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Comparison Between Articulating and Static Antibiotic-Loaded Spacers in Two-Stage Revision for Periprosthetic Hip Infection: A Systematic Review

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ADMINISTRATIVE INFORMATION

Support - This systematic review did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Review Stage at time of this submission - Formal screening of search results against eligibility criteria.

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 24 July 2026 and was last updated on 24 July 2026.

INTRODUCTION

Review question / Objective To evaluate the efficacy and safety of articulating antibiotic-loaded spacers compared with static antibiotic-loaded spacers in adult patients undergoing two-stage revision for periprosthetic hip infection. Specifically, this review aims to compare infection eradication, reinfection rates, range of motion, functional outcomes, and postoperative complications between the two spacer types.

Rationale Periprosthetic hip infection is one of the most serious complications following total hip arthroplasty, resulting in substantial morbidity, functional impairment, increased healthcare costs, and reduced quality of life. Two-stage revision remains the standard treatment for chronic periprosthetic hip infection and involves the use of an antibiotic-loaded spacer. Although both articulating and static spacers provide local antibiotic delivery, previous studies have suggested differences in functional outcomes, range of motion, technical complexity during reimplantation, and postoperative complications. However, evidence regarding their comparative effectiveness, particularly in terms of infection eradication and reinfection rates, remains inconclusive. Therefore, a systematic review is needed to critically synthesize the available evidence and provide a comprehensive comparison of these two spacer types.

Condition being studied Periprosthetic hip infection (PJI) is a severe complication of total hip arthroplasty associated with high morbidity, functional impairment, increased healthcare costs, and reduced quality of life. This review focuses on adult patients with chronic PJI undergoing two-stage revision arthroplasty.

METHODS

Participant or population Adult patients (≥18 years) diagnosed with periprosthetic hip infection

(PJI) undergoing two-stage revision arthroplasty. Studies must include patients diagnosed according to recognized diagnostic criteria (e.g., MSIS, ICM, or equivalent criteria reported by the authors).

Intervention Articulating antibiotic-loaded spacers, including functional articulating spacers when identified, used during two-stage revision arthroplasty for the treatment of periprosthetic hip infection.

Comparator Static antibiotic-loaded spacers used during two-stage revision arthroplasty for the treatment of periprosthetic hip infection.

Study designs to be included Randomized controlled trials (RCTs), prospective cohort studies, retrospective cohort studies, and comparative observational studies evaluating articulating versus static antibiotic-loaded spacers in adult patients undergoing two-stage revision for periprosthetic hip infection.

Eligibility criteria Studies will be eligible if they are randomized controlled trials, prospective or retrospective cohort studies, or comparative observational studies involving adult patients (≥18 years) diagnosed with periprosthetic hip infection (PJI) of the hip according to recognized diagnostic criteria (e.g., MSIS, ICM, or equivalent). Eligible studies must evaluate patients undergoing two-stage revision arthroplasty and provide a direct comparison between articulating and static antibiotic-loaded spacers, with a minimum follow-up of 12 months after reimplantation and reporting at least one predefined outcome. There will be no restrictions on publication year or language. Case reports, case series without a comparator, reviews, meta-analyses, editorials, conference abstracts without full text, animal or in vitro studies, studies involving joints other than the hip, pediatric populations, one-stage revision, DAIR, indirect comparisons, duplicate publications, or studies without accessible full text will be excluded.

Information sources The literature search will be conducted in the following electronic databases: PubMed/MEDLINE, the Cochrane Library, and LILACS. Additionally, the reference lists of all included studies and relevant reviews will be manually screened to identify any additional eligible studies.

Main outcome(s) The primary outcomes are infection eradication, reinfection rate, and pre-reimplantation range of motion (ROM), comparing articulating and static antibiotic-loaded spacers in two-stage revision for periprosthetic hip infection.

Additional outcome(s) Secondary outcomes will include Harris Hip Score (HHS), Hip Disability and Osteoarthritis Outcome Score (HOOS), length of hospital stay, reoperation rate, bone loss, need for extensive surgical exposure during reimplantation, spacer dislocation, and spacer fracture.

Data management Search results will be imported into Rayyan for reference management, duplicate removal, and independent screening of titles, abstracts, and full texts by two reviewers. Any disagreements will be resolved through discussion or consultation with a third reviewer when necessary.

Quality assessment / Risk of bias analysis Two reviewers will independently assess the risk of bias. The Cochrane Risk of Bias 2 (RoB 2) tool will be used for randomized controlled trials, and the Risk Of Bias In Non-randomized Studies of Interventions (ROBINS-I) tool will be used for observational studies. Disagreements will be resolved by discussion or consultation with a third reviewer when necessary.

Strategy of data synthesis When sufficient clinical and methodological homogeneity is identified, a meta-analysis will be performed. Continuous outcomes will be summarized using mean difference (MD) or standardized mean difference (SMD), as appropriate, while dichotomous outcomes will be analyzed using risk ratio (RR) or odds ratio (OR), all with 95% confidence intervals. Statistical heterogeneity will be assessed using the I^2 statistic. If meta-analysis is not appropriate because of substantial heterogeneity or insufficient data, a narrative synthesis of the findings will be conducted.

Subgroup analysis Where sufficient data are available, subgroup analyses will be performed according to: (1) conventional versus functional articulating spacers; (2) articulating versus static spacers; (3) MRSA infection versus other microorganisms; and (4) degree of bone loss (Paprosky classification).

Sensitivity analysis Sensitivity analyses will be performed by excluding studies judged to be at high risk of bias, provided that a sufficient number of studies are available.

Language restriction Studies published in any language will be considered for inclusion.

Country(ies) involved Brazil.

Keywords Periprosthetic Joint Infection; Hip Arthroplasty; Two-Stage Revision; Articulating Spacer; Static Spacer; Antibiotic-Loaded Spacer; Prosthetic Joint Infection; Systematic Review.

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