


**DIABETES AND PERIODONTITIS: PROTOCOL FOR DENTAL MANAGEMENT
OF PATIENTS WITH DIABETES MELLITUS**

**DIABETES E PERIODONTITE PROTOCOLO AO MANEJO ODONTOLÓGICO
AO PACIENTE COM DIABETES MELLITUS**

**DIABETES Y PERIODONTITIS: PROTOCOLO PARA EL MANEJO
ODONTOLÓGICO DEL PACIENTE CON DIABETES MELLITUS**

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ABSTRACT

Diabetes Mellitus represents one of the greatest global public health challenges, with significant impacts on various areas of health, including oral health. Scientific evidence demonstrates a bidirectional relationship between diabetes and periodontal disease, with diabetic patients being three times more likely to develop periodontitis. This article aimed to address, through a narrative review, relevant information regarding dental care for individuals with diabetes, considering the main pathophysiological aspects, oral manifestations, and clinical and therapeutic approaches. A search was conducted in electronic databases such as Google Scholar and PubMed using the descriptors: "Diabetes Mellitus," "Periodontal Disease," "Oral Health," and "Dental Care." The content was structured into a clinical protocol intended for healthcare professionals, especially dental surgeons, with guidelines based on updated recommendations. The protocol covers aspects ranging from medical history and diagnosis to specific recommendations on pharmacological therapy, anesthetic management, emergency care, and the importance of a multidisciplinary approach. The application of these guidelines can optimize dental care, prevent systemic complications, and improve the quality of life of patients with diabetes.

Keywords: Diabetes Mellitus. Periodontitis. Oral Health. Dentistry.

RESUMO

A Diabetes Mellitus representa um dos maiores desafios de saúde pública global, com impactos significativos em diversas áreas da saúde, incluindo a saúde bucal. Evidências científicas demonstram uma relação bidirecional entre diabetes e doença periodontal, sendo que pacientes diabéticos apresentam risco três vezes maior de desenvolver periodontite.

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Este artigo teve como objetivo abordar, por meio de uma revisão narrativa, informações relevantes sobre os cuidados odontológicos em indivíduos com diabetes, considerando os principais aspectos fisiopatológicos, manifestações bucais, condutas clínicas e terapêuticas. Foi realizada uma busca em bases eletrônicas como Google Acadêmico e PubMed, utilizando os descritores: “Diabetes Mellitus”, “Doença Periodontal”, “Saúde Bucal” e “Cuidados Odontológicos”. O conteúdo foi estruturado em um protocolo clínico destinado a profissionais da área da saúde, especialmente cirurgiões-dentistas, com orientações baseadas em diretrizes atualizadas. O protocolo aborda desde a anamnese e diagnóstico até recomendações específicas sobre terapêutica medicamentosa, manejo anestésico, condutas em urgências, além da importância da abordagem multiprofissional. A aplicação dessas orientações pode otimizar o atendimento odontológico, prevenir complicações sistêmicas e melhorar a qualidade de vida de pacientes com diabetes.

Palavras-chave: Diabetes Mellitus. Periodontite. Saúde Bucal. Odontologia.

RESUMEN

La Diabetes Mellitus representa uno de los mayores desafíos de salud pública a nivel mundial, con impactos significativos en diversas áreas de la salud, incluida la salud bucal. La evidencia científica demuestra una relación bidireccional entre la diabetes y la enfermedad periodontal, siendo que los pacientes diabéticos tienen un riesgo tres veces mayor de desarrollar periodontitis. Este artículo tuvo como objetivo abordar, mediante una revisión narrativa, información relevante sobre los cuidados odontológicos en individuos con diabetes, considerando los principales aspectos fisiopatológicos, manifestaciones bucales y conductas clínicas y terapéuticas. Se realizó una búsqueda en bases de datos electrónicas como Google Académico y PubMed utilizando los descriptores: “Diabetes Mellitus”, “Enfermedad Periodontal”, “Salud Bucal” y “Cuidados Odontológicos”. El contenido fue estructurado en un protocolo clínico dirigido a profesionales de la salud, especialmente cirujanos dentistas, con orientaciones basadas en directrices actualizadas. El protocolo aborda desde la anamnesis y el diagnóstico hasta recomendaciones específicas sobre terapéutica farmacológica, manejo anestésico, conductas en urgencias, además de la importancia del abordaje multiprofesional. La aplicación de estas orientaciones puede optimizar la atención odontológica, prevenir complicaciones sistémicas y mejorar la calidad de vida de los pacientes con diabetes.

