Ministry of Higher Education

and Scientific Research, University of

Maysan College of Dentistry

Periodontitis And Its Association With Anti-Diabetes Mellitus Drugs

Submitted to the Council University of Maysan College of Dentistry in Partial Fulfillment of Requirements for the Bachelor's Degree in Medicine and Surgery

Submitted By

Zahraa Fakher Ajil

Furqan Kadim Mussa

Supervised By

Assistant Lecturer: Amani Monam

2025 م **1445هـ**

بسم الله الرحمن الرحيم

(وَأَنزَلَ اللَّهُ عَلَيْكَ الْكِتَابَ وَالْحِكْمَةَ وَعَلَّمَكَ مَا لَمْ تَكُن تَعْلَمُ ۚ وَكَانَ فَضْلُ اللَّهِ عَلَيْكَ عَظِيمًا)

صدق الله العلي العظيم

المحتويات

الإهداء

الحمد لله على ما أنعم , ولهُ الشكر على ما ألهم.

نهدي هذا العمل المتواضع إلى من كان لهم الفضل بعد الله في مسيرتنا العلمية...

إلى أهلنا الأحبة، الذين كانوا سندنا الأول، بدعائهم ودعمهم وتشجيعهم المستمر...

إلى أساتذتنا الكرام، الذين أضاءوا لنا طريق العلم والمعرفة...

إلى كل من شاركنا الرحلة، وكان له بصمة في نجاحنا، من أصدقاء وزملاء...

وإلى أنفسنا، لأننا آمنا بقدرتنا، وثابرنا حتى وصلنا...

نهدي هذا البحث، عربون وفاء وشكر وامتنان، لكل من كان جزءاً من هذه الرحلة.

شكر وتقدير

بحمد الله وتوفيقه، تمكنا نحن، الباحثتان (زهراء فاخر عجيل) و(فرقان كاظم موسى)، من إنجاز هذا البحث الذي يمثل ثمرة جهد مشترك، وتعاون مستمر، وساعات طويلة من العمل، والنقاش، والمراجعة.

لقد كانت هذه التجربة رحلة مليئة بالتحديات والدروس، وقد استطعنا – بعون الله أولاً، ثم بإصرارنا وتعاوننا – أن نتجاوز كل الصعوبات لنصل إلى هذه النتيجة التي نعتز بها.

يأتي هذا البحث بعنوان:

"**Periodontitis And Its Association With Anti-Diabetes Mellitus Drugs**"

ضمن متطلبات نيل شهادة البكالوريوس في طب الأسنان، وهو نتاج مراحل متعددة من البحث

والتحليل العلمي، ويمثل محاولة جادة لفهم العلاقة بين أمراض اللثة والسكري، لما لهذا الموضوع من أهمية سريرية وصحية كبيرة.

نتوجه بالشكر والتقدير لمشرفتنا (م.م.اماني منعم) على الملاحظات التي ساعدتنا في تحسين البحث، مع تقديرنا لكل من ساهم بأي شكل من الأشكال في إنجاح هذا العمل، سواء بكلمة تشجيع، أو دعم معنوي، أو مساندة في مراحل البحث المختلفة.

وأخيرًا، لا يسعنا إلا أن نشكر أنفسنا على الجهد والالتزام الذي بذلناه، ونفخر بأن هذا العمل يُعبّر عن رؤيتنا وجهدنا المشترك، ويمثل خطوة مهمة في مسيرتنا العلمية نحو أن نكون أطباء أسنان قادرين على المساهمة في تطوير هذا المجال الحيوي.

Abstract

Diabetes mellitus (DM) is characterized by a high blood sugar level over a prolonged period of time Diabetes causes changes to blood vessels. This affects the flow of nutrients. It also affects how waste is removed from body tissues and can cause bacterial growth and infection; also, Poor blood sugar control makes it harder for immune system to fight infections. Uncontrolled gum disease may also make it harder to control the diabetes.

Diabetes has been unequivocally confirmed as a major risk factor for periodontitis People with diabetes are more likely to have periodontal disease than people without diabetes, probably because people with diabetes are more susceptible to contracting infections. In fact, periodontal disease is often considered a complication of diabetes. Those people who don't have their diabetes under control are especially at risk.

A number of studies found a higher prevalence of periodontal disease among diabetic patients than among healthy controls. In large studies. showed that diabetic patients were twice as likely as nondiabetic subjects to have attachment loss, one study has shown that diabetic patients are 5 times more likely to be partially edentulous than nondiabetic subjects.

1.1 DEFINITIONS

Periodontal disease, which includes gingivitis and periodontitis, is classified according to the presence or absence of periodontal ligament and/or alveolar bone involvement (Burt ,2005).

