

INPLASY

Comparative analysis of tear strength across different types of maxillofacial silicone materials: SRMA

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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.

INPLASY registration number: INPLASY202410126

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 31 January 2024 and was last updated on 31 January 2024.

INTRODUCTION

Review question / Objective 1. What is the range of tear strength values reported for different types of maxillofacial silicone materials?

2. Are there significant differences in tear strength values among various types of maxillofacial silicone materials?

3. Which specific types of maxillofacial silicone materials exhibit superior tear strength?

4. How does tear strength correlate with the longevity and performance of maxillofacial prostheses?

5. What are the clinical implications of tear strength in material selection for prosthetic rehabilitation?.

Rationale The rationale for conducting a systematic review and meta-analysis on tear strength across different types of maxillofacial silicone materials is driven by the need to establish evidence-based guidelines and recommendations

for optimal material selection in prosthetic rehabilitation.

Condition being studied 1. To compare and analyse the tear strength values reported in various studies.

2. To identify the types of maxillofacial silicone materials that exhibit superior tear strength.

METHODS

Search strategy Relevant keywords were identified from the research objectives and topic, the keywords were joined together using two Boolean operator "OR" and "AND". The search string formulated for each database were used to retrieve articles from inception to October, 2023, the final results were exported into Endnote for the first stage of screening.

Participant or population Adults or children with Dental problem.

Intervention Tear strength of Silicone materials.

Comparator Impression materials.

Study designs to be included Clinical trial, Randomized Controlled Trial, observational study, cross sectional study, Prospective study.

Eligibility criteria Studies published in English.

Information sources The information relevant to the present research were retrieved from three database; Web of Science, Conchrane, and PubMed. The scope of the literature search was based on the inclusion and exclusion criteria which was formulated using the PICO format.

Main outcome(s) 2186-RTV platinum maxillofacial silicone material exhibit strong tear strength, follow by VST50F maxillofacial silicone as a result of reinforced Nano-filler particles (TiO₂). This improves the lifespan, comfortability, and effectiveness of silicone maxillofacial prostheses. Therefore, this study strongly recommends 2186-RTV platinum types of silicone for individualized maxillofacial materials.

Data management Data was processed in Microsoft Excel (Excel 365; Microsoft Corp., Redmond, WA, USA). For export and data manipulation, Google Sheets (Alphabet Inc., Mountain View, CA, USA) were also used. This is an online spreadsheet program included as part of the free, web-based Google Docs Editors suite offered by Google.

Quality assessment / Risk of bias analysis Considering the screening and selection approach discussed above, the quality of the study included was assessed to guarantee that the studies that were chosen were of high quality. To determine the quality of the included studies, we adopt the grading of recommendation assessment, development, and evaluation (GRADE) strategy. The studies would be evaluated based on ten questions, with a scoring system from 0 to 1. This grading system was formulated by (Kitchenham and Stuart 2007) (10) approach. The formulated questions were designed to examine the methodology of the included studies, with each question representing one point. And the remarks were assigned in this order: an overall score of 10 is "excellent," while articles with a total score between 9 and 8 are "very good." 6 to 7 as an overall score is "good," and less than 5 as an overall score is regarded as "poor." Thus, only studies with good remarks were considered fit for the analysis.

Strategy of data synthesis The meta-analysis was performed using the Review Manager 5.3 from the Cochrane Library, following the grading criteria. At first, the numerical information extracted from the included study was presented using mean, percentage and standard deviation. A continuous meta-analysis using inverse variance approach under random effects was used to analyze the data, and results were visualized using a forest plot. The criteria for assessing the significant of the result was based on 5% significance level and 95% confidence interval, the heterogeneity among the studies was assessed using (I²), and publication bias among the included studies were analyzed using a graphical presentation of the studies (Funnel plot). A situation were more than two Maxillofacial silicone materials were reported and high heterogeneity was found, we performed a meta-regression to investigate the source of the heterogeneity and also determined the most significant material(s).

Subgroup analysis The data was compiled from a variety of articles:

- Author(s), year of publication, country, study design.
- Total number of patients/datasets.
- Training/validation datasets
- Test datasets
- Aim of the study.

Sensitivity analysis None.

Language restriction Only articles in English.

Country(ies) involved Saudi Arabia, West Indies.

Keywords Silicone materials, Tear strength, Tensile strength, Prosthetic rehabilitation.

Dissemination plans All the data and the article will be share after the publication.

Contributions of each author

Author 1 - Ravinder Saini - Author 1 drafted the manuscript.

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