Palabras clave: Diabetes Mellitus. Periodontitis. Salud Bucal. Odontología.



1 INTRODUCTION

According to the Brazilian Diabetes Society (2025), Diabetes Mellitus is a public health problem. The number of adults living with diabetes in the world has exceeded 800 million, more than quadrupling since 1990, most living in low- and middle-income countries, and 1.5 million deaths are associated with diabetes every year. It should be noted that the number of cases and prevalence have increased considerably (World Health Organization, 2025).

Diabetes is a chronic disease caused by insufficient production or failure to properly employ the amount of insulin that the body produces (American Diabetes Association, 2025). Insulin is the hormone produced by the pancreas that has the function of regulating glucose (sugar) in the blood. The normal concentration of insulin in the blood varies between 70 and 99 mg/DL (Andrade, 2014). This process works by breaking down glucose molecules and transforming it into energy for the maintenance of the body's cells (American Diabetes Association, 2024).

Abnormal alteration of insulin in the blood can cause the physiological process of hyperglycemia (American Diabetes Association, 2025). Symptoms associated with hyperglycemia include polyuria (increased urine volume), polydipsia (excessive thirst), weight loss, in situations with polyphagia (excessive hunger), and blurred vision. Chronic hyperglycemia may also be accompanied by increased susceptibility to certain infections. Therefore, diabetes can cause long-term complications if not controlled correctly (Jensen *et al.*, 2021).

Oral health is directly related to systemic diseases, as people with diabetes are 3 x more likely to develop oral diseases than healthy people, due to the glycemic alteration in the body that influences the inflammatory issue and the lack of saliva (Brazilian Diabetes Society, 2025). The dental consultation comprises actions that can help meet the health needs of diabetic patients (Nazir *et al.*, 2018).

This protocol aims to establish diagnostic, therapeutic and follow-up criteria as a way to assist in the care of the disease. The target audience of this Protocol/E-book are health professionals involved in the comprehensive care of these individuals, in the office, primary care and specialized health care, in order to contribute to clinical decisions and optimize the care and quality of life of these patients.



2 EPIDEMIOLOGY

In Brazil, as the Brazilian Diabetes Society reports, there are currently more than 13 million people with the disease, which represents 6.9% of the national population. Thus, Brazil ranks 5th among the countries with the most cases of DM in the world (Brazilian Diabetes Society, 2020).

The global prevalence of this disease is 8.5%, with a forecast to increase by 12% by 2030. In Brazil, data from the Ministry of Health (MS) indicate that 7.6% of the population self-reports being carriers of morbidity, which affects people of both sexes, with low education and living in a less developed region (Ministry of Health, 2018).

Regarding the subject of dental treatment, according to SB Brasil, through the 2010 epidemiological survey, it shows that 45.8% of the adult population, aged between 35 and 44 years, has gingival bleeding; 64.1% have dental calculus, shallow pockets are found in 27.7% and deep pockets in 6.9%; thus, these percentage rates show the population profile with great relevance to periodontal conditions that also affect the other age groups (SB, 2010).

3 CLASSIFICATION

Knowledge of the classification of the disease is important for the health professional to know how to provide effective care. Diabetes is classified into type 1, type 2, and gestational.

Type 1 and type 2 diabetes mellitus are heterogeneous diseases, in which the clinical presentation and progression of the disease can vary considerably. Therefore, classification is critical in determining therapy (American Diabetes Association, 2024).

3.1 TYPE 1 DIABETES

Type 1 diabetes, also called juvenile diabetes, is an autoimmune condition caused by the destruction of insulin-producing beta cells in the pancreas that leads to relative or absolute insulin deficiency, requiring insulin throughout life to maintain blood glucose levels. The diagnosis of type 1 diabetes is manifested in childhood or adolescence, but it can be diagnosed in adults, usually under 25 years of age, and has a strong genetic component (Ministry of Health, 2024).

Patients who have type 1 diabetes need insulin daily to keep control of the blood glucose level considered normal. Such treatment is called insulin therapy and is performed by administering insulin subcutaneously (under the skin) (American Diabetes Association,

2025). The accumulation of glucose in the bloodstream can occur at a high concentration and manifest hyperglycemia. Symptoms of hyperglycemia can include excessive thirst, frequent urination, fatigue, and blurred vision (Brazilian Diabetes Society, 2025). For glucose measurement, it is advisable to have a device called a glucometer, which will be able to measure the concentration of glucose in the blood (American Diabetes Association, 2025).

