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Robotic-assisted versus manual total hip arthroplasty in overweight or obese patients: A systematic review and meta-analysis

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ADMINISTRATIVE INFORMATION

Support - No.

Review stage at the time of initial registration - Completed but not published.

Conflicts of interest - There is no conflicts of interest.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 23 November 2026 and was last updated on 23 November 2026.

INTRODUCTION

Review question / Objective Whether there is a difference in efficacy between robotic-assisted total hip arthroplasty (rTHA) and manual total hip arthroplasty (mTHA) in overweight or obese patients remains controversial.

Condition being studied Whether there is a difference in efficacy between robotic-assisted total hip arthroplasty (rTHA) and manual total hip arthroplasty (mTHA) in overweight or obese patients remains controversial. The best available data comparing rTHA with mTHA are synthesized in this systematic review and meta-analysis with a primary focus on functional results, particularly in overweight or obese individuals.

METHODS

Participant or population Twenty-nine studies were initially identified in the databases. Eight papers were excluded because of duplication. Among the remaining 21 papers, 18 were excluded because of a lack of clinical data and statistical analysis (n=15) or because they were abstracts (n=1) or reviews only (n=2). Three studies met the predefined eligibility criteria. One study included overweight and obese patients. Therefore, a total of 4 groups of patients were included in this study. The 4 groups of patients in the 3 studies included 430 overweight and obese patients in total. A total of 199 patients (46.28%) underwent rTHA, and 231 patients (53.72%) underwent mTHA.

Intervention Robotic-assisted total hip arthroplasty in patients who were overweight or obese.

Comparator Manual total hip arthroscopyin patients who were overweight or obese.

Study designs to be included The randomized controlled trials (RCTs), prospective or retrospective cohort studies

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Eligibility criteria The following criteria were met by the included studies: (1) were randomized controlled trials (RCTs), prospective or retrospective cohort studies; (2) compared rTHA with mTHA in patients who were overweight or obese; (3) enrolled adult THA patients; and (4) had follow-up data.

Information sources Using Medical Subject Headings (MeSH) and pertinent keywords, a comprehensive search of the PubMed, Embase, Cochrane, and Chinese databases (CNKI, Wanfang) was carried out between the database creation and January 2026.

Main outcome(s) These data were extracted from the studies included. The data included the first author, publication year, age, sex, body mass index (BMI), and follow-up.

Quality assessment / Risk of bias analysis We checked the quality of the included studies using the Newcastle–Ottawa Scale (NOS), and literature with a score greater than or equal to 6 was considered high-quality literature.

Strategy of data synthesis For continuous variables, mean differences (MDs) with 95% confidence intervals (CIs) were calculated. For dichotomous variables, odds ratios (ORs) with 95% CIs were calculated. Statistical significance was defined as $P<0.05$. Heterogeneity was evaluated using the Q test and I2 statistic.

Subgroup analysis For I2 greater than 50%, it is considered to have significant heterogeneity and subgroup analysis was performed.

Sensitivity analysis We performed a sensitivity analysis to evaluate the influence of individual studies on the overall results. The analysis revealed that after sequentially removing any single study, the 95% confidence interval of the pooled effect size remained within the range of the original results, and statistical significance was maintained ($P<0.05$). This indicates that the meta-analysis results are highly stable and no single study dominated the overall conclusion.

Country(ies) involved China and Japan.

Other relevant information Current review status: Completed but not published.

Keywords Robotic-assisted total hip arthroplasty, manual total hip arthroplasty, overweight, obese, meta-analysis.

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