

## Original Article

### Estimation of salivary uric acid in dental caries: A biochemical study

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#### ABSTRACT:

**Background:** Saliva is a complex fluid in the oral cavity, composed of a mixture of secretory products from the major and minor salivary glands. Uric acid has been considered as the major antioxidant present in human saliva. Hence; we planned the present study to assess the salivary uric acid levels in patients with dental caries. **Materials & methods:** A total of 50 patients with clinical evidence of dental caries were included in the present study. Another set of 50 subjects with absence of clinical evidence of dental caries along with absence of any sign and symptom indicative of dental caries were included as healthy controls. Salivary samples were taken from all the subjects and were sent to laboratory for assessment of salivary uric acid levels. **Results:** Mean salivary uric acid levels among the subjects of the study group and control group was 2.22 and 2.35 mg/dl respectively. Non- significant results were obtained while comparing the mean salivary uric acid levels among subjects of the study group and the control group. **Conclusion:** Alteration in uric acid levels might occur in patients with dental caries thus highlighting the role of antioxidant system in the pathogenesis of the disease.

**Key words:** Dental caries, Uric acid.

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#### INTRODUCTION:

Saliva is a complex fluid in the oral cavity, composed of a mixture of secretory products from the major and minor salivary glands. Saliva has multifunctional roles in the oral cavity, and is very important for the maintaining of oral health.<sup>1-3</sup> Thus the saliva research field is rapidly advancing.

About 99% of saliva is water. The remaining 1% is complex of organic and inorganic molecules, such as electrolytes, mucins, antiseptic substances, immunoglobulin, proteins and various enzymes. Although the main component of saliva is water, it play key roles in lubrication, mastication, taste perception, prevention of oral infection and dental caries.<sup>4-6</sup>

Uric acid has been considered as the major antioxidant present in human saliva. It accounts for more than approximately 85% of the TAC of both unstimulated and stimulated saliva, and is mainly derived from the diet.<sup>7</sup>

Hence; we planned the present study to assess the salivary uric acid levels in patients with dental caries.

#### MATERIALS & METHODS

The present study was conducted in the department of oral medicine and radiology and it included assessment of

salivary uric acid levels in patients with dental caries. Ethical approval was obtained before the starting of the study and written consent was obtained from all the subjects after explaining in detail the entire research protocol. A total of 50 patients with clinical evidence of dental caries were included in the present study. Another set of 50 subjects with absence of clinical evidence of dental caries along with absence of any sign and symptom indicative of dental caries were included as healthy controls. Detailed demographic and clinical details of all the patients were obtained. Salivary samples were taken from all the subjects and were sent to laboratory for assessment of salivary uric acid levels. All the results were recorded in Microsoft excel sheet and were analysed by SPSS software. Chi- square test was used for assessment of level of significance. P- value of less than 0.05 was taken as significant.

#### RESULTS

A total of 50 dental caries patients and 50 healthy controls were included in the present study. Mean age of the patients of the study group and the control group was 45.5 and 44.2 years respectively. Majority of the subjects of the study group and the control group belonged to the

age group of 41 to 50 years. There were 25 males in the study group and 28 males in the control group. Mean salivary uric acid levels among the subjects of the study group and control group was 2.22 and 2.35 mg/dl respectively. Non-significant results were obtained while comparing the mean salivary uric acid levels among subjects of the study group and the control group.