The cause of type 1 diabetes is idiopathic and the best way to prevent it is habits such as: diet, physical exercise, avoiding alcohol, tobacco and other drugs to achieve health goals (Brazilian Diabetes Society, 2025).

3.2 TYPE 2 DIABETES

Type 2 diabetes occurs when the body does not properly take advantage of the hormone (insulin) produced, subsequently developing insulin resistance. The cause of type 2 diabetes is associated with a sedentary lifestyle, high triglycerides, hypertension, poor diet, and overweight (Fletcher *et al.*, 2002; El sayed *et al.*, 2022).

Thus, in addition to healthy habits, medical follow-up is essential to treat this disease and possible other changes. Health professionals who care for patients with systemic comorbidities need to have brief knowledge of the pharmaceutical drugs that patients use for better planning and treatment, in addition to preventing complications from Diabetes (American Diabetes Association, 2025).

Table 1 below describes the drugs available in the Unified Health System (SUS) and the administration regimens used in the treatment of DM2:

Table 1

Laboratory criteria for the diagnosis of Diabetes Mellitus and pre-diabetes

| Classe | Droga | Via administração |
|---------------------------------|--|-------------------|
| Primeira Escolha | | |
| Biguanidas | Cloridrato de Metformina | Oral |
| | Cloridrato de Metformina - XR liberação prolongada | Oral |
| Indicadas com Associação | | |
| Sulfonilureias | Glibenclamida | Oral |
| | Glicazida liberação prolongada | Oral |
| Inibidores SGLT2 | Dapagliflozina | Oral |
| INSULINAS | NPH | Subcutânea |
| | REGULAR | Subcutânea |

Caption: SGLT2: Sodium-glucose cotransporter 2 inhibitors.

Adapted table of the protocols and guidelines in Type 2 Diabetes Mellitus of the Ministry of Health, 2024.



People who have proof of a diagnosis of diabetes, the (SUS) offers the drugs covered in Table 1 free of charge. The offer takes place in the Basic Health Units, comprehensive and free care, developing actions of prevention, detection, control and drug treatment, including insulin (Caderno de Atenção Básica, 2018).

3.3 GESTATIONAL DIABETES

Gestational Diabetes occurs temporarily during the woman's gestation period. Usually, between the second or third trimester of pregnancy. But, in the exam, the rates are low to be considered type 2 diabetes. Therefore, every woman who is pregnant should perform the correct tests to follow the conduct proposed by the doctor (American Diabetes Association, 2025).

4 DIAGNOSIS

There are tests that diagnose diabetes and detect individuals with prediabetes. According to the Brazilian Society of Endocrinology and Metabolism (2022), glycemic control is treated individually for adults, children, and the elderly, respecting the clinical situation.

Diabetes can be diagnosed through analysis of hematological parameters such as: glycated hemoglobin A1c (HbA1c) and capillary (or plasma) blood glucose. Table 1 adapted from the Brazilian Society of Endocrinology and Metabolism (SBEM) (2022) shows these parameters:

Table 2

Periodontitis staging system based on clinical severity, radiographic bone loss, complexity and extent of the disease, according to Papapanou et al. (2018)

| | Fasting glucose (mg/dL) | Glucose 2 hours after OGTT 75g | Glucose at random | HbA1c | Symptoms |
|--|-------------------------|--------------------------------|-------------------|---------------|----------|
| Normoglycemia Stage 1 | <100 (WHO 110mg) | <140 | - | <5.7 | Absent |
| Prediabetes or increased risk Stage 2 | ≥ 100 and <126 | ≥140 and <200 | - | ≥5.7 and <6.5 | Absent |
| Established diabetes Stage 3 | ≥126 | ≥200 | ≥200 | ≥6.5 | Gifts |

OGTT: oral glucose tolerance test

5 RISK FACTORS

In addition to genetic predisposition and unhealthy habit behaviors, other factors can lead to a possible development of diabetes such as: prediabetes; high blood pressure, high cholesterol, overweight; parents or close relatives with diabetes; chronic kidney diseases; gestational diabetes; sleep apnea; polycystic ovary syndromes and glucocorticoid drugs (Brazilian Diabetes Society, 2024)

