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Meta-Analysis of The Effects of Heat Sterilization and Chemical Sterilization on The Accuracy of Polyvinyl Siloxane Impressions

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ADMINISTRATIVE INFORMATION

Support - Completed but not published.

Review Stage at time of this submission - Completed but not published.

Conflicts of interest - None declared.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 23 February 2024 and was last updated on 23 February 2024.

INTRODUCTION

Review question / Objective a) To assess and determine the accuracy of PVS after heat and chemical sterilization. b) The objective of this review was to evaluate the data from relevant sources.

Rationale How accurate are polyvinyl siloxane impressions after heat or chemical sterilization?

Condition being studied This systematic review and meta-analysis plays a significant role in the field of dentistry in dental practice and patient care. First, by evaluating the existing literature based on the effects of heat sterilization and chemical disinfection on dental impression materials such as PVS, this review lays a foundation for insights into optimal sterilization practices. Clinicians can use the information generated to improve their knowledge of impression-taking protocols, thereby enhancing the reliability and accuracy of dental restorations and prostheses.
Consequently, identifying the variables that influence PVS impression accuracy after sterilization can lead to a better understanding of the factors that affect clinical outcomes. This knowledge can aid clinicians in tailoring sterilization approaches to distinct clinical scenarios.

METHODS

Search strategy PubMed, ERIC, ScienceDirect, and Google Scholar databases were thoroughly searched. A thorough analysis of 22 relevant studies was conducted to evaluate the precision and economic viability of sterilization techniques for PVS impressions. Studies that examined autoclaving, chemical disinfection, and other sterilization methods with an emphasis on surface detail replication, dimensional stability, the

effectiveness of microbiological sterilization, and economic concerns were included.

Participant or population Studies involving human participants of any sex and age undergoing dental procedures involving PVS.

Intervention Studies investigating the effects of heat and chemical sterilization on polyvinyl siloxane impressions.

Comparator Studies that compared the accuracy of PVS impressions before and after sterilization or compared polyvinyl siloxane impression accuracy under different sterilization methods.

Study designs to be included Randomized controlled trials, cohort studies, case-control studies, or observational studies with control groups. These study designs provide a strong basis for determining causality and analyzing the effects of interventions on outcomes compared with uncontrolled observational studies.

Eligibility criteria Using PICOS framework.

Information sources The search performed using the above databases, the Google Scholar database was used. To ensure that the initial search gives out relevant studies on the first pages displayed, the search made good use of the keyword's "sterilization," "polyvinyl siloxane," and "accuracy" and "polyvinyl siloxane" and " sterilization" OR "disinfect."

Main outcome(s) The accuracy of polyvinyl silicone (PVS) impression materials in dentistry is affected in various ways by heat and chemical sterilization techniques. Although these techniques are essential for disinfecting microbes, they can also cause surface and dimensional changes that affect the accuracy of dental impressions. To guarantee the best possible treatment results, dentists must carefully weigh the effectiveness of sterilization in preserving the material integrity. Further studies and cooperative efforts are required to develop sterilization processes that promote accuracy while efficiently limiting infections. This can improve the quality of treatment in prosthodontics and restorative dentistry.

Data management Using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines, Data extraction and selection were conducted systematically to ensure rigor and transparency throughout the process using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines. EndNote software was used to manage bibliographic references and facilitate the selection of studies.

Quality assessment / Risk of bias analysis Methodological quality assessment of the included studies was conducted using the relevant tools using Cochrane Risk of Bias for Bias tool for randomized controlled trials and the Newcastle-Ottawa Scale for observational studies.

Strategy of data synthesis Using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines, Data extraction and selection were conducted systematically to ensure rigor and transparency throughout the process using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines. EndNote software was used to manage bibliographic references and facilitate the selection of studies.

Subgroup analysis Exclusion criteria
a) Studies failed to investigate the effects of heat or chemical sterilization on PVS impressions.
b) Studies that fail to provide sufficient data on PVS impression accuracy.
c) Case reports, letters, reviews, editorials, and lack of appropriate control groups.
d) Studies published in languages other than English.

Sensitivity analysis Not applicable.

Language restriction Only articles in English.

Country(ies) involved Saudi Arabia.

Keywords "Dental impressions", "Polyvinyl siloxane (PVS)", "Accuracy," "disinfect," "steriliz".

Dissemination plans Data will be shared after publication of the article.

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