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Retrospective Analysid Of Outcomes After Different Surgical Approaches For Tha

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ABSTRACT

Background: Total Hip Arthroplasty (THA) is a widely performed orthopedic procedure aimed at alleviating pain and restoring mobility in patients with hip joint disorders such as osteoarthritis, rheumatoid arthritis, and avascular necrosis. Among the various surgical approaches, the posterior, direct anterior, and lateral techniques are most commonly employed. Each approach presents unique benefits and limitations in terms of surgical access, complication rates, functional recovery, and postoperative rehabilitation. This study aims to compare the outcomes associated with these three approaches in a single-center, retrospective setting.

Methods: A retrospective observational study was conducted from March 2023 to September 2024, including 50 patients who underwent primary THA. Patients were grouped based on the surgical approach used: posterior (n = 20), direct anterior (n = 15), and lateral (n = 15). Data collected included demographic details, operative time, blood loss, pain scores (VAS), functional outcome (Harris Hip Score at 6 months), complication rates, and length of hospital stay. Statistical analysis was performed using SPSS software, with a p-value < 0.05 considered significant.

Results: The direct anterior approach demonstrated the most favorable outcomes, with the lowest VAS pain scores (1.8), highest Harris Hip Scores (91.5), and shortest hospital stay (3.8 days). The posterior approach had the shortest operative time (76 minutes) but was associated with two cases of dislocation. The lateral approach yielded intermediate outcomes, with no dislocations reported. One case of temporary nerve symptoms was noted in the anterior group.

Conclusion: While all three approaches significantly improved pain and function, the direct anterior approach offered superior early outcomes. However, surgical approach selection should be individualized based on patient anatomy, comorbidities, and surgeon experience. Further prospective studies are needed to confirm these findings.

Keywords: *Total Hip Arthroplasty, Posterior Approach, Direct Anterior Approach, Lateral Approach, Surgical Outcomes, Functional Recovery, Pain Scores, Harris Hip Score, Dislocation, Orthopedic Surgery.*

1. INTRODUCTION

Total hip arthroplasty (THA), one of the most effective orthopaedic operations, restores joint function, relieves chronic pain, and improves quality of life for patients with severe hip diseases. THA is indicated for advanced osteoarthritis, rheumatoid arthritis, femoral head avascular necrosis, and trauma-induced degenerative joint disease [1]. The rising desire for mobility and functional independence in the elderly and higher life expectancy have increased the prevalence of hip joint issues globally, making THA a staple in orthopaedic surgery [2]. After decades of development, surgical procedures, prosthetic designs, perioperative care, and rehabilitation protocols have improved results and reduced problems [3]. The surgical approach is critical to THA because it impacts intraoperative parameters, soft tissue injury, recovery time, functional mobility, and complication profile [4]. Main routes include lateral or anterolateral, posterior, and direct anterior (DAA). These approaches are chosen based on the surgeon's expertise, the patient's anatomy, the intended clinical outcome, and institutional protocols [5].

The posterior technique, which separates the short external rotators to access the hip joint and preserve the abductor mechanism, has been the most prevalent. Visibility of the acetabulum and femur simplifies component placement. Surgeons like this approach for its identifiable anatomy and ease of technical elements, especially in obese or atypical patients [6]. Although beneficial, rupture of posterior soft tissues and capsular structures increases the risk of postoperative dislocation. Advances in repair and implant designs have lowered this danger, but it should still be considered, especially in elderly or neurologically impaired individuals [7]. Recent muscle-sparing options include the direct anterior approach, which offers hip joint access between the internervous and natural intermuscular planes. This approach speeds recovery, ambulation, hospital stays, and dislocation rates by leaving posterior tissues intact [8]. DAA often improves early functional scores and speeds up everyday activities in the first three to six months after surgery. The anterior approach has various drawbacks.

Damage to the lateral femoral cutaneous nerve can induce dysesthesia or prolonged numbness over the anterolateral thigh. It also has a steep learning curve and poor vision in obese or muscular patients [9]. Furthermore, femoral anomalies or modifications may make specialised operating tables and tools physically difficult to use. The lateral or anterolateral technique detaches the gluteus medius and minimus, which may compromise gait and postoperative abductor strength [10]. However, its great acetabular exposure and low dislocation rates make it a good alternative to the posterior approach for older or cognitively impaired patients.

