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Diabetes Mellitus and Periodontitis: A New Method for Risk Assessment

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Abstract

People living with diabetes mellitus (DM) are at a 3-4 times higher risk of developing periodontal disease (PD) than non-diabetics; for smokers this risk is up to 10 times. However, many doctors are not aware of this.

DM and PD are bidirectionally linked. Further research to determine the mechanism is required. PD has an adverse effect on glycaemic control. There is improvement when periodontitis is successfully treated.

Doctors and dentists and their teams need to share results. A system of red, amber and green for both medical and dental risks is proposed, and a pro forma designed, so that diabetics themselves can take more control of their own health and share them with their professional advisors.

Keywords: Diabetes, Periodontitis, Risk Assessment.

Introduction

The relationship between diabetes mellitus (DM) and periodontal disease (PD) is well established. These diseases are linked [1]. People with DM have a 3 to 4 times greater risk of developing PD than non-diabetics rising to 10 times for smokers [2].

Pathophysiology

There is a common pathogenesis between diabetes mellitus and PD involving an enhanced inflammatory response at both local and systemic levels [3]. For PD, this is derived from polysaccharides in Gram-negative bacteria in mature dental plaque that are known to stimulate the production of cytokines [4]. PD has an adverse but modifiable effect on glycaemic control [5]. Periodontal therapy improves metabolic control so the overall management of diabetes may improve [6, 7].

Alveolar Bone Loss

Periodontitis is associated with loss of alveolar bone supporting the teeth. When dental plaque is left, after 7 to 10 days gingival inflammation ensues and this is the precursor of periodontitis [8]. Toxic products from these Gram-negative organisms include osteoclast activation factor that causes bone resorption in the periodontium. Osteoclastic activity also increases along with enhanced glycation levels and poor glycaemic control, thus stimulating further bone resorption and diminished bone formation in a vicious circle and contributing to the enhanced levels of periodontitis and alveolar bone loss seen in people with diabetes who also have a reduced healing capacity [9, 10].

No interdental plaque control gives poorer glycaemic control for Type 2 diabetics [11]. These factors underline the need for screening people with periodontal disease for diabetes mellitus and vice versa [2].

Medical Risks for People Living with DM

The five well-recognised individual disease risks routinely screened for diabetic patients are:
Cardiopathy and arterial disease, nephropathy, neuropathy and retinopathy

There are few studies about these complications together with PD. However, all point towards higher levels of PD giving rise to more severe diabetic complications.

Defining Risk Factors for Doctors

The gold standard for diabetic monitoring is the serum level of glycated haemoglobin expressed as a percentage, m.mol/mol or mmol/litre (Table 1).

A traffic light classification of risk has been proposed as a simple way for doctors, dentists and patients themselves to understand the risks that they face from the interaction of these two diseases [12]. For HbA1c levels below 6.5 per cent the band is green, an amber band for 6.5 to 8.5 per cent, and a red band for greater than 8.5 per cent [13].

Table 1: HbA1c Levels and Medical Risks

RISK FACTOR	LOW, GREEN	MODERATE, AMBER	HIGH, RED
Percentage	<6.5	6.5 – 8.5	8.5 >
mmol/L	< 7.8	7.8 – 10.9	10.9 >
mmol/mol	<48	48 - 69	69>

Defining Risk Factors for Dentists

The measure of choice is the World Health Organisation's Community Periodontal Index of Treatment Needs (CPITN) [14]. This method divides the mouth into sextants that are probed for pocket depths ranging from 0 to 4*. The maximum score in each sextant is recorded then the single highest score is taken and classified (Table 2).

Table 2: Periodontal Risk Factor

RISK FACTOR	LOW, GREEN	MODERATE, AMBER	HIGH, RED
Highest sextant score	0 - 1	2 - 3	4 or 4*

These two risk factors can be combined into a single pro forma, with explanations of the periodontal scores for diabetics themselves to have and share with their respective professional advisors [12].

Table 3: My Diabetes Results For 20…….

NAME……DOB……

Doctors – HbA1c, this should be below 6.5%

Risk Factor: less than 6.5% low; 6.5-8.5%, medium; 8.5% or more high, or Less than 48mmol/mol, low;48-70mmol/mol, medium; 70mmol/mol or more, high

Date HbA1c…… Risk level……

Previous results

Date HbA1c…… Risk level……

Dentists: The Basic periodontal examination

Date……. Highest score…….

Risk Factor 0-1 low; 2-3 medium; 4 or 4* high

Previous results

Date……. Highest score…….

Risk Factor 0-1 low; 2-3 medium; 4 or 4* high

Notes: These numbers range from 0 to 4*. The maximum score in each sextant is recorded.
0 – no periodontal problems.
1 – bleeding on probing (a sign of gingivitis and poor plaque control).
2 – Calculus (indicating the need for scaling and root planning).
3 – Pockets of 3.5 to 5.5mm (that is early periodontal breakdown).
4 – Pockets of 5.5 to 8.5mm (that is moderately severe periodontal breakdown).
4*- Pockets greater than 8.5mm (that is severe periodontal breakdown with an increased risk that teeth will require extraction).
 Reference: Brit dent J 233: 1, 2022.
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Discussion

Periodontitis has been recognised as the sixth complication of PD [15]. Both doctors and diabetics are often unaware of the importance of dental health. The traffic light pro forma is a start on what could be a long educational road to improve the overall care of people living with DM. This will require further research, especially in relation to treatment outcomes from collaborative care, as well as methods to ensure effective inter-professional result sharing [13].

Periodontitis is both a treatable and preventable disease with good clinical outcomes. Prevention depends on daily efficient and effective control of plaque by patients on a daily basis [16]. In relation to other costs of care for the main diabetic complications, dental treatment is relatively cheap. Recent evidence has shown that periodontal treatment is cost effective for people with Type 2 diabetes assuming improvements in HbA1c levels are maintained [17].

However, it will require both doctors, dentists and their teams to make their results readily available for their patients as a matter of routine rather than being asked to provide them through access to medical records requests. For dentists who are not routinely sharing their CPITN results this will represent a significant change in their working practices.

Meanwhile, multi-professional teams should work together and involve their patients to facilitate and improve diabetes management and clinical outcomes in a rapidly changing environment where dental care has been shown to mitigate diabetic complications [18].

Conclusions

Periodontitis is a significant factor for people living with DM that has been overlooked by doctors. Dentists should take the lead by informing them about the periodontal status of their patients as a first step in information and care sharing. Diabetics themselves should be used to keep both their medical and dental records and share them with their respective professional advisors. A pro forma has been developed for this purpose [12].

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