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Can Re-osseointegration Occur After Peri-implantitis? A Systematic Review

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ADMINISTRATIVE INFORMATION

Support - None.

Review Stage at time of this submission - Risk of bias assessment.

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 22 June 2025 and was last updated on 22 June 2025.

INTRODUCTION

Review question / Objective -Review question: Is re-osseointegration possible after peri-implantitis treatments in animal models, based on histological outcomes?

-Objectives: The specific aims include:
• Analyze whether re-osseointegration is achievable after peri-implantitis.
• Evaluating the efficacy of different therapeutic approaches (e.g., mechanical debridement, laser therapy, regenerative techniques...) in achieving re-osseointegration.
• Identifying predictors of successful re-osseointegration, such as implant surface characteristics.

Condition being studied Peri-implantitis is a growing concern in implant dentistry, leading to progressive bone loss, implant failure, and significant clinical challenges. While surgical and non-surgical treatments aim to halt disease progression, the possibility of re-osseointegration, re-establishing bone-to-implant contact after peri-implantitis, remains controversial and poorly understood.

METHODS

Participant or population Animal models with experimentally induced peri-implantitis (all species, both sexes).

Intervention Mechanical debridement, chemical agents (chlorhexidine...), laser therapy, photodynamic therapy, regenerative interventions (bone grafts, membranes, enamel matrix derivatives, BMP-2...) , or combined therapeutic approaches.

Comparator No treatment, placebo, or alternative interventions.

Study designs to be included In vivo experimental studies conducted on animal models will be included. These studies must involve induced peri-implantitis, followed by treatment,

and must report histological evidence of re-osseointegration.

Eligibility criteria
Additional Inclusion Criteria:
-Studies published between 2014 and 2024.
-Studies published in English.

Additional Exclusion Criteria:
-Studies involving pre-existing defects before implant placement.
-In vitro studies, clinical trials, or studies on human subjects.

Information sources
- Databases: MEDLINE (via PubMed), Scopus, and Science direct.
-Manual search: We will screen the reference lists of included studies for additional eligible studies not retrieved by our search.

Main outcome(s) -The primary outcome of this review is the histological evidence of re-osseointegration following peri-implantitis treatment in animal models. Outcomes will be assessed based on quantitative and and qualitative histomorphometric parameters such as re-osseointegration (%, mm),bone-to-implant contact percentage (BIC%), new bone area...

Quality assessment / Risk of bias analysis The risk of bias will be evaluated using appropriate tools. For preclinical animal studies, assessment will be conducted using SYRCLE's risk of bias tool, which is specifically designed for this type of research.

Strategy of data synthesis A narrative synthesis will be performed to summarize the main findings from the included studies. This will include a detailed description of re-osseointegration outcomes following peri-implantitis treatment in animal models, with a particular focus on histological evidence. The synthesis will also cover Implants and Surface characteristics, as well as the different treatment modalities applied in the studies. Given the anticipated variability in the interventions used across studies, we expect limited scope for meta-analysis, which may restrict the ability to quantitatively combine the results.

Subgroup analysis If sufficient data are available, subgroup analyses will be performed based on:
-Type of implant surface (e.g., rough vs. smooth)
-Type of surface decontamination technique (e.g., mechanical, chemical, laser)
-Use or non-use of regenerative therapy (e.g., bone grafts, membranes)
-Duration of follow-up after treatment.

Sensitivity analysis A sensitivity analysis will be performed to assess the robustness of the review findings. Given that a meta-analysis is not anticipated due to the expected heterogeneity among studies, a qualitative sensitivity analysis will be conducted. This will involve examining whether the conclusions of the review change when excluding studies with a high risk of bias, as assessed by SYRCLE's risk of bias tool.

Country(ies) involved Morocco.

Keywords dental implants, animal models, peri-implantitis, decontamination techniques, bone to implant contact, bone regeneration, histomorphometry, systematic review.

Contributions of each author
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