

Posterior Versus Lateral Approach in Total Hip Replacement: A Comparative Study

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Abstract

Background: Total hip replacement (THR) is a highly successful surgical procedure for end-stage hip disorders. The posterior and lateral approaches are the most commonly used techniques, yet controversy persists regarding their comparative outcomes.

Objectives: To compare posterior and lateral approaches in primary THR with respect to early functional outcome, perioperative parameters, and short-term complications.

Methodology: This prospective comparative study was conducted at a tertiary care hospital over 4–6 months. A total of 100 patients undergoing primary THR were equally divided into posterior (n=50) and lateral (n=50) approach groups. Functional outcome was assessed using the Harris Hip Score (HHS). Data were entered in Microsoft Excel and analyzed using SPSS version 26. Appropriate statistical tests were applied.

Results: Both groups showed significant improvement in functional outcome. The posterior approach demonstrated slightly higher early HHS and lower incidence of abductor weakness. No dislocations were observed in either group.

Conclusion: Both posterior and lateral approaches provide comparable short-term outcomes following THR. The posterior approach may offer better early functional recovery, while overall complication rates remain similar.

Keywords: Total hip replacement; Total hip arthroplasty; Posterior approach; Lateral approach; Harris Hip Score.

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Introduction

Total hip replacement is one of the most successful orthopedic procedures, providing effective pain relief and restoration of mobility in patients with advanced hip pathology such as osteoarthritis, avascular necrosis, inflammatory arthritis, and post-traumatic arthritis [1].

Hip osteoarthritis is a leading cause of disability globally, affecting approximately 7–10% of adults over 60 years of age [2]. The demand for THR has increased substantially over the past two decades due to population aging, increased life expectancy, and improved access to orthopedic care [3]. In developing countries such as India, avascular necrosis of the femoral head represents a significant proportion of THR indications and often affects a younger population [4].

Despite advances in implant design and perioperative care, the choice of surgical approach remains controversial. The posterior approach provides excellent exposure and preserves abductor musculature but has historically been associated with higher dislocation rates [5]. The lateral approach offers inherent stability but may lead to postoperative abductor weakness and limp [6].

Recent studies and meta-analyses suggest that with meticulous soft-tissue repair and standardized rehabilitation, differences in dislocation rates are minimal, shifting emphasis toward functional outcomes and early recovery [7,8]. This study was therefore undertaken to compare posterior and lateral approaches in primary THR at a tertiary care hospital.

Methodology

Study design and setting: A prospective comparative study conducted at a tertiary care teaching hospital over 4–6 months.

Sample size calculation: Sample size was calculated based on Harris Hip Score, as functional outcome is a more reliable endpoint in short-term single-center studies. Previous studies reported a mean difference of 2–4 points in HHS with a standard deviation of approximately 7 points between posterior and lateral approaches [9,10].

Using the formula for comparison of two independent means:

$$n=2(Z_{\alpha/2}+Z_{\beta})^2\sigma^2/d^2$$

With $\alpha = 0.05$, power = 80%, $\sigma = 7$, and minimum detectable difference (d) = 3, the calculated sample size was 45 per group. Allowing for attrition, 50 patients per group (total $n = 100$) were included [11].

Study population: Patients aged ≥ 18 years undergoing primary unilateral THR were included.

Inclusion criteria

- Primary THR
- Osteoarthritis, avascular necrosis, inflammatory arthritis

Exclusion criteria

- Revision THR
- Active infection
- Neuromuscular disorders
- Bilateral THR

Group allocation

- **Group A:** Posterior approach ($n=50$)
- **Group B:** Lateral approach ($n=50$)

Outcome measures

- **Primary:** Harris Hip Score
- **Secondary:** Operative time, blood loss, abductor weakness, limb length discrepancy, complications

Statistical Analysis: Data were entered in Excel and analyzed using SPSS version 26. Continuous variables were expressed as mean \pm SD and categorical variables as percentages. A p -value < 0.05 was considered statistically significant.

Results

A total of 100 patients undergoing primary total hip replacement were included in the study, with 50 patients in the posterior approach group and 50 patients in the lateral approach group. All patients completed the planned follow-up period of 4–6 months, and no cases were lost to follow-up.

