

# Research Paper: Comparison of oral mucosal soft tissue lesions prevalence in diabetic patients and healthy subjects



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## ABSTRACT

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**Introduction:** Type 2 diabetes is one of the most common chronic diseases caused by environmental and genetic factors. The development of diabetes affects all organs of the body. Oral complications of diabetes cause discomfort and dissatisfaction for affected patients. In this study, we aimed to compare the prevalence of oral lesions between patients and healthy persons.

**Materials and Methods:** In this study, complete oral examinations were performed to detect and record any type of oral lesion in 37 diabetic patients and 41 healthy individuals. The prevalence of each lesion was determined separately, and then overall prevalence of lesions was documented to analyze groups by mann-whitney & Friedman test and chi-square test by spss21.

**Results:** Median-rhomboid glossitis, oral candidiasis, angular cheilitis, burning mouth, fissured tongue, geographic tongue and dry mouth were higher in the diabetic group; but only burning mouth and dry mouth were significantly higher. The prevalence of total oral lesions was significantly higher in the diabetic group (94.6%) than in the healthy group (65.9%) ( $p=0.002$ ).

**Conclusion:** The high prevalence of oral lesions in diabetic patients indicates that screening of at risk patients; and monitoring of affected patients is very important, and dentists can play a critical role.

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## Introduction

Diabetes mellitus is a very common metabolic disorder that alters the metabolism of carbohydrates, proteins, and fats. The main symptom is elevated blood glucose (hyperglycemia), which is caused by a lack or deficiency in insulin secretion or resistance of insulin receptors or both. Diabetes mellitus is classified according to etiologic factor and risk factors into two types: 1 and 2. Type 1 diabetes mellitus is common with the autoimmune mechanism at an earlier age. Type 2 diabetes is caused by important genetic and environmental factors such as obesity and physical inactivity, at an older age. (1) The prevalence of type 2 diabetes mellitus is on the rise, with more than half a billion people predicted to be affected by the year 2040.(2)

Hyperglycemia affects all tissues and organs of the body such as the kidneys, eyes, peripheral nerves and blood vessels and can lead to death due to increased cardiovascular and cerebrovascular risks.(3, 4) The severity of these complications seems proportional to the level of hyperglycemia. Diabetes mellitus causes various and sometimes serious manifestations in oral tissues, including: xerostomia; bacterial, viral and fungal infections (such as candidiasis and rarely mucormycosis); increased severity and incidence of gingivitis, periodontitis and dental caries; burning sensation; pain; paresthesia; dysgeusia and delayed wound healing. It is reported that the most consistent finding among these manifestations is an increase in the incidence and severity of periodontal disease.(5-7)

Various complications of diabetes, especially in oral cavity, have a great impact on patients' quality of life in long term. lifestyle modifications can prevent type 2 diabetes and its associated complications, improve quality of life and survival. Studies on the prevalence of oral manifestations in diabetic patients are limited and inconsistent, so we compared the prevalence of some oral manifestations in type 2 diabetic patients with healthy controls.

## Methods and materials

This study was a descriptive cross-sectional study. The patients group was composed of 37 Type 2 Diabetic patients and the control group was composed of 41 healthy individuals without systemic diseases who were recruited from Razi Hospital of Rasht Hospital and Oral Medicine Department of Dental School in 1396, After matching age and sex.

A checklist consisting of information including age, sex, systemic disease, and duration of illness was completed for each individual. Inclusion criterion was type 2 diabetes mellitus. Exclusion criteria included other systemic diseases with oral manifestations, cigarette smoking, and denture use. After obtaining informed consent, all oral mucosal areas of the study participants, was clinically examined for ulcer, dry mouth, median rhomboid glossitis, angular cheilitis, presence of any kind of oral candidiasis, geographic tongue, fissured tongue and oral burning sensation. The clinical features of these lesions and their location were recorded in a checklist.

In this study, the data were coded and analyzed by SPSS 22 software in order to compare oral manifestations of type 2 diabetes and healthy controls. At first, quantitative data normality test was performed by Kolmogorov-Smirnov test. The results were analyzed by chi-square test for parametric variables; and by mann-whitney & Friedman test for non-parametric variables. Statistical significance was considered less than 0.05.