• Gingivitis - Gingivitis involves only the gums it is an inflammatory process characterized by gingival redness, swelling, and bleeding that is provoked by routine brushing or flossing or by a use of a periodontal probe. Healthy gingival tissues are pink, stippled (similar to an orange peel), and firm. Noninflamed gingival tissue should not bleed or suppurate during routine flossing and brushing, or when professionally probed. (Hein , 2008)

•Periodontitis is a chronic infectious disease caused by periodontal bacterial infection. Periodontitis is characterized by gingival inflammation accompanied by the loss of supportive connective tissues including the periodontal ligament and alveolar bone. Bone loss is seen on radiographs. Progression of periodontitis will cause accelerated tooth mobility and eventual tooth loss. (Teshome and Yitayeh ,2016)

1.2 CLINICAL PRESENTATION

In the majority of cases, primary care providers are alerted to the presence of periodontitis or gingivitis in their patients after a diagnosis is made by a dental professional. Alternatively (Hein , 2008), primary care providers may notice the presence of periodontitis or gingivitis (i.e., gum swelling and/or bleeding, bad breath) on routine physical exam, at which point the patient should be directed to seek care from a dental professional for further evaluation and management (Teshome and Yitayeh 2016).

1.3 Symptoms:

1.Healthy gums are firm and pale pink and fit snugly around teeth. Signs and symptoms of periodontitis can include:

2.Swollen or puffy gums

3.Bright red, dusky red or purplish gums

4.Gums that feel tender when touched

5.Gums that bleed easily

6.Pink-tinged toothbrush after brushing

7.Spitting out blood when brushing or flossing teeth

8.Bad breath

9.Pus between teeth and gums

10.Loose teeth or loss of teeth

11.Painful chewing

12.New spaces developing between teeth

13.Gums that pull away from teeth (recede), making teeth look longer than normal

14.A change in the way teeth fit together when bite (Litin and Sanjeev,2018.).

1.4 Causes

In most cases, the development of periodontitis starts with plaque a sticky film composed mainly of bacteria. If left untreated, here's how plaque can eventually advance to periodontitis:

•Plaque forms on teeth when starches and sugars in food interact with bacteria normally found in mouth. Brushing teeth twice a day and flossing once a day removes plaque, but plaque re-forms quickly (Jamestown *et al*, 2019).

•Plaque can harden under gum line into tartar (calculus) if it stays on teeth. Tartar is more difficult to remove and it's filled with bacteria. The longer plaque and tartar remain on teeth, the more damage they can do. Can't get rid of tartar by brushing and flossing need a professional dental cleaning to remove it.

•Plaque can cause gingivitis, the mildest form of gum disease. Gingivitis is irritation and inflammation of the part of gum tissue around the base of teeth (gingiva). Gingivitis can be reversed with professional treatment and good home oral care.

•Ongoing gum inflammation can cause periodontitis, eventually causing pockets to develop between gums and teeth that fill with plaque, tartar and bacteria. In time, these pockets become deeper, filling with more bacteria. If not treated, these deep infections cause a loss of tissue and bone, and ultimately may lose one or more teeth. Also, ongoing chronic inflammation can put a strain on immune system (Litin and sanjeev ,2018.).

1.5 Diagnosis

Periodontal disease is diagnosed by dentist or dental hygienist during a periodontal examination. This type of exam should always be part of regular dental check-up. A periodontal probe (small dental instrument) is gently used to measure the sulcus (pocket or space) between the tooth and the gums. The depth of a healthy sulcus measures three millimeters or less and does not bleed. the periodontal probe helps indicate if pockets are deeper than three millimeters. As periodontal disease progresses, the pockets usually get deeper. dentist or hygienist will use pocket depths, amount of bleeding. inflammation, tooth mobility to make a diagnosis (Highfield ,2009).

1.6 Associations between diabetes and periodontitis

Diabetes mellitus is one of the world's major diseases. Antidiabetic drugs are medicines developed to stabilize and control blood glucose levels amongst people with diabetes, mostly

anti-diabetic drugs are administered orally except the insulin. There are different types of anti-diabetic drugs, and their selection depends on the nature of the diabetes, age and situation of the person, and many other factors. Treatments include the agents which increase the amount of insulin secreted by the pancreas, or increase the sensitivity of target organs to insulin, and agents which decrease the rate at which glucose is absorbed from the gastrointestinal tract. People are mainly focused on insulin, insulin analogues, oral hypoglycemic agents and various other complementary and alternate medicines to control the blood glucose levels in diabetes (Khader *et al*, 2006).

Research has suggested that the relationship between diabetes and periodontal disease goes both ways - periodontal disease may make it more difficult for people who have diabetes to control their blood sugar. Severe periodontal disease can increase blood sugar, contributing to increased periods of time when the body functions with a high blood sugar.This puts people with diabetes at increased risk for diabetic complications (Mealey and Oates , 2006).