**Table 1:** Age-wise distribution of subjects

Age group (years)	Study group	Control group
18- 30	3	5
31- 40	6	8
41- 50	24	20
51- 60	5	7
60 and above	11	10
<b>Total</b>	<b>50</b>	<b>50</b>

**Table 2:** Gender-wise distribution of patients

Gender	Study group	Control group
Male	25	28
Female	25	22
<b>Total</b>	<b>50</b>	<b>50</b>

**Table 3:** Comparison of salivary uric acid levels

Parameter	Study group	Control group	p-value
<b>Salivary uric acid levels (mg/dl)</b>	2.22	2.35	0.22

## DISCUSSION

Antioxidant mechanisms of the body are a series of compounds that act to reduce oxidative stress and the effect of free radicals on the human body. It has been suggested that saliva, through salivary antioxidants, could constitute a first line of defense against oxidative stress. Salivary antioxidants are a group of enzymes that comprise of salivary peroxidase, salivary uric acid, and several minor enzymes. The combined ability of these enzymes to counter oxidative stress is often referred to as the total antioxidant capacity (TAC) of the saliva.<sup>6-8</sup>

A total of 50 dental caries patients and 50 healthy controls were included in the present study. Mean age of the patients of the study group and the control group was 45.5 and 44.2 years respectively. Majority of the subjects of the study group and the control group belonged to the age group of 41 to 50 years. Kumar SV et al carried out oral examination to assess the dental caries experience using decayed, missing and filled teeth (DMFT) index. The salivary total antioxidant capacity (TAC) was measured by using "ammonium molybdate method." Data were analyzed using Pearsons correlation and one-way ANOVA with Bonferroni multiple comparison test. A P value of 0.05 was taken as the level of significance. With increasing DMFT scores, TAC of saliva also increased correspondingly. When the TAC of saliva was correlated against DMFT scores, there was a correlation of 0.981 ( $P < 0.0005$ ). With increasing dental caries experience, the TAC of saliva was found to increase. TAC of saliva could be a marker for dental caries activity among children.<sup>8</sup>

There were 25 males in the study group and 28 males in the control group. Mean salivary uric acid levels among the subjects of the study group and control group was 2.22 and 2.35 mg/dl respectively. Non-significant results were obtained while comparing the mean salivary uric acid levels among subjects of the study group and the control group. Muchandi S et al correlated the salivary total antioxidant capacity (TAC) and salivary pH of children with caries-free and severe early childhood caries. Fifty children from ages 3 to 5 years divided into two study groups had undergone screening. Group I ( $n = 25$ ) with severe early childhood caries (S-ECC) and group II ( $n = 25$ ) who were caries free. Unstimulated whole saliva of subjects were in the collection during the study by draining method. Salivary pH determination of saliva samples was done using pH indicator paper strips. The TAC was done using an antioxidant assay with the help of a spectrophotometer at wavelength 532 nm. The means of salivary pH and TAC were subjected to analysis using unpaired student 't' test and correlation was determined using Pearsons correlation coefficient analysis. Mean salivary pH was higher in group II ( $7.46 \pm 0.37$ ). Mean TAC was greater in group I ( $1.82 \pm 0.19$ ). A statistically significant negative correlation as seen between TAC and salivary pH in S-ECC patients. The study concluded that salivary TAC increases in patients with S-ECC are by that showing a high indirect relationship with salivary pH.<sup>9</sup> Akgul N et al investigate the effects on salivary nitric oxide (NO) and uric acid (UA) levels after application of dental composite filling materials to healthy volunteers. A total of 52 individuals (32 female and 20 male) participated in the study. Filtek Z250 composite filling material (3M ESPE, St Paul, MN, USA) was applied to healthy volunteers. Saliva samples were collected before restoration (baseline) and 1 h, 1-day, 7 days, and 30 days after restoration. NO concentrations were measured using the Griess reaction method, and UA was measured using an enzymatic method. NO values increased statistically significant after 7 days ( $P < 0.05$ ). In addition, lower UA levels were determined compared to the baseline levels, but the difference was not statistically significant ( $P > 0.05$ ). There was no correlation between NO and UA levels in saliva ( $P > 0.05$ ) Composite resins activated the antioxidant system in saliva.<sup>10</sup>

## CONCLUSION

Under the light of above obtained results, the authors conclude that alteration in uric acid levels might occur in patients with dental caries thus highlighting the role of antioxidant system in the pathogenesis of the disease.

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