

# Change in the Frequency of occurrence in the Oral Manifestations between Controlled and Uncontrolled Type 1 & Type 2 Diabetes Mellitus- A Pilot Study

Yadav B<sup>1</sup>, Mody B<sup>2</sup>, Lakhanpal M<sup>3</sup>, Suma GN<sup>4</sup>, Aggarwal P<sup>5</sup>

## Abstract :

**Aim:** To compare the oral manifestations in controlled and uncontrolled Type 1 & Type 2 Diabetes Mellitus. **Materials & Method:** A total of 40 patients were included which were divided equally into four groups: uncontrolled & controlled Type 2 Diabetes Mellitus (T2DM) and uncontrolled & controlled Type 1 Diabetes Mellitus (T1DM). Blood Sugar (fasting, postprandial, random), urine sugar and urine protein were done for all the patients. Oral manifestations were recorded for all the patients and patients with opportunistic infections and mucosal lesions were subjected to cytological and histopathological investigations. **Results & Conclusion:** The oral manifestations in uncontrolled diabetics are more severe and more prevalent as compared to controlled diabetics.

**Abbreviations:** T1DM: Type 1 Diabetes Mellitus, T2DM: Type 2 Diabetes Mellitus, DM: Diabetes Mellitus.

**Keywords:** Type 1 Diabetes Mellitus, Type 2 Diabetes Mellitus, Oral Manifestations.

## Introduction

Diabetes mellitus is a group of metabolic diseases characterized by hyperglycemia resulting from defects in insulin secretion, insulin action or both. Diabetes Mellitus can broadly be divided into Type 1 Diabetes Mellitus (T1DM) and Type 2 Diabetes Mellitus (T2DM). T1DM is caused by  $\beta$ -cell destruction, usually leading to absolute insulin deficiency. Whereas, T2DM is a combination of insulin resistance and  $\beta$ -cell dysfunction along with other factors.<sup>1</sup>

Oral diagnosticians are the first ones to observe and note the changes in the oral cavity caused as a result of Diabetes Mellitus (DM). The common oral manifestations include inflammation of gingiva, severe periodontitis,

oral ulcerations, candidiasis etc. These manifestations are the basis of identification of this disease by the oral diagnostician.

## Aim & Objective

Whatever may be the type of diabetes it is associated with oral manifestations. Hence it becomes the duty of oral diagnosticians to combine their knowledge to:

1. Compare the frequency of occurrence of the oral manifestations in controlled and uncontrolled T1DM and T2DM.
2. Diagnose and educate the unaware diabetic patients on the basis of their oral manifestations so that they can avail adequate medical care in time.

With this background a pilot study was done with an aim to compare the oral

**Corresponding Author :** Dr Bhawna Yadav, PG Student, Department of Oral Medicine and Radiology, ITS-CDSR, Muradnagar, Ghaziabad, UP, India. (M) +91-9953690232 E-mail : dr.bhawmayadav@gmail.com

1. PG Student, Department of Oral Medicine & Radiology, ITS-CDSR, Muradnagar, Ghaziabad.
2. PG Guide, Professor, Department of Oral Medicine & Radiology, ITS-CDSR, Muradnagar, Ghaziabad.
3. Associate Professor, Department of Oral Medicine & Radiology, ITS-CDSR, Muradnagar, Ghaziabad.
4. Professor, Department of Oral Medicine & Radiology, ITS-CDSR, Muradnagar, Ghaziabad.
5. Head of Department, Hormone Care Research Centre, Ghaziabad.

manifestations of controlled and uncontrolled T1DM & T2DM.

### Materials & Method

The study took place at the department of Oral Medicine, Radiology & Diagnosis, I.T.S-CDSR, Muradnagar, Ghaziabad, Uttar Pradesh, India and the laboratory investigations at the Hormone Care Research Centre, Ghaziabad, Uttar Pradesh, India. Ethical clearance was obtained by the departmental ethical committee prior to the study.

The study consisted of a total of 40 patients divided equally into four groups:

Group 1 (n=10) consisted of Uncontrolled T1DM patients,

Group 2 (n=10) consisted of patients with T1DM controlled,

Group 3 (n=10) had patients with uncontrolled T2DM and

Group 4 (n=10) included patients with controlled T2DM.

All the patients having controlled DM were the ones who were previously diagnosed as diabetic, and were being treated by a physician. Those included in the uncontrolled DM group were the ones who were newly diagnosed as Diabetics at Hormone Care

Research Centre, Ghaziabad and who had not undergone any treatment for diabetes. All the patients were selected randomly and were age and sex matched.

Patients having either T1DM or T2DM and willing to participate in the study were included. The exclusion factors included patients with mental or secondary systemic illness, pregnant or lactating mothers, patients with deleterious habits like alcohol, smoking and patients on any form of medications except for DM.