The risk of periodontitis is increased by approximately threefold in diabetic individuals compared with non-diabetic individuals. The level of glycemic control is of key importance in determining increased risk. For example, in the US National Health and Nutrition Examination Survey (NHANES) III, adults with an HbA level of >9% had a significantly higher prevalence of severe periodontitis than those without diabetes (OR 2.90; 95% CI 1.40, 6.03) after controlling for age, ethnicity, education, sex and smoking .The importance of diabetes as a major risk factor for periodontitis became apparent in the 1990s in a number of cross-sectional and longitudinal studies investigating the Pima Indian population(Tsai , 2002). The prevalence and incidence of periodontitis were greater in Pima Indians who had type 2 diabetes mellitus compared with those who did not, with an approximately threefold increased risk for periodontitis. The majority of research has focused on type 2 diabetes mellitus as a risk factor for periodontitis, probably because both diseases have historically tended to develop in patients in their 40s

and 50s. However, type 1 diabetes mellitus also increases the risk of periodontitis, and all patients with diabetes (including children and young adults) should be considered to be at increased risk of periodontitis. One early study identified that around 10% of children (<18 years) with type 1 diabetes mellitus had increased attachment loss and bone loss compared with controls, despite comparable plaque scores]. More recently, in a study of 350 diabetic children (6-18 years old) vs 350 non-diabetic controls, the proportion of periodontal sites with evidence of periodontitis was greater in the children with diabetes (>20% vs 8% of sites, respectively) (Lalla et al, 2007).

1.7 How periodontal disease starts and progresses Health

The periodontium is made up of gingival (gum) tissue, the supporting bone, and a periodontal ligament that attaches the root of the tooth to the bone. The periodontium plays an important role in keeping the teeth in place (Eaton and Owet, 2015). A healthy periodontium is key to a healthy mouth and body. It enables a person to eat, speak, and smile, as well as improving a person's self-esteem and quality of life. Throughout the day, dental plaque builds up on the tooth surfaces. This is asticky white film made up of bacteria, saliva, and food. The aim of tooth brushing is to remove this layer of dental plaque twice a day. If dental plaque is not Effectively removed from the tooth surfaces, especially at the junction where the tooth meets the gum, the dental plaque irritates the gum tissues leading to inflammation, known as gingivitis (Marsh, 1994).

1.8 Complications of Diabetes

The complications of diabetes are related to long-term elevation of blood glucose concentrations (hyperglycemia). Hyperglycemia results in the formation of advanced glycation end-products (AGEs).These AGEs act to "prime" endothelial cells and monocytes, making them more susceptible to stimuli that induce the cells to produce inflammatory mediators. Accumulation of AGEs in the plasma and tissues of diabetic patients has been linked to diabetic complications. There is some speculation that AGE-enriched gingival tissue has greater vascular permeability(Offenbacher , 1999), experiences greater breakdown of collagen fibers, and shows accelerated destruction of both nonmineralized connective tissue and bone.Apart from the accumulation of AGEs, the pathophysiology is strikingly

similar to that of periodontal disease Long-term complications may occur in both type diabetes. Macrovascular complications include coronary artery disease,cerebrovascular disease, and peripheral vascular disease. Microvascular complications include retinopathy, nephropathy, and neuropathy. Retinopathy may lead to blindness (Lalla , 2001), whereas progressive renal disease can lead to kidney failure. Peripheral neuropathy may lead to loss of limbs and dyesthesia (burning sensations). In terms of oral manifestations, the patient may experience delayed wound healing and xerostomia, as well as an increased susceptibility to periodontal disease (Loe , 1993).

Periodontal Disease as a Complication of Diabetes Periodontitis has been referred to as the sixth complication of diabetes. A number of studies found a higher prevalence of periodontal disease among diabetic patients than among healthy controls (Firatli , 1997). In a large cross-sectional study, Grossi and others showed that diabetic patients were twice as likely as nondiabetic subjects to have attachment loss (Grossi *et al*, 1994). Firatli followed type 1 diabetic patients and healthy controls for 5 years. The people with diabetes had significantly more clinical attachment loss than controls. In another cross-sectional study, Bridges and others found that diabetes affected all periodontal parameters, including bleeding scores, probing depths, loss of attachment, and missing teeth(Bridges *et al*, 1996). In fact, one study has shown that diabetic patients are 5 times more likely to be partially edentulous than nondiabetic subjects. and tooth loss(Moore *et al*, 1998).

Other factors are involved in the high prevalence of peri-odontal diseases in association with diabetes (Chen , 2000). The relation-The link between diabetes and periodontal disease appears to be very strong within certain populations, such as Aboriginal peoples, which indicates a genetic component. A recent study found that smoking increases the risk of periodontal disease by nearly 10 times in diabetic patients (Skrepcinski and Niendorff , 2000). According to these results, the management of diabetic patients should include strong recommendations to quit smoking(Moore , 1999).

1.9 Treatment

Treatment may be performed by a periodontist, a dentist or a dental hygienist. The goal of periodontitis treatment is to thoroughly clean the pockets around teeth and prevent damage to surrounding bone.

The best chance for successful treatment when also adopt a daily routine of good oral care, manage health conditions that may impact dental health and stop tobacco use.

1.9.1 Medical treatment

If periodontitis isn't advanced, treatment may involve less invasive procedures, including:

- **Scaling:** removes tartar and bacteria from tooth surfaces and beneath gums. It may be performed using instruments, a laser or an ultrasonic device.
- **Root planning:** smooths the root surfaces, discouraging further buildup of tartar and bacteria, and removes bacterial byproducts that contribute to inflammation and delay healing or reattachment of the gum to the tooth surfaces (Hill *et al*.2011).
- **Antibiotics:** Topical or oral antibiotics can help control bacterial infection. Topical antibiotics can include antibiotic mouth rinses or insertion of gels containing antibiotics in the space between teeth and gums or into pockets after deep cleaning. However, oral antibiotics may be necessary to completely eliminate infection-causing bacteria.

