International Journal of Research in Health and Allied Sciences

Journal home page: www.ijrhas.com

Official Publication of "Society for Scientific Research and Studies" [Regd.]

ISSN: 2455-7803

ORIGINAL RESEARCH

Effect of autoclaving on dimensional stability of elastomeric impression material

Dinesh Kumar[1], Narendeep Ashutosh[1]

[1]Medical Officer (Dental), Himachal Pradesh

ABSTRACT:

Background: Elastomeric impression materials offer high elastic recovery and acceptable flexibility on removal of the impression from the mouth. The present study was conducted to assess the effect of autoclaving on dimensional stability of elastomeric impression material. **Materials & Methods:** Standardized stainless steel die was prepared. Polyvinyl siloxane (Affinis) light body and putty viscosity elastomeric impression materials were used. A total of 30 impressions of the stainless steel die were made. Distance between the cross lines CD and C0 D0 reproduced in the impression were measured before autoclaving, immediately after autoclaving and 24 hours after autoclaving and dimensional change was calculated. **Results:** The mean value of dimensional change was 3.92 before autoclaving, 4.06 immediate after autoclaving and 3.57 after 24 hours. The difference of dimensional change at different intervals found to be non- significant (P> 0.05). **Conclusion:** Authors found that autoclaving does not cause significant dimensional change of elastomeric impression material.

Key words: Autoclaving, Elastomeric impression material, Dimensional change

Received: 15 December, 2019 Revised: 19 December, 2019 Accepted: 29 December, 2019

Corresponding author: Dr. Narendeep Ashutosh, Medical Officer (Dental), Himachal Pradesh

This article may be cited as: Kumar D, Ashutosh N. Effect of autoclaving on dimensional stability of elastomeric impression material. Int J Res Health Allied Sci 2020; 6(1):99-101.

INTRODUCTION

Elastomeric impression materials offer high elastic recovery and acceptable flexibility on removal of the impression from the mouth. Recently, new elastomeric impression materials have been introduced, with the claim of very high elastic recovery and high tear and tensile strengths.[1] Vinylpolysiloxanes (VPSs) (addition silicones) have a moderately low-molecular-weight silicone that contains silane groups. Since VPSs do not produce a volatile byproduct during polymerization, very small dimensional changes occur on setting. VPS are intrinsically hydrophobic in nature, which can result in voids at the margin of the tooth preparation in the impression and bubbles in gypsum casts.[2]

The ideal impression material should exhibit adequate mechanical properties to withstand stresses under various clinical scenarios.[3] As a part of infection control impressions contaminated with variety of micro-organisms via blood and oral secretions should be cleaned and disinfected or sterilized before being handled in dental laboratory. Autoclaving is considered to be the most effective method of sterilization however, the accuracy of the polyvinyl siloxane elastomeric impression material after autoclaving have not been extensively studied. [4]

Elastomeric impression materials are highly accurate and are widely used for making impressions in fixed prosthodontics. Such materials are reported to the most stable when they have an even thickness of 2 to 4 mm, achieved with an acrylic resin custom-made impression tray. However, the material may distort during setting. In addition, it has greater temperature dependence and other elastic properties compared with metal trays, which may jeopardize the good qualities of an impression material.[5] The present study was conducted to assess the effect of autoclaving on dimensional stability of elastomeric impression material.

MATERIALS & METHODS

The present study was conducted with the aim of assessing the effect of autoclaving on dimensional stability of elastomeric impression material. Standardized stainless steel die was prepared. Polyvinyl siloxane (Affinis) light body and putty viscosity elastomeric impression materials were used. A total of 30 impressions of the stainless steel die were made and numeric coding system was used to identify the samples. Measurements were made using a measuring microscope. Distance between the cross lines CD and C0 D0 reproduced in the

impression were measured before autoclaving, immediately after autoclaving and 24 hours after autoclaving and dimensional change was calculated. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant (P< 0.05).

