

ORIGINAL RESEARCH

**A STUDY OF THE FUNCTIONAL RESULT OF CEMENTED
TOTAL HIP ARTHROPLASTY USING MOORE'S
PROCEDURE**

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ABSTRACT

Background: One of the most common causes of human locomotion impairment is hip joint pain. Total hip arthroplasty is the most significant single advancement in modern orthopedic surgery. By replacing damaged cartilage surfaces with various artificial bearing materials, surgeons have been able to improve function and relieve pain in the vast majority of patients. The current study was carried out to investigate the functional outcome and complications associated with cemented total hip replacement using a modular prosthesis. Moore's approach, which is commonly used in our institution, is used in all of the cases.

Materials and Methods: In this study, 30 patients with 30 diseased hips were treated with cemented total hip replacement using modular prosthesis by Moore's approach in our institution between September 2020 and September 2021, and were followed up for 1-24 months.

Results: Patients were evaluated functionally as well as radiologically. Functional evaluation using the Modified Harris hip score revealed excellent results in 17 patients (60%), 7 patients (30%) were the good results, and 3 patients (10%) had in fair condition. There were no negative outcomes. The most recent radiological evaluation of all cases revealed no signs of aseptic dislocation or implant failure.

Conclusion: We achieved results comparable to other authors by using proper patient selection, adequate planning, armamentarium, and meticulous surgical technique. In a nutshell, this procedure performed with the utmost technical precision at our institute yielded very good clinical results. If done with extreme care and precision, functional results are excellent and complications are minimal. Long-term studies are required to investigate late complications and to demonstrate the efficacy of the implants and procedure.

Keywords: Hip, arthroplasty, cemented, Moore's approach, modern orthopaedic surgery.

INTRODUCTION

Hemi-arthroplasty of the hip joint was initially performed in 1940 (Moore & Bohlmann 1943), and since then, it has acquired worldwide recognition as an effective treatment for acute hip discomfort. Fractures of the femoral neck in older patients Bone cement should be used as the primary anchoring for the prosthesis, and the goal should be to prevent or at least delay the prosthesis from becoming loose. In the treatment of femoral neck fractures, the results of cemented and non- cemented Moore hemi-arthroplasties are compared in this clinical controlled experiment that is presented in this report. The follow-up time for this study was one year.^[1-3]

Hip replacement surgery was pioneered as a miracle cure to alleviate the chronic agony caused by osteoarthritis of the hip. Later on, further goals including the correction of the deformity as well as the restoration of hip mobility and stability were accomplished. It has enabled millions of people to live a life that is more typical of their peers.^[3] It is common practise to classify the prostheses that are used in THR as either cemented, cement-less, or hybrid. There has been a growing tendency toward the use of cement-less components, with proponents stating a greater number of difficulties, such as loosening, an increased infection rate, and other issues; however, these components come with additional financial considerations.^[4] The utilisation of cement constitutes the central focus of THR surgery that is cemented. The load of the patient's body weight is spread out over a larger region of bone with the use of cement.^[5] The virtually immediate and complete absence of discomfort is one of the most attractive aspects of the acrylic-fixed hip replacement. Patients who have hip diseases that require replacement surgeries have shown to benefit tremendously from the quick pain alleviation, stable fixation, and rapid rehabilitation that these procedures provide.^[6] Because it has been demonstrated that the "First time" is the optimal time to employ acrylic cement, the surgery should be performed with the utmost technical perfection in order to achieve outcomes that are stable over the long term.^[6,7]

Cemented total hip replacements have been used at our institute for a long time, and during that time, we have not had any of the issues that are typically associated with cemented implants. In a poor country like ours, should we truly go over to un-cemented prostheses, which are more expensive and come with the fear of complications like these, or can we continue to utilise cemented prostheses with results that are just as excellent, if not better?

Aims and objectives

The purpose of the current study was to investigate the functional outcomes and related comorbidities of cemented total hip replacement with modular prosthesis. Moore's method, which is widely utilised here at our establishment, is applied to each and every one of the cases.

MATERIALS & METHODS

In this study, 30 patients with 30 hips were treated with cemented total hip replacement. All of the patients were older than 40 years old, and their hips were sick or damaged. The duration of the subsequent research ranged from one month to two years.

