

A Single Stage Bilateral Total Hip Replacement Versus Staged Two Sessions

Bilateral Total Hip Replacement: A Functional Outcome

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Abstract- Bilateral total hip replacement (BTHR) is an effective surgical solution for patients with bilateral hip osteoarthritis and avascular necrosis. The procedure can be performed either as a single-stage operation or as two staged session surgeries. To compare single-stage bilateral total hip replacement with staged two-session bilateral total hip replacement, with particular emphasis on functional outcomes and early postoperative recovery. A prospective comparative observational study. Sixty patients aged 45-65 years with bilateral hip osteoarthritis or avascular necrosis and without any major comorbidity were enrolled. Thirty patients were operated on in a single stage, and 30 had the two hips replaced separately with an interval of 6-12 weeks. All surgeries were conducted through a posterolateral approach. Measures were total hospital stay, total rehabilitation time, and time to symmetric normal gait 12 months post-surgical follow-up using the OHS. Baseline demographic characteristics and underlying diagnoses were comparable between groups. The single-stage group demonstrated a significantly shorter hospital stay, reduced rehabilitation duration, and earlier achievement of symmetric normal gait compared with the staged group ($P<0.001$). Additionally, functional outcome was significantly higher in the single-stage group, as reflected by superior OHS scores at 12 months ($P<0.001$). Single-stage bilateral total hip replacement provides a better early functional recovery, shorter hospital stays, and faster rehabilitation than staged two-session surgery in properly selected patients. Our results justify single stage BTHR as a safe and effective option when selection of patients and preoperative optimization are well thought out.

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Introduction

Total hip replacement of both sides (BTHR) is a well-recognized and successful surgical procedure for patients suffering from bilateral destruction of the hip joint, particularly osteoarthritis and avascular necrosis (1). The surgery is designed to reduce pain, improve joint function, and restore mobility, as well as provide better quality of life. With improvements in surgical technology, anesthetics, perioperative care, and rehabilitation protocols, BTHR has been practiced safely and has grown popular worldwide (1,2). BTHR can be carried out either as a one-stage operation, with replacement of both hips in the same operation, or as a

two-stage procedure, with each hip being replaced in its own operation at an interval from the first. Both options have their theoretical pros and cons (3). Single-stage BTHR has the advantages of single anesthesia exposure, one hospitalization, a shorter total length of hospital stays, and the same rehabilitation treatment, which results in an accelerated overall recovery and decreased medical expense (3,4). Staged BTHR, on the other hand, is sometimes contemplated in elderly, multimorbid patient populations, as it allows for temporal separation of interventions, thus potentially lowering perioperative stress (5). Functional outcome after BTHR is an important endpoint for the purpose of the latter's first aim, since this does not only consist of pain relief but also

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regaining mobility, independence, and daily activity. Hip Score (OHS) outcome measures, including the Oxford Hip Score (OHS), have become increasingly used as reliable instruments to measure postoperative hip function (6). Some studies have shown marked functional improvement following BTHR irrespective of operative approach, but the timing and stage of bilateral surgery continue to be a matter for debate (7,8). Recent literature has shown that, in carefully selected patients, single-stage BTHR can obtain similar to or better functional results than a staged procedure and is associated with less total rehabilitation time and an earlier return to normal activity (9). The feasibility of single-stage procedures has also been supported by using enhanced recovery after surgery (ERAS) protocols to improve pain relief and decrease complications as well as promote early mobilization (10). However, concerns remain about a possible augmentation of blood loss, transfusion demand, and perioperative complications in one-step surgery, making patient selection and preoperative preparation essential (11). The aim of the study is to compare single-stage bilateral total hip replacement with staged two-session bilateral total hip replacement, with particular emphasis on functional outcomes and early postoperative recovery.

Materials and Methods

Study design and setting

A prospective comparative observational study, it was performed in Al-Hilla General Hospital for 3 years from January 2023 to December 2025. Functional results of single versus two-session bilateral total hip replacement were compared in a prospective study. Patients were stratified into group 1: single stage; group 2: staged based on overall clinical assessment of both surgeon and patient-general condition, anesthetic risk, perioperative factors. No randomization was performed. In the single-stage group hospital stay mounts as one admission. In the staged group, hospital stay stands for the 2 admissions.

Study population

Sixty (60) patients were included, and they were all within the age range of 45-65 years without past medical or systemic comorbidities. Patients were all confirmed to have bilateral hip disease, bilateral avascular necrosis (AVN) or OA. Patients were distributed in two equal groups:

- Single-stage group: 30 patients underwent bilateral THR during a single operative session.
- Staged two-session group: 30 patients underwent bilateral THR in two separate operations, with an

interval of 6-12 weeks between the first and second procedures.

