

In Oral Sub-Mucous Fibrosis: Taste Alteration Un-notified symptom – A Clinico-biochemical Research



Clinical Research

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ABSTRACT

Aim & Objective: To evaluate the gustatory functions of subjects with clinically diagnosed OSMF and to compare with a control group involving normal healthy adults.

Materials & method: 60 samples collected from our Dental department, GCRG Institute of Medical sciences and Hospital, Lucknow. Clinically diagnosed Oral Sub-mucous fibrosis (OSMF) and divided into two groups. Group 1 consists clinically diagnosed with OSMF and group 2 consist healthy individuals. Apply freshly prepare four tastants such sweet, salt, sour and bitter for gustatory evaluation and compare to healthy individuals.

Results: In this study unpaired-t test perform and obtained significant taste alteration was found with salt followed by sweet, bitter and sour.

Conclusion: Aside from increasing risk of cancer the change in taste perception in OSMF patients often leads to depression.

Introduction: Oral sub-mucous fibrosis (OSMF), first described in the early 1950s, is a potentially malignant disease predominantly seen in people of Asian decent. It is a chronic progressive disorder and its clinical presentation depends on the stage of the disease at detection. The majority of patients present with an intolerance to spicy food, rigidity of lip, tongue and palate leading to varying degrees of limitation of opening of the mouth and tongue movement along with taste alteration due to de-papillation. The hallmark of the disease is sub-mucosal fibrosis that affects most parts of the oral cavity; pharynx and upper third of the oesophagus.¹ Schwartz coined the term 'atropica idiopathica mucosae oris'. Subsequently, in 1953 Joshi coined the term 'oral sub-mucous fibrosis' for this condition.² OSMF is known to be prevalent in countries like India, Pakistan, Taiwan, China, Malaysia and Singapore.³ Overall prevalence of OSMF in India is about 0.5% with a range of 0.2 to 1.2% in different regions of the country.⁴ It has been suggested that, chewing areca nut and tobacco may be involved in the pathogenesis of this condition.⁵ The progressive inability to open the mouth due to fibrotic mucosal alteration, symptoms like burning sensation, difficulty in eating, swallowing, taste alteration and phonetics⁶ are of great concern to the patients. The prevalence reasons for the rapid increase of the disease are reported to be due to an upsurge in the popularity of commercially prepared areca nut preparations (pan masala) in India⁷ and an increased uptake of this habit by young people⁸ due to easy access, effective price changes and marketing strategies. Taste receptor cell found in the taste buds are located in the mouth, throat, larynx and esophagus.⁹ Taste dysfunction may be due to inflammation and infection in oral cavity that reduces blood flow to the tongue and interferes with saliva production^{3,10} and leads injury to the cell receptors or atrophy of taste buds. The major disabilities like Blanching, burning sensation, trismus or less mouth opening, tongue protrusion or movements and odynophagia that occur in the patient with OSMF are well-documented but impairment of the taste sensation or alteration have not received much attention.¹¹ Therefore, we decided to carry out a clinico-biochemical study on taste impairment or alteration by using liquid tastant for four basic tastes such as Sweet, salty, sour and bitter.

Aims and objective: To evaluate the gustatory function of subjects with clinically diagnosed oral sub-mucous fibrosis and compare with a control group involving healthy individuals.

Materials and method: This study was performed on 60 male subjects, age group 18 to 45 years considered. All subjects were

randomly selected from Department of Dentistry, GCRG Institute of Medical Sciences and Hospital, Lucknow. An informed consent was taken from the individual, who participated in the study. The subjects were divided into two groups, such as study group and control group. Group 1, study group (n = 30) with clinically diagnosed OSMF stage II, patient with a given history of chronic chewing of areca nut with tobacco for at least ≥ 5 years of duration subjects with systemic diseases like diabetes mellitus, hypertension and peripheral neuropathies were excluded. In group 2, control group (n = 30) with healthy individuals of same age and gender. Four different solutions for four basic tastes (sweet, salty, sour and bitter) in three different concentrations (low-C1, medium-C2 and high-C3) were freshly prepared for gustatory testing. Sucrose for sweet (0.1-1.0 mol/l), citric acid for sour (0.320-0.032 mol/l), quinine hydrochloride for bitter (0.01-1.0 mol/l), sodium chloride for salty (0.01-1.0 mol/l) were used. Two different tests, first being spatial or localized, and second being whole-mouth rinse tests were performed. For spatial/localized testing, the four different tastants in three progressively increasing concentration were directly applied with a cotton swab over the taste buds on the dorsum of the tongue, approximately for 5 seconds and taste intensity response score was recorded. For whole-mouth rinse test: Three sets of different concentrations C1, C2, C2 (5 ml each) of the same tastants were prepared and each taste solutions was randomly arranged with two cups of 5 ml of distilled water. The subjects were asked to sip and rinse for 10 seconds and then to spit it. Then, they were asked to identify the taste (sweet, salty, sour and bitter or tasteless) and intensity of the taste was noted. If subject was unable to identify the taste, another row with the next higher concentration of the taste solution was given. This procedure was carried out in the same, for all followed by distilled water rinse which preceded each different taste solution. The scorings were recorded based upon concentration 'low' as 1 to 3, 'medium' as 4 to 6, 'high' as 7 to 9. The data obtained and analyzed by unpaired t-test.

