

## Research Article

# The choice of approach in total hip arthroplasty, does it really matters?

Sukumaran Subbiah Subramanian<sup>1</sup>, Mugundhan Moongilpatti Sengodan<sup>2\*</sup>,  
Masoodh M. Basha<sup>3</sup>

<sup>1</sup>Department of Orthopedics, Chengalpattu medical college, Chengalpattu, Tamilnadu, India

<sup>2</sup>Department of Orthopedics, Coimbatore medical college, Coimbatore, Tamilnadu, India

<sup>3</sup>Department of Orthopedics, Kilpauk medical college, Chennai, Tamilnadu, India

**Received:** 08 May 2016

**Accepted:** 03 June 2016

### \*Correspondence:

Dr. Mugundhan Moongilpatti Sengodan,  
E-mail: [mugundhan@yahoo.com](mailto:mugundhan@yahoo.com)

**Copyright:** © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

## ABSTRACT

**Background:** Various surgical approaches have been described for total hip arthroplasty with their own advantages and disadvantages. In the study it would like to know whether there is significant difference exists between the most widely used posterior and lateral approaches.

**Methods:** Study was a randomized prospective study in 108 hips. Out of 108 hips 52 were operated by posterior approach and the remaining 56 by lateral approach. The choice of approach was determined by random numbers. In the study functional outcome was compared with the Harris hip score, rate of complications and the effect of approach on the placement of acetabular cup with relation to its inclination and version in arthroplasty of the hip.

**Results:** Similar results in both approaches were found; there were no statistically significant difference in the outcome.

**Conclusions:** To conclude, the approach did not significantly affect the outcome in total hip replacement with respect to functional outcome or rates of complication. And it neither influences the acetabular cup placement. Proper operative technique seems to be more important than the choice of approach in total hip replacement. Studies with a bigger sample size need to be done to further throw light on the role of approach on cup placement.

**Keywords:** Total hip arthroplasty, Surgical approach, Functional outcome

## INTRODUCTION

Charnley, with his concept of low friction arthroplasty revolutionized total hip arthroplasty in 1962 with his first surgery and published his results in 1972.

Total hip replacement has seen tremendous progress since then. Many approaches to the hip for replacement surgery are described. The two most common ones that have endured the test of time are the posterior and lateral approaches.

Hence, need to assess the functional outcome of these two approaches and compare them especially with reference to the rate of complications was felt, if any, as

they usually decide which approach will embrace in their practice.

Kelmanovich D, et al in their article briefed on the various surgical approaches to the hip. In their observation the most common approach used is the posterior due to it being technically simpler, but the high rates of posterior dislocation of the hip are a cause for concern.<sup>2</sup>

Roberts et al compared the anterolateral and posterolateral approaches in 175 patients and observed that the posterolateral group had significantly less perioperative morbidity as defined by lesser blood loss and shorter surgery time, albeit having an increased

incidence of posterior dislocation of the hip and acetabular loosening.<sup>3</sup> Robinson et al first suggested that the external rotators should be sutured to the greater trochanter to reduce the rate of dislocation. They managed to reduce the rate from 7.5 to 1%.<sup>4</sup>

Weiss and Jacobs later advocated repair of both the short external rotators and the posterior capsule.<sup>5</sup> Headley and workers used a no.1 vicryl suture to repair the posterior soft tissue and reduce the incidence of dislocation to less than 1% in the first large study of 259 patients.<sup>6</sup>

Pellicci et al report no incidence of posterior dislocation in 395 cases operated by the posterior approach when they used an enhanced posterior soft tissue repair.<sup>7</sup>

He used drill holes in the greater trochanter and number 2 ethibond to suture the short external rotators to the greater trochanter, and also repaired the Quadratus femoris muscle belly, overlying fat and bursa.<sup>7,8</sup> Various authors used different techniques to repair the posterior soft tissue and encountered a significant reduction in the dislocation rate.<sup>9-14</sup>

Nissen et al reported that the lateral approach, though it gives excellent exposure disturbance of the abductor mechanism is common.<sup>15</sup> Baker et al reviewed this particular side effect in patients who underwent total hip replacement and conclude that it is more common in the lateral approach than the modified lateral and posterior approaches.<sup>16</sup>

Masonis et al in his review of comparison of direct lateral, posterior and transtrochanteric approaches suggested that though lateral approach has a much reduced incidence of dislocation, there is a slightly higher incidence of limping.<sup>28</sup>

