

# To Assess the Outcomes of Total Hip Arthroplasty Using Dual Mobility Implants

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## ABSTRACT

**Background:** A common and reasonably priced treatment, total hip arthroplasty (THA) is well-known for its positive results in treating advanced hip osteoarthritis and associated disorders. Although there has been a 9.2% revision rate in Pakistan due to cup shell fractures, dual mobility implants, which are being utilised more and more to lower the risk of dislocation, have shown promise.

**Objective:** To assess the outcomes of total hip arthroplasty using dual mobility implants.

**Study design:** Descriptive study

**Place and Duration:** This study was conducted in, Muhammad Medical College, Ibn-e-Sina University Hospital Mirpurkhas Pakistan from January 2022 to January 2025

**Methodology:** 80 patients who had total hip arthroplasty (THA) with dual mobility implants participated in this descriptive study, which was carried out at the Department of Orthopaedic Surgery. Clinical evaluations and Harris Hip Scores were used to evaluate pre- and postoperative results, and SPSS version 28.0 was used to analyse the data. With a paired t-test and dependent stratified t-test by gender, we established statistical significance at  $p < 0.05$ .

**Results:** The total number of patients was 80, aged 61.05 years on average, with 65% of them being male. The most common reason for performing THA was avascular necrosis of the femoral head. Surgical dislocations were not encountered and both sexes' Harris Hip Scores improved ( $p < 0.001$ ) statistically.

**Conclusion:** The study found that there was a statistically significant difference in preoperative and postoperative evaluations of the Harris Hip Score. Moreover, no dislocations were observed after dual mobility total hip replacement.

**Keywords:** Total Hip Arthroplasty, Harris Hip Score, Dual Mobility Implants.

## INTRODUCTION

Total hip arthroplasty (THA) is considered a procedure with a high surgical success rate relative to cost in orthopaedic surgery [1]. For patients suffering from advanced degenerative osteoarthritis of the hips, it provides significant relief from pain, increased mobility, and augmentation in the quality of life [2,3]. The condition of hip osteoarthritis is prevalent in around 88 symptomatic cases per 100,000

people and is a huge contributor to the need for THA in the US [4]. In addition, THA is conducted in cases of hip dysplasia, inflammatory diseases of the joints, and osteonecrosis of the hip [5].

THA usually outcomes in positive clinical and functional results and assists in relieving disability and ache both in the short and long term [6]. The magnitude of Total knee arthroplasty (THA) results is usually more

reliable and consistent compared to the other knee surgeries performed at the same time [7]. While the primary reason that total hip arthroplasty (THA) is done is advanced stage of hip osteoarthritis (OA) which is the most common reason, it is also done for hip osteonecrosis ON, hip dysplasia and arthritis of inflammatory origin also requires surgery [8]. Hip ON usually affects younger people between the ages of 35 and 50 and makes up about 10% of all THA surgeries [9].

After total hip arthroplasty (THA), dislocation is still a serious complication that can be caused by both surgical and patient-related factors. Dual-mobility implants are linked to a lower likelihood of dislocation, according to comparative studies between Exeter THAs and dual-mobility THAs [10]. According to a study, cup shell fractures are the main cause of the 9.2% revision rate for THAs including multiple implants in Pakistan [11].

Given how common total hip arthroplasty (THA) is in Pakistan, the purpose of this study is to assess the outcomes of this treatment using dual mobility implants. There is no doubt that to augment the results in a patient's health, better techniques in surgery and better choice of implants is required. Assessment of the safety and efficacy of dual mobility implants in the domain of Pakistan could aid in determining their value and usefulness.

## METHODOLOGY

This research is a descriptive study which was performed in the Department of Orthopedic Surgery. 80 patients in all took part of the trial. The WHO sample size determination formula was used to determine the sample size. The 9.2% percentage of revision procedures performed after total hip arthroplasty (THA) using dual mobility implants served as the basis for this computation. The computation was performed with an 8.1% margin of error and a 95% confidence interval. All eligible patients who satisfied the inclusion criteria during the study

period were enrolled using a non-probability consecutive sampling procedure.

Based on predetermined inclusion criteria, patients were chosen. The goals of the study were fully explained to those who fit the requirements. Prior to enrolment, each subject provided written informed approval. Every patient had thorough clinical and radiological examinations prior to having a total hip arthroplasty with a dual mobility implant. Patients were kept under observation in the hospital ward for five days following surgery. After the medical staff determined that their condition was suitable, they were released. At three months, follow-up evaluations were carried out to look for any indications of dislocation. After consulting with a prominent orthopaedic physician, the researcher verified all of the findings.

SPSS version 28.0 was used for data entry and analysis. The mean and standard deviation (SD) were computed for numerical factors such as age and Harris Hip Scores before and after surgery. Frequencies and percentages were used to define categorical factors, such as gender, THA indications, the side of the afflicted hip, and the occurrence of dislocation. The Harris Hip Scores before and after surgery were compared using a paired t-test. The Harris Hip Scores were additionally stratified by gender in order to investigate potential effect modifiers. Within each group, paired t-tests were used after stratification. P-values below 0.05 were regarded as statistically significant.

