INPLASY

Evaluation of the effectiveness of chitosan-modified bone repair materials

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ADMINISTRATIVE INFORMATION

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Review Stage at time of this submission - Preliminary searches.

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 1 April 2025 and was last updated on 1 April 2025.

INTRODUCTION

Review question / Objective What is the effectiveness of chitosan-modified bone regeneration materials on bone regeneration (C), investigated through, in vitro and in vivo (animals) studies (C) during the period from 2016 to 2025 (P)?

Condition being studied Effectiveness of chitosan-modified bone repair materials.

METHODS

Search strategy Scopus, Web of Science, and PubMed databases.

Participant or population In vitro and in vivo (animals) studies.

Intervention The effectiveness of chitosan-modified bone repair materials on bone regeneration.

Comparator Bone regeneration.

Study designs to be included The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Statement standards are followed.

Eligibility criteria
Inclusion criteria:
Research articles in English
Published in the period January 2016 – January 2025
Studies including research on groups of bone-repair materials described in Figure 1A and 1B.
Exclusion criteria:
Abstracts, reviews, books, book chapters, case reports and case series

Articles from 2014 and earlier
Articles in languages other than English
Studies that do not evaluate the effectiveness of chitosan-modified bone repair materials
Studies investigated a variety of bone repair materials, but chitosan was included to all groups investigated (Figure 1C and 1D).
Studies investigating the effectiveness of various bone-repair materials after the addition of chitosan in combination with another material (Figure 1E).
Studies that examined chitosan-modified bone-graft, but the control group, represented self-administered chitosan (Figure 1F).

Information sources Electronic search was carried out to find research publications in the Scopus, Web of Science, and PubMed databases.

Main outcome(s) Chitosan improves the biological properties of bone regenerative materials modified with it.

Additional outcome(s) The proven effectiveness of chitosan-modified bone repair materials and its positive influence on them in terms of their biological properties.

Quality assessment / Risk of bias analysis For the purpose of this review, a quality assessment was conducted using the SYRCLE ROB tool for animal studies and The QUIN assessing tool for in-vitro studies.

Strategy of data synthesis Titles and abstracts were screened and assessed for eligibility by two independent reviewers (T.G. and R.Y.). Article titles, abstracts, authors, year of publication and DOI-number were exported from the databases used (Web of Science, Scopus and PubMed) into an MS Excel spreadsheet. A review for available duplicate articles was performed and duplicates found were removed. All remaining full-text studies were screened for eligibility criteria in this systematic review. In order to perform an acute analysis of the data, studies meeting the criteria were divided into two tables, a table including in vitro studies and a table including in vivo studies.

Subgroup analysis Not applicable.

Sensitivity analysis Not applicable.

Language restriction English only.

Country(ies) involved Bulgaria.

Keywords chitosan, bone graft, bone substitute, bone regeneration, biological properties.

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