INPLASY PROTOCOL

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None declared.

Assessment of Mechanical Properties of Hybrid PVES Elastomeric Material in Comparison to its Parent Materials - A Systemic Review

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Review question / Objective: **Does the hybrid elastomeric impression materials have better elastic memory, tensile strength, hydrophilicity, and dimensional stability as compared to polyether and poly vinyl siloxane.**
Condition being studied: **Dimensional Stability, Tear Strength, yield strength, wettability and other properties of impression materials.**
Information sources: **Original studies from corresponding databases were exported using Harzing's Publish or Perish (Tamra Software Research Ltd) Widows GUI v8.8 edition with MeSH keywords. Data was exported to MS Excel 2021 edition (Microsoft Corporation, Washington USA).**

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 13 March 2023 and was last updated on 13 March 2023 (registration number INPLASY202330043).

INTRODUCTION

Review question / Objective: **Does the hybrid elastomeric impression materials have better elastic memory, tensile strength, hydrophilicity, and dimensional stability as compared to polyether and poly vinyl siloxane**

Rationale: **This study aims to evaluate the mechanical properties of hybrid VPESs materials by evaluating the available data**

of recent studies on subject matter. Several studies in recent past have reported effectiveness of novel PVES hybrid, claiming to showcase positive hallmarks of the PE and PVS elastomers with minimal drawbacks. However, consensus on the results of these in vitro studies is yet be achieved. This study will provide a milestone in assessment of mechanical and physical properties of VPES, providing guidance on mixing and hybridization of different elastomeric impression materials in dentistry to achieve desirable outcomes.

Condition being studied: Dimensional Stability, Tear Strength, yield strength, wettability and other properties of impression materials.

METHODS

Search strategy: Boolean Search Strategy. The studies were systematically searched in electronic databases including ScienceDirect, Scopus, PubMed, Google Scholar, and Web of Science.

Participant or population: None.

Intervention: The studies selection criteria covered 1) in vitro studies 2) studies should include the standard deviation and mean of mechanical properties of the polyether vinyl siloxanes.

Comparator: The properties of elastomeric impression materials for which data was collected for meta-analysis were tensile strength, elasticity/young's modulus, hydrophilicity/wettability, rigidity, dimensional stability, viscosity.

Study designs to be included: We took into account both descriptive (case control and cohort) and interventional (trials) based research that was written in English for this review.

Eligibility criteria: Involved the selection of studies which compare the mechanical properties of PVES with PE and PVS.

Information sources: Original studies from corresponding databases were exported using Harzing's Publish or Perish (Tamra Software Research Ltd) Widows GUI v8.8 edition with MeSH keywords. Data was exported to MS Excel 2021 edition (Microsoft Corporation, Washington USA).

Main outcome(s): The meta-analysis results showed that PVES inherits the tear strength from its parent materials PE and PVS, showing improved tear strength from both.

Additional outcome(s): The contact angle measurements for hydrophilicity of the hybrid impression materials showed highly positive trend, indicating that PVS and PE hybrid has improved hydrophilic properties.

Data management: The descriptive analysis of data was performed using MS Excel 2021 (Microsoft Corporation, Redmond, USA) and meta-analysis was performed using Meta-Essentials 2017. ALl the supplimentary files willbe made available on open cloud system.

Quality assessment / Risk of bias analysis: Two researchers independently assesed the risk of bias of the included articles using - JBI critical appraisal tools. The potential risk of bias was categorised as low if a study provided detailed information pertiaining to 70 % to 50 % of the applicable parameters.

Strategy of data synthesis: Two review authors AK and RS used the studies to help select studies and document their decisions . This was done in two stages with the first stage consisting of a title and abstract screening of all studies against the inclusion criteria and the second stage being a full text assessment of papers that were deemed potentially relevant based on initial screening.

Subgroup analysis: The data was compiled from a varienty of articles: Authors, Year of Publication, Country and study design; Total no of datasets; TestDatasets; Aim of the Study.

Sensitivity analysis: NA.

Language restriction: Articles only in English were Selected.

Country(ies) involved: India, Saudi Arabia.

Keywords: vinyl polyether siloxane, polyether, polyvinyl siloxane, elastomeric impression materials.

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

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