Morrey et al found a minimal increase in heterotopic bone formation in the lateral approach compared to a posterior approach, and this according to him was the reason for better pain relief and functional outcome in the posterior approach group.<sup>17</sup>

The ideal cup positioning according to Lewinnek in his landmark paper is with 5-25° of anteversion and 30-50° of inclination. CT scan is the gold standard for evaluating cup version, whereas inclination can be studied with a plain X-ray taken with the joint centred and correction of pelvic tilts in the sagittal plane.<sup>18-22</sup>

Aim of the study was to study the functional outcome of posterior and lateral approaches in hip arthroplasty and to compare the functional outcomes of the posterior and lateral approaches to the hip in arthroplasty and to analyse the effect of approach on the placement of acetabular cup with relation to its inclination and version in arthroplasty of the hip.

## METHODS

In Kilpauk Medical College between August 2009 and April 2013 primary total hip replacement for 122 patients was done. Of which 86 patients (108 hips) were included in this study, who met the inclusion criteria and available for a minimum follow up of 3 years.

Out of 108 hips 52 were operated by posterior approach and the remaining 56 by lateral approach. Surgeries were done by four surgeons who had proper training and experience in arthroplasty. The choice of approach was determined by random numbers. It is a Randomized Prospective Comparative study of 108 hips.

### *Inclusion criteria*

- Adult age group above 18 years.
- Chronic arthritis of the hip joint.
- Secondary arthritis of the hip joint.
- Uncemented THR

### *Exclusion criteria*

- Age less than 18 years.
- Fracture of proximal femur.
- Infected hips.
- Revision arthroplasty.
- Cemented THR

All patients were operated with De Puy total hip replacement system, with metal on polyethylene articulation, corail stem, ultra high molecular weight poly-ethylene (UHMWPE) liner and a standard 28 mm metal (stainless steel) head. A standard preoperative protocol was followed with emphasis on the Harris Hip Score.

All the cases were done under regional anesthesia, with patient in lateral position. In lateral approach we followed the steps described in standard Hardinge approach (Figure 1). And meticulous soft tissue repair was done at the end of the procedure.

In cases of posterior approach the principles of standard Moore's approach was followed; and after the implantation of prosthesis and joint reduction enhanced soft tissue repair of posterior capsule, piriformis tendon, short external rotators and quadratus femoris (Figure 2). Any drains was not routinely don't use.

Bilateral cases were operated with a mean interval of 7 days. Patients were started to mobilise the hip, knee and ankle from the first day. Patients were allowed to bear weight as tolerated from second day. Thromboembolic prophylaxes were given only to high risk cases. X rays were taken in the second postoperative day. Patients were followed up periodically at the end of 1 month, 3 months, 6 months, 12 months and then at yearly interval. At each

follow-up clinical assessment with Harris hip score and radiological assessment with anteroposterior and cross table lateral views were done. At the one month follow up CT scan was taken for the purpose of evaluating cup version.

**RESULTS**

Out of the 106 hips operated, avascular necrosis was the major indication for surgery in our study. The mean Harris hip score in the posterior group was 92.6 and in the lateral group it was 90.7. Even though the posterior group has a better post op functional score, the difference is not statistically significant. 3 cases of superficial infection in the posterior group and 1 deep infection and one superficial in the lateral group were observed. There was no case of dislocation in our study in either of

the approaches. Even though there were 2 cases of acetabular cup retroversion, which is known to predispose to posterior dislocation, we did not have any in the posterior group even 1 year after surgery. We had a case of heterotopic ossification in our series in the posterior group. Abductor dysfunction was noted in 2 patients with lateral approach and in 2 patients with posterior approach.

The mean inclination and version of acetabular cup was measured in X ray and CT (Table 1). A surprising fact was that 2 of the cases in the posterior approach had retroverted cups on CT, which was not discerned on X rays. 3 out of the lateral approach group had inclination outside the safe zone as compared to 1 in the posterior approach group, whereas in version both the groups had 2 values outside the safe zone as per the CT measurements.

**Table 1: Mean acetabular inclination and version.**

Approach	Inclination in degrees	Version in degrees	Version in degrees by CT
Lateral	43.9	16.4	16.3
Posterior	45.3	13.2	9



**Figure 1: Lateral Hardinge approach.**

The p value for inclination and version difference in both the approaches was not significant (0.3882) in the chi square and t-tests. The margin of error between CT and X ray version estimation was + or - 3°.



