

## SHORT COMMUNICATION

**The Relationship between Diabetes Mellitus and Periodontitis****A.M. Hussain**

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**Abstract:** Chronic gingivitis and periodontitis are common inflammatory conditions of the periodontal tissues. Given the 'right' concurrence of risk factors, a person with periodontitis can experience significant destruction of tooth-supporting bone, ultimately resulting in tooth loss. Poorly controlled diabetes is an important risk factor for periodontitis, and gingivitis and periodontitis are sometimes the first sign that a patient has diabetes. As severe periodontitis can lead to the loss of teeth, it is important that patients with diabetes practise good oral hygiene and have regular dental check-ups so that problems can be detected quickly.

**Key words:** Diabetes mellitus, gingivitis, periodontitis.

**Introduction**

Periodontitis is a disease of the tooth supporting structures (alveolar bone and the periodontal ligament) in which there is destruction of these structures ultimately leading to tooth loss. Dental plaque is the primary etiology for the disease, however there are other factors that contribute to the progression of this disease. Complexes of oral anaerobic bacteria and perhaps viruses are thought to interact with risk factors, such as smoking and diabetes, to create the conditions which make a person susceptible to periodontitis. The patient's immuno-inflammatory response to the bacteria causes the tissue destruction which occurs in chronic periodontitis. Chronic gingivitis is the very common inflammatory reaction occurring in the gingival tissues in response to the accumulation of dental plaque. It usually precedes the development of periodontitis, but chronic gingivitis does not inevitably progress to periodontitis. The clinical appearance of gingivitis may be modified by systemic factors such as poorly controlled diabetes, which can significantly accentuate the gingival tissues' response to dental plaque.

**The relationship between diabetes, gingivitis and periodontitis:**

Although periodontitis is a recognised complication of diabetes, people with well-controlled diabetes who have good oral hygiene are not at increased risk of periodontitis. However, their susceptibility to periodontitis is significantly increased when their diabetes is poorly controlled, particularly if they also smoke. Recent epidemiologic evidence shows that the prevalence of diabetes in patients with periodontitis is significantly greater (by two times) than in people without periodontitis [1]. Given that diabetes may be present for a number of years before it is diagnosed, and that the prevalence of diabetes is increasing in the Indian community, dentists may be the first health professionals to detect a patient's diabetes.

The gingival and periodontal signs which may alert the clinician that the patient has previously undiagnosed diabetes or that the patient's diabetes is poorly controlled include:

1. Persistence of gingival inflammation after phase-I periodontal treatment (thorough supra- and sub gingival scaling and cleaning, oral hygiene instruction).
2. Severe gingival inflammatory response to plaque and continuing alveolar bone loss despite periodontal treatment.
3. Severe, aggressive periodontitis in people 20–45 years of age (deep periodontal pocketing, increased tooth mobility and tooth migration, causing teeth to over-erupt or spaces to open between teeth, and radiographic evidence of advanced bone loss).
4. Simultaneous formation of multiple periodontal abscesses.

#### **How diabetes increases susceptibility to periodontitis:**

Advanced glycation end products deposited in the tissues as a result of hyperglycaemia can alter the phenotype of macrophages and other cells via a specific cell-surface receptor. Macrophages are key cells in the pathogenesis of periodontitis through their ability to produce a large array of cytokines. They also influence the inflammatory response, the metabolism of fibroblasts and lymphocytes and stimulate bone resorption via prostaglandin E<sub>2</sub>. It is thought that the advanced glycation end products transform the macrophages into cells with a destructive phenotype, producing pro-inflammatory cytokines in an uncontrolled fashion [2]. Neutrophils are the primary defence cells of the periodontium. The reduced neutrophil function observed in patients with diabetes is therefore another mechanism increasing the susceptibility to periodontitis.

#### **Is there a relationship between periodontitis and the ability to control diabetes?**

Recent investigations have attempted to determine if the presence of periodontal disease influences the control of diabetes. There appears to be good evidence to support this hypothesis. Grossi and others have suggested that effective control of periodontal infection in diabetic patients reduces the level of AGEs in the serum [3]. The level of glycemic control seems to be the key factor. Tervonen and Karjalainen followed diabetic patients and nondiabetic controls for 3 years [4]. They found that the level of periodontal health in diabetic patients with good or moderate control of their condition was similar to that in the nondiabetic controls. Those with poor control had more attachment loss and were more likely to exhibit recurrent disease. While periodontitis is a recognised complication of poorly controlled diabetes, it has been proposed that severe periodontitis may make the metabolic control of diabetes more difficult. The process may be mediated through the systemic release of inflammatory cytokines (e.g. TNF- $\alpha$ ) from periodontitis lesions, and chronic, low-level systemic exposure to Gram negative organisms. It has been suggested that when antibiotics were added to standard periodontal treatment (debridement of the teeth and oral hygiene improvement), diabetic control improved significantly for a period of three months [5].

### What can the patient do?

People with diabetes need to practise high standards of daily oral hygiene, including brushing and flossing. The use of interdental brushes (which are like small bottle brushes) is indicated where there has been some recession of the gingiva. Adjunctive use of a chlorhexidine mouthwash (0.12%) or chlorhexidine gel (0.2%) twice daily (used independently of toothpaste so that the chlorhexidine is not inactivated) may be useful in controlling the more severe forms of gingivitis. Patients should consult with their dentist or periodontist regarding the recommended duration of use of chlorhexidine. Dental care, which is specifically aimed at monitoring the health of the periodontal tissues and providing the necessary treatment, is needed at six-month intervals. The prevention and control of periodontal disease must be considered an integral part of diabetes control. Medical practitioners who suspect a patient has diabetes-related gingivitis or periodontitis should ensure that an early referral is made to a dentist. Dentists in turn need to refer advanced or suspect cases to a periodontist [6].

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