



QUANTITATIVE ANALYSIS OF SALIVA IN ORAL SUBMUCOUS FIBROSIS PATIENTS - A COMPARATIVE STUDY

Dental Science

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ABSTRACT

AIM : To determine the salivary pH and salivary flow rate in patients with various stages of Oral submucous fibrosis (OSMF).

Materials And Method: 100 patients were include in the study, and divided into five groups of 20 each, which are as follows :Control group (CB),Group A : stage I OSMF,Group B : stage II OSMF,Group C: stage III OSMF,Group D: stage IV A OSMF.

The patients were classified into OSMF stages according to Khanna & Andrade's (9) classification based on mouth opening measurement. The Digital Vernier Calliper was used for staging of OSMF patients by recording interincisal distance (mouth opening) in mm. The spitting method of unstimulated saliva collection was carried out in a glass beaker calibrated in ml.

RESULTS: The results obtained showed that as the stage of OSMF goes on increasing the salivary flow rate goes on decreasing. The difference between salivary flow rate of group B i.e. stage II & C i.e. stage III showed no significant difference. The pH was found to be 7 in control group and 6 in the OSMF groups which shows that in patients suffering from OSMF the saliva tend to be slightly acidic.

CONCLUSION: In this study we conclude that as the severity of OSMF increases the SFR goes on decreasing with the lowest in stage IV (i.e. group D) along with shift of the salivary pH in the acidic direction.

KEYWORDS

OSMF; Salivary flow rate (SFR); pH.

INTRODUCTION

Saliva plays a very important role in maintaining the structural & functional integrity of oral cavity. Oral submucous fibrosis(OSMF) is a precancerous condition and it is reported that in OSMF patients the salivary flow is either increased or decreased.^(1,2)

Decreased salivary flow in normal individuals leads to increased incidence of caries, invasion by opportunistic organisms like Candida Albicans, S.mutants etc. But in OSMF patients , decreased salivary flow hampers in addition to the above mentioned ,the digestive and lubricative functions of saliva i.e. formation of bolus and thus difficulty in deglutition.^(3,4)

OSMF is characterized by blanching and stiffness of the oral mucosa due to effect of arecoline which is the main ingredient in areca nuts and considered the main etiological factor.^(5,6,7)

In histological sections of OSMF patients there is increased collagen formation which leads to occlusion of minor salivary ducts which are spread all over the oral cavity and hence the quantity of whole saliva is decreased.^(5,6,8)

Thus, in this study we tried to analyze the quantity and pH of saliva in osmf patients.

AIM

To determine the salivary pH and salivary flow rate in patients with various stages of Oral submucous fibrosis (OSMF).

MATERIALS AND METHODS

100 patients were include in the study, and divided into five groups of 20 each, which are as follows :

Control group (CB).

Group A : stage I OSMF.

Group B : stage II OSMF.

Group C: stage III OSMF.

Group D: stage IV A OSMF.

The patients were classified into OSMF stages according to Khanna & Andrade's (9) classification based on mouth opening measurement. The Digital Vernier Calliper was used for staging of OSMF patients by recording interincisal distance (mouth opening) in mm.

The spitting method of unstimulated saliva collection was carried out in a glass beaker calibrated in ml.

PROCEDURE FOR SALIVA COLLECTION:

Saliva collection was done between 9:00 am to 12:00 noon to avoid diurnal variation. Each subject was requested not to eat, drink or perform oral hygiene or chew or smoke 60 minutes before and during entire study. Subjects were then seated in the dental chair and asked to spit in a graduated container every 1-minute for 5 minutes. (image I & II)



Image I : Showing measurement of mouth opening



Image II : Showing collection of saliva .

During saliva collection subjects were instructed not to speak or swallow. After collection the SFR was measured and expressed in ml/5 minutes.

Procedure for Saliva pH measurement:

Salivary pH was measured immediately after measuring SFR using the Medical Salivary pH Indicator (pH 2.0-10.5). (image III)



Image III : pH strips

Based on the color change of the indicator paper strip, the pH was assessed in comparison with a color chart. Manufacturer's instructions were followed while measuring salivary pH.

