

A Comparative Evaluation of Adhesive Paste, Cleanser, 0.25% Sodium Hypochlorite and 0.2% Chlorhexidine for Denture Cleaning Against Candida Albicans

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ABSTRACT

Background: To compare adhesive paste, cleanser, 0.25% sodium hypochlorite and 0.2% chlorhexidine for denture cleaning against *Candida albicans*.

Materials and Method: The present invitro study was done on 50 complete dentures of both genders. In group I, thin adhesive paste, in group II, cleanser solution, in group III, 0.25% sodium hypochlorite solution, in group IV 0.2% CHX and in group V, dentures tap water was used. After incubation, the colonies were counted and expressed as colony-forming units.

Results: In group I, adhesive paste, in group II cleanser, in group III 0.25% sodium hypochlorite and in group IV 0.2% chlorhexidine was used. Table II shows that mean CFU in group I was 1026, in group II was 84, in group III was 15, in group IV was 23.7 and in group V was 1134. ANOVA test revealed significant differences ($P < 0.05$). Sodium hypochlorite was most effective followed by chlorhexidine, cleanser and adhesive paste.

Conclusion: Authors found that 0.25% sodium hypochlorite was most effective followed by 0.2% chlorhexidine, cleanser and adhesive paste.

Keywords: Chlorhexidine, *Candida Albicans*, Sodium hypochlorite.

INTRODUCTION

The number of elderly people is increasing all over the world. The reason is better life expectancy owing to better health care facilities. However, with this there is a rise in the number of edentulism which require tooth replacement. The reason for tooth loss is dental caries, periodontal breakdown, dentoalveolar trauma etc. Complete denture is frequently used in elderly people. With time to time there has been modification in material used for the appliance.¹

Denture stomatitis/ prosthetic stomatitis or denture sore mouth is one of the most common inflammatory conditions characterized by inflammation of oral mucosa especially palatal and gingival mucosa that affects denture wearers.² The prevalence rate found to be 25 to 67% among denture wearer seen mostly in females. Microscopic pores, irregularities, high amount of plaque, pooling of saliva allows dentures susceptible for microbial contamination. The undersurface of denture carries a wide range of pathogens. This often leads to

Received: Oct. 21, 2019; Accepted: Dec. 30, 2019

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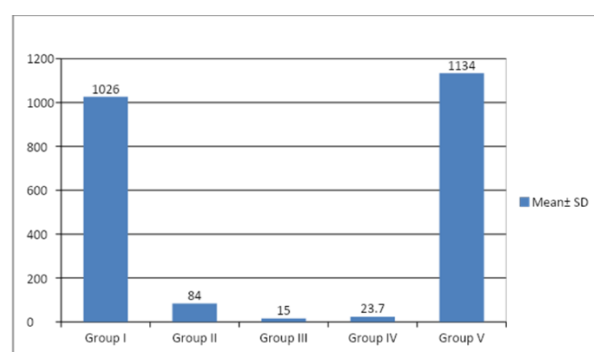
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Table 1: Distribution of dentures in different groups.

Groups	Group I	Group II	Group III	Group IV	Group V
Method	Adhesive paste	Cleanser	0.25% Sodium hypochlorite	0.2% chlorhexidine	Tap water
Number	10	10	10	10	10

Table 2: Assessment of colony forming units in all groups.

Groups	Mean± SD	P value
Group I	1026± 25.6	0.001
Group II	84± 3.5	
Group III	15± 2.1	
Group IV	23.7± 4.2	
Group V	1134± 32.8	



Graph 1: Assessment of colony forming units in all groups.

bacterial and fungal colonization causing denture stomatitis. Among all *Candida* is prevalent.³ It has been observed that traumatic occlusion, old denture, xerostomia, residual monomer, poor oral and denture hygiene, smoking among denture wearers, nutritional deficiency, immunodeficiency, systemic health of patient and various medications are other causative factors for denture stomatitis.⁴ Various denture cleansers such as sodium hypochlorite based denture cleansers, chlorhexidine, acids, mouthwashes, and peroxide solutions are used for denture cleaning.⁵ The present study compared adhesive paste, cleanser, 0.25% sodium hypochlorite and 0.2% chlorhexidine for denture cleaning against *Candida Albicans*.

MATERIALS & METHODS

The present in vitro study was conducted in the department of Prosthodontics. It comprised of fifty complete dentures of both genders. The study was

approved from institutional ethical committee. All patients were informed regarding the study and written consent was obtained.

Data such as name, age, gender etc was recorded. The fungal agent (*C. Albicans* MTCC-227) was used for the study. Acrylic dentures were added to each flask which were kept still for 6 hours and then shaken well at every 1 h interval to achieve adherence of *C. Albicans*. In group I, thin suspension of adhesive paste was applied to ten acrylic dentures for 10 minutes. In group II, ten acrylic dentures were incubated with *C. Albicans* suspension in artificial saliva for 24 hours followed by immersion in freshly prepared cleanser solution for 3 minutes. In group III, ten dentures were immersed in 0.25% sodium hypochlorite solution and in group IV, 10 dentures were kept in 0.2% CHX for 5 minutes and in group V, dentures were cleaned with tap water. After incubation, the colonies were counted and expressed as colony-forming units per milliliter to evaluate the effectiveness of different cleaning protocols.

