

A comparative study to evaluate the efficacy of different disinfectants on the denture base acrylic resins: an in-vivo study

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Abstract:

Dentist are more prone for acquiring or transmitting infectious disease during different dental procedures. Chances of cross contamination from patient to patient is also there. This study was aimed to determine the efficacy of two disinfectants. The samples from 30 complete denture patients were obtained. The bacterial colony count was calculated. The study concluded that Sodium hypochlorite was more effective in disinfecting dentures.

Key Words: Denture, Disinfection, Denture base, acrylic resin.

INTRODUCTION

The need for cross infection control in dental practice has received increasing attention in recent years because of greater awareness of communicable diseases. The hazards of the spread of infection in dental profession by contaminated instruments, impressions, and prosthesis have been emphasized by a number of workers.¹

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. 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. ²Denture cleanliness is reported to be generally poor and denture wearer seems to adjust easily to unclean dentures³. 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 stage⁴ Dental personnel have an increased risk of infection through constant exposure to debris, plaque, and saliva, which harbor pathogenic organisms that adhere to dental prosthesis ⁵. An effort to prevent these cross contamination should be made to reduce the exposure of dental personal and the patient to microbial health hazards.

METHODOLOGY

Each denture were 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

15 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 and independent student T test was used to compare the effectiveness of the solutions A and B.

RESULT

Table 1: Statistical analysis comparing the colony forming units between two disinfectants :
 (Before disinfection)

Before disinfection	Disinfectant	N	Mean	Standard Deviation	Range	‘t’	‘p’
Phase 1	5.25 % Sodium hypochlorite	15	238.5	72.1	150-416	0.419	0.677
	0.2 % chlorhexidine	15	246.1	68.3	138-426		

Table 2: Statistical analysis comparing the colony forming units between two disinfectants :
 (After disinfection)

After Disinfection	Disinfectant	N	Mean	Standard Deviation	Range	‘t’	‘p’
Phase 2	5.25 % Sodium hypochlorite	15	1.2	0.9	0-3	3.433	0.001
	0.2 % chlorhexidine	15	2.2	1.2	0-4		

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.

DISCUSSION

It is known that the prosthesis may become contaminated with microorganisms at various stages of denture fabrication, while wearing by the patient and during post insertion checkup stages. Possible mechanisms of prevention of such spread have also been investigated.⁶

According to the centers for disease control, blood and saliva should be thoroughly and carefully cleaned from material that has been used in the mouth, especially before trimming and polishing the prosthesis. Contaminated materials, impressions, and intra-oral devices should also be cleaned and disinfected before being handled in the dental laboratory and before they are placed in the patient’s mouth.⁷

Chemical disinfectants are a recommended method to prevent cross contamination when used after removal and before insertion of prosthesis into the mouth. The immersion of a denture in a suitable disinfecting solution for an adequate length of time is a convenient and inexpensive method for disinfection.⁸

The two disinfectants used in this study, 5.25% Sodium hypochlorite and 0.2% Chlorhexidine were selected because of their ease of availability.

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.⁹

Chemically Chlorhexidine is a cationic bisbiguanide 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.¹⁰

Both the disinfectants used in this study i.e., 5.25% Sodium hypochlorite and 0.2% Chlorhexidine were effective in a five-minute contact time. But 5.25% Sodium hypochlorite was found to be more effective as compared to chlorhexidine.

CONCLUSION

A significant reduction in the microbial colony counts was observed after inserting the denture in disinfectant. 5.25% sodium hypochlorite being more effective than 0.2% chlorhexidine.

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