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Efficacy of various disinfectants on the microbial flora from the surface of Silicone impression materials used in dentistry. A systematic review and meta-analysis

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ADMINISTRATIVE INFORMATION

Support - King Khalid University.

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 29 February 2024 and was last updated on 29 February 2024.

INTRODUCTION

Review question / Objective 1. To study the Efficacy of various disinfectants. 2. Effect of various disinfectants on the microbial flora from the surface of Silicone impression materials used in dentistry.

Condition being studied Silicone impressions are an integral part of today's dentistry, and there is always a risk of microbes on the surface of these impressions, which can cause cross-contamination. Commercially, different types of disinfectants are available and used as antimicrobial disinfection agents. Therefore, the present systematic review and meta-analysis was designed to evaluate the efficacy of different disinfectants against the microbial flora on the surface of silicone-based impressions.

METHODS

Search strategy Due to the comparative nature of the study, PICO criteria were followed for the selection of the research papers: Population (P): Silicone-based dental impression, Intervention (I): use of disinfectant materials, Comparison (C): rinse with water or saline or no treatment or other competitor, Outcomes (O): antimicrobial activity of disinfectants. An advanced search was performed using different databases, including PubMed, ScienceDirect, Scopus, The Cochrane Library, and Google Scholar, from January 2003 to February 2024. Different keywords such as "disinfectants" OR "disinfection" OR "disinfection techniques" OR "disinfection methods" OR "chemical disinfectants" OR "sterilization" OR "autoclave" AND "microflora" OR "microbes" OR "viruses" OR "bacteria" OR "fungi" AND "silicone based impression" OR "addition silicone impression" OR

"polysiloxane impression" OR "condensation silicone impression" and combination of these keywords were also utilized.

Participant or population Silicone-based dental impression.

Intervention Use of Disinfectants.

Comparator Rinse with water or saline or no treatment or other competitor.

Study designs to be included According to the protocols of Preferred Reporting for Systematic Reviews and Meta-analysis (PRISMA).

Eligibility criteria This research included studies on the impact of shelf-life and storage conditions on the accuracy and performance of additional silicone impression materials. Published literature fulfilling the modified PICO criteria was included.

Information sources An advanced search was performed using different databases, including PubMed, ScienceDirect, Scopus, The Cochrane Library, and Google Scholar, from January 2003 to February 2024.

Main outcome(s) Various studies have investigated the efficacy of different disinfectant agents for silicone-based dental impressions, yielding diverse findings. Certain disinfectants significantly reduce microorganisms on impressions, such as Deconex , glutaraldehyde over alcohol-based disinfectants, sodium hypochlorite, NaOCL, Dimenol, Perform-ID, and MD 520 being most effective options . Meanwhile, UV chambers were also found more effective than immersion systems for microbial growth reduction . Furthermore, microwave exposure had a lethal effect on the growth of microbes within minutes . EOWs also had a significant antimicrobial efficacy . Similarly, autoclave and ozone water methods are effective antimicrobial activity of disinfectants.

Additional outcome(s) Outcomes in terms of efficacy of different disinfectants Various studies have investigated the efficacy of different disinfectant agents for silicone-based dental impressions, yielding diverse findings. Certain disinfectants significantly reduce microorganisms on impressions, such as Deconex , glutaraldehyde over alcohol-based disinfectants, sodium hypochlorite, NaOCL, Dimenol, Perform-ID, and MD 520 being most effective options.

Data management For data extraction (predefined variables) Microsoft Excel sheet was used. The included variables were study characteristics (study ID, country, study design, sample size), intervention characteristics (impression material used, disinfectant used, dose, exposure time, exposure method, type of microorganism evaluated), control/comparison characteristics (water or saline used), outcomes (key findings, efficacy/conclusion, and limitations).

Quality assessment / Risk of bias analysis For the quality assessment of the included studies, the QUIN assessment tool was utilized. Each study was evaluated according to twelve items and rated as yes (1-2 points), no (0 points) or not applicable. Each research paper was graded according to points response. Scores 70% were the low risk of bias.

Strategy of data synthesis Two independent reviewers selected the research papers. At the first step, reviewers screened the title and abstracts of each research paper, whether they were according to our study aim or not. After initial screening and removing duplicate research papers, full-text screening was performed, and eligibility criteria were strictly used to select research papers. Research papers were included when they fulfilled the inclusion criteria. If there was any disagreement among the two reviewers, then the third reviewer was engaged, and issues were resolved through detailed discussions and evaluation of the eligibility criteria.

Subgroup analysis For the quality assessment of the included studies, the QUIN assessment tool was utilized. Each study was evaluated according to twelve items and rated as yes (1-2 points), no (0 points) or not applicable. Each research paper was graded according to points response. Scores 70% were the low risk of bias.

Sensitivity analysis Not applicable.

Language restriction Only articles in English.

Country(ies) involved Saudi Arabia.

Keywords Antimicrobial agents, UV lights, chemicals, microbes, microorganisms, addition silicone impression, condensation silicone impression.

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

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