

Original Research

Efficacy of different disinfectants on the denture base acrylic resins

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ABSTRACT:

Background: The need for cross infection control in dental practice has received increasing attention in recent years because of greater awareness of communicable diseases. The present study was conducted to evaluate the efficacy of different disinfectants on the denture base acrylic resins. **Materials & Methods:** 60 complete dentures were divided into 2 groups of 30 each. Each group of dentures were then disinfected with two different types of disinfectants (5.25 % sodiumhypochlorite and 0.2 % chlorhexidine). Microbial colony count was read through a 4X magnification lens using a colony counter. **Results:** Out of 60 patients, males were 35 and females were 25. The mean colony forming units with 5.25 % sodiumhypochlorite was 238.4 and with 0.2 % chlorhexidine was 246.2 in phase 1 before disinfection. The difference was non-significant ($P>0.05$). The mean colony forming units with 5.25 % sodiumhypochlorite was 1.7 and with 0.2 % chlorhexidine was 2.9 in phase 2 after disinfection. The difference was significant ($P<0.05$). **Conclusion:** A significant reduction was observed in the microbial colony counts after inserting the denture in disinfectant. 5.25% sodium hypochlorite found to be more effective than 0.2% chlorhexidine.

Key words: Chlorhexidine, Complete denture, sodiumhypochlorite

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INTRODUCTION

The need for cross infection control in dental practice has received increasing attention in recent years because of greater awareness of communicable diseases.¹ The hazards of the spread of infection in dental profession by contaminated instruments, impressions, and prosthesis have been emphasized by a number of workers.² Although much importance has been given to infection control practices, such as the barrier technique, sterilization, and disinfection of the dental office and instruments, less emphasis has been given for the disinfection of dentures. The dentures in mouth are prosthetic medical devices that create an appropriate habitat for both pathogenic and non-pathogenic organisms to nurture.³ To prevent the transmission of disease, all dentists, in-office dental auxiliaries, and dental technicians at laboratories should exercise effective infection control procedures. Blood and saliva may carry high concentration of potentially infective virus or bacteria that can produce the common cold, Herpes, Hepatitis B, Pneumonia, and Tuberculosis.⁴

Denture cleanliness is reported to be generally poor and denture wearer seems to adjust easily to unclean dentures.⁵ Microorganisms can spread by direct contact with blood or saliva from the patient in the clinical area, or by indirect contact with microorganisms through impression, gypsum casts, and dental prosthesis both in clinical and laboratory stage.⁶ The present study was evaluated the efficacy of different disinfectants on the denture base acrylic resins.

MATERIALS & METHODS

The present study consisted of 60 complete dentures of both genders. The ethical clearance was obtained before starting the study.

All dentures were kept in separate sterile bags containing 100 ml distilled water. The bags were agitated for 1 minute. Denture samples were divided into 2 groups of 30 each. Each group of dentures were then disinfected with two different types of disinfectants. The sample was streaked on to 5% sheep blood agar culture plate and incubated for 37°

C for 48 hours. Microbial colony count was read through a 4X magnification lens using a colony counter. Data thus obtained were subjected to

statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Total- 60		
Gender	Males	Females
Number	35	25

Table I shows that out of 60 patients, males were 35 and females were 25.

Table II Colony forming units between two disinfectants in phase 1 before disinfection

Disinfectant	Mean	P value
5.25 % Sodiumhypochlorite	238.4	0.82
0.2 %chlorhexidine	246.2	

Table II, graph I shows that mean colony forming units with 5.25 % sodiumhypochlorite was 238.4 and with 0.2 %chlorhexidine was 246.2 in phase 1before disinfection. The difference was non- significant (P>0.05).

Graph I Colony forming units between two disinfectants in phase 1 before disinfection

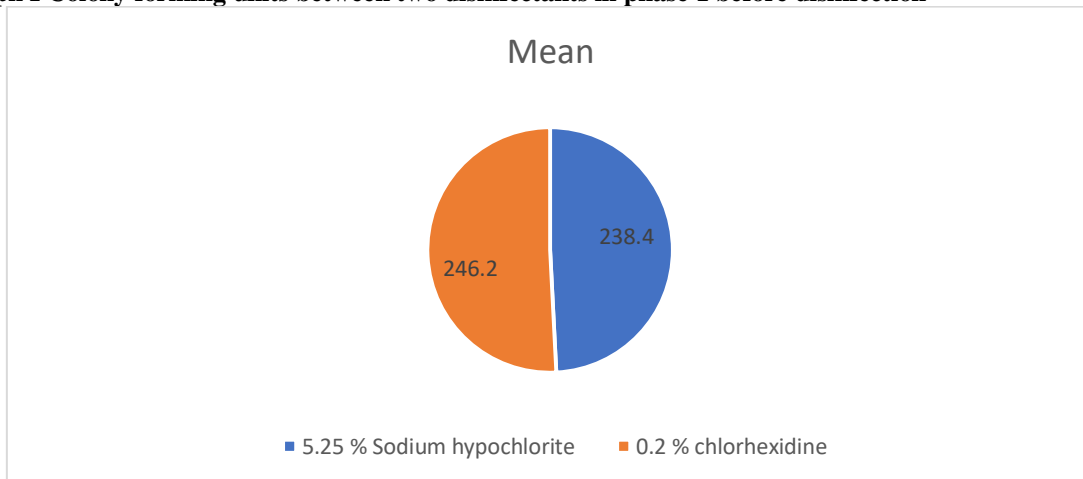
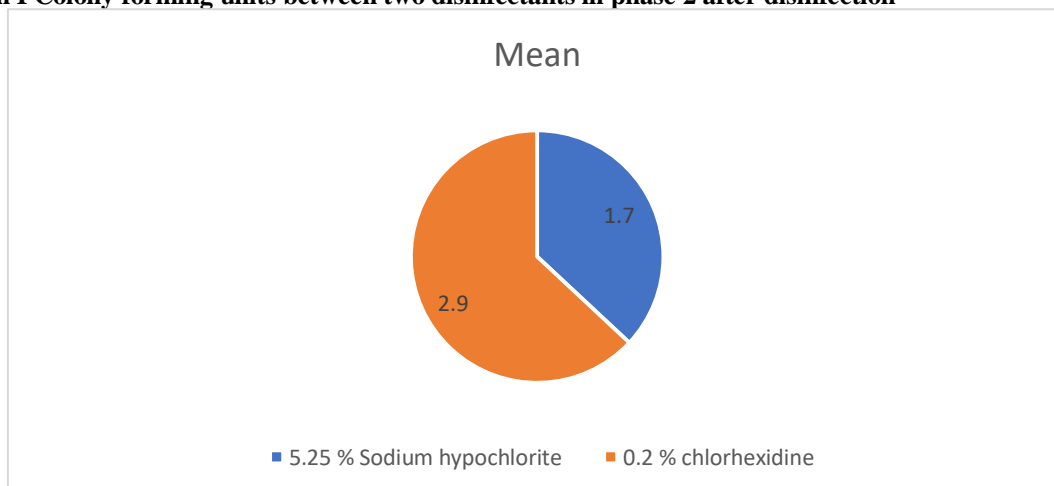


Table III Colony forming units between two disinfectants in phase 2 after disinfection

Disinfectant	Mean	P value
5.25 % Sodiumhypochlorite	1.7	0.04
0.2 %chlorhexidine	2.9	

Table III, graph I shows that mean colony forming units with 5.25 % sodiumhypochlorite was 1.7 and with 0.2 %chlorhexidine was 2.9 in phase 2after disinfection. The difference was significant (P<0.05).

Graph I Colony forming units between two disinfectants in phase 2 after disinfection



DISCUSSION

Health professionals, especially in dentistry, are also involved at high risk of microbial cross-contamination. There are many studies that reported the risk of cross-contamination in prosthetic laboratories.⁷ The dental office has primary responsibility for infection control and if disinfection procedures are not practiced, a cycle of cross contamination may occur, thereby exposing dental personnel and patients to infection. Invisibility does not mean nonexistence; opportunity makes the presence felt.⁸ It is from the vitality of the atmospheric particles that all the mischief arises.⁹ The present study was conducted to assess the efficacy of different disinfectants on the denture base acrylic resins.

We found that out of 60 patients, males were 35 and females were 25. Henderson et al¹⁰ evaluated the disinfection of prosthesis with full strength Sporicidin (2% glutaraldehyde), 1:6 Sporicidin solutions, and 5.25% sodium hypochlorite (undiluted Clorox) and confirmed that after 10 minutes full strength, Sporicidin was effective in reducing or eliminating culturable

We found that the mean colony forming units with 5.25 % sodiumhypochlorite was 238.4 and with 0.2 %chlorhexidine was 246.2 in phase 1 before disinfection. Rudd et al¹¹ studied the antimicrobial action of sodium hypochlorite for the sterilization of complete dentures and determined the time for which the prosthesis should be immersed to achieve this effect. The dentures were coated with the *S. aureus*, *Bacillus subtilis* (both vegetative and spore forms), *C. albicans*, *P. aeruginosa*, and *Streptococcus* (enterococcus) and then immersed in sodium hypochlorite for 1 and 3 minutes showed evidence of growth, whereas the dentures immersed for 5 minutes were sterile. The results of immersion in glutaraldehyde showed that glutaraldehyde was effective in decreasing the microbial load after 5 minutes, but 10 minutes immersion is required to achieve complete disinfection.

We found that the mean colony forming units with 5.25 % sodiumhypochlorite was 1.7 and with 0.2 %chlorhexidine was 2.9 in phase 2 after disinfection. Farheen Set al¹² assessed efficacy of two disinfectants. The samples from 30 complete denture patients were obtained. The bacterial colony count was calculated. No significant difference was seen in microbial colony of both the groups before placing them in disinfectants. However, a significant difference in bacterial colony was observed post insertion to disinfectant. The study concluded that Sodium hypochlorite was more effective in disinfecting dentures.

Ganesh et al¹³ compared the effectiveness of various disinfectants on *Candida albicans* (*C.albicans*) and *Staphylococcus aureus* (*Staph.aureus*) inoculated on acrylic denture base resin and effect of disinfectants on flexural strength of denture base resin. 82 sterile

specimens were used for microbiological study. 2 specimens were cultured for organism growth to ensure sterility. 40 sterile specimens each were inoculated by immersing in Sabouraud & Nutrient broth containing microorganisms for 45 minutes each. Then the specimens were immersed in chlorhexidine, glutaraldehyde & distilled water (control) for 4 & 8 minutes. For flexural strength testing, 8 specimens each was immersed in the disinfectants and distilled water for 8 & 16 minutes. Each of which was then subjected to 3 point flexural load in Lloyd's Universal testing machine. The microbiological study revealed that both disinfectants were equally effective at 4 minutes against *C.albicans* & *Staph.aureus* microorganisms. Flexural strength test revealed no significant difference between test and control groups.

To prevent the transmission of disease, all dentists, in-office dental auxiliaries, and dental technicians at laboratories should exercise effective infection control procedures. Blood and saliva may carry high concentration of potentially infective virus or bacteria that can produce the common cold, Herpes, Hepatitis B, Pneumonia, and Tuberculosis.¹⁴ Sodium hypochlorite is available only as aqueous solutions, which are usually prepared by adding chlorine to caustic soda. Chlorine disinfectants can react readily with all types of organic matter. Chemically Chlorhexidine is a cationic bis-biguanide with a broad antimicrobial spectrum, low mammalian toxicity, and a strong affinity for binding to skin and mucous membrane. The spectrum of activity for chlorhexidine includes gram- positive and gram-negative bacteria, yeasts, dermatophytes, and some lipophilic viruses. Chlorhexidine's antimicrobial activity is by virtue of its membrane binding ability.¹⁵

CONCLUSION

Authors found that a significant reduction was observed in the microbial colony counts after inserting the denture in disinfectant. 5.25% sodium hypochlorite found to be more effective than 0.2% chlorhexidine.

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