Journal University of Kerbala , Vol. 15 No.2 Scientific . 2017

ngival sulcus depth in diabetic and non diabetic patients

عمق التلم اللثوي في مرضى السكري وغير السكري

Bayan Jaber Hussein
Assistant lecturer, College of dentistry-Kufa university

Abstract

Background: Gingival sulcus; Its an invagination extends between the gingiva and the surface of the tooth, it extends vertically from the free gingival margin to the dentogingival junction, gingival sulcus normally has a depth at about 0.5-3 mm, with an average of 1.8mm. Any depth greater than 3mm generally can be considered a pathological state and a sulcus in this deep is known as periodontal pocket. The floor of gingival sulcus and epithelium cervical to it termed as junctional epithelium, the wall of the gingival sulcus is lined by sulcular epithelium which is non keratinized stratified sequemous epithelium thinner than epithelium of gingiva, it has no epithelial ridges, so it forms a smooth interface with lamina properia, it continuous with gingival epithelium from above and with junctional epithelium from below. Junctional epithelium or attachment epithelium or dentogingival junction normally it extends from the bottom of the gingival sulcus towards the cementoenamel junction. The aim of this study was to determine the relative influence of blood glucose level on the depth of the gingival sulcus in diabetic and non diabetic persons.

Materials and Methods:

The samples composed of 40 participants (20 non diabetic and 20 diabetic) with age between (30-60) years. The diabetic patients with type 2 diabetes mellitus **(T2DM)** and duration of their disease ranged from (1-21) years. The depth of the gingival sulcus was measured for all participants using graduated periodontal probe.

Results:

Diabetic groups showed a highly significant difference in the depth of the gingival sulcus compared to normal groups, also there is a highly significant difference among diabetic patients themselves in the depth of the gingival sulcus according to the duration period of diabetic mellitus.

Conclusions:

1-There is a positive relationship between increase gingival sulcus depth and increase the percentage of blood glucose level.

2-There is a positive relationship between increase gingival sulcus depth and increase duration of diabetes mellitus among diabetic patients themselves.

Key Words: Diabetes mellitus, gingival sulcus depth.

الخلاصه

التلم اللثوي: هو اخدود يمتد بين اللثه وسطح السن حيث يمتد عموديا من الحواف اللثويه الحره الى الملتقى اللثوي السني.طبيعيا يكون على عمق حوالي من 0,5 الى 3 ملم مع معدل حوالي 1,8ملم.

اي عمق اكثر من 3ملم يعتبر حاله مرضيه والتلم اللثوي في هذاالعمق يعرف باالجيوب اللثويه ،ارضيه التلم اللثوي والنسيج الظهاري العلوي له هو يعرف بالنسيج الظهاري الالتحامي , جدران التلم اللثوي مبطنه بواسطه النسيج الظهاري الاخدودي الذي هو نسيج ظهاري غير كيراتيني ارق من ظهاره اللثه و هو لايملك الحواف الظهاريه وبذلك سوف يكون تداخل سطحي

املس مع الصفيحه الرقيقه وهو مستمر مع ظهاره اللثه من فوق ومع النسيج الظهاري الالتحامي من الاسفل.
النسيج الظهاري الالتحامي او النسيج الظهاري المتصل او الالتقاء اللثوي السني طبيعيا يمتد من اسفل التلم اللثوي باتجاه التقاطع الملاطي.
الغرض من هذه الدراسه هو معرفه تاثير مستوى السكر في الدم على عمق التلم اللثوي.
المواد والأساليب:
العينات تتكون من 40 مشاركا (20 غير السكري و 20 السكري) مع التقدم في السن ما بين (30-60) سنة. مرضى السكري من النوع 2 من داء السكري (T2DM) ومدة المرض من (1-21) سنة. وقد تم قياس عمق التلم اللثوي لجميع المشاركين باستعمال اداه مدرجه لقياس عمق الجيب.
النتائج:
أظهرت مجموعة مرضى السكري فرقا كبيرا جدا في عمق التلم اللثوي مقارنة بالفئات العادية، أيضا هناك فرق كبير جدا بين مرضى السكري أنفسهم في عمق التلم اللثوي وفقا لفترة المده من داء السكري.
الاستنتاجات:
1 -وجود علاقة إيجابية بين زيادة عمق التلم اللثوي وزيادة نسبة مستوى السكر في الدم
2- وجود علاقة ايجابيه بين زيادة عمق التلم اللثوي وزيادة مدة داء السكري لدى مرضى السكري أنفسهم.
الكلمات الرئيسية: داء السكري، عمق التلم اللثوي.

