

## Outcome of Preliminary Total Hip and Knee Arthroplasty Surgeries in Nnamdi Azikiwe University Teaching Hospital, Nnewi, South East Nigeria: A Retrospective Study

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### ABSTRACT

**Background:** Total joint replacement is a major orthopaedic procedure. The aim is to alleviate pain, improve function and correct disability in a diseased joint thereby improving health related quality of life of the individual.

**Objectives:** To review the outcome of total knee and hip replacement surgeries in Nnamdi Azikiwe University Teaching Hospital Nnewi, Anambra State, Nigeria.

**Materials and Methods:** This is a retrospective analytic study on the outcome of total hip and knee joint replacement surgeries done from 2015 to 2019, at the Nnamdi Azikiwe University Teaching Hospital Nnewi, Anambra State, Nigeria. Relevant information, including pre and post-operative assessment scores, were obtained from the case files of patients. The data was analyzed using Statistical Package for Social Sciences SPSS version 20. **Results:** Twenty three primary total joint replacements were done in 20 patients within the period studied. There were 5 males and 15 females giving a male to female ratio of 1:3. Mean age of the patients was  $64.0 \pm 9.1$  years, ranging from 15 years to 82 years. The indication for surgery in all the cases was severe osteoarthritis with deformities in 65% of cases. Mean duration of illness before intervention was  $6 \pm 4$  years ranging from 1 to 15 years. Short term knee score improved from a mean of 24 to 45, while hip score improved from a mean of 54 to 95.

**Conclusion:** The short term results suggest a successful outcome with minimal complications. Total joint replacement was found to improve the clinical symptoms the patients presented with.

**Keywords:** Hip, Knee, Preliminary, Replacement, Total

### INTRODUCTION

Total joint replacement is a major orthopaedic procedure. The aim is to alleviate pain, improve function and correct disability in a diseased joint thereby improving health related quality of life of the individual. It is used most commonly to treat joint failures caused by various forms of primary and secondary joint arthritis. Joint replacement is only considered after other therapies, such as physical therapy and pain medications, have

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failed. From the earliest recorded attempt at both hip and knee replacement in 1891 by a German Orthopaedic surgeon – Prof Gluck, a lot of improvement has taken place in both material and implant design.[1] From ivory prosthesis, metal on metal, metal on polyethylene, ceramic on ceramic to recent hybrid and cementless implants. With more than 100 years of operative history, total joint replacement has revolutionized the treatment of severe arthritis. It is considered one of the most successful Orthopaedic interventions of its generation.[2] Though it is applied in major joints of the body, hip and knee replacements have gained global acceptance. The commonest indication for joint replacement is severe pain arising from Osteoarthritis (OA) which is the most common chronic condition of the joints affecting patients over the age of 70.[3] The prevalence rises with age with ever increasing burden on health care.[4] The knee joint was reported by Cushnaghan and Dieppe to be the most commonly affected site (41%) in a study of 500 patients with OA.[5] In the same study, 19% had hip OA.[5] Avascular necrosis (AVN) of the femoral head has been reported as the commonest indication for total hip replacement (THR) especially in patients with Sickle cell disease.[6] In a study by Katchy *et al* [7] in Enugu, South East Nigeria, which assessed the outcome of only total knee replacement (TKR) surgeries over a 5 year period, they observed no radiological evidence of osteolysis at 1 and 5 years in 68 patients with general improvement of the pre-operative and post operative knee score assessment. A meta-analysis by Peter Se Davies *et al* on total joint replacements in Sub-saharan Africa which included 2 Nigerian studies, out of the 12 studies they analyzed, AVN was the commonest indication for THR while OA was the commonest indication for TKR.[8] Improvements in patient reported outcome measures were reported in the 1369 patients analyzed.

Complications associated with total joint replacement include: dislocation, implant loosening, impingement, periprosthetic osteolysis, infection, nerve palsy, periprosthetic fractures, deep

vein thrombosis, pulmonary embolism, leg length inequality. Early results have been shown to be predictive of overall satisfaction rate.[9]

Joint replacement is still a novel procedure in Nigeria, with literature on the procedure and outcome of management, evolving. This study was therefore undertaken to explore the pattern of presentation of patients requiring joint replacement surgeries in Nnamdi Azikiwe University Teaching Hospital, Nnewi, as well as the early outcome of their treatment.

#### **MATERIALS AND METHODS:**

This was a 5 year retrospective study of all cases of total hip and knee replacement surgeries done in the Nnamdi Azikiwe University Teaching Hospital (NAUTH), Nnewi (2015 – 2019). NAUTH Nnewi is a referral tertiary centre subserving Anambra State and border states like Delta and Imo. This hospital has an Orthopaedic surgery centre with a full retinue of staff including 8 Orthopaedic surgeons and 16 Resident doctors. The Orthopaedic units manage cases from simple fractures to spine surgeries and joint replacement surgeries. Case notes of all patients were obtained from the Medical and Health records department of the hospital.

