

ORIGINAL ARTICLE**EVALUATION OF SALIVARY COPPER AND ZINC LEVELS IN ORAL SUBMUCOUS FIBROSIS PATIENTS**Dipten Dey¹, Savita. S. Thakkannavar², Manish Kumar², Silvie Singh³, Srikartik Kona², Sipra Salaria⁴¹Senior Lecturer, Oral Pathology, Surendera Dental College and Research Institute, SGNR, Rajasthan,²Senior Lecturer, Oral pathology, ³Tutor, Tatyasaheb Kore Dental College and Research Center, Kolhapur⁴MDS, Oral Medicine Radiology, Private practitioner**ABSTRACT:**

Background: Elements which are present or required in minute quantities are known as Trace element (TE). These TEs play an imperative role in numerous physiological and metabolic processes in humans. Metal ions are necessary for humans as more than 25% of the enzymes need to be activated by them. Past studies have highlighted the role of these trace elements in the pathogenesis of Oral Submucous Fibrosis. However; no convulsive evidence has been stated regarding the role of these trace elements. Hence, we evaluated the salivary Cu and Zn levels in OSMF patients. **Materials & Methods:** The present study was carried in the department of oral pathology of the institution and included a total of 60 patients. All the patients were divided into two groups; Group A consisted of 30 patients that were histologically diagnosed with OSMF. Group B consisted of patients that were control and didn't have any oral lesion. Salivary Cu and Zn levels were estimated. All the results were analyzed by SPSS software. Chi square test were used for the assessment of level of significance. **Results:** Mean salivary Cu levels in OSMF and normal control patients were 0.087 and 0.055 respectively. Mean salivary Zn levels in both OSMF and normal control patients were 0.102. Significant alterations were observed while comparing the mean salivary Cu levels in the two study groups while comparing the mean salivary Zn levels, no significant alterations was seen. **Conclusion:** Salivary markers can be used for predicting the prognosis and diagnosis of the disease.

Key words: Copper, Salivary, Zinc

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INTRODUCTION

Elements which are present or required in minute quantities are known as Trace element (TE). These TEs play an imperative role in numerous physiological and metabolic processes in humans. Metal ions are necessary for humans as >25% of the enzymes need to be activated by them.^{1, 2} Past studies have highlighted the role of these trace elements in the pathogenesis of Oral Submucous Fibrosis. However; no convulsive evidence has been stated regarding the role of these trace elements.³ Hence, we evaluated the salivary Cu and Zn levels in OSMF patients.

MATERIALS & METHODS

The present study was carried in the department of oral pathology of the institution and included a total of 60 patients. All the patients were divided into two groups; Group A consisted of 30 patients that were histologically diagnosed with OSMF. Group B consisted of patients that were control and didn't

have any oral lesion. All the patients that had history of any past illness, any systemic diseases and any known drug allergy were excluded from the present study. All the patients were explained about the study, and informed consent was acquired. An approval was obtained by the Ethical Committee of the Institutional Review Board to proceed with the research. A detailed case history including demographic information, general history, details of diet, habits, and socioeconomic status of the patients were recorded. The clinical examination of the lesion which included various parameters pertaining to the symptoms of the patient such as mouth opening, palpable bands, tongue protrusion, and deviation of the uvula were noted.. Subjects were instructed to bend forward their head so that saliva will move toward the anterior region of the mouth. The pooled saliva was allowed to drool into the wide bore sterile container. Saliva sample was centrifuged at 1200 g for 5 min at the cold

centrifugation. This process provides a saliva sample free of large debris and of reduced viscosity, allowing more accurate and reproducible analysis. Salivary Cu and Zn levels were estimated. All the results were analyzed by SPSS software. Chi square test were used for the assessment of level of significance.

