Oral Health : A Window to Systemic Diseases

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Diabetes mellitus (DM) is a highly prevalent metabolic disease. This disease remains undiagnosed. More importantly, the prevalence of DM has tripled since 1970. This is a significant finding for dental professionals, as evidence from clinical research showing a strong relationship between diabetes and periodontal disease is mounting. In fact, periodontitis is often referred to as the sixth complication of diabetes. Further research suggests that control of periodontal disease may play a key role in the control of diabetes. Thus, dentists must be aware of the signs and symptoms of diabetes, and understand the importance of maintaining periodontal health for anyone with diabetes[1].

Diabetes mellitus is a metabolic disorder characterized by hyperglycemia due to defective secretion or activity of insulin. It may be further complicated by poor regulation of protein and lipid metabolism. In the current classification of this condition, the terms "insulin-dependent diabetes mellitus" and "non-insulin dependent diabetes mellitus" are not used, in part because they relate to treatment rather than to the diagnosis[12].

Diabetes mellitus can be classified into 1 of 4 broad categories according to signs and symptoms.

Type 1 DM is normally a result of autoimmune destruction of the beta cells in the islets of Langerhans of the pancreas. This condition often leads to absolute insulin deficiency. Type 1 diabetes tends to occur in young, lean individuals, usually before 30 years of age; however, older patients do present with this form of diabetes on occasion. This subgroup is referred to as latent autoimmune diabetes in adults (LADA). LADA is a slow, progressive form of type 1 diabetes. Only approximately 10% of the patients with DM have type1 diabetes and the remaining 90% have type2 diabetes mellitus. The patient with type1 diabetes must rely on insulin medication and close dietary control for survival.

In **Type 2 DM**, patients can still produce insulin, but do so relatively inadequately. In many cases, the pancreas produces larger than normal quantities of insulin. A major feature of type 2 diabetes is a lack of sensitivity to insulin by the cells of the body, particularly fat and muscle cells. These larger quantities of insulin are produced as an attempt to get these cells to recognize that insulin is present. In addition to the problems with an increase in insulin resistance, the release of insulin by the pancreas may also be defective, and occur late in response to increased glucose levels. Finally, the liver in these patients continues to produce glucose despite elevated glucose levels. There is a direct relationship between the degree of obesity and the risk of developing type 2 diabetes in both children and adults. It is estimated that the chance to develop diabetes doubles for every 20% increase over desirable body weight and for each decade after 40 years of age, regardless of weight. People with type 2 diabetes constitute 90% of the diabetic population.

Gestational diabetes mellitus (GDM) is glucose intolerance that begins during pregnancy. A wide variety of relatively uncommon conditions fall into the category of "other specific types." These consist mainly of specific genetically defined forms of diabetes and diabetes associated with other diseases, such as pancreatitis or drug use.

Complications

Long-term complications may occur in both type1 and type2 diabetes. Diabetes accelerates atherosclerosis of the larger blood vessels, leading to coronary heart disease (angina or heart attack), strokes, and pain in the lower extremities because of lack of blood supply. Microvascular complications include retinopathy (which may lead to blindness), nephropathy (possibly leading to kidney failure) and neuropathy. (Table 1)

Microvascular disease

- Xerostomia
- Greater susceptibility of oral tissues to trauma, More opportunistic infections(e.g., candidiasis)
- Greater accumulation of plaque
- Greater risk of caries
- Greater susceptibility to periodontal disease
- Greater risk of developing periodontal abscesses when periodontitis is present
- Delayed healing

Peripheral Neuropathy:

- Oral paraesthesia, including burning mouth or tongue
- Altered taste sensations

The Effect of Diabetes on Periodontal Health[2]

Numerous studies have found a positive relationship between poor glycemic control in persons with type 2 DM and increased periodontitis. The literature provides consistent evidence of greater prevalence and severity of periodontal disease in diabetics, both types 1 and 2. As these studies were conducted in distinctly different settings, with heterogeneous subjects and using a number of different measures of periodontal disease, we can state with confidence that diabetics have an increased susceptibility to periodontitis related to diabetes control.