1.9.2 Surgical treatments

Advanced periodontitis, treatment may require dental surgery, such as:

Flap surgery (pocket reduction surgery): periodontist makes tiny incisions in gum so that a section of gum tissue can be lifted back, exposing the roots for more effective scaling and root planning. Because periodontitis often causes bone loss, the underlying bone may be recontoured before the gum tissue is sutured back in place. After heal, it's easier to clean these areas and maintain healthy gum tissue.

Soft tissue grafts: When lose gum tissue, gumline recedes. May need to have some of the damaged soft tissue reinforced. This is usually done by removing a small amount of tissue from the roof of mouth (palate) or using tissue from another

donor source and attaching it to the affected site. This can help reduce further gum recession, cover exposed roots and give teeth a more pleasing appearance.

Bone grafting: This procedure is performed when periodontitis has destroyed the bone surrounding tooth root. The graft may be composed of small fragments of bone, or the bone may be synthetic or donated. The bone graft helps prevent tooth loss by holding tooth in place. It also serves as a platform for the regrowth of natural bone (Isidor , 2014).

1.10 Hypoglycemic drug effect on periodontitis

Diabetes drugs can have varying effects on periodontal disease, depending on the type of medication and how it affects blood sugar control. Here's a breakdown of how different diabetes treatments might impact periodontal health:

1. **Blood Sugar Control:**

• Better control of blood sugar (through insulin or oral medications like metformin) can reduce the risk of periodontal disease progression. High blood sugar contributes to a higher risk of infection and poor wound healing, which can worsen gum disease.

• Poorly controlled blood sugar leads to increased sugar in the saliva, creating a favorable environment for bacterial growth. This can worsen periodontal disease and increase the risk of complications like tooth loss.

2. **Metformin (MF):**

a second-generation biguanide, is a commonly used oral antidiabetic drug that has been shown recently to stimulate osteoblasts and reduce alveolar bone loss. There is t study aims to explore the efficacy of 0.5%, 1%, and 1.5% MF gel as a local drug delivery system in adjunct to scaling and root planing (SRP) for treatment of intrabony defects (IBDs) in patients with chronic periodontitis.

It does not have a direct impact on gum health, but better blood sugar control due to metformin use can indirectly benefit periodontal health. Studies have shown that good glucose control reduces the severity of periodontal disease in diabetic patients.

They are found Mean PD reduction and mean CAL gain was found to be greater in MF groups than the placebo group at both 3 and 6 months. Furthermore, significantly greater reduction of IBD depth was found in the MF groups compared to the placebo group, with greatest reduction in 1% MF.

So, the results of the study show that local delivery of MF into the periodontal pocket stimulated significant increase in the PD reduction, CAL gain, and improved IBD depth reduction compared to placebo in adjunct to SRP. This can provide a new direction in the field of periodontal healing (Pradeep *et al*. 2012,).

3. Insulin:

is a peptide hormone secreted in the body by beta cells of islets of Langerhans of the pancreas and regulates blood glucose levels. Medical treatment with insulin is indicated when there is inadequate production or increased demands of insulin in the body.

proper insulin management helps maintain better blood glucose levels, reducing the risk of periodontal disease. However, poorly controlled insulin levels can lead to complications such as gum infection and inflammation.

Insulin used in the treatment and management of diabetes mellitus type-1 and sometimes diabetes mellitus type-2

So Patients diagnosed with type 2 diabetes were more likely to have severe periodontitis (CPI 4) compared with patients with normal glucose tolerance or impaired fasting glucose (P<.001). Subjects with severe periodontitis had significantly higher prevalence of abdominal obesity, serum triglycerides, and insulin resistance (P values of 012, <.001, and .003, respectively). The odds ratios (ORs) for prevalence of severe periodontitis were significantly increased from normal glucose tolerance and impaired fasting glucose (OR = 1.32; 95% confidence interval, 1.06-1.64) to type 2. diabetes (OR 1.5; 95% CI, 1.11-2.02), after adjusting for potential confounders (P for trend = .003). The prevalence of severe periodontitis increased significantly with increasing insulin resistance (P for trend = .04) in nondiabetic individuals. Furthermore, insulin-resistant individuals with normal waist circumference showed significantly higher odds of severe

periodontitis (OR 1.47; 95% CI, 1.16-1.87) than did insulin-sensitive individuals with normal waist circumference (HimsworthHP. Int , 2013).

So Non-abdominally obese subjects with insulin resistance were more likely to have severe periodontitis. Insulin resistance can be considered an independent risk factor of periodontal disease in normal weight population defined by abdominal obesity (GencoR, 2013).