According to the Ministry of Health's primary care booklet (2023), the risk factors to be considered in the care of diabetic patients are: age over 40 years and family history of the disease, especially among parents, children, and siblings. Atherosclerotic vascular diseases before the age of 50 are also a relevant factor. Other factors include being overweight (BMI > 2 kg/m²), obesity, systemic arterial hypertension, and sedentary lifestyle. Women who have had newborns weighing more than 4 kg, as well as those with a history of frequent miscarriages, premature births, perinatal mortality, polyhydramnios, and gestational diabetes, are also at higher risk (Ministry of Health, 2023). The use of medications with the potential for diabetes, such as corticosteroids and contraceptives, should be considered. In addition, individuals with a previous history of hyperglycemia or glycosuria (excretion of glucose in the urine), low levels of HDL-cholesterol (≤ 35 mg/dL) and high triglycerides (≥ 200 mg/dL) make up a group susceptible to developing the disease (Brazilian Diabetes Society, 2025).

6 ANAMNESIS

Anamnesis is essential for the beginning of dental care for any patient, not just diabetics. However, for diabetics, it has a greater value because they have pertinent characteristics that imply care for their health care. Characteristics such as thirst and excessive hunger, increased urinary volume and weight loss influence the procedures as well. In addition, anamnesis can be a way to identify a diabetic (Oliveira *et al.*, 2016)

The anamnesis consists of questions relevant to the patient's knowledge, such as the main complaint, history of the current disease, current medical treatment, previous medical history, history of family genetics, habits and addictions - the last three are important for the definition of a diabetic patient. (Oliveira *et al.*, 2016)

7 ORAL MANIFESTATIONS

The diabetic patient may present great loss of tooth insertion, bone resorption and gingival bleeding due to periodontitis. In decompensated patients, manifestations of oral candidiasis may appear clinically, such as denture stomatitis, angular cheilitis, among others. In addition, hyposalivation combined with a high concentration of glucose in saliva contributes to the development of dental caries (Mauri-Obradors *et al.*, 2017).

Oral manifestations and complications related to DM include dry mouth (xerostomia), dental caries (including root caries), periapical lesions, periodontal disease, oral candidiasis, burning in the mouth, taste disorder, geographical, coated and fissured tongue, oral lichen planus, recurrent aphthous stomatitis, increased tendency to infections and poor wound healing. The intensity of diabetic complications is usually proportional to the degree and duration of hyperglycemia (Rohani, 2019).

7.1 PERIODONTITIS

Brazil has about 20 million people with diabetes (Brazilian Diabetes Society, 2024). These patients need periodontal examination screening as part of the initial care and screening for diabetes comorbidities, especially periodontitis.

Periodontal disease is a public health problem, affecting more than 50% of the world's population (Papapanou *et al.*, 2018). Periodontitis is characterized by a chronic inflammatory condition of multifactorial origin associated with dysbiotic microbiota, which can lead to progressive destruction of the supporting and inserting periodontium, which are: bone, cementum, periodontal ligament, gingiva (Papapanou *et al.*, 2018; Chapple *et al.*, 2017).

An important risk factor for periodontal disease is diabetes. It influences oral health and can be one of the causes for an increase in cases of tooth loss. The risk of diabetic participants having periodontitis is approximately three times higher than in healthy participants (Mombelli *et al.*, 2018).

Possible mechanisms to explain the increased susceptibility of periodontal disease include changes in host defense response (neutrophil dysfunction), subgingival microflora, collagen structure and metabolism, vascularization (Genco *et al.*, 2020).

Diabetes can trigger an increase in the inflammatory response to the oral microbiota and can impair the host's immune response, thus creating favorable conditions for the development and worsening of periodontal diseases in predisposed participants. At the same time, periodontitis is responsible for increasing insulin resistance and may increase the risk

of diabetes or promote an impairment of glucose tolerance mechanisms (CORBELLA, STEFANO *et al* 2023).

The elimination of pathogens by non-surgical periodontal treatment (scaling and root planing) causes a decrease in inflammation, which in turn reduces insulin resistance, decreases glucose levels (Rohani, 2019).

Given the bidirectional correlation between diabetes and periodontitis, it has been shown that non-surgical periodontal treatment (NCTP) in participants with periodontitis and diabetes can influence glycemic control (Sanz *et al.*, 2018; Van; Bartold; Reynolds, 2020).

7.1.1 Diagnosis

Periodontitis is characterized by:

- loss of clinical attachment detected at two or more nonadjacent interproximal sites.
- Insertion loss of 3 mm or more in the buccal or lingual/palatal in at least 2 teeth, excluding gingival recession of trauma origin; dental caries extending to the cervical of the tooth; presence of insertion loss on the distal surface of a second molar and associated with malpositioning or extraction of the third molar; endo periodontal injury with drainage in the marginal periodontium or occurrence of vertical root fracture (Tonetti *et al.*, 2018).