## RESULTS

There were a total of 80 patients who were a part of this study. The majority of the participants were male with a representation of 65% (n=52). The number of female participants was 28 (35%). The mean age calculated was 61.05 years. Table number 1 shows the clinical as well as demographic characteristics of the participants.

Table No. 1:

Variables	N	%
<b>Gender</b>		
• Female	28	35
• Male	52	65

Hip affected		
• Left	44	55
• Right	25	45
THA Indication		
• Secondary OA	5	6.25
• Ankylosing Spondylitis	4	5.00
• Non-Ossifying Fibromas	21	26.25
• Hip Avascular Necrosis	47	58.75
• 2nd Stage Revision Cases	3	3.75
Outcome		
• No dislocation	80	100
• Dislocation	0	0

Prior to surgery, the average Harris Hip Score was 49.04. Following surgery, it rose to 88.45. Table number 2 compares the Harris Hip score before and after total hip arthroplasty.

Table No. 2:

Paired Sample Statistics				
Outcome	N	Mean	Standard Deviation	p-value
Pre-op Harris Hip Score	80	49.04	7.31	0.000
Post-op Harris Hip Score	80	88.45	8.51	

Table number 3 shows the relation of pre and post Harris Hip score according to gender.

Table No. 3:

Gender	Outcome	N	Mean	Standard Deviation	p-value
Female	Pre-op Harris Hip Score	28	50.50	10.05	0.000
	Pre-op Harris Hip Score	28	86.29	8.77	
Male	Pre-op Harris Hip Score	52	48.22	5.40	0.00
	Pre-op Harris Hip Score	52	89.05	8.38	

## DISCUSSION

The main objective of this study was to assess the results of total hip arthroplasty (THA) with

dual mobility implants. With a mean age of 61 years, 52 (65%) of the 80 patients that were enrolled were male. Both male and female

patients experienced similarly large improvements ( $p < 0.001$ ), with the average Harris Hip Score increasing significantly from 49.04 before surgery to 88.45 after surgery ( $p < 0.001$ ).

The purpose of lowering the probability of dislocation during the surgery is the creation of dual mobility implants [12]. Dual mobility

implants had a lower incidence of dislocation than bipolar hemiarthroplasty in patients with femoral neck fractures according to a systematic review and meta analysis [13]. Another study has shown that in comparison with hemi THA for femoral neck fractures, dual mobility components were associated with significantly lower dislocation rates [14]. Since these implants enhance the effective head size, while also improving the stability of the prosthesis. The application and result of dual mobility THA have been studied extensively.

The effectiveness of dual mobility implants in reducing undermining dislocation during primary total hip arthroplasty (THA) was studied in 2019 and published in *EFORT Open Reviews* [15]. It concluded that dual mobility implants outperform traditional alternatives in providing enhanced stability. The study further emphasized the implants' ability to replicate anatomy accurately which permitted outpatient and even bilateral procedures without compromising the recovery of motion postoperatively perfectly within the set restrictions [16]. This shifts the paradigm as patients can now perform their normal daily activities and vocation without restrictions.

A systematic review published on *PubMed* in 2023 focused on dual mobility total hip arthroplasty (THA) in patients younger than 55 [17]. The review noted that dual mobility implants appear to have a longer life expectancy with lower rates of instability and dislocation following primary total hip arthroplasty which is beneficial for younger patients [18]. Noteworthy clinical findings included high rates of Harris Hip Scores, low revision operations, and adoption of these implants.

The findings from the systematic review by *The Bone & Joint Journal* in 2018 evaluating the use of dual mobility components in total hip arthroplasty (THA) confirmed that dual mobility implants offer better clinical outcomes such as lower dislocation rates alongside low revision rates and high Harris Hip Scores compared to standard implants [19]. Dual mobility implants were also found to have lower dislocation rates than standard implants [20]

Recent literature suggests that dual mobility total hip arthroplasty (THA) is a credible alternative due to the increased prosthetic survivorship and lower instability and dislocation rates following primary THA. These implants, unlike traditional options, offer

advantages such as enhanced anatomical alignment and rapid postoperative activity resumption. But the study has limitations. The findings may suffer from limited generalizability due to the single-center design and relatively low sample size of 80 patients. Additionally, the short follow-up period limits the evaluation of long-term outcomes. Despite these limitations, the study adds important insights on the effectiveness of dual mobility implants in THA.

## CONCLUSION

The study found that there was a statistically significant difference in preoperative and postoperative evaluations of the Harris Hip Score. Moreover, no dislocations were observed after dual mobility total hip replacement.

## Funding source

This study was conducted without receiving financial support from any external source.

## Conflict in the interest

The authors had no conflict related to the interest in the execution of this study.

## Permission

Prior to initiating the study, approval from the ethical committee was obtained to ensure adherence to ethical standards and guidelines.

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