

Original Research

Estimation of salivary pH levels, C-Reactive protein and uric acid in complete dentures denture wearers fabricated with chitosan nanoparticles

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ABSTRACT:

Background: Complete edentulism treatment modality includes removable complete dentures fixed and dental implants. The present study was compared salivary uric acid, C- Reactive protein and pH levels in completely edentulous patients before and after wearing complete dentures. **Materials & Methods:** 70 patients completely edentulous patients were divided into 2 groups. Group I patients received complete dentures without chitosan nanoparticles and group II patients received complete dentures incorporated with chitosan nanoparticles. Saliva samples was collected from subjects immediately before the insertion and one month of denture use. Salivary pH, saliva uric acid and saliva c-reactive protein (CRP) was performed before and after denture insertion. **Results:** Out of 70 patients, males were 40 and females were 30. In group I, mean pH of saliva before denture insertion was 6.78 and after insertion was 6.20 and in group II was 6.82 before insertion and 6.04 after denture insertion. The mean CRP before and after denture insertion was 481.2pg/ml and 514.3pg/ml in group I and 490.6pg/ml and 564.8pg/ml in group II respectively. The mean uric acid (mg/dl) before and after denture insertion was 4.1 mg/dl and 2.9 mg/dl in group I and 4.2 mg/dl and 2.1 mg/dl in group II respectively. The difference was significant (P< 0.05). **Conclusion:** There was significant reduction in uric acid and pH level with addition of chitosan nanoparticles in complete dentures.

Key words: Chitosan nanoparticles, Serum CRP, Serum uric acid

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INTRODUCTION

Complete edentulism treatment modality includes removable complete dentures widely. They are fabricated by use of acrylic resins because of satisfactory features and show advantages over all materials advocated earlier.¹ Saliva is considered a very important biomarker for overall body health and indicates several biomolecules just like blood to give useful information and monitoring of diseases and health.⁷ Saliva sample collection is helpful because it is non-invasive, painless, convenient and can be taken multiple times.²

Saliva plays major part in oral well-being of complete denture users. Antioxidants present in Saliva fight against free radical oxidative stress, one of dominant antioxidant is uric acid in saliva. Thus, analysis of saliva, like blood, yields useful information for the assessment and monitoring of

health as well as disease states. Antioxidants in saliva represent one of the defence mechanisms against free radical induced oxidative stress (OS).³

C-Reactive protein levels in saliva are useful biomarkers for inflammation but their extensive tests and analysing has not yet been carried out and studied. pH changes in oral cavity influence the onset of diseases so saliva helps in maintaining optimum pH required for healthy oral functions, pH levels in saliva after wearing complete dentures will give idea of condition of buffering capacity of oral cavity.⁴ Uric acid is the dominant antioxidant present in saliva with clinical importance in monitoring oral oxidative stress.⁵ OS represents the imbalance between the production of highly reactive molecular species such as reactive oxygen species (ROS) and the antioxidant defence systems.⁶ The present study was compared salivary uric acid, C- Reactive protein and pH levels

in completely edentulous patients before and after wearing complete dentures.

MATERIALS & METHODS

The present study consisted of 70 patients completely edentulous patients of both genders. The consent was obtained from all enrolled patients.

Data such as name, age, gender etc. was recorded. Patients were divided into 2 groups. Group I patients

received complete dentures without chitosan nanoparticles and group II patients received complete dentures incorporated with chitosan nanoparticles. Saliva samples was collected and subjected to assessment of salivary pH, saliva c-reactive protein (CRP) and salivary uric acid immediately before the insertion and one month of denture use. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Total- 70		
Gender	Males	Females
Number	40	30

Table I shows that out of 70 patients, males were 40 and females were 30.

Table II Saliva pH values in both groups

pH	Pre- insertion	Post- insertion	P value
Group I	6.78	6.20	0.05
Group II	6.82	6.04	0.04

Table II shows that in group I, mean pH of saliva before denture insertion was 6.78 and after insertion was 6.20 and in group II was 6.82 before insertion and 6.04 after denture insertion. The difference was significant (P< 0.05).

Table III Serum CRP in both groups

CRP	Pre- insertion	Post- insertion	P value
Group I	481.2	514.3	0.05
Group II	490.6	564.8	0.04

Table III, graph I shows that mean CRP before and after denture insertion was 481.2pg/ml and 514.3pg/ml in group I and 490.6pg/ml and 564.8pg/ml in group II respectively. The difference was significant (P< 0.05).