7.1.2 Classification

Periodontitis is classified according to its stage and degree (Tonetti *et al.*, 2018).

The stage classification is related to the severity of the disease. The stages of severity vary from I to IV. The initial stage of periodontitis is determined by clinical attachment loss (CIN), it is called determinant caracatresitca. In the absence of insertion loss, the X-ray method is used. Presence of complex factors such as furcation lesions or advanced mobility, there is a worse scenario found (Tonetti *et al.*, 2018).

The extent and distribution indicate localized periodontitiis when the area involved has less than 30% of the teeth. And, generalized periodontitis when the area involved is greater than 30% of the teeth and molar/incisor pattern when the disease involves the molars and incisors (Papapanou *et al.*, 2018).

Table 3

Periodontitis grading system (Grades A, B, and C) based on progression rate, direct and indirect evidence, and modifying factors such as smoking and glycemic control, according to Papapanou et al. (2018) and Tonetti et al. (2018)

| Internships | | I | II | III | IV |
|--|--|---|------------------------------------|--|--|
| Severity | Interdental site with highest insertion loss | 1 to 2 mm | 3 to 4 mm | ≥5mm | >5mm |
| | Radiographic bone loss | Coronary rosary (<15%) | Coronary rosary (15 to 33%) | Larger than the coronary third | Larger than the coronary third |
| | Dental Loss Associated with Periodontitis | No missing teeth | No missing teeth | Less than 4 missing teeth | More than 5 missing teeth |
| Complexity | Location | PS Max 4mm Horizontal Bone Loss | Max PS 5mm Horizontal bone loss | In addition to stage II: PS ≥ 6mm Vertical loss ≥ 3mm Grade II or III furcation Moderate bone defect | In addition to the Stage III: Dysfunction Chewing Trauma secondary occlusal (mobility ≥ 2) Severe bone defect Occlusal collapse Less than 20 teeth remainder. |
| Extension and distribution: -Localized < 30% of the teeth involved. - Generalized > 30% of teeth involved or incisor molar pattern. | | Localized < 30% of the teeth involved. - Generalized > 30% of teeth involved or incisor molar pattern. | | | |

Source PAPAPANOU et al., 2018)

The degree represents the evidence or risk of disease progression and its effects on systemic health. The table is used as an indicator of the rate of progression of periodontitis (Tonetti *et al.*, 2018).

The primary criteria have direct or indirect evidence of progression. Indirect evidence is used in the criterion of bone loss as a function of the age of the most affected tooth element or the presentation of the case. He follows the protocol from grade B of the disease, and

when evaluating the case, determines whether to maintain that grade or looks for specific evidence to change the grade to A or C, depending on the situation. After a degree has been established based on evidence of progression. Periodontitis can be modified by the presence of risk factors such as smoking and diabetes (Hb1Ac) (Papapanou *et al.*, 2018; Tonetti *et al.*, 2018). According to table 4 adapted from the article Papapanou *et al.*, 2018; Tonetti *et al.*, 2018:

Table 4

Criteria for the classification of periodontitis based on Grades (PAPAPANOU et al., 2018).

| Degree of periodontitis | | A Slow Progression | B Progression Moderate | C Rapid progression |
|-------------------------|--|--|--|--|
| Primary Criterion | Direct evidence of progression | No evidence of bone loss at 5 years | < 2mm in 5 years | ≥ 5mm in 5 years |
| | Indirect evidence of progression | < 0.25 Biofilm accumulation with low level of destruction | 0.25 to 1 Destruction proportional to biofilm accumulation | > 1 Destruction above expectations related to biofilm. Rapid progression pattern or early onset Lack of response to standard bacterial controls |
| Modifiers | Risk factor | Smoking | Non-smoking | Less than 10 cigarettes/day. |
| | | Diabetes | Undiagnosed | HbA1c ≤ 7 in diabetic patient |
| | | | | More than 10 cigarettes/day. HbA1c > 7 in diabetic patient |

7.1.3 Treatment of periodontitis in diabetic patients

Initial non-surgical periodontal treatment involves scaling and root planing (RAR), which is considered a gold standard treatment. Guidelines focus on periodontal surgery may be considered in patients. Studies show that it is effective in probing depth, in addition to gaining the clinical attachment level and improving periodontal clinical parameters such as bleeding on probing and plaque index (Sanz *et al.*, 2018).