Inclusion criteria

1. AGE-Above40years.
2. SEX-Male and Female.
3. CRP-Negative.

Exclusion conditions

1. An ongoing infectious disease.
2. Patients who are unable to have surgery.

Patients were brought into the wards to be admitted. A comprehensive history of the illness was gathered, including information about the patient's age, gender, occupation, symptoms, and any other existing medical conditions. The patient underwent a comprehensive clinical evaluation. Investigations were performed on later patients who were being treated. These included standard blood counts, an erythrocyte sedimentation rate and a C-reactive protein measurement, as well as AP and lateral X-ray views of the pelvis with both hips.

Before the operation, the patient was treated with analgesics, antibiotics, tetanus toxoid, and blood transfusions when necessary. It was recommended that patients stop taking aspirin, anticoagulants, and any other anti-inflammatory medicines seven to ten days before surgery.

Preoperative Assessment: The Harris hip scoring system with modifications was utilised to perform the examinations on the patients.^[7] Pain, function, range of motion, and deformities were the categories whose scores were taken into consideration. Additionally, both the limb length difference and the flexion contracture are brought up in the discussion. The patient's spine as well as both of their lower limbs, including the opposite hip, knees, and foot, were examined during the physical exam. Occult infections such as skin blemishes, dental caries, and infections of the urinary system were found and treated before surgery. All of the patients underwent standard blood tests as part of their treatment. The CRP and ESR levels were scrutinised more closely than usual, and if they came back abnormal, the procedure was postponed.

Roentgenographic Evaluation: Confirming the diagnosis and determining the anatomic relationship between the femur and the pelvis in order to facilitate the precise restoration of joint architecture and biomechanics are the objectives of the preoperative radiological assessment. The patient underwent a standard pelvic roentgenogram, which included an anteroposterior image of both hips in 15 degrees of internal rotation, as well as a lateral X-ray of the hip. In addition, X-rays of the spine and knees were obtained to determine the state of these areas. The following characteristics were observed.

Femur: The bone stock, the medullary cavity, the limb length disparity, and the length of the neck are all factors to consider.

Acetabulum: Bone stock, floor, migration, protrusion, osteophytes, and estimated cup size are all things to take into consideration. In order to aid in the selection of the type of implant that will provide the best fit, implant size, and neck length required to restore equal limb lengths and medial offset, the prosthesis manufacturer supplied plastic overlay templates for

use in the process of templating both the femoral and the acetabular components. This was done for both the femoral and the acetabular components.

The back or rear area Moore's method,^[8,9] was utilised for each and every one of the situations. Each of the femoral and acetabular components required forty grammes of bone cement to be applied. Following surgery, the affected limb was immobilised in an abduction position using a cushion placed in the space between the legs. Over the course of 48 hours, meticulous monitoring of vital signs was performed. Antibiotics are administered intravenously for a total of two days. After forty-eight hours, the drain was removed, the tip was sent for culture and sensitivity testing, and checks X-rays were conducted. The patient was permitted to resume weight bearing and ambulate the day after surgery, based on their level of pain tolerance.

As part of the study's follow-up, patients who had just been released were asked to check in after one month, two months, three months, and six months, and then every six months after that. At the subsequent appointment, a comprehensive clinical examination was carried out, and the patient's symptoms, such as discomfort, edoema, and restricted joint motion, were evaluated on an individual basis. For the purpose of evaluation, a modified version of the Harris hip scoring system 7 was utilised. During the clinical examination, it was discovered that there was a limb length disparity, that the joint was painful, and that there was a range of motion in the joint. In order to investigate the possibility of the operation leading to complications, check X-rays were taken.

RESULTS

In this research project, there were a total of 30 patients with 30 damaged hips who had total cemented hip replacements performed at our facility. Every patient was tracked for a period of time ranging from one month to two years after their initial visit. The results were evaluated clinically as well as radiographically, with a series of X-rays being taken of the pelvis along with both hips.

Age Distribution

Out of 30 patients, 15 (56.67%) were between the ages of 45 and 55. 10 patients (33.33 percent) were between the ages of 56 and 65. And 3 patients (10%) were 66-75 agegroup.

Table 1: Age Distribution

Age(years)	No. of patients	Percentage
45-55	17	56.67
56-65	10	33.33
66-75	3	10

Side affected

In this study, there was equal distribution regarding the side of the affected.

