INPLASY

Clinical and Safety Outcome Profiles of Resorbable Fixation Systems in Pediatric Facial Fractures: A Systematic Review and Meta-Analysis

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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: INPLASY2025100004

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 2 October 2025 and was last updated on 2 October 2025.

INTRODUCTION

Review question / Objective To assess the clinical outcomes and complication rates of bioresorbable fixation systems compared to titanium systems in pediatric facial fractures.

Rationale Resorbable fixation may avoid growth interference and secondary removal surgeries associated with titanium hardware, but comprehensive comparative evidence in children is limited.

Condition being studied Pediatric facial fractures, including mandibular, maxillary, zygomatic, and cranial vault injuries.

METHODS

Search strategy Search was conducted in PubMed, Cochrane, Scopus, Web of Science, and ScienceDirect using related keywords.

Participant or population Pediatric patients with trauma-induced facial fractures, excluding those with syndromic or non-traumatic deformities.

Intervention Open reduction and internal fixation (ORIF) using resorbable plates and screws made from materials like polylactic acid, polyglycolic acid.

Comparator Internal fixation using traditional titanium plate systems.

Study designs to be included Pediatric facial fractures, resorbable plates, bioabsorbable fixation, titanium comparison, meta-analysis, craniofacial trauma, complication rate, plate removal.

Eligibility criteria Pediatric patients with facial fractures managed by resorbable fixation, reporting outcomes like complications and functional

recovery, while excluding animal models, case reports.

Information sources Sources are PubMed, Cochrane Library, Scopus, Web of Science, and ScienceDirect databases.

Main outcome(s) Complication rates, specifically infection, malocclusion, implant palpability, and the need for plate removal.

Additional outcome(s) Occulsal stability, bite force, functional recovery, bone healing and secondary surgical needs.

Data management Data were extracted independently by two reviewers into a pre-designed spreadsheet, with disagreements resolved by a third reviewer.

Quality assessment / Risk of bias analysis Assessed using the ROBINS-I tool for non-randomized studies visualized with Robvis traffic light plots.

Strategy of data synthesis Meta-analyses were performed using Comprehensive Meta-Analysis (CMA) software, employing both fixed-effect and random-effects models to pool log odds ratios and logit event rates.

Subgroup analysis Focused on variations by fracture location, material type, and study characteristics to explore heterogeneity.

Sensitivity analysis Assessing publication bias through funnel plots, Begg's test, Egger's test, and Duval and Tweedie's Trim and Fill method to evaluate result robustness.

Language restriction Included only English-language publications.

Country(ies) involved United States of America, Saudi Arabia, India.

Other relevant information The analysis was conducted in accordance with PRISMA guidelines and the Declaration of Helsinki

Keywords Pediatric facial fractures, resorbable plates, bioabsorbable fixation, titanium comparison, meta-analysis, craniofacial trauma, complication rate, plate removal.

Dissemination plans To be published in a peer-reviewed journal.

Contributions of each author

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