The result thus obtained was entered in MS excel sheet. The data was evaluated using SPSS version 21 (IBM, Chicago, USA). One-way ANOVA test was used. P value less 0.05 was considered statistically significant.

RESULTS

Table I shows the type of cleansing method used and number of dentures used for the study. In group I, adhesive paste, in group II cleanser, in group III

0.25% sodium hypochlorite and in group IV 0.2% chlorhexidine was used. Table II shows that mean CFU in group I was 1026, in group II was 84, in group III was 15, in group IV was 23.7 and in group V was 1134. ANOVA test revealed significant differences ($P < 0.05$). Sodium hypochlorite was most effective followed by chlorhexidine, cleanser and adhesive paste.

DISCUSSION

Denture stomatitis is quite common among denture wearers. The undersurface of denture provides a suitable site of attachment to *Candida* due to the presence of irregularities, less salivary flow etc. The sodium hypochlorite-based denture cleansers are fungicidal in nature and efficient by dissolving mucin and other organic substances.⁶ Denture cleaners such as alkaline peroxides are the most commonly used agent. It possesses good antimicrobial activity against denture biofilms.

Chlorhexidine is another agent used as a cleansing agent against denture pathogens. It is a good antiseptic agent which broad spectrum of antimicrobial activity including *C. albicans* and other common non albican yeast species.⁷

Sodium hypochlorite is the most commonly used and shows good bactericidal and fungicidal properties. Studies have reported the antimicrobial action of NaOCl in concentrations of 1% to 5.25%. However, these solutions may adversely affect physical and mechanical properties of the denture.⁸ The present study compared adhesive paste, cleanser, 0.25% sodium hypochlorite and 0.2% chlorhexidine for denture cleaning against *Candida albicans*.

In present study in group I, adhesive paste, in group II cleanser, in group III 0.25% sodium hypochlorite and in group IV 0.2% chlorhexidine was used. Gantait et al⁹ conducted a study in which 60 acrylic discs were treated with denture adhesive, cleanser, 0.2% chlorhexidine individually, or in combinations after exposure to *C. albicans* for a duration of 24 hours. The group treated with adhesive showed high fungal growth compared to the control group, whereas chlorhexidine showed high potency to prevent *C. albicans*, whereas adhesive increased the adhesion of *C. albicans* to acrylic surface.

The mean CFU in group I was 1026, in group II was 84, in group III was 15, in group IV was 23.7 and in group V was 1134. Sodium hypochlorite was most effective followed by chlorhexidine, cleanser and adhesive paste. Badaro et al¹⁰ conducted a study on 64 denture wearers of both genders. Media used was S1 containing 0.25% of NaOCl, S2 containing 0.5% of NaOCl, S3 containing 10% *R. communis* and S4 containing normal saline. The biofilm of inner surfaces of maxillary dentures was disclosed, photographed, and total dyed areas were measured. S1 revealed $4.41 \pm 7.98\%$, S2 showed $2.93 \pm 5.23\%$ of removal of biofilm. It was observed that control showed $11.07 \pm 11.99\%$ of values. S3 solution ie 10% *R. communis* was the most effective solution in remission of candidiasis seen in 50% and S1 showed 46%. Both S1 and S2 solutions were found equivalent regarding antimicrobial action and resulted in the lowest microorganism mean count followed by S3. However, there were non-significant differences in patient's satisfaction.

American College of Prosthodontics recommended that dentures should be cleaned daily by soaking and brushing with an effective, nonabrasive denture cleanser. However, for denture wearers with limited motor function, use of denture adhesives are a commonly optional method to maintain dentures.¹¹

Panariello et al¹² determined the efficiency of immersion and brushing with different cleansing agents on acrylic resins. In this study, Lucitone 550 (L) and Tokuyama Rebase Fast II (T) specimens were prepared, sterilized, and inoculated with a suspension of *Candida albicans*, *Candida glabrata*, and *Streptococcus mutans* respectively. They were divided into groups of distilled water, 0.2% peracetic acid-Sterilife, 1% chlorhexidine digluconate, 1:1 water/dentifrice solution, 1% sodium hypochlorite and sodium perborate/Corega Tabs. Authors found that the multispecies biofilm on L and T were killed by brushing or immersion in Ac, CHX, and NaOCl for only 10 seconds.

The limitation of present study is small sample size. Only four agents against *C. albicans* were compared.

CONCLUSION

Authors found that 0.25% sodium hypochlorite was most effective followed by 0.2% chlorhexidine, cleanser and adhesive paste.

CONFLICTS OF INTEREST

The authors declare they have no potential conflict of interests regarding this article.

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