Table 1: Demographic and Clinical Characteristics

Variable	Posterior (n=50)	Lateral (n=50)
Mean age (years)	62.4 \pm 9.6	61.8 \pm 10.1
Male : Female	32 : 18	30 : 20
Osteoarthritis	56%	52%
Avascular necrosis	36%	40%

Table 2: Perioperative Parameters

Parameter	Posterior	Lateral	p-value
Operative time (min)	84.6 \pm 14.2	91.8 \pm 15.6	<0.05
Blood loss (ml)	380 \pm 120	410 \pm 130	>0.05
Hospital stay (days)	6.2 \pm 1.4	6.5 \pm 1.6	>0.05

Table 3: Harris Hip Score Comparison

Time point	Posterior	Lateral	p-value
Pre-operative	42.8 \pm 7.2	43.1 \pm 6.8	>0.05
3 months	78.6 \pm 8.4	75.2 \pm 9.0	<0.05
4–6 months	88.6 \pm 6.4	86.9 \pm 6.8	>0.05

No cases of hip dislocation were observed in either group during the follow-up period. Abductor weakness was noted more frequently in the lateral approach group (14%) compared to the posterior approach group (4%), and this difference was statistically significant ($p < 0.05$). Most cases of abductor weakness were mild and showed

improvement with physiotherapy during follow-up. Superficial surgical site infection occurred in 2% of patients in both groups, and limb length discrepancy was seen in 4% of posterior and 6% of lateral approach patients, with no statistically significant differences ($p > 0.05$).

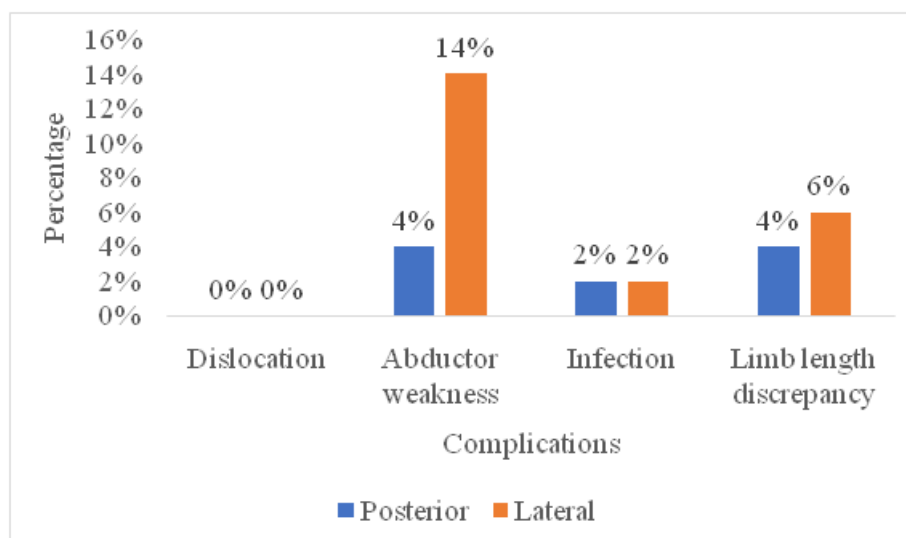


Figure 1: Complications

Discussion

In this prospective study conducted at a tertiary care hospital, both posterior and lateral approaches resulted in significant improvement in early functional outcome following THR. The final HHS in our study (posterior 88.6 vs lateral 86.9) is comparable to Masonis and Bourne, who reported mean scores of 89.2 and 87.5 respectively, concluding that long-term functional outcomes are similar between approaches [7]. Ghaddaf et al., in a recent meta-analysis, also found no clinically significant difference in final functional outcomes, though early recovery favored the posterior approach [8]. Abductor weakness was significantly more common in the lateral approach group (14%), consistent with Hardinge's original report of 10–20% transient abductor dysfunction following the lateral approach [6]. This weakness did not significantly affect final functional outcome. No dislocations were observed in either group during short-term follow-up. Ji et al. reported dislocation rates of 0% in the posterior group and 3% in the lateral group in their randomized trial, emphasizing the importance of surgical technique and soft-tissue repair [12].

Conclusion

Both posterior and lateral approaches to total hip replacement provide excellent short-term outcomes when performed at a tertiary care center. The posterior approach demonstrated better early functional recovery with less abductor weakness, while overall complication rates were comparable. Surgical approach selection should be individualized based on patient factors and surgeon expertise.

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