A written informed consent was obtained from all the patients and a detailed extraoral and intraoral clinical examination was carried out. All the findings were noted in a customized performa. Blood Sugar (fasting, postprandial, random), urine sugar and urine protein were obtained for all the patients. Patients with opportunistic infections and other mucosal lesions were subjected to cytological & histopathological examination.

### Results

In the T1DM group four patients were males and six were females in an age range of 3-30 years. In T2DM group five patients were males and five were females in an age range of 45-82 years. (Table 1)

**Table 1: Distribution of patients with T1DM & T2DM**

Type of Diabetes Mellitus	Males	Females	Age (years)
Type 1 Diabetes Mellitus	4	6	3-30
Type 2 Diabetes Mellitus	5	5	45-82

Oral symptoms were absent in all the patients with T1DM. While examining the hard tissues, dental caries were found in 90% of the patients with uncontrolled T1DM as compared to 40% of the patients with controlled T1DM. During soft tissue examination of patients with T1DM, almost all of uncontrolled T1DM complained of redness, inflammation and bleeding from gums (Fig. 1). Periodontitis was found in 70% of the patients with uncontrolled T1DM and 10% of the patients with controlled T1DM. (Table 2)



**Fig. 1:** Red and inflamed gingiva in patient with uncontrolled T1DM.

**Table 2: Comparison of hard and soft tissue examination of patients with controlled and uncontrolled T1DM**

Hard and soft tissue examination	Uncontrolled T1DM	Controlled T1DM
Dental Caries	90%	40%
periodontitis	70%	10%

Oral symptoms like altered taste and burning mouth were observed in both the controlled as well as uncontrolled T2DM patients. Altered taste was observed in 90% of the patients with uncontrolled T2DM as compared to only 20% of the patients with controlled T2DM. Burning mouth was observed in 70% of the patients with uncontrolled T2DM and only 10% of the patients with controlled T2DM.

While examining the hard tissues, dental caries was found in 80% of the patients with uncontrolled T2DM as compared to 60% of the patients with controlled T2DM. In the T2DM uncontrolled group 20% of the patients were edentulous and the rest 80% were partially edentulous, while 40% of the patients with controlled T2DM were partially edentulous. During soft tissue examination,

periodontitis was observed in all the patients with uncontrolled T2DM as compared to 50% of the patients with controlled T2DM (Table 3) (Fig. 2).



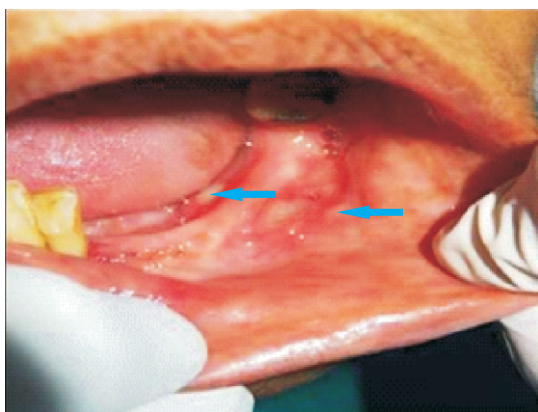
**Fig. 2:** Periodontitis and missing lower anterior teeth in patient with uncontrolled T2DM.

**Table 3: Comparison of hard and soft tissue examination of patients with controlled and uncontrolled T2DM**

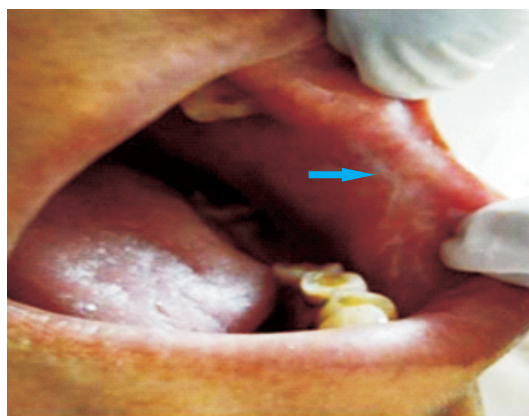
Hard and soft Tissue Examination	Uncontrolled T2DM	Controlled T2DM
Dental Caries	80%	60%
Partially Edentulous	80%	40%
Periodontitis	100%	50%

The oral lesions observed in the T2DM group included oral ulcers, candidiasis and oral lichen planus. Multiple oral ulcers were observed in 30% of the patients with uncontrolled T2DM (Fig. 3). Candidiasis was

observed in 20% of the patients with uncontrolled T2DM and reticular lichen planus (Fig. 4) was observed in 10% of the patients with uncontrolled T2DM. (Table 4)



**Fig. 3:** Multiple ulcers in the floor of the mouth in patient with uncontrolled T2DM.



**Fig. 4 :** Lichen planus on the left buccal mucosa in patient with uncontrolled T2DM.

**Table 4: Comparison of oral lesions in patients with controlled and uncontrolled T2DM**

Oral Lesions	Uncontrolled T2DM	Controlled T2DM
Oral Ulcers	30%	0%
Oral Lichen Planus	10%	0%
Candidiasis	20%	10%