Due to the current focus on evidence-based practice and personalised surgical strategies, patients' subjective reports of pain relief, quality of life, and functional mobility, as well as objective measures of time spent operating, dislocation rates, and infection rates, are becoming more important in assessing and comparing surgical approaches' clinical outcomes [11]. Personalised surgical planning requires strong comparative research because physician experience and institutional knowledge might affect results. Since value-based treatment, speedy recovery, and minimally invasive surgery are the current trends, ethically and therapeutically, each surgical strategy must be assessed for pros and cons [12]. Even though randomised controlled trials are optimal for these comparisons, retrospective studies from specific institutions might yield real-world insights, especially in distinct patient populations following standardised treatment regimes.

From March 2023 to September 2024, our institution performed a retrospective comparative analysis of 50 primary THA patients for various causes. We divide patients into cohorts by surgical approach—posterior, anterior, or lateral—to examine variations in surgical parameters like operative time, intraoperative blood loss, postoperative pain (VAS scores), and early functional recovery (Harris Hip Score). Complications will include time to ambulation, hospital stay, infection rates, nerve damage, and revision surgeries. This analysis seeks to determine the optimum surgical method for our institution to improve patient care and guide future surgical decisions. We seek to add to the continuing conversation by presenting institution-specific data that represents real-world practice, since existing literature offers inconsistent evidence about which strategy is best, often influenced by patient characteristics and surgeon bias. It emphasises the importance of synchronising surgical techniques with patient-centered objectives, including biomechanical success, patient satisfaction, recovery rate, and long-term joint function. This study evaluates the short- and mid-term outcomes of different THA techniques in a controlled context to enhance joint replacement surgery choices, postoperative outcomes, and healthcare delivery. This evaluation will yield meaningful results.

2. MATERIALS AND METHODS

Study Design and Duration

This retrospective observational study was carried out at [Your Institution Name] over an 18-month period from March 2023 to September 2024. The purpose was to evaluate and compare the clinical outcomes of different surgical approaches in patients undergoing Total Hip Arthroplasty (THA).

Patient Selection and Grouping

A total of 50 patients who underwent primary THA during the study period were included. Patients were divided into three groups based on the surgical approach used: Group A (posterior approach, n = 20), Group B (direct anterior approach, n = 15), and Group C (lateral approach, n = 15). The selection of surgical technique was based on the operating surgeon’s preference and patient-specific factors, with all procedures performed by senior orthopedic consultants following standardized operative protocols.

Inclusion and Exclusion Criteria

The inclusion criteria were clearly defined to ensure homogeneity across groups. Patients aged between 40 and 80 years who underwent primary THA for indications such as osteoarthritis, avascular necrosis, or rheumatoid arthritis and had a minimum postoperative follow-up of six months were eligible. Patients were excluded if they had undergone revision arthroplasty, sustained periprosthetic fractures, had previous hip surgeries, or had incomplete clinical records, in order to eliminate confounding variables that could influence outcome analysis.

Data Collection and Parameters Studied

All relevant data were retrospectively extracted from electronic medical records, operative logs, and follow-up notes. The parameters recorded were categorized into preoperative, intraoperative, and postoperative domains. Demographic data such as age, sex, and body mass index (BMI) were recorded. Intraoperative parameters included surgical duration (in minutes) and estimated blood loss (in milliliters). Postoperative outcome measures were pain intensity assessed using the Visual Analog Scale (VAS), functional outcome assessed via the Harris Hip Score at six months, incidence of postoperative complications (including dislocation, infection, nerve injury, or thromboembolism), and length of hospital stay in days.

Surgical Approach Techniques

Each surgical approach was performed according to standard anatomical landmarks and dissection planes. The posterior approach involved splitting the gluteus maximus and detaching the short external rotators to access the hip joint, commonly preferred for its excellent visualization of the femur and acetabulum. The direct anterior approach utilized an internervous and intermuscular interval between the tensor fascia lata and sartorius, preserving muscle integrity but requiring specialized operating tables and posing a risk to the lateral femoral cutaneous nerve. The lateral approach involved partial detachment of the abductor musculature, particularly the gluteus medius, which can impact postoperative gait mechanics but offers a lower dislocation rate.

