



## RESEARCH ARTICLE

### DIABETES IN PERIODONTAL DISEASES: A REVIEW DIDACTIC

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#### ABSTRACT

**Background:** The prevalence of Diabetes mellitus (DM) in the countries of Central and South America was estimated at 26.4 million people and considered for 40 million in 2030. The DM have also increased in children and young people in the last 30 years, especially the D1. About 210,000 young people around 20 years of age have diabetes. This represents 0.26% of the total number of individuals in this age group. About 1 in every 400 to 500 children and adolescents has DM. **Objective:** Was to make a presentation on the findings of the literary influence of diabetes mellitus on periodontal diseases.

**Discussion:** The major oral diabetic patient complications include xerostomia, bacterial, viral and fungal infections, delayed wound healing, incidence of caries, gingivitis and periodontal disease, periapical abscess and symptoms of burning mouth.

**Conclusion:** Diabetes mellitus is one of the diseases that is growing increasingly in the world and we surgeons dentist, had to know better this pathology. Knowing the signs and symptoms is essential to help our patients in the treatment of this disease and preventing complications during dental procedures performed.

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## INTRODUCTION

The prevalence of Diabetes mellitus (DM) in the countries of Central and South America was estimated at 26.4 million people and considered for 40 million in 2030. In European countries and the United States (US) this will increase, especially in the older age groups due to the increase in life expectancy while in developing countries this increase will occur in all age groups, and the group 45-64 years, the prevalence will be tripled, and doubled in the age groups 20-44 years and above 65 years (Lee *et al.*, 2016). In Brazil, data from the Risk and Protective Factors Surveillance for Chronic Diseases Survey Telephone, 2011, showed that the prevalence of self-reported diabetes in the population above 18 years increased from 5.3% to 5.6% between 2006 and 2011 (Ministério Da Saúde, 2013). By analyzing this data according to gender, despite the increase in cases among men who were 4.4% in 2006 and went to 5.2% in 2011, women had a higher proportion of the disease, corresponding to 6% of this population.

In addition, the survey made it clear that the occurrences are more common in people with low education (Ministério Da Saúde, 2013). Moreover, the figures indicate that 7.5% of people who have up to eight years of study have diabetes, compared with 3.7% of people over 12 years of study, a difference of 50% (Mishra *et al.*, 2016 and Andrade *et al.*, 2014). The survey showed also that DM increases with the age of the population: 21.6% of Brazilians over 65 years reported the disease, a much higher rate than among people aged between 18 and 24 in which only 0.6% are people with diabetes. It is also estimated that Brazil pass the 8th position, with a prevalence of 4.6% in 2000 to 6th position, 11.3% in 2030. The risk factors related to eating habits and population lifestyle are associated this increase in diabetes globally load (Andrade *et al.*, 2014). In addition, DM has increased in young children and in the last 30 years, mainly Type 1 Diabetes mellitus (T1DM). About 210,000 young people around 20 years of age have diabetes. This represents 0.26% of the total number of individuals in this age group. About 1 in every 400 to 500 children and adolescents has D1 [2.5]. There is a chronic disease that is differentiated by elevation of glucose and microvascular complications that include kidney disease,