Patients with unilateral hip disease, inflammatory arthritis, previous hip surgery, neuromuscular disorders, or significant cardiopulmonary or metabolic disease were excluded.

Surgical technique and perioperative care

All procedures were performed using a posterolateral approach by the same orthopedic surgical team to minimize technique-related variability. Standardized perioperative protocols were applied to both groups, including anesthesia, antibiotic prophylaxis, thromboprophylaxis, pain management, and postoperative physiotherapy programs. While standard ERAS protocol was not enforced, aspects of perioperative management closely followed major elements of an ERAS approach (outpatient treatment, early mobilization, standard analgesia, and physiotherapy arranged in advance). One blinded to the surgical group directly treated physiotherapists who assessed gait recovery.

Outcome measures

Inpatient days both hips=total hospital stay. Weeks till supervised physiotherapy ends. Weeks for symmetric normal gait, clinically validated by physiotherapist. The total rehabilitation time includes physiotherapy hours. Phased group suspension of and re- rehabilitation for second operation. The Oxford Hip Score (OHS) assesses the outcome of patient function postoperatively at 12 months. A higher score on OHS indicates better hip function (12). Each of the 12 questions is rated 0 to 4. OHS was measured one year after the last procedure performed for each cohort. This however is one year after second operation in staged cohort.

Statistical analysis

Data was analyzed using SPSS 23. Continuous variables were expressed as mean±standard deviation, while categorical variables were presented as numbers and percentages. Comparisons between groups were performed using appropriate parametric or non-parametric tests depending on data distribution (chi square and t-test) respectively. A $P<0.05$ was considered statistically significant. The Shapiro-Wilk test was performed to determine the normality of continuous variables. For all normally distributed data, parametric tests (independent t-test) were conducted while non-parametric tests were applied otherwise. Effect sizes (Cohen's d) and 95% confidence intervals (CI) were also

calculated in addition to P , as indices of the magnitude and precision of differences between groups.

The study was conducted in accordance with the ethical principles that have their origin in the Declaration of Helsinki. The study protocol and the subject information and consent form were reviewed and approved by a local ethics committee according to document number 186 (including the number and the date in 1/1/2023) to get this approval.

Results

Patients aged ≥ 50 years constituted the majority in both groups (73.3%), while those younger than 50 years represented 26.7% in each group. Similarly, osteoarthritis (OA) was more frequent than avascular necrosis (AVN) in both surgical groups (56.7% vs. 43.3%). There were no statistically significant differences between the two groups regarding age distribution or cause of disease ($P=1.000$), indicating that the groups were well matched at baseline. No significant perioperative complications, including thromboembolic events, dislocation, early deep infection or cardiopulmonary complications were reported in either group during the follow-up period. No readmissions were recorded. On the contrary, detailed documentation of intra-operative blood loss and transfusion was not performed. As in table 1.

Table 2 demonstrates a significant difference in the

duration of hospital stay between the two groups approaches. Patients who underwent single-stage surgery had a substantially shorter hospital stay (2.50 ± 0.51 days) compared with those treated with staged two-session surgery (4.97 ± 0.81 days). This difference was highly statistically significant ($P=0.0001$), suggesting that single-stage surgery is associated with earlier discharge and reduced hospitalization time.

As shown in Table 3, the rehabilitation duration was markedly shorter in the single-stage group (4.93 ± 0.74 weeks) compared with the staged two-session group (11.93 ± 1.39 weeks). This indicates that patients undergoing single-stage surgery required significantly less time for postoperative rehabilitation.

There is a significant difference in gait recovery time between the two surgical techniques. Patients in the single-stage group have gait recovery much earlier (10.07 ± 1.39 weeks) than those in the staged two-session group (20.17 ± 2.63 weeks). This reflects faster functional recovery following single-stage surgery. As in table 4.

Table 5 compares postoperative functional outcomes using the Oxford Hip Score (OHS). The single-stage group demonstrated a significantly higher mean OHS (44.50 ± 1.11) compared with the staged two-session group (40.50 ± 1.74). This difference was highly statistically significant ($P=0.0001$), indicating superior functional outcomes in patients treated with single-stage surgery.

