

**Ministry of Higher Education  
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College of Dentistry**



# **Assessment of Oral Findings, Salivary Calcium, Zinc, Vitamin B12 and Brain Derived Neurotrophic Factor in Type 2 Diabetes Mellitus Patients under Therapy**

A Thesis

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## **Abstract**

### **Background**

Diabetes mellitus is a chronic, progressive, incompletely understood metabolic condition chiefly characterized by hyperglycemia. Impaired insulin secretion, resistance to tissue actions of insulin, or a combination of both are thought to be the commonest reasons contributing to the pathophysiology of type 2 diabetes mellitus. Diabetes treated by several classes of hypoglycemic medications that cause many oral side effects and have great effect on salivary glands and alters the quantity and quality of saliva and produce changes on salivary composition. Metformin and Glibenclamide are examples of these important widely used anti-diabetic agents.

### **Aims of the study**

The aim of this study was to investigate the effect of two different types of hypoglycemic agents (metformin monotherapy and combination therapy of metformin and glibenclamide) on the oral findings including (Burning mouth sensation, xerostomia and oral ulceration), salivary calcium and zinc, physical properties of saliva, salivary cobalamin (vitamin B12), and salivary brain derived neurotrophic factor.

### **Subjects, Materials and Methods**

In this study male subject only included with age ( $\geq 40$  years old) were divided into three groups:

**Group 1:** healthy control group,

**Group 2:** patients with type 2 diabetes under treatment of metformin as a monotherapy 500mg twice/day and duration at least 6 months, and

**Group 3:** patients with type 2 diabetes treated with combination of metformin 500mg twice/day and glibenclamide 5mg once/day and duration at least 6 months.

Oral examination was done for each participant and the oral manifestations were recorded. Unstimulated whole saliva samples were collected to measure salivary calcium, salivary zinc, vitamin B12 and brain derived neurotrophic factor and comparing the results with each group. Salivary flow rate was calculated milliliters per minutes and salivary PH was measured by digital PH meter. Body mass index for all participants was recorded.

The level of calcium and zinc in saliva samples were measured by atomic absorption spectrophotometry method, whereas the salivary vitamin B12 and brain derived neurotrophic factor concentrations were measured by enzyme linked immunosorbent assay ELIZA.

## **Results**

Burning mouth sensation, xerostomia and oral ulcers were seen in both patients groups. Statistical analysis showed significant increase in burning mouth sensation and xerostomia among the study groups. Salivary flow rate was lower in both patients groups as compared to control group. Also there was a significant decrease in salivary PH among the study groups.

Statistical analysis revealed that there was a significant decrease in the vitamin B12 in both patients groups as compared to control and salivary brain derived neurotrophic factor was significant higher in combination group as compared to control and metformin monotherapy group. Salivary calcium was increase in metformin group as compared to control and combination groups, although statistically non-significant and in regards to salivary zinc, statistical analysis revealed that there were non-significant differences among the study groups.

## **Conclusion**

Burning mouth sensation and xerostomia are common oral findings in type 2 diabetes patients and noticed more in those patients taking combination therapy. In addition, there was pronounced reduction in salivary flow rate and PH in both

patients groups, however vitamin B12 and brain derived neurotrophic factor and zinc were noticed higher in combination therapy as compared with monotherapy group.