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eye clinics and various types of neuropathies. And all these signs and symptoms characterize Diabetes Mellitus. Currently 240 million people worldwide are diabetic patients, that number will double or triple in the next 10 years (Lee *et al.*, 2016 and Mishra *et al.*, 2016). There are patients who have signs and symptoms such as polydipsia, polyuria, polyphagia, weight loss, drowsiness and malaise (Lee *et al.*, 2016). The major oral diabetic patient complications include xerostomia, bacterial, viral and fungal infections, delayed wound healing, incidence of caries, gingivitis and periodontal disease, periapical abscess and symptoms of burning mouth (Mishra *et al.*, 2016 and Alexander *et al.*, 1999). The oral findings in uncontrolled diabetic patients are most likely included with the fluid loss in the urine, altered response to infections, microvascular changes and probably high glucose concentrations in saliva (Alexander *et al.*, 1999 and Andrade *et al.*, 2011). The result of hyperglycemia causes an increase in the amount of urine, which leads to the breakdown of extracellular fluids and reduces salivary secretion, thus proceeding in dry mouth. Most diabetic patients provides xerostomia (Andrade *et al.*, 2011 and Andrade *et al.*, 2014). Was that a large amount of glucose in the saliva derived from the parotid gland of patients with uncontrolled diabetes. Studies describe increase in incidence and severity of gingivitis and periodontal disease abscess. And there may be minor changes in the blood vessels of the gingival tissues of patients with diabetes. Moreover, adults with diabetes decompensated predisposed periodontal disease offer more severe manifestations than people without diabetes to the same ability (Andrade *et al.*, 2014). This relationship is not clear in patients with controlled diabetes (Mishra *et al.*, 2016). Patients with diabetes appear to provide the most severe periodontal disease than those without diabetes, but even so, the differences are not significant. Because of the importance of the dentist to know the clinical manifestations of this disease, diabetes will hold a theme of literature review and its complications in dental treatment (Mishra *et al.*, 2016). This on its main forms work aims to discuss dental treatment offered to patients with Diabetes Mellitus highlighting the needs that we have to evaluate increasingly this disease (Alexander *et al.*, 1999). The objective of this study was to make a presentation on the findings of the literary influence of diabetes mellitus on periodontal diseases.

## MATERIALS AND METHODS

For the identification of studies or considerations in this review, a detailed search strategy was conducted for Medline (Pubmed) and Medicine® in the years 2016-1996. They were used as descriptors: Diabetes Mellitus, insulin therapy. The inclusion and exclusion criteria were studies in a systematic review, meta-analysis, randomized controlled cases, nonrandomized clinical cases and opinion articles that addressed the "Diabetes Mellitus" descriptors and "Odontologia" were excluded the study articles that were not of Portuguese and English. After critical analysis of the literature, according to the criteria of inclusion and exclusion, they were selected from articles and books 17 in total. The data were analyzed, correlated to the discussion of the results highlighted in the literature.

### Literature Review – Development

This disease is classified by hyperglycemia and complications include renal and ocular microvascular disease and various

clinical neuropathies (Lee *et al.*, 2016). The DM is linked to premature chronic macrovascular disease and severe microvascular disease (Mishra *et al.*, 2016). The metabolic component involves rise in blood glucose associated with changes in lipoprotein metabolism as a result of absolute or relative insulin deficiency. Maintaining good glycemic control can prevent or delay the development of microvascular complications of diabetes (Alexander *et al.*, 1999; Andrade *et al.*, 2011; Andrade *et al.*, 2014 and Bloomgarden *et al.*, 2005). In addition, DM is a disease that presents metabolic and vascular components (Fiske, 2001 and Guyton *et al.*, 2011). Retinopathy and nephropathy comprise any complications that arise in the course of time in virtually all diabetics. These complications result in severe morbidity and are so peculiar diabetes that their presence is used to classify the type of diabetes (Guyton *et al.*, 2012). The DM is a disease of broad importance to dentists because they are health professionals able to detect new cases of the disease (Little *et al.*, 2009).

In this context, dentists are also able to provide dental treatment for patients with diabetic sensibly without putting them at risk or causing damage to the control of diabetes (Lee, 2016; Milley, 2005). An essential look to be identified in diabetic dental patients is the severity and the level of glycemic control, as well as the presence of complications coming from the disease, to treat them properly (Mishra *et al.*, 2016 and Ministério Da Saúde, 2013) Knowing the level of the patient's blood glucose at the time of completion of the dental treatment is paramount. In addition, the diagnosis of DM is acquired through fasting glucose. Patients who have very close glucose levels of the upper limit of normal range are subjected to glucose tolerance test (Nathan *et al.*, 2005). Also the DM therapy is to support the interrelation of three measures: diet, exercise and targeted use of drugs, depending on the type of diabetes and other factors. The most recommended drugs are oral hypoglycemic agents, including sulfonylureas (chlorpropamide and glibenclamide), first choice for type 2 diabetics not obese (Nogi, 2006). Metformin is an oral antidiabetic preferred to treat type 2 diabetics, obese or overweight (Mishra *et al.*, 2016 and Nogi, 2006) Moreover, the insulin used most commonly in T1DM there are several types of preparations can be natural or obtained by bacterial synthesis (human insulin). The duration of insulin may be rapid, slow or ultra-slow-acting, being uniquely prescribed by physicians. The dentist should never change the dosage of hypoglycemic agents, especially insulin, even in emergency situations, can induce hypoglycemia (Sonis *et al.*, 1996). There are two general types of diabetes mellitus: Type 1 Diabetes mellitus (T1DM), also called insulin-dependent diabetes is caused by lack of insulin secretion; Type 2 diabetes (T2DM), also called diabetes mellitus, non-insulin dependent, is initially caused by the decreased sensitivity of target tissues to the metabolic effects of insulin.