## Results

Patients with type 2 diabetes included 37 patients with mean age of  $51.65 \pm 10.62$  years and 41 healthy controls with mean age of  $52.82 \pm 10.81$  years. The patient group consisted of 16 males and 21 females; the control group consisted of 16 males and 25 females. The mean duration of disease was  $4.51 \pm 4.11$  years. The demographic distribution of the groups is presented in Table 1.

Table 1. Age and Gender Distribution

	Diabetic patients(37)	Healthy individuals (41)
Age	10.62 ± 51.65	10.81 ± 52.82
Gender Male	16 person(43.2%)	16 person(39%)
Female	21 person(56.8%)	25 person(61%)

Prevalence of oral lesions in the diabetic and control groups was 35 (94.6%) and 27 (65.9%), respectively, indicating that oral lesions were significantly higher in the diabetic group ( $p = 0.002$ ) (Table 2).

Table 2. prevalence of oral lesions in diabetic and healthy group

Oral lesions	Diabetic patients	Healthy individuals	p-value
Median-rhomboid glossitis	4(10.8%)	1(2.45%)	0.59
Oral candidiasis	8(21.6%)	5(12.2%)	0.862
Angular cheilitis	9(24.3%)	4(9.8%)	0.085
Burning mouth	16(43.2%)	8(19.5%)	0.023*
Fissured tongue	9(24.3%)	3(7.35%)	0.8
Geographic tongue	4(10.8%)	2(4.9%)	0.326
Dry mouth	24(64.9%)	12(29.3%)	0.002*
Sum	35(94.6%)	27(65.9%)	0.002*

## Discussion

In our study, oral lesions in diabetic patients were significantly higher than the control group, which is in compatible with the results of most studies.(8-10)

No significant relationship was found between gender and soft tissue lesions in the present study, which is similar to other studies.(11, 12)

In the present study, the most frequent lesions were dry mouth (64.9%), burning mouth (43.2%) and fissured tongue (24.3%). The results of studies on the most common oral lesion in diabetic patients are inconsistent, as candidiasis, hairy tongue, geographic tongue and gingivitis have been mentioned in various studies. However, dry mouth is also a common complication of diabetes in some studies and reference books.(13-15)

The mechanism of dry mouth of diabetic patients has been attributed to increased plasma glucose levels. Urine increases as a result of hyperglycemia, followed by a decrease in extracellular fluid, leading to a decrease in salivary secretion. Changes in the peripheral nerves of the mouth have also been mentioned as another factor in reducing salivary secretion in affected patients. On the other hand, changes in saliva composition can also cause xerostomia.(16-18)

One of the major complications of diabetic patients is neuropathy that may involve the peripheral and autonomic nerves. Burning mouth occurs due to neuropathy involving the peripheral sensory nerves of the mouth. Oral neuropathy can also cause other symptoms such as pain, numbness and dysesthesia. There was no significant relationship between the duration of diabetes and burning mouth in the present study, which was in contrast with the result of some other studies.(19-21)

Among diabetic patients, 10.8% had geographic tongue and 24.3% had fissured tongue. Similar results were obtained in other studies and reported high prevalence of these lesions in Guilan and Iran.(22-25)

In the present study, oral candidiasis and candida associated lesions such as median-rhomboid glossitis and angular cheilitis were more common in diabetic patients than healthy controls, but this difference was not significant. Other studies have noted this difference to be significant, which may be justified by the limited number of statistical populations in the present study. Higher prevalence of candidiasis in diabetic patients can be attributed to altered immune function, higher susceptibility to infection, and decreased salivary secretion of these patients.(24, 26, 27)

## Conclusion

According to the findings of the study, diabetic patients are at risk of various oral lesions that can affect the function of oral structures, quality of life and sometimes optimal control of diabetes itself. Some of these complications, such as dry mouth and neuropathy, which are

the most common complications in the present study, regress with early diagnosis and treatment of diabetes. Therefore, screening of at-risk individuals for early detection and behavioral correction is important. Dentists must play an active role in screening patients with suggestive signs and symptoms of diabetes as a member of the medical community. On the other hand, optimal levels of plasma glucose control can prevent diabetes complications in the body, including the mouth, indicating the importance of monitoring diabetes control in patients.

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