The Effect of Periodontal Health on the Course of Diabetes[3,10]

Studies attempted to determine if the presence of periodontal disease influences the control of diabetes and reported that periodontal therapy may improve metabolic control of diabetes. Upon closer examination of the research, it was shown that mechanical periodontal treatment alone improves periodontal health, but had an effect of the

Table 1
Oral Complications °f Diabetes Mellitus Long-term Diabetic Complication With Oral Implications[13]

Patient characteristic	Periodontal maintenance 3	Frequency
Diabetes well controlled Healthy periodontium; no or minimal localized gingivitis	Record probing depths and bleeding score; deplaque	Annually
Healthy periodontium	Record probing depths and bleeding score	Annually
Generalized gingivitis	Deplaque; OHI	Every 6 months
Chronic, mild to moderate periodontal disease	Refer management to periodontist if possible If referral not possible moni monitor	Every3 months
	Record probing depths and bleeding score	Annually
	Check probing depths and bleeding score; deplaque; OHI	At each visit
Diabetes Poorly controlled Healthy periodontium; no or minimal localized gingivitis	Record probing depths and bleeding score; deplaque-OHI	Every6 months
Healthy periodontium	Record probing depths and bleeding score	
Generalized gingivitis	Deplaque; OHI	
Chronic, mild to moderate periodontal disease	Refer management to periodontist if possible If referral not possible monitor	
Advanced or aggressive periodontal disease	Refer if possible Deplaque-OHI	
	Record probing depths and bleeding score	

level of glycosylated hemoglobin. However, the magnitude and duration of the improvement may not be clinically significant.

Periodontal Management of the Diabetic Patient[4,9]

There is weak evidence from clinical trials that diabetics require more thorough and aggressive periodontal therapy than do non-diabetics with periodontal disease. Once the periodontal disease is under control, and the patient with diabetes remains on a maintenance program for strict plaque control at three-month intervals, the periodontal health will remain stable. Periodontal health may deteriorate more rapidly in poorly controlled diabetics than in other patients, and may not respond as well to traditional sanative therapy. Therefore, knowledge of patients' metabolic control is important for determining prognosis and recall intervals. For patients who do not respond well to initial therapy, it may be appropriate to select an antibiotic based on the results of microbial testing. While properly controlled diabetics can undergo all dental treatments without special precautions, the dentist must also be aware of the signs and symptoms of an acute hypoglycemic attack.

Signs & Symptoms of Acute Hypoglycemia[13]

- dizziness
- pallor
- anxiety, including agitation and belligerence
- Sweating
- tachycardia
- weakness
- hunger

It is strongly advisable to have some form of rapidly absorbed glucose, such as orange juice, on hand when treating patients with diabetes. To avoid an episode of hyperglycemia consider the following.

- Schedule the patient at their time of highest insulin activity. This depends. upon the type of insulin used and may vary from 30 minutes to eight hours post-injection.
- Advise the patient not to change their insulin regimen or diet prior to their treatment.
- Have a blood glucose monitor in the office or ask patient to bring theirs to the appointment.
- Consider pre-operative sedation for anxious patients.

From this review of the clinical evidence to date, we can conclude that prevention and control of periodontal disease must be considered an integral part of diabetes control. The principles of treatment of periodontitis in diabetic patients are the same as those for non-diabetic patients and are consistent with our approach to all high-risk patients who already have periodontal disease[5].Major efforts should be directed at preventing periodontitis in patients who are at risk of diabetes. Diabetic patients with poor metabolic control should be seen more frequently, especially if periodontal disease is already present[6,7,8]. Patients with well controlled diabetes, who have good oral hygiene and who are on a regular periodontal maintenance schedule, have the same risk of severe periodontitis as nondiabetic patients

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