4. **SGLT2 Inhibitors (e.g., empagliflozin, canagliflozin):**

These medications help lower blood sugar by preventing the kidneys from reabsorbing glucose. There's some evidence suggesting that SGLT2 inhibitors may have an impact on oral health, including a potential increased risk of gum infections due to the glucose being excreted in the urine and possibly affecting the mouth's bacterial balance (Islam *et al* ,.2015).

5. **GLP-1 Receptor Agonists (e.g., liraglutide, semaglutide):**

These medications help regulate blood sugar levels by enhancing insulin secretion and reducing glucose production. As with other medications that control blood sugar, better glucose regulation may help reduce the progression of periodontal disease(Lim.2014).

In summary, well-managed diabetes, regardless of the specific medication, generally helps reduce the risk of periodontal disease. Poorly controlled blood sugar levels, however, can exacerbate gum disease. It's essential for people with diabetes to maintain good oral hygiene, regularly visit the dentist, and manage their blood sugar levels to minimize the risk of periodontal complications.

1.11 Guidelines for the prevention and treatment of patients with diabetes

The International Diabetes Federation and the European Federation Periodontology has published consensus guidelines for physicians, oral health care professionals, and patients. These guidelines also apply to people with pre-diabetes and metabolic syndrome. In summary, they state that oral health education should be provided to all patients with diabetes. Patients with diabetes should be informed that their risk of periodontitis is increased, and if untreated, that periodontitis has a negative

impact on metabolic control and may also increase the risk of complications of their diabetes, such as cardiovascular and kidney disease. Therefore, successful periodontal therapy may have a positive impact on their metabolic control and can prevent diabetes complications.Physicians should investigate a prior diagnosis of periodontitis. For all patients, disease testing should begin at the age of 45 If results are within the normal range, the test should be repeated at three-year intervals, but in those with prediabetes, the retest and risk status should be assessed annually(Sanz & Ceriello , 2018).

In case of a positive diagnosis, the physician should ascertain whether periodontal care and maintenance are being provided. If patients are symptomatic (polydipsia, polyuria, polyphagia,unexplained weight loss), they should be referred directly to a physician. Nasseh et al .Found a statistically significant association between periodontal intervention and lower health care costs. However, this association was only observed among individuals who did not initiate diabetes drug therapy after diagnosis(Nasseh , 2017).

1.12 Prevention

Brush teeth: Brushing after meals helps remove food debris and plaque trapped between teeth and gums. Don't forget to include the tongue; bacteria love to hide there.

Floss: Flossing at least once a day helps remove food particles and plaque between teeth and along the gum line that a toothbrush can't quite reach.

Swish with mouthwash: Using a mouthwash can help reduce plaque and can remove remaining food particles that brushing and flossing missed

Known risk: Age, smoking, diet, and genetics can all increase the risk for periodontal disease. If you are at increased risk, be sure to talk to a dental professional(Periodontology. Perio.Org, 2021).

Blood Glucose Testing

1. Spectrophotometer
2. Glucometer
3. Cobas

American Diabetes Association (2024), Tietz, N. W. (2006).

1.Preparation: The patient is asked to fast for at least 8 hours before the test to ensure accurate results. Only water is allowed during this fasting period.

2. Site Selection: The healthcare professional typically selects a vein in the arm, usually in the antecubital fossa (the crease of the elbow). The skin is cleaned with an antiseptic to reduce the risk of infection[American Diabetes Association(2024)].

3. Blood Draw: A needle attached to a syringe or vacuum tube (e.g., Vacutainer) is inserted into the vein. Blood is collected in one or more tubes, depending on the required test [World Health Organization. (2010)].

4. Post-Collection Care: After the blood is drawn, the needle is removed[Centers for Disease Control and Prevention (CDC). (2022)], and a cotton ball or gauze is applied to the puncture site to stop any bleeding. The patient may be asked to apply light pressure and keep the arm straight for a few minutes[American Diabetes Association. (2024)].

1. Fasting Blood Glucose (FBG):

• Normal: A fasting blood glucose level less than 100 mg/dL (5.6 mmol/L).

• Prediabetes: A fasting blood glucose level between 100 and 125 mg/dL (5.6-6.9 mmol/L).

• Diabetes: A fasting blood glucose level of 126 mg/dL (7.0 mmol/L) or higher, confirmed on two separate occasions.

2.Hemoglobin A1c (HbA1c) Test:

• Normal: An HbA1c level of less than 5.7%.

• Prediabetes: An HbA1c level between 5.7% and 6.4%.

• Diabetes: An HbA1c level of 6.5% or higher.

Home Blood Glucose Testing

Home blood glucose testing is a common method for individuals with diabetes to monitor their blood sugar levels. This type of testing allows patients to check their glucose levels at different times of the day and make necessary adjustments to their treatment plans[Centers for Disease Control and Prevention (CDC) (2022)].

How It Works:

1. Preparation: The patient will need a blood glucose meter (glucometer), test strips, and a lancet device to obtain a small sample of blood. The meter is usually portable and easy to use.

2. Blood Sample: The patient pricks the side of their fingertip with the lancet device to draw a small drop of blood. The drop of blood is then placed on the test strip, which is inserted into the glucometer.