Table 2: Side Affected

Side Affected	No. of Patients	Percentage
Left	15	50
Right	15	50

Sex Distribution

There were 21 male and 9 female patients in this series. Statistics show male preponderance.

Table 3: Sex Distribution

Sex	No. of Patients	Percentage
Male	21	70
Female	9	30

Indications

In the present study, secondary osteoarthritis was the most prevalent reason for surgical intervention, involving 12 patients (or forty percent of the total). Secondary osteoarthritis was caused by rheumatoid arthritis (in three patients), previous trauma (in two patients), and advanced AVN (7 patients 10 percent). In three cases, the signal was implant failure or loosening (20 percent). Six individuals with femoral neck nonunion fractures were included in the study (30 percent). In two cases, the preliminary stages of AVN were the indication (10 percent).

Table 4: Indications

Indications	No. of Patients	Percentage
Secondary OA	12	40
Nonunion Fracture	9	30
Implant failure	6	20
AVN of Femurhead	3	10

Size of Implants

Acetabular cups used were of 28mm inner diameter and the outer diameter varied from 44mm to 60mm. 46mm cup was most used, the number of patients being 11 (36.67%), 12 patients (40 %) was put with 44mm cup and the remaining 7 patients (23.0%) were operated with 48mm cup. Femur stems ranged from small to extra-large sizes. The necks were of small (- 4), medium (0), large (+4) and extra-large (+8) sizes. Small femur stems were used the most. 15 patients (50%) were operated with small stem, 13 patients (43.33%) with medium stem and 2 patient (6.67%) with large stem. Metal head sized medium (12) was used in 13 patients (43.33%). Small and large metal heads were used in 2 (6.67%) and 15 patients (50 %) each.

Table 5: Acetabularcups

Acetabularcup	No. of patients	Percentage
44mm	11	36.67
46mm	12	40
48mm	7	23.33

Table 6: Femurstems

Femurstem	No. of Patients	Percentage
Small	15	50
Medium	13	43.33
Large	2	6.67

Table 7: Metal Heads

Metalhead	No. of Patients	Percentage
Small	9	30
Medium	14	4.67
Large	7	2.33

Complications**Dislocation**

We had two (5%) cases of posterior dislocation on the seventh postoperative day while the patient was walking out of 30 cases. The case was managed with closed reduction and a four-week Thomas splint. That patient had no episodes of re-dislocation. Other patients in this study had no other complications.

Table 8: Complications

Complications	No. of Patients	Percentage
Vascularinjuries	–	–
Nerveinjuries	–	–
Hemorrhage	–	–
Bladder injury	–	–
Limblength discrepancy	–	–
Thromboembolism	–	–
Infection	–	–
Dislocation	2	5
Loosening	–	–
Stem failure	–	–
Heterotrophiccalcification	–	–

Table 9: Harriship Score (Modified)

Results	No. of Patients	Percentage
Excellent	17	60
Good	7	30
Fair	3	10
Poor	0	0

In this study observed 17 patients (60%) were excellent, 7 patients (30%) were the good results, and 3 patients (10%) had in fair condition. No patients had in poor condition.

DISCUSSION

A total hip replacement can help alleviate discomfort in the hip caused by a variety of disorders in a manner that is permanent.^[3,5] The discomfort was to be alleviated, and at the same time, the patient's range of motion and overall joint stability were to be maintained. The limits of a cemented total hip replacement include long-term problems connected with the cementing technique, which principally include aseptic loosening and complex revision operations.^[8,9] 10 When patients in adult age groups are to be operated on, the difficulty arises from the fact that every technical detail needs to be employed and followed for the patient to have a reasonable chance of 20 or more years of trouble-free activity and survival after the procedure. The clinical efficacy of cemented total hip replacement has been demonstrated by a number of series, and several published series have demonstrated that it can give sufficient durability for the majority of patients even at intervals of 20 years or more following surgery.^[10]