Information on demography, duration of symptoms, comorbidities, image studies, implant type, implant sizes and complications were obtained from the case notes using a semi-structured proforma. Preoperative and postoperative hip (Harris Hip Score [0 – 100]) and knee (The New Oxford Knee Score [0 – 48]) scores were documented and used in all our cases to determine patients' overall satisfaction. These results are important in the early postoperative period.

Standard medial parapatellar approach was adopted for the knee arthroplasties. All cases of total knee replacement (TKR) were cruciate substituting. Approach to the hip was posterior in some cases and modified lateral Gluteus medius splitting approach in others. All the cases of total hip replacement (THR) and total knee replacement (TKR) were done under regional anaesthesia.

Cementless implants were used for the hip replacements, while cemented implants were used for all knee replacements. Prostheses used were manufactured by Aesculap (B BRAUN) and Johnson and Johnson (DE PUY).

Data was manually accessed, entered and analysed using Microsoft excel and Statistical Package for Social Sciences (SPSS) 2011 version 20 Armonk, NY: IBM Corp. (Mean ages calculation). Demographic characteristics of the patients and other retrieved information were presented with tables and charts

**RESULTS**

Twenty three primary total joint replacements were done in 20 patients-5 males and 15 females giving a male to female ratio of 1:3. Mean age of the patients was 64.0 ± 9.1 years (Range 15 years to 82 years). The surgeries comprised 11 hips in 10 patients including 2 patients with Sickle Cell Disease (SCD), and 12 knees in 10 patients (Table 1). All the bilateral surgeries were done in females.

The indication for surgery in all the cases was severe osteoarthritis. Amongst the patients with knee osteoarthritis, 50% had varus deformity while the remaining 50% had valgus deformity. All the patients that had hip replacement had gait abnormalities with shortening in 50%. The predominant co-morbidity was hypertension in 60% of the patients.

Mean duration of illness before intervention was 6 ± 4years ranging from 1 to 15 years. Mean Pre-operative knee score was 24 ranging from 15 to 38. (Oxford). Mean Pre-operative hip score was 54 ranging from 49 to 59. (Harris). Short term knee score improved to a mean of 45, while hip score improved to 95 ( Figure 1).

Ambulation with and without support was achieved post operatively, within a mean of 6 days and 65 days respectively. Superficial surgical site infection (SSI) occurred in 1 patient (4.4%) who had total hip replacement. Pre and post operative radiographs of selected patients are shown in (Figures 2 to 5). One of the SCD patients had intra-operative peri-prosthetic fracture which was fixed with cerclage

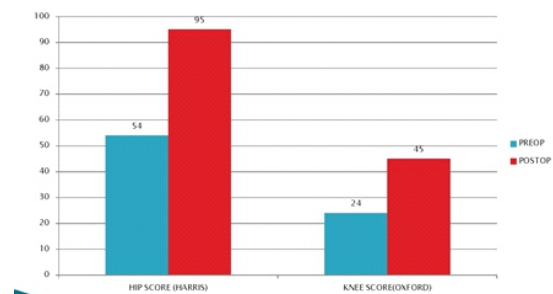
wires and delayed weight bearing (Figure 5). Another hip dislocated following a fall while on admission. This was managed with closed reduction under general anaesthesia. Mean duration of admission was 23 days. The patient with hip dislocation who spent 42 days on admission was excluded from the admission duration analysis. As at 1 year post op, no complication had been recorded in the knee replacements do

**Table 1: Gender Distribution of site of Pathology**

GENDER	PART OF BODY AFFECTED		TOTAL n(%)
	KNEE JOINT	HIP JOINT	
MALE N=5(%)	1(20)	4(80)	5(100)
FEMALE N=15(%)	9(60)	6(40)	15(100)

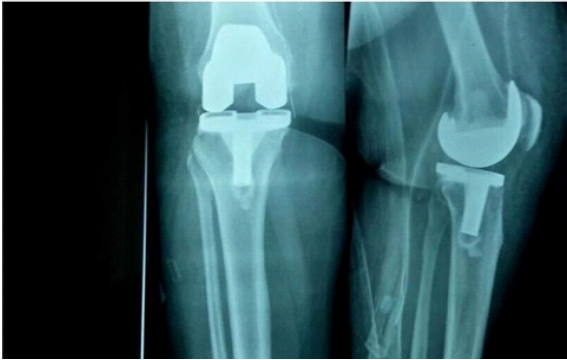
GENDER	NUMBER OF SIDES INVOLVED		TOTAL n(%)
	UNILATERAL INVOLVEMENT	BILATERAL INVOLVEMENT	
MALE N=5(%)	4(80)	1(20)	5(100)
FEMALE N=15(%)	6(40)	9(60)	15(100)