- **Monitoring and maintenance of oral health**

The American Academy of Dental (ADA) American Academy of Periodontology (AAP) (2018) recommend that diabetic patients have dental appointments every 3 to 6 months to monitor periodontal health and have professional cleanings.

8 DRUG THERAPY

In the anamnesis, it is important to identify the correct diagnosis of diabetes. Patients who need insulin therapy may present hypoglycemia, that is, a sudden drop in glucose in which the patient presents signs and symptoms such as pallor, tremors, tachycardia, headache (Oliveira *et al.*, 2016).

In situations of hypoglycemia or hyperglycemia, an intervention is necessary in which the dentist must suspend any procedure, offer the patient carbohydrate-rich foods, monitor capillary glucose every 15 minutes and wait for improvement. If there is not, medical help will be necessary. (Andrade, 2014)

In hypoglycemic conditions, a sign evidence is unconsciousness. It is recommended to administer 50 milliliters of 50% aqueous glucose solution for 2 to 3 minutes intravenously and is restricted to the administration of oral medications. (Oliveira *et al.*, 2016) Therefore, the dental office that serves the diabetic public must have a source of carbohydrates and carry out, before the service, instructions regarding the need for the patient to be medicated and well fed for any procedure.

Regarding anti-inflammatory drugs, the action of hypoglycemic agents is enhanced by drugs that have a high degree of protein binding such as NSAIDs. Thus, the drug prescription with NSAIDs needs to be according to the guidance of the patient's responsible physician (Dos Santos *et al.*, 2021).

And, in case of pain with mild intensity and discomfort, analgesics such as paracetamol and Dipyron are safe and indicated in the usual dosages and dosages. As with more invasive dental interventions, in which there is edema and pain of greater intensity, one to two doses of dexamethasone or betamethasone can be used in compensated diabetics (Andrade, 2014).

8.1 ANTIBIOTICS

The prescription of antibiotics for patients requires some precautions. When the patient has good glycemic control, the prescription is made when there are systemic signs and

symptoms of infection. And, in patients with decompensated or uncontrolled disease, antibiotic prophylaxis should be used in procedures that may generate bacteremia (Souza *et al.*, 2018)

Antibiotic prophylaxis is indicated for decompensated patients with blood ketoacidosis and ketonuria, while for controlled patients, a protocol of asepsis and local antisepsis is adopted before any intervention. When antibiotic prophylaxis is indicated, a single dose of amoxicillin 1g (gram) or clindamycin 600 mg (milligram) one hour before the start of the procedure is recommended. (Andrade, 2014).

The use of antibiotic prescription in the pre- and postoperative period should be considered to reduce the risk of infection. In addition, BP should be monitored, since diabetic patients have a higher risk of developing hypertension (Andrade, 2014). According to Andrade (2014), table 5 of the most suitable medications for patients with Diabetes Mellitus is as follows:

Table 5

| Medicinal product | Usual dose | Maximum dose |
|---------------------------------|---|--------------|
| Diclofenac | 50mg tablets, every 8 hours | 200mg |
| Dipyron | 500mg tablets, 1 every 6 hours or 4 hours | 4g |
| Paracetamol | Tablets of 125, 250, 500, 650 and 750mg, with usual dose of 500mg every 6 hours | 4g |
| Dexamethasone and Betamethasone | 4mg tablet administered 1 hour before the start of the intervention. | - |
| Amoxicillin | 500mg tablets every 8 hours | 3g |
| Azithromycin | 500mg tablet and capsules in a single daily dose | 1g |

Adapted with information from (ANDRADE, 2014).

9 LOCAL ANESTHETICS IN DIABETIC PATIENTS

When it comes to local anesthesia in individuals with diabetes, the biggest concern arises in relation to vasoconstrictors. This is because epinephrine, a vasoconstrictor commonly used in dental anesthesia, has opposite effects to those of insulin, with the risk of

raising blood glucose levels (Pontes *et al.*, 2022). Thus, the use of these vasoconstrictors in diabetic patients is admitted, restricting the use of these drugs to 3 to 4 tubes per session.