This decreased sensitivity to insulin is often called insulin resistance (Sonis *et al.*, 1996). In both types of diabetes mellitus, metabolism of all nutrients is changed. The basic effect of the absence of insulin or insulin resistance on glucose metabolism and prevent the efficient uptake and use of glucose by most cells of the body except the brain. As a result, the blood glucose concentration increases, cell glucose utilization drops even more and the use of lipids and proteins increases (Sonis *et al.*, 1996). Thus, the main symptoms of diabetes are: The polyuria, polydipsia, the polyphagia, weight loss are insulin deficiency results. Insulin acts necessarily in regulating

the metabolism of carbohydrates, fats and proteins. Insulin deficiency results in decreased blood glucose entry into the tissues and an increased blood glucose level (Andrade *et al.*, 2014). Besides the increase in blood glucose levels leads to an increase of glucose intended kidneys.

who have cardiac arrhythmias (Mishra *et al.*, 2016). Also the hypoglycemic action of sulfonylureas may be potentiated by drugs that provide a high degree of protein binding, as some of the nonsteroidal anti-inflammatory drugs (NSAIDs).

**Table 1. Dental treatment protocol for patients with diabetes**

1. Non-insulindependent	• If the diabetes is controlled, all dental procedures can be performed without extra precautions.
2. Patients with insulin	<ul style="list-style-type: none"> <li>• If the diabetes is controlled, all dental procedures can be performed without additional precautions;</li> <li>• morning Consultations are usually better;</li> <li>• Recommend that patients take the usual insulin dosage and do normal meals on the dental appointment;</li> <li>• Recommend that the patient tell the dentist or the team if the occurrence of any symptoms of hypoglycemia;</li> <li>• <u>glucose sources should be available and administered to the patient if symptoms of hypoglycemia occur.</u></li> </ul>
3. Extensive surgery	<ul style="list-style-type: none"> <li>• Consult the patient's physician regarding the necessary dietary recommendations during the postoperative period;</li> <li>• Prophylactic antibiotic therapy may be recommended for patients with unstable diabetes and for those who use insulin and who also have chronic mouth infections.</li> <li>• If diabetes is not well controlled, ie, if you do not meet any previous criteria: fasting blood glucose &lt;70 mg / dL or &gt; 200 mg / dL and any complications [post-MI, kidney disease, congestive heart failure, angina symptomatic, advanced age, heart disritimias, stroke], and blood pressure &gt; 180 / 110mmHg, or functional capacity &lt;4 metabolic equivalents):</li> <li>• Provide appropriate emergency care;</li> <li>• Referral to medical risk assessment and modification.</li> </ul>

The lack of resorption of all this exaggeration of glucose by the kidney resulting in glucosuria, triggering osmotic diuresis and an increase in urine output, to be compensated by an increase in fluid intake (Bloomgarden *et al.*, 2005). The continuous loss of glucose in the urine also results in weight loss despite increased food intake. In the abnormality in utilization of glucose, insulin deficiency also causes abnormality in the metabolism of proteins (Fiske, 2004). With the rise of the disintegration of fats causes an increase in the formation of ketones. This severe deficiency of insulin may contain accumulation of ketone bodies, resulting in ketoacidosis (Guyton *et al.*, 2012). Patients with ketoacidosis that have polydipsia and polyuria history of growing and systemic symptoms, such as nausea.

