



▶ Risk Factors Multiply Effects of Diabetes and Periodontal Disease



▶ Early Assessment is Key

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# Informed

*The truth about the diabetic & oral care*

## Diabetes, Periodontitis: Risks & Rewards

The number of people living with diabetes is on the rise, and promises to continue until 2030. The number of people who develop periodontal disease may be matching that growth rate, and studies suggest that the two together may increase co-morbid rates for systemic as well as oral health complications.

The question is, what is triggering the rise in what may be two closely related diseases? And what can physicians and

dentists do to positively impact these trends as well as the health of their individual patients?

This month, we will examine the **common risk factors** for each disease, to what degree those factors multiply the effects of one or both diseases, what the medical communities can do to positively impact outcomes. And what the consequences of inaction may be.



### Did You Know?

In 2004, there were 36.3 million people in the United States older than 65 years, representing 12.4 percent of the population. By 2030 this number will grow to 71.5 million people, or 20 percent of the population.

# Risk Factors Multiply Effects of Diabetes and Periodontal Disease

It is estimated that 7% of the United States population, or 20.8 million people, have been diagnosed with diabetes (another 5.6 million go undiagnosed). That total promises to grow as the population ages. At the same time, periodontal disease is also on the rise. Studies have shown that periodontal disease may have a two-way relationship with diabetes – suggesting that the presence of one of these diseases increases the risk factors for and severity of the other.

Key underlying defects endemic to diabetes are an inability to maintain normal blood glucose levels, delay in wound healing and inhibited immune response that create vulnerabilities within the oral cavity and may lead to oral complications including periodontal disease, gingivitis, dental caries, salivary gland dysfunction and xerostomia, burning mouth syndrome and increased susceptibility to oral infections).<sup>1-4</sup> However, periodontal disease is of particular concern due to impaired host responses and enhanced collagenolytic activity.<sup>5</sup> Delayed healing, associated with diabetes, may prevent surgical treatment, resulting in advance of perio infection and its potential to trigger infection and active systemic inflammation. This inflammatory response may generate compounds that increase insulin resistance and inhibit management of diabetes.<sup>6-7</sup>

## These factors beg several key questions such as:

- What is the nature and extent of the relationship between two?
- What other factors impact them?
- What clinical and preventive methods can be used to reduce risks for these diseases—both individually and together?

We will attempt to answer these questions by reviewing known risk factors for each disease and the potential impact of these on both diseases. In part 1 of this two-part review, we will examine the risks for

each associated with age, number of years living with each disease, socio-economic status and tobacco use. In part 2, we will examine the risks associated with obesity, gender, ethnicity, and also examine the multiply affect of each disease on the other.

## AGE

The number of people 65 years and older will increase dramatically. According to the 2000 U.S. Census, there are approximately 24.2 million people between the ages of 55 and 64 years, representing 8.6 percent of the population. In 2004, there were 36.3 million people in the United States older than 65 years, representing 12.4 percent of the population.<sup>8</sup> By 2030 this number will grow to 71.5 million people, or 20 percent of the population.<sup>9</sup>

Half of all patients diagnosed with diabetes are over the age of 55, a statistic that makes the aging baby boomer generation an ominous specter for an already over-burdened healthcare system. What's more, periodontal disease (sometimes referred to as the sixth complication of diabetes) is also more prevalent in individuals over the age of 40.<sup>10-12</sup>

Periodontal disease in older groups may be the result of cumulative tissue destruction throughout a lifetime rather than an age-related risk of periodontal susceptibility.<sup>13</sup> However, patients with diabetes have been found to develop periodontal disease at a rate as much as 3.4 times that of systemically health individuals.

In addition, many of the comorbid conditions associated with periodontal disease occur more frequently and reach more advanced levels in people of advanced age. This outcome is multiplied for patients with diabetes. As a result, early interventions to maximize oral health and systemic health may provide important health benefits for patients over 40.

**Check it out**

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## Number of Years Living with Disease

Studies have shown the number of years living with diabetes may be a greater risk factor than age, for developing complications associated with diabetes, especially for those subjects with poor to marginal control. This may be especially true for those at risk for periodontal disease.

In a study of the Pima Indians, the incidence and prevalence of periodontal disease was determined in 2,273 subjects 15 years of age or older. The prevalence of periodontitis was 60% in subjects with diabetes and 36% in those without diabetes. The incidence was determined in a subset of 701 subjects 15 to 54 years old, with little or no evidence of periodontitis at baseline.

Following these subjects for an average of over 2.5 years, the incidence of periodontitis was 2.6-fold higher in diabetic subjects than in non-diabetic patients.<sup>14</sup> In another 2-year longitudinal study, subjects with type 2 diabetes had a fourfold increased risk of progressive loss of alveolar bone (the bone that supports the teeth) compared to non-diabetic subjects.<sup>15</sup>

These research results suggest that prevention and early diagnosis are key in maintaining the health of at-risk patients.

## Tobacco Use

According to studies from the Mayo Clinic, tobacco use may increase risk of developing diabetes, due to increases in glycemic levels which may lead to insulin resistance. In addition, nornicotine, found in tobacco may increase the risk of diabetes. Those individuals who smoke 20 or more cigarettes a day more than triple their risk of developing diabetes.

From an oral health perspective, tobacco use has more devastating affects. Studies show daily volume and duration of tobacco use directly impacts severity of periodontal pathology.<sup>16-18</sup> Both local and systemic mechanisms mediate the negative impact of tobacco use on oral health.<sup>19-20</sup>

- Heat from smoke may increase gum attachment loss
- Increased calculus deposits often result from smoking can enhance plaque retention.
- Nicotine diminishes collagen synthesis, protein secretion and may inhibit bone formation.

## Gum Disease, Smoking & Diabetes

Whether you are a counselor, doctor or patient, you know that glycemic control, age/duration of illness and smoking are among the top risk factors affecting management and health of the diabetic. Not coincidentally, they are also high-risk factors for oral health diseases.

- Poor glycemic control + diabetes = 2.0 to 3.4-fold risk of periodontitis
- Smoking + diabetes = 6-fold increased risk of contracting periodontal disease
- Smoking + 10 years living with diabetes mellitus = increases the risk of developing periodontal disease up to 10X
- Age + diabetes = increased risk of xerostomia (due to meds and salivary degeneration)

**Periodontal disease and xerostomia are often the first two diseases in a long line of oral diseases that can affect overall health.**

Tooth loss, edentulism, bone loss, oral lesions, fungus (oral candidiasis) and burning mouth syndrome – all potential outcomes of poor glycemic control, diabetes and smoking.

These outcomes inhibit wound healing and may impair immunological function by affecting immunoglobulin levels, which may increase susceptibility to typical and unusual microbial pathogens<sup>21</sup> – both by-products of diabetes.

Inclusion of a risk assessment instrument in patient encounters with smokers provides clinicians with an opportunity to identify patients at risk and deliver critical information about the benefits of smoking cessation and the importance of daily self-care strategies to control the plaque biofilm.

## Early Assessment is Key

Risk Factor	Oral Disease	Diabetes
Age	X	X
No. Years Living with Disease	X	X
Metabolic Control		
Obesity		X
Tobacco Use	X	X
Ethnicity		X
Gender		X
Socio-Economic Status	X	X
Periodontal Disease		X
Diabetes	X	

The research review thus far suggests that risk assessment both by dentists and physicians may hold the key to delaying onset and preventing the most damaging affects of periodontal disease and diabetes. In next month's issue of *Informed*, we will look at additional risk factors and discuss the multi-faceted relationship between the two diseases and their risks.

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