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ADMINISTRATIVE INFORMATION

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**Review Stage at time of this submission** - Data analysis.

**Conflicts of interest** - None declared.

**INPLASY registration number:** INPLASY202550019

**Amendments** - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 9 May 2025 and was last updated on 9 May 2025.

INTRODUCTION

**Review question / Objective** To assess the clinical outcomes of zirconia implants (ZIs) supporting three-unit fixed partial dentures (FPDs) or complete dentures (fixed or removable), including survival and success rates, marginal bone loss (MBL), and reported complications.

**Condition being studied** Although zirconia implants have demonstrated favorable outcomes for single crowns in low-load regions, their performance in more demanding prosthetic scenarios, such as fixed partial dentures and complete rehabilitations, remains unclear.

METHODS

**Participant or population** Patients with ZIs supporting fixed partial dentures (with more than three teeth) or complete dentures (fixed or removable).

**Intervention** Rehabilitation of partial or complete edentulous teeth with ZIs.

**Comparator** Mean survival, success, and MBL rates between ZIs and titanium implants (when data are available).

**Study designs to be included** Randomized controlled trials (RCTs), controlled clinical trials, and observational (cohort studies).

**Eligibility criteria** Animal studies, in vitro studies, case series, case reports, and reviews were excluded. No studies were excluded due to language, publication date, or number of patients to avoid publication bias.

**Information sources** PubMed/MEDLINE, the Cochrane Central Register of Controlled Trials, Embase, and Web of Science.

**Main outcome(s)** The primary outcomes are the mean survival and success rates of ZIs.

**Additional outcome(s)** The secondary outcomes are MBL and the mean prosthetic survival rate.

**Quality assessment / Risk of bias analysis** The risk of bias in the included studies was independently assessed by two researchers based on version 2 of the Cochrane risk-of-bias tool for RCTs (RoB 2) and the ROBINS-1 tool for observational studies. The RoB 2 tool allowed for a detailed analysis of seven key domains, including selection bias (randomization and allocation concealment), performance bias (blinding of participants and personnel), detection bias (blinding of outcome assessors), attrition bias (incomplete outcome data), reporting bias (selective reporting of results), and other potential biases.

According to the tool, each trial's overall risk of bias was classified as low if all domains were at low risk and high if any domain was at high risk or if multiple domains were classified as having some concerns. If only one domain was classified as having some concerns, the overall risk of bias for that trial was categorized as "of some concern."

The ROBINS-I tool analyzed biases related to confounding, participant selection, intervention classification, deviations from intended interventions, missing data, outcome measurement, and reporting of selected results.

Based on the detailed description of the methodological procedures in the studies, each domain in both tools was classified as having a 'low risk of bias,' 'moderate risk of bias,' or 'high risk of bias.' Regardless of the analysis's result, no study was excluded based on the risk of bias within studies.

**Strategy of data synthesis** The implant failure data from the selected studies (considered a dichotomous variable) were divided into subgroups based on the type of prosthesis used. A meta-analysis was performed using MetaAnalysisOnline.com, a web-based tool. The pooled proportion or the risk ratio (RR) with a 95% confidence interval (CI) was calculated to estimate the effects. To enhance clinical relevance, prediction intervals were assessed to illustrate the range of true effects around the overall summary effect.

**Subgroup analysis** No applicable.

**Sensitivity analysis** No applicable.

**Language restriction** No applicable.

**Country(ies) involved** Brazil.

**Keywords** Dental implants · Zirconia implants · Ceramic implants · Survival · Marginal bone loss · Systematic review.

#### **Contributions of each author**

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