3. Result: The glucometer measures the amount of glucose in the blood and provides a reading, usually in a matter of seconds. The results help the patient understand if their blood sugar levels are too high, too low, or within the normal range[American Diabetes Association. (2024)].

اسم المريض : بتول دختور محمد
العمر : 40 سنة
الجنس : أنثى
مدة الاصابة : عشر سنوات
استخدام العلاج : أنسولين

اسم المريض : خديجه خالد

العمر : 65 سنة

الجنس : أنثى

مدة الاصابة : 20 سنة

استخدام العلاج : ابر انسولين

اسم المريض : محبس مصلي

العمر : 65 سنة

الجنس : ذكر

مدة الاصابة : منذ 2013

استخدام العلاج :Choline and inositol
multivitaminفيتامينات

اسم المريض : سهام عزيز

العمر : 47 سنة

الجنس : أنثى

مدة الاصابة : عشر سنوات

استخدام العلاج : ابر انسولين معتدل Zolidplus

اسم المريض : نضال عون مزعل

العمر : 63 سنة

الجنس : أنثى

مدة الاصابة : 9 سنوات

استخدام العلاج: Avas-40
Telmodip 80/5mg
NATRILX SR
DIAZAC M ER 10/1000

اسم المريض : نجاة صاحب

العمر : 63 سنة

الجنس : أنثى

مدة الاصابة : منذ 7 سنوات

استخدام العلاج : منظم للسكر لونه اصفر

اسم المريض : باسمة محمد

العمر : 40 سنة

الجنس : أنثى

مدة الاصابة : 5 سنوات

استخدام العلاجtab :

اسم المريض : جاسم كاظم

العمر : 47 سنة

الجنس : ذكر

مدة الاصابة : منذ 15 سنة

استخدام العلاج:Tab

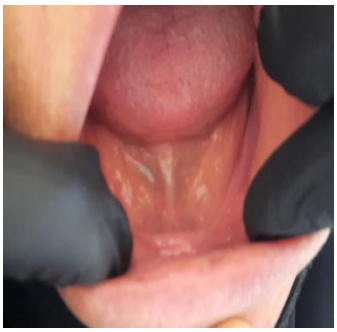
اسم المريض : عماد حسين

العمر : 30 سنة

الجنس : ذكر

مدة الاصابة : 10 سنوات

استخدام العلاج:Tab



اسم المريض : علياء عبد المحسن

العمر : 56 سنة

الجنس : أنثى

مدة الاصابة : منذ 10 سنوات

استخدام العلاج :Tab منظم الانسولين اذا عالي

اسم المريض : كميلة داخل

العمر : 50 سنة

الجنس : أنثى

مدة الاصابة : منذ سنتين

استخدام العلاج:Tab

اسم المريض : ابتهال عبد الرزاق

العمر : 76 سنة

الجنس : أنثى

مدة الاصابة : منذ 51 سنة

استخدام العلاج:Insulin

اسم المريض : بشرى جاسم

العمر : 46 سنة

الجنس : أنثى

مدة الاصابة : منذ 10 سنوات

استخدام العلاج : حبوب DIAZAC ME 10/1000

اسم المريض : عادل سليم عبد الصاحب

العمر : 50 سنة

الجنس : ذكر

مدة الاصابة : 40 سنة

استخدام العلاج:Insulin

اسم المريض : حسنه زرزور خلف

العمر : 60 سنة

الجنس : أنثى

مدة الاصابة : منذ 6 سنوات

استخدام العلاج:Tab

Tooth loss and its relationship to diabetes

Tooth loss considerably affects oral health–related quality of life (OHRQoL), causing chewing difficulty, poor dietary intake and functional disorders. A predominant reason for tooth loss is periodontitis, which is an inflammation of periodontal tissues. Damage from periodontal disease can lead to loosening of teeth and, in a final stage, to tooth loss.The manifestation and progression are influenced by a wide variety of determinants and factors that have been linked with general health. Notably, the association between periodontitis and diabetes mellitus (DM) has been highlighted in the literature. Periodontal disease is considered the sixth complication of DM.4 Another primary cause of tooth loss is dental caries. Its development of which is presumably enhanced in DM patients (GencoR. 2013).

Due to the ageing population, DM is a growing public health problem, and it likely contributes to a greater demand for health care. The negative effects of elevated blood sugars on the immune system result in an increased susceptibility to infections. The risk for development and progression of periodontitis is increased approximately threefold in DM patients as compared to non-diabetic individuals (non-DM). Furthermore, DM is associated with increased severity of periodontal disease.11 The increased risk of dental caries in DM patients can likely be explained by decreased salivary flow rates12 and expanded levels of glucose in the saliva. The American Diabetes Association and International Diabetes Federation have published DM care guidelines,7, 14 of which the main goal is prevention and treatment of DM complications, thereby optimizing quality of life (Mealey& Oates 2006).

The following are some points that illustrate the effect of diabetes on teeth:

1. Tooth Decay

The human mouth contains various types of bacteria that interact with the food we eat, especially sugary foods.

