International Platform of Registered Systematic Review and Meta-analysis Protocols



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Corresponding author: Ravinder Saini

rsaini@kku.edu.sa

Author Affiliation: King Khalid University.

Maxillofacial Reconstruction Outcomes with Different Bone Substitute Combinations: A Systematic Review and Network Meta-analysis

Saini, R; Ibrahim, R; Heboyan, A.

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: INPLASY202550020

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 10 May 2025 and was last updated on 10 May 2025.

INTRODUCTION

Review question / Objective To evaluate the efficacy of bone grafting materials for new bone formation and residual graft reduction in maxillofacial reconstruction.

Rationale Autogenous bone, though the gold standard, has limitations like donor site morbidity; synthetic alternatives require comparative efficacy assessment.

Condition being studied Maxillofacial bone defects requiring reconstruction, specifically sinus augmentation and alveolar ridge preservation.

METHODS

Search strategy Systematic search across PubMed, Scopus, Web of Science, Cochrane Library, and ScienceDirect using keywords like "bone graft," "new bone formation," and "maxillofacial reconstruction". **Participant or population** Human patients undergoing sinus augmentation or alveolar ridge preservation with biopsy-confirmed histomorphometric outcomes.

Intervention Bone substitutes including autogenous bone, hydroxyapatite, β-tricalcium phosphate, biphasic calcium phosphate.

Comparator Other bone substitutes or synthetic materials, with β -TCP as the primary reference.

Study designs to be included Randomized controlled trials (RCTs) and prospective cohort studies.

Eligibility criteria Studies published in English with \geq 3-month follow-up, histomorphometric data, and comparative arms; excluded in vitro, animal, or non-comparative studies.

Information sources Five electronic databases (PubMed, Scopus, etc.) and manual searches.

Main outcome(s) Quantitative histomorphometric measures of new bone formation and residual graft content.

Additional outcome(s) Soft tissue percentage, volumetric changes (CBCT), bone density, implant success rates, and complications.

Data management Data extracted into Excel by two reviewers; discrepancies resolved via consensus or third reviewer.

Quality assessment / Risk of bias analysis Assessed using Cochrane RoB2 tool; visualized via traffic light plots.

Strategy of data synthesis Frequentist NMA via Metalnsight platform with random-effects models.

Subgroup analysis Not explicitly mentioned; analysis stratified by intervention types and outcomes.

Sensitivity analysis Conducted by excluding studies with high/unclear bias.

Language restriction Only articles published in English.

Country(ies) involved Saudi Arabia, India.

Other relevant information PRISMA-NMA guidelines followed.

Keywords Bone graft, maxillofacial reconstruction, new bone formation, sinus augmentation, biomaterials.

Dissemination plans Findings intended for publication in peer-reviewed journals.

Contributions of each author

Author 1 - Ravinder Saini - Conceptualization, Methodology, Writing draft, Investigations. Email: rsaini@kku.edu.sa Author 2 - Rayan Ibrahim - Statistical analysis, VIsualization. Email: rihasan@kku.edu.sa Author 3 - Artak Heboyan - Project administration, funding acquisition, publication. Email: heboyan.artak@gmail.com