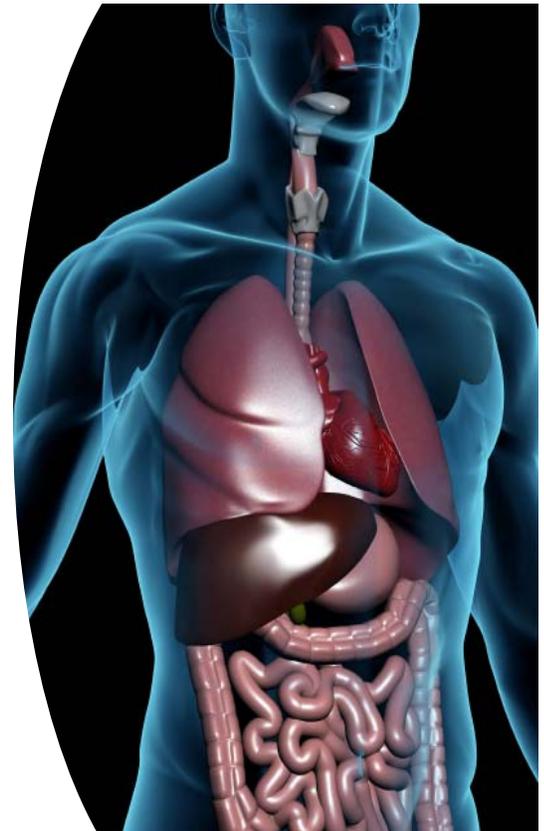
Informed

The truth about the diabetic & oral care

Effects of Periodontal Disease & Diabetes — A Two Way Street

In previous issues of *Informed*, the focus has been on how the complications and vulnerabilities associated with diabetes impact oral health. How blood glucose levels, triglyceride levels, systemic infection, lifestyle choices, etc. may increase the incidence of oral infection, tissue insult, and attachment loss. Poor glycemic control, for example, can increase the risk of periodontal disease in diabetic patients by more than 300 percent, while also increasing the severity and occurrence of alveolar bone loss up to 400 percent. And prescription medications can trigger oral thrush, xerostomia and secondary oral infection.

This month's issue of *Informed*, however, will examine the ways oral health may impact **system health** of diabetic patients – including inflammatory response and risk factor increase for other diabetic comorbidity. We will look closely at the relationship between periodontal disease and vascular disease. And we will review the latest studies surrounding periodontal infection and system wide health.



Did You Know?

CVD is the major cause of mortality for individuals with diabetes. It is also a major contributor to morbidity and direct and indirect costs of diabetes.

Periodontal Disease Linked to Vascular Disease in Diabetic Patients

Periodontal disease is an advanced infection of the subgingival microflora that destroys attachment fibers and can progress to the alveolar bone. The most advanced forms of periodontitis result in attachment reduction, tissue and alveolar bone loss, and ultimately in permanent damage and tooth loss.

For the diabetic, periodontal disease occurs up to 3.4 times more often than in non-diabetics, according to a multivariate risk analysis.¹ And, like any infection for the diabetic, gum disease can inhibit glycemic control.

Recent research also shows that infection of the periodontal tissue can create an ongoing inflammatory burden on the host system—triggering a chronic cycle of inflammation and infection. This cycle can expose other tissue to gram-negative pathogens, LPS, etc. with the potential to trigger mediator expression and inflammation that can affect the integrity of other organs.²

Of special note are research findings that may have identified several links between vascular complication and periodontal disease.

In a longitudinal case-control study, 82% of diabetic patients with severe periodontitis experienced one or more major cardiovascular, cerebrovascular, or peripheral vascular events compared to only 21% of diabetic subjects, who had no periodontal infection.³

Another study was performed to determine to what degree periodontal disease can affect mortality rates in diabetic subjects with cardiovascular disease. The longitudinal study examined more than 600 subjects with type 2 diabetes.⁴ And the results were as follows.

In subjects with severe periodontitis, the death rate from ischemic heart disease was 2.3 times higher than in subjects with no periodontitis or mild periodontitis. The mortality rate from diabetic nephropathy was 8.5 times higher in the severe periodontitis group after accounting for other known risk factors.

The overall mortality rate from cardio-renal disease was 3.5 times higher in subjects with severe periodontitis.

Up to one third of all diabetic adults go undiagnosed.

Less clear is the causal relationship between periodontal disease and vascular complications. According to some recent research, periodontal diseases may induce or exacerbate an elevated systemic chronic inflammatory state.

Research indicates that patients with periodontitis, particularly those colonized by Gram-negative organisms such as *P. gingivalis*, *Tannerella forsythensis*, and *Prevotella intermedia*, have higher serum markers of inflammation such as C-reactive protein (CRP), IL-6, and fibrinogen than subjects without periodontitis.⁵⁻⁷ When these organisms are released into the system, they can trigger bacteremia or endotoxemia, elevating the inflammatory state and stimulating an increase in serum inflammatory marker levels.