**Figure 1: Treatment outcome of patients**



**Figure 2: Pre-op Radiograph of bilateral knee OA**



**Figure 3: Post-op (TKR) Radiograph of patient with bilateral knee OA in Figure 2**



**Figure 4: Pre-op Radiograph of patient with AVN right hip**



**Figure 5: Post-op Radiograph of patient with AVN right hip**

## DISCUSSION:

The result showed that THR and TKR significantly improved the health-related quality of life of patients with severe OA evident by short term improvement in the scores within an average of 4 months follow up. Scott *et al*, [9] in their study observed that the results of the scoring systems in the early post operative period are predictive of overall patient satisfaction even in the long term. All but 3 patients with secondary OA, were in the 5<sup>th</sup> to

8<sup>th</sup> decades of life. This agrees with findings by other authors. [3,10] Those 3 included 2 sicklers with avascular necrosis (AVN) of the head of femur, and a teenager who had bilateral AVN following trauma and traditional bonesetter (TBS) intervention. The first case of sickle cell disease (SCD) was technically difficult necessitating a redo operation as a result of wrong implantation with intraoperative peri-prosthetic fracture. Ekere *et al* in their report of two cases of THR in sicklers also experienced technical difficulties intra operatively.[10] Other authors had also documented technical difficulties in preparation of the medullary canal due to sclerosis which is known to obliterate the femoral canal making its preparation extremely difficult and hazardous.[11-13] These authors documented varying percentages of intraoperative periprosthetic fractures despite meticulous attention to surgical details. However, both procedures were eventually successful. Nine (90%) out of 10 cases of TKR were females. This is similar to findings by Ugbeye *et al* in Lagos where 10 out of 11 cases of knee replacements were done in females.[14] This suggests that knee OA is commoner in females.

The 23 day average duration of hospital stay observed in our study is a bit higher than the 15 days reported by Ugbeye *et al*. [14] In the United States of America, average length of hospital stay has decreased from several weeks to 3 to 6 days.[15,16] This may be explained by the “learning curve hypothesis” which is a result of expertise and proficiency, acquired over time, with advancement in technology. Adequate inpatient rehabilitation may have contributed to a reduction in hospital stay with invariable reduction in medical bills. In the index study, the average time of ambulation with and without support was 6 (2-10) and 65 (45- 80) days respectively. This is also similar to the finding from the Lagos study.[14] The complication rate from this study is low. One patient (4.4%) had superficial surgical site infection which is similar to what was obtained at Enugu by Madu KC *et al*. [17] In a study in England by Ridgeway *et al* [18] between 1997-2001, a 2.3% surgical site infection rate was observed in patients following hip prosthesis, which

compares favorably with our findings. In contrast, Blom *et al.*[19] reported a drop in infection rate in primary total knee from 4.4% in 1986 to 1% in 2004 after the introduction of stringent antibiotic prophylaxis, occlusive clothing and vertical laminar flow. Fan JCH *et al*[20] in a study of 479 primary total knee replacements in Hong Kong recorded a superficial infection rate of 1.9% (9/472) and deduced that diabetic patients had a three-fold higher risk of infection than non diabetics. The relative high percentage in our study could be due to the small population studied.

Further studies need to be done in the future with larger population and longer follow up duration to objectively compare the infection rate in our centre with what obtains internationally, putting all stringent antiseptic measures into consideration. The offending organism in the singular patient with SSI in our study was *Staphylococcus aureus* which responded to treatment with parenteral third generation cephalosporin (Ceftriaxone- Rocephin). Although *Pseudomonas* species was documented as the offending organism in Enugu[17], in the United States, about 70% of surgical site infection following prosthetic joint replacements are caused by either *Staphylococcus aureus* (12-23%), or coagulase negative *Staphylococci* (30-43%).[21] Although the population studied was small, all the patients who underwent joint replacement surgeries within the study period were included, ruling out bias in sample selection. The study was limited by the small sample size and short duration of follow-up, with no documentation of long term outcome.

## CONCLUSION

Total joint replacement is a laudable milestone in the practice of orthopaedic surgery. In our centre the outcome has so far been successful with minimal complications.

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**Data Availability:** The data is available upon request from the corresponding author.

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**Conflict of Interest:** No conflict of interest declared.

**Ethical Approval:** The study was approved by the institutions ethical committee.

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