



Is periodontal disease a risk factor for diabetes?

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Periodontitis and diabetes are both complex chronic diseases linked by an established bi-directional relationship.¹

Dentists and dental students play a vital role in the prevention and stabilisation of periodontal disease; many of our patients are living with diabetes and it has been well established that diabetes is one of the most prevalent risk factors for periodontal disease.² However, as a dental student, less focus is placed on periodontal disease as a risk factor for diabetes and the potential role of periodontal treatment in the prevention, stabilisation and treatment of diabetes.

The facts

- Almost 50% of adults in the UK have a degree of periodontitis that is irreversible³
- It is estimated that 415 million people are living with diabetes worldwide, which is estimated to be 1 in 11 of the world's adult population⁴
- Drugs used to treat diabetes contributed to 12.5% of all prescription spending by NHS England in 2020/2021.⁵

The biological mechanism

Periodontitis is a chronic inflammatory disease that is triggered by bacterial microorganisms and is associated with severe chronic inflammation, leading to the destruction of the tooth-supporting apparatus.⁶

Evidence suggests that periodontal infection can exacerbate systemic disease and this potential mechanistic link is centred around inflammatory processes.⁷ Periodontitis-induced bacteraemia has been proven to cause an increase in serum pro-inflammatory cytokines like interleukin-1 beta and tumour necrosis factor alpha; this increase has in turn been evidenced to produce alterations in lipid metabolism, resulting in hyperlipidemia, in addition to impeding insulin signalling. These cytokines have the potential to produce an insulin resistance syndrome akin to that observed in patients with diabetes. Some evidence indicates that periodontal disease may also lead to elevated levels of low-density lipoproteins and triglycerides, which

are high in diabetic patients regardless of their glycaemic control.⁷

Some biochemical markers of diabetes are altered by periodontal disease, such as glycated haemoglobin levels (HbA1c). The onset of type 2 Diabetes Mellitus can be predicted through serum interleukin-6 and C-reactive protein, and these are also increased in patients with untreated periodontitis.^{8,9}

Studies have attempted to demonstrate the effect of periodontal treatment on glycemic control in diabetic patients and there is currently good evidence to support this relationship, however there is some conflicting evidence.^{8,10} Successful periodontal treatment in patients with diabetes has been demonstrated to reduce HbA1c by 3-4mmol/mol (0.3-0.4%) in the short-term post-treatment.¹

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Despite these positive findings, more research is required to explore the potential long-term effects of successful periodontal therapy on the control and prevention of diabetes and the possibility of integrating regular periodontal therapy for patients with diabetes in conjunction with pharmacotherapy and lifestyle modification. With the huge burden that diabetes currently incurs on the NHS,⁵ the question I pose is this: can dentists have a role in reducing the micro and macrovascular complications in diabetic patients and reduce the need for pharmacotherapy, particularly in patients with type 2 diabetes?

References

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‘Can dentists have a role in reducing the micro and macrovascular complications in diabetic patients and reduce the need for pharmacotherapy?’

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Getting to know you

- *Cats or dogs?* Dogs always.
- *Favourite ice cream?* Honeycomb
- *Guilty pleasure TV show?* Sex and the City
- *Does pineapple belong on pizza?* It's not for me.
- *You want to become a dentist because...* It is a multi-faceted career that provides you with the privilege to make a positive impact on people and improve their quality of life.