**Figure 2: Enhanced posterior soft tissue repair.**

**DISCUSSION**

The direct lateral and posterior approaches are fundamentally similar in that they are both muscle-splitting approaches to the hip. However the surgical anatomy and potential complications differ between these approaches, which can influence patient outcomes.<sup>23</sup>

The most important determinants of a successful THA are based on its goals of treatment: mitigation of pain, improved quality of life and restoration of function. Barber and colleagues prospectively followed for 2 years. 28 patients undergoing direct posterior and 21 undergoing direct lateral THA, each performed by a single surgeon.

Both groups had similar improvements on the Harris hip score at the 2-year follow-up and had no observable differences in dislocations or in the incidence of a Trendelenburg gait 24. In present study also we have not encountered any dislocation in either group.

A more recent prospective study randomly assigned 60 patients to undergo THA through either a posterior or lateral approach. Both approaches showed similar improvements across the Harris hip score, WOMAC and SF-36 questionnaires at multiple time points up to and including 12 weeks postoperatively. The rate of dislocation and fracture did not differ significantly between the groups.<sup>25-27</sup> Harris hip score in our study also favors that there is no significant difference with either approach.

A common comparator between the posterior and lateral approach is the incidence of abductor insufficiency. Several studies have suggested the direct lateral approach has an increased incidence of abductor insufficiency following THA. The reported incidence varies from 0% to 16% for the posterior approach and from 4% to 20% for the direct lateral approach. The incidence of abductor insufficiency is equal with both approaches in present study.

Dislocation is one of the most common and devastating complications after THA. Acetabular positioning directly influences dislocation rates. It is, therefore, no surprise that majority of the literature attempting to discern an ideal orientation for the acetabular component is based on reducing dislocation rates. Although the recent use of larger femoral heads dramatically reduced dislocation rates, they are not considered a substitute for a proper cup positioning.

Lewinnek et al showed that cups with an anteversion of  $15\pm 10$  degrees and inclination angle of  $40\pm 10$  degrees had 1.5% dislocation rates, while acetabular components outside this safe zone had a dislocation rate of 6.1%. This historic paper, however, has been challenged in literature due to its methodology. Other authors have since attempted to re-define the optimal acetabular position based on biomechanical and clinical studies. As per those studies the ideal inclination was  $35^\circ$  to  $45^\circ\pm 10^\circ$  and the ideal anteversion was  $15^\circ$  to  $30^\circ\pm 10^\circ$ . This wide range indicates that the ideal acetabular position, still remains a topic of debate.<sup>27</sup> Present mean acetabular inclination and anteversion fall within this safe zone.

## CONCLUSION

To conclude, the approach did not significantly affect the outcome in total hip replacement with respect to functional outcome or rates of complication. And it neither influences the acetabular cup placement. Proper operative technique seems to be more important than the choice of approach in total hip replacement. Studies with a bigger sample size need to be done to further throw light on the role of approach on cup placement.