RESULTS

Graph 1 highlights the mean value of salivary Cu and Zn levels. Mean salivary Cu levels in OSMF and normal control patients were 0.087 and 0.055 respectively. Mean salivary Zn levels in both OSMF and normal control patients were 0.102. **Table 1** highlights the comparison of mean salivary Cu and Zn levels in OSMF patients and normal control. Significant alterations were observed while comparing the mean salivary Cu levels in the two study groups while comparing the mean salivary Zn levels, no significant alterations was seen.

Graph 1: Mean Salivary Copper and Zinc levels (ppb) in patients of both the groups

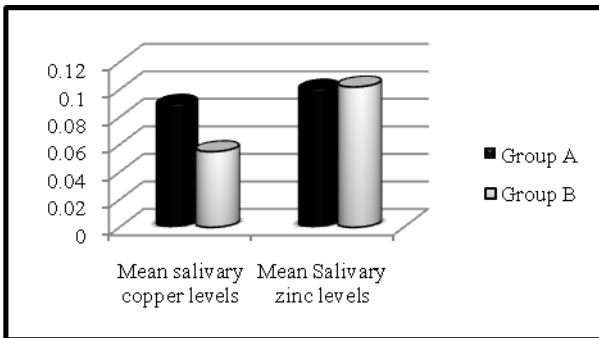


Table 1: Comparison of mean salivary copper and zinc levels in patient of group A and group B

Parameter	p-value
Mean salivary copper levels	0.002 (s)
Mean salivary zinc levels	0.120 (ns)

S: Significant, n.s: Significant

DISCUSSION

In various physiological metabolic processes, trace elements play, directly or indirectly, an important role. Metal ions are required to activate more than 25% of the enzymes in the body.⁴ Bioelements e.g. Copper and zinc are involved in vital biochemical activities like different redox and free radical formation and in maintaining cellular proton homeostasis. Copper is present in many enzymes involved in oxidation. Zinc is involved in carbonic acid (carbonic anhydrase), in proteolysis (carboxy peptidase, leucine amino peptidase, etc.).^{5, 6} Hence,

we evaluated the salivary Cu and Zn levels in OSMF patients.

In the present study, we observed significant increase in the salivary copper in the OSMF group when compared to normal control group. For regulation of cell cycle and cell division and also essential for DNA polymerase activity, Zinc is very essential. It is also particularly important for rapid cell proliferation encountered in growing tumors. Bloniarz *et al*, compared the copper, zinc levels in saliva of patients with oral cancer to the control group and observed that these elements were significantly higher in the case group when compared to controls. They found that copper and zinc levels were higher in case group when compared to control group.⁷ The unstimulated whole saliva is used in the present study because, the anatomical proximity of saliva to both premalignant and malignant oral neoplasm's, saliva could be ideal for screening of these lesions and highly specific and sensitive analytical methods are currently available allowing measurement of micro concentrations of various salivary components. From a logistical perspective the collection of saliva is safe i.e. No needle punctures, non-invasive and relative simple and collected repeatedly without discomfort to the patients.⁸ The major role of Cu in the pathogenesis of OSF has been well recognized. Various studies done by Ma *et al.*, and Trivedi *et al.*, have indicated that Cu dependent extracellular enzyme LO is upregulated in OSF. This upregulation in turn results in the excessive cross linkage of collagen, which is resistant to the degradative action of collagenase enzyme.⁹ Zn is physiologically and biologically essential for the normal development, growth and function in mammals.¹⁰ Zn is basically involved as a cofactor in carbonic anhydrase, carboxy peptidase, leucine peptidase and SOD. Zn is also an essential component for regulating cell cycle and cell division and is also an essential ion needed for the activation of DNA polymerase enzyme.¹¹ Our results were in correlation with the results of Trivedy C et al., who suggested that the increased copper levels in the saliva enhance the uptake of copper by the tissues and that this increase the levels of copper within the tissues.¹²

CONCLUSION

It can be concluded from the present study, that the serum trace element levels could be used as potential prognostic and diagnostic markers in the OSMF patients.

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