According to the research conducted by P. Thiagarajan and colleagues, out of 140 instances, 70 were assigned to Group 1, which was cemented, and 70 were assigned to Group 2, which was uncemented. According to the data presented in Graph 1, there were a total of 140 instances, of which 92 (or 65%) involved males and 48 (or 34%) included females. The age range of 50-60 years accounted for the majority of cases in both the cemented and uncemented groups, accounting for 58 (82 percent) and 56 (80 percent) respectively.^[11] Very few people in the cemented group belonged to the age range 61-70 years old (11 percent) and 7 years old (10 percent), respectively, which was followed by the 71-80 year age group. In the cemented group, the majority of the cases were avascular necrosis, which accounted for 34 percent of the total, followed by fracture neck of femur, which accounted for 10 percent, fracture-dislocation of hip, which accounted for 8 percent, and displaced DHS, which accounted for 5 percent (7 percent). Extremely few patients had periprosthetic fractures, which accounted for two percent of cases, infected bipolar lesions, which accounted for four percent, arthritis, which accounted for five percent, and non-union I/T femur, which accounted for five percent (7 percent). Out of a total of 30 patients, this study discovered that 15 patients, or 56.67 percent, fell into the age bracket of 45 to 55 years. 10 patients, or 33.33 percent, belonged to the age range of 56-65 years old. And three patients, or ten percent, fell into the age range of 66 to 75. According to the findings of a study that Hammed et al ., conducted on conversion THA, the pre-op mean HHS of 33.95 significantly raised to a post-op mean HHS of 86.60. Additionally, around 19.1 percent of his patients had an outstanding

functional result, which was on par with the findings of the study by Sahaya Jose R. et al.^[12,13] According to Mohamed et al findings, articulation with a hemiarthroplasty prosthesis for only five years can lead to erosion of the acetabular cartilage that is severe enough to restrict the activity of daily living. This finding is consistent with our own research.^[12]

Following hemiarthroplasty, acetabular cartilage will deteriorate in a manner that is analogous to what Dalldorf et al. found happening to femoral cartilage. The bone quality is frequently poor as a result of pre-existing osteoporosis, which increases the amount of cement in THA.^[15] The periprosthetic fracture is the problem that occurs most frequently with these surgical procedures. In the current investigation, the surgical method that we used was called the posterior approach. Complications both during and after surgery have the potential to influence the outcome of treatment. In the current study that followed patients for a period of twelve months after surgery, none of us experienced any issues. Any surgical procedure has with it the potential for unforeseen problems; however, the likelihood of experiencing these complications is highly variable depending on the nature of the operation and the experience level of the surgeon. When performing the radiological examination of the cemented acetabular component, the De Lee and Charnley Criteria were applied. When performing the radiological evaluation of the cemented femoral component, the Gruen Zone Criteria were applied.^[16] Both the position of the acetabular component and the position of the femoral component was found to be stable and in an appropriate position at the end of our trial after a period of twelve months.

COMPLICATIONS

With the exception of one incidence of dislocation, we did not encounter the majority of the problems that are often associated with this treatment when we used Moore's technique. On the seventh postoperative day, one patient developed a dislocation, which was treated with a closed reduction. According to the findings of the study conducted by Amstutz 40 et al., the incidence of dislocation of the hip in the first week was 3%. Within the first week of our research, we found that there was a dislocation rate of 5%.^[19]

In their study, Fackler CD 81 et al. observed that the incidence of dislocation following primary hip arthroplasty was 2%. The rate of dislocation that was observed in the study that was carried out by Turner was 8.9 percent, but the incidence of dislocation that was observed in this study was better.

Witzleb WC et al., Masonis JL et al.^[20,21] It has been suggested by Jolles BM et al,^[22] and Iorio R et al. [23] that the straight lateral approach has a higher incidence of abductor insufficiency after total hip arthroplasty. It has been observed that the incidence ranges anywhere from 0% to 16% when using the posterior technique, and it can be anywhere from 4% to 20% when using the direct lateral approach.