*Funding: No funding sources*

*Conflict of interest: None declared*

*Ethical approval: Not required*

## REFERENCES

- Charnley J. The long-term results of low-friction arthroplasty of the hip performed as a primary intervention. *J Bone Joint Surg Br.* 1972;54(1):61-76.
- Kelmanovich D, Parks ML, Sinha R. Surgical Approaches to Total Hip Arthroplasty. *Journal of the Southern Orthopaedic Association.* 2003;12(2):90-4.
- Roberts JM, Fu FH, McClain EJ, Ferguson AB Jr. A comparison of the posterolateral and anterolateral approaches to total hip arthroplasty. *Clin Orthop Relat Res.* 1984;187:205-10.
- Robinson RP, Robinson HJ, Salvati EA. Comparison of the transtrochanteric and posterior approaches for total hip replacement. *Clin Orthop.* 1980;147:143-7.
- Weiss APC, Jacobs MA. Posterior augmentation during closure following total hip arthroplasty. *Orthopedics.* 1990;13:577-9.
- Hedley AK, Hendren DH, Mead LP. A posterior approach to the hip joint with complete posterior capsular and muscular repair. *J Arthroplast.* 1990;5(Suppl):S57-66.
- Pellicci PM, Bostrom M, Poss R. Posterior approach to total hip replacement using enhanced posterior soft tissue repair. *Clin Orthop.* 1998;355:224-8.
- Bottner F, Pellicci PM. Review: Posterior Soft Tissue Repair in Primary Total Hip Arthroplasty. *HSS Journal.* 2006;2(1):7-11.
- Ko CK, Law SW, Chiu KH. Enhanced soft tissue repair using locking loop stitch after posterior approach for hip hemiarthroplasty. *J Arthroplast.* 2001;16(2):207-11.
- Macaulay W, Colacchio ND, Fink LA. Modified enhanced posterior soft tissue repair results in a negligible dislocation rate after hip resurfacing. *Operative Techniques in Orthopaedics.* 2009;19(3):163-8.
- Kao JT, Woolson ST. Priformis tendon repair after total hip replacement. *Orthop Rev.* 1992;21(2):171-4.
- Suh KT, Park BG, Choi YJ. A posterior approach to primary total hip arthroplasty with soft tissue repair. *Clin Orthop.* 2004;418:162-7.
- White RE, Forness TJ, Allman JK, Junick DW. Effect of posterior capsular repair on early dislocation in primary total hip replacement. *Clin Orthop.* 2001;393:163-7.
- Dixon MC, Scott RD, Schai PA, Stamons V. A simple capsulorrhaphy in a posterior approach for total hip arthroplasty. *J Arthroplast.* 2004;19:373-6.
- Nissen KI. The Judet Arthroplasty of the Hip via Gibson's Lateral Approach. *Postgraduate Medical Journal.* 1952;28(321):412-23.
- Baker AS, Bitounis VC. Abductor function after total hip replacement. An electromyographic and clinical review. *Bone & Joint Journal.* 1989;71(1):47-50.
- Morrey BF, Adams RA, Cabanela ME. Comparison of heterotopic bone after anterolateral, transtrochanteric, and posterior approaches for total hip arthroplasty. *Clin Orthop Relat Res.* 1984;160-7.
- Saxler G. The accuracy of free-hand cup positioning-a CT based measurement of cup placement in 105 total hip arthroplasties. *International Orthopaedics.* 2004;28(4):198-201.

19. Pierchon F, Pasquier G, Cotten A, Fontaine C, Clarisse J, Duquenois A. Causes of dislocation of total hip arthroplasty. CT study of component alignment Pierchon. *Journal of Bone and Joint Surgery – British.* 1994;76(1):45-8.
20. Linclau L, Dokter G, Peene P. Radiological aspects in preoperative planning and postoperative assessment of cementless total hip arthroplasty. *Acta Orthop Belg.* 1993;59:163-7.
21. Kalteis T, Handel M, Herold T, Perlick, Paetzel LC, Grifka J. Position of the acetabular cup-accuracy of radiographic calculation compared to CT-based measurement. *European Journal of Radiology.* 2006;58(2):294-300.
22. Haenle M, Heitner A, Mittelmeier W, Barbano R, Scholz R, Steinhäuser E. Assessment of cup position from plain radiographs: impact of pelvic tilting. *Surgical and Radiologic Anatomy.* 2007;29(1):29-35.
23. Learmonth ID, Young C, Rorabeck C. The operation of the century: total hip replacement. *Lancet.* 2007;370:1508-19.
24. Barber TC, Roger DJ, Goodman SB, Schurman DJ. Early outcome of total hip arthroplasty using the direct lateral vs the posterior surgical approach. *Orthopedics.* 1996;19:873-5.
25. Witzleb WC, Stephan L, Krummenauer F, Neuke A, Günther K-P. Short-term outcome after posterior versus lateral surgical approach for total hip arthroplasty: a randomized clinical trial. *Eur J Med Res.* 2009;14:256-63.
26. Chechik O, Khashan M, Lador R, Salai M, Amar E. Surgical approach and prosthesis fixation in hip arthroplasty worldwide. *Arch Orthop Trauma Surg.* 2013;133:1595-600.
27. Petis S, Howard JL, Lanting BL, Vasarhelyi EM. Surgical approach in primary total hip arthroplasty: anatomy, technique and clinical outcomes. *Canadian Journal of Surgery.* 2015;58(2):128-39.
28. Masonis JL, Bourne RB. Surgical approach, abductor function, and total hip arthroplasty dislocation. *Clin Orthop Relat Res.* 2002;405:46-53.

**Cite this article as:** Subramanian SS, Sengodan MM, Basha MM. The choice of approach in total hip arthroplasty, does it really matters? *Int J Res Med Sci* 2016;4:2756-60.