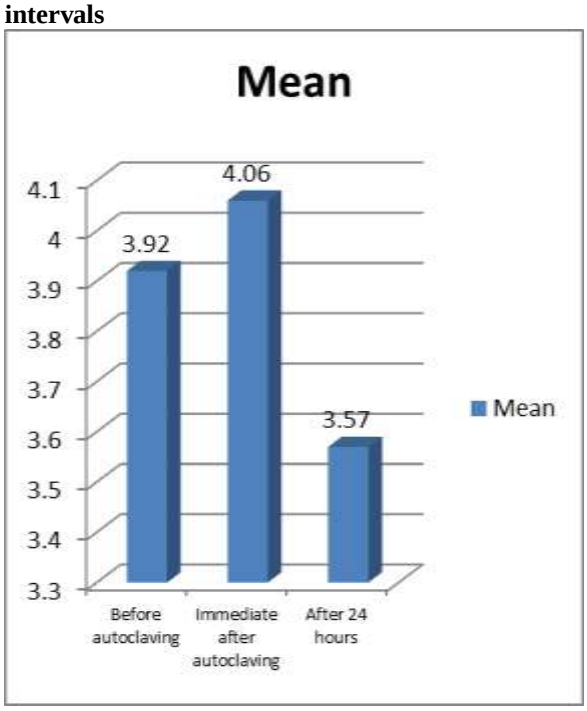
RESULTS

Table I Dimensional stability at three different time intervals

Interval	Mean	P value
Before autoclaving	3.92	0.15
Immediate after autoclaving	4.06	
After 24 hours	3.57	

Table I, graph I shows that mean value of dimensional change was 3.92 before autoclaving, 4.06 immediate after autoclaving and 3.57 after 24 hours. The difference of dimensional change at different intervals found to be non-significant (P> 0.05).

Graph I Dimensional stability at three different time intervals



DISCUSSION

Saliva and blood contaminated impressions are often a source of cross contamination between the clinic and dental laboratory. Explicit communication and observance of an infection control protocol for handling of dental impressions must exist among the office staff as well as between office and dental laboratories. Such an infection control protocol should include guidelines for proper handling and disinfection or sterilization of impressions.[6]

Several laboratory tests demonstrated the ability of elastomeric impression materials to reproduce details. The dimensional stability of these materials is considered to depend on the bulk of elastic material, that is, the distance from the inner surface of the tray to the surface of the impression.[7] Although several reports emphasize the importance of custom-made trays, many dentists use stock trays for fixed prosthodontics with acceptable results. The need for stable and reproducible test conditions justified the present experimental design. Similar conditions could not be obtained clinically because of tooth mobility and difficulties in achieving identical insertion and removal of the impression trays.[8]

The present study was conducted to assess the effect of autoclaving on dimensional stability of elastomeric impression material.

In this study, standardized stainless steel die was prepared. Polyvinyl siloxane (Affinis) light body and putty viscosity elastomeric impression materials were used. Dimensional change was assessed before and after autoclaving. We found that mean value of dimensional change was 3.92 before autoclaving, 4.06 immediate after autoclaving and 3.57 after 24 hours. The difference of dimensional change at different intervals found to be non-significant (P> 0.05).

Surendra et al[9] in their study found that the mean difference in dimensional change between the three groups was not statistically significant. However the results revealed that there was higher mean dimensional change immediately after autoclaving when compared to the other 2 time intervals. It is desirable to delay the casting of an autoclavable elastomeric impression material by about 24 hours. Though disinfection of impression is routinely followed autoclaving of impression is an effective method of sterilization.

Valderhaug et al[10] found that sixty-four percent of the measurements from the impressions made in stock trays were the same as those in the models. The corresponding value for the measurements made in custom-made trays was 42%. All the measurements except one complied with the requirements for dimensional stability of rubber impression material in the American Dental Association (ADA) Specification No. 19. These illustrations reflect the general tendency of the two-dimensional changes registered. There were no statistically significant differences between the distances recorded in impressions made with stock trays and those made with custom trays (p< 0.05). The calculated mean value for all 864 measurements differed 0.03% from the distances in the models.

CONCLUSION

Authors found that autoclaving does not cause significant dimensional change of elastomeric impression material.

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