For Healthcare Professionals

Infectious Smiles

Focus on Anti-infectives

VOL 14

The Impact of Diabetes on Treatment in General Dental Practice.

Diabetes affects various parts of everyday general dental practice including: the altered host-pathogen relationship on periodontal disease and its management; the dental pulp and, therefore, endodontics; and both wound and bony healing, thereby impacting surgical procedures.

How does diabetes influence dentistry in everyday dental practice?

Type II diabetic patients were found to have an increased prevalence of active caries and root surface caries when compared to non-diabetics. This may be attributed to the reduced salivary flow reported in diabetes patients from the disturbed glycaemic control, reducing remineralization of enamel being demineralized by acidic insult from cariogenic bacteria. The higher glucose content in the saliva of diabetes patients further contributes to dental caries. Longer duration of diabetes also correlates with increased manifestations of caries.

Periodontal disease - Result of an altered host-pathogen relationship

Evidence from one meta-analysis found periodontal disease in diabetics to be significantly greater in severity. Diabetes patients display deeper probing pocket depths and number of sites bleeding on probing to be significantly more prevalent than the non-diabetes control group.

> “ Being richly vascularized, the periodontium exhibits complications of the microangiopathy (as previously outlined) associated with the diabetic state. ”

Constant insults from the oral bacterial biofilm induces an immune response whilst diabetes results in altered neutrophil, monocyte and macrophage function. The bacteria are persistent in the periodontal pocket due to the impaired adherent, chemotactic and phagocytic functions of neutrophils. Prolonged wound healing in diabetes is associated with the increased apoptosis found in diabetes patients, and the aforementioned effects of Advanced Glycation End-products (AGEs) on connective tissue structure and function.

Increase in inflammation of the periodontium results from modifications in host defences, including elevation of pro-inflammatory mediator levels. There is evidence to suggest a hyperactive response to bacterial antigens, and up-regulation of TNF-α in response to antigens from P. gingivalis − gram-negative bacteria in diabetic patients.

These changes also contribute to poor glycaemic control, supporting this bidirectional relationship of diabetes and periodontal disease. Exaggeration of the inflammatory response and resultant increased periodontal destruction could arise from the Advanced Glycation End-products–Receptors for AGEs (AGE−RAGE) interaction.

Table: A brief summary of the effects of diabetes.

	Potential effect(s) of diabetes
Caries	- Diabetes patients produce less saliva to act as an ion buffer for enamel demineralization; and the saliva may contain higher levels of glucose – increasing caries risk
Periodontal Disease	- Microangiopathy and impaired immune response associated with diabetes, which in turn has been associated with increased probing pocket depths - Elevated blood glucose may be associated with periodontal abscess formation
Endodontics	- Calcifications in the pulp chamber are more prevalent. Combined with the reduced circulation associated with diabetes – pulpal repair is impaired - Impaired pulpal circulation associated with diabetes may lead to pulpal necrosis and pain in a tooth with no clinical signs of pathology (diabetic odontalgia) - Periapical bony healing post treatment is also impaired due to the reduced vascular supply
Oral Surgery	- Increased AGEs promote inflammation, impaired immunity delays wound and bone healing - Poor glycaemic control increases risk of peri-implantitis and is associated with reduced osseointegration
Oral Medicine	- Impairment of the immune system increases risk of oral candidiasis - Neural damage associated with diabetes, reduced vascular supply could be linked with xerostomia
Prosthodontics	- Increased risk of candidiasis when mucosal coverage is incorporated into design

Dentist play a role in identifying these cases from oral signs and symptoms, which have been discussed in this review. Furthermore, patients with diabetes should be educated and informed about the effects that their condition may have on their oral health and treatment. This may be critical in diabetes patients with poor glycaemic control.

Reference

1. Vinson Yeung et. al; The Impact of Diabetes on Treatment in General Dental Practice, Dental Update, Feb 2018, pp. 120-128.

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