The bacteria secrete acids on the surface of the teeth, which in turn leads to tooth decay. High blood sugar increases the production of acid by bacteria, increasing the risk of tooth decay.

2. Gum Inflammation

Diabetes significantly reduces the body's ability to fight bacteria, especially if teeth are not brushed, allowing bacteria and food debris to form a layer of tartar.The prolonged presence of calcification and tartar on the teeth negatively affects the gums, leading to inflammation. Gum inflammation can cause them to swell and bleed easily under any circumstances [National Institute of Dental and Craniofacial Research (NIDCR)(2020)] .

3. Advanced Gingivitis

Left untreated gingivitis leads to advanced gingivitis, which destroys the gum tissue and bone that supports the teeth. Advanced gingivitis can lead to gum and jaw bone dysfunction, leading to tooth loss.Diabetes weakens the immune system and slows wound healing. Therefore, gingivitis must be treated immediately upon noticing the problem.

4. Thrush

Diabetics are more susceptible to thrush, a fungal infection caused by Candida albicans. Symptoms of thrush can be seen as red or white patches appearing inside the mouth.

Diabetics are advised to take good care of their teeth to avoid dental problems.

5. Dry Mouth

Diabetics suffer from decreased saliva production, which in turn causes dry mouth.

Saliva plays an important role in moisturizing the mouth and teeth and protecting them from cavities and gum infections.

Symptoms that indicate diabetes' impact on teeth Regular dental checkups are necessary to prevent dental and gum problems. Consult a doctor if you notice any of the following symptoms:

Bleeding gums or gingivitis.

Recurring and frequent infections.

Halitosis that persists despite various treatments.

Conclusions:

Diabetes mellitus and periodontitis are closely related. Diabetes mellitus. that is not controlled well leads to higher blood sugar (glucose) levels in the mouth fluids. This promotes the growth of bacteria that can cause gum disease. On the other hand, infections from untreated periodontal disease can cause the blood sugar to rise and make it harder to control diabetes.

Diabetes mellitus is considered one of the major risk factors for periodontitis, and, vice versa, periodontitis is considered to increase the risk of developing diabetes mellitus.

Effective glycemic control improves lesions in diabetic patients with periodontitis through ameliorating inflammation at the gingival sites of periodontal tissue.

A huge number of reports has addressed the effect of periodontal intervention therapy on glycemic control, but few reports have addressed the effect of glycemic drug on periodontal disease diabetic patients. I recommend that in the future there should be research on the effect of each anti-diabetic drug, its effect on gingivitis, and how each drug contributes to prognosis of periodontitis.

Reference

1. Albert DA, Ward A, Allweiss P, et al. Diabetes and oral disease:Implications for health professionals. Ann NY Acad Sci 2012;1255:1-15.
2. American Diabetes Association. (2024). Standards of medical care in diabetes—2024. Diabetes Care, 47(Supplement_1), S1–S212.
3. Bridges RB, Anderson JW, Saxe SR, Gregory K. Bridges SR. Periodontal status of diabetic and non-diabetic men: effects of smoking, glycemic control, and socioeconomic factors. J Periodontol 1996; 67(11):1185-92
4. Burt B, Research, Science and Therapy Committee of the American Academy of Periodontology. Position paper: epidemiology of periodontal diseases.J Periodontol 2005; 76:1406.
5. Centers for Disease Control and Prevention (CDC). (2022). All about your A1C.
6. Chapple IL, GencoR. Diabetes and periodontal diseases: Consensus report of the Joint EFP/AAP Workshop on Periodontitis and SystemicDiseases .J Clin Periodontitis.2013;40Soppl 14:$106-S112.
7. Chen I. The Surgeon General's report on oral health: implications for research and education. NY State Dent J 2000; 66(9):38-42.
8. Eaton KA, Ower P (2015) Practical Periodontics. Churchill Livingstone, London
9. Firatli E. The relationship between clinical periodontal status and insulin-dependent diabetes mellitus. Results after 5 years. / Periodontol 1997; 68(2):136-40
10. Grossi SG, Zambon JJ, Ho AW, Koch G, Dunford RG, Machtei EE, and others. Assessment of risk for periodontal disease. I. Risk indicators for attachment loss. J Periodontol 1994; 65(3):260-7.
11. Grover HS, Luthra S. Molecular mechanisms involved in the bidirectional relationship between diabetes mellitus and periodontal disease. J Indian Soc Periodontol 2013;17:292-301.
12. Hein C. Scottsdale revisited: the role of dental practitioners in screening for undiagnosed diabetes and the medical co-management of patients with diabetes or those at risk for diabetes. Compend Contin Educ Dent 2008; 29:538.

