

Periprosthetic Fractures and Surgical Complications Following Femoral Impaction Grafting in Revision Hip Arthroplasty: A Systematic Review and Meta-Analysis of 4,686 Hips

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INTRODUCTION: Femoral impaction bone grafting (fIBG) is used in revision total hip arthroplasty (rTHA) to treat cases of substantial bone loss. The aim of this systematic review and meta-analysis was to evaluate the incidence of periprosthetic fractures and surgical complications following fIBG.

METHODS: Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines were followed, and studies reporting on fIBG in rTHA with ≥ 12 months of follow-up were included. Risk of bias was assessed using the Methodological Index for Non-Randomised Studies (MINORS) tool. The meta-analysis was performed using a random effects model and the inverse-variance weighting method. Heterogeneity was assessed using Higgins and Thompson's I^2 statistic and Cochran's Q test. Subgroup analysis was based on gender, age, indication, amount of bone loss, stem length, stem cementation and follow-up period. Complications that required interventions, as well as nerve lesions with partial or no recovery were classified as major complications.

RESULTS:

The systematic search included a total of 45 studies (4,686 hips, 4,409 patients). Major surgical complications occurred at a rate of 21% (95% CI: 16%–26%, $I^2=89\%$, $p<0.01$), with 89% of these cases necessitating additional surgical intervention. Long stems were associated with a higher major complication rate (44.1%, 95% CI: 0.174–0.747) compared to short stems (18.8%, 95% CI: 0.136–0.254, $p=0.016$). The incidence of major complications was higher in Endo-Klinik defect grades III and IV (25.3%, 95% CI: 0.060–0.226) compared to grades I and II (14.2%, 95% CI: 0.164–0.326, $p=0.028$). The rate of intraoperative fractures was 3% (95% CI: 2%–6%, $I^2=49\%$, $p<0.01$), with a higher incidence using long stems (12.5%, 95% CI: 0.059–0.245) compared to short stems (2.8%, 95% CI: 0.013–0.057, $p=0.016$). Intraoperative fractures were more common with cementless components (15.4%, 95% CI: 0.002–0.934) versus cemented ones (2.8%, 95% CI: 0.013–0.057, $p<0.001$). [Postoperative](#) periprosthetic fractures occurred in 4% of cases (95% CI: 3%–5%, $I^2=38\%$, $p<0.01$), with higher rates for long stems (4.2%, 95% CI: 0.021–0.084) compared to short stems (4.1%, 95% CI: 0.027–0.060, $p=0.024$).

DISCUSSION AND CONCLUSION:

The pooled analysis revealed a high incidence of surgical major complications (21%) following fIBG in rTHA, particularly with massive bone loss (Endo-Klinik grades III and IV) and long stems. Intraoperative and postoperative periprosthetic fractures had incidences of 3% and 4%, respectively, and occurred more frequently with long and/or cementless stems.