A Comparative Evaluation of Dimensional Change of Addition Reaction Elastomeric Impression Material After Disinfecting With 1% NaOCL and 3% H2O2: An in Vitro Study

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Abstract

Background: Elastomeric impression materials are most commonly used impression materials in clinical practice for treating partially edentulous patient. After making impression it needs to be sterilized properly to minimize the risk of cross infection. Dimensional stability and accuracy of an impression after chemical disinfection by using different disinfectants are crucial for the accuracy of final prosthetic restoration. Until 1991 the recommended procedure for disinfection of impression was rinsing under running water with which only 40% of bacteria, virus, and fungi were removed and potential for transmission of microorganism remained there. Now a days most clinically used disinfection solutions are 3%hydrogen peroxide and 1% sodium hypochlorite. These two solutions are more effective to diminish microorganisms from the impression surface without altering dimensional stability.

Objective: To evaluate and compare the dimensional change of addition reaction elastomeric impression material after disinfecting with 1% NaOCL and 3%H2O2.

Methods: It was a quasi experimental type of in vitro study. This study was done in the Department of Prosthodontics in BSMMU, during the period of October 2021 to October 2022.Specimens of addition reaction impression materials were prepared from a plexiglass mold used as a specimen of this study. Plexiglass mold was fabricated with the measurement of 100 mm length,10 mm width and 3 mm thickness. This mold had some indentations like two parallel horizontal lines and two vertical lines that cross its surface at each end. Totally 32 specimen for each disinfectant solution were included in this study, among them 16 specimen were prepared with addition reaction impression material after disinfecting with 1% NaOCL in a thickness of 3 mm. Another 16 samples were prepared with addition reaction impression material after disinfecting with 3% H2O2 in a thickness of 3 mm. Samples of addition reaction impression material of putty consistency was prepared by taking half spoon base and half spoon of catalyst and kneaded by fingers till uniform color appears and then loaded into the plexiglass mold. The cover of the mold was applied with finger pressure and secured to the base. Excess material was flowed out of the mold through two holes of the lid. the sample was removed form the mold after setting time of 6 minutes. All sample were prepared and their length, width and thickness was measured by electronic vernier caliper at two points. The measurement was averaged and used as the thickness of samples. Afterwards, the samples were visualized with a magnifying loupe (Wild / Leica M420) where, under a magnification of 4.5x.
Measurements were made 2 times for each of the 32 samples.

**Statistical analysis:** The data were analyzed using Statistical Package for Social Sciences (SPSS) version 26 (IBM, Chicago, US). The values were subjected to statistical analysis by unpaired t-test. A p-value <0.05 considered as a level of significant.

**Results:** No significant differences in mean length, width and thickness of specimen between the disinfectant of 1% NaOCL and 3% HPO₂ (p>0.05) was found. However, more changes of length were observed in 3% H2O2 compare to 1% NaOCL (0.181±0.245 vs 0.117±0.185); more changes of width were observed in 3% H2O2 compare to 1% NaOCL (256±0.255 vs 0.185±0.241). Regarding thickness more changes were observed in 1% NaOCL compare to 3% H2O2 (0.178±0.196 vs 0.158±0.158).

**Conclusion:** No significant difference was found in both 1% NaOCL and 3% H2O2 disinfectant solution. So both of the disinfectant 1% NaOCL and 3% H2O2 solution was capable of disinfecting addition reaction silicone elastomeric impression material without causing dimensional changes.

**Keywords:** Disinfectant, cross infection, dimensional stability