Patients clinically and histologically diagnosed as OSMF were included in the study and patients having any local or systemic causes for xerostomia were excluded. (image IV & V)

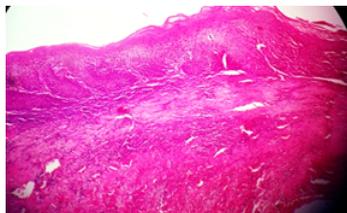


Image IV : Histological section of OSMF stage I

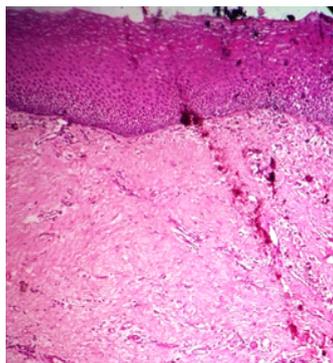


Image V : Histological section of OSMF stage IV

OBSERVATIONS & RESULTS:

The results obtained for the mean salivary flow rate (SFR) were 3.77,2.65,1.84,1.64 & 0.82 for control group (CB),A,B,C and D respectively as shown in table 1.

TABLE :1

Groups	Control group (CB)	Group A	Group B	Group C	Group D
Mean Saliva	3.77	2.65	1.84	1.64	0.82
Standard Deviation (SD)	0.471467	0.588188	0.570933	0.547936	0.426669

Comparisons were made between the groups with the help of unpaired t test and p value was obtained, which was found significant in the intergroup comparison except in between group B & C as shown in table 2.

The results obtained showed that as the stage of OSMF goes on increasing the salivary flow rate goes on decreasing.

The difference between salivary flow rate of group B i.e. stage II & C i.e. stage III showed no significant difference.

The pH was found to be 7 in control group and 6 in the OSMF groups which shows that in patients suffering from OSMF the saliva tend to be slightly acidic.

TABLE :2

Groups	p value	Significance
CB Vs A	1.73715 × 10 ⁻⁷	P<0.001 Significant
CB Vs B	2.10223 × 10 ⁻¹³	P<0.001 Significant
CB Vs C	5.11156 × 10 ⁻¹⁵	P<0.001 Significant
CB Vs D	3.31605 × 10 ⁻²¹	P<0.001 Significant
A Vs B	1.31321 × 10 ⁻⁵	P<0.001 Significant
A Vs C	3.15961 × 10 ⁻⁶	P<0.001 Significant
A Vs D	5.134 × 10 ⁻¹³	P<0.001 Significant
B Vs C	0.253824913	P>0.05 Not Significant
B Vs D	3.28063 × 10 ⁻⁷	P<0.001 Significant
C Vs D	1.15003 × 10 ⁻⁵	P<0.001 Significant

DISCUSSION:

Saliva is a very important constituent of our oral cavity and it exhibits various protective, defensive, lubricative and digestive functions.

In various studies it has been reported that in OSMF patients there is reduction in SFR due to occlusion of minor salivary gland openings as reported by Hayes PA in a 4 year old girl⁽¹⁾.

Reduction in SFR renders the oral cavity dry causing difficulty in mastication, swallowing, reduction in taste sensation and burning sensation – a major symptom which adds to the morbidity in OSMF patients.^(6,7)

Due to increased fibrosis, the mouth opening in OSMF patients goes on decreasing making it difficult to perform the oral hygiene procedures and with the reduction in SFR this disability worsens.^(5,4,7)

In OSMF patients, the acidic nature of the saliva i.e. decreased pH as found in our study and reported in other studies increases the risks of superinfections, renders the saliva a vehicle for erosion of enamel and increases incidence of injury to oral mucosa which adds to the effect of arecoline.^(2,3,4)

It has been observed that arecanut acts as a salivary stimulant in normal individuals due the presence of arecoline and it has been reported that SFR increases in stage I OSMF, but in our study the SFR in Stage I OSMF patients was reduced compared to CB which proves that chronic use of arecanut reverts its stimulant property and increases fibrosis thereby inducing xerostomia.^(1,2,5,6,7)

Studies have been carried out in OSMF patients on salivary flow rate and pH measurement, but there is no such reported study as per our knowledge on SFR and pH measurement in various clinical stages of OSMF patients.^(2,3,4)

Hence, this study was undertaken to find out whether any co-relation exists between the SFR and pH in various stages of OSMF patients. And as we found that SFR goes on decreasing with increase in the severity of OSMF and vice-versa for pH, attention should be given on treatment of xerostomia which will increase the pH and relieve the symptoms of burning sensation to some extent which restrict such patients from consuming proper diet thus affecting the nutritional status in addition to various treatment modalities for OSMF.

CONCLUSION:

In this study we conclude that as the severity of OSMF increases the SFR goes on decreasing with the lowest in stage IV (i.e. group D) along with shift of the salivary pH in the acidic direction.

So, a physician should emphasize on maintenance of homeostasis of oral cavity by giving oral hygiene care instructions, local treatment for hyposalivation and stage wise management of OSMF that will be helpful in reduction of the morbidity in such patients.

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