

INPLASY

Clinical interpretability of laboratory zirconia bonding studies: a structured systematic review

INPLASY202620041

doi: 10.37766/inplasy2026.2.0041

Received: 11 February 2026

Published: 11 February 2026

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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: INPLASY202620041

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 11 February 2026 and was last updated on 11 February 2026.

INTRODUCTION

Review question / Objective To identify in-vitro zirconia–resin bonding studies which yield methodologically and clinically interpretable evidence to guide surface-treatment and bonding decisions.

Rationale A domain-based interpretability review is needed to separate laboratory findings that truly inform clinical practice from those that do not.

Condition being studied In-vitro bonding between dental zirconia ceramics and resin-based luting agents using various surface treatments.

METHODS

Search strategy Electronic searches in PubMed/MEDLINE and Scopus using combined keywords for zirconia, surface treatments, resin cements, and

bond strength, limited to English-language peer-reviewed articles.

Participant or population Not applicable—this is an in-vitro review of laboratory studies.

Intervention Clinically relevant surface treatment protocols applied to zirconia, such as sandblasting, silica coating, acid etching, laser treatment, or hybrid methods.

Comparator Different surface treatments or untreated/control zirconia surfaces within included studies.

Study designs to be included In-vitro laboratory studies evaluating zirconia bonding to resin cements with quantitative bond strength testing.

Eligibility criteria Included: in-vitro studies on zirconia with resin cement, surface treatments, bond strength testing.
Excluded: non-zirconia ceramics, reviews, case reports, insufficient methodological details.

Information sources MEDLINE, PubMed, Scopus, and manual screening of references from included studies.

Main outcome(s) Overall clinical interpretability classification (high, moderate, low) based on predefined domains.

Additional outcome(s) Specific surface treatment efficacy, durability testing results, failure mode patterns, and reporting transparency.

Data management Data extraction using a standardized form covering study characteristics, methods, and outcomes.

Quality assessment / Risk of bias analysis A domain-based checklist for clinical interpretability was used instead of traditional risk-of-bias tools.

Strategy of data synthesis Qualitative synthesis due to methodological heterogeneity; no statistical meta-analysis was performed.

Subgroup analysis Not conducted due to inconsistent reporting of variables like zirconia generation.

Sensitivity analysis No formal quantitative sensitivity analysis was done.

Language restriction Only English-language publications were included.

Country(ies) involved Saudi Arabia, United States of America, India.

Other relevant information The review followed PRISMA 2020 guidelines and excluded studies with inadequate methodological reporting.

Keywords Zirconia Bonding, Resin Cements , Surface Treatment Protocol, Clinical Interpretability, MDP primers, tribochemical silica coating.

Dissemination plans Implied through peer-reviewed publication.

Contributions of each author

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