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Original Article

Comparison of Different Disinfectant On Condensation Silicone Impression Material

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ABSTRACT

Background: Many studies have evaluated the effect of various disinfectants and methods of disinfecting impression materials, but the results of those studies varied widely. The present study aimed at assessing the disinfection effect of Deconex and 0.525% NaOCl on condensational silicone impression material. **Materials & Methods:** The present study was conducted 20 samples of heavy body impression material. 10 were disinfected with 0.525% NaOCl and other 10 with deconex. All were incubated on Tryptic soy broth (TSB) for 24–48 h; after which the bacterial growth was examined. **Results:** In group I samples, 0.525% NaOCl disinfectant was used and in group II, deconax disinfectant was used. 0.525% NaOCl at 5 minutes showed 98.11% clearance of Staphyloccus aureus and 93.27% of candida albican and 100% at 10 minutes. Deconax at 5 minutes showed 97.14% clearance of Staphyloccus aureus and 93.27% of candida albican and 100% at 10 minutes. The difference was non- significant (P- 0.1). **Conclusion:** Author concluded that 0.525% NaOCl and deconex could effectively disinfect condensational silicone contaminated by the tested microorganisms.It is recommended for disinfecting of condensational silicone impression materials by spraying method

INTRODUCTION

Impression materials are used in dentistry to reproduce the form and relations of the teeth and surrounding oral tissues. Impressions are used for fabricating diagnostic and master casts. Silicone impression materials are widely used because of their excellent physical properties, favorable handling properties and good patient acceptance.[1]

Many studies have evaluated the effect of various disinfectants and methods of disinfecting impression materials, but the results of those studies varied widely. The role of a disinfectant should, ideally, be of a dual purpose, it must be an effective antimicrobial agent, yet cause no adverse response to the dimensional accuracy and surface features of the impression material and the resultant gypsum cast.[2] Dimensional stability and accuracy of impressions under various conditions are crucial for the accuracy of the final prosthetic restoration. Accuracy of impressions also depends on the correct choice of impression material. In order to prevent transmission of infectious diseases such are hepatitis B virus (HBV) infection, AIDS, herpes infection and tuberculosis, disinfection of the entire dental equipment, including dental impressions, is mandatory.[3]

Dental impressions, contaminated with the patient's blood and saliva are a potential route of transmission of infection. Although the number of microorganisms

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decreases after rinsing impressions under water, a measurable bacterial load remains on the impressions and can be transferred to the casts. The most frequently identified microorganisms are Streptococcus species, Staphylococcus species, Escherichia coli species, Actinomyces species, Antitratus species, Pseudomonas species, Enterobacter species, Klebsiella pneumonia, and Candida species. Silicone impression materials are the first group of polymeric impression materials. These materials have the best dimensional stability. Polyvinyls are the only impression materials which can be disinfected without any dimensional changes.[4] The present study aimed at assessing the disinfection effect of Deconex and 0.525% NaOCl on condensational silicone impression material.

MATERIALS AND METHODS

The present study was conducted in the department of Prosthodontics. It comprised of 20 samples of heavy body impression material. 10 were disinfected with 0.525% NaOCl and other 10 with deconex. All were incubated on Tryptic soy broth (TSB) for 24–48 h; after which the bacterial growth was examined. NaOCl 0.525% was used to disinfect for 5 and 10 minutes. The standard inoculums were prepared according to 0.5 McFarland (1.5 × 108 CFU/ml) by transferring 1–2 colonies of 18–24 h cultures to TSB medium and incubate at 35°C until the turbidity of media were equal to 0.5 McFarland. For Candida albicans fungus, the sample was taken from 48 h Sabouraud and Dextrose Agar cultures. Each samples were separately polluted with microbial suspensions of Staphylococcus aureus and C. albicans fungus. The impressions were put in sterile test tubes separately with 2 ml of microbial suspension for each one and were incubated at 35°C for 1 h. After contamination, all samples were rinsed with sterile distilled water for 30 s. In order to disinfect all samples, 0.525% NaOCl and deconex was used on each sample, by applying spraying method, 10 puffs in 15 s. Results thus obtained were subjected to statistical analysis using chi- square test. P value less than 0.05 was considered significant.

