

Original Study

Associative Link Between Chronic Periodontitis & Hyperglycemia

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Introduction

Periodontitis is an immune-inflammatory diseases of the periodontal tissue characterized by destruction of bone and connective tissue attachment (**Thomas et al. 2013**)

Several experimental and human studies have shown that infections are accompanied by a decrease in glucose tolerance and hyperinsulinemia, which together indicate the presence of insulin resistance. (**K. Sammalkorpi, 1989**)

Periodontal infection is associated with hyperglycemia and diabetes (**Demmer et al., 2012; Borgnakke et al., 2013**)

More recent evidence, however, has indicated that patients with severe periodontitis have increased serum levels of CRP, hyper-fibrinogenemia, moderate leukocytosis, as well as increased serum levels of IL-1 and IL-6 when compared with unaffected control populations (**Kweider et al., 1993; Ebersole et al., 1997; Loos et al., 2000; Slade et al., 2000, 2003; Hutter et al., 2001**).

Periodontal disease is an infectious disease caused by a small group of predominantly anaerobic gram-negative bacteria on the tooth surface as biofilms.

Chronic gram-negative periodontal infection results in increased insulin resistance and poor glycaemic control.

Aim of the Study

To evaluate blood glucose level in chronic periodontitis patients and in periodontally healthy groups.

Materials & Methods

20 periodontally healthy subjects (Control group) and 20 moderate to advanced generalized chronic periodontitis patients (Test group) were recruited for the study with an age range between 30-65 years. Blood glucose level was measured by with drawing blood from the antecubital vein of both the groups by veni - puncturing.

- Exclusion criteria
- Any dental treatment during the past 6 months
- Diabetes mellitus or any other endocrine disease
- Myocardial infraction
- Stroke
- Cancer

Measurement of blood glucose

After enrolling into the study periodontitis as well as control subjects were asked to consult their family doctor for measuring fasting and postprandial blood glucose levels. The measurements were done in the same local laboratory of clinical chemistry using routine enzymatic methods. To identify subjects with pathological values the following cut-off points were used:

Normal Range Pathological Value

Fasting blood glucose :	70-100mg/dl	>100mg/dl
Postprandial :	100-140mg/dl	>140mg/dl

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DOI: <https://doi.org/10.5281/zenodo.11000724>

How to cite this article: Kumari M et al.: Associative Link Between Chronic Periodontitis & Hyperglycemia *HTAJ OCD. 2024; March-April(4):25-26.*

Statistical Analysis:

Data are presented as mean and standard deviation. Differences between means were proved for significance using the Student's t-test for unpaired samples.

Results:

	Control		Periodontitis Patients		p-value
	Mean	sd	Mean	sd	
Fasting (mg/dl)	80.35	3.10	104.55	6.14	0.01
Post Prandial (mg/dl)	123.15	3.90	147.55	7.46	0.05

Mean fasting blood glucose levels in periodontitis subjects were higher by about 3.91% and mean post prandial blood glucose levels in periodontitis subjects were higher by about 5.35% as compared to control subjects.

Discussion:

Although patients with known diabetes mellitus were excluded from the study, values of fasting blood glucose levels in periodontitis patients were slightly but significantly higher than in control subjects.

This observation may indicate that these patients have some problems with their glycaemic control and in a pre-diabetic condition. (Losche W et al.,2000)

Periodontal infection is associated with hyperglycemia and diabetes (Demmer et al.,2012; Borgnakke et al.,2013)

Poor glycaemic control is known as an established risk factor of periodontitis (Nishimura et al.1998, Lalla et al.1998).

Severe periodontal disease may deteriorate glycaemic control (Taylor et al.1996, Grossi et al.1997, Grossi & Genco 1998).

Some cytokines, such as $TNF\alpha$, $IL-1\beta$ or interferon γ , that are produced in response to an infection with gram negative bacteria may be responsible for an insulin resistance and subsequent poor glycaemic control in periodontitis patients (Liu et al. 1998, Reimers 1998, Shiba et al. 1998).

Severe periodontitis at baseline increases risk for poor glycaemic control (George W. Taylor et al., 1996).

Williams and Manan: noted reductions in insulin requirements for seven of nine patients after periodontal therapy, an interesting finding that does not appear to have been investigated further.

Miller et al.: in a pilot study evaluated the effect of reducing gingival inflammation on glycaemic control in nine patients, reported an association between improved periodontal bleeding response and more favorable blood glucose levels.

Conclusion:

Moderate to advanced generalized chronic periodontitis can predispose an individual to the risk of developing higher blood glucose level.

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