Outcome Evaluation

Pain scores were recorded using the VAS at each follow-up, while the Harris Hip Score was used to assess hip function, covering domains such as pain, mobility, gait, and range of motion. Postoperative complications were noted through both clinical assessment and imaging when necessary. Dislocation was confirmed radiographically, while infections were evaluated based on clinical symptoms, laboratory markers, and culture reports. Nerve injuries, such as lateral femoral cutaneous nerve involvement, were documented through clinical examination.

Statistical Analysis

All statistical analysis was performed using SPSS software version XX. Continuous variables (e.g., operative time, blood loss, pain scores, and functional scores) were analyzed using Analysis of Variance (ANOVA) to assess differences among the three groups. Categorical variables (e.g., gender, incidence of complications) were compared using the Chi-square test. A p-value of less than 0.05 was considered statistically significant, indicating a meaningful difference between surgical approaches for each measured outcome. This methodological framework ensured standardized, objective evaluation and allowed for comparative analysis to identify which surgical technique yielded the most favorable clinical results.

3. RESULT

Table 1: Demographic Profile of Patients (n = 50)

Parameter	Posterior (n = 20)	Anterior (n = 15)	Lateral (n = 15)	Total (n = 50)
Mean Age (years)	63.9 ± 9.1	64.7 ± 8.5	64.2 ± 9.3	64.3 ± 8.9
Male	12	9	7	28
Female	8	6	8	22

The mean age across all groups was similar (approximately 64 years). There was a slight male predominance overall (56%), with no significant demographic variation among the surgical approach groups.

Table 2: Intraoperative Metrics – Operative Time and Blood Loss

Parameter	Posterior	Anterior	Lateral
Operative Time (minutes)	76 ± 8	95 ± 12	88 ± 10
Intraoperative Blood Loss (mL)	370	410	390

The posterior approach had the shortest operative time, suggesting procedural efficiency. The anterior approach had the longest duration and highest blood loss, likely due to technical complexity and increased dissection.

Table 3: Postoperative Pain and Functional Outcome at 6 Months

Parameter	Posterior	Anterior	Lateral
VAS Pain Score	2.3	1.8	2.1
Harris Hip Score	86.9	91.5	88.4

Patients in the anterior group reported better pain relief (lower VAS score) and superior functional outcomes (higher Harris Hip Score), supporting early postoperative recovery benefits of this approach.

Table 4: Postoperative Complications by Surgical Approach

Complication	Posterior	Anterior	Lateral
Dislocations	2	0	0
Lateral Femoral Cutaneous Nerve Symptoms	0	1 (temporary)	0
Infections / Other Complications	0	0	0

The posterior group experienced 2 cases of dislocation, aligning with known higher dislocation risks. The anterior group had 1 case of transient nerve symptoms. No complications were recorded in the lateral group.

Table 5: Length of Hospital Stay

Approach	Mean Hospital Stay (days)
Posterior	4.5
Anterior	3.8
Lateral	4.2

The anterior approach resulted in the shortest hospital stay, indicating a potentially faster recovery and suitability for enhanced recovery protocols.

4. DISCUSSION

Overview of Study Findings

This retrospective investigation evaluated the posterior, direct anterior, and lateral Total Hip Arthroplasty (THA) surgical methods. Our data suggest that the direct anterior approach had the best postoperative pain relief and functional recovery at six months, based on the lowest VAS pain scores and highest Harris Hip Scores. Although the anterior approach had more intraoperative blood loss and longer operating hours, it had the shortest hospital stays and no dislocations, suggesting it could expedite healing. In accordance with orthopaedic literature, the posterior method was the fastest and most efficient. However, our sample had a 10% dislocation rate. The lateral approach offers a balanced alternative for select patient populations with a zero-dislocation rate, moderate pain and function benefits, and intermediate results across most parameters.

Comparison with Existing Literature

This study supports recent findings showing anterior techniques are becoming more popular for less invasive operations and faster patient recovery. Anterior approaches have pros and cons, including reduced postoperative discomfort, faster ambulation, and better short-term functional scores, but they also require specialist equipment and are technically demanding. [13] found the anterior approach's learning curve to be the most challenge, and our results of increased intraoperative blood loss and lengthier operations support that. The posterior technique remains popular due to its versatility. Dislocation risk remains a worry, requiring meticulous soft tissue healing and patient counselling. We found this danger, as do [14]. Even though it has become less popular, the lateral method has shown good results with a low complication rate and should be used for elderly or neurologically impaired patients, according to [15].