Table 1. Association between variable demographic and Surgery groups

	Surgery groups		<i>P</i>
	Single stage	Staged two sessions	
Age Group (years)			
< 50 years	8 (26.7%)	8 (26.7%)	1.000
≥ 50 years	22 (73.3%)	22 (73.3%)	
Cause			
AVN	13 (43.3%)	13 (43.3%)	1.000
OA	17 (56.7%)	17 (56.7%)	

Table 2. Differences mean in hospital stay (days) according to both types of operation

Variable	Single-stage (n=30) Mean $\pm$ SD	Staged (n=30) Mean $\pm$ SD	Mean Difference (95% CI)	Cohen's d	<i>P</i>
Hospital stay (days)	2.50 ± 0.51	4.97 ± 0.81	$-2.47 (-2.82 \text{ to } -2.12)$	3.65	<0.001

Table 3. differences mean in Rehabilitation duration (weeks) according to both types of operation

Variable	Single-stage (n=30) Mean $\pm$ SD	Staged (n=30) Mean $\pm$ SD	Mean Difference (95% CI)	Cohen's d	<i>P</i>
Rehabilitation duration (weeks)	4.93 ± 0.74	11.93 ± 1.39	$-7.00 (-7.58 \text{ to } -6.42)$	6.32	<0.001

Table 4. Differences mean in Gait recovery time (weeks) according to both types of operation

Variable	Single-stage (n=30) Mean $\pm$ SD	Staged (n=30) Mean $\pm$ SD	Mean Difference (95% CI)	Cohen's d	<i>P</i>
Gait recovery time (weeks)	10.07 ± 1.39	20.17 ± 2.63	$-10.10 (-11.16 \text{ to } -9.04)$	4.83	<0.001

Table 5. Differences mean in OHS score according to both types of operation

Variable	Single-stage (n=30) Mean $\pm$ SD	Staged (n=30) Mean $\pm$ SD	Mean Difference (95% CI)	Cohen's d	P
OHS score	44.50 $\pm$ 1.11	40.50 $\pm$ 1.74	4.00 (3.26 to 4.74)	2.71	<0.001

Discussion

All patients in our study could be described as heavily selected (age 45-65 years, no significant comorbidities) and treated with uniform perioperative protocols. There were no significant perioperative complications (thromboembolic events, dislocations, early infections, or any cardiopulmonary complications) in both groups. No readmissions occurred.

This study compared single-stage and staged two-session surgeries, showing that the single-stage approach presents marked early advantages—reduced hospitalization time, faster rehabilitation, quicker locomotor recovery, and better OHS. Because there were no significant differences between the two groups in age distribution at baseline and primary diseases (OA and AVN), it is less likely that the postoperative difference would be due to the demographic characteristics, but rather it would be an influence of the bilateral hip replacement timing, namely single session or two sessions. A commonly shared opinion in the literature about hip arthroplasty is that by combining both operations within one surgical underpass, it would have been possible to reduce the overall treatment burden, particularly if a second hospital admission was eluded with a lesser quantity of general anesthetic and repeat postoperative rehabilitation programs. In a landmark study comparing one-stage and two-stage bilateral THA, Parvizi et al. demonstrated an increased total hospital stay and total costs but a similar functional outcome in the staged group and concluded that staging leads to additional resource consumption and delay of full recovery (13). Recent evidence substantiates this trajectory. Large analytic research and a meta-analysis of studies by Ramezani et al. found that staged bilateral THAs were associated with increased costs and worse perioperative outcomes than simultaneous BTHAs (14). The current study finds that hospital stay supports well enhanced recovery principles. Modern ERAS pathways emphasize multimodal analgesia, opioid-sparing strategies, early mobilization, and standardized perioperative care—all factors that shorten inpatient duration and accelerate function (15,10). In practical terms, staged surgery can interrupt or prolong functional progression because patients essentially undergo two

recovery curves rather than one, which may explain why the staged group required markedly longer rehabilitation and later gait recovery. The single-stage group had a significantly better functional outcome according to the Oxford Hip Score. The OHS is a validated, commonly used patient-reported outcome measure for hip replacement and, as such, should be suitable for recording patient-perceived function and pain (16). Comparative research examining the one-stage and staged bilateral THA has indicated that both approaches demonstrate improvement in patient-reported outcomes, but a one-stage procedure for selected patients may result in quicker or slightly better functional recovery (17). This development is in line with modern comparative cohorts published as part of maintaining the least compromise in safety and any significant functional improvement after one-stage bilateral THA after appropriate patient selection (18,19).

Limitations

The study was conducted at a single center, which may limit the generalizability of the findings. However, systematically recording blood loss and transfusion rates was not performed and we acknowledge this as a limitation.

A single-stage bilateral total hip replacement operation showed much shorter overall hospital days than staged two-session procedures. Patients in the single-stage group had faster rehabilitation and more early normal symmetric locomotion. Functional results, measured by the Oxford Hip Score at 12 months, were significantly better in the single-stage group. Single-stage bilateral total hip replacement seems to be a safe and effective technique with better functional rehabilitation for the suitable patient.

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