Introduction:

Diabetes mellitus (DM) is a chronic disease related with abnormally high levels of the glucose sugar in the blood stream and this due to one of two mechanisms either inadequate manufacture of insulin, which is made by the pancreas or inadequate sensitivity of cells to the action of insulin **[1],** and this will lead to change in metabolism of carbohydrate, protein and lipid also will cause amassing of glucose in the blood stream, and this will effect on a variety of tissues including the periodontuim **[2]**, Change in the metabolism of bone is the important complication associated with diabetes mellitus, so loss of alveolar bone is one of this complication **[3].**

Diabetes mellitus has been classified according to its etiology, as type 1 and 2, type 1 or TID formerly (insulin-dependent diabetes**)** or **(** juvenile diabetes**)**, which is a form of diabetes mellitus that result from the autoimmune damage to insulin producing beta cell of the pancreas, while type 2 is an outcome of cellular dysfunction in resistance to insulin by peripheral tissues **[4]**.

Subjects who are suffering from diabetes mellitus have been reported to be more susceptible to oral problem such as gingivitis and periodontitis than healthy others and these diseases are commonly measured to be oral complications of diabetes mellitus **[5].**

Multiple factors have been suggested to describe the relationship between diabetes mellitus and periodontal diseases including 1) change in immunoinflammatory response to bacterial pathogens, 2) reduction of the formative aspects of metabolism in connective tissue, 3) diminishing in the mechanism of wound healing, 4) alterations in microvascular and 5) development of advanced glycation end products. **[6]**

Materials and Methods:

The samples composed of 40 participants with age between (30-60) years of both sexes, they were carefully informed about the aim of the study and they were free to accept or refuse to be examined.

The samples were divided into two groups:

Group I: Includes 20 healthy subjects without any history of any systemic disease.

Group II: consist of 20 patients with type 2 diabetic mellitus, were selected from subjects attending to specialized centers for endocrinology and diabetes mellitus in Al- Sadar learning hospital in Al- Najaf city and duration of their disease rang from (1-21) years. **[7]**

Dental Examination:

The dental examination was performed on the dental chair and by using dental mirror and graduated periodontal probe,the patients who were chosen in this study had to have up to fifteen teeth and the wisdom molars were involved to measure the distance from the free gingival margin to the dentogingival junction which representing the depth of gingival sulcus. **[8]**

Statistical analysis

Statistical analysis was done by using SPSS (statistical package for social sciences) version 20. In which we use chi square test for categorical data and independent sample t-test and Pearson correlation coefficient for numerical data. **[9]**

P value ≤ 0.05 as significant.

Results

A total of 40 subjects had been included in the study, twenty of them were diabetics and twenty were non diabetics.

The result showed a highly significant difference between the healthy subjects and the diabetic patients as shown in table (1).

Table (1). The depth of the gingival sulcus/ mm in diabetic patients and healthy subjects.

	Groups	Number	Mean	Standard. Deviation	P value
Depth of gingival sulcus/mm	Control	20	1.365	0.746	<0.001
	Diabetics	20	4.44	0.864	

There is a highly significant positive relationship between duration of diabetes mellitus and the depth of the gingival sulcus(r=0.732) as shown in **figure 1**.

