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Uncemented THR in The Treatment of Primary Osteoarthritis for Young Patients

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ABSTRACT

Introduction: Primary hip osteoarthritis is a progressive degenerative disease-causing chronic pain, functional limitation, and reduced quality of life. Though common in older adults, younger individuals are increasingly affected. Total hip replacement relieves pain. This article aimed to study the clinical and X-ray results of uncemented total hip replacement in young patients with primary osteoarthritis. **Methods & Materials:** This prospective observational study was conducted to evaluate the clinical and radiological outcomes of uncemented total hip replacement (THR) in young patients with primary osteoarthritis. The study was carried out at Dhaka Community Medical College & Hospital from January 2025 to December 2025. A total of 65 patients with primary osteoarthritis of the hip, aged between 20 and 55 years and meeting the inclusion criteria, were enrolled. Data analysis was performed using the Statistical Package for Social Sciences (SPSS) version 25.0. **Result:** The largest group of patients aged 4049 years (38.5%), the next were 3039 years (27.7%), and 12.3% were below 30 years. Males accounted for 58.5% and females 41.5% of the cases. The average Harris Hip Score increased from 48.6 before operation to 89.7 after operation. Few patients (87.7%) experienced no complications; there was superficial infection (4.6%), dislocation (3.1%), and aseptic loosening (3.1%). Radiologically, 89.2% of patients had stable fixation, 7.7% had radiolucent lines, and 3.1% had loosening. **Conclusion:** Uncemented total hip replacement in young patients with primary osteoarthritis provides excellent functional outcomes, significant improvement in Harris Hip Score, stable implants, and minimal complications. It reliably relieves pain and enhances mobility, making it an effective and preferred treatment option for active individuals in this age group.

Keywords: *Total Hip Replacement, Primary Osteoarthritis, Harris Hip Score.*

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INTRODUCTION

Total hip replacement (THR) is widely recognized as a great surgical intervention for eliminating pain and helping patients regain their mobility in cases of severe hip damage. The main indication for hip joint replacement is Primary Osteoarthritis. Though it was a common practice to perform this operation in the elderly nowadays due to the longer life expectancy of people, their higher functional demands as well as more advanced implant technologies, the trend of doing THR in younger patients has been on the rise [1,2]. Nevertheless, young and active patients pose a big problem for doctors, first of all, because they live longer and, on top of that, they are more active resulting in a higher possibility of implant wear and eventually needing a revision surgery [2,3]. Uncemented total hip replacement (THR) among other reasons is a great option for young patients because it leads to a stable fixation of the implant by bone growth. If cemented implants use bone cement to fix the components, uncemented prostheses are designed with porous surfaces that allow the bone to grow into them, which is a key factor for (self) long-term stability and durability [3,4]. Thorough designs offering porous coated and hydroxyapatite surfaces have achieved exemplary fixation and survivorship, especially in the case of femoral components [4,5]. Research has shown that uncemented stems in young patients can have survival rates of more than 90% at 10 to 15 years, which is very encouraging for their use in the young population [5,6]. However, the acetabular component is still an issue with uncemented total hip replacements (THR). Young patients usually place higher mechanical loads on the joint, which can cause polyethylene wear, osteolysis, and the loosening of the acetabular cup [3,5]. Registries have indicated that while femoral parts are very reliable, acetabular parts might not have as good long-term survival and are often revised because of liner wear or instability [5]. Improvements in the types of surfaces used for bearings, like ceramic-on-polyethylene and highly cross-linked polyethylene, have brought down wear substantially and have led to better results [7]. In terms of functionality, an uncemented THR has been linked to the immense relief of pain, enhanced mobility, and the overall betterment of life quality for younger patients with primary osteoarthritis. Clinical researches have confirmed the marked elevation of Harris Hip Score and other functional outcome measures after the surgery [6,8]. Besides that, a lot of patients are able to get back to their regular activities and work in a pretty short time, which further attests to the effectiveness of the procedure in restoring functional independence [8]. On the other hand, worries about the long-term performance of implants mainly in young person's remain. Younger patients will probably outlive their prosthesis thus the time-related probability

of revision surgery is escalated [2,9]. Next revision surgeries are typically more complicated, effective with higher rates of complications, and they might even affect the bone stock, leading to secondary operations becoming a much bigger challenge [9]. Therefore, careful patient selection, optimal implant choice, and meticulous surgical technique are crucial in achieving favourable long-term outcomes. This study aimed to evaluate the clinical and radiological outcomes of uncemented total hip replacement in young patients with primary osteoarthritis.

