

**ORIGINAL ARTICLE****Assessment of Serum vitamin C levels in Oral Submucous Fibrosis patients: A Case-Control Study**Archana Kumari<sup>1</sup>, Sonali Roy<sup>2</sup><sup>1</sup>Senior Resident (Dental), Sri Krishna Medical College, Muzaffarpur, Bihar, India, <sup>2</sup>M.D.S.**ABSTRACT:**

**Background:** Oral submucous fibrosis (OSMF) precancerous condition and is chronic, resistant disease characterized by juxta-epithelial inflammatory reaction and progressive fibrosis of the submucosal tissues. The exact mechanism is not clear yet. Hence; we planned the present study to assess vitamin C levels in OSMF patients. **Materials & methods:** The present study was conducted with the aim of evaluating the serum vitamin C profile of patients with Oral submucous fibrosis. A total of 30 OSMF patients and 30 healthy controls were included in the present study. Complete demographic and clinical details of all the patients were collected. Diagnosis of OSMF was confirmed based on histopathologic and clinical signs and symptoms described previously in the literature.<sup>7</sup> 30 age and gender matched healthy subjects were included in the present study as healthy controls. Blood samples were collected from all the subjects and were sent to laboratory. Assessment of serum vitamin C levels was done using an auto-analyser.

**Results:** Mean vitamin C levels of the subjects of the control group was 1.05 mg/dl and was found to be significantly higher than that of the subjects of the study group (0.30 mg/dl). **Conclusion:** Vitamin C levels are significantly decreased in OSMF patients thus highlighting the amount of oxidative stress associated with the disease.

**Key words:** Oral submucous fibrosis, Vitamin C

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This article may be cited as: Kumari A, Roy S. Assessment of Serum vitamin C levels in Oral Submucous Fibrosis patients: A Case-Control Study. J Adv Med Dent Scie Res 2016;4(4):201-203.

**INTRODUCTION**

Oral submucous fibrosis (OSMF) precancerous condition and is chronic, resistant disease characterized by juxta-epithelial inflammatory reaction and progressive fibrosis of the submucosal tissues.<sup>1</sup> The exact mechanism is not clear yet. But the arecoline and flavonoid, components of areca nut when exposed to buccal mucosal fibroblast results in the accumulation of collagen. Reduced collagenase activity and increased cross-linking of the fibers results in decreased degradation of collagen.<sup>2-4</sup> This evidence implies that OSF may be considered a collagen-metabolic disorder resulting from exposure to areca nut. The most obvious changes occur in the extracellular matrix of the submucous tissue layer. Fibrosis is associated with quantitative and qualitative alterations of collagen deposition within the subepithelial layer of the oral mucosa.<sup>5, 6</sup> Hence; we planned the present study to assess vitamin C levels in OSMF patients.

**MATERIALS & METHODS**

The present study was conducted with the aim of evaluating the serum vitamin C profile of patients with Oral submucous fibrosis. A total of 30 OSMF patients and 30 healthy controls were included in the present

study. Complete demographic and clinical details of all the patients were collected. Diagnosis of OSMF was confirmed based on histopathologic and clinical signs and symptoms described previously in the literature.<sup>7</sup> 30 age and gender matched healthy subjects were included in the present study as healthy controls. Blood samples were collected from all the subjects and were sent to laboratory. Assessment of serum vitamin C levels was done using an auto-analyser. All the results were compiled in Microsoft excel sheet and were analysed by SPSS software. Chi-square test was used for assessment of level of significance.

**RESULTS**

In the present study, mean age of the subjects of the study group and the control of the present study was 44.5 and 45.6 years respectively. There were 20 males and 10 females in the subjects of the study group and 22 males and 8 females in the subjects of the control group. Mean vitamin C levels of the subjects of the control group was 1.05 mg/dl and was found to be significantly higher than that of the subjects of the study group (0.30 mg/dl).

**Table 1:** Demographic data

Parameter	Study group	Control group
Mean age (years)	44.5	45.6
Males	20	22
Females	10	8

**Table 2:** Vitamin C levels

Parameter	Study group	Control group	p- value
Vitamin C (mg/dl)	0.30	1.05	0.02*

\*: Significant

**DISCUSSION**

Oral submucous fibrosis (OSF) is a potentially malignant disorder (WHO, 2017) that causes fibrosis and inflammation of the oral mucosa. Although studies have attempted to explore the status of trace elements in OSF patients, results to date have been inconclusive. Differences exist in sample age, gender, biological samples (serum, plasma, and saliva), and laboratory methods used by the investigators. In addition, all these studies have measured multiple micronutrients (outcomes), which may have synergistic and antagonistic interactions.<sup>8-10</sup>

In the present study, mean age of the subjects of the study group and the control of the present study was 44.5 and 45.6 years respectively. There were 20 males and 10 females in the subjects of the study group and 22 males and 8 females in the subjects of the control group. Vitamin C (Vit. C) is one of the naturally occurring antioxidants in nature. Most plants and animals are able to synthesise Vit. C *in vivo* from glucose. Vit. C is essential for collagen biosynthesis. It has been proposed that Vit. C influences quantitative collagen synthesis in addition to stimulating qualitative changes in the collagen molecule. Vit. C serves as a co-factor for the enzymes prolyl and lysyl hydroxylase, the enzymes that are responsible for stabilizing and cross-linking the collagen molecules. Another mechanism by which Vit. C influences the collagen synthesis is by stimulation of lipid peroxidation, and the product of this process, malondialdehyde, in turn stimulates collagen gene expression.<sup>11-13</sup>

In the present study, mean vitamin C levels of the subjects of the control group was 1.05 mg/dl and was found to be significantly higher than that of the subjects of the study group (0.30 mg/dl). Guruprasad R et al analysed Vitamin C levels and iron levels in OSMF patients. Thirty five OSMF patients and 50 deleterious habit free healthy individuals (controls) were selected. Two ml of venous blood was collected from each individual. Vitamin C level in serum was estimated by 2-4 dinitrophenylhydrazine method and Iron estimated by Tripyridyl method. The level of Serum Vitamin-C and Iron was significantly decreased in OSMF patients when compared to controls which were statistically significant. On the basis of these observations, it seems possible that the chemical, thermal and/or mechanical factors associated with the use of areca nut may act in conjunction with the Vitamin C and Iron deficiency leading to the development of OSMF.<sup>14</sup>

Bhat S et al estimated the detoxification status of serum and saliva by assessing the serum and salivary Vitamin C in oral potentially malignant disorders and oral cancer. A total of 90 subjects, 30 subjects with oral potentially malignant disorders, 30 subjects with oral cancer, and 30

healthy subjects (controls) were included in the study. Serum and saliva were collected and levels of Vitamin C were assessed. Data obtained was analyzed using ANOVA test for the comparison between the groups. The mean serum and salivary Vitamin C levels were decreased significantly in potentially malignant disorders and oral cancer when compared to healthy subjects. As significant reduction of Vitamin C is seen in saliva, it can be stated that saliva can be used as a reliable, noninvasive biomarker in diagnosis and management of potentially malignant disorders and oral cancer.<sup>15</sup>

**CONCLUSION**

Under the light of above mentioned results, the authors conclude that vitamin C levels are significantly decreased in OSMF patients thus highlighting the amount of oxidative stress associated with the disease.

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