The use of anesthetics with adrenaline-type vasoconstrictor is contraindicated in these patients, because this hormone will cause a breakdown of glycogen into glucose, which may result in hyperglycemia. That is why we tend to choose prilocaine with felipressin, because this vasoconstrictor does not cause changes in blood pressure. Felipressin can be used in patients with type I and II diabetes (Carvalho, B *et al.*, 2013). The anesthesia protocol is observed according to table 6 below:

Table 6

Local anesthetics recommended for dental consultation for each type of Diabetes

| Diabetes | Controlled | | Uncontrolled | |
|-------------|---|--|---|---------|
| | Anesthetic | Volume | Anesthetic | Volume |
| Type I | Articaine 4 % Epinephrine 1:200:000 | 4 tubes | Prilocaine 3% Felipressin 0.03 IU | 3 tubes |
| Type II | Articaine 4 % Epinephrine 1:100:000 Or 1:200:000 | 1 tube / 10kg of the patient. Maximum of 8. | Prilocaine 3% Felipressin 0.03 IU | 3 Tubes |
| Gestational | Lidocaine 2 % Epinephrine 1:100:000 | 2 tubes | Mepivacaine (without vasoconstrictor) | 2 tubes |

Source: (Andrade, 2014)

It is worth noting that elective dental procedures should be avoided in uncontrolled (decompensated) diabetic patients, regardless of type. In the case of emergencies, the anesthetic solution and volume should be restricted to those shown in the table.

10 DRUG INTERACTIONS

NSAIDs have characteristics of having a high protein binding capacity, potentiating the hypoglycemic action of sulfonylureas (drugs that promote the release of insulin from the beta cells of the pancreas). Thus, NSAIDs may compete with oral hypoglycaemic agents for the same plasma protein binding sites. With this action, the displacement occurs leaving the compound free, consequently increasing the pharmacological effect of the sulfonylureas, leading to hypoglycemia (Andrade, 2014).

11 CONSULTATION SCHEDULE

The most appropriate time for consultations for diabetic patients is in the morning when insulin reaches the maximum level of secretion. Such as, the endogenous levels of corticosteroids that are high during the morning, allowing a greater tolerance of the patient to the increase in adrenaline and blood glucose, which result from stressful situations (Cantanhede *et al.*, 2013).

In addition, long appointments should be avoided because they can lead the patient to anxiety. And, the patient should eat normally before appointments (Sousa, Leite and Yamashita, 2022).

The dentist must inform the patient clearly about proper diet and oral hygiene. Additionally, check blood pressure before appointments. In cases where the service requires more time than expected for the patient to show signs of hypoglycemia, the dentist should interrupt the clinical procedure and offer the patient some light food, in order to reverse the hypoglycemia condition (Sousa, Leite and Yamashita, 2022).

12 DENTAL CONDUCT: URGENCY AND EMERGENCY IN PATIENTS WITH CASES OF INSULIN SHOCK (HYPOGLYCEMIA)

Table 7

| |
|--|
| Low-risk patients |
| Fasting glucose level < 200 mg/dl Asymptomatic 7% HbA1c · Clinical and surgical procedures can be performed, taking the care indicated in the conduct. |
| Moderate-risk patients |
| Fasting glucose level 200 < 250 mg/dl HbA1c between 7 and 9% occasional symptoms · Oral examination, radiography, guidance on oral hygiene, restorations, supragingival prophylaxis, scaling, subgingival polishing and endodontics can be performed. · Always request medical evaluation. |
| High-risk patients |
| Fasting glucose level > 250 mg/dl, HbA1c above 9%; Frequent symptoms Multiple complications If you have an active tooth infection: · Perform dental control procedure as simply as possible. · Non-surgical clinical procedures may be performed. |



- Minor surgical procedures require adjustment of the insulin dose by the physician, if applicable.
 - In major surgeries, in addition to insulin adjustment, study the possibility of hospitalization.
 - Prescribe antibiotic prophylaxis.
- If there is no active tooth infection:
- Postpone treatment until metabolic conditions are balanced, seeking, during this period, to control oral infections.
 - Special care should be taken with periodontal diseases.
 - Provide guidance for the prevention of oral diseases – caries and periodontitis – through brushing, flossing, fluoridated and chlorhexidine mouthwash, a diet rich in fiber and a low-calorie diet

Adapted from the Primary Care Notebook (2018).

13 PEDIATRIC DENTISTRY, PERIODONTAL DISEASE AND DIABETES MELLITUS

13.1 EPIDEMIOLOGY

Brazil is the third country with the highest number of cases of type 1 DM, an incidence that has been increasing particularly in children, with a prevalence of 132,600 new cases in young people under 19 years of age (Brazilian Diabetes Society, 2024). Type 2 DM, on the other hand, usually occurs in adults and obese people, however, it has been increasing in children/adolescents, due to poor eating habits, sedentary lifestyle and stress. (Andrade, 2014; WHO 2024).