13. Highfield, J. "Diagnosis and Classification Of Periodontal Disease". Australian Dental Journal, vol 54, 2009, pp. S11-S26, Wiley. doi: 10.1111/j.1834-7819.2009.01140.x.
14. Hill RW, Ramfjord SP, Morrison EC, et al. Four types of periodontal treatment compared over two years. J Periodontol.2011
15. HimsworthHP. Diabetes mellitus: Its differentiation into insulin-sensitive and insulin-insensitive types. 1936. Int J Epidemiol. 2013; 42:1594-1598.
16. Isidor F, Karring T. Long-term effect of surgical and non-surgical periodontal treatment. A 5-year clinical study. J Periodontal Res. 2014; 21:462-472 13/14
17. IslamSK, SeoM, LeeYS, MoonSS.Association of periodontitis with insulin resistance, B-cell function, and impaired fasting glucose before onset ofdiabetes. EndocrJ.2015; 62:981-989,
18. Jamestown.ubertali, DMD, hingham, MA jul2019/ merck manuals
19. Khader YS, Dauod AS, El-Qaderi SS, Alkafajei A, Batayha WQ. Periodontal status of diabetics compared with nondiabetics: a meta-analysis. J Diabetes Complicat. 2006
20. Lalla E, Cheng B, Lal S, et al. Diabetes mellitus promotes periodontal destruction in children. J Clin Periodontol. 2007
21. Lalla RV. D'Ambrosio J. Dental management and considerations for the patient with diabetes mellitus. J Am Dent Assoc 2001; 132(10):1425-32.
22. LimSG, HanK, KimHA, et al. Association between insulin resistance and periodontitis in Korean adults.J Clin Periodontol. 2014;41:121-130.
23. Loe H. Periodontal disease. The sixth complication of diabetes mellitus. Diabetes Care 1993; 16(1):329-34
24. Marsh PD (1994) Microbial ecology of dental plaque and its significance in health and disease. Adv Dent Res 8: 263-71
25. Mayo Clinic. (n.d.). Gingivitis and diabetes: Symptoms and treatment.
26. Mealey BL, Ocampo GL. Diabetes mellitus and periodontal disease.Periodontol 2000, 2007
27. Mealey, B. L., & Oates, T. W. (2006). Diabetes mellitus and periodontal diseases. Journal of Periodontology, 77(8), 1289–1303.
28. Moore PA, Weyant RJ, Mongelluzzo MB, Myers DE, Rossie K, Guggenheimer J, and others. Type 1 diabetes mellitus and oral health: assessment of periodontal disease. J Periodontol 1999; 70(4):409-17.

29. Moore PA, Weyant RJ, Mongelluzzo MB. Myers DE, Rossie K, Guggenheimer J, and others. Type 1 diabetes mellitus and oral health: assessment of tooth loss and edentulism. J Public Health Dent 1998; 58(2):135-42.
30. Nasseh K, Vujicic M, Glick M. The relationship between periodontal interventions and healthcare costs and utilization. Evidence from an integrated dental, medical, and pharmacy commercial claims database. Health Econ 2017:26:519-527.
31. National Institute of Dental and Craniofacial Research (NIDCR). (2020). Oral health and diabetes. U.S. Department of Health and Human Services.
32. Offenbacher S. Salvi GE. Induction of prostaglandin release from macrophages by bacterial endotoxin. Clin Infect Dis 1999; 28(3):505-13
33. Periodontal Diagnosis. Vol 59, no. 2, 2014, pp. e41-e42. Elsevier BV, doi:10.1016/j.denabs.2013.01.039.
34. Periodontitis Symptoms and Causes" Litin, Scott C. and Sanjeev Nanda. Mayo Clinic Family Health Book, 2018, 5Th Edition. 2018.
35. Periodontology. American. "PREVENTING PERIODONTAL DISEASE | Perio. Org". Perio.Org, 2021
36. Pradeep, A.R. et al. "Efficacy Of Varying Concentrations Of Subgingivally Delivered Metformin In The Treatment Of Chronic Periodontitis: A Randomized Controlled Clinical Trial". Journal of Periodontology, vol 84, no. 2, 2013, pp. 212-220. Wiley, doi: 10.1902/jop.2012.120025.
37. Salvi GE, Carollo-Bittel B, Lang NP. Effects of diabetes mellitus on periodontal and peri-implant conditions: update on associations and risks. J Clin Periodontol. 2008;35:398-409.
38. Sanz M, Ceriello A, Buysschaert M, et al. Scientific evidence on the links between periodontal diseases and diabetes: Consensus report and guidelines of the joint workshop on periodontal diseases and diabetes by the International Diabetes Federation and the European Federation of Periodontology. J Clin Periodontol 2018;45: 138–149
39. Skrepcinski FB, Niendorff WJ. Periodontal disease in American Indians and Alaska Natives. J Public Health Dent 2000: 60(Suppl 1):261-6
40. Teshome A, Yitayeh A. The effect of periodontal therapy on glycemic control and fasting plasma glucose level in type 2 diabetic patients: systematic review and meta-analysis. BMC Oral Health 2016; 17:31.

41. Tietz, N. W. (2006). Tietz textbook of clinical chemistry and molecular diagnostics (4th ed.). Elsevier Saunders.
42. Tsai C, Hayes C, Taylor GW. Glycemic control of type 2 diabetes and severe periodontal disease in the US adult population. Community Dent Oral Epidemiol. 2002
43. World Health Organization. (2010). WHO guidelines on drawing blood: Best practices in phlebotomy. Geneva: WHO Press.