Clinically, they are faced dehydrated, lethargic and confused, have exaggerated breathing (Kussmaul breathing) and the breath odor containing fruit. Severe ketoacidosis results in altered mental status and cardiovascular instability. Coma and death can occur if not promptly established a therapeutic measure (Guyton *et al.*, 2012 and Lemmark *et al.*, 2005). Also the clinical signs of diabetes include xerostomia, bacterial, viral and fungal infections, delayed wound healing, incidence and severity of dental caries, gingivitis and periodontal disease, periapical dental abscesses and burning. In addition to the diseases that are related to diabetes such as atherosclerosis, increased susceptibility to infection, diabetic retinopathy, cataracts, hypertension and chronic kidney disease, are deeply associated with lipid levels and blood glucose, some doctors also use lowering drugs lipid to help avoid these changes (Mishra *et al.*, 2016 and Alexander *et al.*, 1999).

## DISCUSSION

Dental treatment in diabetic patients can be carried out according to their glycemic condition. Almost all patients need to be anesthetized, and diabetic patients are no different, when we use local anesthetics with epinephrine 1: 100,000 are well tolerated. However, epinephrine has pharmacological effect opposite to that of insulin, glucose can therefore increase with use. Must be used with caution epinephrine in hypertensive diabetic patients who have suffered myocardial infarction or

This means that NSAIDs are able to compete with oral hypoglycemic agents for the same binding sites to plasma proteins, dismantling them and leaving them on their own, which will add the pharmacological effect of sulfonylureas and one adequate hypoglycemia. When there is need of NSAID use in diabetics, it is recommended that only the dentist prescribed after exchange information with the patient's physician (Alexander *et al.*, 1999). For diabetic patients well-controlled surgical antibiotic prophylaxis is not routinely, by adopting a sterilization protocol or local antiseptis. Prophylactic use of antibiotics in diabetic should only be considered in patients with decompensated disease with blood ketoacidosis and ketonuria, when the functions of neutrophils are decreased. You cannot generalize such conduct to all diabetics, each case must be analyzed carefully (Andrade *et al.*, 2014). If antibiotic prophylaxis is indicated, it is recommended that the single-dose regimen of amoxicillin 1 g, 1 hour before the dental procedure. In cases of oral bacterial infections previously existing in diabetics, they should be treated aggressively, because the relationship between DM and infection is bidirectional. DM benefits infection, which in turn makes it difficult to control this disease (Bloomgarden *et al.*, 2005). So that, for diabetic patients, the decontamination site of the infection is essential conduct treatment of oral infections.

Antibiotic therapy also does not differ from that recommended for ASAI patients, employed the same groups of antibiotics, dosages, dosage and duration of treatment, the longer treatments, the patient should be monitored because of the greater likelihood of secondary fungal (Fiske *et al.*, 2004 and Guyton *et al.*, 2011). Moreover, acute complications in diabetes is the most important insulin shock, characterized by an acute hypoglycemia, which can be life-threatening, because it develops very quickly, resulting in loss of consciousness and possibly seizures. With the decrease in blood glucose with blood levels <40-50 mg dL<sup>-1</sup> seems to be the crucial factor in the increase in clinical symptoms of hypoglycemia, excluding the central nervous system of its fundamental energy source [8-10]. It is important to identify the signs and symptoms of hypoglycemia in diabetic patients is essential that the dentist knows differentiates them from those associated with the state of ketoacidosis, an emergency situation of rare occurrence in

the office, it drags days or weeks to develop, not less important than insulin shock (Lemmark *et al.*, 2005).

### Conclusion

Diabetes Mellitus is one of the diseases that is increasingly growing in the world and we surgeons dentist, he had to know better this pathology. Knowing the signs and symptoms is essential to help our patients in the treatment of this disease and preventing complications during dental procedures performed.

### Competing Interests

The authors declare que they have no competing interests.

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