One study, published in the *Journal of Periodontology* (2002), found that periodontal disease may be a risk factor for systemic pathologies such as cardiovascular disease, through release of pro-inflammatory bacterial components.

Did You Know?

Periodontitis is a local inflammatory process mediating destruction of periodontal tissues — triggered by bacterial insult. However, this disease is also characterized by systemic inflammatory host responses that may contribute, in part, to the higher risk for cardiovascular disease (CVD) among patients with periodontitis.

Following mild mastication by test subject, those patients with periodontitis had endoxemia in 40% of subjects, while just 12 percent of periodontally healthy subjects had endotoxemia. What's more, the concentration of endotoxin in those with periodontitis was five times higher than those without periodontitis.

Patients with periodontal disease are almost 2X as likely to suffer from coronary artery disease as those without periodontal disease.

When those patients were treated for periodontal disease and associated inflammation, clinically-evident inflammation was reduced and serum levels of IL-6 and CRP were reduced.⁵

All suggesting that the effects of periodontal diseases may extend far beyond the local periodontal environment. There is, in fact, some research that shows they be a contributor to:

- Chronic inflammatory response and associated confounding of glycemic control
- Thickening of arterial walls
- Clot formation

Some researchers believe that periodontitis may simply be a marker for cardiovascular disease (and other diabetes-related comorbidity) based on some studies that showed pathophysiological features but few other indicators to prove a causal relationship between the two.

Clearly, further research is needed to fully understand the connection between diabetes, periodontitis and comorbidity. However, these data points are worth remembering:

- Up to one third of diabetic adults go undiagnosed

- Periodontitis is exacerbated by diabetes
- Glycemic control is hampered by severe periodontitis
- Patients with periodontal disease are almost twice as likely to suffer from coronary artery disease as those without periodontal disease.

Highlighting the need for collaborative treatment for periodontal disease by medical doctors and dentists trained in proper oral care of patients with diabetes mellitus.

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Check it Out:

Patients with systolic blood pressure of 130–139 mmHg or a diastolic blood pressure of 80–89 mmHg should be treated with lifestyle and behavioral therapy only for 3 months. After that time, if targets are not reached, treatment should include pharmacological agents that block the renin-angiotensin system.

Periodontal Treatment for Diabetic Patients

Periodontal disease is caused by bacterial infection that attacks soft tissue, destroys attachment fibers and alveolar bone that hold teeth in place. As the disease reaches advanced stages, gums separate from teeth to form pockets. These pockets, in turn, fill with bacteria -building plaque. And infection and inflammation increase.

This effect can have a confounding and sometimes devastating effect on glycemic control.

The end point of clinical therapy is the elimination of inflammation. Therefore, the diabetic dentist will work to affect both local and systemic outcomes. Treatments vary based on level of the periodontal disease's advance. However, scaling and root planing are standard treatment for perio disease.

The purpose of these treatments is:

- Debridement of bacteria and calculus
- Removal of infected cementum and dentin

- A shift in the microbial population

This last outcome is of increased importance to the overall health of the patient. The oral health practitioner will focus on decreasing pocket depth, smoothing root surfaces and reducing inflammatory level. To achieve systemic health goals, additional treatment may be required – including antibacterial fiber placement in sub gingival layers to prevent bacterial growth.

Special Note Concerning Patients with Diabetes Mellitus:

While root planing and scaling are standard treatment, the diabetic patient is vulnerable to severe infection associated with mediator expression, leading to hematogenous-born infection. Diabetic patients should receive antibiotic prophylaxis to prevent infection. And treatment should be performed by a dentist specifically trained in the care of diabetic patients.

What's Clicking? Reducing CVD Risk Factors

Type 2 diabetes is an independent risk factor for macro vascular disease, along with common, coexisting conditions – hypertension and dyslipidemia.

In addition to oral health treatments discussed above, there are several steps recommended by the American Diabetes Association to slow or prevent cardiovascular diseases. The first is thorough screening and diagnosis in order to reduce CVD risk factors.

Screening and Diagnosis¹

Blood pressure should be measured at every routine

diabetes visit. Patients found to have systolic blood pressure ≥ 130 mmHg or diastolic blood pressure ≥ 80 mmHg should have blood pressure confirmed on a separate day.

Patients with diabetes should be treated to a systolic blood pressure ≤ 130 mmHg and a diastolic blood pressure ≤ 80 mmHg.

1. Standards of Medical Care in Diabetes
— 2007, Diabetes Care. January
2007, Vol. 30 (Suppl. 1), S15-S16

From:

To:

