

Original Research

Assessment of efficacy of different disinfectants on the denture base acrylic resins

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ABSTRACT:

Background: 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. The present study was conducted to assess the efficacy of different disinfectants on the denture base acrylic resins. **Materials & Methods:** 40 complete dentures of both genders were studied. These sample were divided into 2 groups. Each group of denture were then disinfected with two different types of disinfectants. Similarly, sample was collected from denture after immersing it in disinfectant solution (phase 2). 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. The aggregated microbial colony count was compared. **Results:** Out of 40 patients, males were 22 and females were 18. The mean colony forming units with 5.25 % Sodiumhypochlorite was 240.5 and with 0.2 %chlorhexidine was 248.2 in phase 1. The difference was non- significant (P>0.05). The mean colony forming units with 5.25 % Sodiumhypochlorite was 1.5 and with 0.2 %chlorhexidine was 2.7 in phase 2. The difference was significant (P<0.05). **Conclusion:** 5.25% sodium hypochlorite being more effective than 0.2% chlorhexidine. A significant reduction in the microbial colony counts was observed after inserting the denture in disinfectant.

Key words: colony forming units, denture base acrylic resins, disinfectants

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INTRODUCTION

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.¹ 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.²

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. Denture cleanliness is reported to be generally poor and denture wearer seems to adjust easily to unclean dentures.³ 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.⁴ Dental personnel have an increased risk of infection through constant exposure to debris, plaque, and saliva, which harbour pathogenic organisms that adhere to dental prosthesis.⁵ An effort to prevent these cross contaminations should be made to reduce the exposure of dental personal and the patient to microbial health hazards.⁶The present study was conducted to assess the efficacy of different disinfectants on the denture base acrylic resins.

MATERIALS & METHODS

The present study comprised of 40 complete dentures of both genders. Each denture was placed in separate sterile bags containing 100 ml distilled water (phase 1). The bags were agitated for 1minute. A sterile disposable 0.001ml-inoculating loop was used to obtain the sample of the solution. These sample were divided into 2 groups. Each group of denture were

then disinfected with two different types of disinfectants. Similarly, sample was collected from denture after immersing it in disinfectant solution (phase 2). 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. The aggregated microbial colony count was compared. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Total- 40		
Gender	Males	Females
Number	22	18

Table I shows that out of 40 patients, males were 22 and females were 18.

Table II Assessment of colony forming units between two disinfectants in phase 1

Before disinfection	Disinfectant	Mean	P value
Phase 1	5.25 % Sodiumhypochlorite	240.5	0.76
	0.2 % chlorhexidine	248.2	

Table II, graph I shows that mean colony forming units with 5.25 % Sodiumhypochlorite was 240.5 and with 0.2 % chlorhexidine was 248.2 in phase 1. The difference was non- significant (P>0.05).

Graph I Assessment of colony forming units between two disinfectants in phase 1

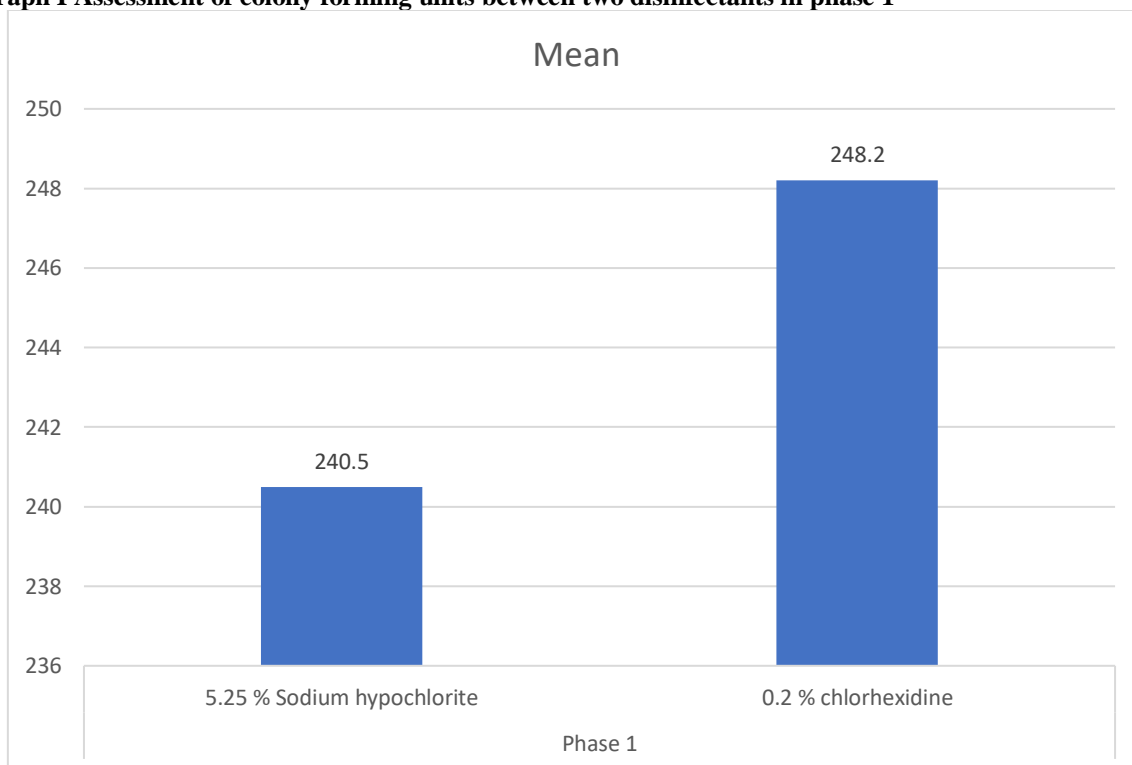
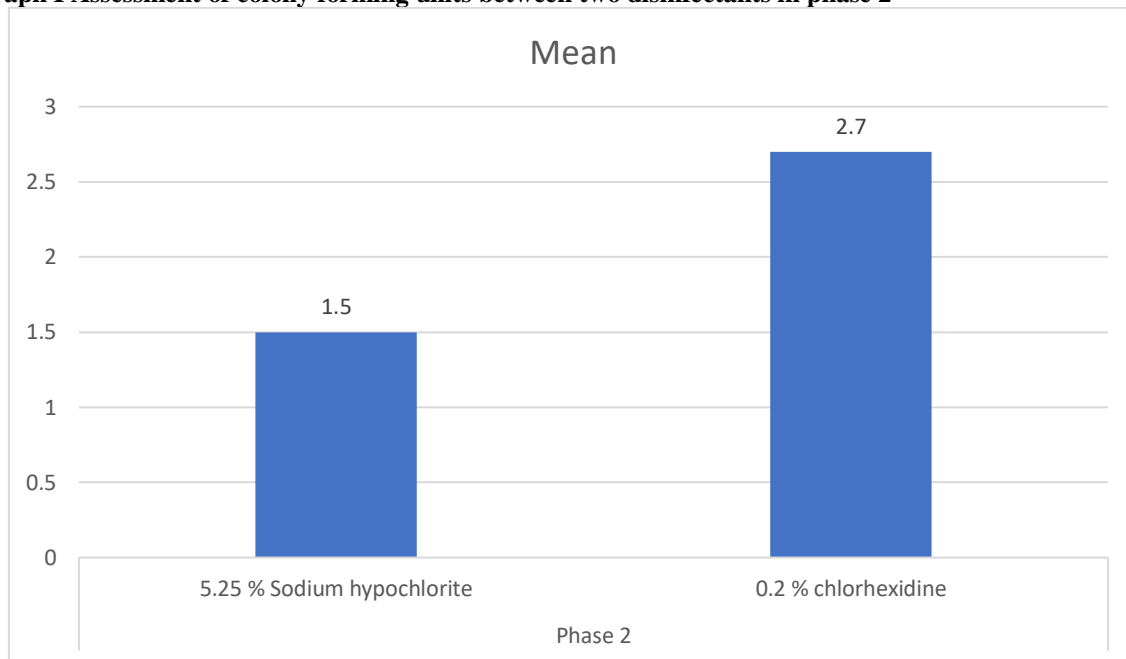


Table III Assessment of colony forming units between two disinfectants in phase 2

After disinfection	Disinfectant	Mean	P value
Phase 2	5.25 % Sodiumhypochlorite	1.5	0.01
	0.2 % chlorhexidine	2.7	

Table III, graph I shows that mean colony forming units with 5.25 % Sodiumhypochlorite was 1.5 and with 0.2 % chlorhexidine was 2.7 in phase 2. The difference was significant (P<0.05).

Graph I Assessment of colony forming units between two disinfectants in phase 2

DISCUSSION

Invisibility does not mean nonexistence; opportunity makes the presence felt.⁷ It is from the vitality of the atmospheric particles that all the mischief arises. Nowadays there is high consternation regarding the spread of infectious diseases.⁸ More awareness is on several ways of cross-contamination external to the dental operatory, facilitated by the dentist and the dental auxiliary personnel. Patients are becoming more sophisticated in their scrutinizing of the dental and medical professional's approach to asepsis.⁹ The present study was conducted to assess the efficacy of different disinfectants on the denture base acrylic resins.

We found that out of 40 patients, males were 22 and females were 18. Bhatthal et al¹⁰ evaluated the efficacy of four denture disinfectants on four most common organisms found in denture biofilm at two different time intervals. Three hundred twenty denture base acrylic resin specimens were fabricated by means of wax patterns with dimensions diameter 15 mm × 4 mm. The contamination of samples was done by the four microorganisms taken in study that were *Staphylococcus aureus*, *Candida albicans*, *Pseudomonas aeruginosa*, and *Escherichia coli*. The contaminated samples were disinfected by immersion procedure in four disinfectants that were sodium hypochlorite, glutaraldehyde, peracetic acid, and chloroxylenol. Sodium hypochlorite was the best disinfectant resulting in complete elimination of microorganisms in 5 minutes immersion time. Glutaraldehyde and chloroxylenol were also effective against microorganisms. Minimum 10 minutes immersion time was required to completely eliminate the microorganisms. Peracetic acid was least effective of all showing the least reduction in microbial growth. Among the organisms, *S. aureus*

showed the maximum resistance to disinfection, and *C. albicans* was the least resistant.

We found that the mean colony forming units with 5.25% Sodiumhypochlorite was 240.5 and with 0.2 %chlorhexidine was 248.2 in phase 1. Farheen Set al¹¹ aimed to determine the 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.

We found that the mean colony forming units with 5.25 % Sodiumhypochlorite was 1.5 and with 0.2 %chlorhexidine was 2.7 in phase 2. Rudd et al¹² 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.

Henderson et al¹³ 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 aerobic bacteria. Bal et al²⁰ also concluded that 10 minutes immersion in 2% glutaraldehyde and 0.525% sodium was effective for disinfection and great reduction of microorganisms. 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

CONCLUSION

To prevent the transmission of disease and for good oral hygiene of the oral cavity, denture disinfection is recommended. Authors found that 5.25% sodium hypochlorite being more effective than 0.2% chlorhexidine. A significant reduction in the microbial colony counts was observed after inserting the denture in disinfectant. It has to be the responsibility of each associate of dental health team to make certain that all required measures are taken to fend off any cross-infection to both patients and to themselves.

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