METHODS & MATERIALS

This prospective observational study aimed at assessing the clinical and radiological results of uncemented total hip replacement (THR) in the young population with primary osteoarthritis. A total of 65 primary osteoarthritis patients aged 20-55 years were recruited during Jan 2025-Dec 2025 at Department of Orthopedics, Dhaka Community Medical College & Hospital, Dhaka, Bangladesh. Patients with secondary osteoarthritis, previous hip surgeries, active infection, or severe comorbid conditions were excluded. After receiving appropriate anesthesia, all patients went through uncemented THR with the use of standard surgical techniques. Data collection was done using a structured case record form and included demographic variables (age, sex), clinical parameters (laterality, preoperative status), operative details, and postoperative outcomes. The Harris Hip Score (HHS) was used for functional assessment both preoperatively and at follow-up (6 months postoperatively). Radiological study with typical anteroposterior and lateral hip X-rays was used to examine implant positioning, fixation, and the existence of loosening or radiolucent lines. The recording of postoperative complications was done for infection dislocation periprosthetic fracture, and aseptic loosening. Data analysis was carried out by using the Statistical Package for Social Sciences (SPSS) software, version 25.0. Demographic and clinical variables were summarized by descriptive statistics, which were mean standard deviation for continuous variables and frequencies with percentages for categorical variables. To compare preoperative and postoperative HHS scores, the paired sample t-test was performed, and a p-value of <0.05 was considered statistically significant. The findings were shown in tables. Ethical clearance was taken from Institutional review board.

RESULTS

The majority of patients (38.5%) belonged to the 40–49 years age group, followed by 27.7% in the 30–39 years category. Younger patients aged below 30 years constituted a smaller proportion (12.3%), reflecting the relatively lower incidence of severe primary osteoarthritis in this group (*Table I*).

Table I
Age Distribution of the Study Population (*n* = 65).

Age Group (years)	Frequency (n)	Percentage (%)
20–29	8	12.3%
30–39	18	27.7%
40–49	25	38.5%
50–55	14	21.5%
Total	65	100%

There was a male predominance in the study, with males accounting for 58.5% of cases, while females comprised 41.5%, indicating a slightly higher burden of surgically treated osteoarthritis among male patients in this cohort (*Table II*).

Table II
Gender Distribution of the Study Population (*n* = 65).

Gender	Frequency (n)	Percentage (%)
Male	38	58.5%
Female	27	41.5%
Total	65	100%

Right hip involvement was slightly more common (52.3%) compared to the left (44.6%). Bilateral disease was observed in a small proportion (3.1%), though only one side was operated on during the study period (*Table III*).

Table III
Laterality of Hip Involvement (*n* = 65).

Side Involved	Frequency (n)	Percentage (%)
Right Hip	34	52.3%
Left Hip	29	44.6%
Bilateral*	2	3.1%
Total	65	100%

**Only one hip is operated on at a time.*

There was a marked improvement in functional outcome following uncemented THR. The mean Harris Hip Score increased from 48.6 preoperatively (poor function) to 89.7 postoperatively (good to excellent function), demonstrating significant clinical benefit (*Table IV*).

Table IV
Functional Outcome (Harris Hip Score) Before and After Surgery (*n* = 65).

Outcome Measure	Mean ± SD
Preoperative HHS	48.6 ± 8.4
Postoperative HHS (6 months)	89.7 ± 6.5
Mean Improvement	+41.1

The majority of patients (87.7%) had no postoperative complications. Among complications, superficial infection (4.6%) was the most common, followed by dislocation and aseptic loosening (3.1% each), indicating an overall low complication rate (*Table V*).

Table V
Postoperative Complications (*n* = 65).