## Discussion

Diabetes mellitus is a chronic metabolic disease that affects oral disease progression. In diabetic patients, the oral tissues react and produce characteristic manifestations which not only destroy the oral tissues but also produce characteristic oral manifestations. The various oral manifestations reported include dental caries, salivary dysfunction, oral mucosal diseases, oral infections such as candidiasis, taste and other neurosensory disorders.<sup>2</sup>

Oral symptoms and mucosal lesions were absent in patients with T1DM. This may be due to the small sample size of the patients. Increased incidence of dental caries and periodontitis was found to be more in patients with uncontrolled T1DM as compared to controlled T1DM. Which is in accordance with previous studies.<sup>3</sup> It has been observed that patients with T1DM have an exaggerated gingival inflammatory response to a bacterial challenge as compared to that found in non-diabetics.<sup>4</sup> In addition, patients with T1DM may have more Gram-negative bacteria than controls.<sup>5</sup>

Taste is a special function of tongue due to taste buds. Uncontrolled T2DM have an altered taste sensation which displays a degree of speciality towards glucose. Taste disturbance has also been reported to lead to poor glycemic control by inhibiting the ability to maintain a good diet.<sup>6</sup>

Numerous contributing factors are responsible for increased susceptibility of diabetics to periodontal diseases. Compromised polymorphonuclear leukocyte function resulting from impaired neutrophil adherence, chemotaxis, and phagocytosis prevent destruction of bacteria in the periodontal pocket and markedly enhance

periodontal destruction. Abnormalities of collagen metabolism, impaired proliferation of osteoblasts and weakened mechanical properties of newly formed bone have been documented in hypoglycemic patients.<sup>7</sup> In the present study periodontitis was found in all the patients of uncontrolled T2DM as compared to only 50% of the patients with controlled T2DM.

Lichen planus is a chronic inflammatory disease of the skin and mucosa whose exact aetiology is not known. There have been studies in the past which have shown a positive correlation between T2DM & lichen planus. The association of oral lichen planus and diabetes mellitus remains a subject of research due to a common autoimmune background of both the diseases.<sup>8</sup>

It is important for the clinicians to understand and recognise the changing scenario in controlled and uncontrolled states. A dentist may be the first to observe changes in the oral cavity as a result of diabetic state. Also, even though the manifestations of the disease may not be evident clinically, it does not imply that the disease is absent as it may be present in its latent stage. The changing scenario in the controlled state is an important clinical indicator for good diagnosis and herein lies the importance of such studies. The present study is being actively pursued in large number of patients for better validity.

## Conclusion

From the present study it is evident that the oral manifestations in uncontrolled diabetics are more severe as compared to controlled diabetics. Furthermore, intense monitoring and prevention as well as early treatment is necessary in both the controlled and uncontrolled diabetic patients to prevent the ravaging effect of diabetes.



## Limitations

This study had certain limitations.

1. The sample size was small and was restricted to a limited geographic area.
2. Furthermore no correlation of the duration of DM was done with the severity of oral disease progression.
3. A case control study following the patients before start of treatment would be more appropriate.

So future studies with larger sample size over a large population are recommended to further validate the results.

## References

1. The Expert Committee on the Diagnosis and Classification of Diabetes Mellitus: Report of the Expert Committee on the Diagnosis and Classification of Diabetes Mellitus. *Diabetes Care*.2006 Jan; 29 (Supply):S43-S48.
2. Ship JA .Diabetes & oral health: an overview.*JADA* 2003, 134 (suppl): 4S-10S.
3. Gupta S, Anand CK. A comparative study on oral manifestations of controlled & uncontrolled type 2 diabetes mellitus. *JIAOMR* 2011;23(4):521-6.
4. Salvi GE, Kandylaki M, Troendle A, Persson GR, Lang NP. Experimental gingivitis in type 1 diabetics: a controlled clinical and microbiological study. *J Clin Periodontol* 2005;32:310–6.
5. Sandholm L, Sw anljung O, Rytomaa I, Kaprio EA, Maenpaa J. Morphotypes of the subgingival microflora in diabetic adolescents in Finland. *J Periodontol* 1989;60:526–8.
6. Perros P, Counsell C, Wallace Mac Farlane T, Frier BM. Altered taste sensation in newly diagnosed non-insulin-dependent diabetes mellitus. *Diabetes Care* 1996;19:768-70.
7. Mealy BL, Oates TW. Diabetes mellitus and periodontal diseases. *J Periodontol*. 2006;77:1289-303.
8. Petrou-Amerikanou C, Markopoulos AK, Belazi M, Karamitsos D,Papanayotou P. Prevalence of oral lichen planus in diabetes mellitus according to the type of diabetes. *Oral Dis* 1998;4(1):37-40.

**Source of Support:** NIL

**Conflict of Interest:** None Declared