Discussion

The tissues which are responsible for attaching the teeth and supporting them during health and functional constitute are known as the periodontium, these tissues are comprised of the gingiva that covers the alveolar bone of the maxillary and the mandibular arches and the periodontal attachment apparatus which attaches the tooth to the jaw and includes the cementum, periodontal ligament and lastly the alveolar bone as shown in the figure (1). In the normal periodontium, the gingiva that are surrounding the neck of the tooth, its like a collar in its form, so normally there will be a shallow space with a range between 0.5 to 3 mm formed between the free gingival margin and the crown of the tooth, this space between the crown of the tooth and the gingival tissue is known as the gingival sulcus **(Hanes and Krishna, 2010)**, as shown in **figure (2).**

The result of the study displayed that there was a highly significant difference between group I (control) and group II (diabetic) regarding the depth of the gingival sulcus and thus agree with **(Herring and Shah, 2006)** who found that there will be a highly destruction of the periodontal

ligaments in diabetic patients due to periodontal disease, so the depth of gingival sulcus may expand, in this case it is referred to as a gingival pocket.

Intergroup comparison of diabetic patients showed that there was highly significant positive correlation between duration of diabetes mellitus and the depth of gingival sulcus and thus agree with **(Hanes and Krishna, 2010)** who found that due to increase duration of diabetes mellitus there will be increasing the risk of more severe periodontal disease with greater loss of the periodontal attachment, bone loss and deeper periodontal probing depth.