RESULTS

Total- 20	
Group I (10)	Group II (10)
0.525% NaOCl	Deconex

Table I Distribution of Samples

Table I shows that in group I samples, 0.525% NaOCl disinfectant was used and in group II, deconax disinfectant was used.

Disinfectant	Staphyloccus aureus	Candida albican	P value
0.525% NaOCl			0. 1
5 mins	98.11	93.27	
10 mins	100	100	
Deconax			
5 mins	97.14	92.25	
10 mins	100	100	

Table II Comparison of disinfectant

Table II shows that 0.525% NaOCl at 5 minutes showed 98.11% clearance of Staphyloccus aureus and 93.27% of candida albican and 100% at 10 minutes. Deconax at 5 minutes showed 97.14% clearance of Staphyloccus aureus and 93.27% of candida albican and 100% at 10 minutes. The difference was non- significant (P- 0.1).

DISCUSSION

Two main concerns for disinfectant evaluation are the efficiency of disinfecting solutions in eliminating

pathogens, and the influence of disinfection treatment on the dimensional stability of dental impression materials. Even though various disinfection treatments are being proposed, chemical disinfection of impressions by immersion in disinfectants is the most reliable and practical method. Immersion will disinfect both internal and external surfaces of an impression, including a tray and will minimize the risk of inhalation of disinfectant.[5] The recommended exposure time for the most surface disinfectants is 10–15 min. However, repeated disinfection of an already disinfected impression is often done in a dental laboratory. The results of a research conducted by the ADA and British Dental Association (BDA) showed no good communication between dental offices and laboratories in terms of weather and which disinfection procedure was carried out.[6]

In this study, in group I samples, 0.525% NaOCl disinfectant was used and in group II, deconax disinfectant was used. We found that 0.525% NaOCl at 5 minutes showed 98.11% clearance of Staphyloccus aureus and 93.27% of candida albican and 100% at 10 minutes. Deconax at 5 minutes showed 97.14% clearance of Staphyloccus aureus and 93.27% of candida albican and 100% at 10 minutes. This is similar to Ahmad et al.[7]

In a study by Muller et al[8]. 66 circular samples of condensational silicone impression materials of 1 cm diameter and 2 mm thickness were contaminated by Staphylococcus aureus, Pseudomonas aeruginosa, and Candida albicans fungus. Except for control samples, all of them were disinfected with sodium hypochlorite (NaOCl) 0.525%, Deconex and Epimax by spraying method. There was a meaningful difference between disinfection effects of Epimax - Deconex for all mentioned microorganisms after 5 min and between disinfection effects of NaOCl 0.525% - Epimax for S. aureus and P. aeruginosa after 5 min. Furthermore, there was a meaningful difference between disinfection effects of Epimax - Deconex (P = 0.034) and NaOCl 0.525% - Epimax for P. aeruginosa after 10 min.

In a study by Egusa et al[9], a total of 120 impressions were made on the model of the upper arch representing three full metal-ceramic crown preparations. Four impression materials were used: two condensation silicones and two addition silicones. After removal from the model the impressions were immediately immersed in appropriate disinfectant (glutaraldehyde, benzalkonium chloride – Sterigum and 5.25% NaOCl) for a period of 10 min. The control group consisted of samples that were not treated with disinfectant solution. The dimensional changes of all the samples were significant both as a function of time and the applied disinfectant. The results show significant differences of the obtained dimensional changes between the group of condensation silicones and the group of addition silicones for the same time, and the same applied disinfectant.

CONCLUSION

Author concluded that 0.525% NaOCl and deconex could effectively disinfect condensational silicone contaminated by the tested microorganisms.It is recommended for disinfecting of condensational silicone impression materials by spraying method.

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