Results: In this study, 60 male subjects aged between 18 to 45 years with the mean age of 27.88 years were present. Result showed that delayed perception with salt followed by sweet, bitter and sour as compared with control.

Taste	Groups	Mean	SD	t-value	p-value
Sweet	Study group	2.20	2.14	3.0714	0.0032**
	Control group	1.00	0.00		
Salt	Study group	3.07	1.80	3.2474	0.0019***
	Control group	2.00	0.00		

Sour	Study group	3.27	1.01	1.4392	0.1555
	Control group	3.00	0.00		
Bitter	Study group	4.80	1.60	2.6926	0.0093*
	Control group	4.00	0.00		

Table 1 indicates the data of significance difference between the study and control group. Discussion: Gustation is an important chemical sense and its disturbances like dysgeusia can be very distressing.⁹ Taste is the main sensory system that keeps a check on ingested food; human beings are able to recognize four basic tastes, i.e. sweet, salt, sour and bitter.¹² Taste is a function of taste buds in the mouth. The texture of food and the presence of substances like pepper stimulate pain receptors greatly in condition to the taste experience.^{13, 14} While patient sometimes describe their inability to taste one quality without loss of sensation for the other three, these symptoms are rarely confirmed by demonstration of specific taste loss. Likewise few reports confirm loss of specific taste as a manifestation of particular pathologic state.¹⁵

In present study, physiological stimuli tastants were used for testing taste whereas studies done by Soni et al and Chaturvedi et al revealed impairment of taste in OSMF patient with use of electrogustometry method.^{11,16} It is generally assumed that decline in taste sensitivity occur after the age of 60 years. Mojet et al¹⁷ and Pinjel¹⁸ described that changes in the gustatory sensation can also occur as an aging process. According to Winkler et al¹⁹ sensitivity to salty and bitter tastes declines with age. Govindkar et al²⁰ reported that taste impairment was found in patient with diabetes mellitus suggesting altered sweet taste perception in relation to blood glucose level. Considering the above facts, subjects of this study were confined in an age group from 18 to 45 years and free from systemic diseases. Taste receptor cell found in the taste buds are located in the mouth, throat, larynx and esophagus.²¹ Taste dysfunction may be due to inflammation and infection in oral cavity that reduces blood flow to the tongue and interferes with saliva production^{3,10} and leads injury to the cell receptors or atrophy of taste buds. In this study, the alteration in the taste perception with severity of OSMF showed a significant difference, this might be due to the reason that OSMF inflammation and atrophy increases as the advanced stage.^{5,6,10} Atrophy in the specific area will cause alteration in taste related to that region. In this study salt taste sensitivity was more affected, suggestive of more common and severe depapillation in anterior region of tongue²² due to chewing habit. Significant difference between study and control group for taste impairment established, 'altered taste perception' as a subjective signs of OSMF.

Conclusion:

The present study demonstrated taste alteration in OSMF patients, related to sweet, salt, bitter and sour taste, by using physiological stimuli tastants. Aside from increasing risk of cancer the change in taste perception in OSMF patients often leads to depression, anorexia and weight loss. This study led to consider that both sensory stimuli caused by a lesion and the patients perception of those stimuli must be considered by the clinician who is evaluating the patients sensory complaint. This test is recommended for clinical assessment of taste perception, as the procedure is easy to handle, inexpensive and solutions can be self-made. Patients were included as the patients reported at the time of study did not perform any scientific tests for xerostomia, so to overcome these limitations more research should be performed with high level to justify the results and prime important to institute proper balance diet as a part of the overall treatment of OSMF with other modes of treatment.

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