INPLASY

Short versus standard systemic antibiotic courses after surgery for adult bone and orthopaedic implant infection

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ADMINISTRATIVE INFORMATION

Support - No support.

Review stage at the time of initial registration - 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 13 November 2026 and was last updated on 13 November 2026.

INTRODUCTION

Review question / Objective In adults undergoing surgery for bone or orthopaedic implant infections, how do shorter versus standard or longer finite courses of systemic antibiotics compare in treatment failure, infection persistence or recurrence, repeat surgery, and adverse events? This review aimed to evaluate these outcomes according to infection type and surgical source-control strategy.

Rationale The optimal duration of systemic antibiotic therapy after surgery for bone and orthopaedic implant infections remains uncertain. Prolonged treatment may increase adverse events, treatment burden, and antimicrobial resistance. Shorter courses may be appropriate after adequate surgical source control, but effectiveness may differ according to infection type, implant retention or removal, and local antibiotic delivery. This review systematically evaluated comparative evidence to clarify the effectiveness and safety of shorter postoperative antibiotic regimens.

Condition being studied Bone and orthopaedic implant infections requiring therapeutic surgery, including prosthetic joint infection, fracture-related infection, spinal implant infection, diabetic foot osteomyelitis, and chronic osteomyelitis. Surgical procedures included debridement with implant retention, implant removal or exchange, amputation, and surgery with local antibiotic delivery. The review focused on infection control and treatment-related outcomes following different durations of systemic antibiotics.

METHODS

Participant or population Adults aged 18 years or older with diagnosed osteomyelitis, prosthetic joint infection, fracture-related infection, or other orthopaedic implant-associated infections who underwent therapeutic surgical procedures. Eligible

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patients received postoperative systemic antibiotic treatment following debridement, implant retention or removal, revision surgery, amputation, or other forms of surgical source control.

Intervention Shorter finite courses of systemic antibiotic therapy following therapeutic surgery for bone or orthopaedic implant infections. Treatment durations varied across studies and surgical contexts, including shorter regimens administered after debridement, implant removal, or surgery combined with local antibiotic delivery.

Comparator Standard or longer finite courses of systemic antibiotic therapy following comparable surgical treatment. The duration of comparator regimens was defined by each original study and varied according to infection type, surgical intervention, implant status, and treatment protocol.

Study designs to be included Randomized controlled trials and comparative observational studies were eligible, including prospective and retrospective cohort studies, historical comparisons, before-and-after studies, and case-control studies. Studies were required to compare different finite durations of systemic antibiotic therapy following surgery. Non-comparative case series, narrative reviews, study protocols, and duplicate reports were excluded. Randomized and observational evidence was analyzed separately.

Eligibility criteria Studies were included if they enrolled adults with bone or orthopaedic implant infections undergoing therapeutic surgery, directly compared at least two finite durations of postoperative systemic antibiotic treatment, and reported infection-control or safety outcomes by treatment group or provided interpretable comparative effect estimates. Randomized trials and comparative observational studies were eligible.

Exclusion criteria included studies evaluating antibiotic prophylaxis only, intravenous-to-oral switching without comparison of total treatment duration, non-operative populations without separable surgical outcomes, pediatric populations, non-comparative studies, case reports, reviews, study protocols, duplicate reports, and indefinite suppressive antibiotic therapy without a defined treatment endpoint.

Information sources PubMed, Web of Science, Embase, and ClinicalTrials.gov were searched for relevant comparative studies. Records were deduplicated using DOI and standardized title/year matching. Titles, abstracts, and full texts were screened for eligibility. Original publications, available author versions, and trial registration records were examined. Multiple reports from the same underlying trial were linked to prevent duplicate counting.

Main outcome(s) The primary outcome was source-defined clinical treatment failure, persistence, or recurrence of the index bone or orthopaedic implant infection after surgery. Outcome definitions and follow-up periods were retained as reported in the original studies.

Quality assessment / Risk of bias analysis Risk-of-bias issues were considered using RoB 2 domains for randomized trials and the ROBINS-I framework for observational studies. Confounding, missing data, outcome assessment, and selective reporting informed interpretation. Formal domain-level risk-of-bias judgments and outcome-specific GRADE certainty ratings were not completed in the manuscript.

Strategy of data synthesis Crude risk ratios (RRs) with 95% confidence intervals were calculated from treatment-group event counts. Adjusted hazard ratios and odds ratios were reported separately. Two randomized DAIR comparisons were pooled using an inverse-variance DerSimonian-Laird random-effects model. Heterogeneity was assessed using Cochran's Q, I^2, and τ^2. Other comparisons were summarized in stratified, unpooled forest plots. Randomized and observational evidence was analyzed separately.

Subgroup analysis Evidence was stratified by infection type and surgical source-control strategy, including debridement with implant retention (DAIR), implant exchange or removal, local-antibiotic carrier surgery, fracture-related infection, spinal implant infection, diabetic foot osteomyelitis, and chronic osteomyelitis. Randomized and observational studies were assessed separately. No formal subgroup interaction tests were reported.

Sensitivity analysis For the exploratory meta-analysis of two randomized DAIR comparisons, the DerSimonian-Laird random-effects model was compared with a fixed-effect inverse-variance model to assess the influence of model selection. No additional leave-one-out sensitivity analyses were performed.

Country(ies) involved China.

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Keywords Osteomyelitis; Prosthetic joint infection; Fracture-related infection; Orthopaedic implant infection; Antibiotic duration; Surgical source control; Systematic review; Meta-analysis.

Contributions of each author

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