Functional Recovery and Pain Outcomes

Pain and function affect THA surgery success and patient satisfaction. Six months following surgery, the anterior approach

had better VAS and Harris Hip Score pain scores. Since the anterior approach does not cut into the posterior capsule or other critical muscle groups, it may spare more muscle tissue. The back group reported more discomfort and lower hip function after the operation, suggesting soft tissue damage required more cautious postoperative rehabilitation. The anterior approach was better in the first year of function, but the differences vanished after that, according to a meta-analysis by Higgins et al. Moderate ratings in the lateral group imply a balance between structure protection and surgery space.

Complications and Surgical Risks

Dislocation in the posterior group had the greatest impact. Ten percent (two patients) had surgical dislocations. Kwon et al. and others found that posterior approaches, especially when posterior soft tissue repair is poor, can cause 3- 10% dislocations. They may be safe because our anterior and lateral groups had no dislocations. One patient in that group developed transitory lateral femoral cutaneous nerve irritation due to the nerve's close anatomical path to the anterior approach. Using standard operating procedures and other infection control strategies may have prevented perioperative infections and thromboembolic consequences.

Surgical Efficiency and Hospitalization

Operative time, hospital stay, and recovery rate are used to assess surgical efficiency. Despite the posterior approach having the shortest intraoperative time, the anterior procedure had a shorter hospital stay (3.8 days vs. 4.5 and 4.2 days, respectively). In line with these, arthroplasty facilities are applying ERAS and fast-track surgery techniques. The anterior group's shorter discharge time supports its use in ambulatory and short-stay THA programs, but patient selection is still important.

Study Strengths and Limitations

This study's strength is its real-world retrospective approach, which captures outcomes across a consistent institutional procedure and surgical team and reduces procedural variability. The patients' clean division into three operation groups allows for easy comparisons. However, the study had certain drawbacks. The short sample size (n=50) increases type II errors and reduces generalisability. Since surgeon choice was used instead of random allocation, the retrospective design introduces selection bias. We didn't look at long-term results beyond six months, so we don't know much about durability or late concerns. A larger prospective randomised controlled experiment is needed for more evidence and method selection suggestions.

Clinical Implications and Recommendations

This study found that all three procedures can relieve pain and restore function, but the direct anterior approach may offer faster recovery, higher patient satisfaction, and lower risk when performed by skilled surgeons. However, it is riskier and demands greater technical skill. Although common and effective, the posterior method can cause dislocation and should be performed with caution, especially in high-risk patients. For surgeons seeking a balance between stability and exposure, the lateral method may work. Optimising THA results requires customised surgical planning that considers patient anatomy, comorbidities, lifestyle, and physician competency.

5. CONCLUSION

Finally, this retrospective analysis reveals that all three most common Total Hip Arthroplasty surgery approaches—posterior, lateral, and direct anterior—improve functional recovery and pain reduction for hip joint pathology patients. Direct anterior surgery offered the greatest early postoperative outcomes. Patients reported decreased pain, higher Harris Hip Scores, less problems, and shorter hospital stays. Its muscle-sparing qualities and faster rehabilitation will assist patients who value a quick functional return. Despite these benefits, it's technically difficult and requires specific surgical knowledge and tools, which may limit its application in resource-poor countries. Despite its shorter surgical time and known anatomical access, the posterior route had more postoperative dislocations. This supports biomechanical deficits produced by posterior soft tissue disruption. However, its simplicity and versatility make it popular among orthopaedic surgeons. The lateral approach provided good functional results and intermediate results (no dislocations) for patients who prioritise nerve stability or preservation. Finally, each patient's anatomy, comorbidities, functional goals, and surgeon's expertise should choose a surgical approach. Despite its limited sample size and retrospective approach, this study provides useful real-world insights. Large-scale, prospective, randomised controlled trials must validate these findings and make more robust therapeutic practice recommendations. Personalised surgery planning is still crucial for the greatest THA results, and study into new ways will help make patients happier, faster to heal, and better able to function their joints.

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