Complication	Frequency (n)	Percentage (%)
Superficial infection	3	4.6%
Dislocation	2	3.1%
Periprosthetic fracture	1	1.5%
Aseptic loosening	2	3.1%
No complications	57	87.7%
Total	65	100%

Radiological evaluation showed that the majority of implants (89.2%) had stable fixation, confirming successful osseointegration. Radiolucent lines were observed in 7.7% of cases, while definite loosening was noted in only 3.1%, suggesting good implant stability in most patients (*Table VI*).

Table VI
Radiological Outcome and Implant Fixation (*n* = 65).

Radiological Outcome	Frequency (n)	Percentage (%)
Stable fixation	58	89.2%
Radiolucent lines	5	7.7%
Loosening	2	3.1%
Total	65	100%

DISCUSSION

Regarding age distribution, most of the patients in our study belonged to the 40-49 years age group (38.5%), with the 30-39 years age group coming the next (27.7%). This suggests that serious degenerative changes leading to the necessity for surgery are more common in people in their forties. In contrast, Wade et al. reported a lower mean age of 27.5 years in their cohort of young patients undergoing uncemented THR [10]. Likewise, Siddique et al. reported the mean age was around 35 years [11]. Our patients however, were on average older than these studies, probably because we included patients with primary osteoarthritis whereas other studies mainly looked at young patients with secondary causes such as avascular necrosis. 58.5% of our study population were male. Siddique et al. found an even higher male dominance (66%) [11]. Lakhotia et al also saw that 68% of their patients were males. Such male dominance in these different studies might mean that males either come earlier or have higher physical demands which lead to their earlier surgery. With respect to the side, involvement. Siddique et al. have in the same vein also reported right-sided involvement in 62% of cases [11]. Our study's functional result demonstrated a major improvement in the Harris Hip Score, which raised from 48.6 preoperatively to 89.7 postoperatively. Wade et al. showed improvement from 36 to 92 at a 5-year follow-up period, whereas Liang et al. reported a rise from 46.2 to 96.5 [10-12]. Similarly, studies in younger populations have shown improvement from approximately 36.9 to 92.3 [13]. Lakhotia et al. also reported postoperative scores reaching 88.5 [14]. Our findings are somewhat below the level of the best results from long-term follow-up studies but are in fact very similar to mid-term results. This basically means that an uncemented THR allows for a major improvement in function. In terms of postoperative problems, a large majority (87.7%) of the participants in our study did not experience any problems. Surgical wound infection at the skin level and dislocation of the joint were the two most frequently observed issues at 4.6% and 3.1%, respectively. According to Wade and his colleagues, they did not experience any major problems in their series though minor issues like superficial wound complications were present. [10]. Lakhotia et al. also documented superficial infections in a small proportion of patients [14]. In contrast, longer-term studies have reported complications such as osteolysis and liner wear [12]. The radiological outcomes showed stable fixation in 89.2% of cases, with loosening in only 3.1%. Wade et al. reported consistent bony ingrowth with no evidence of loosening in all patients [10]. Similarly, long-term studies in young patients have demonstrated excellent osseointegration with minimal loosening and absence of radiolucent lines [13]. However, Liang et al. reported osteolysis in 14% of cases at longer follow-up despite low loosening rates [12]. Compared to these findings, our results demonstrate slightly lower fixation rates but still confirm reliable biological fixation with uncemented implants.

LIMITATIONS

There are a number of limitations in this study that must be taken into account when interpreting the results. For one thing, the sample size was pretty small (n=65), which may hinder the generalization of the results. Moreover, the study was done in only one hospital, so the patients selected may not be representative of the general population, and this affects the study's external validity. The length of follow-up was also rather short, which means that the investigation of long-term outcomes was limited - for instance, implant survival, wear, and late complications like osteolysis.

CONCLUSION

Uncemented total hip replacement (THR) in young patients suffering from primary osteoarthritis shows very good functional results, marked enhancement in Harris Hip Score, and a high level of implant stability with very few complications. It is a very dependable method of removing pain and bringing back motion, which means it is a really good treatment choice for such an active group of patients.

RECOMMENDATION

This study outcomes indicate that uncemented total hip replacement (THR) may be the best choice of treatment for young osteoarthritis patients because it produces excellent functional results and stable implant fixation. To improve durability of the implant especially in the case of physically active persons, surgeons should think about employing the latest versions of uncemented prostheses with high-tech bearing surfaces.

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CONFLICT OF INTEREST

None declared

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