It has been demonstrated by Pfirrmann CW et al,^[24] and Twair A et al,^[25] that metal suppression pulsed MRI sequences may detect abductor muscle fibres. Individuals with symptomatic abductor rips who had had total hip arthroplasty were found to have sustained injury. Within the scope of Madhan Jayaraman's research, each individual patient received Muller's modular prosthesis. For a total of 89 patients, cemented total hip arthroplasty was performed on 43 patients (which accounts for 48.31 percent), and uncemented total hip arthroplasty was performed on 46 patients (which accounts for 51.68 percent). Excellent

performance was found across the board in the functional evaluations using modified Harris Hip scores. 32 patients (68.08 percent), good in 13 patients (27.65 percent), and poor in 2 patients (4.25 percent) in group 'L' (n=47), and excellent in 26 patients (61.90 percent), good in 13 patients (30.95 percent), and poor in 3 patients (7.14 percent) in group 'P' (n=42). 32 patients (68.08 percent), good in 13 patients (27.65 percent), and poor in 2 patients (4.25 percent) in group 'P'.^[26]

In the current study, it was noted that out of 30 instances, there were 2 cases of posterior dislocation, accounting for 5 percent of the total. Both of these cases happened on the seventh post-operative day when the patient was walking. The patient's condition was treated with closed reduction, and they were given a Thomas splint to wear for a period of four weeks. In the case of the patient, there were no occurrences of re-dislocation area.

CONCLUSION

This study on 20 patients in which Moore's technique was used to accomplish Cemented Total Hip Replacement provided us with a positive experience and results. Based on these findings, we concluded that Moore's approach to Cemented Total Hip Replacement is a rewarding surgery in the therapy of sick and ruined hips with chronic and incapacitating pain in patients. In senior patients, cemented total hip arthroplasty is a beneficial operation for a damaged and shattered hip. Moore's method is a tried-and-true method for exposing the acetabulum and femur during arthroplasty. It is a safe and successful method of performing total hip arthroplasty. The most common cause of chronic hip pathology is secondary osteoarthritis of the hip joint caused by avascular necrosis of the femur head. For individuals with damaged or ruined hips, cemented total hip arthroplasty is a cost-effective option. In the late stages of hip osteoarthritis, conservative therapy is not an option. Post-operatively, cemented total hip arthroplasty can provide a painless, stable, and flexible hip. With appropriate patient selection, proper planning, adequate implants, and thorough surgical technique, we got exceptional and good results in this study. We were able to get these results in our institution using this process and approach with the maximum technical precision, and our findings are comparable to those of other researchers.

REFERENCES

1. Kumar, K. R. (2019). A study on functional outcome of cemented total hip arthroplasty by Moore's approach. *International Journal of Orthopaedics*, 5(2), 1148-1151.
2. Davenport, T., & Kalakota, R. (2019). Digital Technology The potential for artificial intelligence in healthcare. *Future*, 6(2), 94-8.
3. Daniel, M., Mohammed, S., Francis, A., William, Y., Joseph, K., & Cornilius, E. (2015). Early result of hemiarthroplasty in elderly patients with fracture neck of femur. *Nigerian Medical Journal: Journal of the Nigeria Medical Association*, 56(1), 64-68.
4. Maggs, J., & Wilson, M. (2017). The relative merits of cemented and uncemented prostheses in total hip arthroplasty. *Indian journal of orthopaedics*, 51(4), 377-385.
5. Evans, B. G., Salvati, E. A., Huo, M. H., & Huk, O. L. (1993). The rationale for cemented total hip arthroplasty. *Orthopedic Clinics of North America*, 24(4), 599-610.

22. Jolles BM, Bogoch E (2006) Posterior versus lateral surgical approach for total hip arthroplasty in adults with ŽĚĪĞŽĀřĪŚřŖΘĒ Cochrane Database Syst Rev: CD003828. 29.
23. Iorio R, Healy W, Warren P (2006) Lateral trochanteric pain following primary total hip arthroplasty. *J Arthroplasty* 21: 233-236.
24. Pfirrmann, C. W., Notzli, H. P., Dora, C., Hodler, J., & Zanetti, M. (2005). Abductor tendons and muscles assessed at MR imaging after total hip arthroplasty in asymptomatic and symptomatic patients. *Radiology*, 235(3), 969-976.
25. Twair, A., Ryan, M., O'Connell, M., Powell, T., O'Byrne, J., & Eustace, S. (2003). MRI of failed total hip replacement caused by abductor muscle avulsion. *American Journal of Roentgenology*, 181(6), 1547-1550.
26. Jeyaraman M , Ravinath TM, Ajay SS, Sabarish K and Ravi Weera (2019). AV Lateral Hardinge's versus Posterior Southern Moore's Approach in Total Hip Arthroplasty-A Cohort Study, 5(2), 67-75.