Graph I Serum CRP in both groups

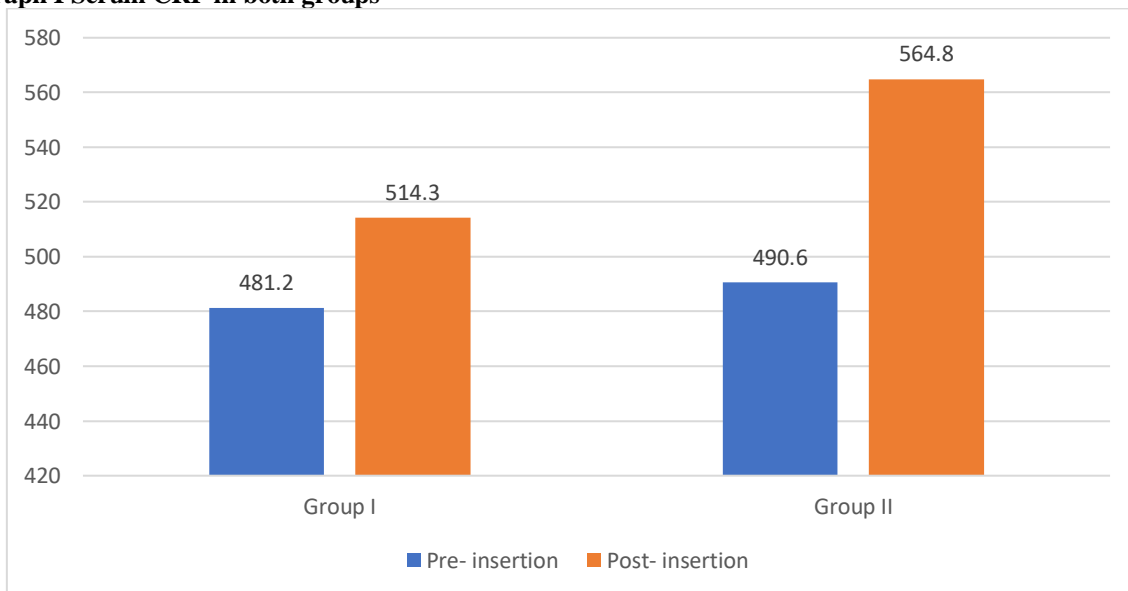


Table IV Saliva uric acid values in both groups

Uric acid	Pre- insertion	Post- insertion	P value
Group I	4.1	2.9	0.05
Group II	4.2	2.1	0.04

Table IV shows that mean uric acid (mg/dl) before and after denture insertion was 4.1 mg/dl and 2.9 mg/dl in group I and 4.2 mg/dl and 2.1 mg/dl in group II respectively. The difference was significant (P< 0.05).

DISCUSSION

Removable complete denture is a widely accepted treatment modality for complete edentulism. Acrylic resins have been widely used to fabricate dentures due to their desirable characteristics and have replaced all other previously used materials.⁷Saliva, often called 'mirror of the body's health', has been shown to reflect tissue fluid levels of several biomolecules.⁸The present study was compared salivary uric acid, C- Reactive protein and pH levels in completely edentulous patients before and after wearing complete dentures.

We found that out of 70 patients, males were 40 and females were 30. Bhat et al⁹estimated and compared salivary uric acid, pH and C-Reactive Protein levels in completely edentulous subjects before and after wearing complete dentures. The mean values for salivary pH and uric acid after denture insertion were found to be significantly decreased whereas the estimated median concentrations of saliva CReactive Protein before and after complete denture insertion did not differ significantly. The C-Reactive Protein levels indicate absence of significant change in oral inflammatory status of the subjects. Decreases in saliva uric acid and pH levels after denture wearing indicate decrease in antioxidant potential and increase in acidity of saliva respectively, which are not favourable outcomes in prosthodontic interventions. Findings on saliva characteristics such as these can help the dentist suggest remedial measures such as adoption of better oral hygiene, denture cleaning practices.

We found that in group I, mean pH of saliva before denture insertion was 6.78 and after insertion was 6.20 and in group II was 6.82 before insertion and 6.04 after denture insertion. Sonawane et al¹⁰evaluated salivary pH, uric acid & C-Reactive protein levels before and after complete denture insertion with and without addition of Chitosan nanoparticles & comparatively evaluate the outcome. 15 complete denture patients incorporated with Chitosan nanoparticles were tested for salivary pH, C-reactive protein & uric acid levels. Saliva samples was collected from subjects immediately before the insertion of complete dentures and after 24 hrs and compared with Control groups not containing Chitosan. This study shows antifungal and antimicrobial effect of Chitosan in Complete dentures which implies less fungal activity post denture insertion leading to less denture stomatitis cases proving effectiveness in preventing Denture stomatitis.

We found that mean CRP before and after denture insertion was 481.2pg/ml and 514.3pg/ml in group I and 490.6pg/ml and 564.8pg/ml in group II respectively. Nikolopoulo Fet al¹¹ studied the variation of resting salivary pH before and after Prosthodontic treatment in implant supported denture wearers, and found that there were statistical differences in ranges of pH of saliva after 15 days of

use of dentures and significant difference in groups of implants over dentures.

We found that mean uric acid (mg/dl) before and after denture insertion was 4.0 and 2.8 in group I and 4.1 and 2.0 in group II respectively. Arai, T Ueda et al¹²assessed inhibition of adherence of microorganisms to titanium dioxide coated denture base acrylic resin by comparing two categories, non-coated and coated and incubating for 24 hrs to evaluate biofilm formation, they concluded that coating a denture base acrylic resin with tiO₂ resulted in preventive effect on attachment of D S. Sanguis and alteration of C albicans.

Only limited number of patients were selected for this prospective observational study. Inclusion of large sample could result different results.

CONCLUSION

Authors found that there was significant reduction in uric acid and pH level with addition of chitosan nanoparticles in complete dentures.

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