In view of this alarming increase, studies and meta-analyses emphasize the association between periodontal disease and childhood obesity (Martens et al., 2017; Janem et al., 2017). Also, Todescan et al. (2023) address that children with type 2 diabetes mellitus had a higher prevalence of periodontitis compared to previous studies. And, he highlighted that uncontrolled diabetes (HbA1c) can significantly influence the prevalence of periodontal disease.

It is extremely important that the dental surgeon knows how to diagnose periodontitis in childhood. And to conduct a multidisciplinary and individualized treatment for each child. In addition to teaching the importance of oral health to parents and children.

13.2 ETIOLOGY AND RISK FACTORS

Plaque is the main etiologic factor of periodontal disease. However, there are local and systemic factors that modify the oral microbiota. Local factors favor the accumulation of bacterial plaque and hinder its removal, while systemic factors can modulate and decrease the host's protective response (Korman, 1997). Thus, in the determining factor that is the biofilm, there is an involvement of the bacterial complex in the etiology of periodontal disease is well defined, with the main etiological agents being: *Aggregatibacter*

actinomyces comitans, *Porphyromonas gingivalis* and *Prevotella intermedia* among other microorganisms (Van, Bartold; Reynolds, 2020).

The evolution of periodontal disease is directly related to the modulation of the host's response to the presence of bacterial plaque products, responsible for stimulating the inflammatory process in the body. Inflammatory mediators are activated and actively participate in the destruction of periodontal support (Van, Bartold; Reynolds, 2020).

The predisposing factors in the evolution of periodontal disease are evidenced by the increase in probing depth, presence of calculus, malpositioned tooth, orthodontic appliance and iatrogenic causes such as: poorly adapted restorations. Modifying factors can be puberty and/or mouth breathing. It is worth mentioning that puberty may be related to sex hormones, which increase vascular permeability, influence the formation of granulation tissue, and alter the composition of the gingival flora (Murakami et al., 2018).

13.3 DIAGNOSIS AND CLASSIFICATION

Periodontal disease and tooth decay are problems that can increase the risk of tooth loss, chewing difficulty, and the negative impact on oral health-related quality of life. Thus, it is important to know the diagnostic criteria for oral conditions.

In childhood, the condition of gingivitis is an occurrence found due to the determining etiological factor, the accumulation of biofilm (bacterial plaque) that results in a stagnant and growing anaerobic population that affects the gums and tissues (Murakami et al., 2018). In childhood, the appearance of normality of the gums is presented with inserted gums with a flaccid and shiny appearance and the depth of the gingival sulcus of deciduous teeth is lower than in permanent teeth.

When it presents alteration, due to the presence of gingivitis pathology, there is a change in color, evidence of bleeding, presence of gingival edema and increase in the depth of the bag. The progression of gingivitis disease can lead to periodontitis, however, the condition of periodontitis is considered a rare finding in children and may indicate the diagnosis of a systemic disease such as diabetes (Lang, Schatzle, and Loe, 2009).

The study by Jensen et al., (2021) highlighted that children with type 1 diabetes mellitus showed a significant relationship between glycemic control and increased early periodontal parameters of periodontal disease (gingival plaque index, bleeding on probing, depth on probing). In this study, glycemic control was related to the complexity of the plaque



microbiota, addressing that as the diversity of microorganisms increases, HbA1c levels increase as well.

14 TREATMENT GOALS

The goals of diabetes treatment and management have advanced significantly in recent decades, reflecting the increasing scientific evidence and the need for personalized approaches according to the American Diabetes Guidelines (2024) and based on recent evidence include: glycemic control, fasting and postprandial glucose, blood pressure control, lipid control, kidney health, prevention of complications, mental health.

14.1 PREVENTION OF COMPLICATIONS

The prevention of complications associated with diabetes, such as neuropathy, retinopathy and cardiovascular disease, should be a priority in management. Thus, perform regular examinations of the feet and eyes. Education about the importance of self-care and regular monitoring is vital to prevent complications (WHO, 2024).

Diabetes is a significant public health challenge, contributing to higher mortality rates compared to the general population. The rapid increase in diabetes cases underscores the need for effective early intervention and disease prevention strategies, such as the American Diabetes association guidelines (2024), which aims to reduce the incidence of type 2 diabetes through lifestyle modifications. The integration of health services can facilitate the resources needed to control diabetes and improve health outcomes.

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