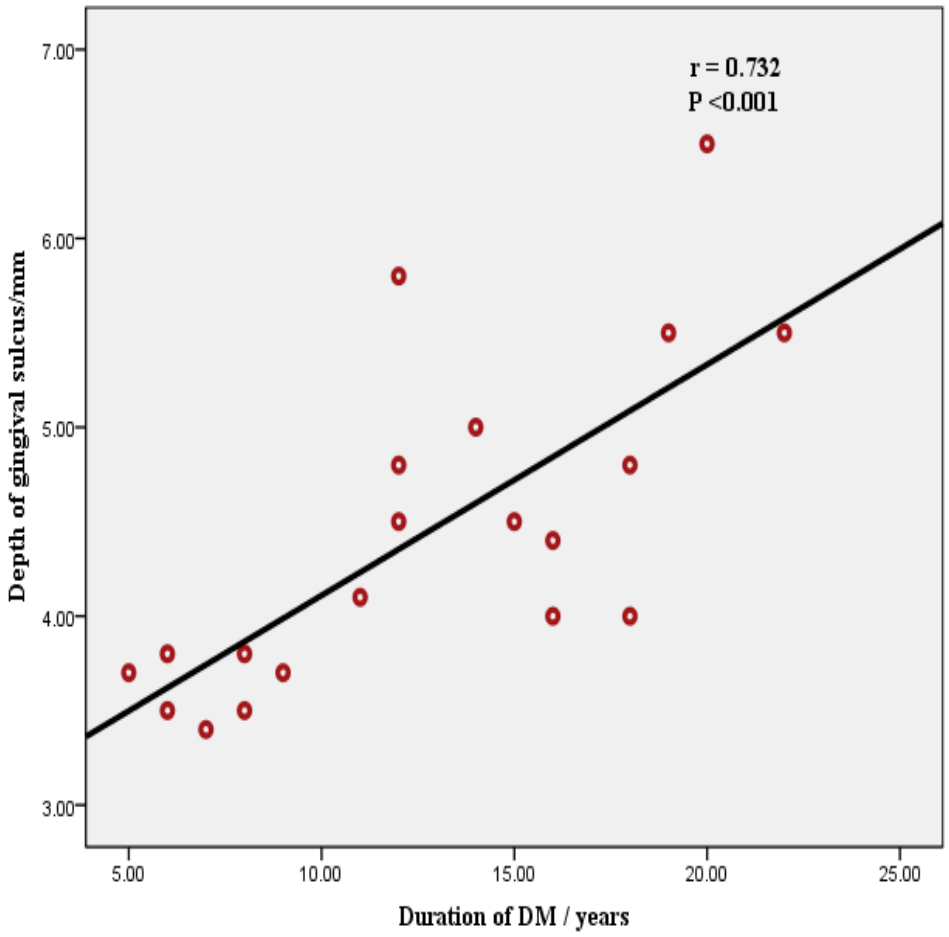
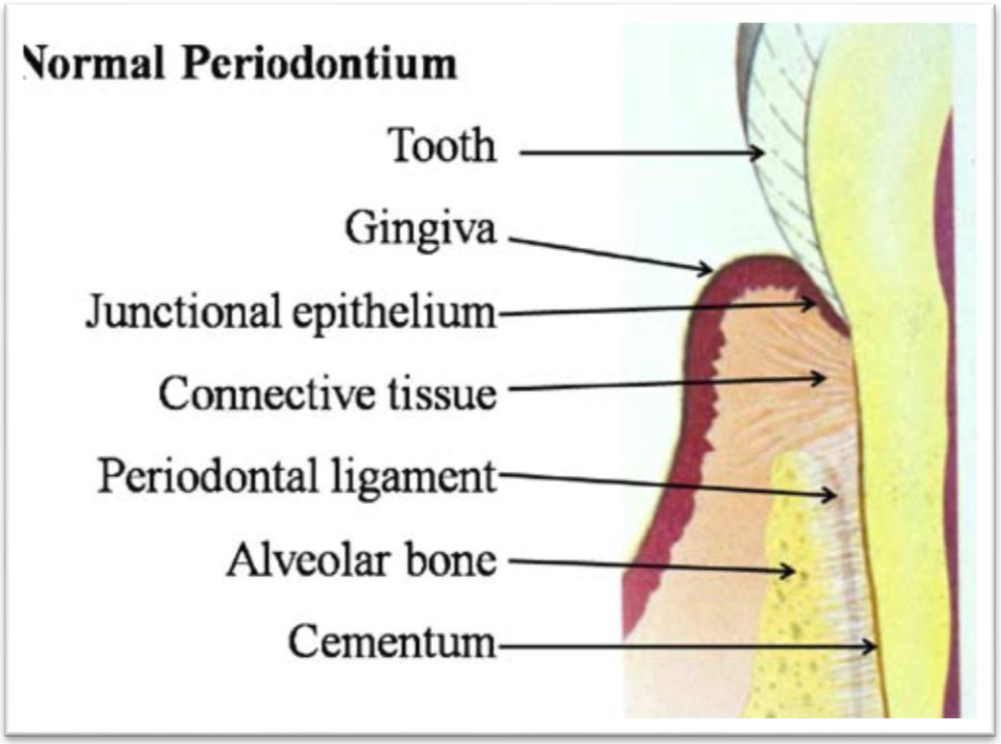
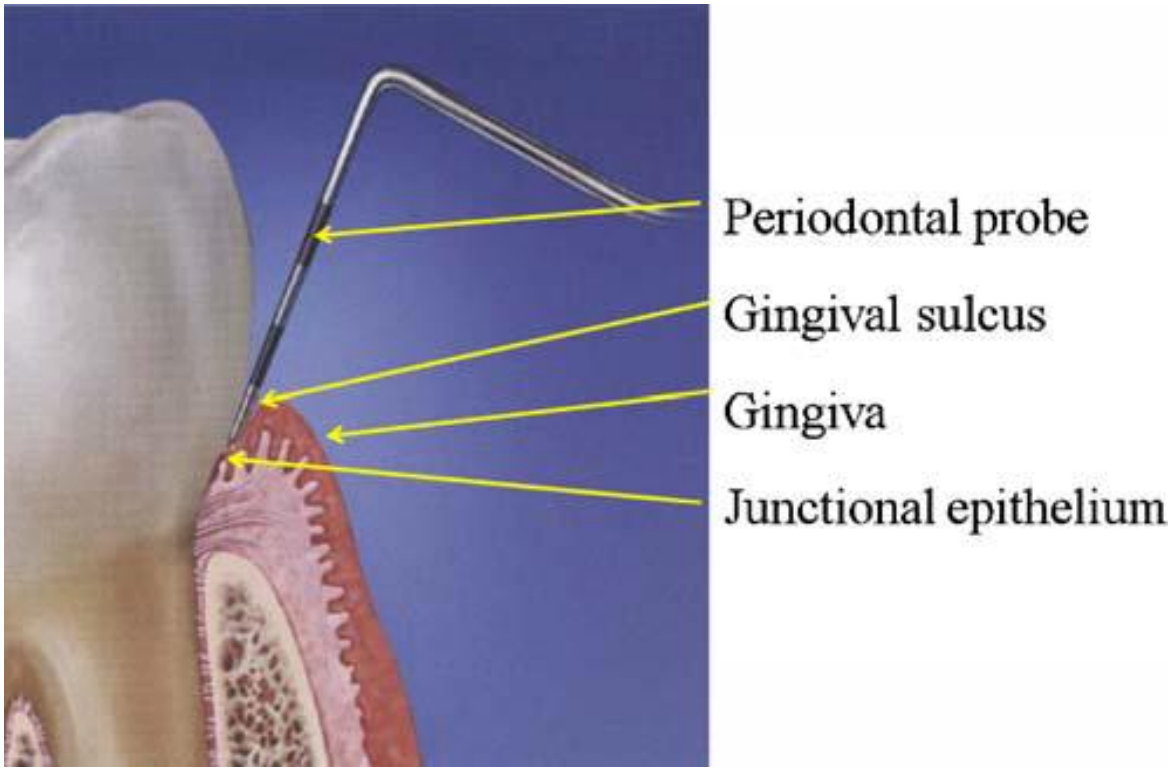


