

Periodontal Disease And Diabetes Mellitus: An Update And Case Report.

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Abstract

Periodontal disease and diabetes mellitus are inter-related in a two-way relationship that has increasingly been associated with chronic infection, although the exact mechanism is not precise.

When periodontal disease is treated, glycaemic control can improve, yet many doctors are unaware of this or what dental care their patients living with diabetes might or might not have.

This case shows how patient self-awareness and thorough daily interproximal plaque control can reduce the risks of the complications of both diseases.

Introduction

People with diabetes mellitus are 3 -4 times at greater risk of developing periodontal disease than non-diabetics. This rises to ten times for smokers [1]. The two conditions affect each other and are biologically linked [2], although the mechanism is not fully understood and may be related to the raised serum levels of inflammatory products found in both diseases. The severity of the hyperglycemia affects the periodontium most [3]. The dental source of these products is Gram-negative organisms in mature plaque that lead to periodontal inflammation, bleeding on toothbrushing, increase in pocket depth, and loss of bony support to the teeth. Periodontitis has an adverse but modifiable effect on glycaemic control [4]. When

treated, the overall management of diabetes mellitus may improve [5] because periodontal therapy improves glycaemic control [6].

In the UK, doctors and dentists do not share their results and are generally unaware of the other's treatment of their diabetic patients. There have been calls for better interprofessional awareness and the sharing of results [7].

For doctors, the gold standard of care is the maintenance of HbA1C below 6.5 percent or 7.8 mmol/L. As levels increase to more than 8.5 percent or 10.9 mmol/L, so do risks. These risks can be classified using a traffic light system [8]. (Table 1).

Table 1. HbA1c levels

Risk Factor	GREEN	AMBER	RED
Percentage	<6.5	6.5 – 8.5	8.5>
mmol/mol	<48	48 - 69	69>
mmol/L	<7.8	7.8 – 10.9	10.9>

For dentists, patients can be routinely screened using the World Health Organisations Community Periodontal Index of Treatment Needs (CPITN). The scores generated from maximum periodontal

pocket depth measurements can also be classified using the same traffic light system [8]. (Table 2).

Table 2: Maximum CPITN score from highest scoring sextant

Risk Factor	GREEN	AMBER	RED
Sextant score	0 or 1	2 or 3	4 or 4*

Case Report

Mrs D is aged 77 years and has been a type 1 diabetic for 25 years. Her HbA1C levels have been persistently over 8.5 percent (10.9 mmol/L), placing her in a high-risk or red category of developing diabetic complications. She has been advised that her dental health is satisfactory, although she has experienced episodes of periodontal abscesses leading to tooth extractions and a CPITN score of 4*, placing her in the highest dental, red risk category. She has a gingival recession and spaces between her teeth and gingivae and has been prescribed large and small diameter interdental brushes (TePe, Malmo, Sweden) and left to work out which brush to use where in her mouth. She has bleeding while brushing her teeth, which is never normal.

Neither her doctor nor her dentist is aware of each other's results and what effect each disease is having on the other.

Mrs. D was recruited onto an interdental plaque control program (www.chooseabrush.com) that supplied her with instructions and advice that there should be slight resistance as interdental brushes are used for optimum plaque removal, a chart of her teeth and the full range of eight different diameters of TePe interdental brushes, to enable her to create her prescription to determine which was the most effective brush to use for a given space.

At her three-month review, she reported that her gingivae were no longer bleeding for the last month. This was maintained for six months. She also said that she could now use a larger diameter brush for some spaces – a sign of further resolution of gingival inflammation [9].

During the trial period, she decided to lose weight and managed a 3 kg reduction in six months. Her HbA1c, now green, had fallen to 6.4 percent, and her CPITN to 3, or amber risk. She now shares her results with both her doctor and dentist.

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Discussion

It is interesting to speculate which modality, weight loss or improvement in periodontal health, has had the more significant effect in improving her glycaemic control or whether there has been a synergistic effect. This case reinforces the need for doctors and dentists to share their results and work together.

However, this will require a paradigm shift in working practices for both groups and their teams. This author has suggested that people with diabetes should keep their results and show them to their respective professional advisors using a suitable *pro forma* that ideally should contain details about CPITN scores and what they mean as an educational tool [8].

Doctors should also ask their patients if they receive dental care and consider referrals for non-attenders in the highest risk (red) cohort, especially if they require renal dialysis. Dentists should routinely ask their patients if they are type 1 or type 2 diabetics, their medication(s), and their last HbA1c score so they, too, can assess this important marker of risk for periodontitis and loss of alveolar bone.

There are three factors contributing to this bone loss:

- Gram-negative bacteria in plaque secrete, along with other inflammatory markers, osteoclastic activation factor.
- High blood sugar levels increase osteoclastic activity.
- People with diabetes have reduced healing capacity.

Further, larger, studies using the *pro forma* above, are suggested.

Declarations

Mrs D has given her written permission for publication of her case report.

The author is the inventor of the Chooseabrush® method of plaque control.