

ORIGINAL RESEARCH

Evaluation of role of trace elements in oral submucous fibrosis patients

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ABSTRACT

Background: This research had been carried out to evaluate the function of trace elements in oral submucous fibrosis subjects. **Material and methods:** There were 100 participants in all, 50 of whom were controls and 50 of whom had an OSMF diagnosis. Every patient had OSMF, which was verified by histological examination. A computerized autoanalyzer photometer was employed to examine blood samples obtained from 100 distinct individuals. This colorimetric study was performed to determine the blood's copper content. We employed statistical analysis to compare the case and control outcomes. **Results:** It was noticed that the levels of copper were reduced in the control cohort and high in study cohort. **Conclusion:** The most accurate method for diagnosing Oral Submucous Fibrosis (OSMF) is a biopsy; however, this procedure is also the most invasive and time-consuming. Many contemporary advancements are currently being employed to detect OSMF early and stop it from advancing to advanced and irreversible stages. Trace element testing may be helpful for patients with oral submucous fibrosis (OSMF) as a diagnostic and prognostic method.

Keywords: OSMF, trace elements

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INTRODUCTION

Oral submucous fibrosis (OSMF) is a chronic, precancerous condition, found to affect the South and South East Asian population, especially those of the Indian subcontinent.¹⁻⁵ It has now become an Indian epidemic with an estimated 2.5 million people being affected with this disease.⁶ It has been suggested that areca nut chewing, consumption of chillies, genetic susceptibility, nutritional deficiency, autoimmunity and collagen disorders may be involved in the pathogenesis of this condition. The most common etiology considered for causation of OSMF is "arecoline" which is a constituent of areca nut.⁷⁻⁹ Several studies have provided evidence that chewing of areca nut is the primary etiological factor for the development of OSF.¹⁰⁻¹³ In a case-control study, it was found that 98% of the patients with OSF chewed areca nut regularly, compared to 38% among the healthy controls.¹⁴ Maher et al. observed an increased risk of development of OSF in those who chewed areca nut (relative risk = 154).¹⁵ Hence, this study was conducted to assess the role of trace elements in oral submucous fibrosis patients.

MATERIAL AND METHODS

There were 100 participants in all, 50 of whom were controls and 50 of whom had an OSMF diagnosis.

Every patient had OSMF, which was verified by histological examination. A computerized autoanalyzer photometer was employed to examine blood samples obtained from 100 distinct individuals. This colorimetric study was performed to determine the blood's copper content. We employed statistical analysis to compare the case and control outcomes. SPSS software was used to conduct statistical analysis.

RESULTS

Table 1: Comparison of mean serum copper concentrations ($\mu\text{g/ml}$) in individuals of study group and control group.

Group	Mean copper concentrations ($\mu\text{g/ml}$)
Study group	212.84
Control group	120.36

The concentrations of copper had been discovered to be lesser in the control group as well as greater in the study group.

DISCUSSION

The copper which is released during chewing is brought in direct contact with the oral mucosal keratinocytes and it is present in the oral environment. It is dissolved in the whole saliva for a prolonged

period (up to 30 minutes). Following chewing, the uptake of copper into the epithelial cells occurs probably by a non energy dependent diffusion, where it is either bound to the proteins (mainly metallothioneins) or transferred across the basement membrane.¹⁶ The absorbed copper appears in the blood stream in as little as 15 minutes after its ingestion.

Various studies have shown that areca nut chewing, nutritional deficiencies, immunity of the person and genetic predisposition play a part in the initiation and progression of the disease process. OSF is strongly associated with a risk of OSCC with a malignant transformation rate of 7.6% over a period of 17 years.¹⁷ The prevalence of oral precancerous lesions is much higher than that of oral cancer and these lesions provide useful clinical markers for oral cancer.¹⁸ Trace elements are required in small concentrations as essential components of biological enzyme systems or structural portions of biologically active constituents. Hence, this study was conducted to assess the role of trace elements in oral submucous fibrosis patients.

In this study, the concentrations of copper had been discovered to be lesser in the control group as well as greater in the study group.

A study was conducted by Yadav A et al¹⁹ on fifty subjects with clinically diagnosed oral submucous fibrosis (OSMF) and fifty controls with no apparent lesions of the oral mucosa and without any areca nut-related oral habit. The level of serum zinc was significantly ($P < 0.0001$) lower among cases (73.48 ± 24.21) compared with controls (119.48 ± 52.78). However, the serum copper level was significantly ($P < 0.0001$) higher among cases (155.50 ± 40.13) than controls (100.40 ± 24.52). The level of serum iron was observed to be lower among the cases (66.57 ± 27.76) as compared to controls (94.19 ± 35.70), and the difference was statistically significant. It was concluded from this study that serum zinc, copper, and iron levels could be used as a potential prognostic and diagnostic markers in OSMF patients.

Kode MA et al (2013)²⁰ compared the levels of the trace elements in patients with gutkha eating habits with or without oral submucous fibrosis and in healthy patients. A total of 75 patients were included in this study and they were divided into three groups; the individuals with a history of gutkha intake with OSMF, the individuals with a history of gutkha intake without OSMF and apparently healthy individuals without OSMF and without any habits. Blood and saliva were collected and they were subjected for analysis by using atomic absorption spectrometry and a differential pulse anodic stripping voltmeter. The results were tabulated and they were subjected to a statistical analysis. There was a significant difference in the serum Mg and Fe levels between the patients with habits and the normal healthy individuals. A significant difference was observed in the serum zinc levels in the patients with habits with and without OSMF. Altered serum trace element levels are

documented in malignant cases and they are considered to be good biomarkers for malignancies. The serum copper and Zn levels and the Cu/Zn ratio in OSMF patients can be considered as the markers which show a susceptibility towards cancer.

CONCLUSION

The levels of copper were found to be lower in the control group and higher in the study group. Oral submucous fibrosis (OSMF) patients may benefit from trace element testing as a diagnostic and predictive tool.

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