Figure (1). Relationship between duration of diabetes mellitus and the depth of the gingival sulcus.



Figur (2). Diagrammatic demonstration of the different constituents of the normal periodontium



Figur (3). Gingival sulcus.

References

1. D.Mathews " The Relationship between diabetes and periodontal disease," Journal of the Canadian dental association, 68 (2002) 161-164.
2. G.Abdul-Wahab and Ahmed M.Ahmed "Assessment of some salivary enzyme levels in type 2 diabetic patients with chronic periodontistis (clinical and biochemical study)," Journal Baghdad college dentistry,27 (1) (2015) 138-143.
3. Y.Ying Y , E. Xiao and D. Graves" Diabetes mellitus related bone and periodontal disease," international journal of oral science,7(2015) 63-72
4. A.Vasconcelos, M. Soares,P. Almeida and T. Soares" Comparative study of the concentration of salivary and blood glucose in type 2 diabetic patients," Journal of Oral Science ,52 (2010) 293-298.
5. B.Mealy,"Periodontal disease and diabetes,"American Detal Association,137 (2006) 275-315.
6. P.Hanes and R. Krishna," Characteristics of inflammation common to both diabetes and periodontitis: are predictive diagnosis and targeted preventive measures possible?, "Europen Association for Predictive,Preventive and Personalised Medicine Journal ,2010; Vol (1) ,P:101-116.
7. L. Ibrahem and R. Abass ,"periodontal health status and biochemical study of gingival crevicular fluid among diabetic and non diabetic(comparative study)," Jornal Baghdad collage of dentisty , 20 (2008) 52-57
8. D. Abbas "Relationship between severity of periodontitis and serum lipid profile in type 2 diabetic patients," Iraqi J . Comm. Med., 3 (2013) 229-233.
9. Chap. T.Le , Lynn E. Eberly, introductory biostatistics , second edition 2016.
10. M .Herring and S Shah," periodontal disease and control of diabetes mellitus," the journal of the American Osteopathic Association, 106 (2006) 416-421.