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The Effect of Gold Nanoparticle Coated Dental Implants On Osseointegration - A Systematic Review

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ADMINISTRATIVE INFORMATION

Support - Akeela dental care sponsor.

Review Stage at time of this submission - Completed but not published.

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 07 October 2023 and was last updated on 07 October 2023.

INTRODUCTION

Review question / Objective Is there a difference in osseointegration between gold nanoparticle coated dental implants and non coated titanium implants?

Rationale Dental implants are widely used in dentistry to replace missing teeth, restore oral function, and improve the quality of life for patients. Osseointegration, defined as the direct structural and functional connection between living bone and the surface of a load-bearing artificial implant, is critical for the success of dental implants. The surface characteristics of dental implants play a crucial role in osseointegration. Gold nanoparticles have emerged as a promising coating material for dental implants, owing to their unique physicochemical properties.

Condition being studied With the increasing usage of dental implants, the most prevailing concern amongst clinicians remains to be peri-implantitis. Peri-implantitis is observed despite the biocompatibility and osseointegration properties of titanium. Thus, the inclusion of surface coatings was brought about in implant surface modifications. Surface coatings with antimicrobial effectiveness can help in preventing the onset of peri-implantitis and bone loss while also increasing or improving the bone implant contact.

METHODS

Participant or population Animals subjected to dental implants.

Intervention Gold nanoparticle coated dental implants.

Comparator Non coated titanium dental implants.

Study designs to be included Animal study.

Eligibility criteria In vivo animal studies, human clinical trials, studies investigating the effects of gold nanoparticle coated dental implants on osseointegration, published in English language, full text available articles - included studies.

Information sources PubMed; Scopus; Web of Science; Google Scholar.

Main outcome(s) Histomorphometry, Pull out test, Histology , Micro CT.

Quality assessment / Risk of bias analysis TIMPERS tool used for assessment of risk of bias.

Strategy of data synthesis For the identification of studies to be included or considered for this systematic review, detailed search strategies were developed for the databases searched. The search was initiated with the combination of controlled vocabulary-free text terms. The keywords employed in this search were broadly classified into four categories describing the population, intervention, comparison and outcome. Keywords within each group were combined using operator (odds ratio) OR and the searches of individual groups were combined using operator AND, to retrieve articles electronically.

Subgroup analysis None reported.

Sensitivity analysis None reported.

Language restriction English literature accepted.

Country(ies) involved India.

Keywords Gold nanoparticles; coated dental implants; implant surface modifications; osseointegration.

Contributions of each author

Author 1 - Nadhirah Faiz - Author 1 drafted the manuscript.
Email: 152109001.sdc@saveetha.com
Author 2 - Dr Vinay Sivasamy - Author 2 provided the statistical expertise.
Author 3 - Dr Suresh Venugopal - The author created the list of keywords to be entered for the database search.